EQUITY™ 386SX User's Guide

EQUITY

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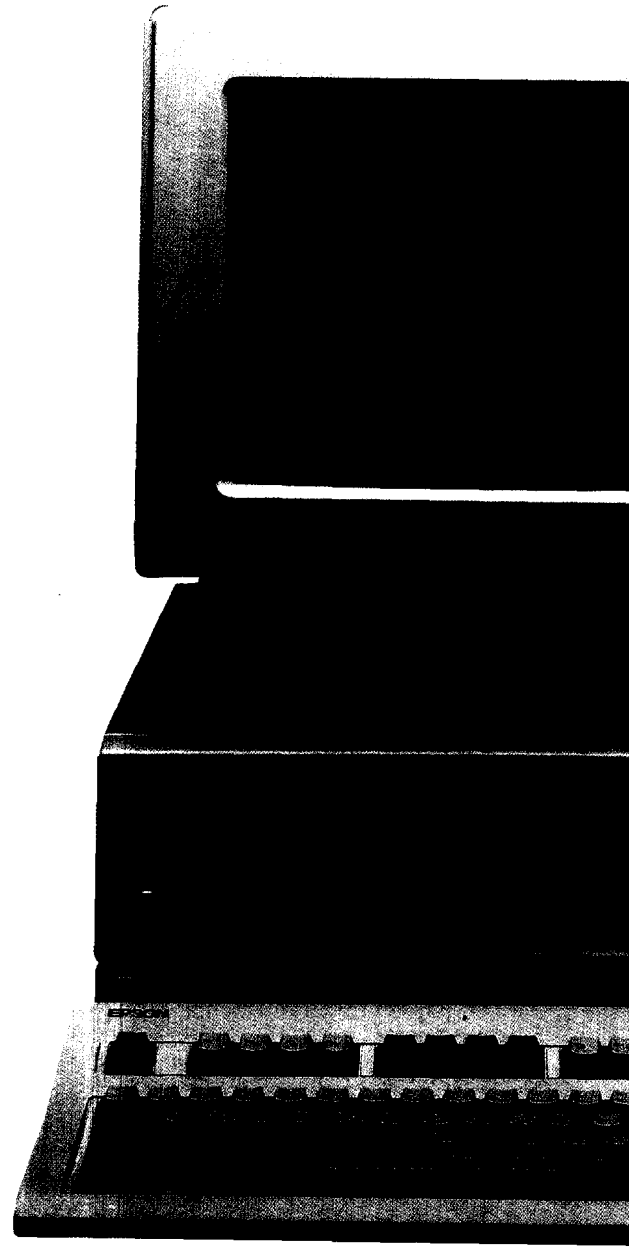

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Equity 386SX User's Guide

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Please rate the following:	Excellent	Good	Fair	Poor
■ Organization of this manual	❑	❑	❑	❑
■ Technical accuracy	❑	❑	❑	❑
■ Completeness of instructions	❑	❑	❑	❑
■ Clarity of concepts and wording	❑	❑	❑	❑
■ Quality of examples and pictures	❑	❑	❑	❑
■ Quantity of examples and pictures	❑	❑	❑	❑

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EQUITY™386SX

User's Guide

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IMPORTANT NOTICE

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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. Do not use liquid cleaners or aerosol cleaners. Use a damp cloth for cleaning.
4. Do not use this product near water.
5. Do not place this product on an unstable cart, stand, or table. The product may fall, causing serious damage to the product.
6. Slots and openings in the cabinet and the back or bottom are provided for ventilation; to ensure reliable operation of the product and to protect it from overheating, these openings must not be blocked or covered. The openings should never be blocked by placing the product on a bed, sofa, rug, or other similar surface. This product should never be placed near or over a radiator or heat register. This product should not be placed in a built-in installation unless proper ventilation is provided.
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. This product is equipped with a 3-wire grounding-type plug, a plug having a third (grounding) pin. This plug will only fit into a grounding-type power outlet. This is a safety feature. If you are unable to insert the plug into the outlet, contact your electrician to replace your obsolete outlet. Do not defeat the purpose of the grounding-type plug.
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 cabinet slots, as they may touch dangerous voltage points or short out parts that could result in a risk of fire or electric shock. Never spill liquid of any kind on the product.

12. Except as specifically explained in the User's Manual, do not attempt to service this product yourself. Opening or removing those covers that are marked "Do Not Remove" may expose you to dangerous voltage points or other risks. Refer all servicing in those compartments to 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 or frayed.

    B. If liquid has been spilled into the product.

    C. If the product has been exposed to rain or water.

    D. 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.

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

    F. If the product exhibits a distinct change in performance, indicating a need for service.

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Chapter **5** **Installing Options**

Appendix A **Troubleshooting**

Appendix B **Power-on Diagnostics**

Introduction

The Epson® Equity™ 386SX is a high-performance personal computer which offers exceptional speed and versatility in a compact design. The computer's 80386SX microprocessor makes all your programs run faster, even when supporting multitasking operations.

The Equity 386SX is available in these configurations:

- A single diskette drive system with a 1.44MB (megabyte) 3 1/2-inch diskette drive
- A hard disk drive system with one 40MB or 100MB hard disk and a 1.44MB diskette drive.

You can install an additional diskette drive or hard disk drive, up to a maximum of three drives total.

All models of the Equity 386SX include 1MB of internal memory, five standard option slots (four 16-bit and one 8-bit), serial and parallel interfaces, and an auxiliary mouse connector. You can easily upgrade your computer by installing additional memory and adding optional devices.

Because of its industry-standard architecture, the Equity 386SX is fully compatible with the current installed base of personal computer hardware and software. You can install just about any optional device that is compatible with the IBM@ Personal Computer, PC XT™, or PC AT™.

You can expand the computer's memory up to 14MB by adding memory modules to a special card that comes with the Equity 386SX. Memory modules are efficient because they eliminate the need to use one of your option slots to add memory to your computer. If you do choose to use a memory card, you can increase the computer's memory up to 16MB.

You may also want to install an 80387SX math coprocessor in your computer to speed up mathematical calculations. Check with your authorized Epson dealer to see which options are available.

The Equity 386SXoffers several features to enhance the security and versatility of your computer:

- Password protection. This optional feature ensures that no one may access your computer unless they know the password.
- Embedded hard disk drive and integrated diskette drive controllers. Each controller can run up to two drives so you don't have to use an option slot to install additional drives in your system.
- Automatic configuration. The Setup program automatically configures the memory and other items included in your system, making it easier for you to get started.

Your Equity 386SX comes with version 4.01 of MS-DOS the operating system by Microsoft? This version of MS-DOS includes a Shell program, which lets you run MS-DOS commands by selecting options from on-screen menus. You'll find a set of MS-DOS manuals packed in the box with the computer.

You probably also purchased other software; you can use virtually any application program designed for the IBM PC, PC XT, PC AT, or compatible computers on your Equity 386SX. You may also use powerful 32-bit software-such as Microsoft Windows/386-with your computer.

Additionally, Epson has included two time-saving utilites that make MS-DOS easier to use: HELP and MENU. The HELP program lets you display information on the screen about any MS-DOS command. MENU provides an easy way to run many useful MS-DOS commands.

MS-DOS is not the only operating system you can use with your computer. If you have a hard disk you also may want to use MS®OS/2. Among other capabilities, MS OS/2 provides multitasking, dual-mode processing, and online help. With Epson's version of MS OS/2, you can have both MS-DOS and MS OS/2 on your Equity 386SX; this way, you can select which operating system to load each time you turn on the computer. Ask your Epson dealer for more information.

How to Use This Manual

This manual explains how to set up and care for your. Equity 386SX. It also describes how to use your computer and run diagnostics checks. You probably do not need to read everything in this book; see the following chapter summaries.

Chapter 1 provides simple step-by-step instructions for setting up your system. On the back cover foldout are illustrations identifying the different parts of the Equity 386SX; you may want to refer to this while setting up your system.

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

Chapter 3 provides instructions for performing important operating procedures, including using and caring for your disks and disk drives.

Chapter 4 provides basic instructions for using MS-DOS with your computer.

Chapter 5 describes some of the options you can use in your Equity 386SX and contains instructions for installing option cards and changing jumper settings.

Appendix A contains troubleshooting tips in case you encounter any problems while using your computer.

Appendix B provides information about the power-on diagnostics.

Appendix C outlines the system diagnostics checks you can perform on your computer. If you are having trouble with any part of the hardware, you may want to run some of these diagnostics checks.

Appendix D describes how to perform a hardware-level format on a hard disk. You need to do this only if you have installed a new hard disk that has never received this type of low-level format, or if you are having serious problems with the hard disk in your computer. (This is not the same type of format you can perform with the MS-DOS FORMAT command.)

Appendix E lists the types of hard disk drives you can use in the Equity 386SX.

Appendix F gives the technical specifications for the computer.

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

Where to Get Help

Customer support and service for Epson products are provided by a network of authorized Epson dealers and Customer Care Centers throughout the United States. Epson America provides product information and support to its dealers and Customer Care Centers.

Therefore, we ask that you contact the business where you purchased your Epson product to request assistance. If the people there do not have the answer to your question, they can obtain it through our toll-free dealer support program.

Epson is confident that this policy will provide you with the assistance you need.

Call the Epson Consumer Information Center at 1-800-922-8911 for the following:

- ❑ The nearest Epson dealer
- ❑ The nearest Customer Care Center
- ❑ Information on Epson User Groups.

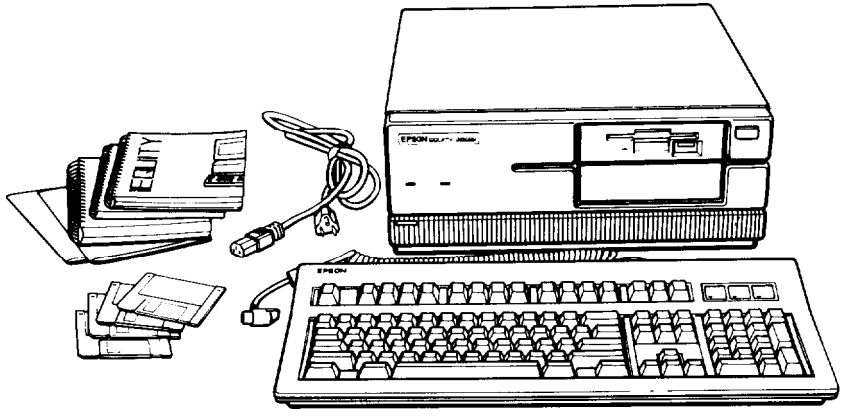
To locate or purchase accessories or supplies, contact your nearest Epson dealer or call 1-800-873-7766.

Chapter 1
Setting Up Your System

Setting up your Epson Equity 386SX personal computer is easy. Just follow the seven steps in this chapter. As you set up your computer, you may want to leave this manual's back cover foldout open so you can refer to the two illustrations identifying the different parts of the computer.

1 *Unpacking*

As you remove your system components from their cartons, be sure to inspect each piece. If anything is missing or looks damaged, check with your Epson dealer.



Besides this manual, you should have the following:

- ❑ The computer and power cord
- ❑ The keyboard with attached cable
- ❑ Three MS-DOS 4.01 diskettes: Install, Operating, and Shell
- ❑ A Reference diskette
- ❑ Four MS-DOS manuals: an Installation Guide, a Shell User's Guide, a Reference Manual, and a Command Summary.

In addition to these items, you need a compatible monitor and display adapter card. You may also have a printer or other peripheral device.

You'll find a warranty card and a registration card with the computer. Keep the warranty card for your records. Fill out the registration card now and mail it to Epson. With your registration card on file, Epson can send you update information.

Be sure to keep your packing materials. They provide the best protection for your computer if you need to transport it later.

2 *Choosing a Location*

Before you set up your Equity 386SX, it's important to choose a comfortable, convenient location where it can run properly. Select a location that provides the following:

- ❑ A large, sturdy desk or table that can easily support the weight of your system, including all its components.
- ❑ A flat, hard surface. Soft surfaces like beds and carpeted floors attract static electricity, which can erase data on your disks and damage the computer's circuitry. Soft surfaces also prevent proper ventilation.
- ❑ Good air circulation. Air must be able to move freely under the system as well as behind it. Leave several inches of space around the computer to allow ventilation.
- ❑ Moderate environmental conditions. Protect your computer from extremes in temperature, humidity, dust, and smoke. Avoid direct sunlight or any other source of heat. High humidity also hinders operation, so select a cool, dry area.
- ❑ Appropriate power sources. To prevent static charges, connect all your equipment to three-prong, 120-volt *grounded* outlets. You need one outlet for the computer, one for the monitor, and additional outlets for a printer and any other peripherals. You can plug one peripheral into the auxiliary power outlet on the back panel of the computer, reducing the number of wall outlets you need.
- ❑ No electromagnetic interference. Locate your system away from any electrical device, such as a telephone, that generates an electromagnetic field.

3 *Connecting a Monitor*

The procedure you use to connect your monitor to the computer depends on the type of monitor you have. See your monitor manual for detailed instructions or follow the general guidelines below.

A monitor requires that a display adapter (video) card be installed inside the computer to control it. Your dealer may have already installed a video card for you; if not, you need to install it before you can connect your monitor. See Chapter 5 for instructions on how to remove the computer's cover and install an option card (a video card in this case).

The monitor type must match the video card installed in the computer. Check the following table to make sure your card and monitor match.

Monitor/video *card compatibility*

Monitor	Video card
Monochrome	Monochrome display adapter (MDA) Multi-mode graphics adapter (MGA) Enhanced graphics adapter (EGA) Hercules@ graphics card (HGC)
Color or EGA	Color graphics adapter (CGA) Multi-mode graphics adapter (MGA) Enhanced graphics adapter (EGA)*
Monochrome or color VGA	Video graphics array (VGA)

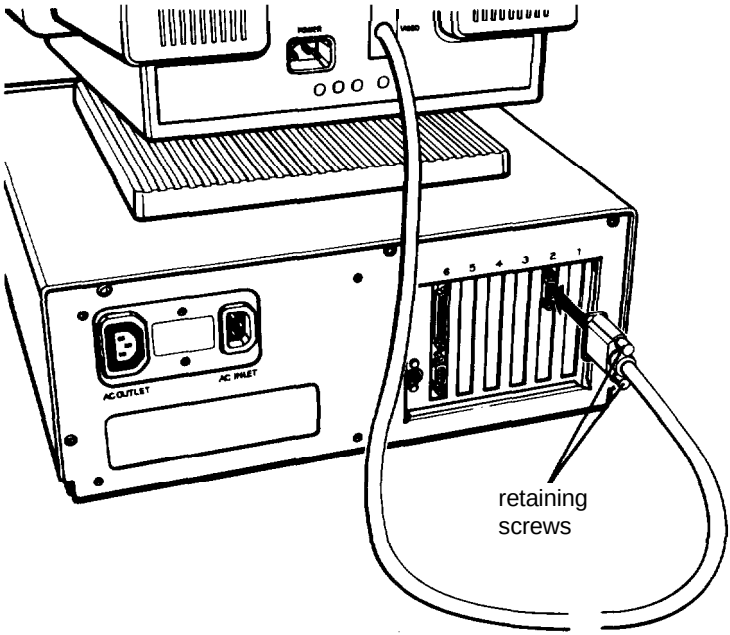
* Color monitors do not support EGA cards,

Follow these steps to connect the monitor:

1. Place your monitor on top of or near the computer. It is easiest to connect the monitor cable if the backs of the monitor and the computer are facing you.

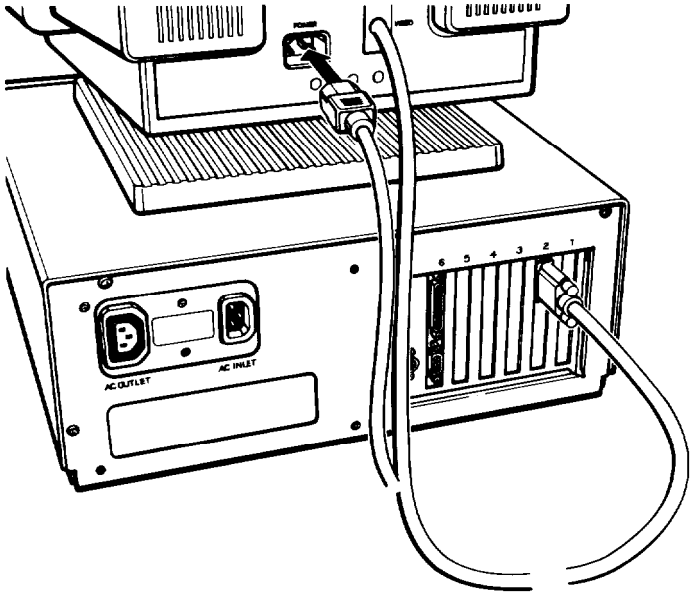
2. If necessary, connect the monitor cable to the monitor. (Some monitors come with permanently attached cables.)

3. Connect the appropriate end of the monitor cable to the video card connector on the back of the computer, as shown below. If the plug has retaining screws, tighten them by hand or with a screwdriver, depending on the screw type.



4. If there are any switches or jumpers on the video card (for example, to indicate color or monochrome), be sure they are set properly. (See the documentation that came with your monitor or video card for instructions.)

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



6. Plug the other end of the power cord into an electrical outlet.

Note

If the monitor has the proper type of plug, you can plug it into the AC power outlet on the back of the computer,

4 Connecting a Printer or Other Device

The Equity 386SX has a parallel interface, a serial interface, and an auxiliary mouse connector. To connect a printer or other peripheral device to one of these interfaces, follow the instructions below. Of course, Epson offers a full range of printers; check with your dealer for more information.

Using the Parallel Interface

The Equity 386SX parallel interface is Centronics®-compatible and uses a DB-25S connector.

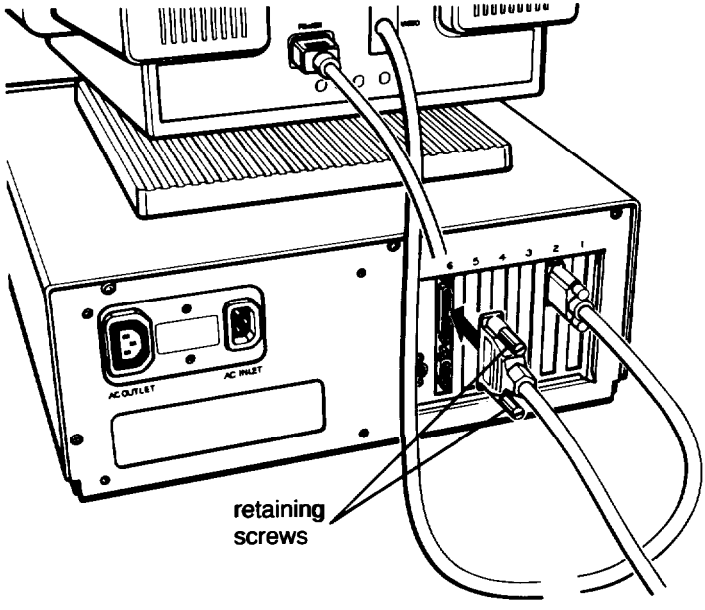
To connect a printer to the computer, you need an IBM-compatible printer cable. If you are not sure which one you need, check with your Epson dealer.

Once you have the correct printer cable, follow these steps to connect your printer to the parallel interface on the computer:

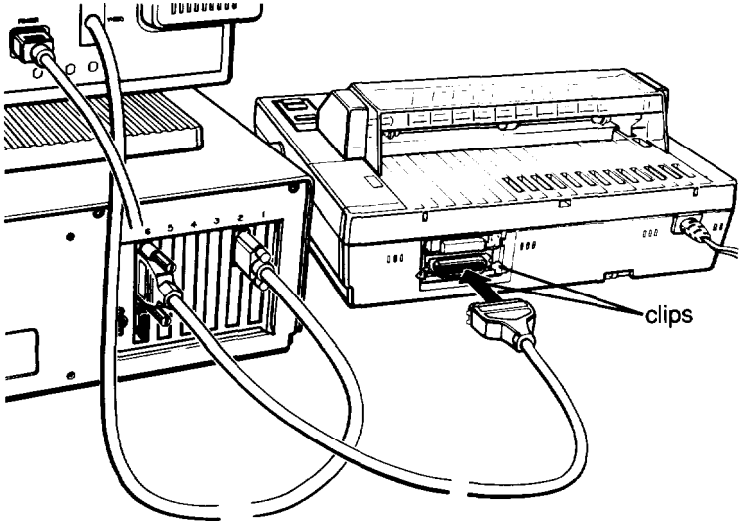
1. Be sure the power switches on the computer, monitor, and printer are off.

2. Place the printer next to the computer.

3. One end of the printer cable has a 25-pin, D-shell, male connector. Connect this end to the parallel port on the back panel of the computer, as shown below. If the plug has retaining screws, tighten them by hand or with a screwdriver, depending on the screw type.



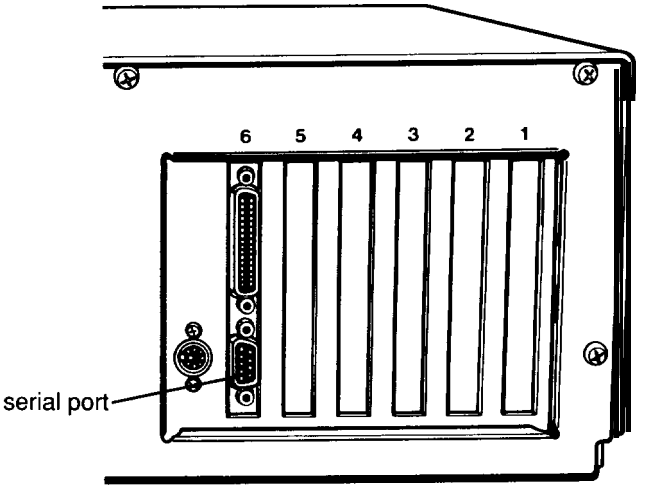
4. Connect the other end of the cable to the printer, as shown below. To secure the cable, squeeze the clips at each side of the printer port and push them into place.



5. Plug the printer's power cord into an electrical outlet.

Using the Serial Interface

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



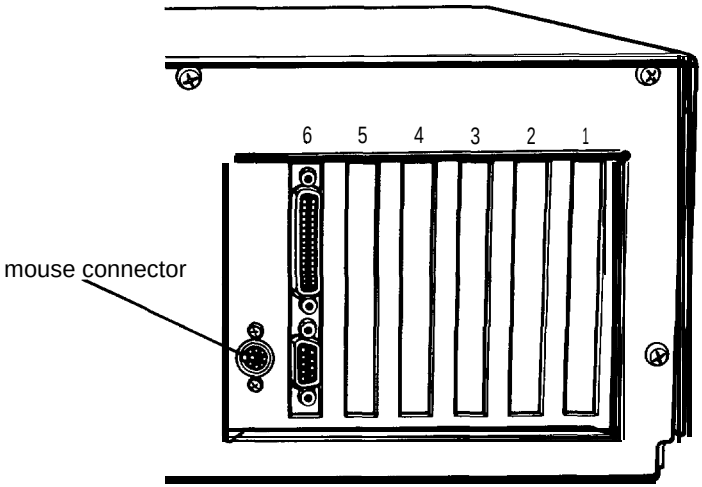
The Equity 386SX uses a DB-9P male connector, so be sure you have a compatible cable. To connect a serial device, follow the same steps as above for connecting a parallel device.

Note

You need to ensure that the serial port is set up so it functions properly. If you are using the port for a serial printer, you need to redirect printer output to the serial port instead of the parallel port. To do this, you can use the MS-DOS MODE or SETMODE command or the MENU program. See your MS-DOS Reference Manual for instructions.

Using the Mouse Connector

The Equity 386SX has an auxiliary port for a mouse that uses a mini DIN (6-pin) connector. To connect a mouse to the built-in mouse port and set up the computer to use it, see the manual that comes with the mouse. To use a mouse with your computer, you may need to add commands to your MS-DOS CONFIGSYS file. See your MS-DOS Reference Manual for instructions.



Note

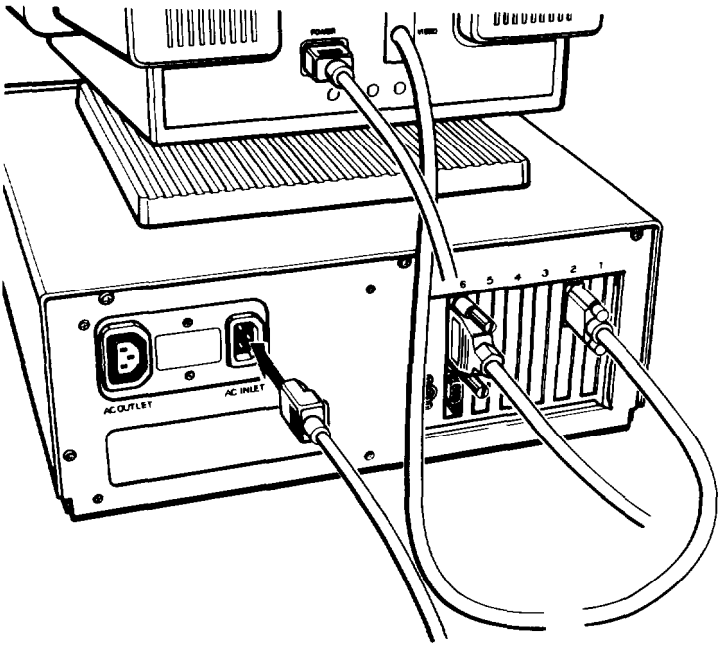
If you want to use a mouse or other pointing device connected to a port on an option card in your computer, you need to disable the built-in mouse connector by changing a jumper setting in the computer. See "Changing Jumper Settings" in Chapter 5 for instructions.

5 *Connecting the Power Cord*

Follow these steps to connect the power cord:

1. Make sure the power switch on the computer is turned off.

2. Plug the power cord into the AC power inlet on the back panel, as shown below. To avoid an electric shock, be sure to plug the cord into the computer before plugging it into the wall socket.



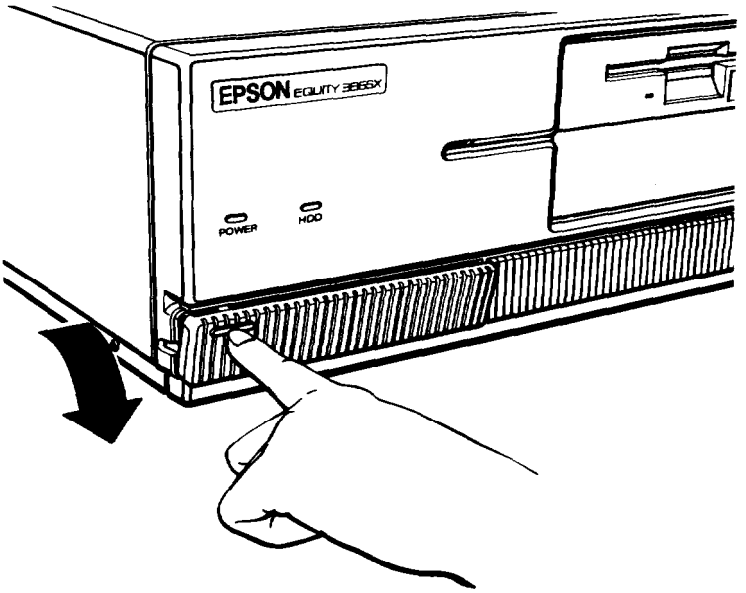
3. Plug the other end of the power cord into a three-prong, 120-volt, grounded electrical outlet.

6 *Connecting the Keyboard*

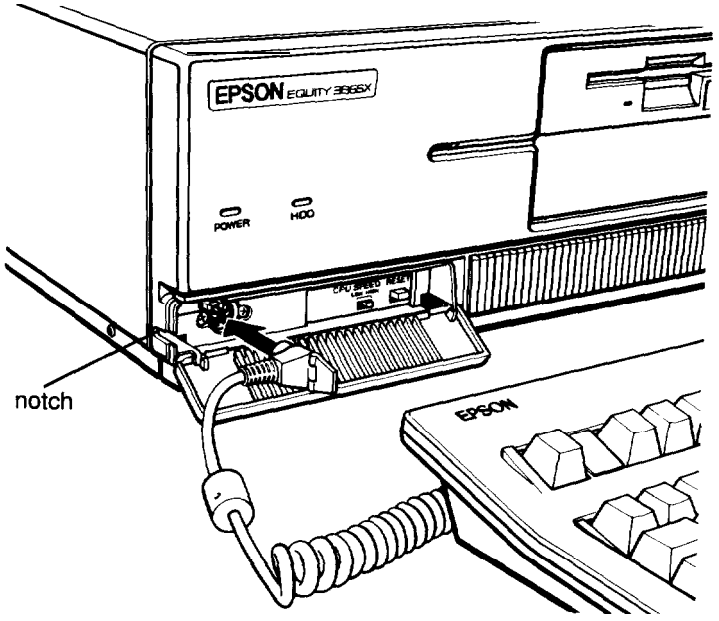
Follow these steps to connect the keyboard:

1. Turn the computer around so the front is facing you.

2. Open the door on the lower left corner of the computer's front panel by pressing it in slightly and then releasing it.

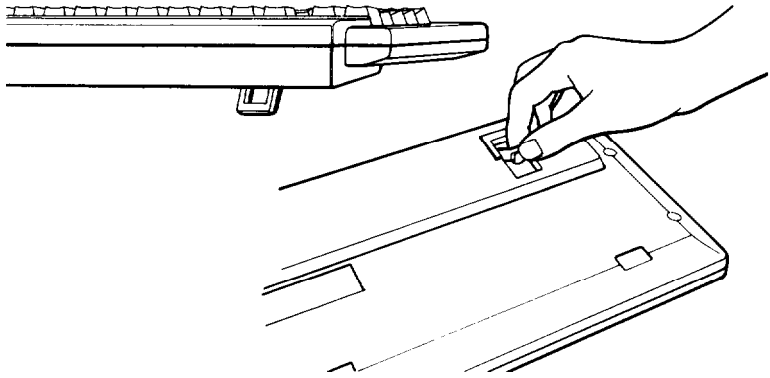


3. Plug the keyboard cable into the socket, as shown below. Do not force the connector, but be sure to insert it all the way. Guide the keyboard cable through the notch on the left side of the panel.



