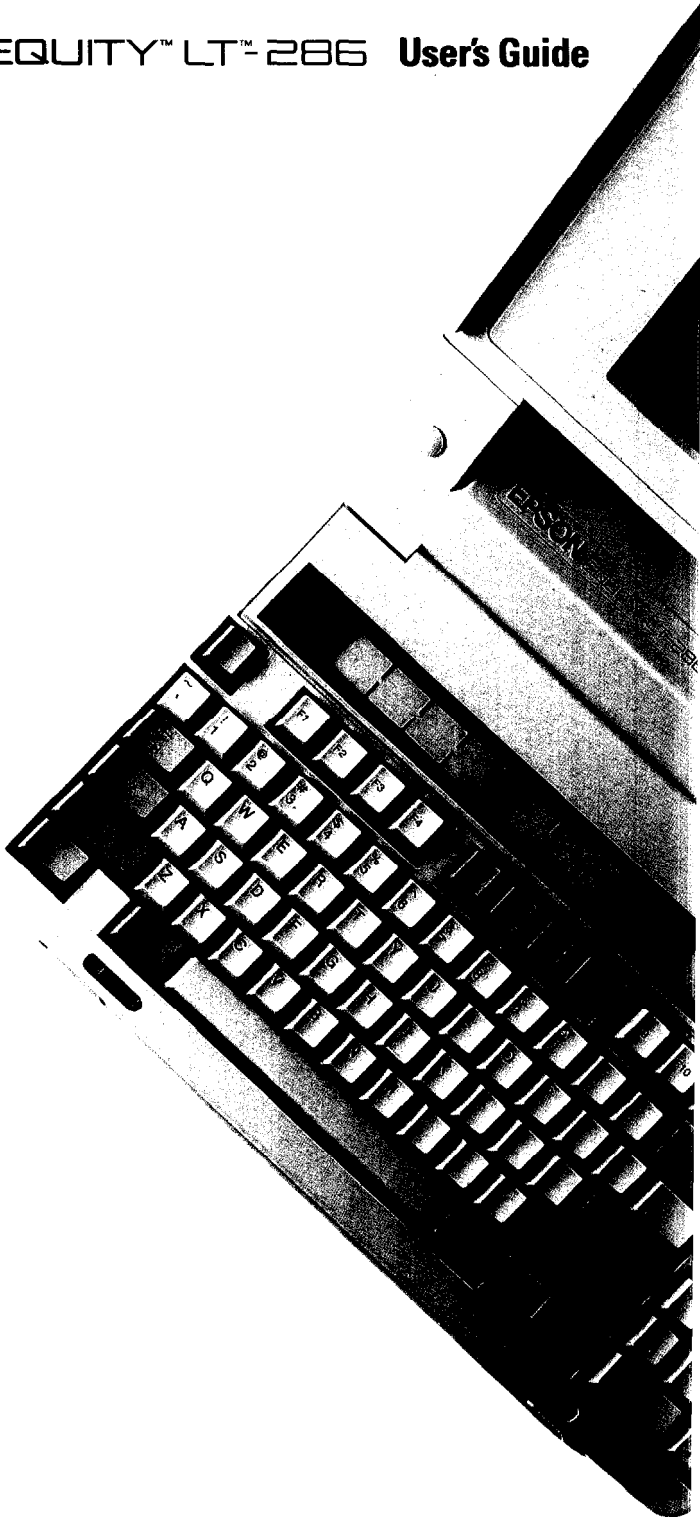


TM

EQUITY™ LT™-286 User's Guide

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EQUITY™ LT™-286

User's Guide

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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 and television reception, which can be determined by turning the equipment off and on, you are 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, consult your dealer or an experienced radio/television technician for additional suggestions. You 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 computer 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 that exceed the limits established by the FCC for this equipment.

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Introduction

Your Epson® Equity™ LT™-286 portable computer is a compact, high-performance system you can use just about anywhere: at the office, at home, or on the road. Its rechargeable battery lets you use it in remote locations when you don't have access to an electrical outlet. With the AC adapter connected, you can use the computer as long as you like and recharge the battery in the process.

The Equity LT-286 comes with the following:

- An 80286 microprocessor
- 640KB (kilobytes) of internal memory
- One 20 or 40MB (megabyte) hard disk
- One 1.44MB 3 1/2-inch diskette drive
- A high-contrast paper-white backlit LCD (liquid crystal display) screen
- Built-in serial, parallel, and video interfaces.

The 80286 microprocessor inside your Equity LT-286 can run at an execution speed of either 12 MHz or 8 MHz. Ordinarily you'll want to use the 12 MHz speed to get faster performance from your computer. A few application programs may require the 8 MHz speed; a switch above the keyboard allows you to change speeds without resetting the computer. The Equity LT-286 also has a built-in socket for an 80287 math coprocessor, which can be installed by an authorized Epson dealer or Customer Care Center.

The built-in serial and parallel interfaces allow you to attach almost any peripheral device, such as a printer or external modem, to your Equity LT-286.

If you have a CGA-compatible color monitor, you can connect it to the computer to take advantage of the color and the larger display. If you have an external 5 1/4-inch diskette drive, you can also connect that to the computer so that you can easily exchange data with computers that use 5 1/4-inch diskette drives.

The following optional equipment should be available from your Epson dealer:

- 300/1200-baud Hayes@-compatible auto-dial internal modem
- 1200/2400-baud Hayes-compatible auto-dial internal modem
- 2MB memory expansion modules-one or two can be installed by an authorized Epson dealer or Customer Care Center
- Expansion chassis
- Soft carrying case.

Either of the internal modem options allows you to communicate with other computers over telephone lines. The expansion chassis contains two expansion slots, which can accommodate standard 8-bit and 16-bit option cards.

Your Equity LT-286 comes with MS-DOS[®] version 3.3, by Microsoft[®] and 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 can use virtually any application program designed for the IBM[®] Personal Computer, PC XT," or PC AT" on your Equity LT-286.

In addition to MS-DOS and GW-BASIC, Epson has included three 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 the most common MS-DOS commands. XTREE is a disk management utility that simplifies all file and directory operations.

How To Use This Manual

This user's manual explains how to set up and care for your Equity LT-286. It also describes how to use your computer and run diagnostic checks.

The eight steps in Chapter 1 explain how to set up your computer and prepare it for use. On the inside back cover is a foldout illustration of the computer parts; you may want to refer to this while you set up the computer.

Chapter 2 tells you how to run the setup program. The setup program gives the computer information about what kind of equipment you have installed and how that equipment is configured. You need to run setup once, when you first begin working with your computer. Afterward, you need to run setup only if you change the configuration.

Chapter 3 explains the procedures for preparing your hard disk. Unless your dealer has already set up the disk for you, you must follow the steps described in this chapter before using your hard disk.

Chapter 4 describes general operating procedures and explains how to use and care for your disks and disk drives.

