EPSON®

EQUITY™ 386/20

User's Guide

Y18499100101

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FCC COMPLIANCE STATEMENT FOR AMERICAN USERS

This equipment generates and uses radio frequency energy and if not installed and used properly, that is, in strict accordance with the manufacturer's instructions, may cause interference to radio and television reception. It has been type tested and found to comply with the limits for a Class B computing device in accordance with the specifications in Subpart J of part 15 of FCC Rules, which are designed to provide reasonable protection against such interference in a residential installation. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient the receiving antenna
- Relocate the computer with respect to the receiver
- Move the computer away from the receiver
- Plug the computer into a different outlet so that the computer and receiver are on different branch circuits.

If necessary, the user should consult the dealer or an experienced radio/television technician for additional suggestions. The user may find the following booklet prepared by the Federal Communications Commission helpful:

"Television Interference Handbook."

This booklet is available from the U.S. Government Printing Office, Washington, DC 20402. Stock No. 004-000-00450-7.

Note: If the interference stops, it was probably caused by the computer or its peripheral devices. To further isolate the problem:

Disconnect the peripheral devices and their input/output cables one at a time. If the interference stops, it is caused by either the peripheral device or its I/O cable. These devices usually require shielded I/O cables. For Epson peripheral devices, you can obtain the proper shielded cable from your dealer. For non-Epson peripheral devices contact the manufacturer or dealer for assistance.

WARNING

This equipment has been certified to comply with the limits for a Class B computing device, pursuant to Subpart J of Part 15 of FCC Rules. Only peripherals (computer input/output devices, terminals, printers, etc.) certified to comply with the Class B limits may be attached to this computer. Operation with non-certified peripherals is likely to result in interference to radio and TV reception.

The connection of a non-shielded equipment interface cable to this equipment will invalidate the FCC Certification of this device and may cause interference levels which exceed the limits established by the FCC for this equipment.

Contents

Appendixes

Introduction

The Epson® Equity™ 386/20 is a versatile, high-performance personal computer. Its 80386 microprocessor and 20 MHz operation speed make this a fast machine, and you can easily upgrade it by adding memory and installing options.

The Equity 386 is available in these configurations:

- A single diskette drive system with one 1.2MB (megabyte) diskette drive
- A hard disk drive system with one 40MB hard disk and one 1.2MB diskette drive
- A hard disk drive system with one 90MB hard disk and one 1.2MB diskette drive.

You can install additional diskette or hard disk drives up to a maximum of four drives total.

All models of the Equity 386 include 1MB of internal memory, nine option slots, and built-in serial and parallel interfaces.

You can expand the computer's memory up to 16MB by adding memory modules to the main system memory card. Specific memory configurations allow the computer to access the memory 32 bits at a time, making it twice as fast as systems that use a 16bit address.

Because of its industry standard architecture, the Equity 386 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". The Equity 386 has six 16-bit option slots and three 8-bit option slots.

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

The Equity 386 offers a shadow RAM feature which lets you speed up processing by moving the ROM BIOS and VIDEO ROM into the RAM area of memory. When the ROM data is in RAM, the computer can access information and display text and graphics on the screen faster.

Your computer comes with version 3.3 of MS-DOS®-the operating system by Microsoft@-and version 3.2 of the GW-BASIC® programming language. You'll find reference manuals for both MS-DOS and GW-BASIC 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, and 386 machines on your Equity 386.

As a supplement to MS-DOS, Epson has included several time-saving utilities that make MS-DOS easier to use: HELP MENU, and XTREE®. The HELP program lets you display information on the screen about any MS-DOS command. MENU provides an easier way to run many of the most common MS-DOS commands. XTREE is a file management utility that simplifies all file and directory operations.

MS-DOS is not the only operating system you can use with your computer. If you have a hard disk, for example, you also may want to use the more powerful 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 386; this way, you can select which operating system to load each time you turn on the computer. Ask your Epson dealer for more information. (In particular, be sure to check the amount of RAM required to run MS OS/2.)

How to Use This Manual

This manual explains how to set up and care for your Equity 386. It also describes how to use your computer and run diagnostic 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 computer. On the inside back cover are illustrations identifying the different parts of the Equity 386; you may want to refer to this while you are 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 explains how to prepare the hard disk for use. If your computer has a hard disk, you must follow the instructions in this chapter before you can use it. If you don't have a hard disk, skip this chapter.

Chapter 4 covers some general operating procedures, including how to use and care for your disks and disk drives.

Chapter 5 provides basic instructions for using MS-DOS with your computer.

Chapter 6 describes some of the options you can use in your Equity 386 and contains instructions for installing option cards.

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 diagnostic 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 diagnostic checks.

Appendix D describes how to perform a hardware-level format of a new hard disk that either you or your dealer have installed in the computer. You need to do this only if you are using a hard disk that has never received this type of low-level format; it is not the same type of format you perform with the MS-DOS FORMAT command.

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

Appendix F gives the technical specifications for the Equity 386.

At the back 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 service centers throughout the United States. Epson America provides product information and toll-free support to its dealers and service 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 Epson's toll-free dealer support program.

Epson is confident that this policy will provide you with the assistance you need. If you need to find an Epson dealer or service center in your area, please call our Customer Information number at 1-800-922-8911.

Chapter 1

SETTING UP YOUR SYSTEM

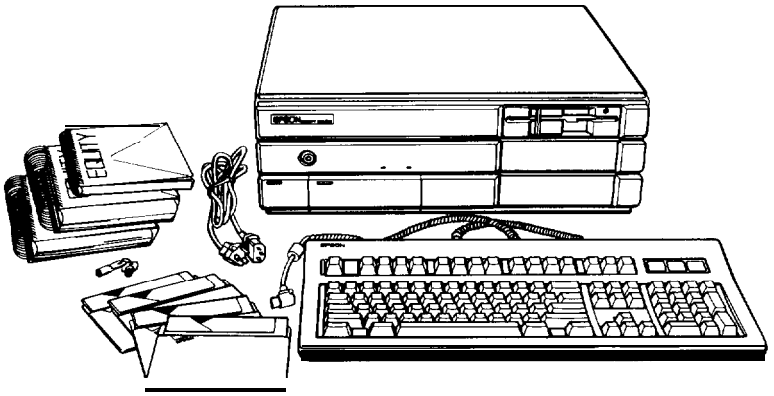
Setting up your Epson Equity 386 personal computer is easy. Just follow the 10 steps in this chapter, which describe how to set up your computer, start MS-DOS, and make copies of your system diskettes.

As you set up your computer, you may want to leave the back flap of this book open so you can refer to the two illustrations identifying the different parts of the computer.

When you finish setting up the computer, go on to Chapter 2 and follow the instructions there to run the Setup program. If you have a hard disk, you'll then need to perform the procedures in Chapter 3 to prepare your hard disk for use.

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
- Keys for locking the computer
- Four diskettes: three that contain the MS-DOS operating system and the GW-BASIC programming language (Startup, Operating 1, and Operating 2), and a Reference diskette
- An MS-DOS Reference Manual and a GW-BASIC Reference Manual.

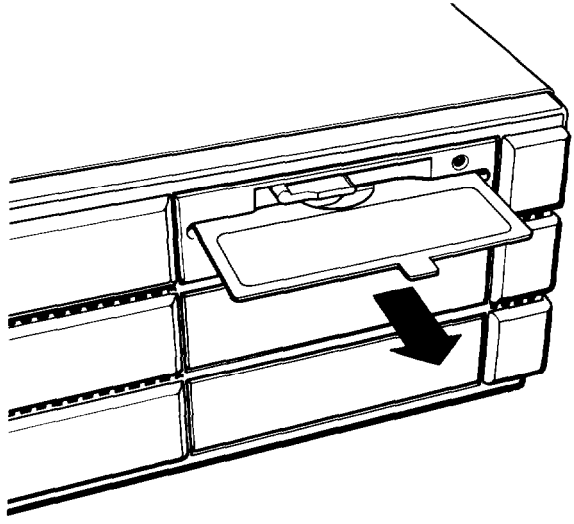
In addition to these items, you need a compatible video monitor and display adapter card, and you may also have a printer or other peripheral device.

You'll also find a registration card with the computer. Fill this card out 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.

Removing the Diskette Drive Protector Card

A diskette drive protector card occupies the slot in the diskette drive in your computer. This card is inserted at the factory to protect the read/write heads in the drive. To remove it, turn the diskette drive latch up until it is horizontal. This causes the card to pop out slightly so you can pull it out of the slot, as shown in the following illustration.



(If you have a second diskette drive, be sure to remove the card from that drive too.)

Save the protector card and reinsert it whenever you move the computer. If you don't plan to use your computer for a week or more, reinsert the card to help prevent dust from entering the disk drive.

2 *Choosing a Location*

Before you set up your Equity 386, 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 3-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 Equity 386, 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.

Note
A monitor requires that a display adapter (video) card be installed inside the computer to control it. Your dealer may have already installed the video card for you; if not, you need to install it before you can connect your monitor. See Chapter 6, "Installing Options," for instructions on how to remove the computer's cover and install an option card (the video card in this case).

The monitor type must match the video card in the computer. If you have a color card, you can use one of three connectors: a nine-pin, female D-shell connector for an RGB monitor, an RCA connector for a composite video monitor, or a 15-pin female D-shell connector for a VGA monitor. Check the following table to make sure your card and monitor match.

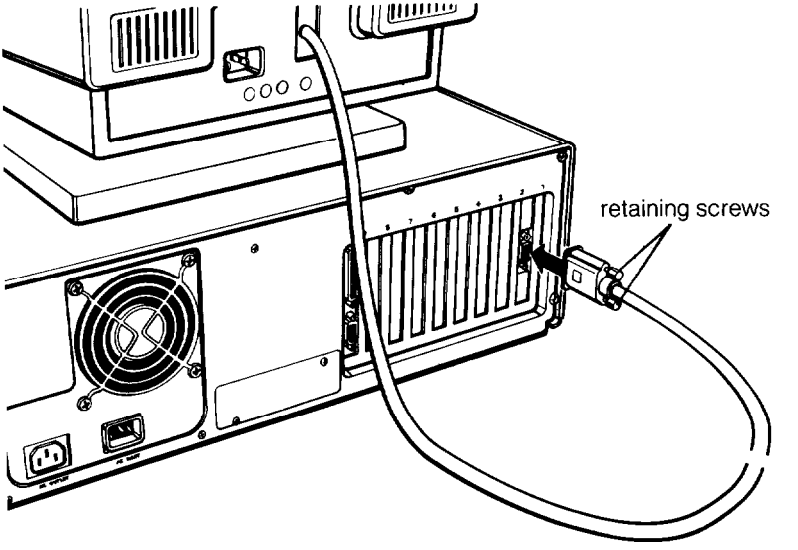
Monitor/video card compatibility

Monitor	Video card	Output type
Monochrome	Monochrome, graphics, or enhanced graphics	One 9-pin output (TTL compatible)
Color or or enhanced color	Graphics, color graphics, or enhanced graphics	One 9-pin RGB output or one RCA-type jack for composite video
VGA monochrome or color	Video graphics array	One 15-pin analog output

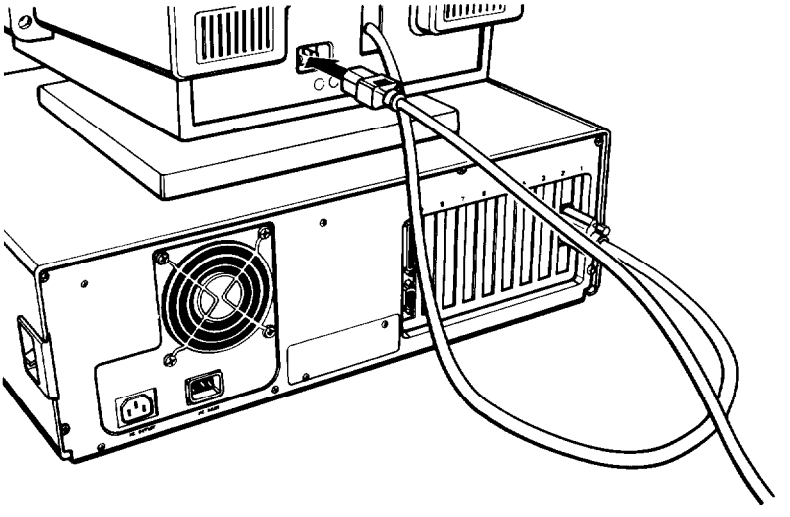
1. Place your monitor on top of or near the computer. It is easiest to connect the monitor cable if the backs of the monitor and the computer are facing you.

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



5. 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 auxiliary power outlet next to the AC power inlet on the back of the computer.

4 *Connecting a Printer*

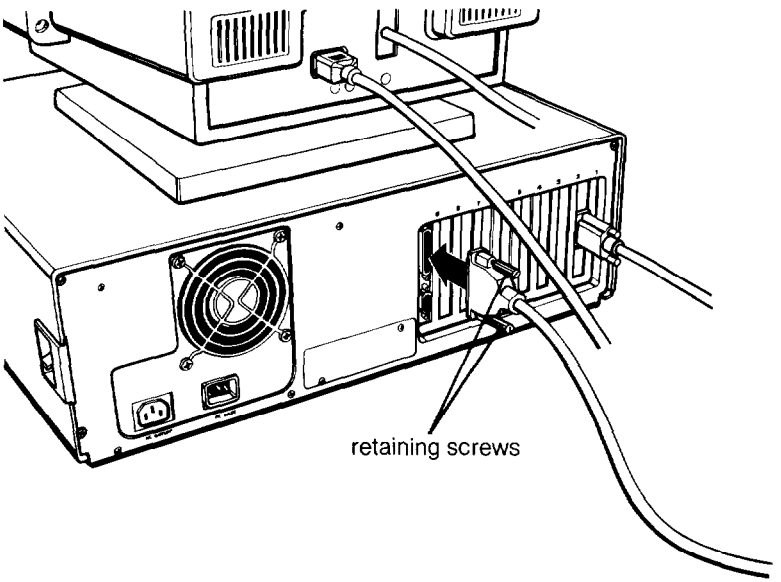
The Equity 386 has a parallel interface and a serial interface. You can easily connect a printer or other device that has either type of interface-just follow the instructions below. Epson, of course, offers a full range of printers; check with your dealer for more information.

Using the Parallel Interface

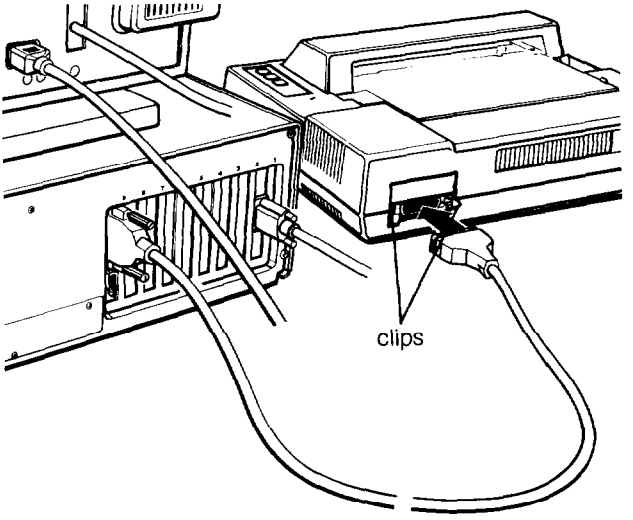
The Equity 386 parallel interface is Centronics®-compatible and uses a DB-25S connector. Most Epson printers have parallel interfaces.

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. Place the printer next to your computer.
2. Before you connect the printer, be sure the power switches on the computer, monitor, and printer are off.
3. One end of the printer cable has a 25-pin, D-shell male connector; this is the smaller 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.



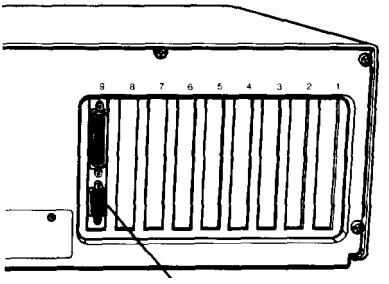
4. Connect the other end of the cable to the printer as shown below. To secure the cable, squeeze the clips at each side of the printer port and push them into place.



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

Using the Serial Interface

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



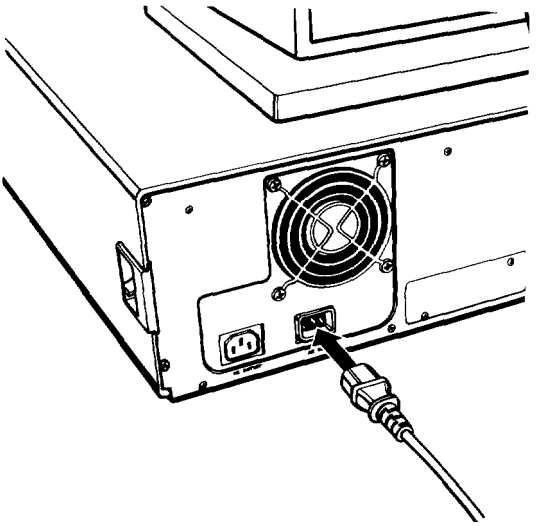
The Equity 386 uses a DB-9P male connector, so be sure you have a compatible cable (or an adapting cable that converts the 9-pin output to the standard 25-pin output). To connect a serial device, follow the same steps as above for connecting a parallel device.

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. You can do this in MS-DOS using the MODE or SETMODE command (or the MENU program). See your MS-DOS Reference Manual 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. Insert 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.

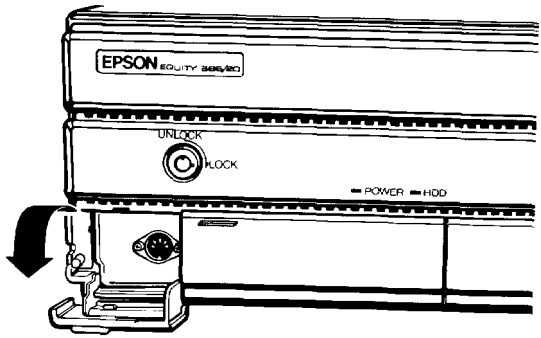


3. Plug the other end of the power cord into a three-prong, 120-volt, grounded electrical outlet.

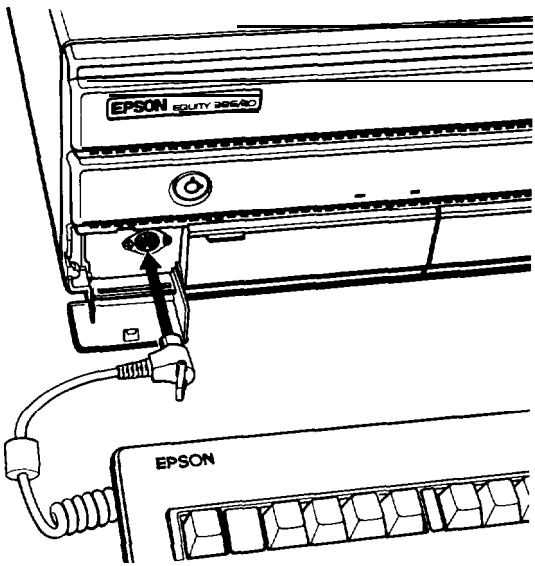
6 Connecting the Keyboard

Follow these steps to connect the keyboard:

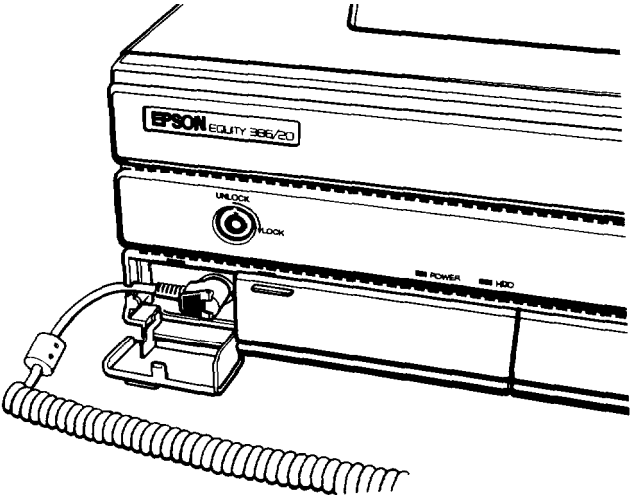
1. Turn the computer around so you are facing the front.
2. Pull open the cover on the lower left corner of the computer's front panel. You need to push down slightly on the tab as you open the cover.



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.

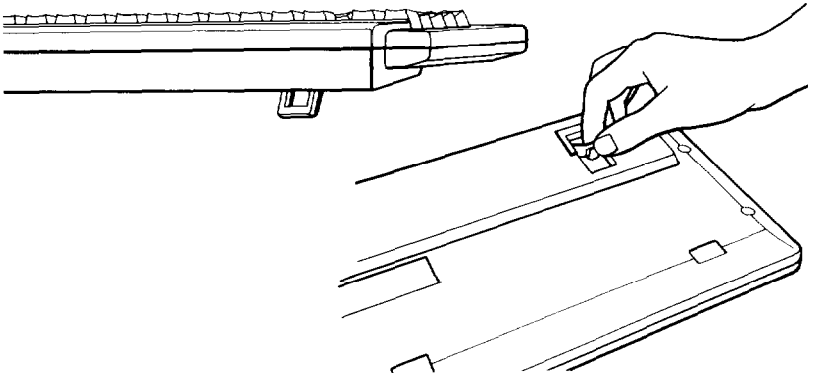


4. Push the cable into the notch at the left side of the computer, as shown below, so the cable leads away to the side of the computer.



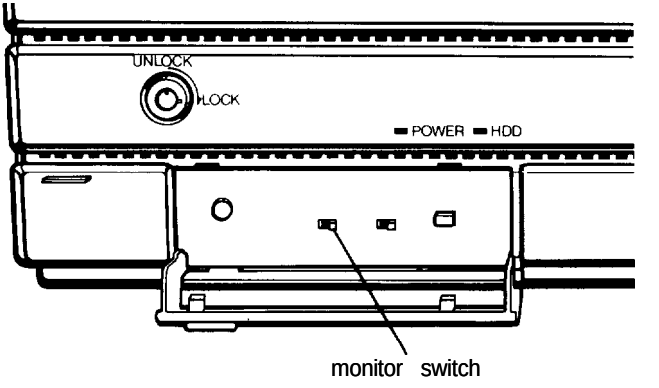
5. Close the keyboard cable cover.

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 Setting the Monitor Type

In addition to connecting the monitor, as you did in step 3, you must set the monitor switch on the front panel to match the type of monitor you are using. To access the monitor switch, open the cover to the right of the keyboard cable socket cover, as shown below. You need to push down slightly on the tab as you open the cover.



Slide the switch left for a monochrome monitor or right for a color monitor.

8 Turning On the Computer

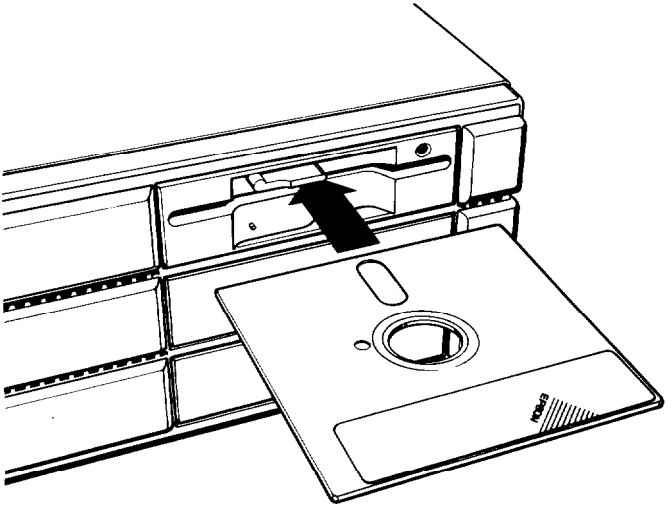
After you set up your system, you're ready to turn on the power. But first read the following safety rules to avoid accidentally damaging your computer or injuring yourself:

- Never turn the computer on or off with a protector card in the diskette drive.
- Do not dismantle any part of the computer. Only remove the cover to install and remove optional devices. If there is a hardware problem you cannot solve after reading the section in Appendix A on troubleshooting, 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 a whole disk unusable.
- Always wait at least five seconds after you switch off the power before you switch 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 power inlet on the back panel of the computer and into a 3-prong, 120-svolt, 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. Insert the Startup diskette into the diskette drive, as shown below. When it is in all the way, turn the latch down (clockwise) to lock the diskette in place.