4. Close the panel access door.

You can change the angle of the keyboard by adjusting the legs on the bottom. Turn the keyboard over and lift each leg upward until it locks into place, as shown below. You can lock the legs to a low or high position, or leave them flat.



7 *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 dismantle any part of the computer. Only remove the cover to install or remove optional devices or change jumper settings. If there is a hardware problem you cannot solve after reading the information on troubleshooting in Appendix A, check with your Epson dealer.
- ❑ Always turn off the power, disconnect the computer's power cord, and wait five seconds before you remove the computer's cover.
- ❑ Do not unplug cables from the computer when the power is on.

- ❑ Never turn off or reset your computer while a disk drive light is on. This can destroy data stored on disk or make an entire disk unusable.

- ❑ Always wait at least five seconds after you turn off the power before you turn it on again. Turning the power off and on rapidly can damage the computer's circuitry.

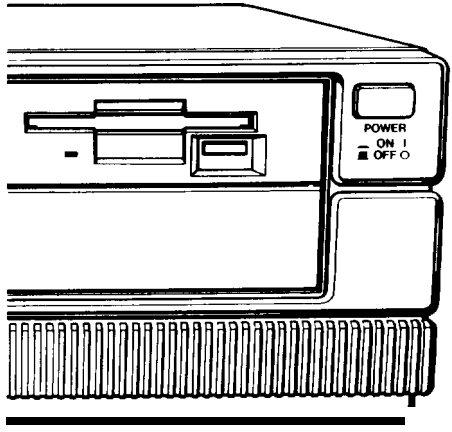
- ❑ Do not leave a beverage on top of or next to your system or any of its components. Spilled liquid can damage the circuitry of your components.

Follow these steps to turn on your system:

1. Make sure the power cord is plugged into the AC power inlet on the back panel of the computer and into a three-prong, 120~volt, grounded electrical outlet.

2. Turn on the monitor, printer, and any other peripheral devices connected to the computer. (Always turn on the monitor and any peripheral devices before you turn on the computer.)

3. To turn on the power, press the power button in the upper right corner of the computer's front panel.



The power indicator on the front panel lights up. After a few seconds, the computer starts to perform an internal self test. This is a series of checks the computer completes each time you turn it on to make sure everything is working correctly. If anything is wrong, an error message appears on the screen.

You see a message prompting you to insert a system diskette. (Do not insert a diskette at this point.)

If you cannot see the screen display clearly, use the controls on your monitor to adjust the brightness and contrast until characters on the screen are clear and bright. If the display is not stable, check your monitor's horizontal and vertical hold controls.

After you adjust the monitor's brightness and contrast, press the power button again to turn off the computer. Then turn off the monitor and any peripherals.

Now go on to Chapter 2 and follow the instructions there to run the Setup program. After you run Setup, you need to install MS-DOS using the instructions in your MS-DOS Installation Guide.

Chapter 2
Running the Setup Program

The first time you use your Equity 386SX, you need to run the Setup program on the Reference diskette to define the computer's configuration. This is a simple procedure you must do at least once. (You may need to do it again later, if you change the configuration.)

The Setup program lets you set (or change) the following for your computer:

- ❑ Type of display adapter (video) card installed
- ❑ Power-on password
- ❑ Fast boot function
- ❑ Auto speed function
- ❑ 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 the Setup program is stored in the CMOS RAM, which is permanent because it is backed up by a battery. Whenever you turn on the computer, it searches the CMOS RAM for the correct installation information.

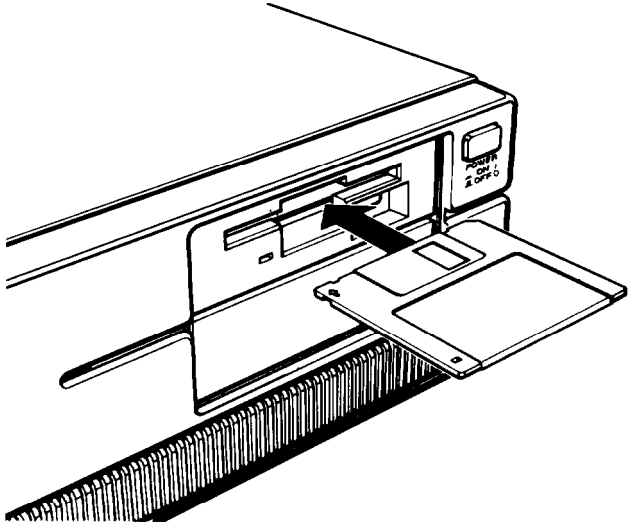
The Equity 386SX automatically defines your system's memory configuration and recognizes a math coprocessor, if you have installed one. If the computer discovers a difference between the information in the CMOS RAM and its actual configuration, it prompts you to run the Setup program.

Starting the Setup Program

Follow these steps to start the Setup program:

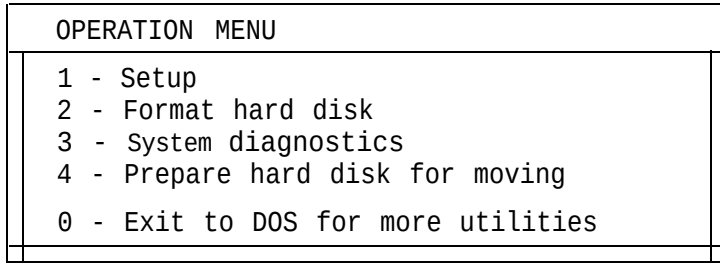
1. Turn off your computer, monitor, and any peripheral devices, if you have not already done so.

2. Insert the Reference diskette into drive A with the label facing up and the metal shutter leading into the drive, as shown below:



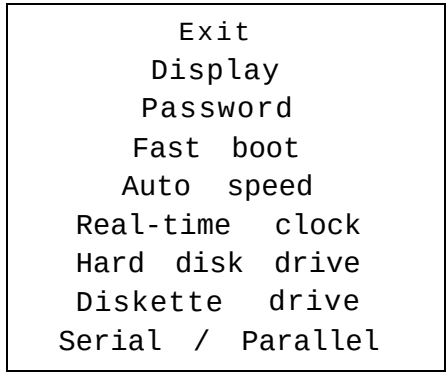
Slide the diskette into the drive until it clicks into place. (For more instructions on inserting and removing diskettes, see Chapter 3.)

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



Note
If an error message appears when you rum 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:



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 to proceed:

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

```
!!!!! Error(s) detected !!!!!

♦ Incorrect configuration


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

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

```
Time is invalid
HDD and/or HDC failed initialization
Memory size is incorrect, correction made
Incorrect configuration
Checksum is incorrect
Real-time clock has lost power
```

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.

Note
If you see the message Real-time clock has lost power, contact your Epson dealer. You **cannot** correct this error using the Setup program.

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

```
Exit
Display
Password
Fast boot
Auto speed
Real-time clock
Hard disk drive
Diskette drive
Serial / Parallel
```

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 particular 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, you can 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. If the Num Lock indicator in the upper right corner of the keyboard is lit, press the Num Lock key once to disable Num Lock mode. 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, you need to turn on Num Lock.

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

Setting the Display Adapter Card Type

Follow the steps below to set the type of display adapter (video) card you are using with your Equity 386SX.

Note
With this option you select the type of display adapter card you are using-not the type of monitor.

1. At the main Setup menu, highlight **Display.** You see the current display adapter card type, such as the following:

```
Monochrome  80 column
```

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

2. To change the display adapter card setting, press **Enter.** The cursor block moves into the submenu and you see:

```
CGA          40 column
CGA          80 column
Monochrome   80 column
Special Adapter
```

The last option in this menu displays the type of display adapter card you installed if it is an EGA, VGA, or MCGA card. If you installed a different type of display adapter card or a type listed as one of the first three options, you see **Special Adapter** as the fourth option.

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

   - ❑ If you have a VGA, EGA, or MCGA card, select the fourth option.
   - ❑ If you have a color graphics adapter (CGA) or a multi-graphics adapter (MGA) attached to an RGB (color) monitor, select **CGA 80 column.** (Also be sure to 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 be sure to set the color/mono switch on the MGA card to mono.)

- ❑ If you have any other combination of monitor and display adapter card, select Special Adapter. In addition, consult the documentation supplied with your display adapter card.

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

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

Setting the Power-on Password

Setting a power-on password lets you control who can use your system. However, you do not need to set a power-on password to use the Equity 386SX.

If you set a power-on password, you must enter it the next time you turn on or reset your computer. If you cannot enter it correctly, the computer locks up and does not respond to your keyboard entries. Therefore, if you set a power-on password, be sure to remember it or write it down and keep it in a safe place.

If you want to use your computer as a network server, you must turn on network server mode. (A network server is 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.) To turn on network server mode, you must set a power-on password.

If you do not want to set a power-on password or turn on network server mode, skip this section.

Follow these steps to set a power-on password (when one does not exist) and turn network server mode on or off:

1. At the main Setup menu, highlight Pas sword. This submenu appears:

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

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

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 one already exists. 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.

3. Press Enter. You see this prompt:

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

Do not use characters requiring the SHIFT key, such as $, @, or *, in your password. The Equity 386SX does not recognize the SHIFT key when you use your password to access the system.

WARNING
Be sure to remember the password you enter or write it down and keep it in a safe place. If you cannot remember the password you enter now, 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.

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

5. Highlight `Network server mode.` To turn network server mode on or off, press Enter.

The Setup program requires a power-on password to turn network server mode on. If you did not enter a password, this message appears:

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

To enter a password, highlight `Power-on password` and follow steps 3 and 4 above.

6. After you enter a power-on 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 A for instructions.

Setting the Fast Boot Function

The Fast boot function allows you to start up your system faster by reducing the time it takes the computer to perform its power-on diagnostics. Power-on diagnostics are a series of diagnostics checks which your computer runs automatically each time you turn on the power.

When Fast boot is disabled, the diagnostics program performs three different tests on your system's memory and also checks the internal devices in your computer. When you enable Fast boot, the program performs abbreviated versions of these tests.

You should enable Fast boot when you are using your computer in its current configuration. If you install additional memory in your computer, disable Fast boot before you make the change. The next time you turn on your computer, it runs complete power-on diagnostics, allowing you to test your new configuration thoroughly. Then you can run the Setup program to enable the Fast boot function again.

Note
If you disable the Fast **boot function and then change your system's configuration, the computer can take up to five minutes to perform its power-on diagnostics the first time you turn it on.**

Follow these steps to change the Fast boot setting:

1. At the main Setup menu, highlight Fast boot and press Enter. The current status appears:

```
Fast boot     enabled
  **    SAVE  SETTING  **
```

   If the displayed setting is correct, press ↑ to return to the main Setup menu.

2. To change the setting from enabled to disabled or vice versa, press Enter.

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

Setting the Auto Speed Function

The Equity 386SX can operate at 16 MHz or simulate an 8 MHz operating speed. The 16 MHz speed is high and the simulated 8 MHz speed is low. You can use the CPU SPEED switch on the computer's front panel to select either speed. (See "Selecting the Operating Speed" in Chapter 3.)

You'll probably use high speed for almost all your operations. Some copy-protected application programs, however, require the computer to run at the 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 enable the Auto speed function.

When Auto speed is enabled, the computer automatically switches to low speed whenever it needs to access a diskette drive. It runs at high speed for all other operations.

There are different types of copy-protected programs. Depending on the type you have, you may or may not want to enable the Auto speed function. 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 start the program on high speed. If this works, you do not need to enable the Auto speed function.

  If you can't load the program on high, enable Auto speed.

- If you are using a copy-protected program that does not require a key disk but requires a special procedure to install the program on a hard disk, set the CPU SPEED switch on the front panel to LOW while you are installing the program. Once it is installed, set the switch to HIGH, where you should be able to leave it while you load and run the program.

- If this does not work, try loading the program at low speed and then switch to high to run it. Do not enable the Auto speed function.

Follow these steps to change the Auto speed setting:

1. At the main Setup menu, highlight Auto speed and press Enter. The current status appears:

```
Auto speed disabled
 ** SAVE SETTING **
```

   If the displayed setting is correct, press ↑ to return to the main Setup menu.

2. To change the setting from disabled to enabled or vice versa, press Enter.

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

Setting the Real-time Clock

The real-time clock in your Equity 386SX constantly tracks the time and date-even when the computer is turned off. The first time you run the Setup program, you use the Real-time clock option to set the time and date for your computer. You may need to use this option again later to adjust the time for daylight savings time. The computer automatically changes the date for leap years.

Note
Another way to change the real-time clock*s time **and date is with the** MS-DOS TIME and DATE **commands. See your MS-DOS** Reference Manual for instructions.

Follow these steps to set the real-time clock:

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

```
Time    09:16:52
Date    12-30-1989
```

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
```

Go to step 2 to enter the time and date.

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

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

```
hh:mm:ss
_
```

4. Using a 24-hour time period, 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.

Note
If you want to use the number keys on the numeric keypad to enter the time or date, press the Num Lock key to enable Num Lock mode. The Num Lock light is on when Num Lock mode is enabled.

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 beeps and ignores your entry. Try again.

When the time is correct, press Enter.

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

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

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 dashes. For example, to set the date for December 30, 1989, you would type the following:

   12301989

   You can use the backspace key to make corrections.

   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 beeps and ignores your entry. Try again.

   When the date is correct, press Enter.

7. Check the new time and date to be sure they are correct. Then 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 change the time or date and 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 40MB or 100MB hard disk, your computer's hard disk configuration has already been set for you at the factory 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 Setup menu, highlight `Hard disk drive.` Your current settings appear:

```
Drive 1:    Type  17
Drive 2:    None
```

The `Type` number indicates the type of hard disk installed in your computer. See Appendix E for a list of hard disk drive types, and the documentation supplied with your hard disk to find the correct type for the hard disk drive installed in your computer.

The None after `Drive 2` indicates that there is not a second hard disk.

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

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

2. To select Hard disk drive, press Enter. You see a menu such as the following:

```
Change settings
** SAVE SETTINGS **
```

Drive 1: Type 17	
Number of cylinders	977
Number of heads	5
Number of sectors	17
Precomp. cylinder	300
Landing zone	971
Total capacity (MB)	40.5

Drive 2: None	
Number of cylinders	0
Number of heads	0
Number of sectors	0
Precomp. cylinder	0
Landing zone	0
Total capacity (MB)	.0

The submenu lists the settings you can change for each drive: the number of cylinders (tracks), the number of read/write heads, the number of sectors, the precompensation cylinder, the landing zone (the cylinder on which you want to park the heads when moving the computer), and 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. You see this submenu:

```
None
Type  17
User  defined
```

5. If you want to change the drive type and the configuration of the hard disk you are installing matches one of the drive types listed in Appendix E, go to step 6.

If you want to change the drive types, and the configuration of the hard disk you are installing does not match one of the drive types listed in Appendix E, go to step 7.

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

Note

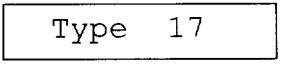
If you install an ESDI hard **disk drive controller in an option slot (instead of using the embedded controller), follow these guidelines to set the drive type:**

- **If the** ESDI **controller does not have its own BIOS** ROM **and your hard disk drive type is not listed on the hard disk drive parameter table, go to step 7.**

  If the hard disk drive type is listed on the hard disk drive parameter table, go to step 6 and set the type.

- **If the ESDI controller has its own BIOS ROM, you must set the hard disk drive type to Type 1. Go to step 6.**

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



Now select the drive type number that matches your hard disk configuration from the list of hard disk drive types in Appendix E.

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

- You can type the drive type number (listed in Appendix E) and press Enter. The screen displays the new drive type number and hard disk settings. (You cannot type 00 or a drive type number that has more than three digits.)

- You can use the cursor keys to move through the drive type numbers, as follows:

↓	increases the drive type number one number at a time
↑	decreases the drive type number one number at a time
PgDn	increases the drive type number in increments of 10 (for example, from 47 to 57)
PgUp	decreases the drive type number in increments of 10 (for example, from 47 to 37)
Home	enters drive type 1 (the first available drive type)
End	enters drive type 63 (the last available drive type)

  This is a handy way to verify new hard disk settings before you press Enter because the settings list is automatically updated as you display each new type number.

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

7. If the configuration of the hard disk you are installing does not match one of the drive types listed in Appendix E, highlight User defined and press Enter. You see the following:

```
Number of cylinders          977          I
```

The same parameter is highlighted on the submenu above. Enter the correct number of cylinders (tracks) for the disk and press Enter.

Note
If you use the number keys on the numeric **keypad to enter parameters, press the** Num Lock **key to enable Num Lock mode. The** Num Lock **light is on when the** Num Lock **mode** is enabled.

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 for you, 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 settings for drive 2, press → 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. The main Setup menu appears.

Setting the Diskette Drive Type(s)

Your Equity 386SX comes with one factory-installed diskette drive. If you removed the installed drive or added a second diskette drive, you need to change the diskette drive settings to match your configuration. If you haven't made any changes, you can verify the drive type settings. Follow these steps:

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

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

Each diskette drive is followed by its specific type (360KB, 720KB, 1.2MB, or 1.44MB). If the diskette drive types on the screen match your diskette drive configuration, you can skip the rest of this section.

2. 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")
```

3. If you want to change the drive A settings, be 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 type for your diskette drive and press Enter. The screen displays the new diskette drive 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 and Parallel Interfaces

The serial and parallel interfaces in your computer are set up to act as the primary ports. If these are the only ports you are using in your computer, you can skip this section.

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

- ❑ If you install an option card with a port pre-set as primary by the manufacturer, you must designate it as the primary port and make the computer's built-in port the secondary port.
- ❑ If you install an option card or peripheral with a port not pre-set, you must designate it as the secondary port and the built-in port as the primary 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 Setup 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:

```
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 ports 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, press ↑ to highlight Exit at the main Setup menu and press Enter. The following Setup summary appears on the screen:

```
Memory          Extended memory        384   KB
                Base  memory           640 KB
Password        Power-on password      not installed
                Network server mode    OFF
Display type                           Monochrome 80 column
Fast boot                              enabled

                  Change settings
                Exit without saving
                ** EXIT AND SAVE **
```

If you see an error message on the first Setup summary screen, see "Adding an Optional Memory Card" later in this chapter.

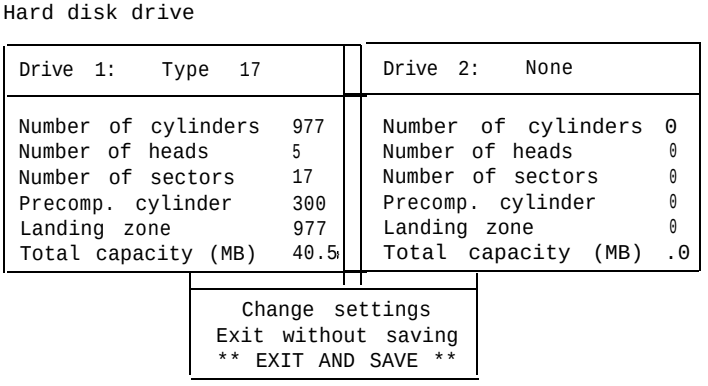
There are two more Setup summary screens you need to check. To display the next screen, press PgDn. You see the following:

```
Real-time clock      Time          13:40:38
                     Date          12-30-1989
Auto speed                         disabled
Coprocessor                        not installed
Diskette drive       Drive A:      1.44 MB
                     Drive B:      None
Serial                             Primary
Parallel                           Primary

                  Change settings
                Exit without saving
                ** EXIT AND SAVE **
```

If you have never set the real-time clock, the real-time clock entry at the top of the screen flashes to remind you to set the time and date.

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



Check each Setup summary screen to see if all the information is correct. You can press PgUp to display the previous screen or PgDn to display the next screen.

If anything is incorrect, be sure Change settings is highlighted and press Enter. The main Setup menu appears and you can change the appropriate settings.

Leaving the Setup Menu

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. Press 0 and Enter to exit the Operation Menu.

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 ask your dealer for assistance.

Note
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. Press 0 and** Enter to exit from the Operation **Menu. (If you changed the time or date, the new setting takes effect even if you exit the Setup program without saving your changes.)**

After you save the settings you entered, remove the Reference diskette from your diskette drive and turn off your system. Then follow the instructions in your MS-DOS Installation Guide to install MS-DOS.

Note
Be sure to make a backup copy of your Reference diskette after you run the **Setup** program **and install MS-DOS. See Chapter 3 for instructions on how to copy diskettes,**

Adding an Optional Memory Card

The first Setup summary screen shows the current amount of memory installed in your system. The Equity 386SX comes with 1MB of on-board memory. (On-board memory is memory that resides on the computer's main system board.) Setup automatically configures this memory as 640KB of base memory and 384KB of extended memory. If you install even more memory, Setup configures it as extended memory also.

You can add more memory to your computer by installing single inline memory modules (SIMMs) or by installing an optional memory card. Because SIMMs do not require you to use an option slot, they provide a more efficient way to add memory than optional memory cards: You can also add both SIMMs and a memory card.

All memory in your system has a particular address. A memory address is the exact area where the memory resides in the system. If you add memory by installing a memory card, the address of the memory on the card could overlap the address of memory you added by installing SIMMs, or there could be a gap between the two addresses.

Setup displays this error message on the first summary screen if a memory address overlap occurs:

```
ERROR: Memory overlapping from 100000h to
260000h
Reset Add-on memory board starting at
200000h or 260000h
```

If there is a gap between the memory addresses, you see this message:

```
ERROR: Memory gapping from 160000h to
200000h
Reset Add-on memory board starting at
100000h or 160000h
```

The addresses of the gap or overlap are shown in hexadecimal numbers. (Hexadecimal is a base-16 numbering system used in programming.) The message tells you the starting and ending addresses of the gap or overlap and recommends two starting addresses for the memory you added on the memory card.

Note
If the memory on your memory card overlaps only the 384KB of on-board extended memory, the computer automatically disables the 384KB of memory and does not display an error message. You see an overlapping error message only if memory on a memory card overlaps extended memory above 1MB.

The first recommended starting address is the starting address of the 384KB of on-board extended memory. The second recommended starting address is the ending address of that 384KB of memory. If you reset your memory card to the first recommended starting address, your system cannot use the 384KB of on-board extended memory in your configuration since its address is used by memory on the memory card. By choosing the second recommended starting address, you can include the 384KB of memory in your configuration because the memory you add on the memory card begins where the 384KB of memory ends.

Some memory cards limit the possible starting addresses you can set. See the manual that came with your memory card to determine which starting address to use.

Note
If you install an Intel® Above™ Board memory card, the computer automatically disables the 384KB of on-board extended memory even if there is no memory overlap. This is because the Intel Above Board card requires its memory, and any other memory you may have added, to be contiguous with the 640KB of base memory. The 384KB of on-board extended memory is considered "split" memory by the Intel Above Board card.

If you see a memory gapping or overlapping message, exit the Setup program (see "Leaving the Setup Menu" above) and see the manual that came with your optional memory card to reset the starting address. Then run Setup again to ensure that your memory is configured correctly.

Chapter 3
Using the Equity 386SX

This chapter describes the following procedures for using your Equity 386SX computer:

- ❑ Installing MS-DOS
- ❑ Using a power-on password
- ❑ Selecting the operating speed
- ❑ Using special keys on the keyboard
- ❑ Stopping a command or program
- ❑ Resetting the computer
- ❑ Using disks and disk drives
- ❑ Turning off the computer.

Installing MS-DOS

After you connect the components of your system and run the Setup program, you must install MS-DOS. Follow the instructions in your MS-DOS Installation Guide.

The MS-DOS installation process automatically copies the MS-DOS files onto your hard disk or generates working copies of the original MS-DOS diskettes. It is best to make another set of backup copies of your original MS-DOS diskettes. You may also want to copy the working diskettes MS-DOS generates if you do not have a hard disk.

In addition, be sure to make a backup copy of your Reference diskette; MS-DOS does not create one for you. See "Making Backup Copies" in this chapter and "Backing Up Data" in Chapter 4 for instructions on how to copy diskettes.

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. (See "Resetting the Computer" later in this chapter for instructions on how to reset the computer.) Follow these steps:

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

2. Turn on your system. The screen displays a key prompt:

3. At the key prompt, enter the power-on password you set when you ran the Setup program. The key turns when you type a character. The screen does not display the characters you type. Then press Enter.

After you type the complete password correctly and press Enter, a happy face character appears. Then the computer loads MS-DOS. The screen displays the MS-DOS command prompt or the MS-DOS Shell Start Programs menu, depending on whether you installed the Shell program when you installed MS-DOS.

You have three chances to enter the correct password. If you do not enter the correct password at the first or second key prompt, another key prompt appears. If you do not enter the correct password at the third key prompt, the screen displays a 0. The keyboard locks up and you cannot use the computer. You may 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 A.

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 Startup diskette in drive A.

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

   123/ABC

   Do not use characters requiring the SHIFT key, such as $, @, or *, in your new password. The Equity 386SX does not recognize the SHIFT key when you use your password to access the system.

   The screen does not display what you type.

WARNING

Be sure to remember the new power-on password you enter or write it down and keep it in a safe place. If you cannot remember the password you enter now, 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 MS-DOS.

To access the computer the next time you turn it on or reset it, you must enter the new power-on password.

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 Startup diskette in drive A.

2. Turn on or reset the computer. At the key prompt, enter your current power-on 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 MS-DOS.

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

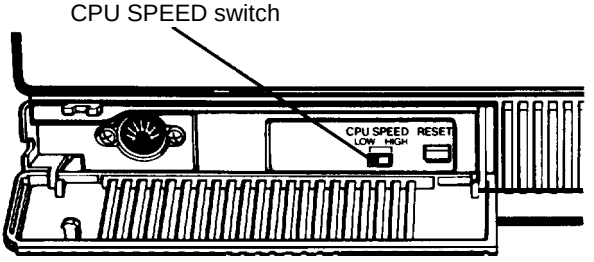
Selecting the Operating Speed

The Equity 386SX can operate at two speeds: high and low. High speed is 16 MHz and low speed simulates 8 MHz. On high, the computer can access memory faster than on low.

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

Note
If you enabled the Auto speed function when you ran the Setup program, the computer automatically slows down to low speed whenever it accesses a diskette drive. See Chapter 2 for information on the Auto speed function.

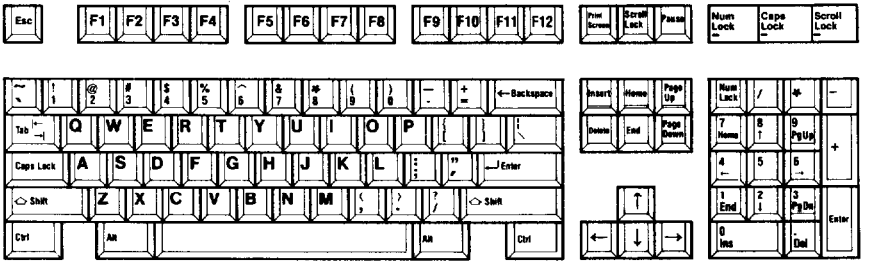
Use the CPU SPEED switch on the front panel to change the CPU speed; move it left for low and right for high. When the computer runs at low speed, the power light is orange; at high speed, it is green.



WARNING
You do not need to turn off the computer to change the operating speed, but do not change it while you are running a program. Complete your current operation, exit the program to MS-DOS, and then change the speed.

Special Keys on the Equity 386SX Keyboard

Certain keys on your keyboard serve special functions when your computer is running MS-DOS or application programs. The following illustration shows the Equity 386SX keyboard, and the table that follows describes the special keys.



Key *functions*

Key	Purpose
Tab |← 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.
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.

Key	Purpose
← 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 Page UP (PgUp) Page Down (PgDn) ↑ ← ↓ →	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 line printer.
SYS Rq (Req)	Generates the System Request function in some application programs (when 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 comer of the keyboard is on. When the function is disabled, the light is off.

Stopping a Command or Program

You may sometimes need to stop a command or program while it is running. Many application programs provide a command you can use to cancel or even undo an operation. 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 you cannot stop a particular operation, however, you may need to reset the computer, as described in the following section.

Caution
It is best not to turn off the computer to stop a program or command. If you created new data and you have not yet stored it, the data will be erased if you turn off the computer. The computer stores your data in its memory until you save it; but the memory area is erased each time you turn off or reset the computer.

Resetting the Computer

Occasionally, you may want to clear the computer's current settings or its memory without turning it off. This is called resetting the computer.

If an error occurs and the computer does not respond to your keyboard entries, you can reset the computer to reload MS-DOS and try again. However, resetting erases any data in the computer's memory that you have not stored; so reset your computer only if necessary.

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

To reset the computer, MS-DOS must be either on the hard disk or on a diskette in drive A; so if your computer does not have a hard disk, insert the Startup diskette in drive A.

There are three ways to reset. Because each is more powerful than the last, try them in the order listed here:

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

2. Press the RESET button on the front panel. This method works even when the computer does not respond to your keyboard entries. If this does not correct the problem, try the third method.

3. Remove any diskette(s) from the diskette drive(s). Turn off the computer and wait five seconds. If your computer does not have a hard disk, insert the Startup diskette in drive A. Then turn on the computer.

Using Disks and Disk Drives

The disk drives in your computer allow you to store data on disk, and then retrieve and use your stored data when you want to. The Equity 386SX comes with a single diskette drive or one diskette drive and one hard disk drive. You may add another diskette or hard disk drive, up to a maximum of three drives total.

This section explains how disks work and tells you how to do the following:

- ❑ Use different types of diskettes and diskette drives
- ❑ Care for your diskettes and diskette drives
- ❑ Insert and remove diskettes
- ❑ Write-protect diskettes

  Make backup copies of your diskettes
- ❑ Use a single diskette drive
- ❑ Use two diskette drives
- ❑ Use a hard disk drive.