Chapter 5 provides basic instructions for using MS-DOS with your computer. You can find more detailed information about MS-DOS in the MS-DOS Reference Manual.

Appendix A explains how to attach an external color monitor to your Equity LT-286. To install other options, see the instructions that come with the option. For dealer-installed options, contact an authorized Epson dealer or Customer Care Center. (See the next section, "Where To Get Help," for details.)

If you encounter any problems while using your Equity LT-286, check the troubleshooting guidelines in Appendix B.

Appendix C provides information on the power-on diagnostics, which you need if your computer has trouble starting up.

Appendix D 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 or all of these diagnostic checks.

Appendix E lists the Equity LT-286 hardware specifications.

At the back of the manual is a glossary of computer terms used in this manual.

Where To Get Help

Customer support and service for Epson products is provided by a network of authorized Epson dealers and Customer Care Centers throughout the United States. Epson America provides training, replacement parts, product information, and toll-free support to our dealers and Customer Care Centers.

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

We are confident that this policy will provide you with the assistance you need. If you need to find an authorized Epson dealer or Customer Care Center in your area, please call our Consumer Information number at 1-800-922-8911.

Chapter 1

Setting Up Your System

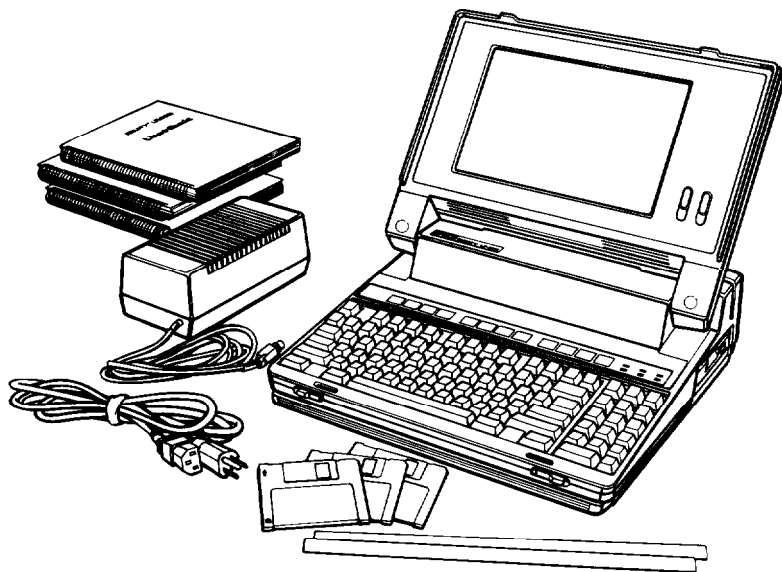
Setting up your Epson Equity LT-286 portable computer is easy. Just follow the steps in this chapter. They describe how to attach the AC adapter, start MS-DOS, and copy the system diskettes that come with your Equity LT-286.

After you have followed these steps, turn to Chapter 2 for information about the setup program. You must run this program to give your computer the information it needs to get started. Then follow the instructions in Chapter 3 to prepare your hard disk.

Do not turn on the computer, printer, or any peripherals until the instructions tell you to. Otherwise, you may damage some part of your equipment.

1 Unpacking

As you unpack the components, be sure to inspect each item. If anything is missing or damaged, consult your Epson dealer.



In addition to this manual, you should have the following items:

- The main unit
- The AC adapter and power cord
- Three diskettes: Startup/Operating 1, Operating 2, and Reference
- An MS-DOS manual and a GW-BASIC manual
- Two function key templates

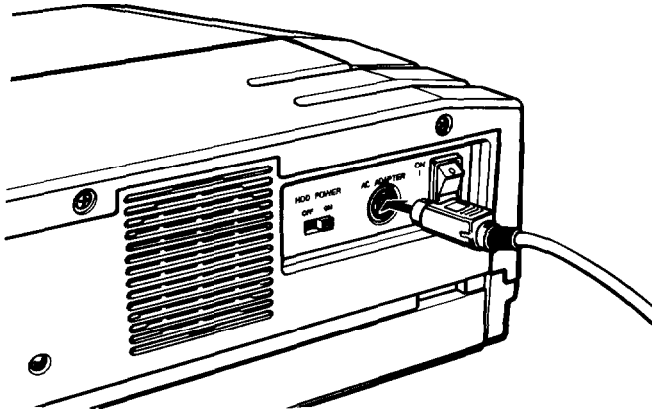
You'll also find a registration card with the main unit. Fill out this card now and mail it to Epson. With your registration card on file, Epson can send you update information.

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

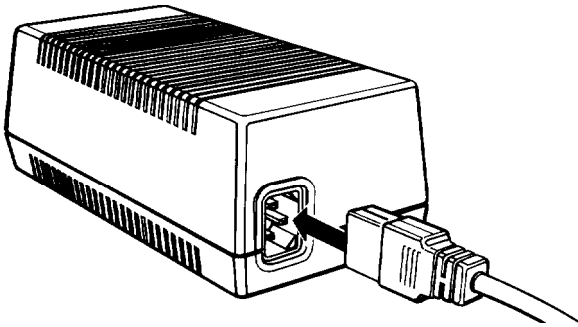
2 *Connecting the AC Adapter*

Follow these steps to connect the AC adapter:

1. Make sure the computer's power switch (located on the back panel of the computer) is turned off.
2. Insert the round end of the adapter cable into the connector marked **AC ADAPTER** on the back panel of the computer.



3. Connect the computer's power cord to the adapter's input socket.



4. Plug the other end of the power cord into a grounded, 120-volt, AC wall outlet.

Be sure to read “Using the AC Adapter” in Chapter 4 for information on powering the computer with the AC adapter.

Note

The AC adapter cable has been designed to prevent it from being accidentally disconnected from the computer. To unplug the AC adapter, grasp the cable with your thumb on the flat part of the connector, Then pull it away from the computer, Do not try to unplug the adapter by pulling on the cord.

3 *Charging the Battery*

The Equity LT-286 contains a rechargeable nickel cadmium (NiCad) battery pack that powers the computer when you are not using the AC adapter. Before you use the computer the first time, you must charge the battery.

When you plugged in the AC adapter in step 2, it started charging the battery. This happens whenever the adapter is connected to the computer and plugged into an electrical outlet. Let the battery

charge for at least five minutes before you start using the computer the first time, and leave the AC adapter connected while you use the computer.

Be sure to read “Using the Battery” in Chapter 4 for information on using the computer with the battery. It explains how to charge the battery fully; you should do this as soon as possible with your new computer.

4 *Connecting a Printer*

The Equity LT-286 has both parallel and serial interfaces (ports). You can easily connect a printer or plotter that has either type of interface. Just follow the instructions below. Of course, Epson offers a full range of printer products; consult your dealer for more information.