(For more instructions on inserting, removing, and caring for diskettes, see Chapter 4.)

You can turn on your computer with or without the MS-DOS Startup diskette in the drive. With the Startup diskette in the top drive (A) as it is now, the computer loads MS-DOS from that drive. (If the drive is empty, the screen displays a message prompting you to insert a system disk.)

4. To turn on the power, flip up the switch on the right side of the computer, toward the back. The power light on the computer's front panel lights up. After a few seconds, the computer starts to perform an internal self test.

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.

9 *Loading MS-DOS*

After the computer completes its self test, it displays how much RAM (random access memory) is available and then loads MS-DOS, the operating system. You see a prompt similar to this:

```
Current date is Mon 02-13-89
Enter new date (mm-dd-yy)
```

You do not need to enter the date because you will soon be entering the correct date and time when you run the Setup program in Chapter 2. Press Enter to accept the displayed date.

The screen displays the time prompt next:

```
Current time is 16:21:15
Enter new time
```

Press Enter to accept the displayed time.

You then see the MS-DOS version number and copyright information, followed by the MS-DOS command prompt:

```
A >
```

This means the operating system is ready for you to enter a command. The command prompt identifies the current operating drive: A, B, or C, for example. Usually, drive A is the top diskette drive; B is the second diskette drive, C is the first hard disk drive, and D is used for a second hard disk drive.

The command prompt appears on the screen whenever you load MS-DOS, complete an MS-DOS command, or exit an application program.

10 Copying System Diskettes

Now that you have set up your system and loaded MS-DOS, it is important that you make copies of your four system diskettes right away. Use only the copies (usually called "working copies") for daily use and store the originals in a safe place.

Note
The following procedure describes how to copy diskettes using only one drive. If your computer has two diskette drives, there is an easier way to copy diskettes; follow the instructions in Chapter 5 for copying diskettes with two drives.

To copy your system diskettes, you need four blank, 360KB, double-sided, double-density, 5¼-inch diskettes. (Although you will probably be using 1.2MB diskettes in your Equity 386, the system diskettes have a capacity of 360KB. Therefore, you must use 360KB diskettes to make the copies.)

Follow these steps:

1. Remove the Startup diskette from the diskette drive by turning the latch up and pulling out the diskette. Then insert the diskette labelled "Operating 1" and turn the latch down to secure the diskette. The Operating 1 diskette contains the DISKCOPY program which you will use to make the copies.

2. Type the following and press Enter:

   DISKCOPY A: A:

   You see these messages:

   ```
   Insert SOURCE diskette in drive A:
   Press any key when ready . . .
   ```

3. Drive A (the top drive) already contains a diskette you want to copy (the source diskette), so just press any key. The DISKCOPY program copies the contents of the Operating 1 diskette to the computer's memory, and then you see the following:

   ```
   Insert TARGET diskette in drive A:
   Press any key when ready . . .
   ```

4. Remove the Operating 1 diskette and insert a blank diskette (which is to be the target) in the drive. Then press any key.

   If the diskette is not formatted, the DISKCOPY program formats it. Then the program begins copying the data from the computer's memory to the formatted diskette. When the copy is complete, you see this prompt:

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

5. Press Y so you can make a copy of the Operating 2 diskette. Again, you see the prompt to insert the source diskette.

6. Remove the copy of the Operating 1 diskette (which you just made) and insert the Operating 2 diskette. Then follow the instructions above and the prompts on the screen to make a copy of this diskette.

7. Repeat the procedure for the Startup and Reference diskettes.

8. When you finish copying the last diskette and the Copy another diskette (Y/N)? prompt appears, press N to return to the MS-DOS command prompt.

After you have copied the four system diskettes, be sure to label them carefully so you know which one is which. Write on the labels before you attach them to the diskettes to prevent damaging the diskettes. Store the originals in a safe place and use the copies.

Chapter 2

Running the Setup Program

The first time you use your Equity 386 after setting it up, 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 something.

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

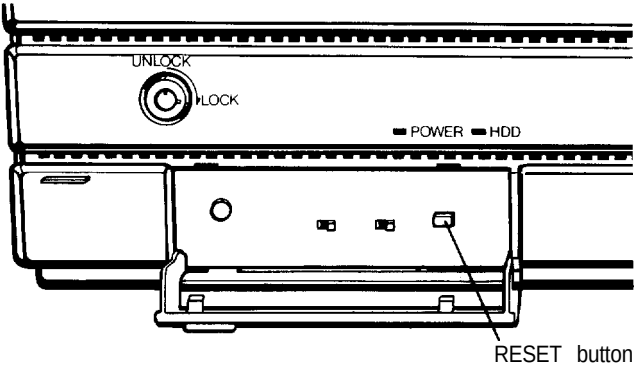
- Amount of memory installed
- Type of video display adapter installed
- Auto speed function
- Shadow RAM function
- Math coprocessor function
- Number and type of disk drives installed
- Real-time clock's time and date.

The information 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. If the computer discovers a difference between the information in CMOS RAM and your computer, it prompts you to run the Setup program.

Starting the Setup Program

Follow these steps to start the Setup program:

1. Insert the working copy of your Reference diskette into the diskette drive.
2. Press the RESET button (shown below) to reset the computer. (See Chapter 4 for more information about resetting the computer.)

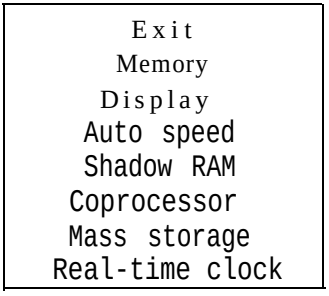


After the computer performs its self test, it loads the setup and diagnostics programs automatically from the diskette and displays this menu:

```
OPERATIONMENU

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

0-Exitto DOS for more utilities

Enter selection number:-
```

This is the menu for the setup and diagnostics programs on the Reference diskette. The first option, Setup, is the only one you need at this point. (See the appendixes in this manual for information about the diagnostics programs.)

3. Press 1 and then Enter to select the Setup option. The screen displays the main Setup menu:



Use ↓ and ↑ to move the cursor block through the options on this menu. Once you highlight the option you want, press Enter to select it. Each option on the main menu (except Exit) leads to an additional submenu of choices.

Follow the instructions below to verify or change the values for the Setup options.

Setting the Amount of Memory

Your computer has two types of memory: base memory and extended memory. The base (or main) memory in the Equity 386 is set at 640KB, which is the maximum value and is recommended for most applications. You may, however, need to reduce the main memory (usually to 512KB) to run certain software applications that require a smaller main memory size.

Note
Although your computer has 1MB of main memory, you can access only 640KB; the Equity 386 uses the rest for other purposes.

The value you set for the extended memory depends on the total amount of memory available in your computer above the 1MB of main memory. This amount consists of any additional RAM you have installed on the main system memory card and on any memory expansion card you may have installed.

Follow these steps to set the amount of memory:

1. Press ↓ to highlight the Memory option and press Enter. A smaller box appears beneath the main Setup menu:

```
  640 KB   Main
 3072 KB   Expansion
** SAVE SETTINGS **
```

   If the displayed settings are correct, press ↑ to return to the main menu.

2. To change the Main memory setting press Enter. The value changes to 256 KB. Press Enter again to change it to 512 KB. If you press Enter again, the value returns to 640 KB.

3. To change the Expansion memory setting, press ↓ to highlight the Expansion option. To increase the memory one megabyte at a time, press → until the value matches the amount of memory in your computer. To decrease it one megabyte at a time, press ←. For example, to increase the expansion memory to 3MB (added to the 1MB of main memory), press → three times. The screen displays the following:

```
  640KB   Main
 3072KB   Expansion
** SAVE SETTINGS **
```

   If you prefer, you can increase and decrease the memory in 64KB increments using the + and - keys.

4. When you finish setting the amount of memory, highlight ** SAVE SETTINGS ** and press Enter to return to the main menu.

Note
If you do not want to save the settings you have made and you have not yet selected ** SAVE SETTINGS **, just press ↑ one or more times to return to the main Setup menu. The Setup program ignores any changes you have made. This is true for all the submenus except the Real-time clock (see below).

Setting the Display Type

Follow the steps below to set the type of display adapter you are using with your Equity 386. Note that with this option you are selecting the type of display adapter (the video card) you are using-not the type of monitor, which may be called something different.

1. Highlight Display and press Enter. The following box appears beneath the main menu:

```
* Special options *
** SAVE SETTINGS **
```

   Special opt ions is the display adapter type currently selected. If you have installed an EGA or VGA card in your computer, this is the correct setting. Press ↑ to return to the main menu.

2. To change the setting, press Enter. Another box appears with these options:

```
* Special options *
Color/graph. 40 col
Color/graph. 80 col
Monochrome   80 col
```

3. Highlight the option that matches your display adapter. If you are not sure which one to choose, follow these guidelines:

   - If you have an EGA or VGA card, select `Special options.` (If you are using a compatibility mode provided by the video card, you may need to set the DIP switches on the video card, which will override the display setting in CMOS RAM.)
   - If you have a color graphics adapter (CGA) attached to an RGB (color) monitor, select `Color/graph. 80 col.`
   - If you have a monochrome display adapter (MDA), a monochrome graphics adpater (MGA), or a Hercules® MGA attached to a monochrome monitor, choose `Monochrome 80 col.`
   - If you have a composite color monitor, such as a color television with a video input, try selecting Color/graph 80 col. If the resolution is poor, run Setup again and select `Color/graph. 40 col.`
   - If you have any other combination of monitor and video card, consult the documentation supplied with your video card.

4. Once you have highlighted the monitor type, press Enter. You see your new selection as the display type.

5. Highlight **SAVE SETTINGS ** and press Enter.

Setting the Auto Speed Function

The Equity 386 can operate at 20 MHz or 8 MHz and you can select either speed using the switch on the front panel of the computer. (See "Selecting Execution Speed" in Chapter 4.) You'll probably use the faster speed for almost all your operations. Some copy-protected application programs, however, require the computer to run at 8 MHz while accessing the program on 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, your computer automatically switches to 8 MHz whenever it needs to access a diskette drive. It runs at 20 MHz for all other operations.

There are different types of copy-protected programs, and 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 at 20 MHz. If this works, you do not need to enable the Auto speed function. If you can't load the program at 20 MHz, 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 the hard disk, set the speed switch on the front panel to 8 MHz while you are installing the program. Once it is installed, set the switch to 20 MHz, 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 8 MHz and then switch to 20 MHz to use it. Do not use Auto speed.

Follow these steps to change the Auto speed setting:

1. Highlight Auto speed and press Enter. You see this box:

   ```
   Auto speed disabled
   ** SAVE SETTINGS **
   ```

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

2. To change the setting, press Enter. The option changes to Auto speedenabled.
3. Highlight ** SAVE SETTINGS ** and press Enter to return to the main menu.

Follow the same procedure if you later need to disable Auto speed.

Setting the Shadow RAM Function

A computer can access RAM (random access memory) faster than ROM (read only memory). The Equity 386 provides a shadow RAM feature that enables it to copy data from ROM areas in the computer to the RAM area so it can perform certain operations faster. If you enable the shadow RAM function through the Setup program, the Equity 386 automatically copies the data stored in ROM to RAM whenever you turn on or reset the computer.

Specifically, there are two ROM areas that can be copied to EXAM: the system ROM BIOS and the video ROM. Enable both of these to improve system performance and increase the speed with which your screen displays text and graphics.

Note
You need to enable the shadow RAM feature for the video ROM only if you are using an EGA or VGA card. The system ROM BIOS contains support for CGA, MDA, and MGA cards; so you do not need to enable shadow RAM for the video ROM if you are using one of these cards.

Follow these steps to enable (or disable) shadow RAM:

1. Highlight Shadow RAM and press Enter. You see this box:

   ```
   BIOS      disabled
   VIDEO     disabled
   ** SAVE SETTINGS **
   ```

   If the displayed settings are correct, press ↑ to return to the main menu.

2. To enable shadow RAM for the BIOS, press Enter. You see BIOS enabled.

3. To enable shadow RAM for the video, highlight VIDEO disabled and press Enter. The line changes to VIDEO enabled.

4. Highlight ** SAVE SETTINGS ** and press Enter.

Now, whenever you turn on or reset your computer, it automatically copies the system ROM BIOS and video ROM to RAM.

If you later want to disable either shadow RAM function, follow the same procedure; when you select the option and press Enter, the enabled changes back to disabled.

Setting the Coprocessor Function

The Setup program assumes you have not installed an 80387 math coprocessor in your Equity 386. If you have, you need to change the coprocessor option, as follows:

1. Highlight Coprocessor and press Enter. This box appears:

```
80387  not installed
*** SAVE SETTINGS ***
```

2. Press Enter. The option changes to 80387 installed.
3. Highlight *** SAVE SETTINGS *** and press Enter to save the setting and return to the main menu.

If you later remove the coprocessor and need to change the setting in the Setup program, follow the same procedure to change it back to 80387 not installed.

Setting the Mass Storage

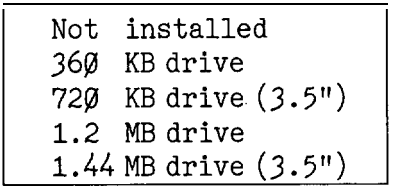
Follow these steps to set the mass storage (disk drive) configuration for your computer:

1. Highlight Mass storage and press Enter. You see a menu such as this:

```
Drive A:   1.2 MB
Drive B:   None
Drive C:   Type 17
Drive D:   None
** SAVE SETTINGS **
```

If the settings displayed match the configuration of disk drives in your computer, press ↑ to return to the main menu. If one of the settings is incorrect, change it as described in the following steps.

2. To change the value for one of the diskette drives-drive B, for example-highlight Drive B : and press Enter. A second menu appears:



3. Highlight the type of drive that matches the second diskette drive installed in your computer; then press Enter to select it. The second menu disappears and the mass storage menu shows the new setting.

4. To change the value for drive C, the hard disk, highlight that option. Then use the + or - key to increase or decrease the value until the number matches the type of drive installed in your computer. If you have the 40MB hard disk supplied with the Equity 386, the number is 17. If you have the 90MB hard disk, the number is 42. For other types of drives, see Appendix E for a list of hard disk drive types. If you are not sure which one you have, consult your dealer.

   Use this same procedure if you need to change the setting for a second hard disk drive installed in your computer (drive D).

5. When all the disk drive settings are correct, highlight ** SAVE SETTINGS ** and press Enter.

Setting the Real-time Clock

The real-time clock in your computer keeps track of the time and date at all times-even when the computer is turned off. Use the Real-time clock option to set the time and date for your computer the first time you run the Setup program. You may need to use it again later to adjust the time for daylight saving time. The Equity 386 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 (version 3.3) TIME and DATE commands. See your MS-DOS Reference Manual for instructions.

Follow these steps to set the real-time clock:

1. Highlight the `Real-time clock` option and press Enter. You see the current setting for the time and date:

```
17:10:54    Time
03-21-1988 Date
```

2. To change the time, highlight `Time` and press Enter. This box appears:

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

3. Using a 24-hour time period, enter the time in the exact format shown in the box. Use two digits for each part (you can omit the seconds, if desired); the Setup program automatically inserts the colons (:). For example, to change the time to 1:30 p.m., you would type the following:

```
133000
```

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.

4. To set the date, highlight Date and press Enter. You see this box:

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

5. Enter the date in the exact format shown in the box, using two digits for the month and day and four digits for the year; the program automatically inserts the dashes. For example, to set the date for April 30, 1989, you would type the following:

   04301989

   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.

6. When both the time and date are correct, press ↑ once or twice to return to the main Setup menu.

Note

The time and date are set automatically as soon as you press **Enter** after typing the time and date; you do not need to save these settings. So if you change either setting in the Setup program and then exit the program without saving your changes, the new time or date still takes effect.

Leaving the Setup Menu

When you finish setting the options in the Setup menu, highlight the Exit option and press Enter. You see a summary such as this:

```
Memory size          Main          640 KB
                     Expansion     3072 KB

Display type                       *Special options*

Coprocessor                        80387 not installed

Mass storage         Drive A:      1.2 MB
                     Drive B:      360 KB
                     Drive C:      Type 17
                     Drive D:      None

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

There is a second screen of information you need to check. To display that screen, press PgDn. You see the following:

```
Real-time clock      Time          13:35:31
                     Date          04-30-89

Auto speed                         disabled

Shadow RAM           BIOS          enabled
                     VIDEO         enabled

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

To go back to the previous screen, press PgUp.

Check each list to see if all the information is correct. If any setting is incorrect, highlight Change settings and press Enter. The main Setup menu appears and you can change the setting.

If you did not make any changes or you want to cancel the changes you made, highlight Exit without saving and press Enter. The Operation menu appears on the screen. Press 0 and Enter to return to the MS-DOS command prompt. (If you changed the time or date, however, the new setting will be in effect.)

If you want to save the settings you made, remove the Reference diskette and insert the Startup diskette in the drive. Highlight ** EXIT AND SAVE** and press Enter. The program stores the new settings and resets the computer using the new configuration. The computer loads MS-DOS and displays the date prompt. Press Enter once to accept the displayed date and a second time to accept the time. The A> prompt appears on the screen.

Note

If you prefer, you can leave the Reference diskette in the drive and then select ** EXIT AND SAVE **. If you do this, the computer loads the operating system from the Reference diskette and displays the OPERATION MENU on the screen. Press 0 and Enter to exit to the command prompt.

If the computer displays a setup error message while it is starting up, run the Setup program again and check all your settings.

Chapter 3

Preparing a Hard Disk for Use

If your Equity 386 has a hard disk, follow the instructions in this chapter to prepare the hard disk before using it for the first time. This chapter describes how to do the following:

- Use the FDISK command to create a primary partition and an extended partition on the hard disk, and then designate the extended partition as one or more logical drives
- Use the SELECT command to format the primary partition and to copy the MS-DOS operating system files to the hard disk
- Use the COPY command to copy the remaining MS-DOS files to the hard disk
- Use the FORMAT command to format the extended partition.

WARNING
Do not perform any of these procedures if your hard disk has already been prepared for use or has data stored on it; otherwise, you could erase data on the hard disk. These instructions apply only to a new hard disk. See "Checking the Hard Disk," below if you are not sure whether your hard disk has been prepared. For more information on the FDISK, FORMAT, and SELECT commands described in this chapter, see your MS-DOS Reference Manual.

These instructions describe how to prepare the entire hard disk for use by MS-DOS. If MS-DOS is the only operating system you plan to use, follow the instructions in this chapter to partition and format the entire hard disk for MS-DOS. Otherwise, follow these guidelines:

- If you are not using MS-DOS at all, prepare the hard disk with the operating system you are using.

- If you are using MS-DOS and another operating system, use MS-DOS to partition and format the space on the hard disk you want to be used by MS-DOS. Then use the other operating system to prepare the rest of the disk space. For example, if you have a 90MB hard disk and want to use 30MB for MS-DOS and 60MB for XENIX®, use MS-DOS to prepare the first 30MB (as described in this chapter) and then use XENIX to prepare the other 60MB.
- If you are using MS-DOS and MS OS/2, prepare the entire hard disk according to the instructions in this chapter and then follow the instructions in the MS OS/2 Setup Guide to install MS OS/2 on the hard disk.

To perform the procedures in this chapter, you'll enter MS-DOS commands and use the working copies of your MS-DOS diskettes and Reference diskette. If this is the first time you have used an operating system, you may want to first read Chapter 5 for basic information about MS-DOS or see your MS-DOS Reference Manual for complete information on the operating system.

Checking the Hard Disk

Your Epson dealer may have already partitioned your hard disk and formatted it so it automatically loads MS-DOS when you turn it on. If this is the case, you do not need to run FDISK or SELECT

If you are not sure whether your hard disk has already been prepared for use, do the following:

1. Turn on or reset your computer without a diskette in drive A. If MS-DOS loads automatically from the hard disk, it is both partitioned and formatted, and it contains the MS-DOS system files. You do not have to perform the procedures described in this chapter. If it does not start, the disk may have been partitioned but not yet formatted for MS-DOS, or it may be partitioned and formatted but missing the MS-DOS system files; go on to step 2.

2. If MS-DOS does not start, you need to check whether the disk has been partitioned. To do this, place the MS-DOS Startup diskette in drive A and hold down the Ctrl key and Alt key and press Del to start MS-DOS.

3. Press Enter twice to accept the date and time prompts. Then type FDISK and press Enter. Press 4 and Enter to select the Display Partition Information option. If the hard disk is partitioned, the screen displays a table of information about the partition(s); go on to step 4 to see if the disk is formatted. If the hard disk is not partitioned, the screen displays the following message:

   ```
   No partitions defined.
   ```

   Press Esc to exit the FDISK program. If no partitions exist, follow the instructions in this chapter to partition and then format the disk.

4. Type C : and press Enter to log onto the hard disk. Type DIR and press Enter to display a list of the files and directories on the hard disk.

   If DIR is successful (it lists the files and directories in the current directory), the hard disk is formatted. If necessary, go on to "Copying the Remaining Files to the Hard Disk," in this chapter for information on using the COPY command to copy your MS-DOS system and reference files to the hard disk. Be aware that you should copy the files on all your MS-DOS diskettes to the hard disk.

   If DIR is not successful (it does not display a list of files and directories or you get an error message), the hard disk needs to be formatted. You must format each partition on your hard disk separately. Go back to step 3 and use FDISK to discover how many partitions are on your hard disk, and then go on to "Formatting the Primary Partition" and "Formatting the Extended Partition" in this chapter for instructions on formatting your hard disk.

Partitioning the Hard Disk

Partitioning is necessary because, while your hard disk can store either 40MB or 90MB of data (depending on which Equity 386 model you purchased), MS-DOS cannot manage more than 32MB at a time.

The partitioning process divides the single *physical* disk drive into two or more logical drives. After you have followed the steps in this chapter, you will be able to access each logical drive as though it were a separate physical device. The first logical drive will be drive C, the second will be drive D, and so on.

The first logical drive (drive C) is also called the *primary partition.* All remaining logical drives together make up what MS-DOS calls the *extended* partition.

The instructions in this chapter tell you how to create a primary partition of 32MB and to divide the extended partition into maximum-sized logical drives. Thus, on a 40MB physical drive, these instructions create a drive C of 32MB and a drive D of 8MB. On a 90MB physical drive, these instructions create a 32MB drive C, a 32MB drive D, and a 26MB drive E. If you prefer to create smaller logical drives, see the instructions for FDISK in your MS-DOS Reference Manual.

Note

If you have two hard disk drives, you must repeat the process described below on the second drive to partition it just as you did the first drive. Additionally, the primary partition on the second drive must be D; so you cannot use D for one of the logical drives in the extended partition of the first drive. For example, if you have two 90MB drives with three logical drives each, the configuration would be as follows:

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

Creating the Primary Partition

Follow the steps below to create a primary partition on your hard disk:

1. Insert the working copy of the MS-DOS Startup diskette in drive A.
2. Turn on the computer (if it is not on already).
3. At the A> prompt, type FDISK and press Enter. The screen displays the FDISK Options menu.
4. Press 1 to select the Create DOS partition option and press Enter.
5. Press 1 to select the Create Primary DOS partition option and press Enter. The screen displays the following prompt:

```
Do you wish to use the maximum size for a DOS
partition and make the DOS partition active
(Y/N). . . . . .?[Y]
```

6. Press Y to create a maximum-sized partition and press Enter. The screen displays the following message and prompts:

```
System will now restart
Insert DOS diskette in drive A:
Press any key when ready . . .
```

7. Press any key to restart the system (the MS-DOS Startup diskette is already in drive A). Your computer begins reloading MS-DOS, displaying the preliminary copyright information and then the date prompt.
8. Press Enter twice to accept the date and time shown.

The system now recognizes the primary partition and MS-DOS automatically designates the primary partition as drive C. The A > prompt reappears.

Creating the Extended Partition on a 40MB Disk

If you have a 40MB hard disk, follow these steps to create an 8MB extended partition and designate it as drive D. (See the instructions below if you have a 90MB hard disk.)