How Disks Store Data

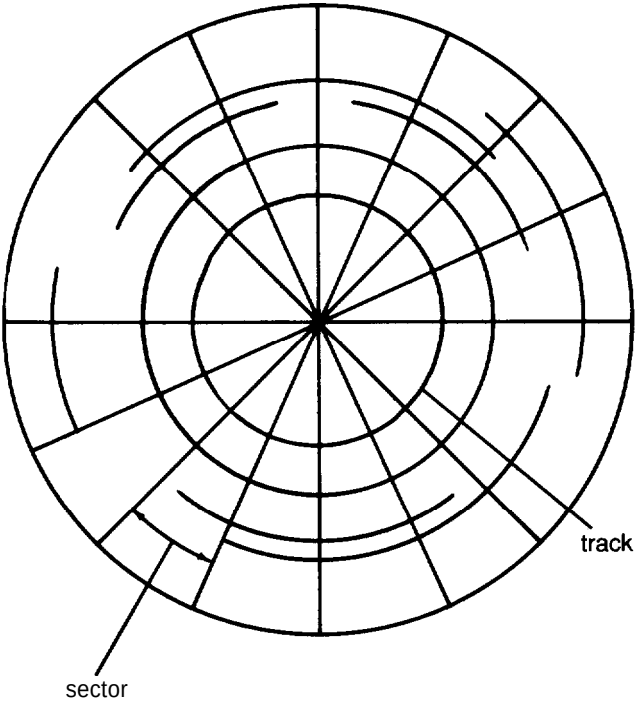
The diskette you insert in your computer's diskette drive is made of flexible plastic coated with magnetic material. It is enclosed in a square jacket that is either hard (3 1/2-inch diskettes) or slightly flexible (5 1/4-inch diskettes).

Unlike a diskette, a hard disk is rigid and fixed in place. It is sealed in a protective case to keep it free of dust and dirt. A hard disk stores data the same way that a diskette does, but it works much faster and has a much larger storage capacity.

All disks are divided into data storage compartments by sides, tracks, and sectors. Double-sided diskettes store data on both sides. On each side, there are concentric rings, called tracks (or cylinders), on which a disk can store data. Double-density diskettes have either 40 or 80 tracks on each side, and high-density diskettes have 80 tracks on each side.

Because a hard disk consists of two or more platters stacked on top of one another, it has four or more sides with many more tracks per side than a diskette. (The number of tracks depends on the capacity of the hard disk. You do not need to know how many sides and tracks your hard disk has.)

A disk is further divided by sectors. To understand what a sector is, picture the spokes on a bicycle wheel radiating from the center of the wheel to the tire. The space between one spoke and the next is like a sector on a diskette; the lines dividing the sectors cut across the tracks. (See the figure below.) A diskette can have 8, 9, 15, or 18 sectors per track. The number of sectors on a hard disk depends on the type of hard disk.



Your computer uses the read/write heads in a disk drive to store and retrieve data on a disk. To write to a disk, the computer spins it in the drive to position the area on the disk where the data is to be written under the read/write head. A diskette has an exposed area where the read/write head can access it.

Because data is stored magnetically, you can retrieve it, record over it, and erase it-just as you play, record, and erase music on a cassette tape.

Types of Diskette Drives

The Equity 386SX comes with one 1.44MB diskette. With this drive, use 3½-inch, double-sided, high-density, 135 TPI, 1.44MB diskettes. These diskettes contain 80 tracks per side, 18 sectors per track, and hold up to 1.44MB of information, which is approximately 600 pages of text. MB stands for megabyte; each megabyte equals 1,048,576 bytes or 1024KB.

You may also have a second diskette drive, and it may be the same type or it may be different. The following list describes the other types of diskette drives you can use in the Equity 386SX and which diskettes to use with them:

- 720KB drive-With this drive, use 3½-inch, double-sided, double-density, 135 TPI, 720KB diskettes. These diskettes contain 80 tracks per side, 9 sectors per track, and hold up to 720KB of information, which is approximately 300 pages of text. KB stands for kilobyte; each kilobyte equals 1024 bytes. Each byte represents a single character, such as A, $, or 3.

- 1.2MB drive-With this drive, use 5¼-inch, double-sided, high-density, 96 TPI, 1.2MB diskettes. These diskettes contain 80 tracks per side, 15 sectors per track, and hold up to 1.2MB of information, which is approximately 500 pages of text.

- 360KB drive-With this drive, use 5 1/4-inch, double-sided, double-density, 48 TPI (tracks per inch), 360KB diskettes. (You can also use single-sided, 160KB or 180KB diskettes.) These diskettes contain 40 tracks per side, 8 or 9 sectors per track, and hold up to 360KB of information, which is approximately 150 pages of text. (With 8 sectors per track, a diskette holds up to 320KB.)

Note

Before you can use them with MS-DOS, you must format new diskettes using the MS-DOS FORMAT command. Formatting erases all the data on a diskette and prepares it to receive new data, so be sure to format only new blank diskettes or diskettes that contain data you want to erase. See Chapter 4 for instructions on formatting diskettes.

Drive and diskette incompatibilities

If your computer has more than one type of diskette drive, or if you use diskettes from other computers with other types of diskette drives, you need to be aware of certain incompatibilities between the diskette drives and the diskettes they use.

Because of the size difference, you cannot use 5 1/4-inch diskettes in a 3 1/2-inch drive or vice versa. There are also certain limitations on using diskettes that are the same size as the drive but have different capacities. The following tables summarize the possibilities and limitations.

3 1/2-inch drive/diskette compatibility

Drive type	Diskette types it can read from and write to
720KB	720KB
1.44MB	720KB, 1.44MB

5 1/4-inch drive/diskette compatibility

Drive type	Diskette types it can read from and write to
360KB	160KB, 180KB, 320KB, 360KB
1.2MB	160KB, 180KB, 320KB, 360KB, 1.2MB

WARNING
If you write to a 360KB (or 160KB, 180KB, or 320KB) diskette in a 1.2MB drive, you may nut be able to read it or write to it in a 360KB drive later.

Because of these incompatibilities, always indicate the diskette type and density when you label your diskettes. (Usually this information appears on the manufacturer's label.)

If you have any combination of the above drives (1.44MB, 720KB, 1.2MB, or 360KB), you can copy files from one drive to another-using the COPY or XCOPY command-as long as the correct diskette type is in each drive. You can also use these commands to copy files between a hard disk and any type of diskette. However, you cannot use the DISKCOPY command to copy from one diskette drive to another if the two drives are not the same type. For more information on the MS-DOS COPY, XCOPY, and DISKCOPY commands, see Chapter 4.

Caring for Diskettes and Diskette Drives

Follow these basic precautions to protect your diskettes and avoid losing data:

- ❑ Do not remove a diskette from the diskette drive or turn off the computer while the drive light is on. This light indicates that the computer is copying data to or from a diskette. If you interrupt this process, you can destroy data.
- ❑ Remove all diskettes before you turn off the computer.

- Keep diskettes away from dust and dirt. Small particles of dust or dirt can scratch the magnetic surface, destroy data, and ruin the read/write heads in a diskette drive.

- Never wipe, brush, or try to clean diskettes in any way.

- Keep diskettes in a moderate environment. They work best at normal room temperature and in normal humidity. Don't leave diskettes sitting in the sun, or in extreme cold or heat.

- Keep diskettes away from magnetic fields. (Remember that diskettes store information magnetically.) There are many magnetic sources in your home or office, such as electrical appliances, telephones, and loudspeakers.

- Do not place diskettes on top of your monitor or near an external hard disk drive.

- Do not slide the metal shutter on a 3 1/2-inch diskette; this exposes the diskette's magnetic surface. If you have a 5 1/4-inch diskette drive, the surface of the diskette is exposed by the read/write slot. Always hold this diskette by its protective jacket and never touch the magnetic surface. The oils on your fingertips can damage it.

- Do not place anything on top of your diskettes, and be sure they do not get bent. A diskette does not rotate properly in the drive if it has been damaged.

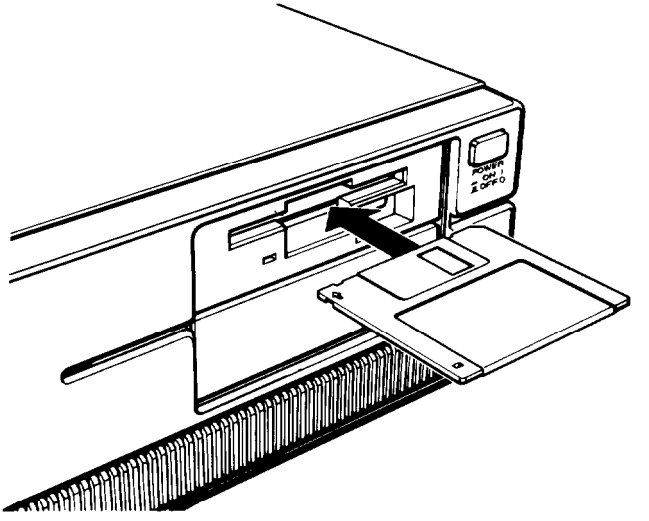
- Carefully label your diskettes and be sure to indicate the diskette type and density. Attach labels firmly but gently, and only along the top of a diskette (next to the manufacturer's label). Do not stick several labels on top of one another; too many labels can make it difficult to insert and remove the diskette in the drive.

- ❑ For a 5 1/4-inch diskette, it is best to write on a label before you attach it to a diskette. If you need to write on a label that is already on a 5 1/4-inch diskette, use only a soft-tip pen-not a ballpoint pen or a pencil.

- ❑ Store diskettes in a proper location, such as a diskette container. Do not store diskettes flat or stack them on top of each other. If you use any 5 1/4-inch diskettes, store them in their protective envelopes.

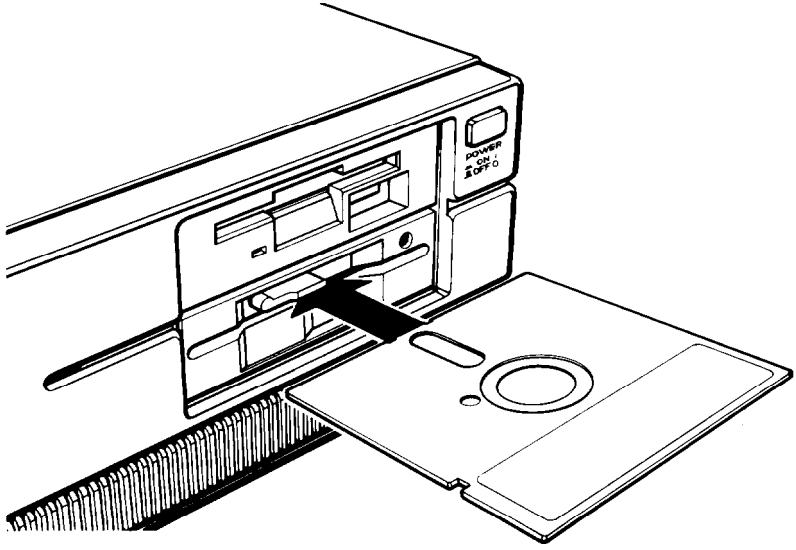
Inserting and Removing Diskettes

Insert the diskette with the label facing up and the metal shutter leading into the drive, as shown below. Slide the diskette into the drive until it clicks into place.



To remove the diskette, press the release button. The diskette pops out of the drive. Pull out the diskette and store it properly.

If you have a 5 1/4-inch diskette drive, hold the diskette with the label facing up and the read/write slot leading into the drive.



Slide the diskette into the slot until it is in all the way. Then turn the latch down to lock it in a vertical position. This keeps the diskette in place and enables the read/write heads in the diskette drive to access the diskette.

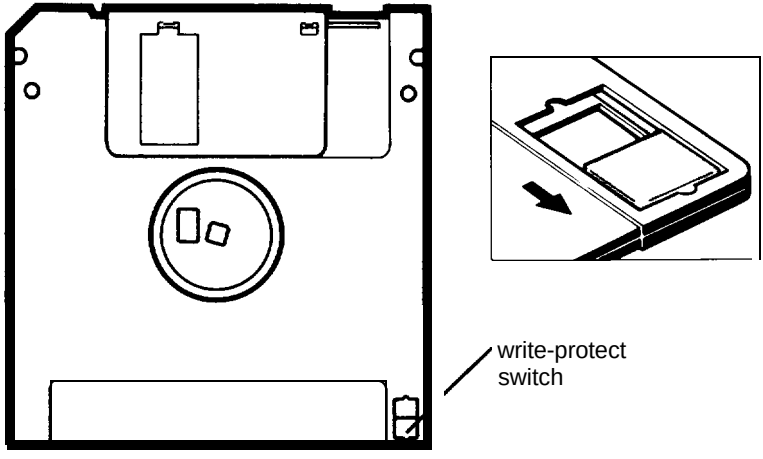
To remove the diskette, turn the latch up until it is horizontal and the edge of the diskette pops out. Carefully pull out the diskette, place it in its protective envelope, and store it in a proper location, such as a diskette container.

WARNING
Never remove a diskette or turn off the computer while the diskette drive light is on. You could lose data. Also, be sure to remove all diskettes before you turn off the computer.

Write-protecting Diskettes

You can write-protect a diskette to prevent its data from being altered. When a diskette is write-protected, you can read it and copy data from it, but you cannot store new data on the diskette or delete any files it contains. If you try to change data stored on a write-protected diskette, MS-DOS displays an error message.

On a 3 1/2-inch diskette, the write-protect device is a small switch on the back of the diskette in the lower right corner, shown below. To write-protect a 3 1/2-inch diskette, slide the switch toward the edge of the diskette until it clicks into position, exposing a hole in the comer.

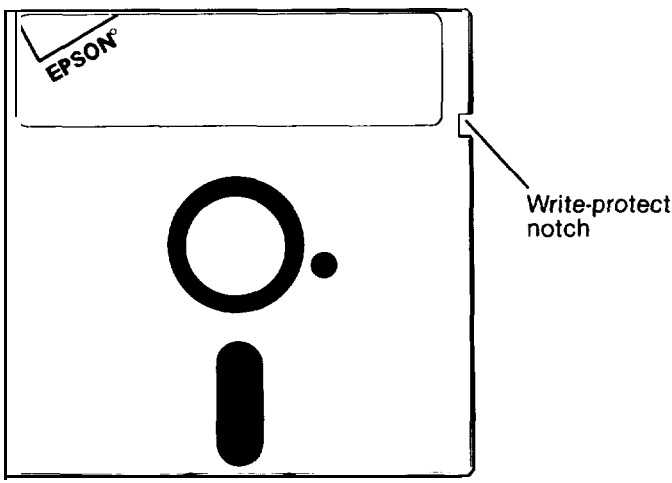


To remove the write protection, slide the switch toward the center of the diskette until it clicks into position so the hole is covered.

Note

Some program diskettes, such as your MS-DOS diskettes and your Reference diskette, have no switch so they are permanently write-protected. This protects them from being accidentally erased or altered. It is a good idea to write-protect the backup copies you make of your MS-DOS and Reference diskettes.

To write-protect a 5 1/4-inch diskette, cover the small, rectangular notch (shown below) with an adhesive write-protect tab. Write-protect tabs usually come with new 5 1/4-inch diskettes when you buy them.



To remove the write protection, peel off the write-protect tab.

Making Backup Copies

It is important to make copies of all your data and system diskettes. Make backup (or working) copies contain programs, such as the original MS-DOS and Reference diskettes that come with the Equity 386SX, and use only the copies. Store the original diskettes in a safe place away from your working diskettes.

Copy your data diskettes regularly, whenever you revise them, to keep them up-to-date, and store them away from your originals.

To make backup copies of your diskettes, use the DISKCOPY command, the MS-DOS Shell, or the MENU program. See Chapter 4, your Shell User's Guide, or your MS-DOS Reference Manual for instructions.

It is best to store the programs and data files you use regularly on the hard disk. Keep backup copies of all your program files on diskettes, and regularly copy important data files to diskettes as well. See "Backing up the hard disk" in this chapter for more information.

Note
Most files on your Reference diskette (including the Setup and diagnostics programs) run properly only if you execute them from the Reference diskette. If you have a hard disk, copy only the following Reference diskette files **onto** it: CORFIX.EXE, HDSIT.COM, HDSIT.VER, and ROMBIOS.COM.

Using a Single Diskette Drive

MS-DOS expects the computer to have at least two diskette drives, and it displays prompts and messages accordingly. If your system has a single diskette drive, MS-DOS treats your one drive like two logical drives. This helps you perform operations that normally require two diskette drives.

Usually, MS-DOS recognizes the first diskette drive (the top drive on the Equity 386SX) as drive A and a second diskette drive as B. If you have only one diskette drive, MS-DOS can treat it as both A and B.

For example, if you enter a command to copy from A to B, MS-DOS copies from the first diskette you place in the drive (A) to the computer's memory. Then MS-DOS prompts you to insert another diskette (for drive B) and copies from memory to the new diskette. When copying is complete, you see a prompt to insert the original diskette (for drive A).

Because you may often swap diskettes this way, it is important to remember which diskette is which. It is also a good idea to write-protect your original diskette.

If you have a hard disk and one diskette drive, you can load the operating system and application programs from the hard disk, create and store your data there, and use the diskette drive just for copying data to or from diskettes.

If you have only one diskette drive and no hard disk, you need to use that drive to load the operating system as well as the application programs you are using. First load the operating system; this copies it to the computer's memory (RAM) so you do not need to leave the system diskette in the drive. Then you can remove that diskette and insert the program diskette you want to use, and load that into memory too. See your application program manual for detailed instructions.

Using Two Diskette Drives

If you have two diskette drives, you can use the top drive (A) for loading the operating system and application programs and the second drive (B) for creating data. If you have a hard disk, you will probably need the diskette drives just to copy files to and from the hard disk and to copy diskettes.

Note
You can load MS-DOS **from an application program diskette** if **that diskette contains the MS-DOS system files.**

Using a Hard Disk Drive

Working with a hard disk is similar to working with a diskette. However, the hard disk provides several advantages:

- A 40MB hard disk can store as much data as approximately 30 1.44MB diskettes, and a 100MB hard disk can store as much data as approximately 70 1.44MB diskettes.
- Your computer can perform all disk-related operations faster.
- You can store frequently used programs and data files on the hard disk, eliminating the inconvenience of swapping diskettes to access different files.

The added storage capacity makes it easy to move back and forth between different programs and data files. However, because it is so easy to add programs and files to your hard disk, you may find yourself trying to organize hundreds of files.

MS-DOS lets you keep related files together in directories and subdirectories so they are easy to find and use. See Chapter 4 for instructions on how to use directories.

Note

The **MS-DOS** Shell program is a menu-driven program which makes it easy for you to move, create, delete, and rename files and directories, as well as view files and execute commands. See your **MS-DOS Shell User's** Guide for instructions.

If your Equity 386SX has a hard disk drive, follow these precautions to protect it from damage and to avoid losing data:

- Never turn off the computer when the hard disk drive light is on. This light indicates that the computer is copying data to or from the hard disk. If you interrupt this process, you can lose data.

- Never attempt to open the hard disk drive. The disk itself is enclosed in a sealed container to protect it from dust.

- Before you move your computer (even to another part of the room), you need to prepare the hard disk for moving. See "Preparing the hard disk for moving," below, for instructions.

A hard disk must be partitioned and formatted before you can use it. Be sure you have performed the procedures in your MS-DOS Installation Guide to prepare your hard disk for use.

You can enhance the performance of your hard disk by using the SMARTDRV.SYS device driver and the FASTOPEN command. See your MS-DOS Reference Manual for instructions.

Backing up the hard disk

While the hard disk is very reliable, it is essential to back up your hard disk files to diskettes in case you lose some data accidentally. Make copies of all your system and application diskettes before copying the programs to the hard disk. After you create data files on the hard disk, be sure to copy them to diskettes whenever you revise them to keep your backup diskettes up-to-date.

To make copies of your program diskettes before copying them to the hard disk, use the DISKCOPY command, the MS-DOS Shell, or the MENU program. To copy your hard disk files onto diskettes, use the BACKUP, COPY, or XCOPY command; the MS-DOS Shell; or the MENU program. See Chapter 4, your Shell User's Guide, or your MS-DOS Reference Manual for instructions.

Preparing the hard disk for moving

If you need to move your computer to a new location-whether it is across the country or just across the room-you should run the HDSIT program to protect the hard disk during the move.

The HDSIT program moves 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.

Follow these steps to run HDSIT:

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

2. Insert the Reference diskette in drive A.

3. Type the following and press Enter:

```
A:HDSIT
```

You see a message on the screen that tells you the disk drive's read/write heads will remain locked until you reset the computer or turn the power off and on again. The computer locks the heads and disables the keyboard. You can now turn off the computer and prepare to move it to the new location.

Turning Off the Computer

Before you turn off your computer, save your data, exit the program you are using, and remove any diskettes from the diskette drives. Turn off the computer first, then turn off the monitor and any peripherals.

Chapter 4
Using MS-DOS with Your Equity 386SX

Your Equity 386SX comes with version 4.01 of MS-DOS. This operating system manages your computer by organizing the computer's memory, controlling the monitor display, receiving keyboard input, and accessing data.

How much you need to know about MS-DOS depends on how you will be using your computer. If you plan to use it just to run application programs, the few MS-DOS commands you'll need are introduced in this chapter. If you plan to use advanced features, refer to your MS-DOS Reference Manual for complete descriptions of MS-DOS commands and features.

This chapter covers the following topics:

- ❑ Starting and exiting MS-DOS
- ❑ Using drive designators
- ❑ Types of MS-DOS commands
- ❑ Entering an MS-DOS command
- ❑ Setting the date and time
- ❑ Creating and managing files
- ❑ Using directories
- ❑ Formatting diskettes
- ❑ Backing up data
- ❑ The MS-DOS Shell program
- ❑ Using the Epson HELP program

- ❑ Using the Epson MENU program
- ❑ Using an AUTOEXEC.BAT file
- ❑ Using memory beyond 640KB.

Starting MS-DOS

Before you can run an MS-DOS application program, MS-DOS must be loaded in the computer's memory. If you have a hard disk and you installed MS-DOS according to the instructions in your MS-DOS Installation Guide, the computer loads MS-DOS automatically after you turn on the power (provided no diskette is in the diskette drive).

If you do not have a hard disk, you need to load MS-DOS when you turn on the computer. To do this, insert the MS-DOS Startup diskette in drive A and then turn on the computer. (The Startup diskette is one of the working diskettes MS-DOS generates during the installation process. See your MS-DOS Installation Guide for instructions on how to install the operating system.)

If you set a power-on password when you ran the Setup program, the computer displays the key prompt ( ) before loading MS-DOS. At the key prompt, type your power-on password and press Enter. (See "Using a Power-on Password" in Chapter 3 for more information.) After you enter your password, the computer loads MS-DOS.

When MS-DOS is loaded, the screen displays the Shell Start Programs Menu if you installed the Shell program when you installed MS-DOS. If you did not install the Shell program, the screen displays the MS-DOS command prompt, usually C> or A>. The MS-DOS command prompt identifies the current drive.

Note

Before you turn off the computer, be sure to exit any application program you are using. The screen should display the Shell Start Programs Menu or the MS-DOS command prompt. Then remove your diskettes (if any), turn off the computer, and turn off any peripherals.

Using Drive Designators

MS-DOS uses letters known as drive designators to identify the disk drives in your computer. If you have one diskette drive, it is known as drive A. If you have two diskette drives, the top drive is A and the bottom drive is B.

If you have one hard disk drive, MS-DOS identifies its primary partition as drive C (even if you have only one diskette drive). If you have a second hard disk drive, MS-DOS identifies its primary partition as drive D.

If you created one or more extended partitions on your hard disk when you installed MS-DOS, the logical drives that make up the extended partition(s) are identified by drive letters. For example, if you have one hard disk (one physical drive) partitioned into three logical drives, the logical drives are C, D, and E. If you have two hard disk drives partitioned into a total of five logical drives (three on the first physical drive and two on the second), the first physical drive is divided into logical drives C, E, and F, and the second physical drive is divided into logical drives D and G, as shown here:

drive 1	drive 2
C: (primary)	D: (primary)
E:	G:
F:	

The Current Drive

At any given time, MS-DOS considers one disk drive to be the current (or default) drive. The current drive is the drive on which MS-DOS executes your next command, unless you tell it to do otherwise. For example, if the current drive is C, and you enter the DIR (directory) command, MS-DOS lists the files stored on drive C. If the current drive is A and you type WP and press Enter, MS-DOS looks on drive A for a file called WP and executes the instructions in that file. The current drive is the drive you are logged onto at the time.

The MS-DOS command prompt tells you which drive is the current drive. The MS-DOS command prompt includes the current drive's letter followed by a greater-than symbol. (Depending on how you installed MS-DOS, it may also include additional information.) Thus, when you see C> on the screen, you know the current drive is C. The MS-DOS command prompt also lets you know that MS-DOS is ready to receive a command from you.

If you need to access a file or program on another drive, you can either change the current drive or specify the other drive when you give the command.

Changing the current drive

To change the current drive, type the letter of the drive you want to change to, followed by a colon. Then press Enter. For example, to change the current drive from C to A, type A : at the C> prompt and press Enter. MS-DOS acknowledges the change by displaying the command prompt A>. Changing to a new drive is also known as logging onto that drive.

Specifying the drive designator

If you want to access a program or file on another drive without first changing the current drive, type the drive designator along with the filename. For example, if you are logged onto drive A and want to use a file named PROGRAM on drive B, type `B : PROGRAM` and press Enter. MS-DOS loads and executes the file named PROGRAM from drive B but stays logged onto drive A.

Types of MS-DOS Commands

Each MS-DOS command is either internal or external. Internal commands are built into MS-DOS; so you can use them any time after MS-DOS has been loaded into memory. External commands are separate files which MS-DOS must be able to find before it can execute the command. If it cannot find the file, MS-DOS displays an error message.

If you installed MS-DOS according to the instructions in your MS-DOS Installation Guide, most external commands are stored in a subdirectory named DOS on the hard disk (unless you specified a different name when you installed MS-DOS). The external commands CONFIG.SYS, AUTOEXEC.BAT, and COMMAND.COM are stored in the root directory. (For information on directories, see "Using Directories," later in this chapter.) MS-DOS automatically finds any external commands you use in the DOS subdirectory or the root directory because the installation process has set a path to them. (For information on setting paths, see "Using Pathnames," later in this chapter.)

If you do not have a hard disk, external commands are stored on the set of working diskettes generated when you installed MS-DOS. To use an external MS-DOS command, you must insert the diskette containing that command into a diskette drive. To find out which external commands are on which diskettes, see the list of working diskette contents in your MS-DOS Installation Guide.

For example, if you want to use the FORMAT command, you must insert the Startup diskette into a diskette drive. Then you can either log onto that drive and enter the FORMAT command or specify the appropriate drive when you enter the command.

For example, if you have two diskette drives and you want to format a diskette that is in drive B, you need to insert the Startup diskette into drive A, and log onto drive A. Then type the following and press Enter:

```
FORMAT B:
```

MS-DOS finds the file named FORMAT.COM on the current drive.

If you are logged onto drive B, you need to type the following and press Enter:

```
A:FORMAT B:
```

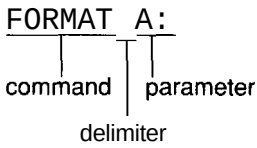
This tells MS-DOS to look on drive A for FORMAT.COM because the current drive is drive B.

Entering an MS-DOS Command

To enter an MS-DOS command, you need to type the command in the correct format. The command format provides MS-DOS with the information needed to perform a task.

The MS-DOS command format consists of the command name, parameters, and *delimiters. The* command name tells MS-DOS the task you want the computer to perform. Parameters specify information such as what data you want to process and where to locate or store a file. Delimiters are characters such as spaces or commas that separate command names and parameters.

For example, the command to format a diskette in drive A is:



`FORMAT` is the name of the command that tells MS-DOS to execute the file FORMAT.COM. The `A:` is a parameter that tells MS-DOS what to format-in this case, the diskette in drive A. The space between `FORMAT` and `A:` is the delimiter that allows MS-DOS to distinguish the command name (`FORMAT`) from the parameter (`A:`).

Some commands also have optional *switches you* can use. A switch is a type of parameter that changes the effects of a command. A forward slash usually precedes a switch. For example, suppose you want to format a 720KB diskette in a 1.44MB diskette drive. To do this, you add the following switch to the FORMAT command:

```
FORMAT A: /F:720
```

If you do not add the /F:720 switch, MS-DOS tries to format the 720KB diskette as a 1.44MB diskette.

See your MS-DOS Reference Manual for more information on the command format and for command descriptions that explain which parameters and delimiters are required and which parameters and switches are optional for each command.

You can enter an MS-DOS command whenever you see the MS-DOS command prompt. Type the command name and any parameters and delimiters. You can type command names and parameters in either uppercase or lowercase letters. Then press Enter to execute the command.

If you make a mistake when typing a command and you notice it before you press Enter, you can do either of two things:

- Use the backspace key to delete the error
- Press ESC and then Enter to cancel the current command line and move to a new one.

Then reenter the command correctly.

If you press Enter when a command line has an error in it, the screen displays an error message. Usually, the MS-DOS command prompt reappears so you can try again. Type the correct command and press Enter.

Setting the Date and Time

The real-time clock in your Equity 386SX constantly tracks the correct time and date-even when the computer is turned off. To adjust the time for daylight savings time, you can use the MS-DOS TIME and DATE commands. See your MS-DOS Reference Manual for instructions. The computer automatically changes the date for leap years.

Note

You can also **use the Setup program on your Reference** diskette to set the correct time and date, See "Setting the Real-time Clock" in Chapter 2 for instructions.

Creating and Managing Files

All your data and programs are stored in files on disk. A data file contains information, such as words, numbers, or pictures. A program file contains coded instructions that the computer can understand and execute.

The kind of file you create depends on the MS-DOS command or application program you use to create it. In general, a data file that you create using an application program is stored in a special format. If you use a different application program to read that file, you may encounter problems.

When you create a file, you need to give it a name. The name must be in the format MS-DOS requires.

Naming Files

Each file must have a unique name so that you can retrieve it when you need to. The name consists of two parts: the filename and the extension (which is optional).

The filename can be up to eight characters long. Create a filename that identifies the information the file contains. You can use any characters or numbers except for blank spaces and the following symbols:

```
* \ / ¦ ? [ ] : ; < > . , + =
```

The extension is optional and can be up to three characters long. You can use the extension to further identify a file or to describe what type of file it is, such as a text file or program file. When you use an extension, separate it from the filename with a period, like this:

```
DATA.TXT
```

Do not use uppercase and lowercase letters to distinguish between files. MS-DOS does not recognize the difference and displays all filenames in uppercase.

Some application programs automatically add extensions to the files you create. These programs use the extension to determine whether a data file is compatible. Avoid using the same extensions that your application programs use.