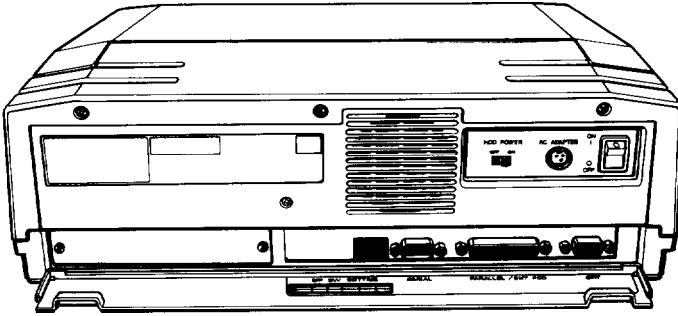
Connecting to the Parallel Interface

The computer’s Centronics®-compatible parallel interface uses a 25-pin, D-shaped female connector. Most Epson printers have parallel interfaces.

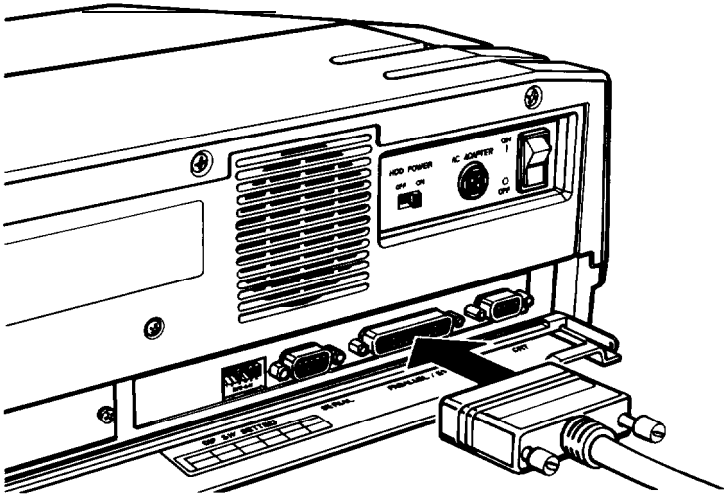
To connect a printer to the computer, you need an IBM-compatible printer cable. If you’re not sure which one you need, consult your Epson dealer. Once you have a printer cable, follow these steps to connect your printer to the parallel interface on the computer:

1. Place the printer next to your computer.
2. Before you connect the printer, make sure the power switches on the computer and printer are off. (The power switch for your computer is located on the back of the machine, on the left side as you face the keyboard.)

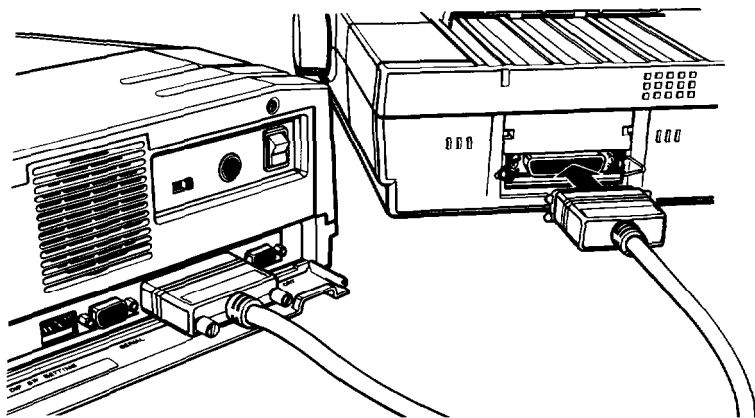
3. Open the computer's interface cover, as shown below.



4. One end of the printer cable has a 25-pin, D-shaped male connector. (See your printer manual if you're not sure which end this is.) Connect this end to the parallel connector on the back panel of the computer, as shown below. If the plug has retaining screws, tighten them by hand or with a screwdriver.



5. Connect the other end of the cable to the printer as shown in the following illustration. To secure the cable, squeeze the clips at each side of the printer connector and push them into place.



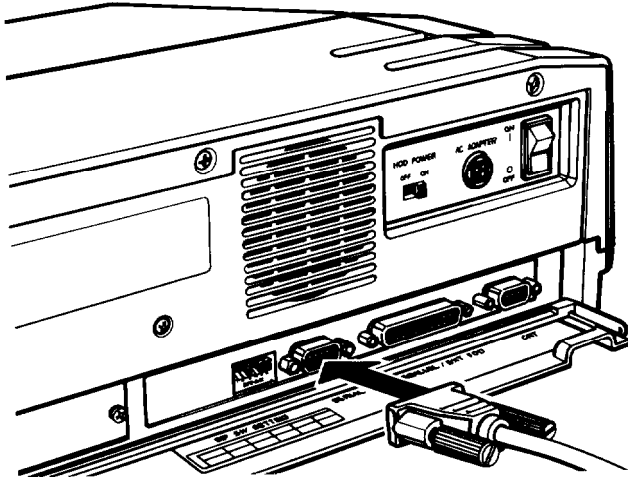
6. Plug the printer's power cable into an electrical outlet.
7. Before starting your computer, be sure to set DIP switch 1 on the back panel to the off position, as described on page 1-8 in "Setting the DIP Switches." This tells your computer that a printer is connected to the parallel interface.

Note

If you plan to use an external 5 1/4-inch diskette drive with your Equity LT-286, you must connect the external drive to the parallel interface. Therefore, you cannot have both a parallel printer and the diskette drive connected at the same time. If you're using an external 5 1/4-inch diskette drive, you need to set DIP switch 1 on the back panel to the on position. See "Setting the DIP Switches," on page 1-8,

Connecting to the Serial Interface

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



The Equity LT-286 uses a 9-pin, D-shaped 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 steps above for connecting a parallel device.

You need to make sure the serial port is set up so it functions properly. If you are using the port for a serial printer, you must also redirect printer output from the parallel port to the serial port. Use the MS-DOS MODE command (or the Epson MENU program) to make these changes. See your MS-DOS manual for instructions.

Note

If you plan to connect a color monitor or an external 5 1/4-inch diskette drive to your computer, do so at this point. For instructions on connecting the monitor, see Appendix A. For instructions on connecting an external diskette drive, see the instructions that came with the drive you purchased.

If you connect either of these devices to your Equity LT-286, be sure to set the computer's DIP switches correctly before using the computer. See "Setting the DIP Switches,"+ below.

5 *Setting the DIP Switches*

The Equity LT-286 has two sets of DIP switches. These are small, on/off switches that provide your computer with information about itself each time you turn the computer on. A DIP switch is either on (up) or off (down). To change a setting, use a hard, thin object, such as a small screwdriver.

One set of DIP switches is located just above the keyboard; the other is on the back panel of the computer. The set above the keyboard has four switches that control the LCD screen. The set on the back panel has six switches that control the diskette drive, the parallel and serial interface configuration, the character set, and the presence or absence of an external video controller card.

Read this section to make sure the current DIP switch settings match your system setup.