1. Insert the working copy of the MS-DOS Startup diskette in drive A (if it is not there already).
2. At the A> prompt, type FDISK and press Enter. The screen displays the FDISK Options menu.
3. Press 1 to select the Create DOS Partition option and press Enter.
4. Press 2 to select the Create Extended DOS Partition option and press Enter. The screen displays a message similar to this:

```
Total disk space is 1021 cylinders.
Maximum space available for partition
is 252 cylinders.
Enter partition size . . . . . [252]
```

5. Press Enter to accept the partition size. The screen displays the following message:

```
Extended DOS partition created
```

   and shows you information about the partitions you have created.

6. Press ESC to return to the FDISK Options menu. FDISK automatically displays the Create Logical DOS Drive(s) option and a message similar to this:

```
No logical drives defined
Total partition size is 252 cylinders.
Maximum space available for logical
drive is 252 cylinders.
Enter logical drive size . . . . . [252]
```

7. Press Enter to accept the logical drive size. FDISK creates a logical drive for the extended partition and designates it drive D.

8. Press ESC twice. The screen displays the following message and prompts:

```
System will now restart
Insert DOS diskette in drive A:
Press any key when ready . . .
```

9. Press any key to restart the system (the MS-DOS Startup diskette is already in drive A). Your computer reloads MS-DOS, displaying the preliminary copyright information and the date prompt.

10. Press Enter twice to accept the date and time shown.

The system now recognizes the primary partition as drive C and the extended partition as drive D. The A > prompt reappears.

After creating the partitions, you must format each one separately. Follow the instructions later in this chapter.

Creating the Extended Partition on a 90MB Disk

If you have a 90MB hard disk, follow these steps to create a 58MB extended partition and divide it into a 32MB drive D and a 26MB drive E.

1. Insert the working copy of the MS-DOS Startup diskette in drive A (if it is not there already).

2. At the A> prompt, type FDISK and press Enter. The screen displays the FDISK Options menu.

3. Press 1 to select the Create DOS Partition option and press Enter.

4. Press 2 to select the Create Extended DOS Partition option and press Enter. The screen displays a message similar to this:

```
Total disk space is 1021 cylinders.
Maximum space available for partition
is 657 cylinders.
Enter partition size ..... [657]
```

5. Press Enter to accept the partition size. The screen displays the following message:

```
Extended DOS partition created
```

and shows you information about the partitions you have created.

6. Press Esc to return to the FDISK Options menu. EDISK automatically displays the Create Logical DOS Drive(s) option and a message similar to this:

```
No logical drives defined
Total partition size is 657 cylinders.
Maximum space available for logical
drive is 364 cylinders.
Enter logical drive size ..... [364]
```

7. Press Enter to accept the logical drive size. A message appears similar to this:

```
Total partition size is 657 cylinders.
Maximum space available for logical
drive is 293 cylinders.
Enter logical drive size . . . . [293]
```

8. Press Enter to accept the logical drive size. The following message appears:

```
All available space in the Extended DOS
Partition is assigned to logical drives.
Press Esc to return to FDISK options.
```

9. Press Esc twice. The screen displays the following message and prompts:

```
System will now restart
Insert DOS diskette in drive A:
Press any key when ready . . .
```

10. Press any key to restart the system (the MS-DOS Startup diskette is already in drive A). Your computer reloads MS-DOS, displaying the preliminary copyright information and the date prompt.

11. Press Enter twice to accept the date and time shown.

The system now recognizes the primary partition as drive C and the extended partition as drives D and E. The A > prompt reappears.

After you create the partitions, you must format each logical drive separately. Follow the instructions below.

Formatting the Primary Partition

Use the SELECT command to format the primary partition, drive C. SELECT automatically does the following:

- Formats the partition
- Labels the partition
- Copies the MS-DOS system files to the hard disk.

After you have done this, MS-DOS boots automatically from this partition on the hard disk every time you turn on or reset your computer (as long as there is no diskette in drive A).

Follow these steps to format the primary partition:

1. Insert the working copy of the MS-DOS Startup diskette in drive A (if it is not there already).
2. At the A> prompt, type the following and press Enter:

```
SELECT A: C:\DOS 001 US
```

Note
001 and US are the country code and keyboard code, respectively, for the United States. If you want to substitute other codes, see your MS-DOS Reference Manual.

The screen displays this message and prompt:

```
SELECT is used to install DOS the first time.
SELECT erases everything on the specified
target and then installs DOS. Do you want to
continue (Y/N)?
```

3. Press Y. Formatting does not begin immediately The screen displays the following:

```
WARNING, ALL DATA ON NON-REMOVABLE DISK
DRIVE C: WILL BE LOST!
Proceed with Format (Y/N)?
```

4. Press Y and Enter to begin formatting the primary partition. The screen continuously displays the changing head and cylinder numbers.

   Besides formatting the hard disk partition, SELECT copies the operating system files to the hard disk. When the procedure is complete, the screen displays the following:

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

5. It is a good idea to enter a name (label) for the partition to protect it from being accidentally formatted later. If you want to name the partition, type up to 11 characters and press Enter. If you do not want to name it, just press Enter.

   The screen first displays disk space information and then displays the following message:

```
Reading source file(s)...
```

   SELECT copies the rest of the files from the Startup diskette to the hard disk. When all the files are copied, the A> prompt reappears. The primary partition on the hard disk is now formatted.

Note
The SELECT procedure described above copies all the files from your Startup diskette to the directory \DOS on drive C. This enables you to start MS-DOS from the hard disk. However, you should copy *all* the MS-DOS files to your hard disk as described in the following section.

Copying the Remaining Files to the Hard Disk

Follow the instructions below to copy the files on your other MS-DOS diskettes and the Reference diskette to drive C, the primary partition on the hard disk:

1. Remove the MS-DOS Startup diskette from drive A and insert the diskette labeled Operating 1 in the drive.

2. You should still be logged onto drive A. If not, type A :, and press Enter.

3. At the A> prompt, type the following and press Enter:

   ```
   COPY *.* C:\DOS
   ```

   MS-DOS copies all the files from the diskette to the \DOS subdirectory on the hard disk. The file names appear on the screen as they are copied.

4. When the A> prompt reappears, remove the Operating I diskette and repeat the procedure for the Operating 2 and Reference diskettes. Store all your diskettes in a safe place.

The procedures described above copy all the files on the MS-DOS and Reference diskettes to the \DOS subdirectory on drive C. You may, however, want to store some of these commands in other subdirectories so they are easier to find. (The file COMMAND.COM, which is included on the Startup and Operating 1 diskettes, must remain in the root directory.) For information on creating subdirectories, see Chapter 5 or see your MS-DOS Reference Manual.

Formatting the Extended Partition

Once you have formatted the primary partition and copied the remaining MS-DOS files to the hard disk, follow this procedure to format the extended partition:

1. Insert the working copy of your MS-DOS Startup diskette in drive A (if it is not there already).
2. At the A> prompt, type the following and press Enter:

```
FORMAT D:/V
```

3. The screen displays this message and prompt:

```
WARNING, ALL DATA ON NON-REMOVABLE DISK
DRIVE D: WILL BE LOST!
Proceed with Format (Y/N)?
```

4. Press Y and Enter to begin formatting the extended partition. The screen continuously displays the changing head and cylinder numbers. When the procedure is complete, the screen displays the following message:

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

5. It is a good idea to enter a name (volume label) for drive D, to protect it from being accidentally reformatted later. If you want to name this drive, type up to 11 characters and press Enter. If you do not want to name it, just press Enter.

   The screen displays information about the total disk space available on drive D. The A > prompt reappears.

6. If you have created additional logical drives on your hard disk, repeat steps 1 through 5 above for each additional logical drive. Substitute the appropriate drive letter in the FORMAT command. For example, to format drive E, type the following and press Enter:

```
FORMAT E: /V
```

Booting From the Hard Disk

Now you can boot your system (load MS-DOS) from drive C on your hard disk. Be sure there is no diskette secured in drive A when you turn on or reset your computer. Otherwise, your computer tries to boot MS-DOS from the disk in drive A. If drive A is empty (or the latch is up), MS-DOS is booted from drive C.

Turn off the computer, wait at least five seconds, and then turn it back on. After the computer completes the power-on self test, the screen displays the date prompt. Press Enter twice to accept the date and time shown.

The C > prompt appears, indicating that the computer has successfully loaded MS-DOS from your hard disk.

Chapter 4

Using the Equity 386

This chapter covers the following basic procedures for using your Equity 386 computer:

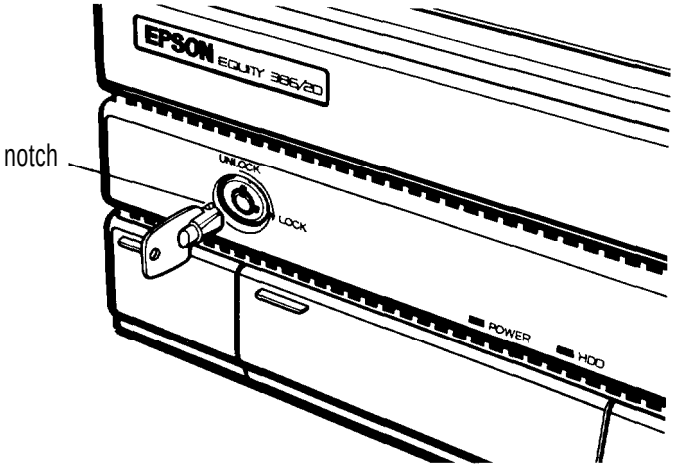
- Locking the computer
- Selecting execution speed
- Selecting monitor type
- Controlling the volume
- Resetting the computer
- Using special keys on the keyboard
- Using disks and disk drives
- Turning off the computer.

Locking the Computer

The key lock on the front panel allows you to lock the cover on the computer and disable the keyboard and the RESET button for security. This provides a safeguard against someone accessing confidential information or altering your computer's internal hardware.

For example, you may want to lock the computer while you are running an application program that features a screen demonstration that should not be interrupted. When the computer is locked, it ignores anything typed on the keyboard.

You can lock the computer whether the power is on or off. To lock it, insert the key with the notch pointing up, as shown in the following illustration. Then, while pressing the key in slightly, turn it clockwise to the LOCK position.



To unlock the computer, insert the key with the notch pointing right and turn the key counterclockwise, to the U N LOCK position.

You can remove the key in either a locked or unlocked position.

Your Equity 386 comes with two keys; store them safely in different locations in case you misplace one.

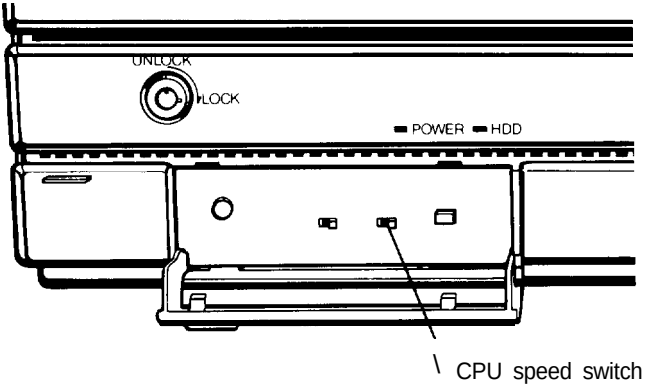
Be sure the computer is unlocked before you try to use the keyboard; otherwise it will not respond to anything you enter.

Selecting Execution Speed

The Equity 386 can operate at two speeds: 8 MHz or 20 MHz. At 20 MHz, the computer performs all tasks faster, and you will probably use this speed for almost everything you do. Certain application programs, however, 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
You can use the Auto speed function in the Setup program to automatically slow down the execution speed for diskette access. See Chapter 2 for instructions.

Use the CPU SPEED switch on the front panel to change the CPU speed; move it left for 8 MHz or right for 20 MHz.



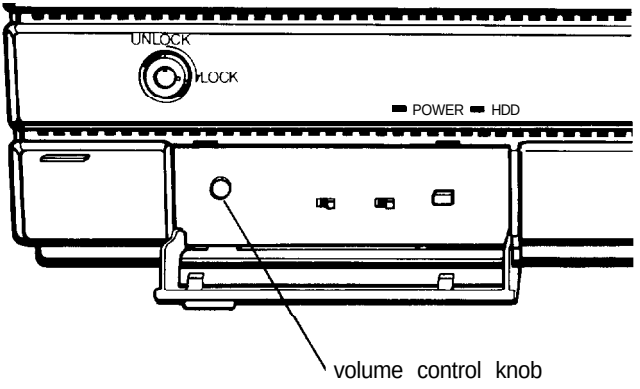
WARNING
Do not change the speed while you are running a program. Complete your current operation, exit the program to the MS-DOS command prompt, and then change the speed.

Selecting the Monitor Type

When you set up your computer, you used the switch on the front panel to select the type of monitor you are using with your Equity 386: either monochrome or color. If you sometimes use an alternate monitor that is the other type or if you later get a new monitor, don't forget to change the switch to match the monitor. Move the switch left for a monochrome monitor or right for a color monitor.

Controlling the Volume

Your Equity 386 has a speaker which enables it to beep when you perform certain operations. You can control the speaker's loudness with the VOLUME knob on the front panel, shown below. Turn it to the right to make the sound louder or to the left to make it quieter.



Resetting the Computer

You can reset the Equity 386 to load a different operating system or to reload the current operating system. For example, if an error occurs and the computer does not respond to your keyboard commands, you can reset the computer and try again. However, resetting erases all data in the computer's temporary memory (RAM) that you have not stored, so reset your computer only when necessary.

You can stop the operation of an MS-DOS command and some application programs by holding down Ctrl and pressing either C or Break. Both key combinations send the ASCII code 03-which is known as the Break signal-to the computer. These methods are less severe than resetting and may not erase the data in RAM; so try one of these Break commands before you reset the computer.

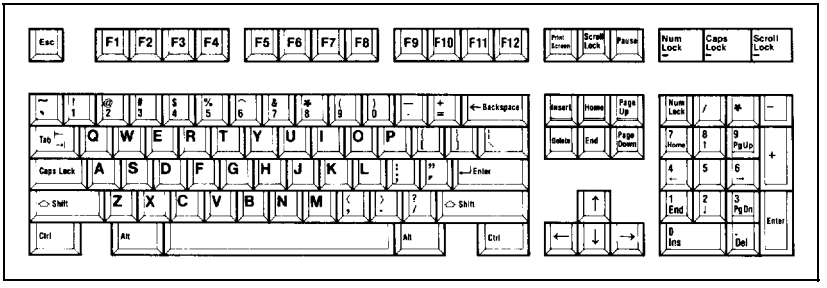
WARNING
Do not reset the computer to exit a program unless you have to. Some application programs classify and store new data when you exit the program. If you reset the computer without properly exiting the program, you may lose data.

To reset the computer, MS-DOS must be either on a diskette in drive A or on the hard disk. 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 on the numeric keypad at the right of the keyboard. The screen goes blank for a moment and then the computer reloads MS-DOS. If this does not correct the problem, try the second method.
2. Press the RESET button on the front panel. This method works even when the keyboard does not respond to your commands. If this does not correct the problem, try the third method.
3. Remove any diskette from the diskette drive(s). Turn off the computer using the power switch on the right side. Wait five seconds and then turn the power back on. Reload the operating system.

Special Keys on the Equity 386 Keyboard

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



Key functions

Key	Purpose
Tab |← →|	Moves the cursor one tab to the right in normal mode and one tab to the left in shift mode.
Caps Lock	Changes the letter keys from lower- to uppercase; changes back to lowercase when pressed again. The numeric/symbol keys on the top row of the keyboard 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 Caps Lock is on.
Ctrl	Works with other keys to perform special (control) functions, such as editing operations in MS-DOS and GW-BASIC.
Alt	Works with other keys to enter alternate character codes or functions.
← Backspace	Moves the cursor back one space, deleting the character to the left of the cursor.
↵ Enter	Ends a line of keyboard input or executes a command.
Insert (Ins)	Turns the insert function on and off.
Delete (Del)	Deletes the character marked by the cursor.

Key	Purpose
Home, End Page Up (PgUp) Page Down (PgDn) ↑ ← ↓ →	Control cursor location.
Num Lock	Changes the function of the numeric/cursor keys from numeric to cursor positioning; changes back when pressed again.
Esc	Cancels the current command line or operation.
F1 - F12	Perform special functions within application programs.
Print Screen (Prt Sc)	Prints the screen display on a line printer.
SYS Rq (Req)	Generates the System Request function
Scroll Lock	In some applications, controls scrolling
Pause	Suspends the current operation
Break	Terminates the current operation

The Num Lock, Scroll Lock, and Caps 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 on the upper-right corner of the keyboard is on. When the function is disabled, the light is off.

Using Disks and Disk Drives

The disk drives in your computer allow you to store data on disk, and then retrieve and use it when you like. All Equity 386 systems have at least one diskette drive; you may also have a hard disk drive and/or a second diskette drive in your system.

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

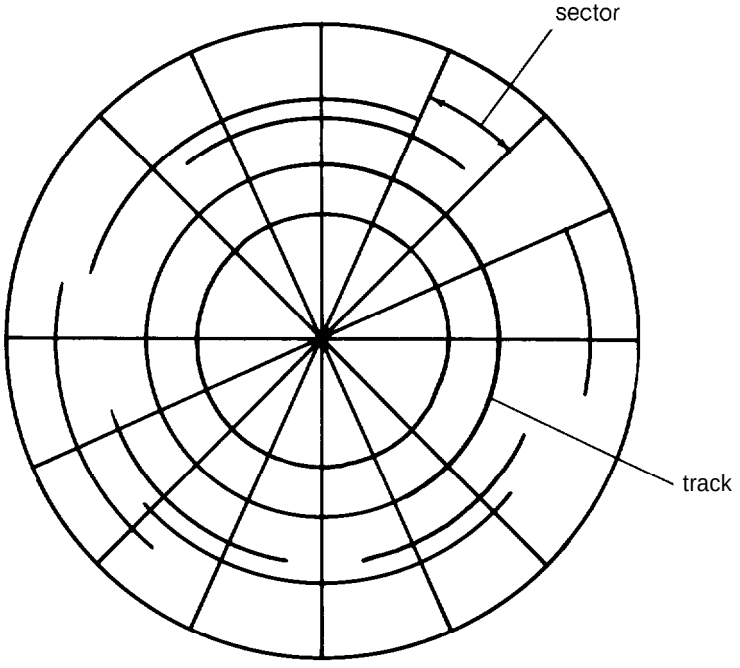
The diskette you insert in your computer's diskette drive is made of flexible plastic coated with magnetic material. It is enclosed in a square jacket that is either slightly flexible (5¼-inch diskettes) or hard (3½-inch diskettes).

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 sometimes called 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.

A hard disk consists of two or more platters stacked on top of one another; so 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

Your computer has at least one 1.2MB diskette drive. 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 types of diskette drives you can use in the Equity 386 and which diskettes you should use with them:

- 360KB drive-With this drive, use 5¼-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.) 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-approximately 500 pages of text. MB stands for megabyte; each megabyte equals 1,048,576 bytes (1024KB).

- 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-approximately 300 pages of text.

- 1.44MB drive-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-approximately 600 pages of text.

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

Note

You must format new diskettes before you can use them with an operating system, Formatting erases all the data an 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 5 for instructions on formatting diskettes.

Drive and diskette incompatibilities

Because of the size difference, you cannot use 3½-inch diskettes in a 5¼-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 tables below summarize the possibilities and limitations.

5¼-inch drive/diskette compatibility

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

WARNING

If you write to a 360KB (or 160KB, 180KB, or 320KB) diskette while it is in a 1.2MB drive, you may not be able to read it or write to it in a 360KB drive later.

3½-inch drive/diskette compatibility

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

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

If you have any combination of the above drives (360KB, 1.2MB, 720KB, or 1.44MB), 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 use these commands to copy files between the hard disk and any type of diskette. You cannot use the DISKCOPY command to copy from one drive to another if the two drives are not the same type.

Caring for Diskettes and Diskette Drives

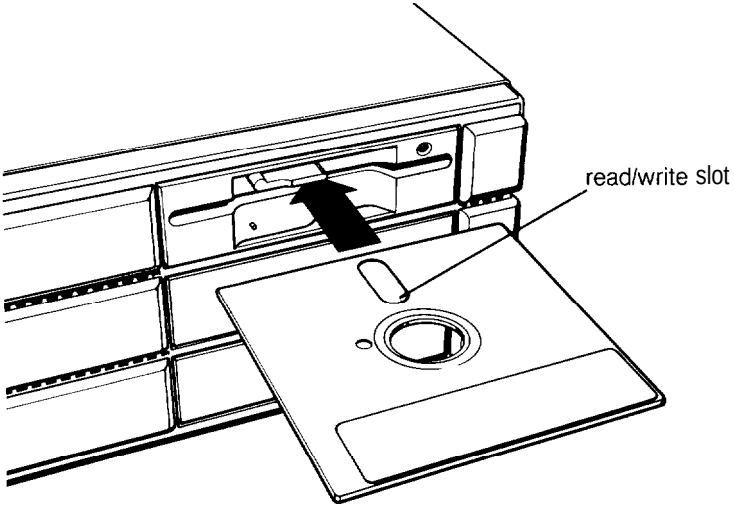
Follow these basic precautions to protect your diskettes and avoid losing data:

- 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 and destroy data. Dust can also 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 your 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 sources of magnetism 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.
- Never touch a diskette's magnetic surface. The oils on your fingertips can damage it. Always hold a diskette by its protective jacket. When using a 3½-inch diskette, do not slide the metal shutter; this exposes the diskette's surface.

- 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. 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 5 1/4inch diskettes, it is best to write on the label before you attach it to the diskette. If you need to write on a label that is already on a diskette, use only a soft-tip pen, not a ballpoint pen or a pencil. Always indicate the drive and density type on the label.
- Store diskettes in a proper location, such as a diskette container. Do not store diskettes flat or stack them on top of each other, When you are not using them, keep your 5 1/4-inch diskettes in their protective envelopes.

Inserting and Removing Diskettes

To insert a diskette into a 5¼-inch drive, hold it with the label facing up and and the read/write slot leading into the drive.

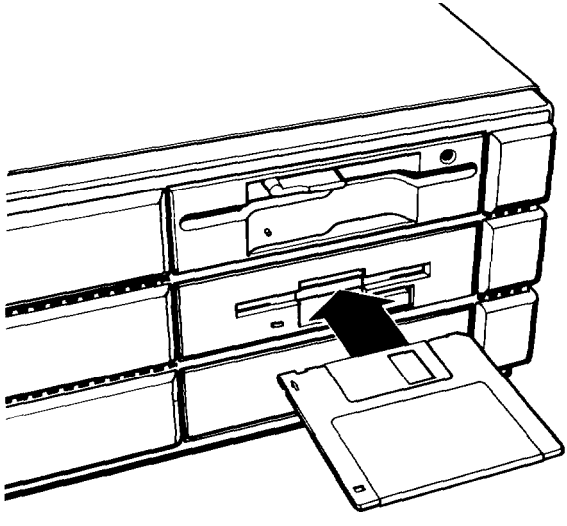


Slide the diskette into the slot until it is in all the way, Then turn the latch down to lock it in a vertical position. This keeps the diskette in place and enables the read/write heads in the disk drive to access the diskette.

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.

Note
If you have a 5¼-inch drive that has a button instead of a latch, see the instructions below for inserting a 3½-inch diskette.

If you have a 3½-inch diskette drive, 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.



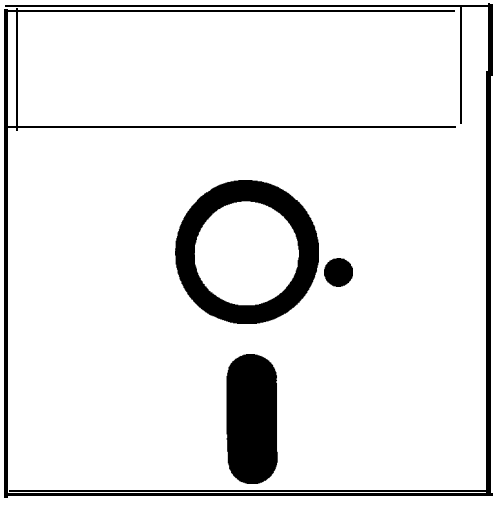
To remove a 3½-inch diskette, press the release button to release it. When the diskette pops out of the drive, pull it out and store it properly.