MS-DOS reserves certain filenames for its own use. The reserved filenames are:

```
AUX       COM4      LPT3
CLOCK$    CON       LST
COM1      LPT1      NUL
COM2      LPT2      PRN
COM3
```

MS-DOS also reserves certain extensions for program files. The reserved extensions are .COM, .EXE, and .BAT, and files with these extensions are also sometimes called executable files. Do not use these reserved filenames and extensions for your data files.

The extension .BAT denotes a type of executable file called a batch file. You can use batch files to automate sequences of MS-DOS commands. Even if you are not a programmer, you may want to create some batch files to save time. See “Creating an AUTOEXEC.BAT File” in this chapter for a description of a particularly useful kind of batch file, an autoexecute batch file.

Copying Files

You can use the COPY command to copy individual files or groups of files. COPY is an internal command; you can use it any time you see the MS-DOS command prompt.

You can use the COPY command to copy files in several ways:

- ❑ You can copy individual files from one disk to another
- ❑ You can copy a group of files using wildcard characters
- ❑ You can copy one or more files and give them new names
- ❑ You can combine or merge files into one file.

To use the COPY command, type COPY at the MS-DOS command prompt, followed by the drive designators and necessary filenames. Then press Enter to execute the command.

For example, to copy the file named REPORT from the diskette in drive A to the diskette in drive B (using the same name for the copy as for the original file), type the following and press Enter:

```
COPY A:REPORT B:
```

You now have two files named REPORT, one on the diskette in drive A and one on the diskette in drive B.

To copy the file named REPORT from the diskette in drive A to the diskette in drive B using a new name, FACTS, for the copy, type the following and press Enter:

```
COPY A:REPORT B:FACTS
```

The file REPORT remains unchanged on drive A and a new file named FACTS now exists on drive B.

To copy the file named REPORT to the same drive or directory and name the copy FACTS, type the following and press Enter:

```
COPY REPORT FACTS
```

Now you have two files on the current drive that have the same contents but different names. In this example, you can omit the drive designators because the original file and the copy are both on the current drive.

You can use wildcard characters to copy a group of files. There are two wildcard characters: * and ?. The asterisk represents any group of characters and the question mark represents any single character.

For example, to copy all the files on the diskette in drive A to the diskette in drive B, type the following and press Enter:

```
COPY A:*.* B:
```

To copy all files with names that begin with the four letters MEMO and end with any single character (such as MEMO1), type the following and press Enter:

```
COPY A:MEMO? B:
```

You can also use the COPY command to combine several files into one file. For example, to create a new file called DATA that consists of the files REPORT, FACTS, and MEMO, type the following and press Enter:

```
COPY REPORT + FACTS + MEMO DATA
```

Now the file DATA consists of REPORT followed by FACTS followed by MEMO.

To copy REPORT, FACTS, and MEMO from drive A to **a** file named DATA on drive B, type the following and press Enter:

```
COPY A:REPORT + A:FACTS + A:MEMO B:DATA
```

Remember these rules when using the COPY command:

- MS-DOS must be able to find the original file and know where to store the copy; that is, you may need to specify the drive (and directory, if necessary) for one or both.
- You cannot create a new file with the same name and in the same directory as an existing file.
- If there is a file on the destination diskette or directory that has the same name as the file you are copying, the copy automatically replaces the existing file. There is no warning that the existing file is being replaced; so be careful that you do not accidentally erase a file you want to keep.
- If you are copying to a diskette, the diskette must already be formatted.

Note

You can also use the XCOPY command **to** copy individual files or groups of files. XCOPY-which is an external **command--offers an efficient way to** copy **certain**groups of **files or whole directories. The MENU pro**gram allows you to copy files with XCOPY using menus instead of the command **itself. See your MS-DOS Reference Manual** and "Using **the Epson MENU Program" in this chapter for inform&on on XCOPY and MENU.**

You can also use the MS-DOS Shell program to copy individual files, groups of files, or whole directories. See your **MS-DOS Shell User's Guide** for **instructions.**

Renaming Files

You can use the RENAME command to change the name of a file or group of files on the same disk and directory. For example, to rename a file named PROSPECT (in the current directory) to CLIENT, type the following and press Enter:

```
RENAME PROSPECT CLIENT
```

You can shorten the RENAME command to REN. For example, to change the name of a file from HAMMERS to WRENCHES, you can type the following and press Enter:

```
REN HAMMERS WRENCHES
```

You can use wildcards to rename groups of files. For example, to change the extensions of all files on drive C with the extension .NEW from .NEW to .OLD, type the following and press Enter:

```
REN C:*.NEW *.OLD
```

To add the extension .OLD to all files that begin with the same four characters, MEMO, but end with one varying character, type the following and press Enter:

```
REN MEMO? MEMO?.OLD
```

This command renames files such as MEMO1 and MEMO2 to MEMO1 .OLD and MEM02.OLD.

See your MS-DOS Reference Manual for more information on the RENAME command.

Deleting Files

You can delete files you no longer need with the DEL (delete) command. For example, to delete REPORT.AUG from drive C, type the following and press Enter:

```
DEL  C:REPORT.AUG
```

To delete the file WRENCHES from drive C, type the following and press Enter:

```
DEL  C:WRENCHES
```

To display a prompt asking you to confirm that you want to delete the file before MS-DOS deletes it, use the /P switch. Type the following and press Enter:

```
DEL  C:WRENCHES  /P
```

You see this prompt:

```
C:\WRENCHES,      Delete (Y/N)?
```

Press Y and Enter for yes or N and Enter for no.

You can use wildcards to delete groups of files. For example, to delete all files on the diskette in drive A (in the current directory), you could type the following and press Enter:

```
DEL A:*.*
```

Because deleting all files is a serious procedure, MS-DOS prompts you to confirm the command when you use the *.* wildcard combination with the DEL command. Press Y and Enter to confirm the command and delete all files on the diskette in drive A or N and Enter to cancel the command.

You may substitute ERASE for DEL in the examples above. ERASE is a synonym for DEL.

Printing Text Files

If you have a printer attached to your computer, you can print text files with the PRINT command. In general, you will probably use application programs to print files, but if you need to print a text file from the MS-DOS command prompt, follow the steps below.

To print a text file named STATS.NBA on drive C:

1. Make sure your printer is on and ready to print.

2. At the MS-DOS command prompt, type the following and press Enter:

   ```
   PRINT C:STATS.NBA
   ```

   MS-DOS prompts you for the name of the printing device connected to your computer. (This is usually the name of the communications port that the printer cable is connected to, such as LPT1.)

3. Type the name of the device, such as `LPT1,` and press Enter. MS-DOS prints the file on your printer.

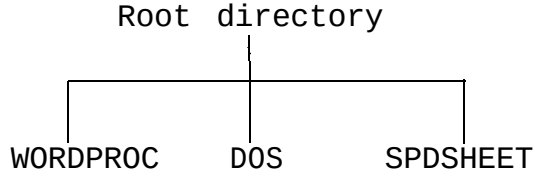
See your MS-DOS Reference Manual for more information on the PRINT command.

Using Directories

You can store many files on a diskette, and a hard disk can store many more. To help you organize this much information, MS-DOS lets you subdivide a disk into logical units called directories. Directories allow you to arrange your disk so that files of similar type or purpose are kept together.

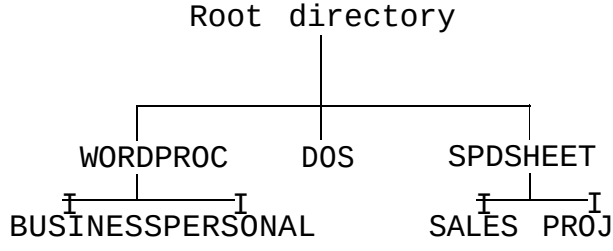
Directories are essential for organizing files on a hard disk, and you might even want to create directories on a 1.44MB diskette. However, you may not need to create directories if you use lower capacity diskettes-especially if the diskette contains only a few large files.

Whenever you format a disk, MS-DOS automatically creates one main directory. This directory is called the root directory. Any directories you later create are logically subordinate to the root directory; that is, they are subdirectories of the root directory. Here is an example of a simple directory structure:



In this example, you keep your word processing programs and data files in a directory called WORDPROC, your spreadsheet programs and data files in a directory called SPDSHEET, and MS-DOS files in a directory called DOS. The few files that MS-DOS needs to find as soon as you turn on your computer (such as COMMAND.COM, CONFIG.SYS, and AUTOEXEC.BAT) remain in the root directory at the top level of the structure.

As the number of files in your WORDPROC and SPDSHEET directories grows, you can create additional directories subordinate to those two-like this:



This directory tree lets you separate business word processing files from personal word processing files, and sales spreadsheets from spreadsheet files used for financial projections.

Your directory structure may be as simple as this example or much more complex. Organize your disk(s) to suit your needs. As your needs change, you can modify the structure by deleting old directories and creating new ones.

Here are some additional points about directories:

- Name subdirectories the same way you name files. The name can include up to eight characters (letters or numbers), and you can add an extension of up to three characters.

- The root directory does not have a name. It is identified by the backslash character: \.

- The total number of files and subdirectories in the root directory must not exceed 512 on a hard disk or 112 on a 1.44MB diskette.

- All directories other than the root directory can have any number of files and subdirectories.

- Like hard disks, diskettes have root directories, and you can create subdirectories on diskettes the same way as you create subdirectories on a hard disk.

The following sections describe how to create, use, and delete directories.

Note
The MS-DOS Shell program provides an easy way to see and organize your directories. See “The MS-DOS Shell Program,” later in this chapter, and your MS-DOS Shell User’s Guide.

The Current Directory

MS-DOS always recognizes one directory as the current (or default) directory, just as it always recognizes one drive as the current drive. The current directory is the directory you are logged onto at the time and the one in which MS-DOS performs your commands, unless you tell it to do otherwise. If you installed MS-DOS according to the instructions in your MS-DOS Installation Guide, the MS-DOS command prompt displays the current directory.

If you want to run a program or access a data file that is not stored in the current directory, you can either change directories (making a different directory the current directory) or include a pathname in your command.

Changing the Current Directory

To change from one directory to another, use the CHDIR command, or its shorthand equivalent, CD. For example, to change to the root directory of the current drive from anywhere in the directory tree, type the following and press Enter:

```
CHDIR \
```

If you are in the WORDPROC directory and you want to change to PERSONAL, a subdirectory of WORDPROC, type the following and press Enter:

```
CD PERSONAL
```

To change from PERSONAL back to WORDPROC, you can use the special symbol . . (two periods). The . . symbol always designates the parent directory, which is the directory one level above the current directory. You can type:

```
CD . .
```

Using Pathnames

You use pathnames with MS-DOS commands to tell MS-DOS how to find its way to the directory you want to access. Backslashes separate the directories in a pathname. There are two types of pathnames: absolute and relative. An absolute pathname begins with a backslash and tells MS-DOS how to find its way to the desired directory from the root directory. A relative pathname does not begin with a backslash and tells MS-DOS how to find its way to the desired directory from the current directory.

Here is an example of an absolute pathname:

```
\WORDPROC\PERSONAL
```

The pathname above tells MS-DOS to start at the root directory, go down the directory tree to the WORDPROC directory, and then continue down the tree to the PERSONAL directory.

Here is an example of a relative pathname:

```
SALES
```

The pathname above tells MS-DOS to find a directory named SALES that is one level below the current directory. Using the example above, this pathname is valid only if you are logged onto the SPDSHEET directory.

Relative pathnames can tell MS-DOS to move upward in the directory tree as well as downward. The symbol . . (two periods) in a pathname tells MS-DOS to move upward one level in the tree. For example, if the current directory is WORDPROC, the pathname `. .\DOS` tells MS-DOS to move up one level from WORDPROC (in the example above, to the root directory) and then find a subdirectory called DOS.

You can use either relative or absolute pathnames at any time, as long as you give MS-DOS enough information to find the directory or file at the end of the pathname.

Including Filenames With Pathnames

You can use a pathname when you want to access a file that is not in the current directory. You specify the name of the file you want to access at the end of the pathname, like this:

```
TYPE  \WORDPROC\PERSONAL\JEAN1204.DOC
```

This command tells MS-DOS to list on screen (TYPE) the contents of the text file JEAN1204.DOC which is stored in the directory \ WORDPROC \ PERSONAL. You separate the name of a file from the name of a directory with a backslash.

Including Drive Letters With Pathnames and Filenames

To access a file stored on a drive other than the current drive, you need to include a drive designator (A :, for example) as well as a filename. If the file you want is not stored in the current directory of that drive, you also need to include a pathname.

For example, if you are logged onto the root directory of drive C and you want to delete the file JEAN1204.DOC stored in the directory \ WORDPROC \ PERSONAL of drive A, type the following and press Enter:

```
DEL  A:\WORDPROC\PERSONAL\JEANl204.DOC
```

If you change drives and then try to access a file on the previous drive, MS-DOS remembers which directory was the current directory the last time you were logged onto that drive. For example, suppose that the last time you were logged onto

drive C, the root directory was the current directory. Now you are logged onto drive A and you enter the following command to delete the file JEAN1204.DOC:

```
DEL  C:JEAN1204.DOC
```

MS-DOS tries to find the file you want in the root directory of drive C. Because the file is not there, an error message appears on the screen. You need to enter the complete pathname in such a case.

If you do not know which is the current directory on another drive, it is best to include the full pathname whether or not you need it. You can never give MS-DOS too much information.

To change to another directory on another drive, include the drive designator in the command-like this:

```
CD  B:\WORDPROC\PERSONAL
```

Note

MS-DOS provides several commands that make using pathnames easy. When you use the following commands, you don't have to type a full pathname or enter the drive and directory every time you want to access certain files.

- The APPEND command lets you specify a search path for data files and executable files.
- The PATH command lets you specify a search path for program files and commands.
- The SUBST command lets you substitute a drive letter for a directory path, which is convenient if you type long pathnames often.

See your MS-DOS Reference Manual for information on these helpful commands.

Creating Directories

You use the MKDIR command to create directories. For example, to create a LEDGER directory under the root directory of the current drive, type the following and press Enter:

```
MKDIR  \LEDGER
```

You can abbreviate the name of this command to MD. For example, to create a SALES directory under the LEDGER directory, type the following and press Enter:

```
MD  \LEDGER\SALES
```

If the current directory is the LEDGER directory, you can create the SALES subdirectory with this command:

```
MD  SALES
```

Listing the Contents of a Directory

You can use the DIR command to list the contents of a directory. To list the files in the current directory, type the following and press Enter:

```
DIR
```

MS-DOS lists the names of the files in the current directory on the current drive, like this:

```
Volume in drive C is MEMODRIVE
Volume Serial Number is 354C-12E9
Directory of  C:\WORDPROC\PERSONAL
            <DIR>      11-09-89    10:16a
..          <DIR>      11-09-89    10:16a
LETTERS     <DIR>      12-13-89     1:48p
RESUME.713      8293   12-29-89     9:07a
BOOKRPRT       10866   11-18-89    11:43p
       5 File(s)    15013560 bytes free
```

A directory listing includes the following information about each file in the directory:

- Name and extension
- Size of the file in bytes
- Date and time the file was created or last modified (whichever is later).

The directory listing also shows any subdirectories in the directory; they are identified by the letters <DIR>. At the top of the listing, MS-DOS reports any name (Volume label) you have given to the hard disk partition or diskette you are using, the volume serial number (an identifying code assigned by the MS-DOS FORMAT command), and the drive and name of the directory you are viewing. At the bottom of the listing, MS-DOS indicates the the total number of files (including subdirectories) in the directory and the number of bytes on the disk that are still available for use.

If the directory listing is too long to fit on one screen, add the /P switch to the command, like this:

```
DIR /P
```

This switch causes MS-DOS to pause after displaying each screenful of information. To see the next screenful, press any key.

You can also use the /W switch to view a long directory listing:

```
DIR /W
```

This switch displays a wide-format directory listing, like this:

```
Volume in drive C is MEMODRIVE
Volume Serial Number is 354C-12E9
Directory of  C:\WORDPROC\PERSONAL

        ..      LETTERS   RESUME.713   BOOKRPRT
       5 File(s)    15013560 bytes free
```

This type of listing does not show the size of a file or the time and date it was last modified.

To list the contents of a different drive or directory, include the appropriate drive designator and/or pathname in the command. For example, to see what is in the root directory of the diskette in drive A, type the following and press Enter:

```
DIR A:\
```

To display the contents of the WORDPROC\PERSONAL directory (on drive C), type the following and press Enter:

```
DIR  C:\WORDPROC\PERSONAL
```

Displaying a List of Directories

The TREE command displays a tree diagram of all the subdirectories of the directory you specify. For example, to see the names of all the subdirectories of the current directory, type the following and press Enter:

```
TREE
```

The screen displays a tree diagram of the subdirectories of the current directory, for example:

```
C:\LEDGER
├──── RECEIV
├──── PAYABL
└──── SALES
      ├── SALE1989
      └── SALE1990
```

To see a list of all the files in the subdirectories, add the /F switch, like this:

```
TREE /F
```

The screen displays the directory information shown above and the names of all the files in each subdirectory:

```
C:\LEDGER
├──── RECEIV
│         NOVRECV
│         DECRECV
│
├──── PAYABL
│
└──── SALES
      ├── SALE1989
      │        NOVSALES.RPT
      │        DECSALES.RPT
      │
      └── SALE1990
               JANSALES
               FEBSALES
               MARSALES
```

To see the list of subdirectories of another directory, include the pathname:

```
TREE  C:\WORDPROC
```

Removing Directories

You may sometimes want to remove directories you no longer need. However, before you can delete a directory, it must be empty. If it contains any files or subdirectories, MS-DOS displays an error message and does not delete the directory. (Use the DEL command to delete the files in a directory or the COPY command to move them to another directory.)

To delete an empty directory from a disk, use the RMDIR command, or its shorthand equivalent, RD. For example, to remove the directory ACCOUNTS, which is a subdirectory in the LEDGER directory on drive C, type the following and press Enter:

```
RD  C:\LEDGER\ACCOUNTS
```

If you are in the LEDGER directory, you can type the following and press Enter:

```
RD ACCOUNTS
```

Formatting Diskettes

Before you can store data on a new diskette, you must format it. Formatting prepares the diskette so that MS-DOS can write to it. You need to do this only once, before you use the diskette for the first time.

You can reformat previously used diskettes. This process erases all data on the diskette, so be sure you do not want to save any of the data on a used diskette before you format it.

If you plan to use a new diskette to make a backup copy of another diskette, you do not need to use the FORMAT command to format it first. The DISKCOPY command automatically formats a blank diskette if it has never been formatted. (See "Using the DISKCOPY Command," later in this chapter.)

Also see your MS-DOS Reference Manual for information about the optional switches you can use with the FORMAT command to format various diskette types in different types of drives.

Note
You can also format diskettes using the **MS-DOS Shell or the** Epson MENU program. These programs are easy to use because they let you select options **from menus instead of using commands, See your MS-DOS Shell User's Guide and** "Using the Epson MENU Program," later in **this** chapter.

Using the FORMAT Command

1. If you do not have a hard disk, insert your Startup diskette into drive A, and log onto drive A.

   If you have a hard disk, type C : and press Enter to log onto drive C.

2. At the MS-DOS prompt, type FORMAT A: and press Enter. **You see this prompt:**

```
Insert new diskette for drive A:
and press ENTER when ready...
```

3. If necessary, remove the Startup diskette from drive A. Insert the diskette you want to format in drive A and press Enter to start formatting.

4. When the diskette is formatted, you see this message:

```
Format complete
Volume label (11 characters, ENTER
for none)?
```

5. At the Volume label prompt, you can enter a name to describe the information the diskette will contain. The name (the volume label) will appear whenever you view the contents of a directory on the diskette using the DIR command. The volume label can be up to 11 characters long and can consist of any characters or numbers, except for blank spaces and the following symbols:

```
* \ / ¦ ? [ ] : ; < > . , + =
```

After you name the diskette, press Enter. (If you do not want to name the diskette, simply press Enter.) Then you see messages such as the following:

```
1457664 bytes total disk space
1457664 bytes available on disk

    512 bytes in each allocation unit
   2847 allocation units available on disk

Volume Serial Number is 344A-15DB

Format another (Y/N)?
```

6. To format another diskette, press Y and Enter. To return to the MS-DOS command prompt, press N and Enter.

Formatting a diskette to 720KE3

If you want to format a diskette to a capacity of 720KB in your 1.44MB diskette drive, you need to use a switch with the FORMAT command.

The /F:size switch tells the FORMAT command to format the diskette as the size specified in the command even if the capacity of the diskette drive is different. You can format a 1.44MB or a 720KB diskette to a capacity of 720KB using this switch.

For example, to format a 720KB diskette in your 1.44MB diskette drive, enter the following command:

```
FORMAT A: /F:720
```

Use this command when you follow the instructions in this section to format a diskette.

Backing Up Data

It is very important to keep backup diskettes containing copies of the files you create. You can copy your data (text and program files) in several ways:

- You can use the COPY or XCOPY command to copy individual files or groups of files.
- You can use the DISKCOPY command to make an exact duplicate of a diskette.

- You can use the BACKUP command to back up hard disk files to diskettes. Because BACKUP can split large files across two or more diskettes, it makes more efficient use of diskette space than COPY or XCOPY. It also allows you to back up files that are larger than the capacity of your diskettes. To access files created with BACKUP, you use the RESTORE command.

DISKCOPY, BACKUP, and RESTORE are described below. "Copying Files," earlier in this chapter, describes the COPY command. See your MS-DOS Reference Manual for information on XCOPY.

Note
The MS-DOS Shell and the Epson MENU program provide easy ways to perform the functions listed above. See your MS-DOS Shell User's Guide and "Using the Epson MENU Program," later in this chapter.

Using the DISKCOPY Command

The DISKCOPY command lets you make an exact copy of a diskette. (You cannot use DISKCOPY to copy to or from a hard disk.) Because this procedure copies the data byte by byte, the two diskettes must be of the same type. For example, you cannot use DISKCOPY to copy a 720KB diskette to a 1.44MB diskette or a 360KB diskette to a 1.2MB diskette. (Use the COPY command to copy files between different types of diskettes and to copy files to or from a hard disk.)

If the diskette you are copying to has never been formatted, DISKCOPY formats it automatically before copying the data.

The procedure for copying diskettes depends on whether you have one or two diskette drives. Follow the instructions below for your configuration.

Using DISKCOPY with one diskette drive

1. Make sure the diskette you want to copy is write-protected. (See Chapter 3 for instructions.)

2. If you don't have a hard disk, insert your Startup diskette into drive A.

3. If you have a hard disk, type C : and press Enter to log onto drive C. If you do not have a hard disk, type A : and press Enter to log onto drive A.

4. At the MS-DOS command prompt, type the following and press Enter:

```
DISKCOPY A: A:
```

   MS-DOS displays these messages:

```
Insert SOURCE diskette in drive A:

Press any key to continue . . .
```

5. If necessary, remove the Startup diskette from drive A. Insert the diskette you want to copy from (the source diskette) into the drive. Then press any key. DISKCOPY starts to copy the contents of the diskette to the computer's memory. When the computer's memory is full, the screen displays these messages:

```
Insert TARGET diskette in drive A:

Press any key to continue . . .
```

6. Remove the source diskette from drive A and insert the diskette you want to copy to (the target diskette). Then press any key. If the target diskette is not formatted, DISKCOPY formats it before copying data to it.

7. After DISKCOPY copies the data from memory to the target diskette, the screen prompts you to insert the source diskette again to copy the remaining data to the computer's memory (if necessary). Insert the source diskette into drive A and press any key.

8. After DISKCOPY copies the rest of the source diskette's data to the computer's memory, the screen prompts you to insert the target diskette again to copy the remaining data from memory to it. Insert the target diskette and press any key. When the copy is complete, you see this message:

```
Copy another diskette (Y/N)?
```

9. Press Y to copy another diskette or N to return to the MS-DOS command prompt.

Using DISKCOPY with two diskette drives

If you have two diskette drives, follow these steps to copy a diskette:

1. Make sure the diskette you want to copy is write-protected. (See Chapter 3 for instructions.)

2. If you don't have a hard disk, insert your Startup diskette into drive A.

3. At the MS-DOS command prompt, type the following and press Enter:

```
DISKCOPY A: B:
```

MS-DOS prompts you to insert your diskettes:

```
Insert SOURCE diskette in drive A:
Insert TARGET diskette in drive B:
Press any key to continue . . .
```

4. If necessary, remove the Startup diskette from drive A. Insert the diskette you want to copy from (the source diskette) into drive A and the diskette you want to copy to (the target diskette) into drive B. Then press any key to begin copying. If the target diskette is not formatted, DISKCOPY formats it before copying data to it.

5. When the copy is complete, you see this message:

```
Copy another diskette (Y/N)?
```

Press Y to copy another diskette or N to return to the MS-DOS command prompt.

Using the BACKUP Command

Use the BACKUP command to back up the data on your hard disk. It provides a convenient and efficient way to copy the files on the hard disk to diskettes. BACKUP allows you to do the following:

- Split large files across two or more diskettes
- Copy only those files that have been modified since the most recent backup (with the /M switch)
- Copy only those files that have been created (or modified) after a specified date (with the /D switch)
- Copy files in the current directory together with files in all subdirectories of the current directory (with the /S switch)
- Automatically format diskettes before copying files.

Unlike COPY, XCOPY, and DISKCOPY, which make readable copies of files, BACKUP creates files that you cannot access directly. To return files copied with the BACKUP command to the hard disk, you need to use the RESTORE command.

Make sure you have enough diskettes to back up the data on your hard disk drive. For example, it takes about 30 1.44MB diskettes to copy a 40MB hard disk partition that is completely full.

See your MS-DOS Reference Manual for complete instructions on using BACKUP and RESTORE.

The MS-DOS Shell Program

The MS-DOS Shell program allows you to execute many MS-DOS commands and programs by selecting options from menus. Using the MS-DOS Shell, you can run commands without having to remember their exact syntax. MS-DOS Shell makes it easy for you to manage files and directories. It is especially useful for managing the data on a hard disk, where you may have hundreds of files. For example, you can easily view, create, move, rename, and delete files and directories using MS-DOS Shell.

See your MS-DOS Installation Guide for instructions on how to install the Shell program and see your MS-DOS Shell User's Guide for information on how to use it.

Using the Epson HELP Program

The Epson HELP program lets you display information on the screen about MS-DOS commands and programs. You can use HELP in one of three ways:

- At the MS-DOS command prompt, you can type HELP and press Enter to display the HELP menu.
- To bypass the HELP menu you can type HELP followed by the name of the command you want information about.

❑ If you want information about more than one command you can type HELP followed by the names of the commands, each separated by a space.

To use the HELP program, follow these steps:

1. If you don't have a hard disk, make sure your Working diskette is in drive A.

2. If necessary, type A : and press Enter to log onto drive A.

3. If you want to use the HELP menu, type HELP and press Enter. Use the cursor keys to highlight the command you want information about and press Enter.

   If you want to bypass the HELP menu and see information about one command, type HELP followed by the name of that command. For example, to see help information about the COPY command, type the following and press Enter:

   ```
   HELP COPY
   ```

   If you want to see information about more than one command, type HELP and the names of the commands you want information about. Separate each command name with a space, as in the following example:

   ```
   HELP DISKCOPY FORMAT COPY
   ```

   The HELP information for the first command is displayed first.

4. If there is more than one screen of information about the command, you see the prompt PgUp at the top of the screen. Press the PgUp key to display the next screen of text.

If there is yet another screen of text, you see both PgUp and PgDn at the top. Press PgUp to display the next screen of text or PgDn to see the previous screen. On the last page of text you see only PgDn at the top.

5. If you used the HELP menu to chose your help information, press ESC to return to the menu.

   If you requested information about more than one MS-DOS command in the HELP command line, press ESC to see information about the next command.

6. Press ESC to exit the HELP program.

Using the Epson MENU Program

The Epson MENU program lets you display a menu of commonly used MS-DOS commands and select the one you need. It provides an easier way to run MS-DOS commands because you can execute commands without having to remember their exact syntax.

To access MENU, follow these steps:

1. If you do not have a hard disk, insert your Working diskette into drive A and log onto that drive.

2. At the MS-DOS command prompt, type MENU and press Enter. You see this main menu:

```
          EXIT
     File Utilities
     Disk Utilities
     Mode Settings
          Help
 Enter  DOS  Command
```

3. To select an option, use the arrow keys to highlight the option you want and press Enter. Most options contain submenus; keep highlighting your selection and pressing Enter until you select the desired operation.

MENU works by calling external commands which it looks for on the current disk or path. If you do not have a hard disk and the diskette in the current drive does not contain a command called by MENU-for example, BACKUP.COM-you may see an error message like this when you select an option:

```
BACKUP.COM is not on the current disk
or path.

Press any key to continue...
```

If you see a message similar to this one, insert the diskette that contains the command you selected into drive A and try again. (To see which commands are on which MS-DOS diskettes, refer to the list of your Working diskette contents in the MS-DOS Installation Guide.)

Note
If you find that you often have to swap diskettes when you use MENU, see the description of MENU in **your** MS-DOS Reference Manual for **some** recommended **solutions.**

MENU Program Options

Following is a description of each MENU option. Your MS-DOS Reference Manual provides step-by-step instructions for using each option.

File Utilities	Lets you back up and restore files, replace files, compare files, change file attributes, and copy files and directories. This option does the work of the MS-DOS commands BACKUP, RESTORE, REPLACE, FC, ATTRIB, and XCOPY.
Disk Utilities	Lets you check, copy, compare, and format diskettes. This option provides an easy-to-use alternative to the MS-DOS CHKDSK, DISKCOPY, DISKCOMP, and FORMAT commands.
Mode Settings	Lets you change your configuration settings. Also lets you select alternate code pages (character sets) and redirect data from the parallel port to the serial port. Because you can perform so many tasks from the Mode Settings submenus, this option is a simpler alternative to the MS-DOS MODE command.
Help	Lets you access the Epson HELP program.
Enter DOS	Lets you run other MS-DOS commands without leaving the MENU program.

See your MS-DOS Reference Manual for a complete description of the MENU program.