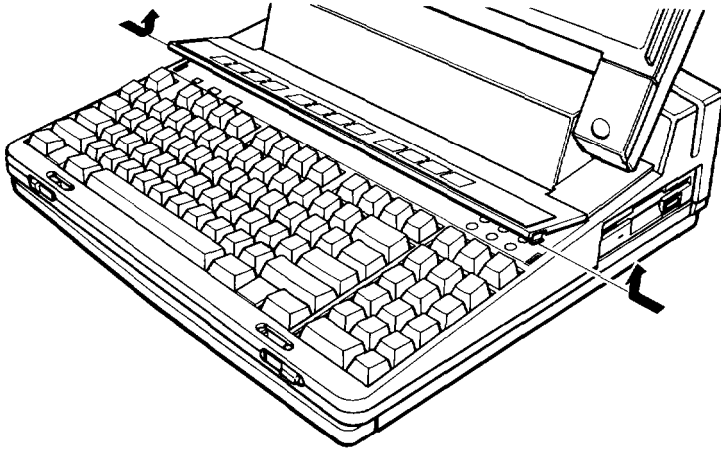
Note

The DIP switches on the back panel should be changed only while the computer is turned off. Otherwise, the new settings do not take effect until the computer is turned off and then on again. (There is one exception: switch 4 on the back panel may be changed while the computer is running.)

The DIP switches above the keyboard may be changed while the computer is running. However, do not change these switches while running the setup program.

Keyboard DIP Switches

The DIP switches above the keyboard are numbered 1 through 4. To access these switches, lift the panel above the keyboard by pressing inward on both sides of the cover as you lift it up:



The system functions controlled by the keyboard DIP switches, shown below, are listed in Table 1-1.

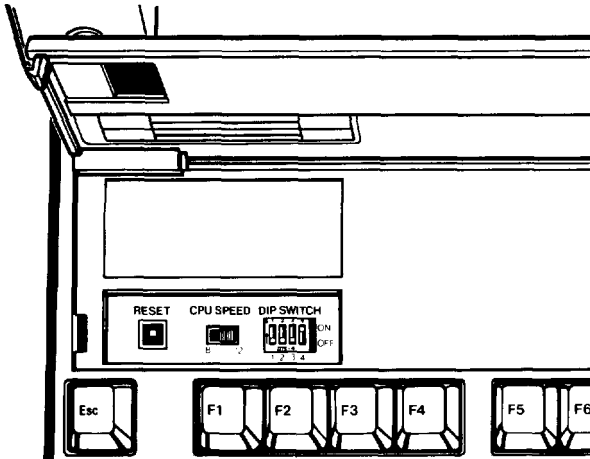


Table 1-1. Keyboard DIP switch functions

	1	2	3	4
LCD reverse	ON			
LCD normal*	OFF			
Gray-scale mode 0 (black/white)*		OFF	OFF	
Gray-scale mode 1		OFF	ON	
Gray-scale mode 2		ON	OFF	
Gray-scale mode 3 (user-defined)		ON	ON	
Select LCD*				ON
Select external monitor				OFF

*Default settings

Switch 1, LCD reverse or normal-This switch tells your computer whether to display text on the screen in normal or reverse mode. In normal mode, black characters are displayed on a white background. In reverse mode, white characters are displayed on a black background.

Switches 2 and 3, gray-scale mode-These two switches select one of four available gray-scale modes. The gray-scale mode governs the way color information is displayed on your LCD screen. In mode 0, everything is displayed in black and white. For most of your work with the Equity LT-286, you probably want to use mode 0. In modes 1 and 2, information that appears in color on a color monitor appears in various shades of gray on your LCD screen. Modes 1 and 2 differ from each other only in the specific assignment of colors to gray tones. The gray tone assignments are shown in Table 1-2.

Table 1-2: Gray-scale mocks 1 and 2

Color	Mode 1 gray tone	Mode 2 gray tone
Black	0	0
Blue	1	1
Green	4	2
Cyan	5	3
Red	2	4
Magenta	3	5
Brown	6	6
White	7	7
Gray	0	0
Light blue	1	1
Light green	4	2
Light cyan	5	3
Light red	2	4
Light magenta	3	5
Yellow	6	6
Bright white	7	7

Note: 0 is the darkest gray tone; 7 is the lightest

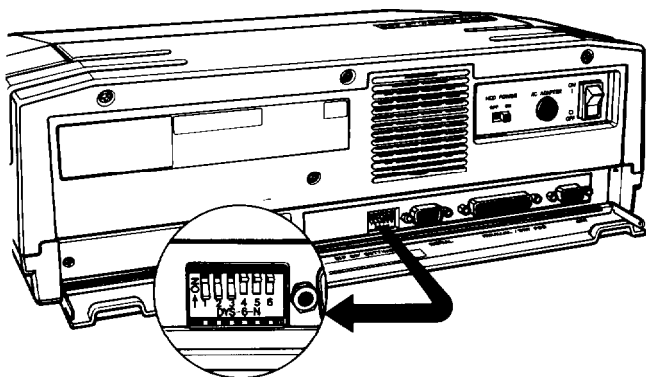
Mode 3 is user-defined. If you select mode 3, you may assign colors to gray tones in whatever way best suits your needs. To specify a mode-3 gray scale, use the setup program, as described in Chapter 2.

Switch 4, LCD or monitor selection-This switch tells the computer whether to display text and graphics on the LCD screen or on a color monitor that you have connected to the computer. If you have connected a color monitor, set this switch to off.

Otherwise, leave it on.

Back Panel DIP Switches

The second set of DIP switches is located near the middle of the back panel. These switches are numbered 1 through 6. To access these switches, open the back panel of the computer as shown below.



The system functions controlled by these switches are listed in Table 1-3 and described below.

Table 1-3. Back panel DIP switch functions

	1	2	3	4	5	6
Use external diskette drive	ON					
Use parallel printer*	OFF					
External diskette drive is B		ON				
External diskette drive is A*		OFF				
Serial port is primary (COM1)*			OFF			
Serial port is secondary (COM2)			ON			
Double dot select*				ON		
Single dot select				OFF		
Internal display controller is enabled*					ON	
Internal display controller is disabled					OFF	
External monitor is color*						ON
External monitor is monochrome						OFF

*Default settings

Switch 1, use of parallel port-This switch tells your computer whether a diskette drive or a parallel printer is connected to the parallel port. If you have connected a parallel printer to this port, set switch 1 off. If you have connected an external 5 1/4-inch diskette drive to the port, set switch 1 on.

WARNING

Failure to set switch 1 correctly may result in damage to your system.

Switch 2, external drive assignment-If you have connected an external diskette drive to the computer, switch 2 determines whether MS-DOS and your application programs access the drive as drive A or drive B. If this switch is on, the built-in 3 1/2-inch diskette drive is drive A and the external 5 1/4-inch diskette drive is drive B. If this switch is off, the internal drive is B and the external drive is A.