WARNING
Never remove a diskette or turn off the computer while the drive indicator 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.

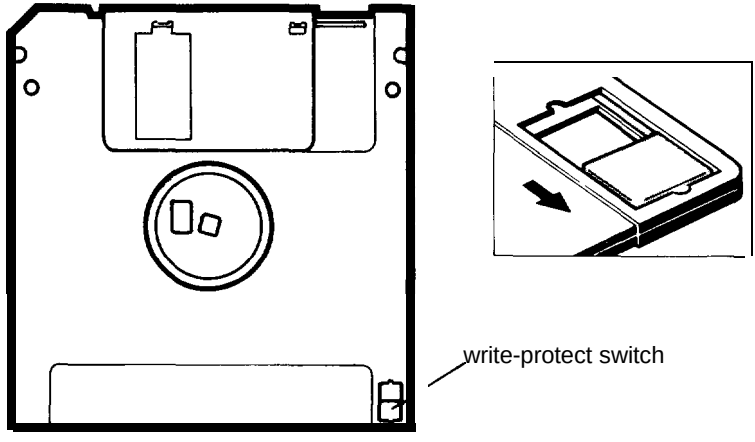
To write-protect a 5¼-inch diskette, cover the small, rectangular notch (shown below) with an adhesive write-protect tab. Write-protect tabs usually come with new 5¼-inch diskettes when you buy them.



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

Note
Some program diskettes, such as your MS-DOS diskettes and your Reference diskette, have no notch so they are permanently write-protected. This protects them from being accidentally erased or altered by the computer.

On a 3½-inch diskette, the write-protect device is a small switch on the lower-right corner on the back, shown below. To write-protect a 3½-inch diskette, slide the switch toward the edge of the diskette until it clicks into position, exposing a hole in the corner.



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

Making Backup Copies

It is important to make copies of all your data and system diskettes. Copy all diskettes that contain programs, such as the original MS-DOS and Reference diskettes that come with the Equity 386, and use only the copies. Store your original MS-DOS diskettes in a safe place away from your working diskettes. Back up your data diskettes regularly, whenever you revise them, to keep them up-to-date, and store them away from your originals.

Chapter 1 describes how to use DISKCOPY to copy your MS-DOS and Reference diskettes. To make backups of other diskettes, use the DISKCOPY command or the MENU program. See Chapter 5 or see your MS-DOS Reference Manual for more instructions on using DISKCOPY and MENU.

If you have a hard disk, it's best to put most of 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. For more information, see "Backing Up" in Chapter 5 and check your MS-DOS Reference Manual.

Using a Single Diskette Drive

The MS-DOS operating system 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 386) 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 give 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. One way to avoid accidentally losing data is to hold the diskette for one drive in your left hand and the diskette for the other in your right. It is also a good idea to write-protect your original diskette.

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.

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.

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 is bootable.

Using a Hard Disk Drive

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

- The 40MB hard disk can store as much data as 33 1.2MB diskettes and the 90MB hard disk can store the equivalent of approximately 75 1.2MB diskettes.
- Your computer can perform all disk-related operations faster.
- You can store all your 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 easier to find and use. See Chapter 5 for instructions on how to use directories.

Epson also includes the XTREE utility with MS-DOS. XTREE provides simple menus that allow you to move, create, delete, and rename files and directories, as well as view and execute files. See Chapter 5 for an introduction to XTREE or see your MS-DOS Reference Manual for complete instructions.

If your Equity 386 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.
- If you are going to move your computer (even to another part of the room) and you are using a non-Epson hard disk, run the program called HDSIT to prepare the hard disk before 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 Chapter 3 to prepare your hard disk for use.

You can enhance the performance of your hard disk by using the MS-DOS HDCACHE command. See your MS-DOS manual for instructions on using HDCACHE.

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.

You can use the MENU utility or the BACKUP command to back up your hard disk files. Use the MENU utility or the DISKCOPY command to make copies of your system and program diskettes. For instructions on using these programs, see Chapter 5 or see your MS-DOS manual.

Preparing the hard disk for moving

If you are using the 40MB or 90MB hard disk supplied with the Equity 386, it automatically moves the read/write heads to a safe region when you turn off the computer. This prevents the heads from altering any of the data on the disk if the computer is bumped accidentally-in its current place or while being moved to a new location.

If you are using another type of hard disk, however, and you need to move your computer across the room or across the country, you should run the HDSIT program just before turning off the computer. For each hard disk installed in the computer, the HDSIT program moves the read/write heads to a region of the disk surface that does not contain data, and locks them securely in position.

To run HDSIT, exit any program you are using so the MS-DOS command prompt is on the screen. If you copied the MS-DOS files to the hard disk according to the instructions in Chapter 3, HDSIT is in the \DOS directory on drive C. Log onto that directory (if necessary) by typing CD \DOS. Or you can just insert the Reference diskette in drive A and type A: to log onto that drive. Then type the following and press Enter:

```
HDSIT
```

You see a screen of information reminding you that the heads will not be unlocked until you reset the computer or turn the power off and on again. Next the program moves 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 turning off your computer, save your data, exit the program you are using, and remove any diskettes from the disk drives. Turn off the computer first, then turn off the monitor and any peripherals.

Chapter 5

Using MS-DOS with Your Equity 386

Your Equity 386 comes with version 3.3 of MS-DOS. This operating system manages your computer by organizing the computer's memory, controlling the monitor display, accepting keyboard input, and directing external communications.

To communicate with the operating system, you use MS-DOS commands. How much you need to know about MS-DOS depends on how you plan to use your computer. If you plan to use it for running application programs only, the few MS-DOS commands you'll need are introduced in this chapter. If you plan to use advanced features or create your own programs, see your MS-DOS Reference Manual for a complete description of MS-DOS.

Starting and Exiting MS-DOS

Before you can run an MS-DOS application program, MS-DOS must be running in memory If you have a hard disk that you prepared according to the procedures in Chapter 3, MS-DOS is loaded automatically when you turn on the computer. If you do not have a hard disk, insert your working copy of the MS-DOS Startup diskette in drive A and then turn on or reset the computer. The computer then loads MS-DOS from drive A.

When the date and time prompts appear, press Enter to accept the date and time shown. The screen then displays the MS-DOS command prompt, A > or C >. This tells you that MS-DOS is loaded and identifies the current drive.

Before you turn off the computer, make sure the A > or C > prompt is displayed. Then remove your diskettes, turn off your computer, and turn off any peripherals.

Drive Designators

MS-DOS uses letters to identify the disk drives in your system. If you have one diskette drive, that device is known as drive A. If you have two diskette drives, one is called drive A, the other drive 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 more than one physical hard disk drive, the primary partition of the second drive is known as D, the primary partition of the third is E, and so on.

If you have used the FDISK command (described in Chapter 3) to create one or more extended partitions, the logical drives that make up the extended partition(s) are identified by the letters immediately following the names of all the primary partitions. For example, if you have one physical drive that's partitioned into three logical drives, the logical drives are C, D, and E. If you have two physical 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 E while the second physical drive is divided into logical drives D and G.

The Default Drive

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

The MS-DOS command prompt tells you which drive is the current default. The command prompt consists of the drive letter followed by a "greater-than" symbol. (Depending on how your system has been set up, the command prompt may also include additional information.) Thus, when you see C > displayed on your screen, you know that the default drive is C. The command prompt also lets you know that MS-DOS is ready to receive a command from you.

Changing the Default Drive

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

To access a program or file without first changing the default drive, use a drive identifier with the filename. For example, if you are logged onto drive A and type B : PROGRAM, MS-DOS loads and executes the file named PROGRAM from drive B but stays logged onto drive A.

The MS-DOS Command Format

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 details 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 A:
```

FORMAT is the command name to execute the file FORMATCOM. The A: is a parameter that tells the command what to format-in this case, the diskette in drive A. The space between FORMAT and A: is the delimiter that lets MS-DOS 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 alters the effects of a command. For example, suppose you want to format a 360KB diskette in your 1.2MB diskette drive. To do this, you need to add a switch to the FORMAT command like this:

```
FORMAT A: /4
```

Without the /4 switch, FORMAT would try to format the diskette as a 1.2MB capacity diskette. Switches are generally preceded by a forward slash (/).

Each MS-DOS command is either internal or external. Internal commands are commands that are built into MS-DOS and can be used at any time once MS-DOS is loaded into memory. External commands are stored on your system diskettes as program files. To run an external command, MS-DOS must be able to locate the file containing the command's instructions. If it cannot find the file, MS-DOS gives you an error message.

See your MS-DOS Reference Manual for more information on the command format. Also see your MS-DOS Reference Manual for command descriptions that tell you which parameters and delimiters are required for each command and which optional parameters and switches you can use.

Entering MS-DOS Commands

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

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 back up to the error so you can correct it
- Press ESC to cancel the command line.

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

Creating and Managing Files

All your data and programs are stored in files. A data file contains information, such as words, numbers, or pictures. A program file contains 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. You must name your files in a certain format required by MS-DOS.

Naming Files

Each file must have a unique filename so you can retrieve it when you need to. The filename consists of two parts: the name and the *extension.*

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

```
* \ / [ ] : I <  > + = ; . ?
```

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. For example, an MS-DOS filename might look like this:

```
DATA.TXT
```

Some application programs add extensions to the files you create. These application programs use the extension to determine whether it is a compatible data file. Avoid using the same extensions as your application programs. Also, do not use uppercase and lowercase letters to distinguish between files. MS-DOS does not recognize the difference and displays all filenames in uppercase.

Certain extensions are reserved for program files. You must not use these extensions for your data files. The reserved extensions are .COM, .EXE, and .BAT Files with these extensions are also sometimes called executable files.

The .BAT extension denotes a particular kind of executable file called a batch file. Batch files can be used to automate sequences of MS-DOS instructions. Even if you are not a programmer, you may want to create some batch files to assist you in your work. A particularly useful kind of batch file, called an autoexecute batch file (or "AUTOEXEC" file) is discussed later in this chapter.

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 also use the XCOPY command to copy individual files or groups of files. XCOPY, an external command, is more versatile than COPY. For details about XCOPY, see your MS-DOS Reference Manual.

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

- You can copy individual files from a diskette or the hard disk to a diskette or hard disk
- 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.

A few rules apply when copying files:

- You must tell MS-DOS where to find the original file and where to store the copy.
- You cannot create a new file with the same name and in the same directory as an existing file.
- If an existing file on the destination diskette or directory has the same name as the file you are copying from, 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 another disk, that disk must have been previously formatted.

To use the COPY command, type COPY at the command prompt, followed by the drive identifiers 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:
```

If you want 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
```

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

```
COPY REPORT FACTS
```

In the example above, you can omit the drive identifiers because the original file and the copy are both on the current drive.

An easy way to copy a group of files is by using wildcard characters in the filenames. You can use 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, type the following and press Enter:

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

You can also use the COPY command to combine a number of 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
```

In the above example, the files are located on the current drive, so no drive identifiers are necessary. To copy REPORT, FACTS, and MEMO from drive A to the DATA file on drive B, type the following and press Enter:

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

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 default directory) to CLIENT, type the following and press Enter:

```
RENAME PROSPECT CLIENT
```

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

```
REN HAMMERS WRENCHES
```

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

```
REN B:*.NEW *.OLD
```

To rename all files that begin with the same five characters "MEMOS" but end with one varying character, type the following and press Enter:

```
REN MEMOS? MEMOS?.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 B, type the following and press Enter:

```
DEL B:REPORT.AUG
```

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

```
DEL B:WRENCHES
```

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

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

Because deleting all files is a somewhat drastic operation, MS-DOS prompts you to confirm your intentions when you use the *.* wildcard combination with the DEL command.

A synonym for DEL is ERASE. Thus, you could substitute ERASE for DEL in any of the preceding examples.

Printing Files

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

To print a file named STATS.NBA on drive A:

1. Make sure your printer is on and ready to print.
2. At the command prompt, type the following and press Enter:

```
PRINT A: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.)

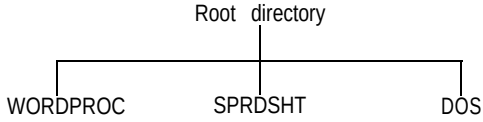
3. Type the name of the device, such as LPT1, and press Enter. MS-DOS prints the file on your printer.

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

Using Directories

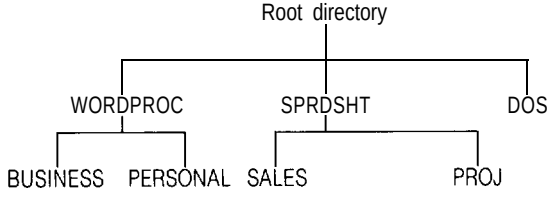
You can create many files on a diskette, and a hard disk can store thousands of files. To help you organize this much information, MS-DOS lets you subdivide a disk into logical units called directories. Directories allow you to arrange your disk so that files of similar type or purpose are kept together.

Whenever you format a hard disk or a diskette, MS-DOS creates one directory for you. This directory is called the root directory. Any subsequent directories you create are logically subordinate to the root directory; that is, they are *subdirectories* of the root directory. A simple directory structure might look like this:



This arrangement would enable you to keep your word processing programs and data files in a directory called WORPROC, your spreadsheet program and data files in a directory called SPRDSHT, and the MS-DOS files (as well as the other files copied from your Reference and Startup diskettes) in a directory called DOS. The few files that MS-DOS needs to find as soon as you boot your system (COMMAND.COM, CONFIG.SYS, and perhaps AUTOEXEC.BAT) could remain at the top level of the structure, in the root directory.

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



This structure would let you segregate your business word processing files from your personal word processing files and your sales spreadsheets from spreadsheet files used for financial projections.

Your directory structure may be as simple as this example, or much more complex. You can organize your disk(s) to suit your own needs, and you can modify the structure as your needs change.

Here are some additional points to note about directories:

- On the root directory, the total number of files and subdirectories must not exceed 512.
- All directories other than the root directory can have any number of files and subdirectories.
- Subdirectories are named the same way files are. The name can include as many as eight characters, and you can add an extension of up to three characters.
- The root directory does not have a name. It is identified by a backslash (\) character.
- Diskettes have root directories, just as hard disks do, and you can create subdirectories on diskettes the same as on hard disks.

The following sections discuss the basics of creating, deleting, and using directories.

The Default Directory

MS-DOS always recognizes one directory as the default or current directory, just as it always recognizes one drive as the default drive. The default directory is the one in which MS-DOS performs your commands, unless you tell it to do otherwise. If you want to run a program or access a data file that is not stored in the default directory, you can either change directories (making a different directory the default) or include a pathname in your command.

Using Pathnames

A pathname tells MS-DOS how to find its way to the directory you want to access. There are two basic types of pathnames: relative and absolute. A relative pathname tells MS-DOS how to find its way to the desired directory from the current default directory. An absolute pathname tells MS-DOS how to find its way to the desired directory from ***the root*** directory.

Here is an example of an absolute pathname:

```
\WORDPROC\PERSONAL
```

The backslash at the beginning of this pathname tells MS-DOS to start its journey at the root directory, proceed down the directory tree to WORDPROC, then continue down the tree to PERSONAL.

Here is an example of a relative pathname:

```
SALES
```

Because this pathname does not begin with a backslash, MS-DOS assumes that the starting point of the path is the current default directory. This pathname thus tells MS-DOS to find a directory named SALES subordinate to the current default directory. Note that if the directory structure of your disk matched the one in the examples above, you would have to be logged onto the SPRDSHT directory in order for this pathname to be valid.

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. Thus, if the default directory were WORDPROC (in the foregoing example), the pathname . . \DOS would tell MS-DOS to move up one level from WORDPROC (in this case to the root directory) and then find a subdirectory called DOS.

You can use either relative or absolute pathnames at any time. It doesn't matter which you use, provided the pathname leads to an existing directory.

Including Filenames With Pathnames

You typically use a pathname when you want to access a file that is not stored in the current default directory. The name of the file you want to access is specified at the end of the pathname, like this:

```
TYPE\WORDPROC\PERSONAL\JEANl204.DOC
```

This command tells MS-DOS to list on screen (TYPE) the contents of the file JEAN1204.DOC, which is stored in the directory \WORDPROC\PERSONAL. Note that the filename is connected to the pathname by a backslash character-the same character used to separate the various directories in the pathname itself.

Including Drive Letters With Pathnames and Filenames

As mentioned earlier in this chapter, if you want to access a file stored on a drive other than the default drive, you have to include a drive designator (A:, for example) along with the filename. If the file you want is not stored in the default directory of that drive, you need to include a pathname as well as the drive designator.

For example, suppose you are logged onto the root directory of drive C, and you want to list the contents of the file JEAN1204.DOC which is stored in the directory \WORDPROC\PERSONAL of drive D. The last time you were logged onto drive D, the default directory on that drive was drive D's root directory. If you issue the command

```
TYPE  D:JEAN1204.DOC
```

MS-DOS attempts to find the file you want in the root directory of drive D. Because the file is not there, you get an error message. To correct the problem, add a pathname to the command, like this:

```
TYPE  D:\WORDPROC\PERSONAL\JEANl204.DOC
```

If you do not know what the default directory on another drive is, it is a good idea to include the full pathname whether you need it or not. You can never give MS-DOS too much information.

Note
MS-DOS provides some commands that make using pathnames easier. The APPEND command lets you set a search path for data files and executable files. The PATH command lets you specify a search path for commands and program files so you don't have to type a full pathname every time you want to run an application program or an MS-DOS command. The SUBST command lets you substitute a drive letter for a directory path, which is helpful if you frequently type long pathnames. See your MS-DOS Reference Manual for information on these helpful commands.

Listing the Contents of a Directory

To list the files in the current directory, type DIR and press Enter. MS-DOS lists the names of the files in the current directory on the current drive. If the 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. Another way to view a long directory is to use the /W switch:

```
DIR /W
```

This results in a wide-format directory listing.

To list the contents of a different drive or a different 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:\
```

Directory listings include the following information about each file: the name and extension, the size in bytes, and the date and time the file was created or last modified (whichever is later). Subdirectories in the directory are listed along with files; they are identified as subdirectories by the letters < DIR >. At the bottom of the listing, MS-DOS indicates the number of bytes on the disk that are still available for use.

Creating Directories

The MKDIR command lets you create directories. To create a LEDGER directory under your root directory, for example, 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
```

Removing Directories

To delete a directory from a disk, use the RMDIR command (or its shorthand equivalent, RD). For example, to remove the directory ACCOUNTS, which is subordinate to the directory LEDGER, you could log onto the LEDGER directory, type the following, and press Enter:

```
RD ACCOUNTS
```

A directory must be empty before it can be deleted. If it contains any files or subdirectories, attempting to delete it will produce an error message.

Changing the Default 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 from anywhere in the directory tree, type the following and press Enter:

```
CD \
```

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

```
CD ACCOUNTS
```

To change from ACCOUNTS back to LEDGER, you can use the special symbol . . or you can use an absolute pathname. (The . . symbol always designates the parent directory.) In other words, you can type:

```
CD . .
```

or

```
CD \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. Always be sure you do not want to save any of the data on a used diskette before you format it.

The formatting procedure you use depends on whether your computer has one or two diskette drives and whether it has a hard disk. Follow the instructions below for your configuration.

Note
Besides the method described below, you can also format diskettes using the Epson MENU utility. This program is easy to use because it lets you select options from a menu. For more information, see the section on MENU later in this chapter or see your MS-DOS Reference Manual.

Formatting Diskettes With a Hard Disk

1. If necessary, log onto drive C. If you are not in the directory where the file FORMAT.COM is stored, change to that directory.

2. When you see the C > prompt, type the following and press Enter:

```
FORMAT A:
```

   You see this prompt:

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

3. Insert the diskette you want to format in drive A and press Enter.

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

```
Format complete
1213952 bytes total disk space
1213952 bytes available on disk
Format another (Y/N)?
```

   At this point, you can either format another diskette by pressing Y and Enter, or return to the MS-DOS command prompt by pressing N and Enter.

Formatting Diskettes With Two Diskette Drives

1. Make sure you are logged onto drive A, with your working copy of the MS-DOS Startup diskette in the drive.

2. When you see the A > prompt, type FORMAT B : and press Enter. You see this prompt:

```
Insert new diskette for drive B:
and strike ENTER when ready
```

3. Insert the diskette you want to format into drive B and press Enter.

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

```
Format complete
1213952 bytes total disk space
1213952 bytes available on disk
Format another (Y/N)?
```

At this point, you can either format another diskette by pressing Y and Enter, or return to the MS-DOS command prompt by pressing N and Enter.

Formatting Diskettes With One Diskette Drive (No Hard Disk)

1. Insert the working copy of your MS-DOS Startup diskette in drive A.

2. When you see the A> prompt, type the following and press Enter:

```
FORMAT A:
```

You see this prompt:

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

3. Remove the MS-DOS Startup diskette from the diskette drive. Insert the diskette you want to format into drive A and press Enter.

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

```
Format complete
1213952 bytes total disk space
1213952 bytes available on disk
Format another (Y/N)?
```

At this point, you can either format another diskette by pressing Y and Enter, or return to the MS-DOS command prompt by pressing N and Enter.

Backing Up

It's very important to keep backup diskettes containing copies of the files you create. You can copy data and program files 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 It also gives you a way to back up files that are larger than the capacity of your diskettes.

DISKCOPY and BACKUP are described below. The COPY command is described in the previous section, "Copying Files." See your MS-DOS Reference Manual for information on XCOPY.

Note
An easy way to perform the functions listed above is through the MENU and XTREE programs. See the sections on MENU and XTREE later in this chapter.

Using the DISKCOPY Command

The DISKCOPY command lets you copy all the files on one diskette to another diskette. (You cannot use DISKCOPY to copy to or from a hard disk.) 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 your original diskette is write-protected. (See Chapter 4 for instructions.)

2. If you have a hard disk, make sure you are logged onto the directory that contains the DISKCOPY.COM file. If you don't have a hard disk, make sure your working copy of the MS-DOS Operating 1 diskette is in drive A.

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

```
DISKCOPY A: A:
```

MS-DOS displays this message:

```
Insert SOURCE diskette in drive A:
Press any key when ready . . .
```

4. If necessary, remove the Operating 1 diskette from drive A. Insert the diskette you want to copy from (the source) in the diskette drive and press any key. DISKCOPY starts to copy the contents of the diskette to the computer's memory.

When the memory is full, the screen displays this message:

```
Insert TARGET diskette in drive A:
Press any key when ready . . .
```

5. Remove the diskette from drive A and insert the blank diskette (the target) in the drive. Press any key. DISKCOPY checks to see if the new diskette is. formatted. If it is not, DISKCOPY formats the diskette. The copy operation begins when the format is complete.

6. When DISKCOPY has copied the data from memory to the copy diskette, the screen prompts you to insert the source diskette again to copy the remaining data to the computer's memory. Insert the original diskette in drive A and press any key.

7. Once DISKCOPY has copied the rest of the original diskette's data to the computer's memory, the screen prompts you to insert the target diskette (the copy) again to copy the remaining data from memory to the diskette. Insert the copy diskette and press any key.

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

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

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

Using DISKCOPY with two diskette drives

When you use the DISKCOPY command with two diskette drives, be sure to specify both diskette drives (A: and B:). If you don't, MS-DOS copies the diskette in drive A to a second diskette that you insert in drive A, requiring you to swap diskettes during the copy process. (MS-DOS prompts you when you need to change diskettes.)

1. Make sure your original diskette is write-protected. (See Chapter 4 for instructions.)
2. If your system has a hard disk, log onto the directory where the file DISKCOPY.COM is stored. Otherwise, insert your working copy of the MS-DOS Operating 1 diskette in drive A.
3. At the 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 when ready . . .
   ```

4. Insert the diskette you want to copy from (the source) into drive A and the diskette you want to copy to (the target) into drive B. Then press any key. DISKCOPY checks to see if the target diskette is formatted. If it is not, DISKCOPY formats the diskette. The copy operation begins when the format is complete.
5. When the copy is complete, you see this message:

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

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

Using the BACKUP Command

The BACKUP command offers several conveniences for archival purposes. It 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
- Copy only those files that have been created (or last modified) after a specified date
- Copy files in the current directory together with files in all subdirectories of the current directory
- Format diskettes "on the fly" (while it is copying files).