Using an AUTOEXEC.BAT File

You may want to run some commands every time you turn on your computer. To run a command or a series of commands automatically upon startup, you can type the commands in a special file called AUTOEXEC.BAT. When you load MS-DOS, it always looks for this file. If MS-DOS finds an AUTOEXEC.BAT file in the root directory, it executes the commands in that file.

Here are some tasks you can perform using an AUTOEXEC.BAT file:

- Modify the PATH command to include the directories containing other software programs you commonly use. This reduces the number of times you need to change directories or specify pathnames.
- Add the command to start your most commonly used application program (such as a word processing or spreadsheet program) so that it loads automatically when you turn on or reset the computer.
- Change the information the MS-DOS command prompt includes.

See your MS-DOS Reference Manual for instructions on using the PATH command, the PROMPT command, and any other commands you want to include in your AUTOEXEC.BAT file. Also see the chapter on batch processing commands in your MS-DOS Reference Manual for detailed information about AUTOEXEC.BAT files.

Note

If you have a hard disk and you installed MS-DOS according to the instructions in your MS-DOS Installation Guide, MS-DOS automatically sets a path to the directory that contains the MS-DOS commands and the MS-DOS command prompt displays the current drive and directory.

Creating an AUTOEXEC.BAT File

Here is an example of an AUTOEXEC.BAT file:

```
PATH C:\;C:\DOS;C:\WP
PROMPT $P$G
```

The first line tells MS-DOS to look for programs or batch files in the root directory, the DOS directory, and your word processing directory. This way you can run programs in those directories without having to specify pathnames in the commands. The second line changes the MS-DOS command prompt so that it displays your current directory.

To create an AUTOEXEC.BAT file, you can use any command or program that lets you create a text-only file. If you have a word processing program that can save a file as a text-only file (sometimes called an ASCII text file), you can use that program to create your AUTOEXEC.BAT file. Name the file AUTOEXEC.BAT and store it in the root directory of the hard disk or diskette from which you load MS-DOS.

You can also use the MS-DOS COPY or EDLIN command to create an AUTOEXEC.BAT file. Follow these steps to create an AUTOEXEC.BAT file with the COPY command:

1. If you are creating an AUTOEXEC.BAT file on your hard disk, log onto the root directory of your hard disk. (Type `CD C :\` and press Enter.)

   If you are creating an AUTOEXEC.BAT file on your Startup diskette, insert the Startup diskette into drive A and log onto that drive.

2. At the MS-DOS command prompt, type the following and press Enter:

   ```
   COPY CON: d:\AUTOEXEC.BAT
   ```

   where d is the drive that will contain the AUTOEXEC.BAT file you are creating. This drive must be the drive from which your computer loads MS-DOS. For example, if you load MS-DOS from drive C, type the following and press Enter:

   ```
   COPY CON: C:\AUTOEXEC.BAT
   ```

3. Now enter the commands you want to include in the file. Type them exactly as you want MS-DOS to execute them, and in the order you want MS-DOS to perform them. Press Enter at the end of each line. After you type the last command, press Enter to move the cursor to the next line.

4. Press F6 and then Enter. MS-DOS copies everything you typed to the AUTOEXEC.BAT file. From now on, MS-DOS runs the commands in the AUTOEXEC.BAT file every time you turn on or reset the computer.

If you need to change anything in the AUTOEXEC.BAT file later, you can use the same procedure to modify the commands. See your MS-DOS Reference Manual for more information.

Using Memory Beyond 640 KB

The Equity 386SX comes with 1MB 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 memory between 640KB and 1MB as extended or expanded memory. If your computer has more than 1MB of random access memory on SIMMS you can also use this additional memory as extended or expanded memory.

Expanded memory can be used by certain application programs (such as Lotus® l-2-3®) that support the Lotus/Intel/Microsoft Expanded Memory Specification (LIM EMS).

To use expanded memory, you must modify the file CONFIG.SYS, which is stored in the root directory of the hard disk or diskette from which you load MS-DOS. If you have a word processing program that can save a file as a text-only file (also called an ASCII text file), you can use that program to modify the CONFIG.SYS file. Start your word processing program, load the file CONFIG.SYS, and then add the following line to the file:

```
DEVICE=EMM386.SYS
```

You can add one or more of the optional switches explained in the next section to this command line. Then save the file as an ASCII text file and reset the computer.

If you do not have a word processing program capable of saving an ASCII text file, you can modify CONFIG.SYS using the MS-DOS COPY or EDLIN command. To modify CONFIG.SYS using the COPY command, follow these steps:

1. Log onto the root directory of the hard disk or diskette from which you boot MS-DOS.

2. Type `COPY CONFIG.SYS + CON` : and press Enter.

3. Type DEVICE=EMM386.SY S **and press** Enter. You can add one or more of the optional switches explained in the next section to this command line.

4. Press F6 and then Enter.

5. Reset the computer.

Using EMM386.SYS

EMM386SYS is an expanded memory manager that lets you use extended memory to emulate expanded memory so that you can use application programs that support LIM EMS.

Note
Do not use EMM386.SYS if you installed an expanded **memory** option card. **Use the device driver that came** with the memory card. See the documentation that came with the card for instructions.

The full syntax for the command line that activates EMM386SYS is:

DEVICE= [d:][path] *EMM386.SYS [size] [X:mmmm-nnnn] [Mx]*

The items in brackets are optional; you do not type any brackets when you enter this command. The following paragraphs describe the items in the command line.

The d:path parameter specifies the pathname. You specify the pathname if the file EMM386.SYS is not in the root directory of the hard disk or diskette from which you load MS-DOS. For example, if EMM386.SYS is in a directory called \DOS on drive C, include the pathname, like this:

```
DEVICE=C:\DOS\EMM386.SYS
```

The size parameter allows you to specify the amount of extended memory to be used as expanded memory. You specify the amount of memory in kilobytes. If you do not specify a size, the default value is 256KB.

This example tells the computer to use 1024KB of extended memory as expanded memory:

```
DEVICE=EMM386.SYS  1024
```

The X:mmmm-nnnn parameter specifies a range of memory to exclude from the EMM386.SYS command in hexadecimal notation. EMM386.SYS does not locate its page frame or other mappable pages in this memory range.

For example, to specify 1024KB of memory as expanded memory and ensure that EMM386SYS does not locate any pages in the address range C400 to C7FF, include this command in your CONFIG.SYS file:

```
DEVICE=EMM386.SYS  1024  X:C400-C7FF
```

You can include more than one X: parameter in your DEVICE=EMM386.SYS command to exclude more than one range of memory.

Note
Do not use the X: parameter unless you experience a memory conflict with a memory option card.

The Mx parameter specifies a particular address for the EMM386.SYS page frame. You specify the address by substituting a code for x from this table:

x	Page frame begins at segment
0	C000
1	C400
2	C800
3	CC00
4	D000
5	D400
6	D800
7	DC00
8	E000

For example, if you want EMM386.SYS to locate its page frame at the address C800, include this command in your CONFIG.SYS file:

```
DEVICE=EMM386.SYS  M2
```

Do not use the Mx parameter unless you need to force EMM386.SYS to use a particular address.

Note

If you install devices that use expanded memory, be sure the DEVICE=EMM386SYS command appears in your CONFIG.SYS file before the commands to install those devices.

For more information on using EMM386.SYS, see your MS-DOS Reference Manual.

Chapter 5
Installing Options

You can enhance the performance of your Equity 386SX by adding a variety of options, including the following:

- ❑ An 80387SX math coprocessor
- ❑ Memory modules
- ❑ A memory card
- ❑ Other option cards.

A math coprocessor speeds up the numeric calculations your computer performs when using certain application software. If you want to install a math coprocessor in your computer, ask your authorized Epson dealer to do it for you.

Memory modules allow you to increase the amount of memory in your computer. This chapter briefly describes the types and amounts of memory modules you can use in the Equity 386SX. If you want to install memory modules in your computer, however, ask your dealer for help.

An option card is a circuit board you install in your computer to add a particular function. A memory card is a type of option card that increases the total amount of memory in your computer, over and above any installed memory modules. Other types of option cards contain a device, such as a modem, or provide an interface, such as a connector to which you connect a monitor. This chapter describes how to install option cards and configure the computer for use with them.

Adding Memory Modules

The standard Equity 386SX system comes with 1MB of on-board memory. You can add SIMMs (single inline memory modules) to increase the amount of memory in the computer. With added SIMMs, the total amount of memory in your computer must be one of the following: 2MB, 4MB, 6MB, 8MB, 10MB, 12MB, or 14MB.

You install SIMMs on the SIMM card that comes with your computer. Any SIMMs you install must have 70ns (nanosecond) access speed or faster to operate in the Equity 386SX. Check with your dealer to ensure that the correct type of SIMMs are used.

There are 16 SIMM sockets on the SIMM card organized in two banks containing eight sockets each. Each socket can contain either one 256KB or one 1MB SIMM. The following table shows the possible configurations for the Equity 386SX:

Possible Equity 386SX SIMM configurations

Left bank								Right bank								Total MB
1A	2A	3A	4A	5A	6A	7A	8A	12A	13A	14A	15A	16A	17A	18A	19A	
																1MB
						*	*	*	*							2MB
					1	*	*	*	.	1						4MB
				1	1	*	*	.	.	1	1					6MB
			1	1	1	*	.	.	*	1	1	1				8MB
		1111			*	.	*	*		1	1	1	1			10MB
	1	1	1	1	1	*	*	*		1	1	1	1	1		12MB
1	1	1	1	1	1	*	*	.	*	1	1	1	1	1	1	14MB

* = 256KB SIMMs
1 = 1MB SIMMs

Two sockets in each bank accept only 256KB SIMMs. These sockets are labelled 7A, 8A, 12A, and 13A. The rest of the sockets accept only 1MB SIMMs. You must fill all of the 256KB SIMM sockets before using any of the 1MB sockets.

SIMMs must be distributed evenly between the two banks. For example, if you want to have 4MB of memory, install two 256KB SIMMs and one 1MB SIMM in the left bank and two 256KB SIMMs and one 1MB SIMM in the right bank. You cannot install both of the 1MB SIMMs in just one of the banks.

Note

Once **SIMMs have been installed, you should be sure your dealer has set a jumper on the SIMM card before you turn on your computer. See "Changing Jumper Settings" later in this chapter for more information.**

After SIMMs have been installed in your computer, you need to run the Setup program on your Reference diskette to set the computer's memory configuration, as described in Chapter 2. Also see "Post-installation Setup," later in this chapter.

Note

If you want to use extended memory as expanded memory, you can use the EMM386,SYS utility, See "Using Memory Beyond 640KB" in Chapter 4 and your MS-DOS Reference Manual for more information.

Installing Option Cards

The Equity 386SX has five standard option slots and one special option slot occupied by the card that controls the serial and parallel interfaces (known as the SP card). The video card that controls your monitor occupies one standard slot. You can buy additional option cards from authorized Epson dealers as well as other vendors.

If you want additional memory, you can install a memory card in your computer. (You can install a memory card whether or not you have already added SIMMs.) With added SIMMs and a memory card, the Equity 386SX can have up to a total of 16MB of memory. Most popular memory cards are compatible with the Equity 386SX.

This section explains how to:

- ❑ Remove the computer's cover
- ❑ Install an option card
- ❑ Change jumper settings
- ❑ Remove an option card
- ❑ Replace the cover.

Note
After you install or remove an option card, see "Post-installation **Setup" at the end of this chapter to configure your computer to operate with an option** card. If **you install a memory card, also see "Post-installation Setup for Memory Cards" in this chapter.**

Removing the Cover

To install an option card, you need to remove the cover from your Equity 386SX. Follow these steps:

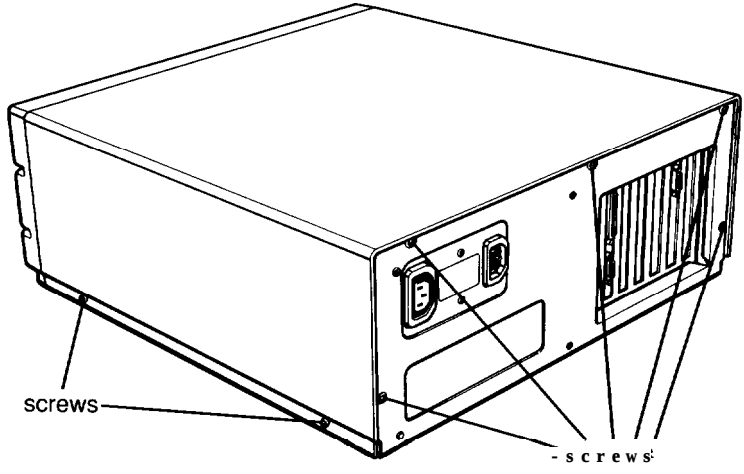
1. Turn off the computer and then any peripherals (including the monitor and printer) that are attached to it.

2. Disconnect the computer's power cable from the electrical outlet and from the back panel. Then disconnect any peripheral cables that are connected to the computer.

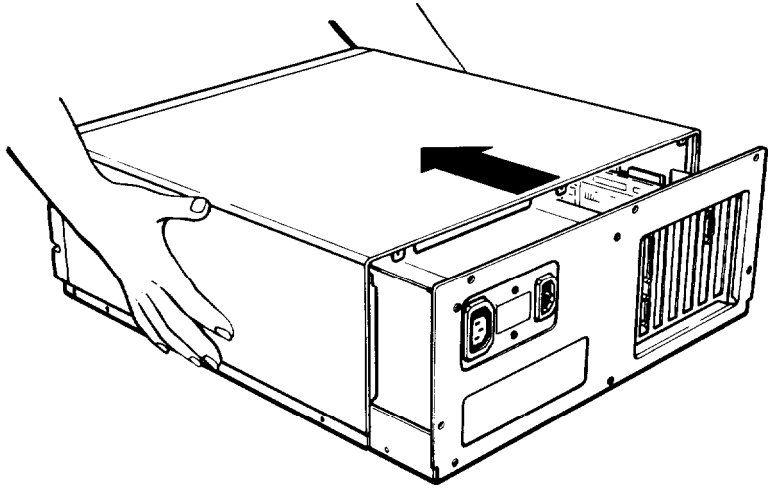
3. Disconnect the keyboard.

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

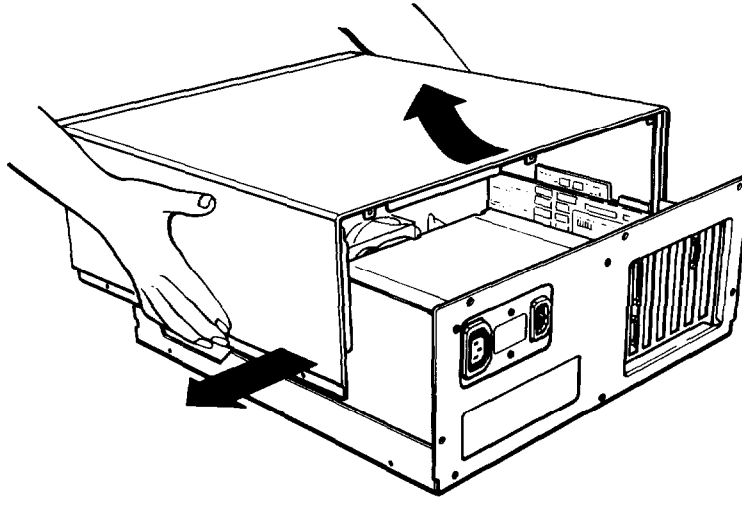
5. As shown below, the top cover is secured by five screws on the back panel and four screws on the side panels (two on each side). Remove the screws and set them safely to one side so you do not lose them.



6. Facing the front panel, grasp the two sides of the cover and carefully pull it straight toward you and away from the back of the computer (as shown in the following illustration), until it is a few inches away from the back panel.

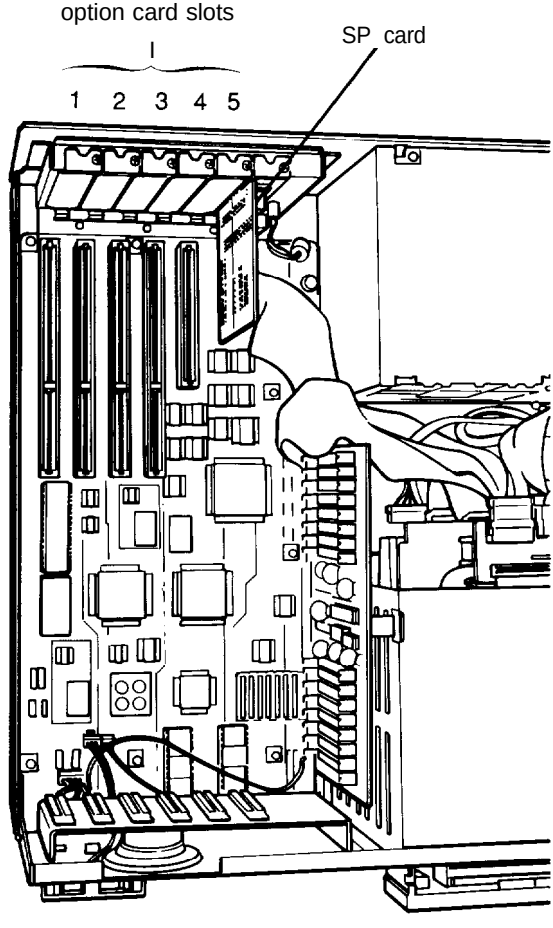


7. After the cover's front panel clears the power button and the diskette drive, you can lift off the cover. Separate the cover's sides from the inside of the computer by pulling them outward slightly, as shown below. Then lift off the cover and set it aside.

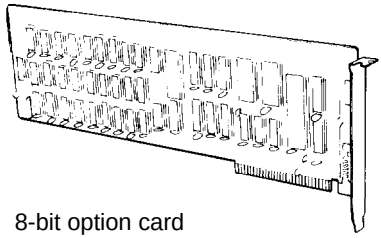


Installing an Option Card

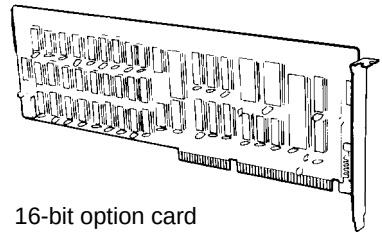
The illustration below shows the five standard option slots inside the Equity 386SX. (The SP card occupies a special additional slot, number 6.)



Slot 5 is designed for an 8-bit option card, and slots 1 through 4 are designed for 16-bit cards. As you can see below, a 16-bit card has a second connector along the bottom.



8-bit option card



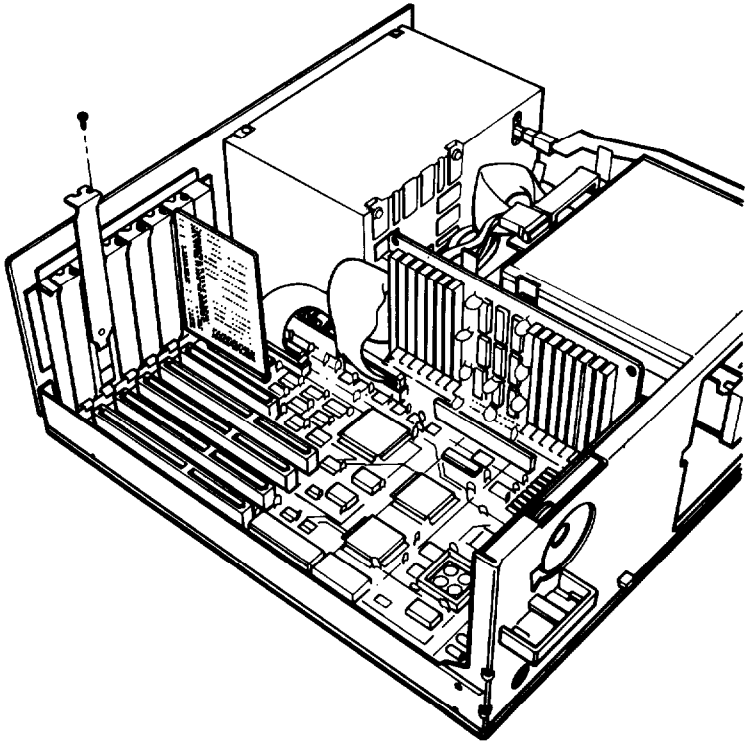
16-bit option card

Usually, it does not matter which slot an option card occupies as long as the card 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 8-bit card with an additional connector along the bottom must go in the 8-bit slot.
- ❑ If you install an additional disk drive that uses a controller card, place the card as close as possible to the disk 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.

Follow these steps to install an option card:

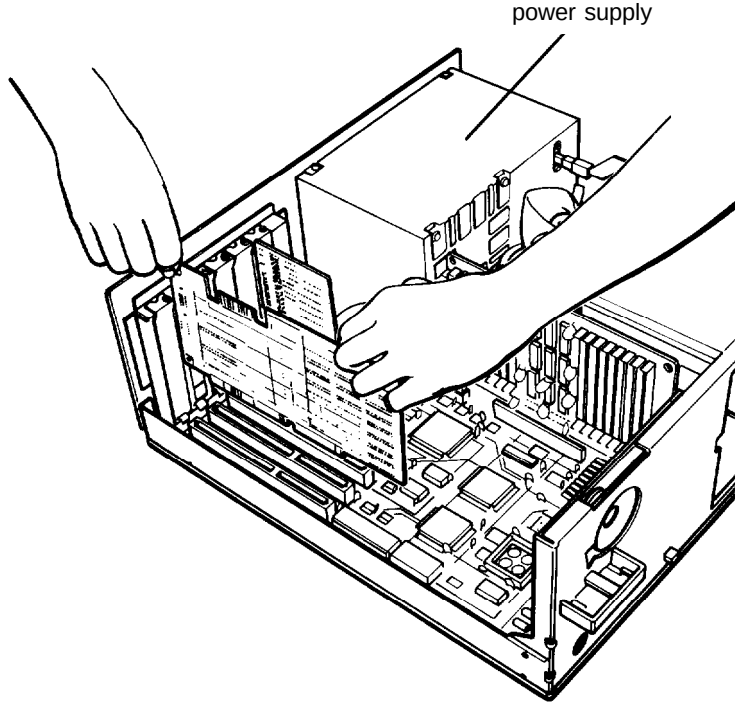
1. Decide which slot you want to use. Then remove the retaining screw from the top of the metal option slot cover; hold on to the screw as you remove it so it doesn't fall into the computer. Lift out the slot cover.



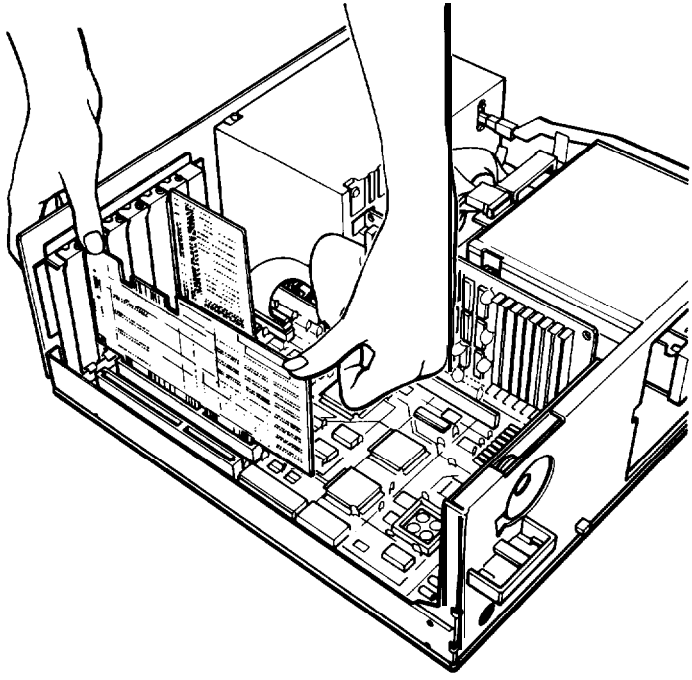
Keep the screw to secure the option card to the computer. Store the slot cover in a safe place in case you remove the option card later.

2. Unpack the option card and adjust any switches or jumpers on it if necessary. (Check the option card instructions to see if this is necessary.) When you handle the card, be careful not to touch any of the contacts on the circuit board, especially the gold-edged connector pins. 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.

3. Grip the card firmly by the top corners and position it at the top of the slot, as shown below. Make sure the connector pins point down and the component side faces the power supply inside the computer.

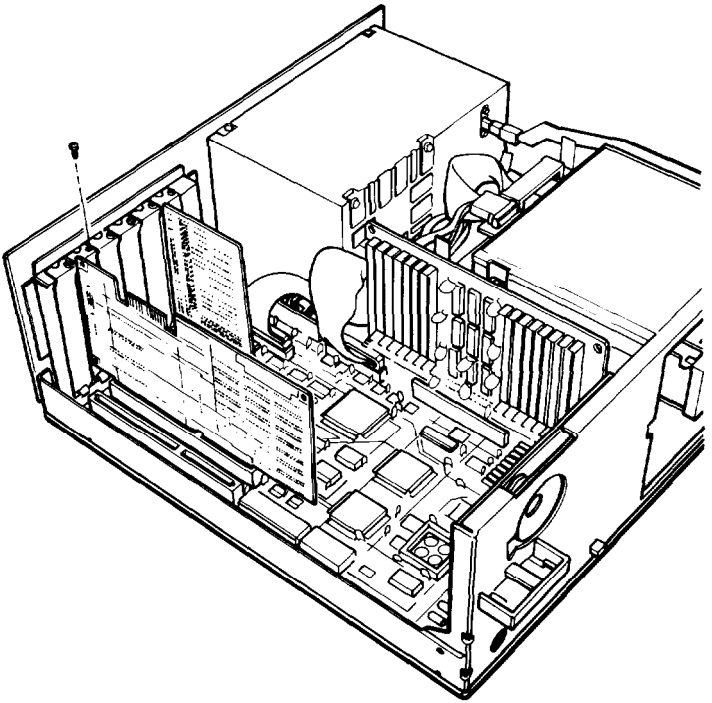


4. Insert the card in the slot, guiding it straight down. Once the connector pins reach the connector slot, push the card downward firmly (but carefully) to fully insert it, as shown in the following illustration. You should feel the card fit into place.



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.

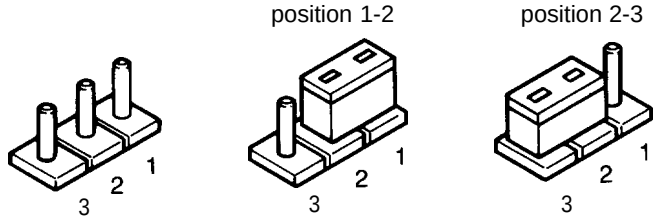
5. Secure the end of the card to the back of the computer with the retaining screw.



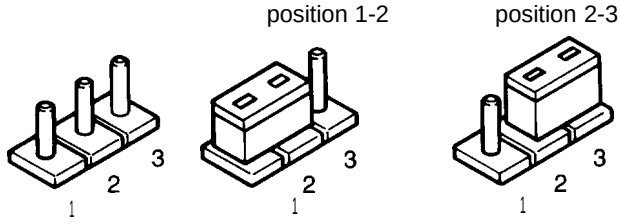
Changing Jumper Settings

If you change your computer's configuration, you may need to change a jumper setting in the computer. A jumper is a small electrical connector that controls one of the computer's functions.

A jumper's setting is determined by where the jumper is placed: either between pin 1 and pin 2 (position 1-2) or between pin 2 and pin 3 (position 2-3), as shown below:



Jumper J5 on the main system board is different from the other jumpers in the Equity 386SX. The pin positions for jumper JS are shown below:



The jumpers you may need to change are on the main system board. There is an additional jumper on the SIMM card that you may want to check if your dealer has installed SIMMs for you. The following tables list the jumper settings and their functions.

Main system board jumper settings

Jumper number	Jumper setting	Function
J1	1-2	Math coprocessor installed
J1	2-3*	No math coprocessor installed
J2	1-2	Password skip enabled
J2	2-3*	Password skip disabled
J3	1-2	Disables the built-in hard disk drive controller so you can use a hard disk drive controller on an option card in your computer
J3	2-3*	Enables the built-in hard disk drive controller
J4	1-2*	Sets the P-ROM type to 256 Kbits
J4	2-3	Sets the P-ROM type to 512 Kbits
J5	1-2	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; the device must use the IRQ 12 signal
J5	2-3*	Enables the built-in mouse connector for use with a mouse which uses the IRQ 12 signal

* Factory setting

SIMM card jumper settings

Jumper number	Jumper setting	Function
J1	1-2	SIMMs have been installed for additional memory
J1	2-3*	No SIMMs have been installed

* Factory setting

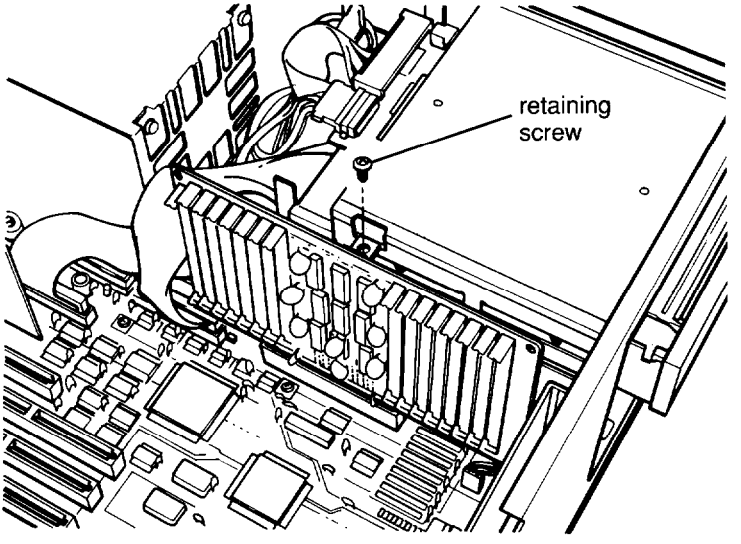
If you need to change or check any jumper settings, perform the following procedures in the order listed here, as necessary for your system:

- ❑ Follow the instructions in “Removing the Cover” earlier in this chapter to remove the computer’s cover.
- ❑ If you need to change any jumper settings for jumpers J1, J2, J3, or J4 on the main system board, remove any option cards that may be blocking your access to those jumpers. See “Removing an Option Card” below.
- ❑ If you need to change the jumper setting of jumper J5 on the main system board, remove the SIMM card to access the jumper. See “Removing the SIMM card” below.
- ❑ Change the main system board jumper settings as necessary. See “Changing the main system board jumper settings” below.
- ❑ If you need to check the SIMM card jumper setting, see “Checking the SIMM card jumper setting” below.
- ❑ Replace any option cards you removed. See “Replacing the options cards” below.
- ❑ Follow the instructions in “Replacing the Cover” later in this chapter to replace the computer’s cover.