Certain copy-protected application programs require that an original program diskette be in drive A when the program is started. If you are running such a program and the original diskette is 5 1/4-inch, be sure to set switch 2 off. Under all other circumstances, it is best to leave it on.

Switch 3, primary or secondary serial port-This switch tells the computer whether the serial connector on the back of the computer is configured as a primary port (COM1) or a secondary port (COM2). If this switch is off, MS-DOS recognizes this connector as COM1; if it is on, MS-DOS recognizes it as COM2.

If you have not installed an internal modem in your Equity LT-286, you probably want to leave switch 3 off. If you have installed an internal modem, and you want the modem's own serial port to be COM1, set this switch on.

Switch 4, double-dot/single-dot select-This switch controls the intensity with which characters are displayed on the screen. Set this switch on for bold (double-dot) characters or off for light (single-dot) characters.

Switch 5, enable or disable internal display controller-If you have attached an optional expansion chassis and you are using an external video controller card (such as an Enhanced Graphics Adapter) in the expansion chassis, set this switch off. Otherwise, set it on.

Switch 6, external monitor type-Switch 6 is important only if you are using an external monitor attached to a video controller card in an expansion chassis and you have set switch 5 off. If your external monitor displays color, set this switch on. If your external monitor is monochrome, set this switch off.

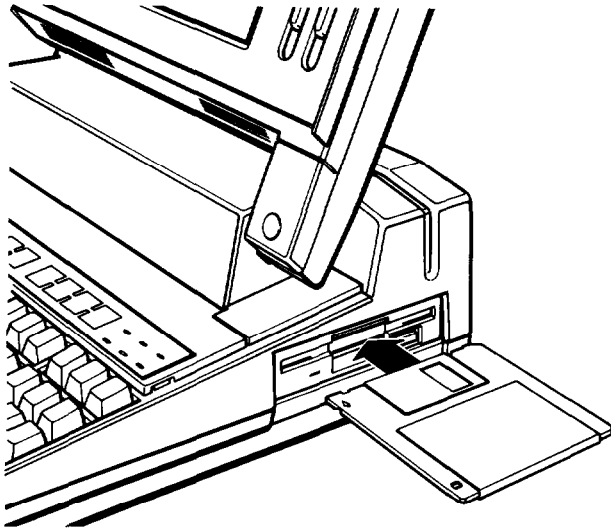
Note

If switch 5 is on, the **computer** ignores the setting of switch 6.

6 *Inserting the Startup/Operating 1 Diskette*

Follow these steps to insert the Startup/Operating 1 diskette:

1. Hold the diskette with the printed label facing up and the arrow pointing into the diskette drive, as shown in the following illustration.



2. Insert the diskette in the drive so that it clicks into place. When the diskette is all the way in, the release button pops out. For more information on inserting, removing, and caring for diskettes, see Chapter 4.

7 *Starting the System*

After you have completed steps 1 through 6, you're ready to turn on the power and start using your Equity LT-286 computer. But before you turn it on, read the following safety rules to avoid accidentally damaging your computer or injuring yourself:

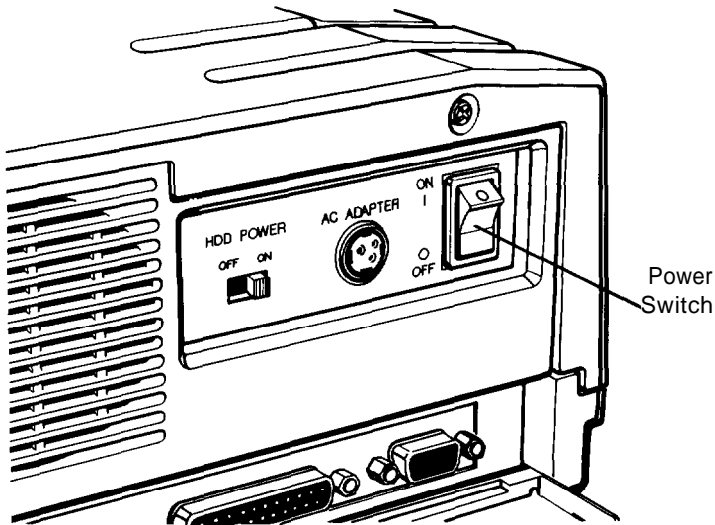
- Do not attempt to dismantle any part of the computer. If there is a hardware problem you cannot solve after reading Appendix B on troubleshooting or after performing the system diagnostics described in Appendix D, consult your Epson dealer.
- Never turn off or reset your computer while a disk drive LED (light-emitting diode) is illuminated. Doing so can destroy data stored on the disk or make the whole disk unusable. The disk drive LEDs are located above the keyboard on the right side. The LED marked **HDD** indicates that the hard disk drive is in use. The LED marked **FDD** indicates that the built-in diskette drive is in use.
- Always wait at least five seconds after you switch off the power before switching it back on. 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.

Turning On the Computer

After you have charged the battery (by connecting the AC adapter to the computer) for at least five minutes, you can turn on your computer. Be sure to leave the AC adapter connected while you use the computer for the first time.

To turn on your computer, follow these steps:

1. Turn on any peripheral devices, such as a printer, an external diskette drive, or a color monitor.
2. Make sure your computer's hard disk switch, located on the back panel, is turned on. It is best to leave this switch on at all times.
3. If you have not done so already, insert the Startup/Operating 1 diskette.
4. Turn on the computer by pressing the power switch on the back panel.

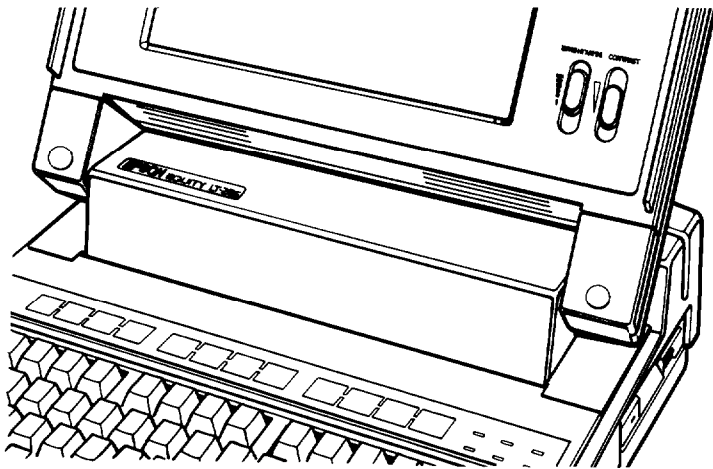


The **Power/Speed** indicator above the keyboard lights up, and after a few seconds the computer begins to perform an internal self test. This is a diagnostic program the computer runs whenever you turn it on. The power-on self test checks the RAM (random access memory), keyboard, system board, and peripherals before the computer begins normal operation.