Unlike DISKCOPY and COPY, which make readable copies of files, BACKUP creates files that cannot be accessed directly. To return files copied with the BACKUP command to their original locations on the hard disk, you must use the RESTORE command.

Make sure you have enough diskettes to back up the data on your hard disk drive. It takes about 27 1.2MB diskettes to copy a 32MB hard disk partition that is completely full.

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

Using the Epson HELP Program

The Epson HELP program provides online information on MS-DOS commands and utility programs. You can use HELP in either of two ways:

- You can type HELP at the command prompt and press Enter to display the HELP menu
- You can bypass the menu by typing HELP plus the name of the command you want information about.

Note
The HELP program requires two files, HELP.COM and HELP.TXT. These files are located on your Operating 2 diskette. To run HELP from the hard disk, you must be logged onto the directory that contains these two files.

To use the HELP menu, follow these steps:

1. Type HELP at the MS-DOS command prompt and press Enter.
2. The screen displays a menu of MS-DOS commands. Use the cursor keys to highlight the command you want information about and press Enter.
3. If there is more than one page of information about the command you selected, you see the prompt PgUp at the top of the screen. Press the PgUp key to display the rest of the text.
4. To return to the HELP menu, press the ESC key. Press ESC again to exit the HELP program.

To bypass the HELP menu and get information about one command, follow these steps:

1. At the command prompt, type HELP, followed by the name of the MS-DOS command you want information about, and press Enter. For example, to see help information for the COPY command, type the following and press Enter:

   HELP COPY

2. If there is more than one page of information about the command you selected; you see the prompt PgUp at the top of the screen. Press PgUp to display the rest of the text.
3. Press ESC to exit the HELP program.

You can also request help information for more than one command. Follow these steps:

1. At the command prompt, type HELP followed by the names of the commands you want information about. Then press Enter. Separate each command name with a space. For example, to see help information for the DISKCOPY, FORMAT, and COPY commands, type the following and press Enter:

   ```
   HELP DISKCOPY FORMAT COPY
   ```

2. The help information for the first command is displayed first. If there is more than one page of information about the command you selected, you see the prompt PgUp at the top of the screen. Press PgUp to display the rest of the text.

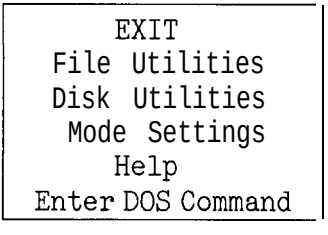
3. Press Esc to see the help information for the next command.

4. To exit the HELP program, press Esc after viewing the information for the last command.

Using the Epson MENU Program

Your Equity 386 comes with a program provided by Epson called MENU. With this program you can display a menu of commands and select the one you need. MENU is easy to use because it lets you execute commands without having to remember the exact syntax for each command.

To access the MENU program, either log onto the directory that contains the file MENU.EXE (if you have a hard disk) or insert the Operating 2 diskette into drive A. Type MENU at the command prompt and press Enter. You see this main menu:



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

Because MENU works by calling other programs, you may see an error message similar to this when you select an option:

```
SETPRINT.EXE not on the current disk.
Press any key to continue...
```

The message appears if you attempt to run MENU from a disk that does not contain the command called by MENU (in this case, SETPRINT). This also happens if you have not set the proper path to the desired command using the PATH command. Be sure that the command exists on the same disk or the same directory as MENU.EXE, or enter a PATH command to search the directory containing the command. If you have a hard disk, it is best to store all the programs required by MENU in the same directory as MENU.EXE.

MENU Program Options

Following is a description of each option. Step-by-step instructions for using each option are provided in your MS-DOS Reference Manual.

File Utilities Lets you back up and restore files, replace files, compare files, change file attributes, copy files, and copy 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. This option 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 Command	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 the XTREE Utility

Epson has included the XTREE program with MS-DOS to make it easier for you to manage files and run other MS-DOS programs. XTREE is fast and easy to use. It lets you do the work of many MS-DOS commands using a convenient menu format, and provides several features not available elsewhere in MS-DOS.

XTREE displays a window that shows your directories and subdirectories in a tree-structured diagram, so you can quickly see the organization of your files. When you highlight a filename, XTREE displays the file's statistics in another window to the side of the screen.

At the bottom of the screen, XTREE displays a menu that lists the functions you can perform by pressing the corresponding letter. Among other things, these XTREE functions let you:

- Display all the files in a directory and the statistics for each file
- Copy, delete, or move files individually or in groups, to any directory or diskette
- Make new directories, rename directories, delete empty directories, and change from one directory to another

- Display data in both ASCII and hexadecimal format
- Display how much space is available on your disks.

Running XTREE

To run XTREE, log onto the directory where XTREE is located or insert the Operating 1 diskette in drive A. Type XTREE at the command prompt and press Enter. A title screen appears while XTREE reads your disk's directory, and then the XTREE display appears.

When a directory is highlighted in the upper window, the DIR COMMANDS list is displayed at the bottom of the screen, This list shows you the commands you can use to perform directory management operations. When you press Enter to switch to the files in the bottom window, the list of FILE COMMANDS replaces the DIR COMMANDS list. This list shows you the commands you can use to perform file management operations.

You use the cursor keys, letter keys, function keys, the Ctrl key, and the Alt key to perform various functions in XTREE.

You use cursor keys to select files and directories. To select a file or directory, use the arrow keys to highlight the name of the file or directory Press Enter to move the cursor from the directory (top) window to the file (bottom) window. Press Enter to expand the file window, and then press it again to return to the directory window.

Letter keys execute XTREE commands. The available XTREE commands appear on the DIR COMMANDS or FILE COMMANDS line at the bottom of your screen. The highlighted letter of the word (the D in Delete, for example) indicates the key you press to execute the command.

To execute a command on more than one file or directory, press T to tag the desired files or directories with the Tag command. A diamond appears next to each tagged file or directory name. Then hold down the Ctrl key as you press the highlighted letter of the command name. Pressing Ctrl D, for example, deletes all tagged files.

Alt key commands execute additional XTREE commands. Press the Alt key to display the ALT DIR COMMANDS or ALT FILE COMMANDS. These commands appear on the line where the DIR COMMANDS or FILE COMMANDS normally appear. To execute an Alt key command, hold down the Alt key and press the highlighted letter of the command name.

Function keys control XTREE itself. Press F1 to quit XTREE, F2 to display a screen of help information, or F3 to cancel a command. XTREE displays the available commands and the key that executes each command on the lower right of your screen.

Cautions

With a utility as powerful and as fast as XTREE, you must always be aware of the danger of accidentally erasing important files. Follow these guidelines to protect your files:

- You can cancel commands, even commands in progress, by pressing F3. This stops any function.
- Use Ctrl A (the attributes command) to give read-only status to all the files in the directories. Then, in order to erase a file, you must first remove its protection. (See your MS-DOS Reference Manual for details.)
- XTREE is limited in the number of files and directories it can handle. If you have more than 2800 files or 180 directories, XTREE displays an error message. If you see this error message, exit XTREE and store your infrequently used files on diskettes, or reorganize and delete some directories. If you use XTREE when you have more files or directories than it can handle, you may accidentally erase or alter files.

Using an AUTOEXEC.BAT File

You may find that there are some commands you want to run every time you turn on your computer. To run a command or a series of commands automatically upon startup, you can type the commands into a special file called AUTOEXEC.BAT When you load MS-DOS, it automatically 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 processor or spreadsheet program) so that it loads automatically when you turn on or reset the computer.
- Change the MS-DOS command prompt so that it displays the current directory-or your name, or anything you want.

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.

Creating an AUTOEXEC.BAT File

You can create an AUTOEXEC.BAT file using 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.

Here's an example of an AUTOEXEC.BAT file:

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

The first line tells MS-DOS to look for programs or batch files in the root directory and the DOS 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.

The MS-DOS COPY command provides an easy way to create an AUTOEXEC.BAT file. Follow these steps:

1. If you are creating an AUTOEXEC.BAT file on the working copy of your MS-DOS Startup disk, insert the diskette into drive A. If you are creating an AUTOEXEC.BAT file on your hard disk, log onto the root directory of your hard disk.

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.

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 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 blank line.

4. Now 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 instructions.

Using Memory Beyond 640KB

Your Equity 386 is equipped with at least 1MB of random access memory. 640KB is for use by the operating system, your application programs, and your data. The memory between 640KB and 1MB is reserved for use by the computer and is not available to application programs or the operating system.

If you have more than 1MB, you may be able to use the memory above 1MB for certain application programs (such as Lotus 1-2-3®) that support the Lotus®/Intel®/Microsoft Expanded Memory Specification 4.0 (LIM 4.0). To make the memory above 1MB available to such programs, you must do the following:

1. Copy the file EEMM386.EXE from your Reference diskette to the root directory of the hard disk from which you boot MS-DOS. (You may put EEMM386.EXE in a directory other than the root directory if you add the path parameter to the DEVICE= line; the path parameter is explained below.)

2. Modify the file CONFIG.SYS, which is stored in the root directory of the hard disk from which you boot 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=EEMM386.EXE
```

Save the file as an ASCII text file, and then reboot your computer.

If you do not have a word processing program capable of saving an ASCII text file, you can modify CONFIG.SYS in the following way:

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

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

3. Type DEVICE=EEMM386.EXE and press Enter.

4. Press the F6 key, and then press Enter.

5. Reboot your computer.

This procedure makes the memory in your computer above 1MB available to any application program that supports the Lotus/Intel/Microsoft Expanded Memory Specification 4.0 (LIM EMS 4.0).

About EEMM386.EXE

EEMM386.EXE is an expanded memory manager that supports the LIM 4.0 expanded memory specification. It does so by using ordinary memory above 1MB (extended memory) to emulate expanded memory.

The full syntax for the command line that activates EEMM386.EXE is as follows:

```
DEVICE=[path]EEMM386.EXE[size][/F]
```

The items in brackets are optional. Their meanings are as follows:

path is a pathname specification. You need to add the pathname if the file EEMM386.EXE is not in the root directory of the disk from which you boot MS-DOS. For example, if you keep EEMM386.EXE in a directory called \DOS on drive C:, be sure to include the pathname, like this:

```
DEVICE=C:\DOS\EEMM386.EXE
```

size allows you to specify the number of kilobytes of memory above 1MB that EEMM386.EXE uses as expanded memory. If you want EEMM386.EXE to use all the memory above 1MB, omit this optional parameter.

/F is an optional switch provided for compatibility with certain application programs that support earlier versions of the LIM expanded memory specification but do not support version 4.0. If your application gives you an error message having to do with expanded memory, try adding the /F switch, like this:

```
DEVICE=EEMM386.EXE/F
```

Using HDCACHE and EEMM386.EXE

The HDCACHE program (described in your MS-DOS Reference Manual) cannot use expanded memory. If you use both HDCACHE and EEMM386.EXE and you want HDCACHE to use extended memory, you must not convert all your extended memory to expanded memory with EEMM386.EXE. Instead, decide how much extended memory you want to allocate to HDCACHE. Then use the size parameter to convert the remainder of your extended memory to expanded memory.

For example, if your computer has 2MB of memory, then it has 1MB of extended memory. If you want to split this amount of memory between EEMM386.EXE and HDCACHE, modify the DEVICE= line to read:

```
DEVICE=EEMM386.EXE  512
```

512KB of your extended memory will be converted to expanded memory by EEMM386.EXE. The remainder will be available to HDCACHE.

Chapter 6

Installing Options

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

- 80387 math coprocessor
- Memory modules
- Option cards.

A math coprocessor speeds up 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 without adding a memory card. This chapter briefly describes the type and amount of memory you can use in the Equity 386. 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. It usually contains a device, such as a modem, or provides an interface, such as a connector to which you connect a monitor. This chapter describes how to install option cards and adjust jumper settings for certain configuration changes.

Adding Memory Modules

The standard Equity 386 system comes with 1MB of memory and you can add memory up to a maximum of 16MB. You do this by adding single inline memory modules (SIMMs) to the memory card inside the computer.

There are 16 SIMM sockets on the card which are divided into four banks of memory, consisting of four sockets each. You can install SIMMs in these sockets that are either 256KB or 1MB. You must,

however, add memory according to certain grouping limitations to preserve the 32-bit access capability of the Equity 386.

There are basically two restrictions: the total amount of memory and the way the memory is installed. Here are the guidelines:

- The total amount of memory must be one of the following: 1MB, 2MB, 4MB, 8MB, 10MB, or 16MB. You cannot, for example, have 3MB or 12MB of memory on the memory card.
- You must fill up any memory bank you use with one size of SIMM. For example, you cannot install just two 1MB SIMMs or two 1MB SIMMs and two 256KB SIMMs in one memory bank.
- You must fill one, two, or four of the memory banks; you cannot fill up just three. And you must fill the banks in numerical order: first bank 0, then 1, then 2 and 3.
- If you use two or four memory banks, they must be configured in pairs: 0 and 1, 2 and 3. For example, if you want to have 8MB of memory and you use four 1MB SIMMs in bank 0, you must use four 1MB SIMMs in bank 1. You cannot install 1MB SIMMs in the first bank and 256KB SIMMs in the second. If you are using all four banks, you could install 1MB SIMMs in banks 0 and 1 and 256KB SIMMs in banks 2 and 3. When the memory banks are configured in pairs, the computer works faster because it can use one-to-one interleave in accessing the memory. Of course, this is not possible if only one bank is filled.

The following table shows the possible configurations you can use:

Memory	Bank 0	Bank 1	Bank 2	Bank 3
1MB	4 x 256KB			
2MB	4 x 256KB	4 x 256KB		
4MB	4x1MB			
or				
	4 x 256KB	4 x 256KB	4 x 256KB	4 x 256KB
8MB	4x1MB	4x1MB		
10MB	4x1MB	4x1MB	4 x 256KB	4 x 256KB
16MB	4x1MB	4x1MB	4x1MB	4x1MB

Remember, your system already has 1MB of memory (consisting of four 256KB SIMMs) installed in bank 0; so consider this when you are deciding how much memory to add and in what configuration.

Note
It is best not to expand the memory of the Equity 386 by installing an optional memory card. Because any memory card you could use in the Equity 386 is 16-bit, it would cause your 32-bit computer to work much slower.

You can use the EEMM386 utility to improve memory management in your Equity 386. See Chapter 5 for instructions.

Installing Option Cards

The Equity 386 has nine option slots so it can hold up to nine cards. One slot is occupied by the card that controls the serial/parallel interfaces and the floppy disk drive (known as the SPF card). The video card that controls your monitor occupies another slot. If you have a hard disk, its controller card occupies a third slot.

This leaves either six or seven slots in which you can install option cards. You can buy option cards from authorized Epson dealers as well as other vendors.

This section explains how to remove the computer's cover, install an option card, and then replace the cover.

Removing the Cover

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

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

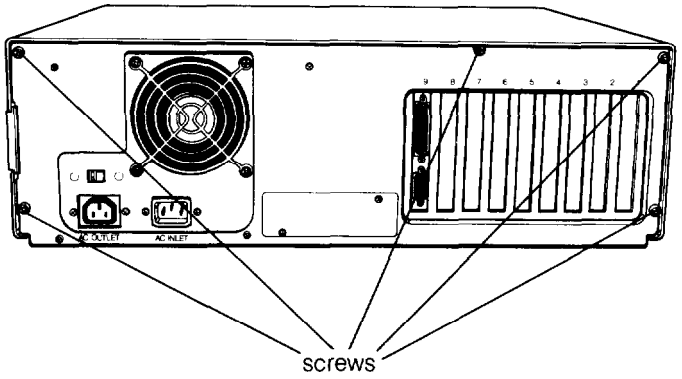
2. Disconnect the computer's power cable from the back panel and disconnect any peripheral cables that are connected to the computer.

3. Disconnect the keyboard.

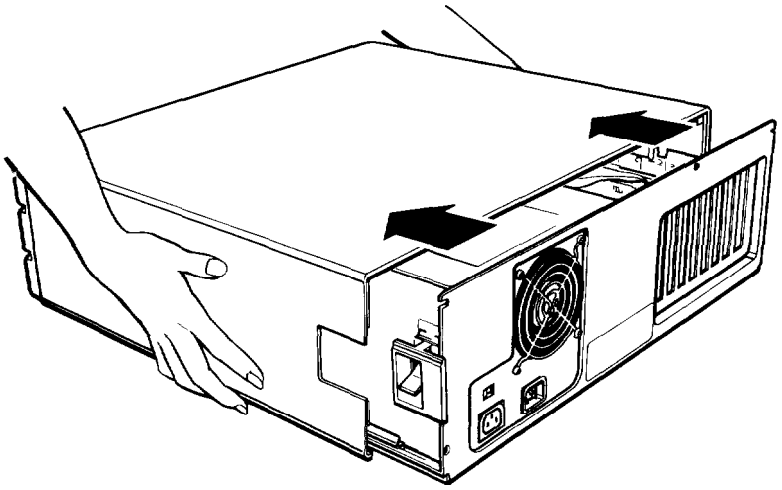
4. If the computer is locked, unlock it (using the key lock). Otherwise you cannot take off the cover. (See Chapter 4 for instructions on locking and unlocking the computer.)

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

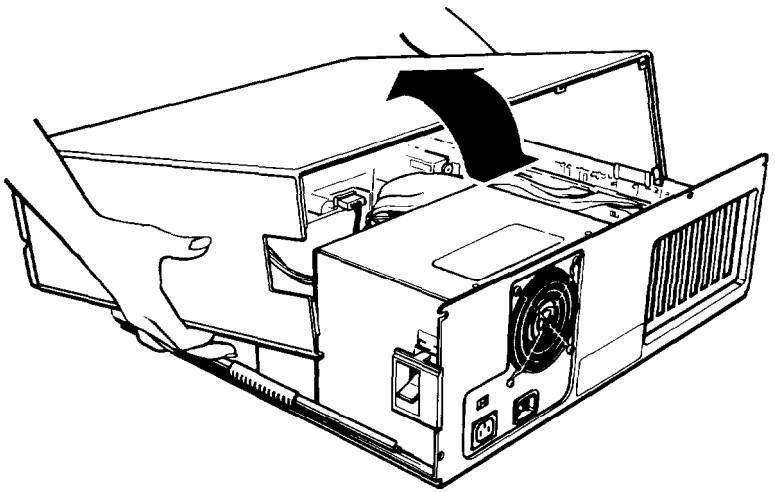
6. As shown below, the top cover is secured by five screws on the back panel. Remove the screws and set them safely to one side where you will not lose them.



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

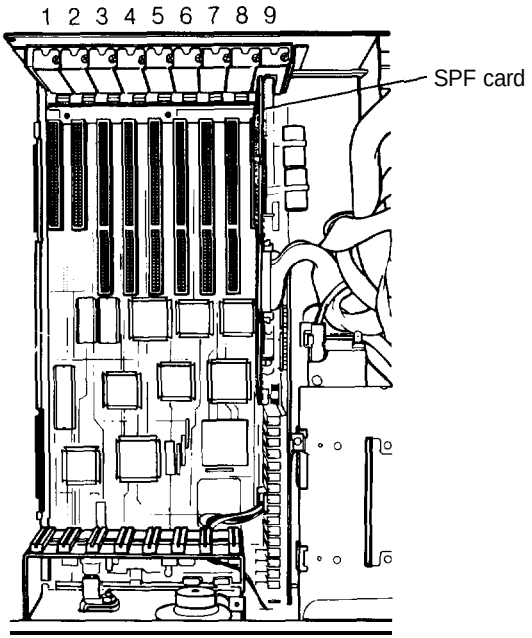


8. When the back edge of the cover has cleared the power switch, you can lift off the cover. Separate the sides from the bottom ledge of the computer by pulling them outward slightly, as shown below. Then lift off the cover and set it aside.

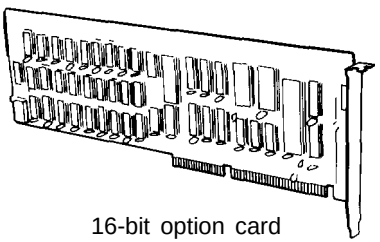


Installing an Option Card

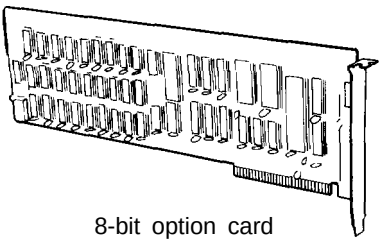
The illustration below shows the nine option slots inside the Equity 386. (Slot number 9 is occupied by the SPF card.)



Slots 1, 2, and 9 are designed for 8-bit option cards, and slots 3 through 8 are designed for 16-bit cards. As you can see below, a 16-bit card has a second connector.



16-bit option card



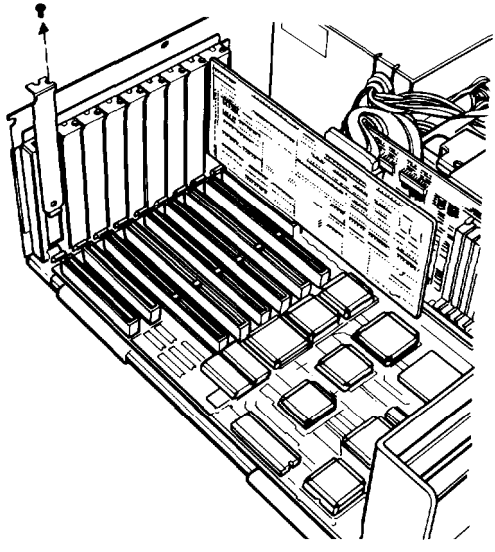
8-bit option card

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 &bit cards in a 16-bit slot. However, it is best to leave the SPF card in slot 9 because of the cables. Likewise, an additional disk drive controller card should be installed 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.

Option cards fit in the slots only one way, but be sure to examine the card first and follow these instructions closely:

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.

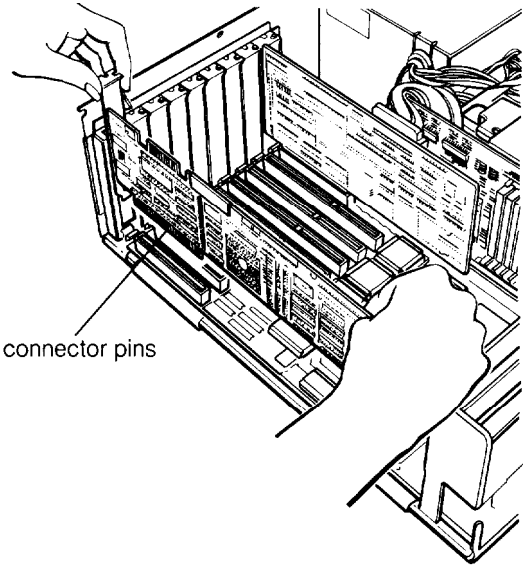


Note
If you select one of the two slots that has a metal grounding tab attached, set the tab aside and remember to replace it in step 5.

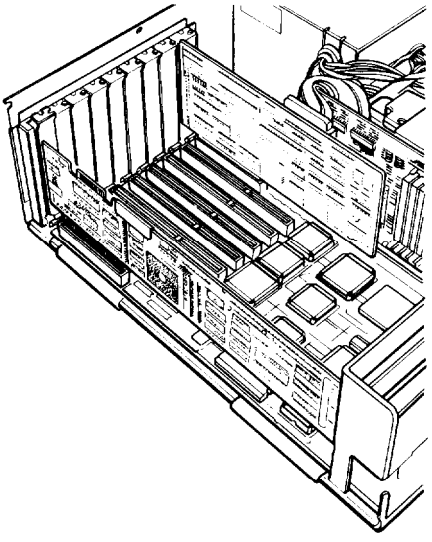
Keep the screw to secure the option card to the computer. Store the slot cover in a safe place in case you remove the option card later.

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 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.

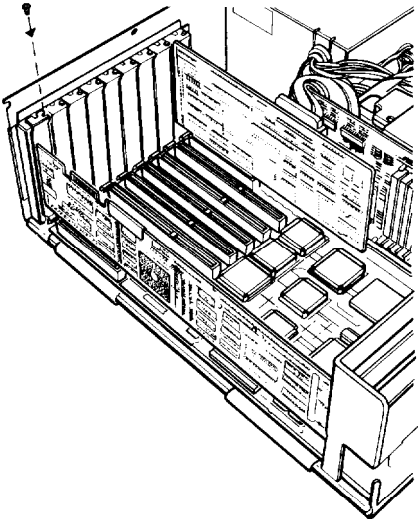


4. Insert the card in the slot, guiding it straight down. Once the connector pins reach the connector slot, as shown in the following illustration, push the card downward firmly (but carefully) to fully insert it. You should feel the card fit into place.



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. If there was a grounding tab underneath the screw when you removed the metal slot cover, replace it now.

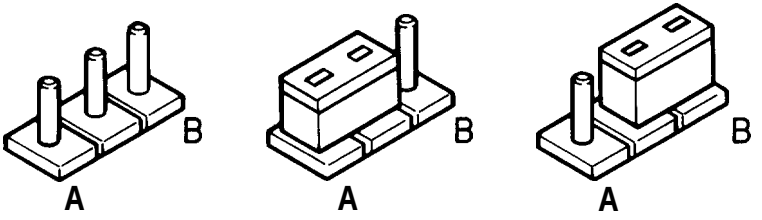


6. See “Post-installation Setup,” below, to see if you need to make any configuration changes.

Changing Jumpers on the SPF Card

If you installed an additional parallel or serial port, you may need to change the jumper settings on the SPF card. Normally, the serial and parallel ports on the SPF card are addressed as the primary ports (COM1 and LPT1, respectively). However, if you want the new serial or parallel port to be the primary port, you need to change the jumper settings so the port on the SPF card becomes secondary (COM2 or LPT2) or is disabled (if the card you install provides two additional ports).

A jumper is a small connector device that joins two pins on a circuit board to activate a particular function. A jumper’s setting is determined by where the jumper is placed: either between pin A and the middle pin (position A) or between pin B and the middle pin (position B).



The following tables describe the jumper functions for the serial port and parallel port.

SPF card jumper settings for serial port

Jumper number 5	6	9	Function
A	A	A	Built-in port is primary *
A	B	B	Built-in port is secondary
B			Disable built-in port **

* default setting
* * the setting of jumpers 6 and 9 do not matter

SPF card jumper settings for parallel port

Jumper number 3	4	10	Function
A	A	A	Built-in port is primary *
A	B	B	Built-in port is secondary
B	A	A	Enable compatibility with IBM monochrome display/printer adapter
B	B		Disable built-in port **

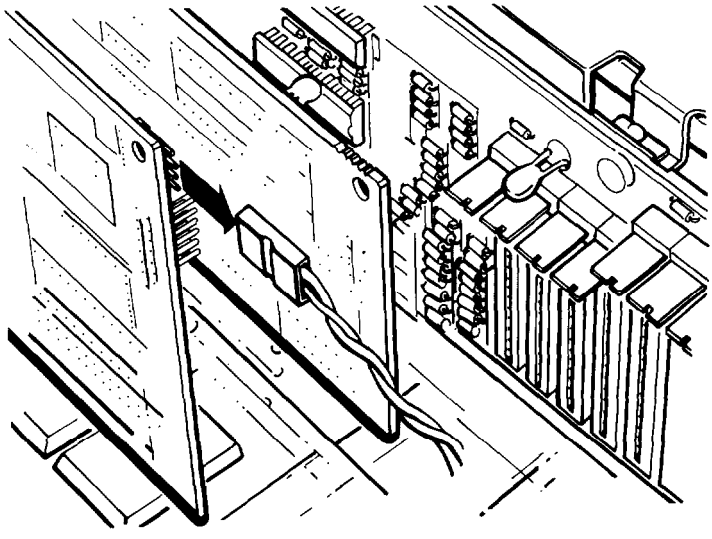
* default setting
** the setting of jumper 10 does not matter

To access the SPF card jumpers, you need to remove the card from the computer. If you have a hard disk drive controller card in slot 7 or 8, you must remove it before you can remove the SPF card because of the cables. Follow the instructions below, in the order listed here, as necessary for your system:

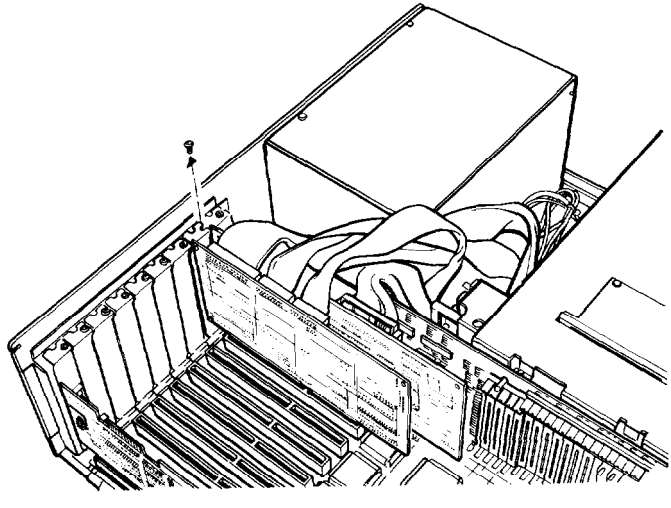
- Remove the hard disk drive controller card (if you have one)
- Remove the SPF card
- Change the jumper settings
- Replace the SPF card
- Replace the disk drive controller card (if necessary).

Removing the hard disk drive controller card

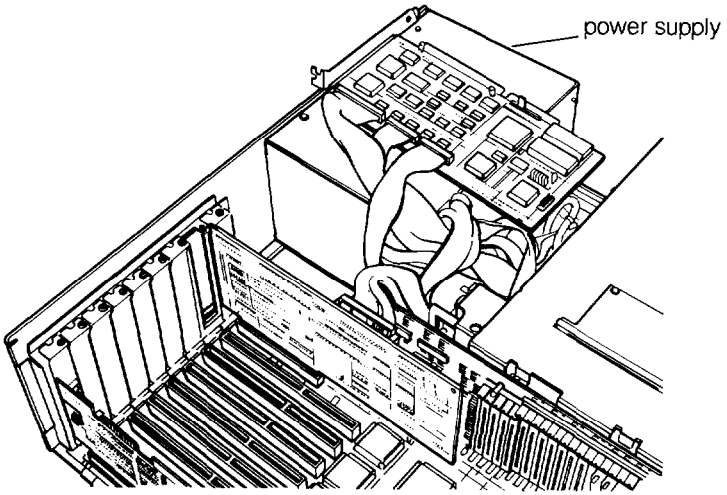
1. Disconnect the wire leading from the drive light on the front panel to the hard disk drive controller card.



2. Remove the retaining screw that secures the card at the back panel of the computer, taking care not to drop the screw.

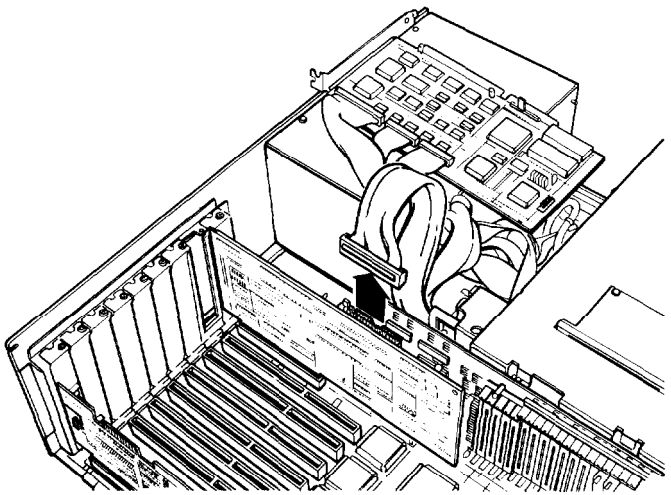


3. Without disconnecting any cables, gently pull the card straight up, out of the slot, and then turn it over and lay it on the power supply.

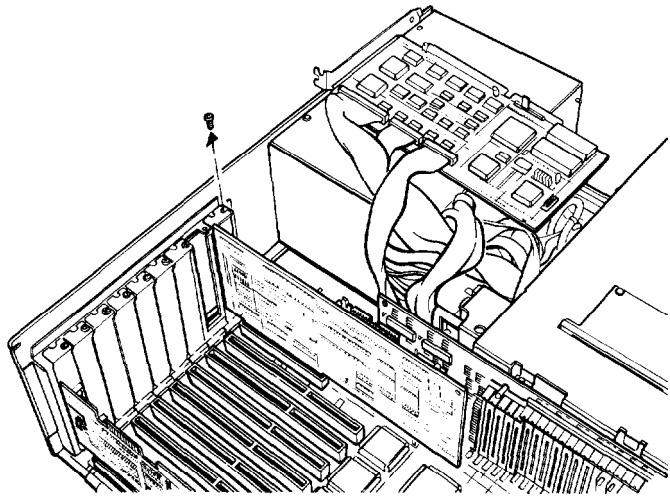


Removing the SPF card

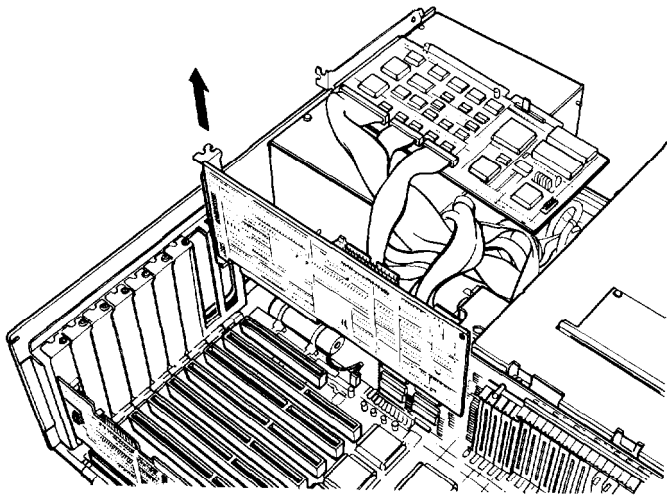
1. Unplug the disk drive cable from the SPF card as shown below. Pull it straight up and out, then lay it to one side,



2. Remove the retaining screw that secures the SPF card at the back panel of the computer. Be careful not to drop the screw.

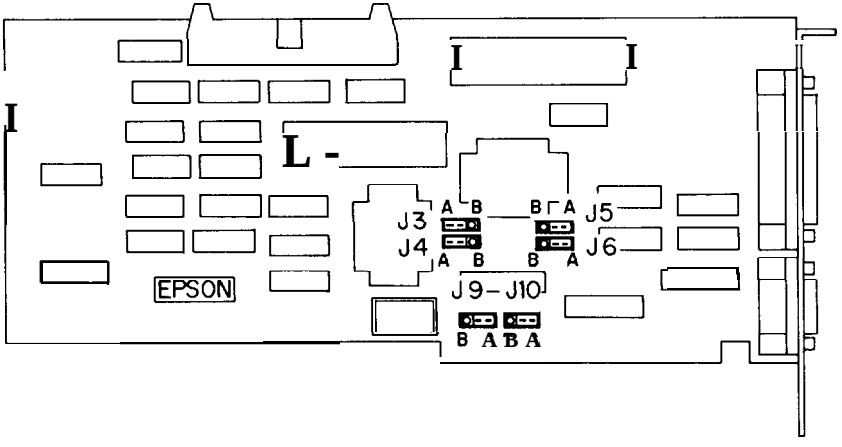


3. Remove the card from the slot by pulling it straight up, as shown below, and set it on a soft surface with the components facing up.



Changing the jumper settings

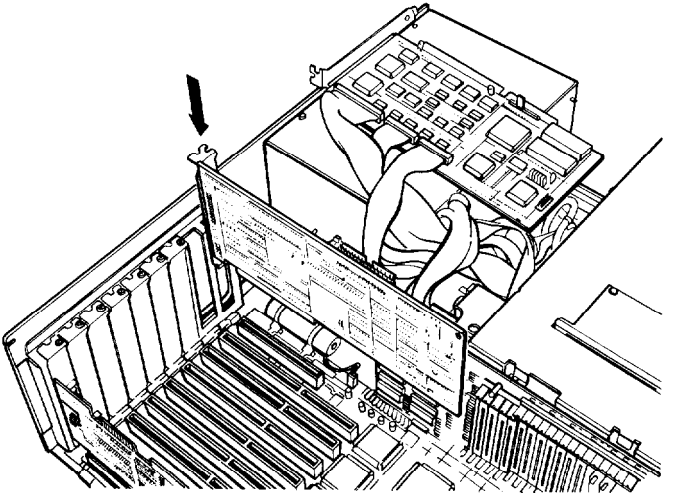
Once you have removed the SPF card, you can change the necessary jumper settings. The illustration below shows the location of the jumpers on the card. Check the tables above to see which one(s) you need to change.



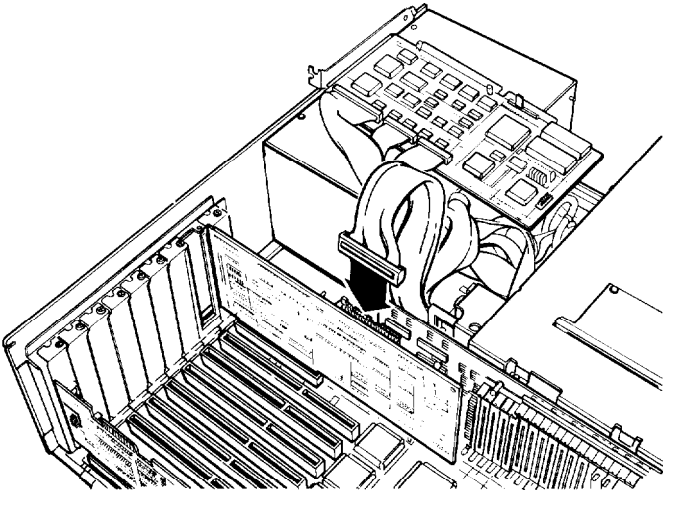
To move a jumper from an A position to a B position, or vice versa, use your fingers or needle-nose pliers or tweezers to pull it off its current pins and gently move it to the other position, Be careful not to lose the jumper or leave it out of the computer.

Replacing the SPF card

1. Reinstall the SPF card in slot 9 as shown below, and secure it to the back of the computer with the retaining screw.

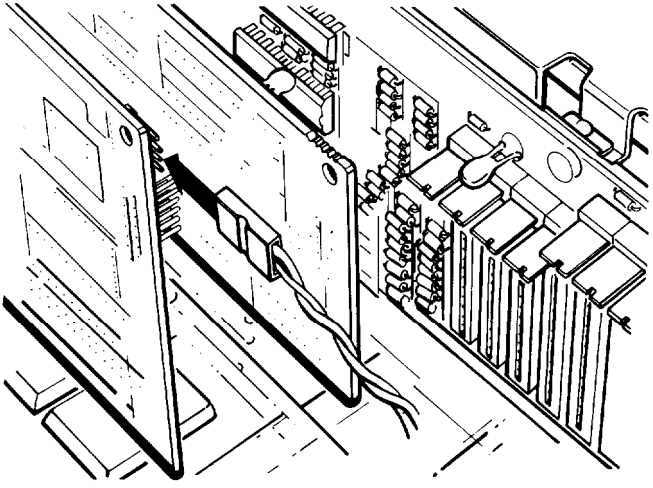


2. Reconnect the disk drive cable to the card.



Replacing the hard disk drive controller card

1. Reinstall the hard disk drive controller card in the appropriate slot and secure it to the back of the computer with the retaining screw.
2. Reconnect the drive light wire to the card.



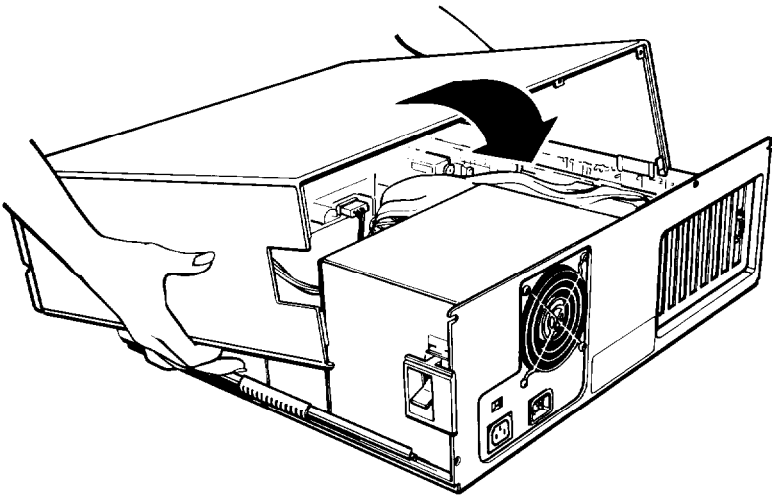
Removing an Option Card

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 in the following illustration. Pull the sides outward slightly and ease the curved edge on each side of the cover underneath the ledge on the bottom of the computer.



2. Slide the cover straight back until the front panel is flush with the diskette drive and key lock.
3. Replace the five screws on the back panel to secure the cover.
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 switch on the computer is off. Then reconnect the power cable to the back of the computer and to an electrical outlet.

Post-Installation Setup

After you install an option card, memory modules, or a math coprocessor, you need to run the Setup program on the Reference diskette to update the 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.

You may also need to add some commands in your configuration files. See the MS-DOS Reference Manual and the instructions that came with the option card for the procedure.

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

- Expansion memory
- 80387 math coprocessor
- Serial and parallel ports
- Monitors and display adapters
- Disk drives.

See Appendix C for instructions.

Appendix A

Troubleshooting

You should not encounter any difficulties as you set up and use your Equity 386. You can correct most problems by adjusting a cable connection, repeating a software procedure, or resetting the computer. If anything out of the ordinary happens, turn to this chapter for a solution.

Besides trying the suggestions in this chapter, you can run diagnostic checks on the various components of your computer system. See Appendix C, System Diagnostics, 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 up when you turn on the power switch, follow the steps below. (If you have a hard disk, also see the section on hard disk problems later in this chapter.)

1. Check that the POWER light on the front panel of the main unit is on. If it is not, remove any diskettes you have in the drives and turn off the power. Wait five seconds, then turn the power back on.

> **WARNING**
> When you turn off the computer, always wait at least five seconds before turning it back on. You can damage your computer if you turn it off and on rapidly.

2. If the light still does not come on, turn off the power again. Check that the power cord is securely connected to both the AC inlet on the back panel and an electrical outlet. Then turn the power back on.
3. If the computer still does not start up, check that your electrical outlet is working by plugging a lamp into the outlet and turning it on.
4. If the electrical outlet is working and all the connections are secure but your computer still won't start, see your Epson dealer.

The Computer Locks Up

If the computer-does not respond to your keyboard entries, try the following:

1. Check the key lock to see if it is locked. If it is, the computer does not respond to anything you enter on the keyboard. Turn the key to the left to unlock it. (See Chapter 4 for more information on the key lock.)

2. Wait a few seconds. Remember that some operations the computer performs take longer than others. For example, it takes longer to recalculate an entire spreadsheet than to record one figure. If the computer remains locked up after you've allowed a reasonable amount of time, follow the steps in Chapter 4 to reset the computer.

Monitor Problems

If your monitor screen displays strange characters or images, or is blank, try the steps outlined below. If you have installed a display adapter card in your computer, also see the section on option card problems at the end of this chapter.

1. Make sure the computer is running properly,
2. Check that the monitor's power switch is on and that the power indicator on the monitor is lit. If the power is on but the indicator 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 display still doesn't appear on the screen, use the controls on the monitor to adjust the display's brightness and contrast.
4. Remove any diskettes from your disk drives and turn off the computer and the monitor. Check that the monitor's power cord is securely connected to the monitor, and that the monitor cable is connected to both the monitor and the video port on the computer's back panel. Then turn both power switches back on.
5. 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.
6. Make sure you have installed your software properly and that you have the appropriate video monitor and adapter card for your software.

Diskette Problems

If you have trouble with one of your diskettes, see if any of the following questions apply:

1. Is the diskette damaged? To find out, make a copy of the diskette. Using this copy, repeat the operation that caused the problem. If the operation works using the copy diskette, the original diskette is probably damaged. Make another copy to use as a backup.

   If you have trouble copying the entire diskette, some of the sectors may be bad. Try using the COPY command to copy one file at a time. If the diskette is copy-protected, you cannot copy it.

2. Have you inserted the right type of diskette? The diskette type normally appears on the manufacturer's label. In the top drive, which has a storage capacity of 1.2MB, use 5¼-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.

   If you have a second diskette drive that is also 1.2MB, follow the same guidelines as above.

   If you have a second diskette drive that has a storage capacity of 360KB, use 5¼-inch, double-sided, double-density, 48 TPI diskettes in this drive. You cannot use 1.2MB diskettes in this drive.

   If you have a 3½-inch, 720KB diskette drive, use double-sided, double-density, 135 TPI diskettes. You cannot use 1.44MB diskettes in this drive.

   If you have a 3½-inch, 1.44MB diskette drive, use double-sided, high-density, 135 TPI diskettes. This type of drive can also read and write to 720KB diskettes.

   See "Types of Diskette Drives" in Chapter 4 for more information.

3. Is the diskette write-protected? There may be a write-protect tab over the notch on the side of the diskette (5¼-inch) or the write-protect switch may be set (on a 3½-inch diskette). Before you remove the write-protection, check the directory of files for that diskette to see which files it contains; it may contain information you do not want to change or lose.

   Although you should normally write-protect all program diskettes, some programs store temporary files on the diskette. These programs do not work if you write-protect the diskette.

Hard Disk Problems

If you have problems with your hard disk when you first start to use it, make sure it is properly set up. Try the following steps:

1. Verify that the hard disk has been properly prepared according to the instructions in Chapter 3.

2. If you cannot boot from your hard disk, you may be missing one of the MS-DOS system files. Turn off your computer and insert your working copy of the Startup/Operating 1 diskette into drive A. Then turn on your computer and log onto your hard disk drive.

   If this procedure works, make sure the file COMMAND.COM is in the root directory of your hard disk. If the file is not in the root directory, use the COPY command to copy COMMAND.COM from the diskette to the hard disk, and then restart your system.

   If COMMAND.COM is already in the root directory, use the MS-DOS COMPARE command (or the MENU utility) to compare the COMMAND.COM file on your diskette with the COMMAND.COM file on your hard disk. If the files don't match, use the COPY command to replace COMMAND.COM on your hard disk with the COMMAND.COM file on your diskette.

3. If the hard disk still doesn't 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/Operating 1 diskette to the root directory of the hard disk, log onto the diskette drive, type the following command, and press Enter:

```
SYS C:
```

4. If you can boot from a diskette, but cannot access data stored on your hard disk, you may have accidentally repartitioned or reformatted part or all of the disk.

   Use the FDISK program to see if your hard disk has an active (bootable) DOS partition on it. If it doesn't, back up all your files and then use FDISK to create an MS-DOS partition. If your hard disk does have an active DOS partition, back up all your files and then try reformatting your hard disk using FORMAT or SELECT 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 you are still having problems, you can try using the Format Hard Disk option of the OPERATION MENU on the Reference diskette. This procedure performs a hardware check and format of a hard disk. See Appendix D for details. You may want to contact your dealer before using this option.

6. If none of the above procedures work, contact your Epson dealer or have an Authorized Epson Customer Care Center check your hard disk. Never open the sealed unit that encloses the hard disk.

Software Problems

If you are having trouble with a software program, try the following solutions:

1. If a software program does not start, check that you are following the correct procedure for starting the program. If you have a hard disk, make sure you are logged onto the directory containing the application program. If you don't have a hard disk, make sure you have inserted the application diskette in the top drive.

2. If an application routine does not work, check the program's manual and try the routine again according to the instructions. If this does not work, reset the computer, reload the program, and try the routine again.

3. Some programs work at only one operating speed. The Equity 386 can run at either 8 or 20 MHz. Check your software manual for this information and then change the CPU operating speed if necessary. Also see the description of the Auto speed function in Chapter 2 for information on accommodating copy-protected programs.

Printer Problems

Your printer manual describes solutions for most potential printer problems.

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. Your printer manual provides detailed instructions on how to connect your printer to the computer. Also, see your software manual to make sure your software is set up correctly for your printer.

If you have problems during printing, 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. You may need to make an adjustment for your configuration.

Option Card Problems

If you install an option card and get unexpected results, check the following:

1. Is the option card installed correctly? Check the installation procedure described in Chapter 6 and also see the instructions that come with the option card.

2. Did you set the necessary DIP switches or jumpers on the option card? See your option card instructions for these settings.

3. 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?

4. Did you run the Setup program to redefine your computer's configuration after installing the option card? See Chapter 2.

5. Did you perform the necessary setup procedures for the software you are using? If necessary, see your software manual for instructions on running the software setup procedure.

Appendix B

Power-on Diagnostics

The built-in memory (ROM) of your computer contains a series of diagnostics programs which your computer runs automatically every time you turn on the power. The diagnostics programs check the internal devices such as ROM, RAM, keyboard controller, timer, video controller, floppy disk driver, and hard disk controller.

When you turn on the power, your system performs the tests described in this appendix. If an error is found, a specific error number and error message appear on the screen. If the error is serious, the computer cancels further checking and halts system initialization. The error message remains on the screen, but the computer is inoperable.

If the error is not serious, the computer displays an error message and 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 resume. Report the error message and code number to your dealer when requesting repairs.

When the self test finds a problem, the system checks all the hardware. This check may take about one minute; during this time, you see only the power light on the computer. After checking the hardware, the diagnostics continue.

System Device Check

The computer first checks its internal devices such as the ROM. If a malfunction is found, the computer displays an error message. In some cases, it may halt with no further information. If this happens, contact your dealer as soon as possible.

If a fault in the main board is found, a number from 101 to 108 and an error message appear. This message is in the following format:

```
l0x-System board error
```

where x is a number from 1 to 8 that represents the specific LSI circuit in which the error is found. Your service dealer needs this information to find and correct the problem.

If an I/O ROM checksum error occurs, you see this message:

```
xxxx0 ROM error
```

where xxxx is the number of the segment of the bad I/O ROM.

Clock and CMOS RAM Check

When the system device check is completed successfully, the computer checks the timer and CMOS RAM. If the information contained in the RAM does not match the actual system installation, you see one of these messages:

```
161-System options not set
    (Run SETUP in DIAGNOSTICS)
162-System options not set
    (Run SETUP in DIAGNOSTICS)
```

The information stored in the CMOS RAM must be corrected. Run the Setup program provided on the Reference diskette to correct the installation information.

If the system clock has not been set, you see this message:

```
163-Timer & Date not set
    (Run SETUP in DIAGNOSTICS)
```

If the memory allocation has not been set, you see this message:

```
lb&Memory size error
    (Run SETUP in DIAGNOSTICS)
```

RAM Check

The computer now begins to check the RAM installed on the main memory card and any option cards. During this check, the screen displays this message:

```
xxxxxx KB Ok
```

where xxxxxx indicates the amount of memory in which no malfunction is found. This value increases continuously by 64KB up to the amount of RAM installed. If the computer detects an error in the first 64KB area, an error message appears and the computer halts with no further information.

If there are faulty RAM chips in your system, you see one of these messages:

```
202-Memory address error
203-Memory address error
```

If an I/O or parity error occurs, you see one of these messages:

```
Parity check 1
Parity check 2
```

The program also displays the number of the segment causing the problem.

Keyboard Controller and Keyboard Check

The computer checks the keyboard controller and keyboard for problems such as failure of one of the keys to release.

If there are any errors in the connection between the keyboard and the computer, this error message appears:

```
301-Keyboard error
```

When this message is preceded by a number (xx), the number represents the key (in hexadecimal) that is the source of the error.

If another failure is found, you see one of these messages:

```
303-Keyboard or system unit error
304-Keyboard or system unit error
```

Display Card Check

The computer checks the color or monochrome display adapter card that is installed in the computer. An error number and message appear if any faults are found. Number 401 represents an error in the monochrome display adapter, and 501 represents an error in the color display adapter. The messages are:

```
401-CRT error
501-CRT error
```

Optional RAM Check

If any additional memory (expansion RAM) is installed, the computer then checks that RAM for any malfunction.

Floppy Disk Drive Seek Check

The computer checks its floppy disk drives by searching the read/write heads for any malfunction.

If any seek errors are found, you see this message:

```
601-Diskette error
```

If this error occurs, confirm that the system diskette is inserted into drive A. If this number still appears after you insert the diskette, the disk drive must be repaired.

Hard Disk Controller and Hard Disk Check

The computer next checks the hard disk controller and drive unit. If a malfunction is found in the hard disk controller card, you see this error number and message:

```
1782-Disk controller failure
```

If an error is found in the hard disk drive unit, one of these error messages appears:

```
178x-Disk x failure
179x-Disk x error
```

where x is 0 or 1, and represents the drive number of the hard disk. Drive C is number 0, and drive D is number 1.

Appendix C

Performing System Diagnostics

This appendix describes how to check the operation of the main unit and peripheral devices of your Equity 386. 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
2 - Memory
3 - Keyboard
4 - Monochrome display adapter and CRT
5 - Color graphics adapter and CRT
6 - Floppy disk 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, you must boot 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. Press 3 to select System diagnostics and then press Enter.

When you start the System diagnostics, the computer checks the results of the power-on diagnostics and 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 installed in the system, such as the following, for example:

```
The following devices have been installed

DEVICE LIST

 1 - System board
 2 - Memory
 3 - Keyboard
 5 - Color graphics adapter and CRT
 6 - Floppy disk drives and controller
 9 - Parallel port (printer interface)
11 - Serial port (RS-232C port)
14 - Dot-matrix printer
17 - Hard disk drives and controller



Is the DEVICE LIST correct (Y/N)?
```

If the list correctly describes your system, press Y and then Enter. If a device is missing from this list, or if you wish to change the list, press N and Enter.

Note
If your system uses an EGA or VGA with a color monitor, your device list should include item 5, "Color graphics adapter and CRT." If your system uses an EGA or VGA with a monochrome display, your device list should include item 4, "Monochrome display adapter and CRT."

Once 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 re-select System diagnostics.

Modifying the DEVICE LIST

If an installed device is missing from the DEVICE LIST, it is important that you add it to the list and test it carefully. In response to this prompt:

```
Is the DEVICE LIST correct (Y/N)?
```

press N followed by Enter. You see a new menu:

```
Modify DEVICE LIST

 1 - Add devices
 2 - Delete devices

 0 - Exit

Enter selection number:
```

To add a device to the list, press 1 and then Enter. 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


Enter the number of the item to add:
```

Type the number of the item you wish to add and press Enter. You can add as many devices as necessary. When the DEVICE LIST is complete, press 8 followed by Enter.

Note
Even if you have both monochrome and color display adapter cards installed, you can test only the monitor that is currently selected with the monitor switch on the front panel.

To remove a device from the list, press 2 and Enter. The screen displays the current DEVICE LIST and the prompt:

```
Enter the number of the item to delete:
```

Type the number of the item you wish to delete and press Enter. You can delete as many devices as necessary.

When the DEVICE LIST is correct, press 0 and then Enter. The screen displays the modified DEVICE LIST for a final check. If the list is correct, press Y and Enter.

You are now ready to select a test.

Selecting a Test

From the DEVICE LIST, select the device you wish to test. Type the number of the device, then press Enter. 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

Enter selection number:
```

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, press 1 and Enter. The program then displays a submenu of more detailed tests for the device you are checking.

To perform the test multiple times, press 2 and Enter. You see this prompt:

```
Terminate checking if an error detected (Y/N)?
```

Press Y and Enter to terminate checking if the device produces an error, or press N and Enter to repeat the tests regardless of an error. You see this prompt:

```
How many times (1-9999):
```

Type the number of times you wish to repeat the test, then press Enter. The tests for the device now start.

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, press N and Enter.

Before you request a printout, be sure your printer is turned on and online, and the paper is installed correctly. Then press Y and Enter. If the printer is not ready, the following message and prompt appear:

```
Printer is not installed correctly.
Install correctly and enter Y, or
Enter N to cancel printing.
```

Correct the problem and press Y and Enter to continue printing, or press N and Enter 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 chapter 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 chapter.

System Board Check

Use this option to check the operation of each major component on the system board, including:

- The 80386 CPU chip
- The system ROM
- The real-time clock, CMOS RAM, and battery
- The main integrated circuits.

The checks made on the 80386 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 the memory installed in your computer, including expansion memory. The program reads the CMOS RAM to find the total amount of memory. If any settings are incorrect, use Setup to define the correct amount 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. The data is written and read in blocks of 64KB. A parity check is also made on each block. A memory count displays after each block tests without error. After the program checks the last block, you see a message such as the following:

000640 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
Memory above 640KB, which is normally not available to MS-DOS, is checked using the protected mode of the 80386 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 your system, then press Enter. You can exit the keyboard test by pressing 0 and 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:

```
KEYBOARD CHECK
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 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 attached to a monchrome monitor. This test includes several checks that allow you to identify particular problems related to the monochrome display. To run this check, the monitor switch on the front panel must be set for a monochrome monitor.

You can select the individual checks from this menu:

```
MONOCHROME DISPLAY ADAPTER AND CRT CHECK
MENU

1 - Monochrome adapter check
2 - Attribute check
3 - Character set check
4 - Video check
5 - Sync check
6 - Run all above checks

0 - Exit

Enter selection number:
```

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.

Monochrome Adapter Check

To check the monochrome adapter, press 1 and then Enter. The computer 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 computer also tests the video enable signal of the display controller chip.

Attribute Check

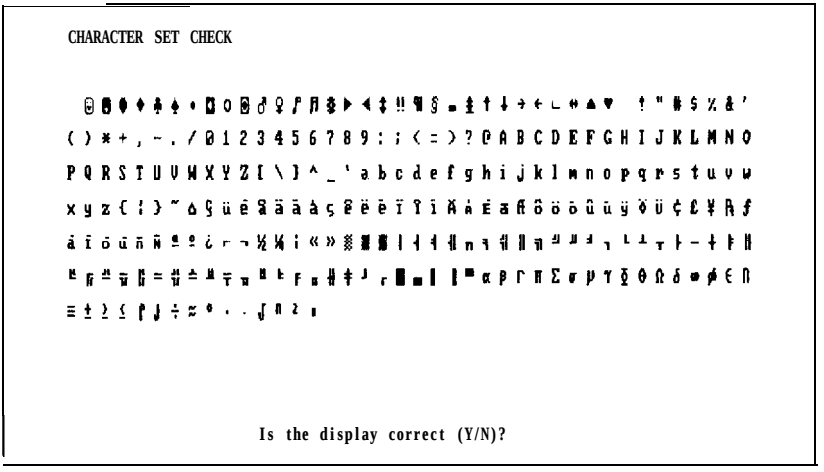
To check the display attributes of the adapter card, press 2 and then Enter. A series of messages appear showing examples of all the possible display attributes (normal intensity, high intensity, blinking, reverse, and underlining). Check the information that appears on your screen, and then respond to the prompt:

```
Is the display correct (Y/N)?
```

Press Y and then Enter 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, press N and Enter.

Character Set Check

To check your character set, press 3 and then Enter. The character fonts that are included in the internal character generator display 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, press Y and Enter. If you find a problem with the characters on the screen, press N and then Enter to display the error message.

Video Check

To check the video output of your monochrome adapter, press 4 and Enter. 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 display on the screen. 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, press 6 and Enter. 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 EGA or VGA) and display. This test includes several checks that allow you to identify particular problems related to the color display. To run this check, the monitor switch on the front panel must be set for a color monitor.

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

Enter selection number:
```

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.

Color Graphics Adapter Check

To check the color graphics adapter, press 1 and then Enter. The computer checks the video RAM (display memory) on the display adapter by writing test data to memory, and then reading it back and comparing it to the written data. The computer also tests the video enable signal of the display controller chip.

Attribute Check

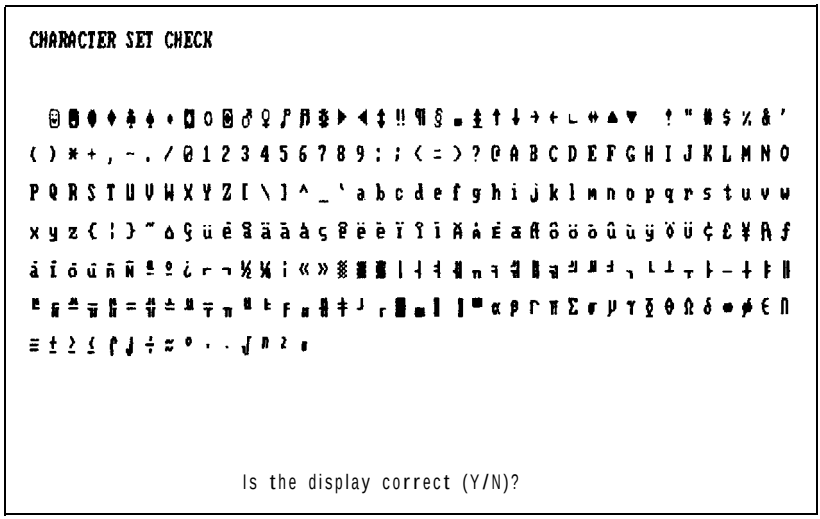
To check the display attributes of the color graphics adapter card, press 2 and Enter. Several messages appear showing examples of all the possible display attributes and colors. Check the information on your screen, and respond to the prompt:

```
Is the display correct (Y/N)?
```

Press Y and then Enter if the display is correct. If the colors are not correct, adjust the controls on your monitor. If they are still incorrect, press N and Enter. Contact your dealer to verify any monitor problems.

Character Set Check

To check your 80-column character set, press 3 and Enter. 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.



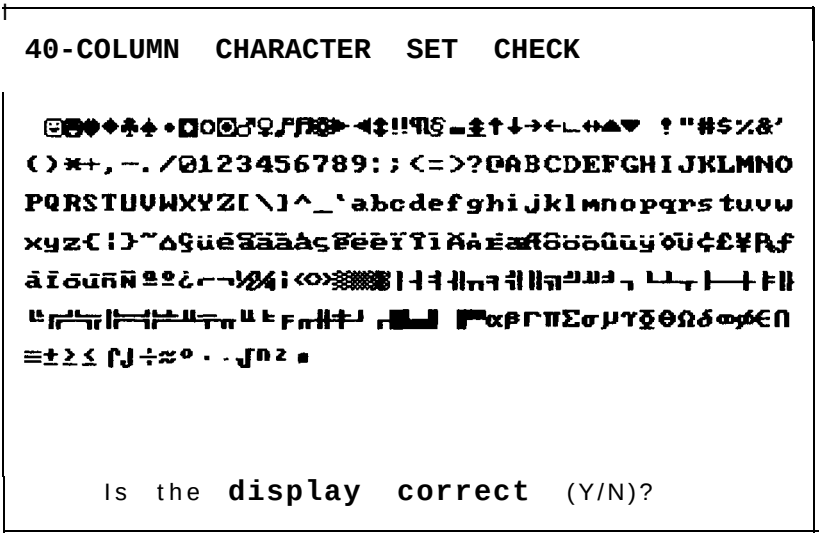
After checking the character fonts, respond to the prompt:

```
Is the display correct (Y/N)?
```

If the characters match the illustration, press Y and then Enter. If you find a problem with the characters on the screen, press N and Enter to display the error message.

40-column Character Set Check

To check your 40-column character set, press 4 and then Enter. The character fonts that are included in the internal character generator display 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, press Y and Enter. If you find a problem with the characters on the screen, press N and Enter to display the error message.

320x200 Graphics Mode Check

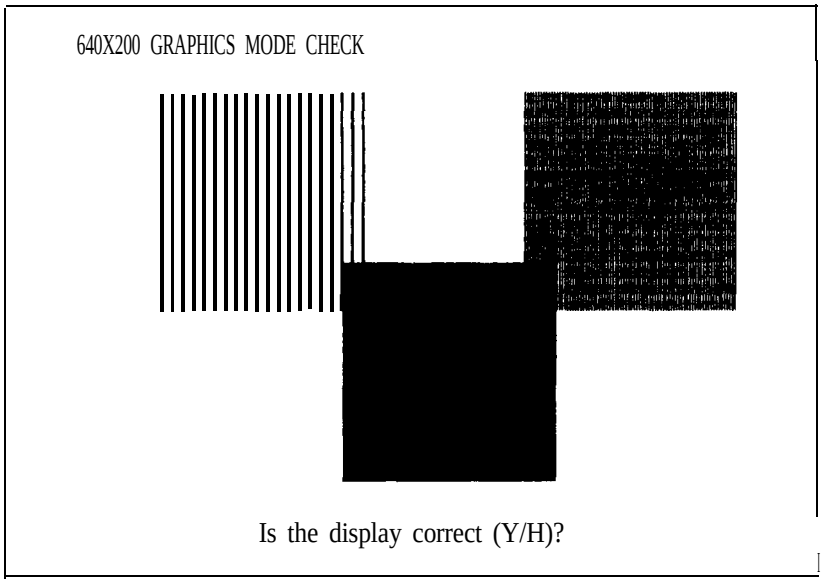
To check your 320x200 graphics mode, press 5 and then Enter. The screen displays three colored squares-light green, brown, and red-against a cyan background. These four colors are Color Set 0. If they are correct, press Y and then Enter.

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, press Y and then Enter to end the test.

If any colors display 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, press N and Enter to display the error message.

640x200 Graphics Mode Check

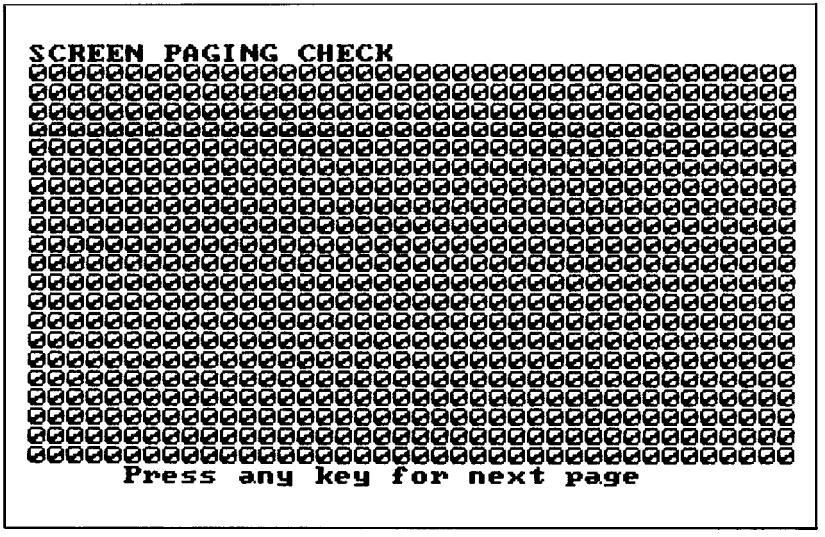
To check your 640x200 graphics mode, press 6 then Enter. The screen displays three patterned squares against a contrasting background, as shown below.



If the patterns on your screen are clear and distinct, press Y and then Enter. 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, press N and Enter to display the error message.

Screen Paging Check

To check the screen paging of your monitor, press 7 and Enter. The video RAM on the color graphics adapter is divided into eight independent display pages. 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, numbered 0 to 7, are displayed sequentially.

After the eighth page appears, you see the prompt:

```
Is the display correct (Y/N)?
```

If all eight pages are correct, press Y and Enter. If any page is filled with an incorrect number, press N and Enter to display the error message.

Light Pen Check

To check the function of a light pen connected to the color graphics adapter card, press 8 and then Enter. 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:

```
Enter Y to start light pen check.
Enter N to return to the menu.
```

If you do not have a light pen attached, press N and Enter. To begin the test, press Y and Enter. 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
2 - Blue
3 - Green
4 - Cyan
5 - Red
6 - Magenta
7 - Brown
8 - White
9 - Gray
10 - Light blue
11 - Light green
12 - Light cyan
13 - Light red
14 - Light magenta
15 - Yellow
16 - White (high intensity)

To start this test, press 9 and Enter. 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, press Y and Enter 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, press N and Enter 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, press 11 and Enter. 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.

Floppy Disk Drives and Controller Check

Use this option to test the performance of the floppy disk (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 1.2MB 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 only use a 360KB diskette.

Likewise, 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.

You can select the individual tests from the following menu.

```
FLOPPY DISK DRIVE(S) AND CONTROLLER CHECK MENU

1 - Sequential seek check
2 - Random seek check
3 - Write, read check
4 - Run all above checks

0 - Exit

Enter selection number:
```

Before any checks are performed, 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:

```
Check which drive (A/B)?
```

Press A or B and then Enter. 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.

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 39 for 360KB diskettes and track 79 for 1.2MB, 720KB, and 1.44MB diskettes.

Select option I from the menu to start this test. The program displays the number of each track it finds. For example, with a 360KB diskette, the first message you see is:

```
Current track is 39
```

The track number counts down (from 39 or 79) to 0. The seek is performed by each head, so you see the count twice. If no errors occur, the menu displays.

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 from a diskette. The test writes to and reads from each cylinder 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 diagnostics diskette (the Reference diskette) and insert a blank diskette before running the test. You see these messages:

```
Use only a formatted blank diskette for this test.
Any data present may be erased.
If using drive A, remove your Diagnostics Disk.
Enter Y to start this check.
Enter N to return to the menu.
```

Make sure the blank diskette you prepared is in drive A, then press Y and Enter. The program displays the current track number as each cylinder is tested. For example, with a 1.2MB floppy disk, the first message you see is:

```
Current track is 79
```

After the test is over, be sure the Reference diskette is in drive A before you return to the device list.

Run All Above Checks

To run all the tests on the menu in sequence, press 4 and then Enter. 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.

Math Coprocessor Check

Use this option to check the operation of the 80387 math coprocessor if you have one installed in your computer. To check the math coprocessor, select option 7 from the DEVICE LIST

Before running any tests, the computer checks the settings in CMOS RAM to ensure that a coprocessor is installed. If the coprocessor is missing, or if you have not changed the setting in CMOS RAM with the Setup program, an error occurs and the test ends.

If the coprocessor is installed, 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.
Enter Y to start this check when connector is
attached, or
Enter N to return to the menu.
```

Insert the loop-back connector. Then press Y and Enter 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) 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.
Enter Y to start this check when connector is
attached, or
Enter N to return to the menu.
```

Insert the loop-back connector. Then press Y and Enter to start the check.

First, the computer checks the serial port control lines to see that they are able to change from high to low and vice versa. No messages display 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:

```
RS232C 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 bits,
                     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) Check.

Dot-matrix Printer Check

Use this option to check the following:

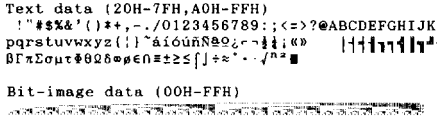
- The operation of your printer in IBM-compatibility mode
- The compatibility of your printer with the extended character set your computer uses
- The ability of your printer to produce bit-image graphics and print images of the graphics screen.

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. Press Y and then Enter to continue, or press N and Enter to return to the menu.

When you continue the test, the computer 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 take care with certain software. The bit-image data is sent to the printer using a command (ESC K) compatible with Epson and IBM printers. If this pattern is printed correctly, you can use the MS-DOS GRAPHICS command to print out copies of graphics screens.

Note
Even if the test runs only for a short time, your printer may store many characters in its buffer. To stop printing, turn the printer offline.

Hard Disk Drives 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

Enter selection number:
```

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:

```
Check which drive (C/D)?
```

Press C or D and then Enter.

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 this check.
Enter Y to start this check.
Enter N to return to the menu.
```

Press Y and then Enter 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 4 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. Re-format the disk using option 2, Format hard disk, on the OPERATION MENU.
3. Recreate the MS-DOS partition with FDISK and format it with SELECT (See Chapter 3.)
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 of the test. For example, for a hard disk with no bad tracks, you see:

```
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 Tests

To run all the tests on the menu in sequence, press 4 and then Enter.

When you choose this option, all checks for the hard disk drives 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 this check.
Enter Y to start this check.
Enter N to return to the menu.
```

Press Y and then Enter to continue with the test.

Error Codes and Messages

The following table lists all the error codes and messages that may appear during diagnostics checks.