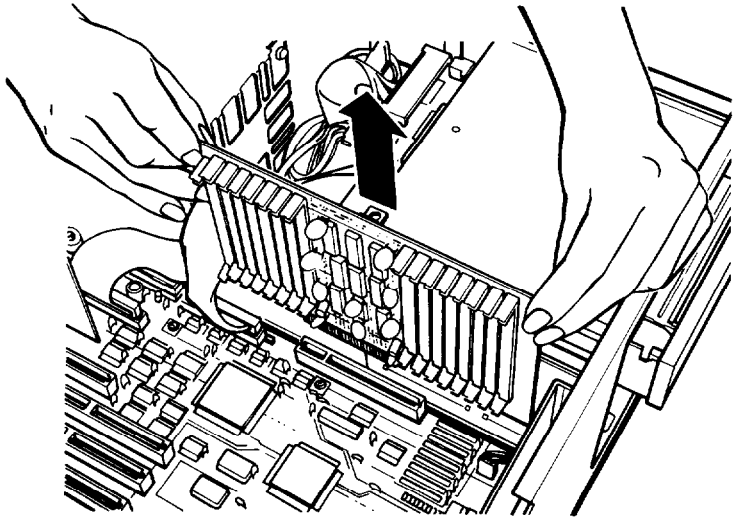
Removing the SIMM card

To reach jumper J5 on the main system board, you need to remove the SIMM card. Follow these steps:

1. Remove the retaining screw that secures the SIMM card bracket to the inside of the computer, as shown below. (Do not remove the screw securing the SIMM card to the bracket.) Be careful not to drop the screw.



2. Remove the SIMM card from its slot on the main system board by pulling it straight up, as shown below. Then set it on a soft surface with the components facing up.

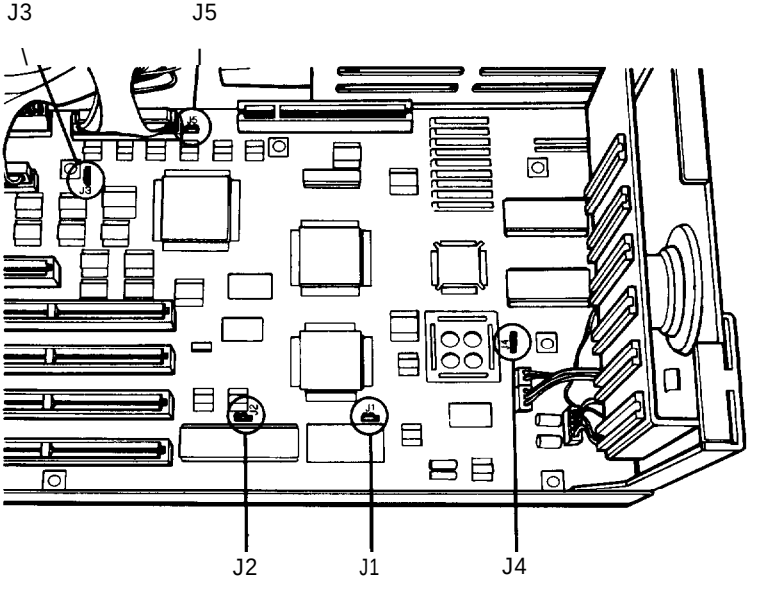


3. Change the setting of jumper J5 as necessary. (See "Changing the main system board jumper settings" below.) Avoid disturbing the cable connection next to the jumper.

4. To replace the SIMM card, reinstall the card in the SIMM card slot on the main system board and secure it to the inside of the computer with the retaining screw.

Changing the main system board jumper settings

The illustration below shows the locations of jumpers J1 through J5 on the main system board. Check the table above to see which one(s) you need to change.

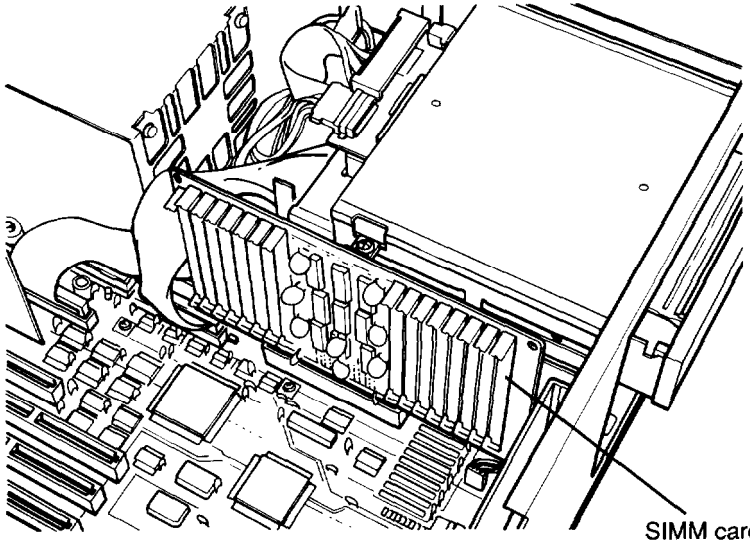


To move a jumper from one position to the other, use your fingers or needle-nose pliers or tweezers to pull it off its current pins and gently move it to the other position. Be careful not to lose the jumper or leave it out of the computer. Also take care not to damage any surrounding components on the main system board.

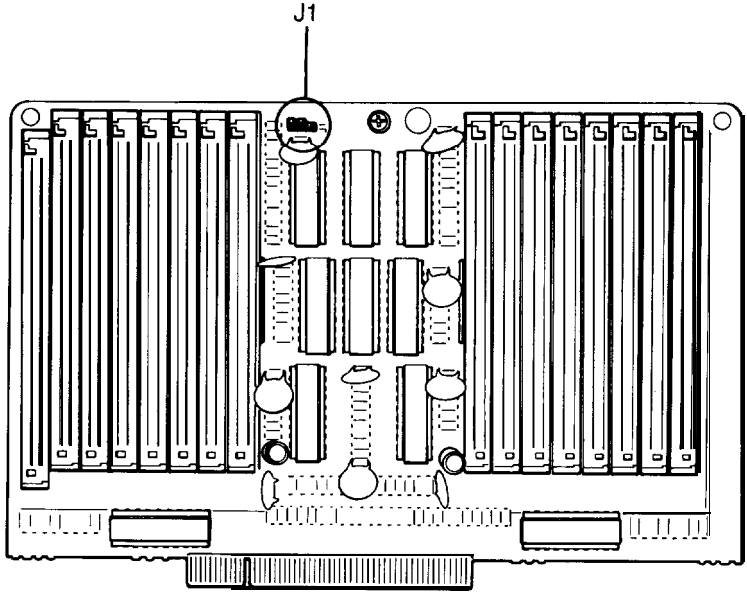
Checking the SIMM card jumper setting

If your dealer has installed SIMMs for additional memory, you may want to check the jumper setting on the SIMM card inside your computer.

The illustration below shows the location of the SIMM card in the computer.



The following illustration shows the location of jumper J1 on the SlMM card. The jumper should be in position 1-2 if SIMMs have been installed. If you are not using SIMMs, the jumper should be set to position 2-3.



If the jumper setting is incorrect, move it to the correct setting. You do not have to remove the SIMM card to change the jumper setting.

Replacing option cards

To replace any option cards you may have removed to access the main system board, reinstall the card in the appropriate slot and secure it to the back of the computer with the retaining screw.

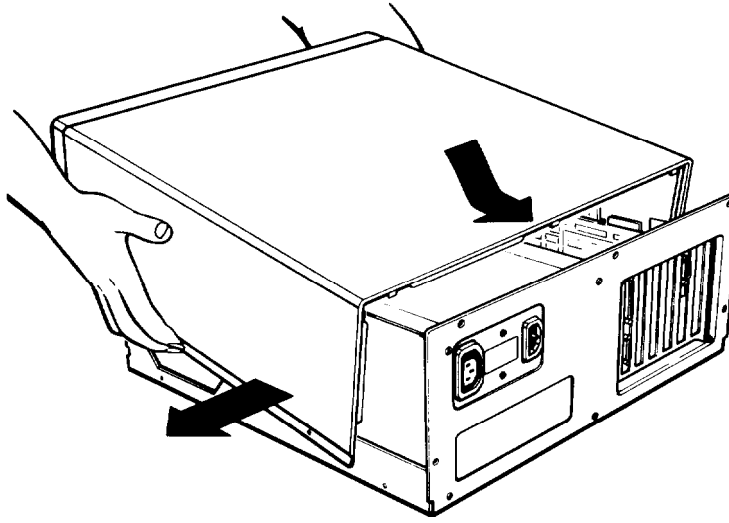
Removing an Option Card

If you later need to remove an option card, simply reverse the steps you followed to install it. Remove the screw securing the card to the back of the computer and pull the card straight up and out of the slot. Then carefully wrap the card, preferably with the original packing materials, and place it inside its box for safe storage. Cover the end of the empty option slot with the original metal cover and secure it with the retaining screw.

Replacing the Cover

After you install (or remove) an option card, follow these steps to replace the computer's cover:

1. Facing the front of the computer, position the cover on the computer as shown below. Pull the cover's sides outward slightly.



2. Lower the cover and slide it toward the back of the computer until it fits into place. The diskette drive fits through the opening in the front panel and the power button fits into its cover.

3. To secure the cover, replace the five screws on the back panel and the two screws on each side panel.

4. Return the computer to its original position and place the monitor on top, if that is where you use it. Then reconnect the computer to the monitor, printer, keyboard, and any other peripherals you have.

5. Check to be sure the power button on the computer is off. Then reconnect the power cable to the back of the computer and to an electrical outlet.

Post-installation Setup for Memory Cards

After you install a memory card in your computer, you need to configure your computer to use it. Follow these guidelines:

- ❑ Use the Setup program on your Reference diskette to automatically reset your computer's configuration to include the memory on your installed memory card. See Chapter 2 for instructions.

- ❑ Use the setup program that comes with your memory card to configure the computer for use with the installed memory card. See your memory card manual for instructions.

- ❑ If you installed a memory card and you want to use any of its memory as expanded memory, use the EMM386.SYS utility. See "Using Memory Beyond 640KB" in Chapter 4 and your MS-DOS Reference Manual for more information.

Also see "Post-installation Setup" at the end of this chapter for more information on setting up your computer for use with an option card.

To configure your computer for use with the RampagePlus® 286 memory card, you need to use CORFIX, an Epson utility on your Reference diskette, and SMART, the RampagePlus 286 setup program. You must use CORFIX before you use SMART. Follow these steps:

1. Make sure that the computer is on and that MS-DOS is loaded. (See "Loading MS-DOS" in Chapter 4 for instructions.)

2. Insert the working copy of your Reference diskette into drive A.

3. If necessary, type A: and press Enter to log onto drive A.

4. At the A> prompt, type CORFIX and press Enter. The following messages appear:

```
This program will configure the
system to work with the SMART
utility when installing the
RampagePlus 286.

SMART can only be executed
immediately after this
configuration program.
Continue ? (Y/N)
```

5. To configure your computer for use with RampagePlus 286, press Y. (If you want to exit to MS-DOS without configuring your computer, press N.) If you press Y, you see the MS-DOS A> prompt and this message:

```
Configuration completed. The SMART
installation utility may now be
used.
```

6. Use the SMART setup program now. See your RampagePlus 286 manual for instructions.

Note

You can also execute CORFIX from your hard disk if you copied the CORFIX utility from the Reference diskette to your hard disk.

Post-installation Setup

After you install or remove a math coprocessor, memory modules, or a memory card, you need to run the Setup program on your Reference diskette so it can automatically update the computer's configuration information.

If you install or remove any other type of option card or device, such as a video adapter card or a diskette drive, it is important to run the Setup program to check if you need to change any configuration information. For example, if you add a hard disk, you need to let the computer know that it has the additional drive. See Chapter 2 for instructions.

Additionally you may also need to add some commands in your configuration files. See the MS-DOS Reference Manual and the manual that comes with the option card for instructions.

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

- ❑ System memory
- ❑ 80387SX math coprocessor
- ❑ Serial and parallel ports
- ❑ Disk drives
- ❑ Monitors and display adapters
- ❑ Dot-matrix printers.

See Appendix C for instructions.

Appendix A

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 the suggestions in this chapter, you can run diagnostics checks on the various components of your computer system. See Appendix C for instructions.

If the suggestions in this appendix or Appendix C do not solve the problem, contact your authorized Epson dealer. Your dealer may be able to solve the problem; if not, he or she can refer you to an Authorized Epson Customer Care Center for service. If necessary, call the Epson Customer Information number (1-800-922-891 1) for the location of your nearest Authorized Epson Customer Care Center.

When you contact your dealer or Customer Care Center, be ready to provide the serial number of your computer, its configuration (including the type of disk drives, monitor, and option cards), and the names and version numbers of any software you are using.

Error Messages

If the screen displays an error message when you turn on the computer, see Appendix B, "Power-on Diagnostics." If the screen displays an error message while you are running system diagnostics, described in Appendix C, check the error message table at the end of that appendix for the cause. Then give this information to your Epson dealer.

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 the computer's front panel on? If not, remove any diskettes and turn off the power. Check that the power cord is securely connected to both the AC inlet on the back panel and an electrical outlet.

   WARNING
   If you need to turn off the computer for any reason, always wait at least five seconds before turning it back on again. You can damage the computer if you rum it off and on rapidly.

   Replace the Startup diskette, if necessary, and turn the computer on again.

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

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

4. If the computer starts but is taking a long time to complete its power-on diagnostics, you may have disabled the Fast boot function and made a change in your computer's configuration. Power-on diagnostics may take up to five minutes to complete if this is the case. If the computer does not display the MS-DOS prompt after five minutes, press the RESET button and try again. If the computer still does not complete power-on diagnostics after five minutes, contact your Epson dealer.

Note

If the computer starts but you can't see anything on the screen, see "Monitor Problems,'" later in this appendix,

The Computer Locks Up

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

1. Some computer operations take longer than others to complete. For example, the computer takes longer to sort a database than to accept a single typed character. If your computer is still locked after a reasonable length of time, proceed to the next step.

2. If you are running an application program, see "Software Problems," later in this appendix. This section covers certain problems caused by application programs.

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

4. 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. In most cases, this solves the problem. See Chapter 3 for more information on stopping a command or program.

5. If your computer still does not respond, you can reset it with the RESET button. Follow the instructions in Chapter 3.

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

Password Problems

If you set a power-on password using the Setup program, you must enter this password after you turn on your computer before you can use the system. When you turn on the computer, the screen displays a key prompt (). If you do not enter the correct password, you see an *X* on the screen to indicate it is incorrect. The computer gives you a second and third chance to enter it correctly.

If after three tries you have not entered the correct password, the computer locks up and does not respond to your keyboard entries.

If you have any trouble using your power-on password, try the following:

1. If you think you know the correct password, reset the computer and try again. (You'll get three chances, as before, to enter the correct password.) See Chapter 3 for instructions on using the password.

2. If you know the current power-on password but you want to change or delete it, see Chapter 3 for instructions.

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.

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.

You should disable the existing password if you want to be able to set a new password later without having to reset a jumper on the main system board again. See "Disabling an existing password" below for instructions.

If you disable the password function, you cannot set a new password unless you perform the steps to 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 and follow the instructions under "Changing Jumper Settings" in Chapter 5 to enable the password skip function by setting jumper J2 to position 1-2.
2. Insert the Reference diskette into 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 as if you are going to enter a new password. However, when you see the password prompt, press Enter immediately. This clears out the existing password.

   Make sure you save your password setting and that you highlight * * EXIT AND SAVE * * when you leave the Setup program.

4. Turn off the computer and follow the instructions under "Changing Jumper Settings" in Chapter 5 to disable the password skip function by setting jumper J2 to position 2-3.

5. Turn on the computer again. You do not see the key prompt ( ) and the computer loads MS-DOS.

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, if you want to use the password function later, your old password is still stored as the current password. If you want to be able to easily set a password later, follow the instructions in "Disabling an Existing Password" above.

To disable the password function, follow the instructions under "Changing Jumper Settings" in Chapter 5 to change the setting of jumper J2 on the main system board to position 1-2.

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 and follow the instructions under "Changing Jumper Settings" in Chapter 5 to enable the password skip function by setting jumper J2 to position 1-2.

2. Insert the Reference diskette into 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.

   Make sure you save your password setting and that you highlight * * EXIT AND SAVE * * when you leave the Setup program.

4. After you exit Setup, you see this message:

   ```
   TURN OFF POWER AND CORRECT JUMPER
   SETTING TO ENABLE PASSWORD CHECKING
   ```

5. Turn off the computer and follow the instructions under "Changing Jumper Settings" in Chapter 5 to disable the password skip function by setting jumper J2 to position 2-3.

6. Turn on the computer. You see the key prompt ( ). Enter your new password to access the system. (See "Using the Power-on Password" in Chapter 3.)

Note

e sure to remember 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 the next time you turn on your computer.

Keyboard Problems

If you are having trouble with the keyboard, check the following:

1. If the screen displays a keyboard error 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 nothing happens when you type on the keyboard, see "The Computer Locks Up," earlier in this appendix.

3. If the cursor keys do not work properly, the Num Lock function may be on. When Num Lock is on, the numeric/arrow keys on the numeric keypad work only as numbers. Check to see if the Num Lock indicator in the upper right corner of the keyboard is lit; if it is, press the Num Lock key to turn off the function.

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 the power light on the monitor is lit. If the power light is on but you still do not see anything on the screen, check the monitor's brightness and contrast controls.

2. If the power switch is on but the power light is not, turn off the monitor's power, wait five seconds, and turn the power back on. Wait a few seconds to see if the screen displays any text.

3. 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 wall outlet. Plug a lamp into the wall outlet and turn it on to see if the outlet supplies power.

4. If you still do not see anything on the screen, make sure your monitor is connected to the computer properly. See "Connecting the Monitor" in Chapter 1 for more details. Also check the monitor manual for instructions on how to connect it to the computer.

5. Make sure your monitor and display adapter card match, and, if your display adapter card has any switches or jumpers, be sure they are set properly. See "Connecting a Monitor" in Chapter 1 and the documentation that came with your monitor and display adapter card for instructions.

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

7. Be sure you have chosen the correct display adapter card type in the Setup program. See "Setting the Display Adapter Card Type" in Chapter 2.

8. If you are still having difficulty with your monitor, try running either the Monochrome Display Adapter and CRT Check or the Color Graphics Display Adapter and CRT Check, as described in Appendix C. If the diagnostics program indicates an error, contact the place where you bought the monitor.

Diskette Problems

If you have trouble accessing data on a diskette, try the following steps:

1. Is the diskette inserted properly? You may have inserted it 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. (See Chapter 3 for detailed instructions on inserting and removing diskettes.)

2. 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 successfully repeat the operation in the new drive, the trouble may be in your diskette drive. See "Diskette Drive Problems," below.

3. Have you inserted the right type of diskette? The diskette type normally appears on the manufacturer's label. Here are the guidelines:

   - In a drive that has a storage capacity of 1.44MB, such as drive A, use 3 1/2-inch, double-sided, high-density, 135 TPI diskettes. This type of drive can also read and write to 720KB diskettes.

   - In a drive that has a storage capacity of 720KB, use 3 1/2-inch, double-sided, double-density, 135 TPI diskettes. You cannot use 1.44MB diskettes in this drive.

   - In a drive that has a storage capacity of 1.2MB, use 5 1/4-inch, double-sided, high-density, 96 TPI diskettes. You can also use 360KB diskettes in this drive, but if you write to a 360KB diskette in this drive, you may have trouble using the diskette in a 360KB drive later.

- ❑ In a drive that has a storage capacity of 360KB, use 5 1/4-inch, double-sided, double-density, 48 TPI diskettes. You cannot use 1.2MB diskettes in this drive.

See "Types of Diskette Drives" in Chapter 3 for more information.

4. If your diskette is the right type for your drive, check to see if the diskette is write-protected. On a 3 1/2-inch diskette, the write-protect switch may be set to the write-protect position or there may be no switch. On a 5 1/4-inch diskette, there may be a write-protect tab over the notch on the side of the diskette or there may be no notch at all. You cannot store or revise data on a write-protected diskette. See Chapter 3 for information on write-protecting diskettes.

   Some application programs do not function properly if the diskette is write-protected. Check the program manual.

5. If MS-DOS displays errors when you try to access data, your diskette may be defective. MS-DOS error messages that may indicate a defective diskette include:

   - ❑ 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 diskette drive. If you use a 5 1/4-inch diskette, make sure the diskette drive latch is closed. Try the operation again. If the problem persists, try removing the diskette and reinserting it. This may solve the problem if the diskette was not seated properly in the drive.

   Is the diskette formatted? A new diskette must be formatted before you can store data on it. See Chapter 4 for instructions on formatting diskettes.

If the error message still occurs, you probably have a defective diskette. Use the MS-DOS COPY command to copy the files from the diskette onto another diskette. (See "Copying Files" in Chapter 4 for instructions.)

If you are not able to copy all the files from the defective diskette, copy as many as you can and then use the MS-DOS program RECOVER. This program recovers all the data that it can read on the diskette. It is specifically designed to work on disks that may be defective. See your MS-DOS Reference Manual for instructions on using RECOVER.

Note
RECOVER renames all files on the diskette, so use it only after you have copied as many files as possible with the MS-DOS COPY command.

6. If you see no error messages but there is something wrong with the data in a file, MS-DOS 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.

   To make the necessary repairs, use the MS-DOS program CHKDSK. See your MS-DOS Reference Manual for instructions.

Diskette Drive Problems

Follow these steps if you are having difficulty with a diskette drive:

1. If the diskette is not turning or 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** with different diskettes.

2. If your diskette drive read/write heads are dirty, you may occasionally see this MS-DOS error message:

   ```
   Error Reading Drive d: Abort,
   Retry,  or Fail?
   ```

   To clean the read/write heads, use a diskette drive head cleaning kit, available in most computer stores.

3. If you are still having problems with your diskette drive, try running the Diskette Drives and Controller Check described in Appendix C. If the diagnostics program indicates an error, consult your Epson dealer.

Hard Disk Problems

If you are having problems with the hard disk in your computer, try the following steps:

1. Be sure you have installed MS-DOS on the hard disk according to the instructions in the MS-DOS Installation Guide.

2. If you have installed MS-DOS on the hard disk but it does not load MS-DOS when you turn on the computer, it may be missing one of the MS-DOS system files. Turn off your computer and insert your Startup diskette into drive A. Then turn on your computer again.

   Type `C :` and press Enter to log onto the hard disk. If this works, the next step is to make sure the file COMMAND.COM is in the root directory of the hard disk. Type `DIR` and press Enter.

   If COMMAND.COM is in the root directory, use the MS-DOS COMPARE command to compare the COMMAND.COM file on your diskette with the COMMAND.COM file on the hard disk. (See your MS-DOS Reference Manual for instructions on using COMPARE.) If the files do not match, use the COPY command to replace COMMAND.COM on the hard disk with the COMMAND.COM file on your diskette. Type the following and press Enter:

   ```
   COPY A:COMMAND.COM C:
   ```

3. If the hard disk still does not work, the root directory of your hard disk may be missing some hidden system files. (Hidden files are not displayed when you list files using the DIR command.)

To copy the hidden system files from your Startup diskette to the root directory of the hard disk, type A : to log onto drive A. Then type the following and press Enter:

```
SYS c:
```

4. If you can load MS-DOS from your Startup diskette but you cannot access data stored on your hard disk, you may have accidentally repartitioned or reformatted part or all of the disk.

   Use the Display Partition Information option of the FDISK program to see if your hard disk has an active (bootable) DOS partition on it. (See the MS-DOS Reference Manual for instructions on using FDISK.) If it does not, back up all your hard disk files and then reinstall MS-DOS on the hard disk. See your MS-DOS Installation Guide for instructions.

   If your hard disk does have an active DOS partition, back up all your hard disk files and then try reformatting your hard disk using SELECT. See your MS-DOS Installation Guide for instructions.

   WARNING
   Reformatting destroys all the data currently on your hard disk, so do this only after careful consideration and after trying the preceding steps.

5. If your hard disk is producing a lot of read/write errors or you are having other serious problems with it, try running the Hard Disk Drive and Controller diagnostics check, described in Appendix C. If the diagnostics program indicates an error, contact your Epson dealer. Never open the sealed unit that encloses the hard disk.

6. If you have been using your hard disk for a long time and begin to see numerous read/write errors, the magnetic signals on the disk may be getting weak. If this is the case, you may need to reformat the hard disk. If you decide to do this, follow these steps:

   - ❑ Back up all the data on the disk using the BACKUP command (described in the MS-DOS Reference Manual).
   - ❑ Follow the instructions in Appendix D to perform a low-level (physical) format.
   - ❑ Follow the instructions in the MS-DOS Installation Guide to install MS-DOS on the hard disk.

7. If you have installed a hard disk drive made by another company in your computer, you need to install MS-DOS. See the MS-DOS Installation Guide for instructions. If the hard disk needs a low-level format, do that before you install MS-DOS. (See Appendix D for instructions.)

8. If you have installed a hard disk drive that has its controller on an option card, you may need to change the position of jumper J3 on the main system board. See "Changing Jumper Settings" in Chapter 5. Also, if your Equity 386SX came with a hard disk drive that you are no longer using, be sure the cable leading from that drive to the main system board is disconnected.

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 have inserted the application program diskette in the top drive (drive A).

2. Your computer can run at either 16 MHz (high) speed or simulated 8 MHz (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 CPU operating speed if necessary. (See Chapter 3 for instructions.) Also see the description of the Auto speed function in Chapter 2 for information on accommodating copy-protected programs.

3. If you have entered an MS-DOS command that you want to stop, there are special key combinations you can type to tell MS-DOS to stop what it is doing. These methods may also work in your application programs.

   To interrupt an MS-DOS command while it is executing, try one of the following commands:

   - ❑ 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 the keyboard. If your computer does not respond when you type on the keyboard, you can reset it. Follow the instructions in Chapter 3.

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.

1. If your printer does not work correctly immediately after you install it, check that the printer has power and is properly connected to the computer. See Chapter 1 or your printer manual for instructions on how to connect your printer to the computer.

   Also make sure your printer has paper in it, since many printers cannot operate without paper.

2. Check the printer manual for the printer's correct DIP switch or control panel settings. These settings help a printer communicate properly with the computer.

3. If you are using more than one parallel port or more than one serial port, the computer must be set properly so MS-DOS knows which port is the primary port and which is the secondary port. See Chapter 2 for instructions on how to set the serial and parallel 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 **PrtSc.** 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 command or the MENU program. See your printer manual and the MS-DOS Reference Manual 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 customization is required.

6. Try running the Parallel Port (Printer Interface) Check if you have a parallel printer, or the Serial Port (RS-232C) Check if you have a serial printer. Appendix C describes these diagnostics checks. If the diagnostics test indicates an error, contact the place where you bought the printer.

Option Card Problems

If you install an option card and it is not functioning properly, check the following:

1. Is the option card installed correctly? Check the installation procedure described in Chapter 5 and also see the instructions that come with the option card. The most common problem with option cards is a loose connection. Make sure the option card is well-seated in its slot.

2. Did you set the necessary DIP switches or jumpers on the option card? See your option card manual for instructions.

3. Did you run the Setup program to redefine your computer's configuration after installing the card? See Chapter 2.

4. If you installed a memory card in your computer, see "Post-installation Setup for Memory Cards" in Chapter 5.

5. If you installed a hard disk drive that has its controller on an option card, you may need to change the position of jumper J3 on the main system board. See "Changing Jumper Settings" in Chapter 5. Also, if your Equity 386SX came with a hard disk drive that you are no longer using be sure the cable leading from that drive to the main system board is disconnected.

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 option card connector on the back panel?

7. Did you perform the correct setup procedures for the software you are using with the option card? If necessary, see your software manual for instructions on running the software setup procedure.

Appendix B

Power-on Diagnostics

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

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 both the error message and code number.

If the `error` is not serious, the computer waits for you to resume further checking. You see this prompt:

```
(Resume = "F1" key)
```

Write down the error message and code number, and then press `F1` to continue. Report the error message and code number to your dealer when requesting repairs.

The following table lists all the error codes and messages which may appear during power-on diagnostics checks.

Power-on diagnostics error codes and messages Table

Error code	Message	Notes
System Board		
101	SYSTEM BOARD ERROR	INTC (8259)
102	SYSTEM BOARD ERROR	Timer (8254)
103	SYSTEM BOARD ERROR	Timer (8254)
105	SYSTEM BOARD ERROR	NMI generated (Parity error or other)
106	SYSTEM BOARD ERROR	DMA page register failure
108	SYSTEM BOARD ERROR	Timer (8254)
Real-time Clock		
161	SYSTEM OPTIONS NOT SET	Power failure
162	SYSTEM OPTIONS NOT SET	Check-sum error
163	TIME AND DATE NOT SET	Invalid value
164	MEMORY SIZE ERROR	
Memory		
181	SYSTEM EXTENDED MEMORY ERROR	Memory overlap
182	SYSTEM RESERVED MEMORY ERROR	Memory overlap (384KB)
201	RAM ERROR	First 64KB
202	MEMORY ADDRESS ERROR	Memory data or parity error
203	MEMORY ADDRESS ERROR	Memory data or parity error
Keyboard		
301	KEYBOARD ERROR	
303	KEYBOARD OR 8042 ERROR	
304	KEYBOARD OR 8042 ERROR	
Diskette drive(s) and controller		
601	DISKETTE ERROR	
Parallel port (printer interface)		
901	PARALLEL PORT ERROR	
Serial port (RS-232C port)		
1101	SERIAL PORT ERROR	

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

Error code	Message	Notes
Hard disk drive(s) and controller		
1760	DISK 0 PARAMETER FAILURE	
1761	DISK 1 PARAMETER FAILURE	
1770	DISK 0 PARAMETER ERROR	Incorrect user definable table
1771	DISK 1 PARAMETER ERROR	Incorrect user definable table
1780	DISK 0 FAILURE	Calibration failure
1781	DISK 1 FAILURE	Calibration failure
1782	DISK CONTROLLER FAILURE	Self test failure
1790	DISK 0 ERROR	Parameter does not match
1791	DISK 1 ERROR	Parameter does not match
Auxiliary device(s)		
8601	AUXILIARY DEVICE FAILURE	No response
8602	AUXILIARY DEVICE FAILURE	Reset device not complete
8603	AUXILIARY DEVICE FAILURE	INT12 or bad mouse ID

Appendix C
Performing System Diagnostics

This appendix describes how to check the operation of the main unit and peripheral devices of your Equity 386SX. You check these devices using the 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 must turn on your computer with the Reference diskette in drive A. If you start this program in any other way, some tests may produce strange results.