Error codes and messages

Error code	Message
System board	
101	80386 CPU ERROR
102	27256 ROM CHECKSUM ERROR
103	8254 TIMER COUNTER REGISTER ERROR
104	8254 TIMER COUNTER ERROR
105	8237 DMA CONTROLLER REGISTER ERROR
105	8237 DMA REFRESH ERROR
106	8237 DMA PAGE REGISTER ERROR
107	8042 TIMEOUT ERROR
108	8042 SELF DIAGNOSTIC ERROR
108	8042 WRITE COMMAND ERROR
109	8259 INTERRUPT CONTROLLER ERROR
110	146818 CMOS SHUTDOWN BYTE ERROR
111	146818 CMOS BATTERY ERROR
112	146818 CMOS CHECKSUM ERROR
113	80386 INSTRUCTION ERROR
114	80386 PROTECT MODE ERROR 1
115	80386 PROTECT MODE ERROR 2
Memory	
201	MEMORY/PARITY ERROR
Keyboard	
301	8042 ERROR
301	KEYBOARD ERROR
302	KEYBOARD IS NON-STANDARD, OR KEYBOARD IS DEFECTIVE
303	KEYBOARD LOCKING ERROR
Monochrome display adapter and CRT	
401	V-RAM ERROR
402	VIDEO SIGNAL ERROR
403	ATTRIBUTE ERROR
404	CHARACTER SET ERROR

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
Floppy disk drives and controller	
601	FLOPPY DISK 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 (80387)	
701	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	
901	ERROR PIN p
Serial port (RS-232C)	
1101	control signal ALWAYS LOW
1101	control signal ALWAYS HIGH
1102	TIMEOUT ERROR
1103	VERIFY ERROR

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 drives 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

Appendix D

Physically Formatting a Hard Disk

This appendix describes how to physically format a hard disk. This operation, sometimes called low-level or hard formatting, should not be confused with the logical formatting process performed by the MS-DOS FORMAT command. The physical formatting of a hard disk is a separate step that is usually performed by the disk manufacturer. If your Equity 386 came equipped with a hard disk, that disk has already been physically formatted. The procedures described in Chapter 3 are all you need to do to prepare your hard disk for use.

You may need to follow the instructions in this appendix if you purchase an additional hard disk for your computer, and that additional disk has not already been physically formatted. You may also need to repeat the physical formatting process if you experience serious problems with a hard disk.

However, before reformatting a disk that appears to be damaged, use the Non-destructive surface analysis test to determine if formatting is necessary. If errors occur during this test, back up your disk. Then run the Conditional format option, followed by the Destructive surface analysis. These tests are described in this appendix.

The physical formatting process destroys all data on the disk. It also removes the partitioning information supplied by the MS-DOS FDISK command and the logical formatting information supplied by the MS-DOS FORMAT or SELECT command. Therefore, after physically reformatting a hard disk, you need to repeat the procedures described in Chapter 3 to prepare your hard disk for use.

Formatting and Checking Options

To perform a physical format or to determine if a hard disk needs to be physically reformatted, follow these steps:

1. Insert the Reference diskette in drive A.
2. Turn on or reset the computer. The OPERATION MENU appears.
3. Press 2 to select Format hard disk, and then press Enter. The following menu of formatting and checking options appears:

```
HARD DISK FORMAT MENU

1 - Conditional format (Normal)
2 - Unconditional format
3 - Destructive surface analysis
4 - Non-destructive surface analysis

0 - Exit

Enter selection number:
```

The first two options format a hard disk. Normally you use option 1, Conditional format (Normal). This option automatically locates any tracks that are *flagged* by the manufacturer and marks them so that they are never used. Option 2, Unconditional format, requires you to enter tracks that are to be flagged as bad, and then allows you to edit the list of bad tracks.

The other two options test a hard disk for problems. Use option 3, Destructive surface analysis, to test the entire disk and update the bad track table. Because this option writes and reads data on the disk, it destroys all data on any track that produces an error. To check for unflagged bad tracks without destroying data, use option 4, Non-destructive surface analysis.

Many hard disk drives are supplied with a list of bad tracks, but without the bad tracks flagged on the disk. Other hard disks are supplied with the bad tracks already flagged. In all cases, run the Non-destructive surface analysis before formatting the disk; this routine finds all bad tracks that are not flagged.

If the analysis shows that all the tracks listed as bad are already flagged, you can then use the Conditional format (Normal) option to format the disk. If the analysis matches the list of bad tracks, but they are not flagged, run the Destructive surface analysis (to flag the tracks) before formatting the disk. If the list provided by the drive manufacturer contains bad tracks that the analysis does not detect, you can use the Unconditional format option to flag those tracks manually.

When you select an option from the HARD DISK FORMAT MENU, the program determines the number of hard disk drives installed in your computer. If you have more than one drive, then each time you select a test you see this prompt:

```
Enter drive letter (C/D)?
```

Press C or D, and then press Enter. If you have only one hard disk drive, the option you select starts immediately.

Conditional Format (Normal)

Use this option to format the hard disk. All flagged tracks are marked so that they are never used.

To start the Conditional format, press 1 and then Enter. The program starts to scan the disk to find all tracks flagged as bad, starting from the innermost cylinder of the disk. During the scan, you see the number of the cylinder the program is currently checking. For example, if you have a hard disk, the first messages you see are:

```
Format Hard Disk
Scanning for flagged bad tracks...
Current cylinder is nnn
```

When the scan is complete, the program displays information about the condition of the disk. For a hard disk with no bad tracks, the display looks like this:

```
Scanning finished.
Count of tracks flagged bad                = 0
Count of tracks with other errors          = 0
Count of good tracks                       = nnnn
```

The program then displays a warning about the consequences of proceeding with formatting:

```
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 there are no tracks with other errors, and you are absolutely sure that you want to format the hard disk, press Y and Enter. The program then asks you once more if you want to continue. You see this message and prompt:

```
DOUBLE CHECK THAT YOU HAVE BACKUP DISKETTE
COPIES OF ALL YOUR FILES.

Do you want to exit and check your file copies
(Y/N) ?
```

When you are certain no valuable data will be destroyed, press N and Enter.

If you cancel formatting at either stage, you see these messages:

```
Format cancelled.
Press ENTER to return to the menu.
```

If you continue with formatting, you see:

```
Format started.
Current cylinder is xxxx
```

When formatting is complete, any bad tracks are flagged, and you see a series of messages like these:

```
Format finished.
Flagging bad tracks...
Cylinder is xxxx, head is yy
Format completed.
Press ENTER to return to the menu.
```

Flagged tracks are identified by xxxx and yy. At this point, press Enter to return to the HARD DISK FORMAT MENU.

If there are any tracks with other errors, scanning stops and you see this message:

```
Scanning cancelled.
Warning: This drive has an unflagged error(s),
or is unformatted.
Press ENTER to return to the menu.
```

Press Enter. This may mean that the drive has never been formatted or that an error was not flagged. If you see this message, it is best to consult your dealer.

If you want to format the disk after receiving this error message, do the following:

1. If the drive is not formatted, perform the Unconditional format (Option 2) and enter any tracks you know are bad in the Bad Track Table. (See "Unconditional Format" below.)
2. Run the Destructive surface analysis (Option 3) to flag any remaining bad tracks. (See "Destructive Surface Analysis," which appears later in this chapter.)
3. Run the Conditional format again. No errors should occur; if one does, contact your dealer.

Unconditional Format

Use this option to format your hard disk when you want to enter the list of bad tracks before formatting begins. The main difference between unconditional and conditional formatting is the way in which bad tracks are identified. With the unconditional format, you must enter the list of bad tracks before formatting begins.

To start the Unconditional format routine, press 2 and then Enter. You are first given the option to change the interleave factor for formatting from the default value of one. Only do this if the documentation with your hard disk recommends a different value. You see this prompt:

```
Do you want default interleave of 1 (Y/N)?
```

To accept the default, press Y and Enter. To change the value, press N and Enter. You see this prompt:

```
Enter interleave factor (l-n):
```

where n is equal to the maximum sector number. For the ST-506 hard disk, *n* is 16; for the ESDI hard disk, n is either 33 or 35. Type the recommended value and press Enter. The next screen allows you to edit the table of bad tracks:

```
Bad Track Table
Cylinder  Head     Cylinder  Head     Cylinder  Head     Cylinder  Head     Cylinder  Head

Move highlighted area to desired track with cursor keys.
A = Add track, C = Change track, D = Delete track, F = Finish editing

Enter command letter :
```

Some of the messages change if the table is full or empty. However, the way that you add a bad track or make a correction is the same.

To add a bad track, follow these steps:

1. Press A. You see this prompt:

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

2. Type the number of the cylinder containing the bad track you want to enter, and press Enter. You see this prompt:

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

3. Type the head number for the bad track, and press Enter. The maximum valid cylinder and head numbers (xxxx and yy) 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 complete a valid entry, it appears in the table and you can select another command.

If you make a mistake, move the cursor block to the incorrect track and press C to alter the track data. Or you can press D to remove the track from the table. Change the track data just like you add a track.

Once you complete editing, check the entries in the table once more. When you are sure the table is correct, press F. The program displays a warning about the consequences of proceeding with formatting, and the remaining steps are exactly the same as for a normal conditional format.

Destructive Surface Analysis

Use this option to accurately locate any bad tracks on a hard disk, and to 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 4, Non-destructive surface analysis, to check the disk surface.

This test operates by a complex process of writing, reading, and verifying information on every track of the hard disk, except for tracks that are already flagged as bad tracks. To start the test, press 3 and then Enter. You see these messages:

```
Analyze Hard Disk
Read/Save/Write/Read/Restore/Read check for all
tracks...
Current cylinder is xxxx
```

As each track is checked, the cylinder number (xxxx) counts down to zero. When the analysis is complete, the program displays a complete report on the status of the disk, including a table of unflagged tracks that produced write, read errors. For a hard disk with no unflagged bad tracks, a display like this appears:

```
Analysis finished.
Count of tracks flagged bad                =    n
Count of tracks with write, read errors =    0
Count of good tracks                       =  n  n  n
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 then followed by a table like this:

```
                    Write, Read Error Tracks
                    ========================
Cylinder  Head     Cylinder  Head     Cylinder  Head     Cylinder  Head
-------------------------------------------------------------------------
  237      2

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

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

To flag the error tracks as bad, press Y and Enter. You then see a list of the tracks as they are flagged and then 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.

Non-destructive Surface Analysis

The Non-destructive surface analysis is slightly simpler than the Destructive surface analysis described in the previous section. This option does not destroy any data, and can safely be used to check the condition of your hard disk drives. However, this test does not flag any bad tracks that are detected.

To start the test, press 4 and then Enter. You see these messages:

```
Analyze Hard Disk
Read/Verify check for all tracks...
Current cylinder is xxxx
```

As each track is checked, the current cylinder is displayed. The cylinder number counts down to zero as the disk is checked.

When the analysis is complete, the program displays a summary of the status of the disk. This summary lists these counts:

- Flagged bad tracks
- Tracks with read, verify errors
- Good tracks.

If no errors occur, you see this message:

```
No read, verify error was detected.
```

If errors are found, the program displays a table of the tracks that gave errors, similar to the one displayed by the destructive analysis.

After the status reports you see this message:

```
Press ENTER to return to the menu.
```

Check the information displayed, then press Enter.

Appendix E

Hard Disk Drive Types

This appendix lists the types of hard disk drives you can use in your Equity 386. 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 mass storage option for the hard disk drive 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	ST506	940	8	17	512	940	62.4	
05	ST-506	940	6	17	512	940	46.8	
06	ST506	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	ST506	612	4	17	0	663	20.3	
17	ST-506	977	5	17	300	977	40.5	CDC94205-51
18	ST506	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 (2)
42	ESDI	1022	5	36	---	1022	89.8	CDC 94216-106
43	ST-506	1024	8	17	512	1023	68.0	(3)
44	ESDI	828	10	34	---	828	137.5	Toshiba MK-156F
45	ST-506	1024	5	17	512	1023	42.5	(4)
46	ST-506	615	8	17	128	618	40.8	NEC D5147H
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	1024	1024	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	Micropolls 1354A
56	ESDI	967	5	34	---	967	80.3	CDC 94166-101 (2)
57	ESDI	967	7	34	---	967	112.4	CDC 94166-141 (2)
58	ESDI	967	9	34	---	967	144.5	CDC 94166-182 (2)
59-255								none

Notes:

1. Miniscribe 8425F, Seagate ST125
2. For Western Digital ESDI HDC or Drive Maker default setting
3. Micropolls 1325, Ataal 3085, Lanstor Lan64, Maxtor XT1085, Newbury NDR1085
4. Micropolls 1323A, Miniscribe 3035, Microscience HH1050, Seagate ST4053

Types 1 through 47 are allocated at 0FE401h, IBM new AT-compatible area.

Types 48 through 58 are allocated at 0FD2F1h to 0FDFF0h, extended Hard Drive Parameter area.

Appendix F

Specifications

CPU and Memory

32-bit CPU	80386 microprocessor, 8 or 20 MHz clockrate, switch-selectable
	Real, protected, and virtual 8086 modes
	0 wait state (or 1 wait state selectable through software)
	32-bit address and 32-bit data bus
Main memory	1MB RAM on memory card; expandable using 256KB or 1MB SIMMs to 2MB, 4MB, 8MB, 10MB, or 16MB (maximum)
ROM	64KB
Math coprocessor	80387 support (coprocessor is optional)

Controllers

Floppy disk	Supports up to two drives in any of four formats: double-density 360KB, high-density 1.2MB, double-density 720KB, or high-density 1.44MB; controller on SPF card
Hard disk	Supports up to two drives available in 40MB or 90MB; ST506 or ESDI controller

Interfaces

Serial	RS-232C, programmable, asynchronous, DB-9P male connector
Parallel	Standard B-bit parallel, DE-25S female connector

Option slots	Nine input/output expansion slots; three with B-bit bus and six with 16-bit bus; one slot occupied by the serial/parallel/floppy disk controller card, another occupied by a hard disk controller card if installed
Speaker	Internal, with volume control
Clock/calendar RAM	Real-time clock, calendar, and 104-byte CMOS RAM for configuration; battery backup

Power Supply

Switching type, fan-cooled, 115/230 VAC, 190 W; +5 VDC, +12 VDC, -5 VDC, - 12 VDC; 50/60 Hz

Mass Storage

Four drives maximum, configurable using three 5¼-inch half-height drives and one 5¼-inch full-height drive

Standard	5¼-inch, half-height floppy disk drive; 1.2MB (high-density) storage capacity
Optional	5¼-inch, half-height floppy disk drive; 1.2MB (high-density) storage capacity
Optional	5¼-inch, half-height floppy disk drive; 360KB (double-density) storage capacity
Optional	3½-inch, half-height floppy disk drive; 720KB (double-density) storage capacity
Optional	3½-inch, half-height floppy disk drive; 1.44MB (high-density) storage capacity
Optional	5¼-inch, half-height hard disk drive; 40MB storage capacity
Optional	5¼-inch, half-height hard disk drive; 90MB 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: 22° to 158° F (-20° to 60° C)
Humidity	Operating range: 20% to 80%, non-condensing Storage range: 20% to 90%, non-condensing

Physical Characteristics

Width	19.6 inches (498.5 mm)
Depth	17.4 inches (442.3 mm)
Height	6.7 inches (170.6 mm)
Weight (without keyboard)	Single diskette drive model: 29.9 lb (13.6 kg) 40MB hard disk drive model: 33.9 lb (15.4 kg) 90MB hard disk drive model: 34.1 lb (15.5 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.

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 386 feature that enables it to automatically switch from 20 MHz to 8 MHz 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 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, all the commands in that file are executed 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 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 or a program into the computer's memory.

Byte

A sequence or group of eight bits that represents one character.

CGA

Color Graphics Adapter. A type of circuit board that is installed in one of the computer's I/O slots that can generate up to 25 lines of text with 80 characters on each line, or monochrome graphics with a 640 x 200 resolution and four-color graphics at 320 x 200 resolution.

Character

Anything that can print 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.

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 in MS-DOS also displays the current operating drive; if it is drive A, the command prompt looks like this: A >. See also Prompt.

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 your computer to perform a specific function.

Coprocessor

An optional device that enables the computer to process certain mathematical calculations faster.

Copyprotected 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 8 MHz instead of 20 MHz.

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 you are logged onto and working in. Also known as the default directory

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 where MS-DOS executes your next command, unless you tell it do otherwise (by including a pathname with the command). Also known as the *current* or *working* 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 identifier 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 piece of hardware such as an option card or a 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. Also called floppy disk.

Display adapter

The card that is installed in one of the computer's option slots. The display adapter provides the interface to which you connect the monitor and 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 5¼-inch double-density diskette can store 360KB of data. A 3½-inch double-density diskette can store 720KB of data.

Drive identifier

The letter name of a disk drive, followed by a colon-for example, c:.

EGA

Enhanced Graphics Adapter. A type of adapter 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.

Execution speed

The speed at which the central processing unit can execute commands. Also called operating speed. The Equity 386 can run at 8 MHz or 20 MHz.

Expanded memory

Memory above 1MB that can be made available to certain MS-DOS application programs via LIM EMS 4.0.

Extended memory

Memory above 1MB that is not available to MS-DOS application programs. Extended memory can be used for the disk caching program, HDCACHE. See the description of HDCACHE in your MS-DOS Reference Manual.

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 can be added to a file name to better identify it.

External command

An MS-DOS command stored in a program file with the extension .COM or .EXE. MS-DOS must be able to find the program file to execute the command. See also Internal command.

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 code and are used by computers to interpret and carry out instructions.

Filename

A name of up to eight characters that MS-DOS uses to identify a file.

Floppy disk

See Diskette.

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.

GW-BASIC

Microsoft's extended version of the Beginner's All-purpose Symbolic Instruction Code. A programming language designed to be easy to use and understand.

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.

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 diskette format that allows you to store more data than normal. A 5¼-inch high-density diskette can store 1.2MB of data. A 3½-inch high-density diskette can store 1.44MB of data.

Input/output (I/O) port

See Port.

Interface

A physical or software connection used to transmit data between 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. This means that you can execute an internal command without specifying a pathname. Examples include COPY, DEL, RENAME, and DIR, among others. Unlike external commands, internal commands can be executed from any drive or directory.

Jumper

A small device that fits over two small pins on a circuit board to activate a particular function.

Keyboard

A device resembling a typewriter keyboard to enter letters and numbers to the computer.

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 4.0

Version 4.0 of the Lotus/Intel/Microsoft Expanded Memory Specification-a protocol that allows certain application programs to use memory above 1MB. To take advantage of LIM EMS 4.0, you must have the file EEMM386.EXE on your hard disk and you must modify the CONFIG.SYS file. See Chapter 5.

Logical disk drive

A subdivision of a physical disk drive, treated by MS-DOS as though it were a separate physical component of the computer. A physical disk drive may be divided into several logical drives.

Main memory

The amount of memory in the computer up to 1MB that is available to MS-DOS and application programs. Also called base memory.

Math coprocessor

An optional device that enables the computer to process certain mathematical calculations faster.

MCGA

Monochrome/Color Graphics Adapter. A type of adapter that runs either a monochrome or color graphics monitor.

MDA

Monochrome Display Adapter. The type of adapter that displays monochrome text on a monochrome monitor.

Megabyte (MB)

A unit used to measure storage space in a computer's memory or on a disk. One megabyte equals 1,048,576 bytes.

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 386 computer operates at 8 MHz or 20 MHz.

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 memory card inside the Equity 386 to expand the computer's memory. A memory module is commonly called a SIMM (single inline memory module).

MGA

Monochrome Graphics Adapter. The type of display adapter that can display monochrome text or 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.*

Numeric keypad

The number keys grouped to the right of the keyboard.

Operating speed

The speed at which the central processing unit can execute commands. Also called execution speed. The Equity 386 can run at 8 MHz or 20 MHz.

Operating system

A collection of programs (such as MS-DOS) that manages a computer's operations. The operating system determines how programs run on the computer and supervises all input and output.

Option card

A circuit board you install inside the computer to provide additional capabilities, such as a modem, a hard disk controller, or a mouse.

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 the computer what particular conditions to look for.

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. Also used in the computer's memory to detect memory errors.

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 need to 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.

Primary partition

The MS-DOS partition from which the operating system starts.

Program

A disk file that contains coded instructions and tells a computer what to do and how to do it.

Prompt

A message displayed on the computer screen that tells you what action you need to perform next.

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 given directory, starting at the current default 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 Equity 386.

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.

Shadow RAM

The feature provided by the Equity 386 that allows you to copy the ROM BIOS and video ROM to RAM to speed up processing.

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.

SPF card

The card that controls the serial, parallel, and floppy disk drive interfaces. The SPF card occupies option slot number 9 in the Equity 386.

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 a diskette as it formats it. See Parameters.

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 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 diskette into separate accessible areas. There are 80 tracks on each side of a double-sided 720KB, 1.2MB, and 1.44MB 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 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 that is installed in one of the computer's option slots. The video card provides the interface to which you connect the monitor and it controls the way the monitor displays text and graphics.

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 placing a write-protect tab over the notch on the side of a 5¼-inch diskette or by setting the write-protect switch on a 3½-inch diskette. When a diskette is write-protected, you cannot erase, change, or record over its contents.

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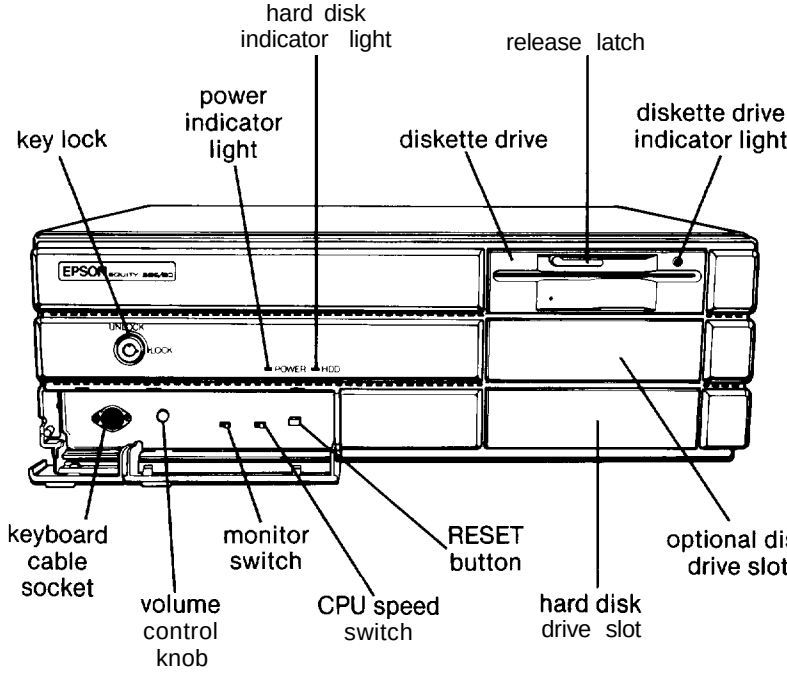
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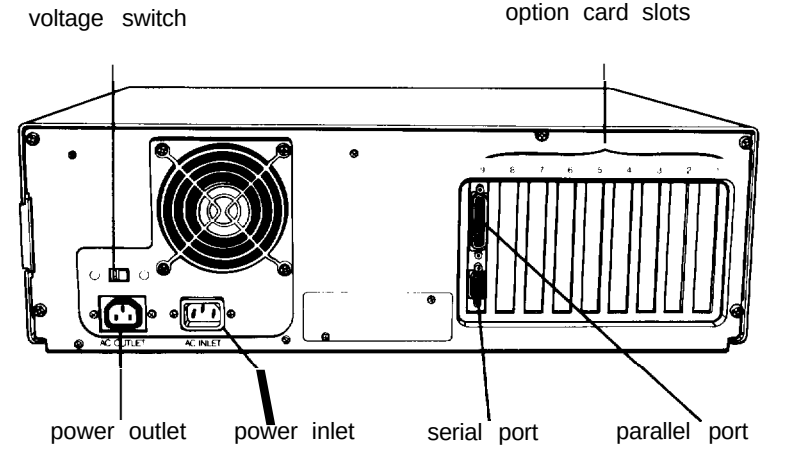
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