To start the System diagnostics program, follow these steps:

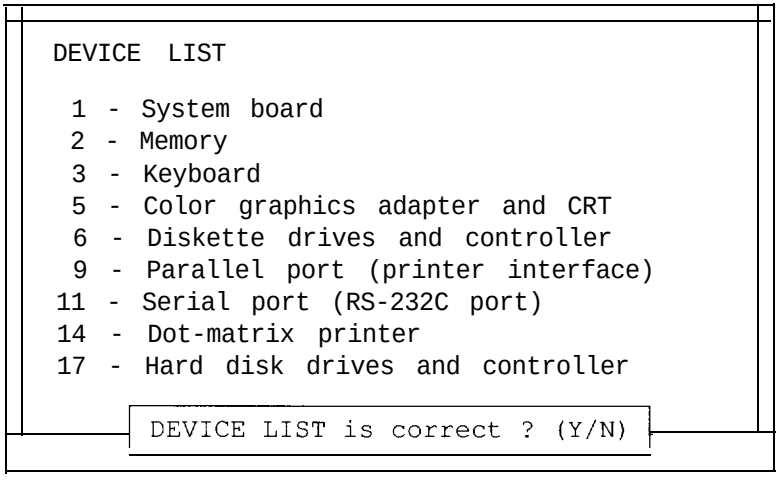
1. Insert the Reference diskette in drive A.

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 that are connected to the system. Then you see a list of the devices available for testing. This list includes only the devices that are part of your system, such as the following, for example:



If the list correctly describes your system, press Enter. If a device is missing from this list, or if you wish to change the list, press N or → and Enter. Then see "Modifying the Device List," below.

Note
If your system uses 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 an EGA or VGA card with a monochrome display, 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 decide later that you need to add a device, you must return to the Operation Menu and reselect System diagnostics.

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:

- You can use the arrow keys (↑ ↓ ← →) to move the highlighted cursor block to the option you want and then press Enter to select it.
- You can 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 1 or 2; this causes the cursor block to move to that option. Then press Enter to select it.

Therefore, when the instructions in this appendix tell you to select an option, you can either use ↑, ↓, ←, or → to highlight the option or you can type the number of the option. Then press Enter. (You must press Enter to start the operation.)

Note

You can press ESC any time you want to leave the menu currently displayed and return to the previous one.

Modifying the Device List

If an installed device is missing from the Device List, you must add it to the list and test it carefully. 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
```

Select the item you wish to add.

Nate
If you want to type the number for an option that has two digits (such as 12 or 81) you **must hold down the Alt key while you type the number.**

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 and these options:

```
1 - Add device
2 - Delete device

0 - Finish modification
```

If the list is correct, select 0.

You are now ready to select a test.

Selecting a Test

From the Device List, select the device you wish to test. Before the test begins, you are asked 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 one time only or any number of times in the range from 1 to 9999. Running a test multiple times is for reliability testing of essential functions only; in most cases, running a test only once is sufficient.

To perform the test once, select 1. The program then displays a submenu of more detailed tests for the device you are checking.

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 regardless of an error. You see this prompt:

```
Repeat times (1-9999) ? 1
```

To perform the test once, press Enter.

If you wish to run the tests 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 code and error message appear. If you want to record the problem, you can print out the message on 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, or
- If you are running multiple tests and are not terminating on an error, the program repeats the test that caused the error.

The remainder of this appendix describes the tests you can run on the system's internal devices and on the optional devices installed on your computer. The program displays the title of each check on the screen.

For a complete list of the error codes and messages these tests may display, see the table at the end of this appendix.

System Board Check

Use this option to check the operation of each major component on the system board, including:

- ❑ The 80386SX CPU chip
- ❑ The system ROM
- ❑ The real-time clock, CMOS RAM, and battery
- ❑ The main integrated circuits.

The checks made on the 80386SX CPU chip are extremely comprehensive and ensure that the CPU instruction set, including protected-mode operation, is functioning correctly.

If an error occurs, make a copy or a printout of the error code and message, and contact your Epson dealer or service center for assistance. Attempting to correct system board errors yourself may violate your warranty agreement.

Memory Check

Use this option to check all the memory currently installed in your computer. The program reads the CMOS RAM to find the total amount of memory. If any settings are incorrect, run the Setup program (described in Chapter 2) to automatically set the correct amount of memory in CMOS RAM. If you installed an optional memory card, you may need to adjust some DIP switch settings on the card.

For this check, the program writes specific data into memory and then reads it back in blocks of 64KB. It also makes a parity check on each block. A memory count is displayed after each block is tested without error. After the program checks the last block, you see a message such as the following:

```
001024 KB OK
```

If an error occurs, make a copy or a printout of the error code and message, and contact your Epson dealer or service center. Attempting to correct memory errors yourself may violate your warranty agreement.

Note
Extended memory, which is normally not available to MS-DOS, is checked using the protected mode of the 80386SX CPU chip.

Keyboard Check

Use this option to check the operation and the configuration of the keyboard. The program first checks the keyboard controller; during this check, you see the green indicator lights on the keyboard flash.

Before checking the operation of the keys, you must identify your keyboard layout so the test is appropriate for the keys on your keyboard. A display appears, asking you to identify the shape of your Enter key. Choose the shape that matches the one on your keyboard, then press Enter.

The program displays your keyboard layout on the screen. When you press a key on the keyboard, an asterisk appears at the corresponding location on the keyboard layout. If you hold a key down, the asterisk begins to blink. If an asterisk does not appear at the correct location, there is a problem with your keyboard. Test each key.

You see these messages on the screen:

```
Press ESC followed by ENTER to exit.
Press END followed by ENTER if screen
and keyboard do not match.
```

If all the keys function correctly and match the characters displayed, press ESC and then Enter.

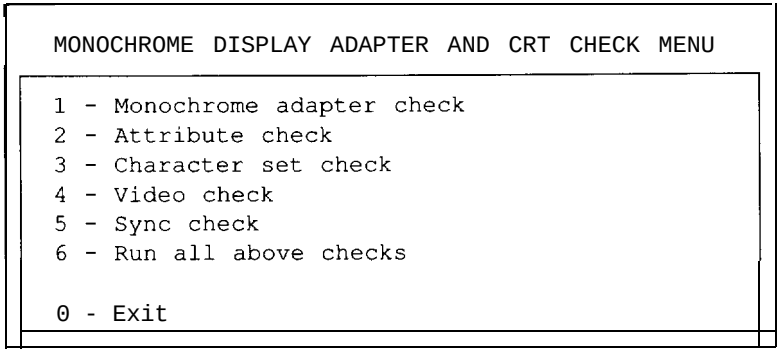
If all the keys function, but the characters displayed do not match the keys, press ESC and then Enter. Then reselect the keyboard test from the Device List, and check that you selected the correct keyboard layout. You can find diagrams of all the international keyboard layouts in the MS-DOS Reference Manual.

If any key is incorrect, press End and Enter. Make a copy of the error code and message, or print them out, and contact your Epson dealer or service center.

Monochrome Display Adapter and CRT Check

Use this option to verify the operation of a monochrome display adapter, VGA, or EGA card attached to a monochrome monitor. This test includes several checks that allow you to identify particular problems related to the monochrome display.

You can select the individual checks from this menu:



If an error occurs during any of these tests, record the error code and message, or print them out. Then contact your Epson dealer or service center.

When you finish testing the device, select 0 to exit.

Monochrome Adapter Check

To check the monochrome adapter, select 1. The program checks the video RAM (display memory) on the display adapter by writing certain data to memory, then reading it back and comparing it to the written data. The program also tests the video enable signal of the display controller chip.

Attribute Check

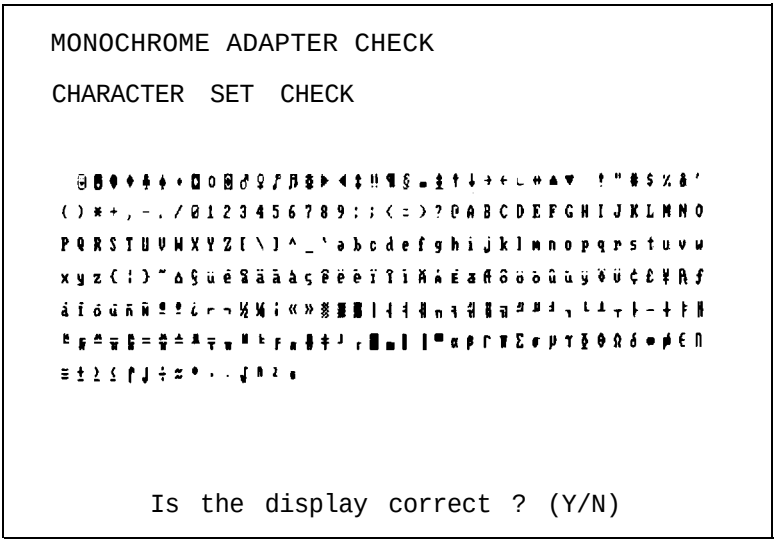
To check the display attributes of the adapter card, select 2. Several messages appear showing examples of all the possible display attributes (normal intensity, high intensity, blinking, reverse, and underlining). Check the information that appears on your screen, and then respond to the prompt:

```
Is the display correct ? (Y/N)
```

Select Y if the display is correct. If the display attributes are not correct, adjust the brightness and contrast on your monitor. If they are still incorrect, select N.

Character Set Check

To check your character set, select 3. The character fonts that are included in the internal character generator appear on your screen. Compare your screen display to this illustration:



After checking the character fonts, respond to the prompt:

```
Is the display correct ? (Y/N)
```

If the characters match the illustration, select `Y.` If you find a problem with the characters on the screen, select `N` to display the error message.

Video Check

To check the video output of your monochrome adapter, select `4.` This check displays two different screens: black and intensified white. First you see the black screen; press any key to display the intensified white screen. Then press any key to end this check.

You can use this test to adjust the size of the screen display. The vertical and horizontal adjustments are located on your monitor.

Sync Check

This test is provided for service purposes only. If you accidentally select this option, press any key to end the test.

Run All Above Checks

To run all the tests on the menu in sequence, select 6. When you choose this option, all checks for the monochrome adapter and CRT are performed automatically in sequential order. Although you do not start each test, you must still supply the appropriate responses to progress from one test to the next. Press any key to return to the menu.

Color Graphics Adapter and CRT Check

Use this option to check the operation of a color graphics adapter (or MGA, EGA, or VGA) card and display. This test includes several checks that allow you to identify particular problems related to the color display. You can select the individual checks from this menu:

```
COLOR GRAPHICS ADAPTER AND CRT CHECK MENU

 1 - Color graphics adapter check
 2 - Attribute check
 3 - Character set check
 4 - 40-column character set check
 5 - 320X200 graphics mode check
 6 - 640X200 graphics mode check
 7 - Screen paging check
 8 - Light pen check
 9 - Color video check
10 - Sync check
11 - Run all above checks

 0 - Exit
```

If an error occurs during any of these tests, record the error code and message, or print them out. Then contact your Epson dealer or service center.

When you finish testing the device, select 0 to exit.

Color Graphics Adapter Check

To check the color graphics adapter, select 1. The program checks the video RAM (display memory) on the display adapter card by writing test data to memory, and then reading it back and comparing it to the written data. The program also tests the video enable signal of the display controller chip.

Attribute Check

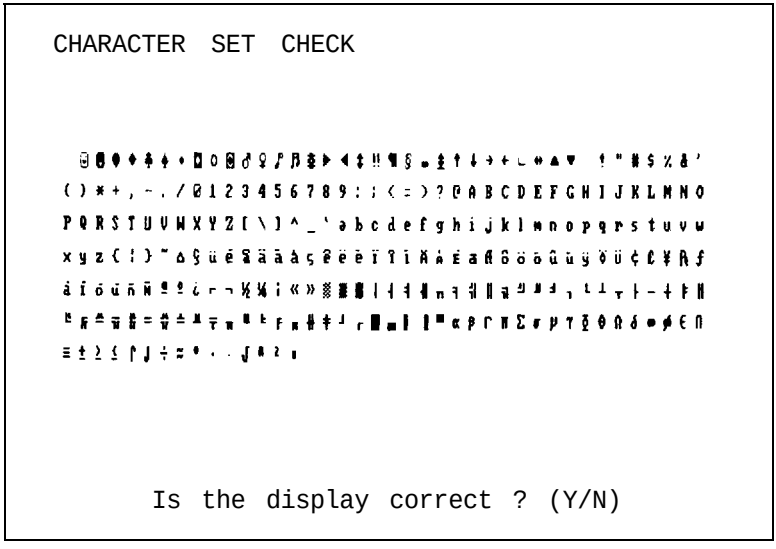
To check the display attributes of the color graphics adapter card, select 2. Several messages appear showing examples of all the possible display attributes and colors. Check the information on your screen, and respond to the prompt:

```
Is the display correct ? (Y/N)
```

Select Y if the display is correct. If the colors are not correct, adjust the controls on your monitor. If they are still incorrect, select N. Contact your dealer to verify any monitor problems.

Character Set Check

To check your 80-column character set, select 3. The character fonts that are included in the internal character generator of the video adapter appear on your screen. Compare your screen display to the following illustration.



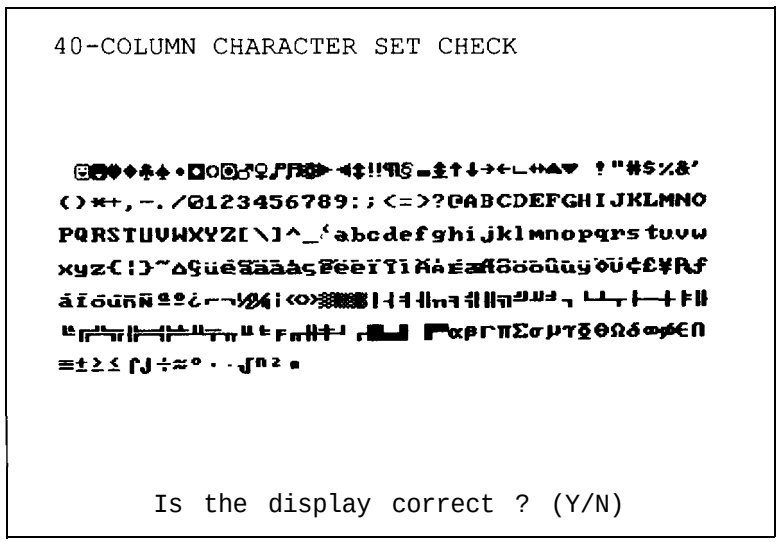
After checking the character fonts, respond to the prompt:

```
Is the display correct ? (Y/N)
```

If the characters match the illustration, select Y. If you find a problem with the characters on the screen, select N to display the error message.

40-column Character Set Check

To check your 40-column character set, select 4. The character fonts that are included in the internal character generator are displayed on your screen. Compare the characters on your screen to the following illustration.



After checking the character fonts, respond to the prompt:

```
Is the display correct ? (Y/N)
```

If the characters match the illustration, select Y. If you find a problem with the characters on the screen, select N to display the error message.

320x200 Graphics Mode Check

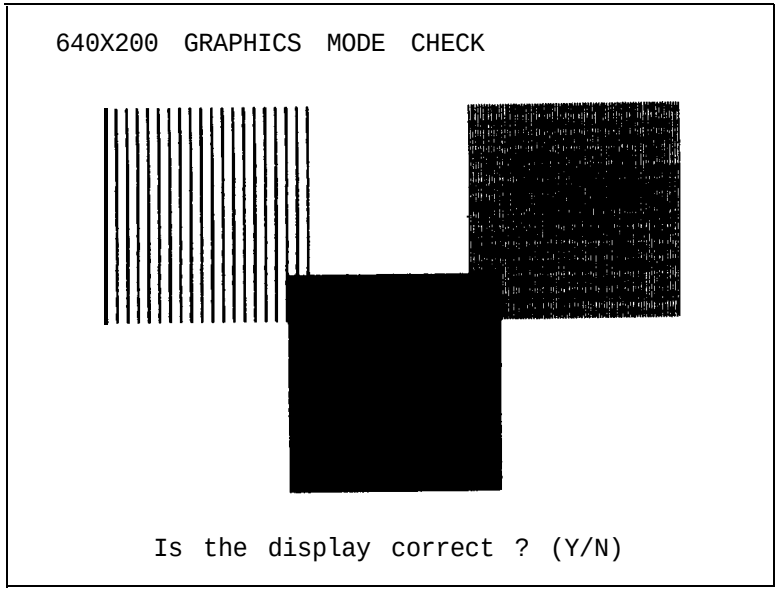
To check your 320x200 graphics mode, select 5. The screen displays three colored squares-green, brown, and red-against a cyan background. These four colors are Color Set 0. If they are correct, select Y.

The same pattern appears again; this time the squares are cyan, white, and magenta, and the background is red. These colors are called Color Set 1. If these are also correct, select Y to end the test.

If any colors are displayed incorrectly, first check the adjustment of your monitor, and make sure that both ends of the cable are plugged in firmly. If a problem still exists, select N to display the error message.

640x200 Graphics Mode Check

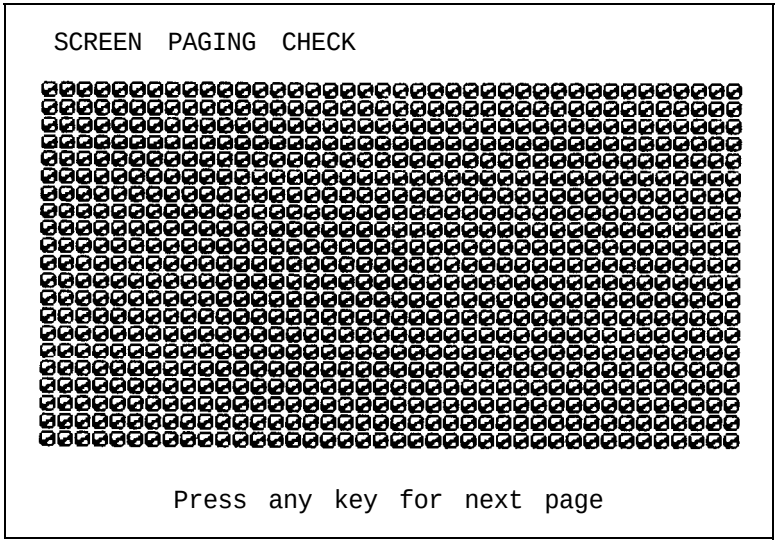
To check your 640x200 graphics mode, select 6. The screen displays three patterned squares against a contrasting background, as shown below.



If the patterns on your screen are clear and distinct, select Y. If any pattern is not clear, first check the adjustment of your monitor, and then make sure that both ends of the cable are plugged in firmly. If a problem still exists, select N to display the error message.

Screen Paging Check

To check the screen paging of your monitor, select **7.** The video RAM on the color graphics adapter is divided into eight independent display pages (numbered 0 through 7). This test checks the eight pages by first filling all eight with a number corresponding to the page, and then displaying each page in turn. You see the following pattern for screen 0:



Once you examine this screen, press any key to display the next page. The eight pages are displayed sequentially.

After the eighth page appears, you see the prompt:

```
Is the display correct ? (Y/N)
```

If all eight pages are correct, select **Y.** If any page is filled with an incorrect number, select **N** to display the error message.

Light Pen Check

To check the function of a light pen connected to the color graphics adapter card, select 8. This test checks that a light pen connected to the color graphics adapter is performing accurately. When you select this check, you see these prompts:

```
Confirm light pen is connected
correctly before starting the check.

Start the check ? (Y/N)
```

After you verify that the light pen is connected properly, select `Y`.

You see this prompt:

```
PLACE LIGHT PEN ON CENTER OF WHITE BLOCK
```

Touch the center of the white block on the screen with the light pen. When the light pen is correctly positioned, the block moves to another part of the screen for a second test. After three successful tests, the check ends.

An error occurs if one of the following is true:

- The light pen is not connected properly
- The light pen is malfunctioning
- You do not touch the square within 12 seconds.

Color Video Check

This test displays 16 different screens, each a different color, and a message indicating the color. The screens show the following colors in the order specified below:

1 -	Black	9 -	Gray
2 -	Blue	10 -	Light blue
3 -	Green	11 -	Light green
4 -	Cyan	12 -	Light cyan
5 -	Red	13 -	Light red
6 -	Magenta	14 -	Light magenta
7 -	Brown	15 -	Yellow
8 -	White	16 -	White (high intensity)

To start this test, select 9. Press any key to display each screen. On the last screen, you see this prompt:

```
Is the display correct ? (Y/N)
```

If all the colors are correct, select `Y` to end the test. If any color is incorrect, first check the adjustment of your monitor, and then make sure that both ends of the cable are plugged in firmly. If a problem still exists, select `N` to display the error message.

Sync Check

This test is provided for service purposes only. If you accidentally select this option, press any key to end the test.

Run All Above Checks

To run all the tests on the menu in sequence, select 11. When you choose this option, all checks for the color adapter and CRT are performed automatically in sequential order. Although you do not start each test, you must still supply the appropriate responses to progress from one test to the next. Press **Esc** to return to the menu.

Diskette Drives and Controller Check

Use this option to test the performance of the diskette drive(s) installed in your computer. This test includes several checks that allow you to identify particular problems related to your diskette drives.

Before running these tests, format a diskette to use for the tests that write data on the disk in the drive. To test a 1.44MB drive, you can use either a 1.44MB diskette or a 720KB diskette; but it is better to use the higher capacity diskette. In a 720KB drive, you can use only a 720KB diskette.

To test a 1.2MB drive, you can use a 1.2MB or a 360KB diskette. However, to test the full capacity of the drive, use only a 1.2MB diskette. In a 360KB drive, you can use only a 360KB diskette.

You can select the individual tests from the following menu.

```
DISKETTE DRIVE(S) AND CONTROLLER CHECK MENU

1 - Sequential seek check
2 - Random seek check
3 - Write, read check
4 - Disk change check
5 - Run all above checks

0 - Exit
```

Before it performs any checks, the program determines the number of diskette drives installed in your computer. If you have more than one drive, you see this prompt each time you select a test:

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

Select 1 (for drive A) or 2 (for drive B). If any errors occur, record the error code and message and contact your dealer. Always have the diskette drive serviced by your dealer or service center.

When you finish testing the device and return to the menu, select 0 to exit.

Sequential Seek Check

This test checks the ability of the read/write heads to locate any part of the diskette. This action by a read/write head is called a seek. During this test, each head seeks sequentially from the innermost track to the outermost track. The innermost track is track 79 for 1.44MB, 1.2MB, and 720KB diskettes and track 39 for 360KB diskettes.

Select option 1 from the menu to start this test. The program displays the number of each track it finds. For example, with a 1.44MB diskette, the first message you see is:

```
Current track is 79
```

The track number counts down from 79 to 0 (39 to 0 for a 360KB diskette). The seek is performed by each head, so you see the count twice. If no errors occur, the menu is displayed.

Random Seek Check

This test is identical to the sequential seek check, except that the seek operation is performed on each track in random order instead of sequential order. Select option 2 from the menu to start this test.

Write, Read Check

This test checks the ability of the selected disk drive to read and write data on a diskette. The test writes to and reads from each track on the diskette, starting at the center.

WARNING
This test destroys all **data on the diskette in the selected drive.**

Select option 3 from the menu to start this test.

If you have only one diskette drive, you see a prompt to remove the the Reference diskette and insert a blank diskette before running the test. You see these messages:

```
If using drive 1, remove your Reference Disk.

Insert a formatted blank disk in the drive
before starting the check.
Any data present may be erased.

Start the check ? (Y/N)
```

Make sure the blank diskette you prepared is in drive A (l), then select `Y`. The program displays the current track number as each cylinder is tested. For example, with a 1.44MB diskette, the first message you see is:

```
Current track is 79
```

After the test is over, be sure to replace the Reference diskette in drive A before you select another device from the Device List or exit System diagnostics.

Disk Change Check

This option tests the ability of a diskette drive to detect whether a diskette has been inserted or removed. Disk changes cannot be detected by a 360KB diskette drive.

Select option 4 from the menu to start this test. The program checks the selected drive type; if it is a 360KB drive, you see these messages:

```
Drive d is a 360 KB drive.
DISK CHANGE is not allowed with this type of
drive.
Press ENTER to return to the menu.
```

When you run the test for 1.44MB, 1.2MB, or 720KB drive, you see this prompt:

```
Remove the disk from drive 1.
```

Remove the diskette. The program displays the following prompt:

```
Re-insert the disk into drive 1.
```

Reinsert the diskette. If no errors occur, the menu reappears. An error occurs if you do not remove or replace the diskette in time or if the drive is malfunctioning.

Run All Above Checks

To run all the tests on the menu in sequence, select 5. When you choose this option, all checks for the diskette drive(s) and controller are performed automatically in sequential order. Although you do not start each test, you must still supply the appropriate responses to progress from one test to the next. Press ESC to return to the menu.

Math Coprocessor Check

Use this option to check the operation of the 80387SX math coprocessor if you have one installed in your computer. To check the math coprocessor, select option 7 from the Device List.

The program runs a series of checks on the precision with which the coprocessor performs calculations and handles exceptions.

Parallel Port (Printer Interface) Check

Use this option to test the operation of the primary parallel printer port. To perform the test, you must insert a special loop-back connector into the parallel port so that the computer can check individual pins of the port. Contact your dealer if you need a loop-back connector. Note that a different connector is required to test the serial port.

When you select option 9 from the Device List, you see these prompts:

```
Attach loop-back connector to parallel
port before starting the check.

Start the check ? (Y/N)
```

Insert the loop-back connector. Then select Y to start the check. The computer checks the port by writing and reading data and control information, and reports errors for any pins that are faulty. Note that if you connect a printer cable instead of a loop-back connector, you will get errors.

Alternate Parallel Port Check

Use this option to test the operation of an additional parallel port. To perform the test, you must insert the special loop-back connector into the alternate parallel port so that the computer can check individual pins of the port.

This test is similar to the Parallel Port Check. For more details, see the description of the Parallel Port (Printer Interface) Check.

Parallel Port (on Video Adapter) Check

Use this option to test the operation of an additional parallel port on a video adapter. To perform the test, you must insert the special loop-back connector into the parallel port on the video adapter so that the computer can check individual pins of the port.

This test is similar to the Parallel Port Check. For more details, see the description of the Parallel Port (Printer Interface) Check.

Serial Port (RS-232C Port) Check

Use this option to test the functions of the primary serial communications (RS-232C) port. To perform the test, you must insert a special loop-back connector into the RS-232C port so that the computer can check individual pins of the port. Contact your dealer if you need a loop-back connector. Note that a different connector is required to test the parallel port.

When you select option `11` from the Device List, you see these prompts:

```
Attach loop-back connector to serial
port before starting the check.

Start the check ? (Y/N)
```

Insert the loop-back connector. Then select `Y` to start the check.

First, the program checks the serial port control lines to see that they are able to change from high to low and vice versa. No messages are displayed during this part of the test unless an error occurs.

The second test is an echo back check during which the port sends data to itself in a fixed data format, at all the possible baud rates. When this test begins, you see these messages:

```
RS-232C echo back check - at various baud rates
Current baud rate is 75
Current test data is 00
```

Each baud rate is tested in turn, and the display informs you of the progress of the test. If the port does not become ready correctly, a timeout error occurs. If any data received does not match the data sent, a verify error occurs, and the computer reports the transmitted and received data at the time of the error.

The final test is an echo back check during which the port sends data to itself at 9600 baud, using various data formats. At the start of the test, you see these messages:

```
RS232C echo back check-with various data formats
Current data format: 5 data bits, 1 stop bit,
                     parity - NONE
Current test data is 00
```

Once again, if any data received does not match the data sent, a verify error occurs, and the computer reports the transmitted and received data at the time of the error.

Alternate Serial Port Check

Use this option to test the functions of an additional serial communications (RS-232C) port. To perform the test you must insert a special loop-back connector into the alternate serial port so that the computer can check individual pins of the port.

This test is identical to the check for the primary serial port. For more details, see the description of the Serial Port (RS-232C Port) Check.

Dot-matrix Printer Check

Use this option to check the following:

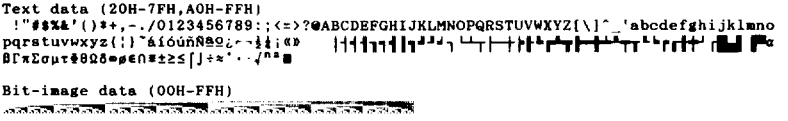
- The operation of your printer in IBM-compatibility mode
- The compatibility of your printer with the extended character set your computer uses
- The ability of your printer to produce bit-image graphics and print images of the graphics screen.

When you select option 14 from the Device List, you see this prompt:

```
Is dot-matrix printer on-line ? (Y/N)
```

Check that your printer is connected to the computer and that it is turned on, loaded with paper, and online. Select Y to continue, or N to return to the menu.

When you continue the test, the program checks that the printer is responding correctly. This test detects whether the printer is offline or whether an interface error exists. If no errors occur, the computer sends a repeating sequence of ASCII characters and bit-image data to the printer until you press any key. The pattern looks like this:



The text data includes all the characters commonly used by programs that require foreign languages or graphic characters. If your printer prints different characters than you see in the illustration, you may need to be careful with certain software. The bit-image data is sent to the printer using a command (ESC K) compatible with Epson and IBM printers.

Note

Even if the test runs only for **a short time, your printer may store many characters in its buffer. To stop printing, set the printer offline.**

Hard Disk Drive(s) and Controller Check

Use this option to test the performance of the hard disk drive(s) installed in your computer. If any errors occur, have your dealer or service center check and service the drive. When you select option 17 from the Device List, you see this menu:

```
HARD DISK DRIVE(S) AND CONTROLLER CHECK MENU

1 - Seek check
2 - Write, read check
3 - Read, verify check
4 - Run all above checks

0 - Exit
```

When you select a check from this menu, the program determines the number of hard disk drives installed in your computer. If you have more than one physical drive, then each time you select a test you see this prompt:

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

Select 1 for the first hard disk or 2 for the second.

When you finish testing the device and return to the menu, select 0 to exit.

Seek Check

This test checks the ability of the read/write heads to locate any part of the hard disk. This action by a read/write head is called a seek. During this test, each head seeks each cylinder of the disk in sequence, starting from the center.

Select option 1 from the menu to start this test. The program displays the number of each cylinder it finds. For example, with a hard disk, the first message you see is:

```
Current cylinder is nnn
```

where *nnn* is the largest cylinder number used on the drive. The cylinder number counts down to 0. The seek is performed by the read/write heads simultaneously, so you see the cylinder numbers only once. If no errors occur, the menu reappears.

Write, Read Check

This check tests the ability of the hard disk drive to read and write data. The test writes to and reads from each sector of the innermost cylinder of the disk, using each head.

Note
This test destroys all data on the innermost cylinder of the selected hard disk drive. This cylinder is reserved for diagnostics, and is never used for storage by MS-DOS or any other operating system. Therefore, data created by application programs is not destroyed.

Select option 2 from the menu to start this test. You see these messages:

```
The data on the highest physical
cylinder may be destroyed by the
check.

Start the check ? (Y/N)
```

Select Y to continue with the test. You do not see a cylinder count during the test. If no errors occur, the program returns to the menu.

If an error occurs, make a note of the code and message. Then use the Non-destructive surface analysis (option 3 on the Hard Disk Format Menu) to check the condition of the hard disk.

If this analysis shows no other problems with the disk, follow these steps:

1. Back up all the files on your hard disk.

2. Reformat the disk using option 2, Format hard disk, on the Operation Menu.

3. Install MS-DOS on the hard disk according to the instructions in the MS-DOS Installation Guide.

4. Restore your files.

Read, Verify Check

This test reads and verifies data from 'all tracks of the disk, checking each cylinder and using all read / write heads.

Select option 3 from the menu to start this test. The program displays the number of each cylinder it finds. For example, with a hard disk, the first message you see is:

```
Current cylinder is nnn
```

The cylinder number counts down to 0. At the end of the test, you see a table of the results, as follows:

```
BAD TRACKS ..................      n
READ ERROR TRACKS ...........      n
GOOD TRACKS .................      nnnn

Press ENTER to return to the menu
```

Press Enter when you have viewed the table. If the results show any read error tracks, run the write/read test (described above), and follow the instructions there.

Run All Above Checks

To run all the tests on the menu in sequence, select 4.

When you choose this option, all checks for the hard disk drive(s) and controller are performed automatically in sequential order. Although you do not start each test, you must still supply the appropriate responses to progress from one test to the next. The first prompt you see is:

```
The data on the highest physical
cylinder may be destroyed by the
check.

Start the check ? (Y/N)
```

Select Y to continue with the test.

Error Codes and Messages

The following table lists all the error codes and messages that may appear during system diagnostics testing.

System diagnostics error codes *and messages*

Error code	Message
System board	
101	CPU ERROR
102	ROM CHECKSUM ERROR
103	TIMER COUNTER REGISTER ERROR
104	TIMER COUNTER ERROR
105	DMA CONTROLLER REGISTER ERROR
105	REFRESH ERROR
106	DMA PAGE REGISTER ERROR
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	INSTRUCTION ERROR
114	PROTECT MODE ERROR 1
115	PROTECT MODE ERROR 2
Memory	
201	MEMORY/PARITY ERROR
Keyboard	
301	KEYBOARD ERROR
302	KEYBOARD IS NON-STANDARD, OR KEYBOARD IS DEFECTIVE
Monochrome display adapter and CRT	
401	V-RAM ERROR
402	VIDEO SIGNAL ERROR
403	ATTRIBUTE ERROR
404	CHARACTER SET ERROR

System diagnostics error codes and messages (continued)

Error code	Message
Color graphics adapter and CRT	
501	V-RAM ERROR
503	ATTRIBUTE ERROR
504	CHARACTER SET ERROR
505	40-COLUMN CHARACTER SET ERROR
506	COLOR GRAPHICS ERROR
507	640 x 200 GRAPHICS MODE ERROR
508	SCREEN PAGING ERROR
509	LIGHT PEN ERROR
510	COLOR VIDEO ERROR
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
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

System diagnostics error codes and messages (continued)

Error code	Message
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
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 MS-DOS FORMAT command. The physical formatting of a hard disk is a separate step that is usually done at the factory by the disk manufacturer.

If your Equity 386SX came with a hard disk, that disk has already been physically formatted. You need only follow the instructions in the MS-DOS Installation Guide to prepare your hard disk for use.

You may need to physically format a hard disk, however, if either of the following is true:

- Your hard disk is producing numerous read/write errors or you are having other serious problems with the disk. Sometimes, after a hard disk has been used for a long time, the disk's data becomes fragmented, causing the disk to frequently produce errors. You may need to reformat the disk in this case.
- You have installed a hard disk in your computer that has never received the low-level format.

WARNING

Physically formatting a hard disk erases any data it contains. If you have any data on the disk or you are unsure if formatting is necessary, contact your Epson dealer for assistance.

In addition to destroying all the data on the hard disk, formatting removes any partitions defined on the disk by SELECT or FDISK and the logical formatting performed by SELECT or FORMAT. After you physically format a new or used hard disk (using option 1 or 2 of the Hard Disk Format Menu), you need to install MS-DOS. Follow the instructions in your MS-DOS Installation Guide. The installation process automatically partitions and formats the hard disk to prepare it for use.

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. The computer automatically loads MS-DOS and displays the Operation Menu.

3. Press 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 (if it has no defective track table) for defective (bad) tracks and lets you decide which tracks to mark as bad. Then the program formats the disk and marks those 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.

Reformatting a Used Disk

If you are reformatting a disk you have been using that appears to be damaged, 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 analysis, use BACKUP to back up the data on your disk. (See your MS-DOS Reference Manual for instructions on how to use BACKUP.)

3. Run the Destructive surface analysis.

Formatting a New Disk

Many hard disk drives come with a printed list of bad tracks but without the bad tracks flagged on the disk. 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 `1 -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:

- You can use the arrow keys (↑ ↓ ← →) to move the highlighted cursor block to the option and press Enter.
- You can type the number of the option and press Enter.

You can select almost any option that appears on the screen while you are formatting the disk using either of these two methods. Therefore, when the instructions in this appendix tell you to select an option, you can either use the arrow keys (↑ ↓ ← →) to highlight the option or you can type the number of the option. Then press Enter. (You must press Enter to start the operation.)

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 `1 -Format` from the Hard Disk Format Menu, you see the following (for a disk that does not have a 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.)

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
```

Next you see the following prompt:

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

For the hard disk in the Equity 386SX, it is best to accept the recommended skewed sector (also called the interleave factor) of 1. For other hard disk drives, you may need to change this value if the documentation that came with the hard disk recommends a different number.

To accept the default, select Y.

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

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

Enter a number from 1 through 16 which equals the maximum sector number for the drive minus 1. The maximum sector number varies, depending on the drive type. Then press Enter.

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.

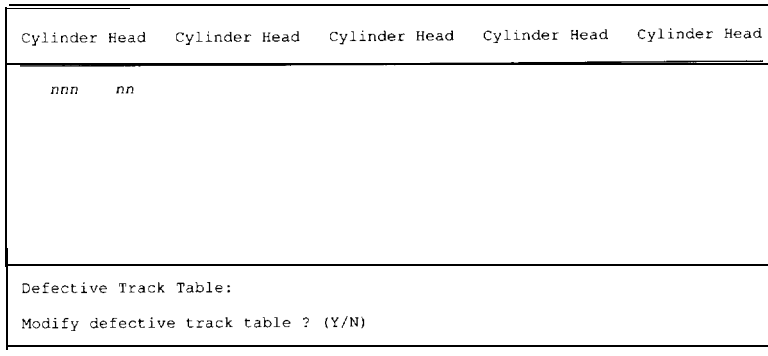
To accept the default, select Y.

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

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

Enter a number from 0 through 16 which equals the maximum sector number for the drive minus 1. The maximum sector number varies, depending on the drive type. Then press Enter.

The program now allows you to edit the table of defective tracks:



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 on to "Formatting the Disk," below.

To modify the defective track entries, select Y.

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 A. 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 alter the track data or press D to remove the track from the table. Change the track data just 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. After you complete editing, 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.

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
```

You see 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 any bad tracks that are not flagged.

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

The Destructive surface analysis 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.

To start this test, select 2-Destructive surface analysis from the Hard Disk Format Menu. You see these messages:

```
Analyze Hard Disk  <Drive 1:>

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 report on the status of the disk, including a table of unflagged tracks that produced write, read errors-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.

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

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 any bad tracks it detects.

To start the test, select 3-Non-destructive surface analysis from the Hard Disk Format Menu. You see these messages:

```
Analyze Hard Disk  <Drive 1:>

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 report on the status of the disk, 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 errors, the screen displays a table of the tracks that gave errors, similar to the one the Destructive surface analysis displays.

After the status reports, you see this message:

```
Press ENTER to return to the menu.
```

Check the information displayed. Then press Enter to return to the Hard Disk Format Menu.

Exiting the Hard Disk Format Menu

To leave the Hard Disk Format Menu, select `0 -Exit. The` screen displays the Operation Menu. At the Operation Menu, select `O-Exit to DOS for more utilities.`

If you formatted the hard disk with option 1 or 2, you must now install MS-DOS on the hard disk to prepare it for use. Follow the instructions in your MS-DOS Installation Guide. (The installation process automatically partitions and formats the hard disk.)

Appendix E
Hard Disk Drive Types

This appendix lists the types of hard disk drives you can use in your Equity 386SX. Check this table and the documentation supplied with your hard disk to find the correct number for the type of hard disk drive installed in your computer. You need to enter this number when you set the hard disk drive parameters in the Setup program. See Chapter 2 for instructions.

Hard disk drive types

Type no.	Type	Cylinders	Heads	Sectors	Precomp	Landing zone	MB	Drive name
00								No fixed disk
01	ST-506	306	4	17	128	305	10.2	(Used by ESDI)
02	ST-506	615	4	17	300	615	20.4	(1)
03	ST-506	615	6	17	300	615	30.6	
04	ST-506	940	8	17	512	940	62.4	
05	ST-506	940	6	17	512	940	46.8	
06	ST-506	615	4	17	—	615	20.4	
07	ST-506	462	8	17	256	511	30.7	
08	ST-506	733	5	17	—	733	30.4	
09	ST-506	900	15	17	—	901	112.1	
10	ST-506	820	3	17	—	820	20.4	
11	ST-506	855	5	17	—	855	35.5	
12	ST-506	855	7	17	—	855	49.7	
13	ST-506	306	8	17	128	319	20.3	
14	ST-506	733	7	17	—	733	42.6	
15								-reserved-
16	ST-506	612	4	17	0	663	20.3	
17	ST-506	977	5	17	300	977	40.5	CDC 94205-51 (2)
18	ST-506	977	7	17	—	977	56.8	
19	ST-506	1024	7	17	512	1023	59.5	
20	ST-506	733	5	17	300	732	30.4	Toshiba MK-133FA
21	ST-506	733	7	17	300	732	42.6	Toshiba MK-134FA
22	ST-506	733	5	17	300	733	30.4	
23	ST-506	306	4	17	0	336	10.2	
24	ST-506	612	4	17	305	663	20.4	
25	ST-506	306	4	17	—	340	10.2	
26	ST-506	612	4	17	—	670	20.4	

Type no.	Type	Cylinders	Heads	Sectors	Precomp	Landing zone	MB	Drive name
27	ST-506	698	7	17	300	732	40.6	
28	ST-506	976	5	17	488	977	40.5	
29	ST-506	306	4	17	0	340	10.2	
30	ST-506	611	4	17	306	663	20.4	
31	ST-506	732	7	17	300	732	42.6	
32	ST-506	1023	5	17		1023	42.5	
33								none
34								none
35								none
36								none
37								none
38								none
39								none
40								none
41	ESDI	1022	5	34	-	1022	84.8	CDC 94216-106(3)
42	ESDI	1022	5	36	-	1022	89.8	CDC94216-106
43	ST-506	1024	8	17	512	1023	68.0	(4)
44	ESDI	828	10	34	-	828	137.5	Toshiba MK-156F
45	ST-506	1024	5	17	512	1023	42.5	(5)
46	ST-506	615	8	17	128	618	40.8	NECD5147H
47								none
48	ST-506	820	6	17	-	820	40.8	Seagate ST251
49	ST-506	830	10	17	-	830	68.9	Toshiba MK56FB
50	ST-506	1024	9	17	-	1023	76.5	Seagate ST4096
51	ESDI	828	7	34	-	828	96.2	Toshiba MK-154F
52	ESDI	967	5	36	-	967	85.0	CDC 94166-101
53	ESDI	967	7	36	-	967	119.0	CDC 94166-141
54	ESDI	967	9	36	-	967	153.0	CDC 94166-182
55	ESDI	1022	7	34	-	1022	118.8	Micropolis 1354A
56	ESDI	967	5	34	-	967	80.3	CDC 94166-101(3)
57	ESDI	967	7	34	-	967	112.4	CDC 94166-141(3)
58	ESDI	967	9	34	-	967	144.5	CDC 94166-182(3)
59	AT	980	5	17	-	979	40.5	CONNERCP-344
60	AT	776	8	33	-	775	100	CONNERCP-3104
61	AT	745	4	28	-	744	40.5	Mini 8051A native mode
62	AT	965	5	17	-	Auto	40	Quantum 40AT(6)
63	AT	965	10	17	-	Auto	80	Quantum pro 80AT(6)
64-255								none

Notes:

1. Miniscribe 8425F, Seagate ST125
2. Conner CP-344 or Miniscribe 8051A can be used as type 17
3. For Western Digital ESDI HDC or Drive Maker default setting
4. Micropolis 1325, Ataal 3085, Lanstor Lan64, Maxtor XT1085, Newbury NDR1085
5. Micropolis 1323A, Miniscribe 3035, Microscience HH1050, Seagate ST4053
6. The landing zone value is 964

Types 1 through 47 are allocated at 0FE401 h, IBM new AT-compatible area.

Types 48 through 63 are allocated at 0FD2F1h to 0FDFF0h. extended Hard Drive Parameter area.

The factory-installed hard disk drive types for the Equity 386SX are number 17 (40.7MB) and number 60 (100MB)

The settings for types 59,60,61, and 63 are stored in the computer's BIOS, so you do not need to enter the parameters for these drives in the Setup program.

Appendix F

Specifications

CPU and Memory

16-bit CPU	80386SX microprocessor, 16 MHz or simulated 8 MHz clockrate, selectable through a switch or through software
	24-bit address and 16-bit data bus
On-board memory	1MB RAM on main system board; expandable using 256KB or 1MB SIMMs to 2MB, 4MB, 6MB, 8MB, 10MB, 12MB, or 14MB (maximum); SIMMs must be 70ns access speed or faster
ROM	64KB
Math coprocessor	80387SX (16 MHz) support; coprocessor is optional

Controllers

Diskette	Supports up to two drives in any of four formats: 3 1/2-inch, high-density, 1.44MB; 3 1/2-inch, double-density, 720KB; 5 1/4-inch, high-density, 1.2MB; or 5 1/4-inch, double-density, 360KB; controller on main system board
Hard disk	Supports up to two drives available in 40MB or 100MB; embedded controller

Interfaces

Serial	RS-232C, programmable, asynchronous; DB-9P male connector
Parallel	Standard 8-bit parallel; DB-25S female connector
Auxiliary	Mini DIN (6-pin) connector for IRQ 12 mouse or other device
Option slots	Five standard input/output expansion slots (one with 8-bit bus and four with 16-bit bus); one special slot occupied by a serial/parallel interface card
Speaker	Internal
Clock/calendar RAM	Real-time clock, calendar, and 64-byte CMOS RAM for configuration; battery backup

Power Supply

Switching type, fan-cooled, 115/230 VAC (switch-selectable), 140 W; +5 VDC, +12 VDC, -5 VDC, -12 VDC; 50/60 Hz

Mass Storage

Three half-height drives maximum

Standard	3 1/2-inch diskette drive, 1.44MB (high-density) storage capacity
Optional	3 1/2-inch diskette drive, 720KB (double-density) storage capacity

Optional	3 1/2-inch diskette drive, 1.44MB (high-density) storage capacity
Optional	5 1/4-inch diskette drive, 1.2MB (high-density) storage capacity
Optional	5 1/4-inch diskette drive, 360KB (double-density) storage capacity
Optional	3 1/2-inch hard disk drive (in a 5 1/4-inch mounting frame), 40MB storage capacity
Optional	3 1/2-inch hard disk drive (in a 5 1/4-inch mounting frame), 100MB storage capacity

Keyboard

	Detachable, three positions, 101 sculpted keys
Layout	58-key QWERTY main keyboard; 17-key numeric/cursor pad; 10 cursor keys; 16 function keys (user-definable)
Function keys	Four levels (normal, shift, control, alternate); user-definable

Environmental Requirements

Temperature	Operating range:	41° to 104° F (5° to 35° C)
	Storage range:	-40° to 158° F (40° to 60° C)
Humidity	Operating range:	20% to 80%, non-condensing
	Storage range:	5% to 95%, non-condensing

Physical Characteristics

Width	15.7 inches (400 mm)
Depth	16.4 inches (416.5 mm)
Height	6.2 inches (157 mm)
Weight (without keyboard)	Single diskette drive model: 23.2 lb (10.5 kg) 40MB or 100MB hard disk drive model: 24.9 lb (11.3 kg)

Glossary

Absolute pathname

A pathname that begins with the backslash character. An absolute pathname tells MS-DOS how to find its way to a given directory, starting at the root directory. See also Relative pathname.

Address

A number or name that identifies the location where information is stored in a computer's memory.

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. Files transmitted in ASCII code can be used by many different computers, printers, and programs.

Asynchronous

A method of data transmission in which one machine sends data one character at a time to another, without either machine preparing for the transmission.

AUTOEXEC.BAT file

The batch file that is executed automatically when you load MS-DOS. See also Batch file.

Auto speed

The Equity 386SX feature that enables it to automatically switch from 16 MHz to simulated 8 MHz speed when accessing the diskette drive (for copy-protected programs).

Backup

An extra copy of a program, data file, or disk, kept in case your working copy is damaged or lost.

Base memory

The amount of 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 MS-DOS commands by typing one command. 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.

Baud rate

A measure of the speed of data transmission. Usually equivalent to bits per second.

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.

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 method of making low-power silicon chips.

Code

A system of symbols for representing data or instructions. Also any software program or part of a program.

Code page

A table that defines the country-specific or language-specific character set you are using.

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 A, the command prompt looks like this: A>.

Configuration

The particular setup of a group of components. For example, a typical system configuration consists of a computer with one diskette drive and 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 on the main system board (up to 640KB) used by MS-DOS and application programs. Also called base memory or main memory.

Coprocessor

An optional device that enables the computer to process certain mathematical calculations faster.

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 simulated 8 MHz instead of 16 MHz. See also Auto 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.

Current directory

The directory where MS-DOS executes your next command, unless you tell it to do otherwise (by including a pathname with the command). Also known as the default or working directory.

Current drive

The disk drive from which MS-DOS executes your next command, unless you tell it to do otherwise (by including a drive designator with the command). Also known as the default drive.

Cursor

The highlighted marker that shows your position on the screen.

Cylinders

See Tracks.

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).

Data length

The number of bits per character in serial transmissions.

Default

Values or settings that take 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.

Default directory

The directory you are logged onto and working in. Also known as the current directory.

Default drive

The disk drive from which MS-DOS executes your next command, unless you tell it to do otherwise (by including a drive designator with the command). Also known as the current drive.

Delimiter

A character or space used to separate different parts of an MS-DOS command.

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.

Diagnostics

The tests and procedures the computer performs to check its internal circuitry and set up its configuration.

DIP switch

A small switch on a computer, option card, or printer that controls a particular function. DIP stands for Dual In-line Package.

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 and used to store data permanently.

Display adapter card

The circuit board installed in one of the computer's option slots that provides the interface to which you connect the monitor. The display adapter card controls the way the monitor displays text and graphics. Also known as *Video* card.

DOS

The Disk Operating System that controls the computer's input and output functions. See Operating system.

Double-density

A type of diskette format that allows you to store twice as much data as the standard-density format. A 3 1/2-inch double-density diskette can store 720KB of data. A 5 1/4-inch double-density diskette can store 360KB 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 color 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.

Executable file

A file containing program instructions, as opposed to data created with an application program. An executable file has the extension .BAT, .COM, or .EXE.

Expanded memory

Memory that specially-written MS-DOS application programs can use with an Expanded Memory Specification (EMS) device driver such as EMM386.SYS. Expanded memory does not fill a certain range of memory like conventional and extended memory; expanded memory can be mapped from the memory area between 640KB and 1MB.

Extended Memory

Memory above 1MB that is accessed by the protected mode of the 80386SX microprocessor and available to some application programs and operating systems.

Extended partition

An additional MS-DOS partition; you can create one primary MS-DOS partition and one extended partition.

Extension

A suffix of up to three characters that you can add to a filename to better identify it.

External command

An MS-DOS command stored in a program file. MS-DOS must be able to find the program file to execute the command. See also Internal command.

Fast boot

The Equity 386SX function that reduces the time it takes the computer to run power-on diagnostics.

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 data permanently. 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.

Hexadecimal

A base-16 numbering system frequently used by programmers. Any decimal number between 0 and 255 can be represented by a two-digit hexadecimal number.

High-density

A type of format that allows you to store more data than normal. A 3 1/2-inch high-density diskette can store 1.44 MB of data. A 5 1/4-inch high-density diskette can store 1.2 MB of data.

Input/output (I/O) port

See Port.

Interface

A physical or software connection used to transmit data between equipment or programs.

Internal command

An MS-DOS command that is stored in the command processor of the operating system; it is not a separate program file. Examples include COPY, DEL, RENAME, and DIR.

Jumper

A small device that connects two pins on an option card, the SIMM card, 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 EMS

The Lotus/Intel/Microsoft Expanded Memory Specification-a protocol that allows certain application programs to use memory that MS-DOS cannot use.

Logical disk drive

A subdivision of a physical disk drive, which MS-DOS treats as though it were a separate physical component of the computer. A physical disk drive may be divided into several logical disk drives.

Main system board

The board built into your computer which contains 1MB of memory and the circuitry the computer requires to operate.

Math coprocessor

An optional device that enables the computer to process certain mathematical calculations faster.

MCGA

Monochrome/Color Graphics Adapter. A type of display adapter that runs either a monochrome or color graphics monitor.

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. The Equity 386SX operates at 16 MHz or simulates an 8 MHz operating speed.

Memory

The area where your computer stores data. Memory contents can be permanent and inalterable (ROM) or temporary (RAM).

Memory module

A small circuit board with an edge connector that contains memory chips. You can add 256KB or 1MB memory modules to the SIMM card inside the Equity 386SX 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 option card installed in the computer.

MGA

Multi-graphics Adapter. A type of display adapter card that can display monochrome text and color graphics on the screen.

Microprocessor

A small version of a CPU contained on one semiconductor chip.

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 several 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 that comes with your computer. See 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

The condition of a computer that is working as a network server.

Numeric keypad

The number keys grouped to the right of the keyboard.

On-board memory

The memory contained on the computer's main system board. The Equity 386SX comes with 1MB of on-board memory.

Operating speed

The speed at which the central processing unit can execute commands. The Equity 386SX can run at 16 MHz or simulate an 8 MHz operating speed.

Operating system

A collection of programs (such as MS-DOS or MS OS/2) 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 more memory or a modem.

Parallel

The type of interface that transmits data in groups of bits. See Interface and Serial.

Parameter

A qualifier added to a command that tells MS-DOS 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.

Parent directory

The directory immediately above a given directory in the directory tree. In pathnames, the parent directory is represented by the symbol . . (two periods).

Parity

Data signals sent during communications to detect errors in transmitting or receiving data.

Partition

The area defined on a hard disk for use by an operating system; to divide a hard disk into separate sections or logical drives.

Pathname

The list of directories and subdirectories you specify to locate a file. For example, the pathname for the file SALES which is located in the subdirectory BUSINESS of the root directory (\ ) is \ BUSINESS \ SALES.

Peripheral

A 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

The system tests 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.

Primary partition

The hard disk partition where the operating system is stored and from which the computer loads the operating system.

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 that tells 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 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.

Relative pathname

A pathname that does not begin with the backslash character. A relative pathname tells MS-DOS how to find its way to a subdirectory of the current directory, starting at the current directory. See also Absolute *pathname.*

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. A portion of 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 or of other subdirectories.

RS-232C

A widely-used, standard type of serial interface. You can easily connect an RS-232C-compatible device to the 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.

Serial

The type of interface that transmits data one bit at a time. See Interface and Parallel.

SIMM

See Memory module.

Software

The programs that enable your computer to perform the tasks and functions you indicate.

Source diskette

The diskette that you are reading or copying data from during a copy or backup operation.

SP card

The circuit board inside the computer that provides the serial and parallel interfaces.

Stop bit

A signal sent in serial communications to mark the end of a character.

Subdirectory

A directory or group of files that branches down from another subdirectory or from the root directory.

Switch

An option added to an MS-DOS 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 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.

Target diskette

The diskette to which you are writing or copying data during a copy or backup operation.

Tracks

Addressable, concentric circles on a disk, resembling the grooves on a record, which help to divide the disk into separate accessible areas. There are 80 tracks on each side of a double-sided 1.44MB, 1.2MB, or 720KB diskette and 40 tracks on each side of a double-sided 360KB diskette. The number of tracks on a hard disk depends on its capacity.

VGA

Video Graphics Array. A type of high-resolution color display adapter card that can display monochrome text and graphics at up to 720 x 400 resolution, 16-color graphics at up to 640 x 480 resolution, or 256-color graphics at 320 x 200 resolution.

Video card

The display adapter card installed in one of the computer's option slots. The video card provides the interface to which you connect the monitor and controls the way the monitor displays text and graphics. Also known as Display adapter card.

Wildcard

A character that represents any character or group of characters. The wildcard character * (asterisk) represents a group of characters, and the wildcard character ? (question mark) represents a single character.

Write

To store data on a disk.

Write-protect

To protect the data on a diskette from being changed by setting the write-protect switch on a 3 1/2-inch diskette or by placing a write-protect tab over the notch on the side of a 5 1/4-inch diskette. When a diskette is write-protected, you cannot erase, change, or record over its contents.

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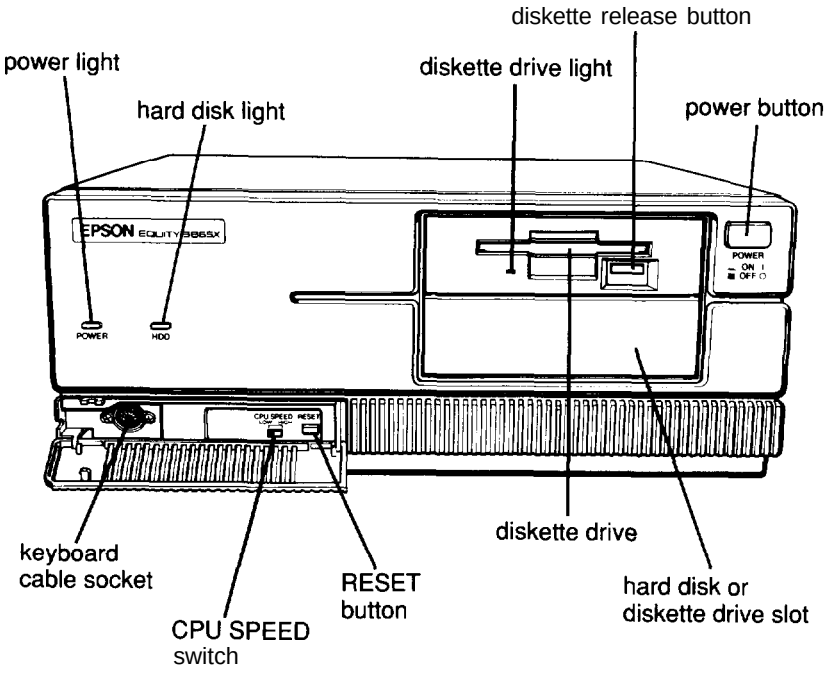
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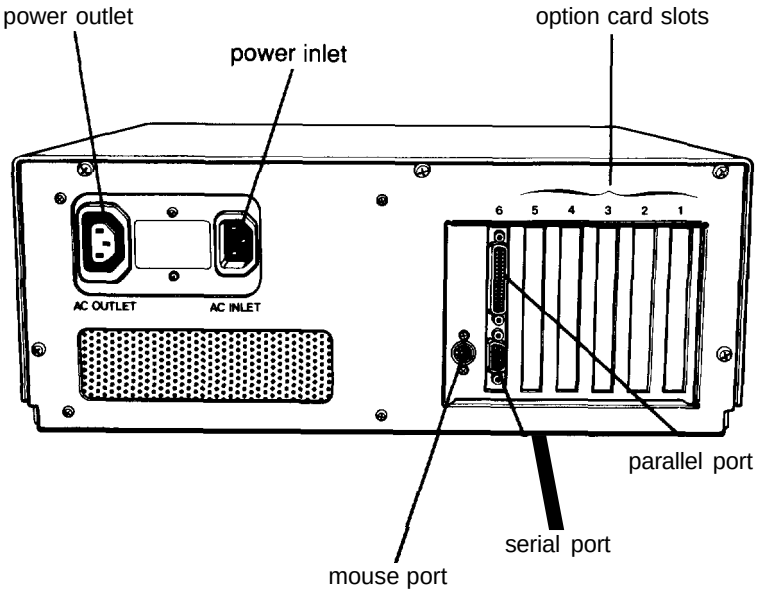
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