For a complete description of the power-on diagnostics, see Appendix C.

Adjusting Screen Contrast and Brightness

If you cannot see text on the screen clearly, use the switches on the right side of the screen to adjust the screen's contrast and brightness. The switches are shown below:



The contrast switch determines how bright the characters appear against the background. To increase the contrast, move the switch up. To decrease it, move the switch down.

To make the backlighting brighter, move the brightness switch up. To decrease the backlighting, move the switch down. To conserve the battery's charge when you're running the computer on the battery, do not make the screen brighter than necessary to read the text clearly.

Initial Screen Display

After the computer completes its self test, a message tells you how much random access memory (RAM) is available:

```
000640 KB Ok
```

The computer then boots (starts up) the MS-DOS operating system. The screen displays a date prompt similar to this:

```
Current date is Sat 09-03-88
Enter new date (mm-dd-yy):
```

Type today's date, in the format shown above, and press **Enter**. You can use either hyphens or slashes to separate the month, day, and year.

The screen then displays the time:

```
Current time is 09:10:33.49
Enter new time:
```

Type the current time in the format shown above, and press **Enter**. You don't need to enter the seconds. For PM times, use a number between 12 and 23 to designate the hour.

Note

You need to enter the current date and time only the first time you start your computer. Afterward, your computer's built-in, battery-powered clock keeps track of the date and time automatically. If you ever want to change the date or time for any reason, use the MS-DOS **DATE** and **TIME** commands (described in your MS-LXX manual).

The screen displays the MS-DOS version number and copyright information. Then the MS-DOS command prompt appears:

```
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. The prompt appears on the screen whenever you

load MS-DOS, complete an MS-DOS command, or exit an application program.

Note

Your computer is designed to conserve energy by darkening the screen when there is no activity at the keyboard for a certain period of time. If the screen goes dark, press one of the Shift keys to illuminate it again.

8 *Copying System Diskettes*

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

To copy your system diskettes, you need three blank, 720KB, double-sided, double-density, 3 1/2-inch diskettes. Follow these steps:

1. Write-protect your original system diskettes. This protects the diskettes from accidentally being erased or copied over. The write-protect device is a small switch on the lower-right corner on the back of the diskette. To write-protect a diskette, slide the switch down toward the edge of the diskette so there is a hole where the switch used to be. (For more detailed instructions, see "Write-Protecting Diskettes," in Chapter 4.)
2. Insert the Startup/Operating 1 diskette in the diskette drive if it is not there already.
3. Type `DISKCOPY` and press `Enter`. The screen displays this message:

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


4. Drive A already contains the diskette you want to copy (the source diskette), so just press any key. The DISKCOPY program copies most of the files on the diskette to the computer's memory. (Because the 720KB MS-DOS diskette holds more data than fits in the computer's 640KB of memory, the computer must copy the diskette in two passes. MS-DOS prompts you when you need to change diskettes.)

The screen then displays this message:

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

5. Remove the Startup/Operating 1 diskette from drive A by pressing the release button, and insert the blank diskette (the target diskette) in the drive. Then press any key.

If the diskette in drive A has not been formatted, the DISKCOPY program formats it. Then the program begins copying the data from the computer's memory to the formatted diskette. When it has copied all the files from memory, the screen displays this message:

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

6. Remove the target diskette from the drive and insert the original Startup/Operating 1 diskette. Then press any key.

The DISKCOPY program copies the rest of the files from the original diskette to the computer's memory and then displays this message:

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

7. Remove the Startup/Operating 1 diskette from drive A and insert the target diskette in the drive, then press any key. The program copies the remaining files from the computer's memory to the target diskette.

When the copy is complete, you see this prompt:

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

8. Press Y so you can make a copy of the Operating 2 diskette. Follow the instructions above and the prompts on the screen to copy the Operating 2 diskette.
9. When the Copy another diskette (Y/N)? prompt reappears, press Y again, and follow the instructions above to copy the Reference diskette.
10. When you finish copying all three system diskettes, answer N to the Copy another diskette (Y/N)? prompt.

Chapter 2

Running the Setup Program

If this is the first time your Equity LT-286 has been used, you need to run the setup program on the Reference diskette to give the computer information about the way it is set up. This is a simple procedure that you must do at least once. You may need to do it again later if you want to change a setting.

The setup program lets you specify the following:

- The amount of random access memory (RAM) in your computer
- The type of display you're using
- Whether or not you have installed an 80287 math coprocessor
- Whether or not you have installed an external 5 1/4-inch diskette drive
- What type of hard disk drive you have
- The backlight period for your LCD screen
- The mapping of colors to gray tones for gray-scale mode 3.

The settings you specify with the setup program are recorded in a special area of memory called CMOS RAM. This memory is backed up by a battery, so it cannot be erased when you turn off or reset the computer. Whenever you turn on the computer, it reads the settings stored in CMOS RAM. If there are any differences between those settings and the settings of your DIP switches, the computer prompts you to rerun the setup program.

Starting the Setup Program

To start the setup program, follow these steps:

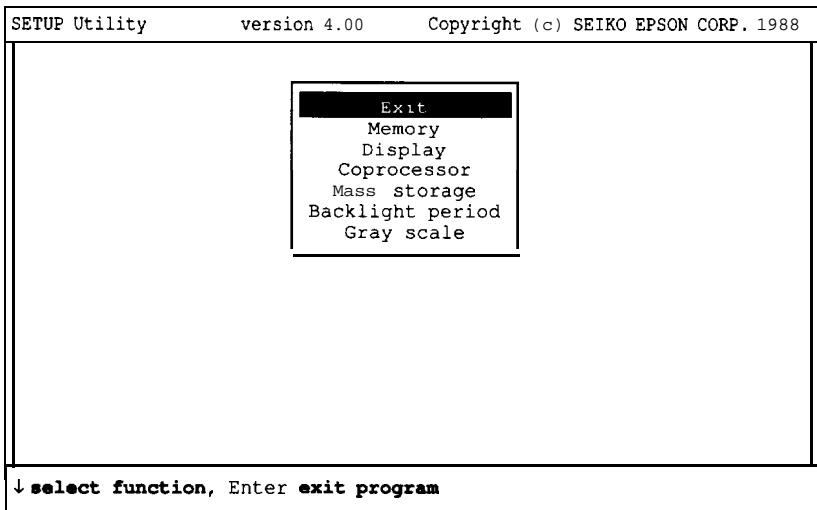
1. Insert your working copy of the Reference diskette in drive A.
2. Turn on or reset the computer. Press **Enter** twice to respond to the date and time prompts. The setup program loads automatically and displays the Reference diskette's operation menu:

OPERATION MENU

- 1 - Setup
- 2 - System diagnostics
- 0- Exit to DOS for more utilities

Enter selection number:

3. Press **1** to select **Setup** and then press **Enter**. The setup main menu appears on the screen:



Note

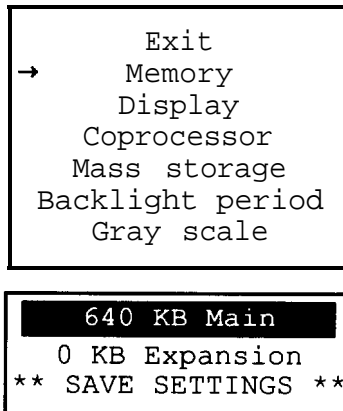
If you are running setup on an external monitor instead of on the computer's built-in LCD screen, you do not see the Gray scale option on the main menu.

- To select an option on this menu, use the ↓ and ↑ keys to highlight the option. Then press Enter. (The ↓ and ↑ keys are located on the numeric keypad, at the lower-right corner of your keyboard.)

Memory

The setup program assumes that your Equity LT-286 is equipped with 640KB of main memory and no expansion memory. If this information is correct, you do not need to make any changes to the Memory portion of the setup program.

To change the memory information recorded by the setup program or to confirm that the current settings are correct, highlight Memory and press Enter. The following display appears:



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

To change the main memory setting, highlight `Main`. Then press `Enter` one or more times until the correct value appears.

To change the expansion memory setting, highlight `Expansion`. Then press the `+` key (either the gray `+` on the right side of the keyboard or the white `+` next to the backspace key) until the correct value appears.

For example, if you have installed a 2MB memory expansion module, press the `+` key until `2048KB` appears. If you have installed two 2MB expansion modules, press the `+` key until `4096KB` appears.

When you have finished making changes to the memory settings, highlight `SAVE SETTINGS` and press `Enter`.

Display

The setup program assumes that you are using either the built-in LCD screen in its normal 80-column mode or a color monitor (attached to the CRT connector) in 80-column mode. If this information is correct, you do not need to make any changes to the `Display` portion of the setup program.

To change the display information recorded by the setup program or to confirm that the current settings are correct, highlight `Display` and press `Enter`. The following screen appears:

```

      Exit
      Memory
      →  Display
      Coprocessor
      Mass storage
      Backlight period
      Gray scale
-----
Color/graph. 80 col
** SAVE SETTINGS **
```

If the current settings are correct, press \uparrow to return to the main setup menu.

To change the display information, highlight Color/graph. **80 col** and press Enter. The following menu appears:

```
Exit
Memory
→ Display
Coprocesor
Mass storage
Backlight period
Gray scale

→ Color/graph. 80 col
** SAVE SETTINGS **
```

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

The choices are as follows:

- Color/graph. **80 col**-In this mode, the Equity LT-286 displays text at a width of eighty characters per line and can display graphics. This is the standard setting.
- Color/graph. **40 col**-In this mode, the Equity LT-286 displays text at a width of forty characters per line and can display graphics. Use this setting if you want the computer to start up with wider characters. (Your application programs may still change the display from the 40-column mode to the 80-column mode, but the computer will start in the 40-column mode each time you turn it on or reset it.)
- Monochrome **80 col**-Choose this setting only if you have a monochrome monitor attached to a monochrome display adapter in an expansion chassis and you want the computer's initial display to appear on the monochrome monitor.

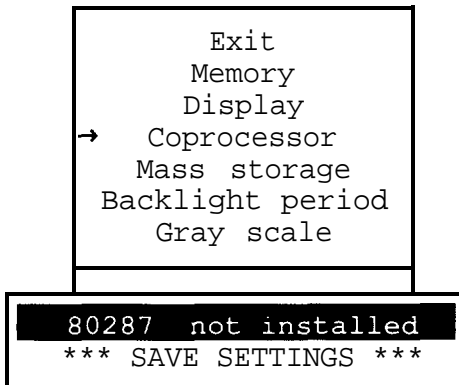
- **Special options**—Choose this setting if you have an EGA (Enhanced Graphics Adapter) or VGA (Video Graphics Array) display adapter in an expansion chassis and you want the computer's initial display to appear on the monitor connected to that adapter.

To select a display option, highlight the option and press **Enter**. Then highlight **SAVE SETTINGS** and press **Enter** again. The main setup menu reappears.

Coprocessor

The setup program assumes that you have not installed an 80287 math coprocessor. If this is the case, you do not need to make any changes to the **Coprocessor** portion of the setup program.

If you have installed an 80287 coprocessor, highlight **Coprocessor** and press **Enter**. The following display appears:



Highlight the **80287** option and press **Enter** once, to indicate that you have installed an 80287 coprocessor. Then highlight **SAVE SETTINGS** and press **Enter**.

Mass Storage

The setup program assumes that your computer has an internal 1.44MB 3 1/2-inch floppy disk drive, an internal 20MB hard disk, and that you are not using an external 5 1/4-inch diskette drive. If this is true, you do not need to make any changes to the Mass storage portion of the setup program.

To change the mass storage information recorded by the setup program or to confirm that the current settings are correct, highlight Mass storage and press Enter. The following display appears:

```
Exit
Memory
Display
Coprocesor
→ Mass storage
Backlight period
Gray scale
```

```
Drive B(external): None
Drive C           : Type 2(20MB)
***** SAVE SETTINGS *****
```

If you are using an external 5 1/4-inch diskette drive, highlight Drive B (external). Then press Enter to select the type of external diskette drive you have installed. As you continue to press Enter, the display cycles through the available options: 360 KB, 1.2 MB, and None. Select the appropriate option for your system.

Your hard disk is most likely a Type 2,20MB disk. If it is not, highlight Drive c and press Enter. Then press Enter to select the type of drive you have installed. As you continue to press Enter, the display cycles through the available options: Type 3 (40MB), Type 4 (40MB), None, and Type 2 (20MB). Select the appropriate option for your system.

If you are using an external 5 1/4-inch diskette drive and have set DIP switch 2 on the back panel off, your computer recognizes the external diskette drive as A and the internal drive as B. In this case, you need to confirm or adjust the setup settings for both Drive A and Drive B. When you first select Mass storage from the setup main menu, you may see the following display:

```
Exit
Memory
Display
Coprocessor
→ Mass storage
Backlight period
Gray scale
```

```
Drive A(external): 1.44 MB (BAD SETTING)
Drive B(internal): None (BAD SETTING)
Drive C           : Type 2(20MB)
***** SAVE SETTINGS *****
```

Do not be concerned about the message BAD SETTING. This is merely to remind you to adjust the settings for both of your diskette drives.

When you have entered the correct setup information for both diskette drives, highlight SAVE SETTINGS and press Enter. The main setup menu reappears.

Backlight Period

In order to conserve the battery's charge when you are running your computer without the AC adapter, your screen is designed to go blank after a preset period of inactivity. Initially, that period is two minutes. If you don't press any key on the keyboard for two minutes, the screen's backlighting is automatically turned off. To turn it on again, press any key. To do this without disturbing a program running on your computer, press **Shift**, **Ctrl**, or **Alt**.

You can change the period of time the computer waits before darkening the screen to any value between 30 seconds and five minutes, in half-minute increments. You can also disable the automatic screen darkening feature by selecting an unlimited backlight period. To change the backlight period, highlight **Backlight period** on the setup program's main menu, then press **Enter**. The following display appears:

```
Exit
Memory
Display
Coprocessor
Mass storage
'Backlight period
Gray scale
```

```
2.0 Minutes
** SAVE SETTINGS **
```

Press the **+** key to increase the backlight period or the **-** key to decrease it. To disable automatic screen darkening, keep pressing the **+** key until the display reads **No time limit**.

Note

When certain memory-resident programs are running, the screen's backlighting cannot be restored after it has been turned off. If you find that the screen's backlighting does not come back on when you press a key, you may want to set the backlight period to Not time limit. Another way to avoid this problem is to use the Epson LIGHTON utility. See chapter 5 for details on the LIGHTON utility.

When you have selected the backlighting period, highlight **SAVE SETTINGS** and press Enter. The main menu reappears.

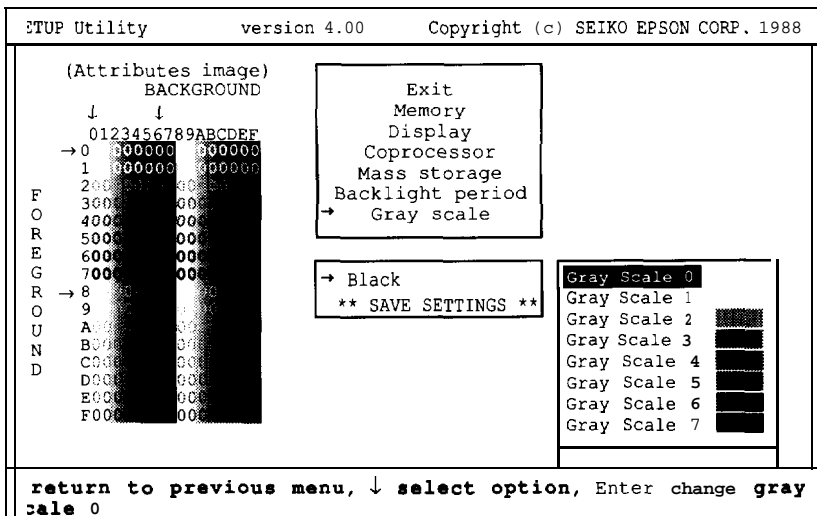
Gray Scale

The Gray scale option on the setup menu allows you to define the correspondence between colors and gray tones in gray-scale mode 3 (see Chapter 1). If you are not planning to use gray-scale mode 3, you do not need to set the Gray scale portion of the setup program.

To define gray-scale mode 3, highlight Gray scale on the setup main menu and press Enter. The following display appears:

TUP Utility		version 4.00	Copyright (c) SEIKO EPSON CORP. 1988
(Attributes image) BACKGROUND			
	↓ ↓		
	0123456789ABCDEF		
→ 0	000000 000000	<div style="border: 1px solid black; padding: 5px; text-align: center;">Exit Memory Display Coprocessor Mass storage Backlight period + Gray scale</div> <div style="border: 1px solid black; padding: 5px; margin-top: 10px; text-align: center;">Black ** SAVE SETTINGS **</div>	
1	000000 000000		
2	000000 000000		
F	300000 000000		
O	400000 000000		
R	500000 000000		
E	600000 000000		
G	700000 000000		
R →	800000 000000		
O	900000 000000		
U	A00000 000000		
N	B00000 000000		
D	C00000 000000		
	D00000 000000		
	E00000 000000		
	F00000 000000		
return to main menu, ↓ select option, + - select attribute, ter change gray scale			

In the submenu (the lower box), a black, gray, or white tone appears next to the word Black. That tone is currently associated with the color black. If you are satisfied with that tone, press the + key to move to the next color. If you want to use a different gray tone for black, press Enter. The following display appears:



Use ↑ and ↓ to highlight the gray tone that you would like to use for black, then press Enter. The submenu shown in the preceding figure then reappears, showing your latest gray tone selection for the color black.

Next, press the + key. The name of another color appears, along with the gray tone currently associated with that color. To assign a different gray tone to that color, press Enter and follow the procedure described in the last paragraph. To move to the next color, press the + key again.

As you build a gray scale for mode 3, the setup program displays all possible combinations of foreground and background tones in a grid at the left side of the screen. In this grid, the numbers and letters in the column at the left represent foreground tones. The numbers and letters in the row at the top of the grid represent background tones. Here is what the numbers and letters stand for:

Foreground	Background
0 - Black	0 - Black
1 - Blue	1 - Blue
2 - Green	2 - Green
3 - Cyan	3 - Cyan
4 - Red	4 - Red
5 - Magenta	5 - Magenta
6 - Brown	6 - Brown
7 - White	7 - White
8 - Gray	8 - Blinking black
9 - Light blue	9 - Blinking blue
A - Light green	A - Blinking green
B - Light cyan	B - Blinking cyan
C - Light red	C - Blinking red
D - Light magenta	D - Blinking magenta
E - Yellow	E - Blinking brown
F - Bright white	F - Blinking white

For example, to see how a red character might look on a blue background, you would find the intersection of row 4 and column 1. The character displayed there is an example of how that color combination will appear in gray-scale mode 3, given the current settings.

When you finish assigning gray tones to colors, highlight **SAVE SETTINGS** and press **Enter**. The main menu reappears.

Leaving the Setup Program

When you finish using the setup program, press \uparrow until `Exit` is highlighted and then press `Enter`. The screen displays a list of the current setup program settings and a menu:

STUP Utility	version 4.00	Copyright (c)	SEIKO EPSON CORP. 1988			
Memory size	Main	640 KB				
	Expansion	0 K N				
Display type		Color/graph.	80 col			
Coprocessor		80287 not installed				
Mass storage	Drive A(internal):	1.44 MB				
	Drive B(external):	None				
	Drive C:	Type 2(20MB)				
Backlight period		3.0 minutes				
<table border="1"><tr><td>Change settings</td></tr><tr><td>Exit without saving</td></tr><tr><td>**EXIT AND SAVE**</td></tr></table>				Change settings	Exit without saving	**EXIT AND SAVE**
Change settings						
Exit without saving						
EXIT AND SAVE						
return to main menu, ↓ aselect option, Enter return to main menu, F 1 change						

Check the list to make sure all the information is correct:

- If any setting is incorrect, highlight `Change settings` and press `Enter`. The main setup menu appears again and you can correct the setting.
- If you did not make any changes or if you want to cancel the changes you made, highlight `Exit without saving` and then press `Enter`. The Reference diskette's operation menu appears. Press `0` and then `Enter` to exit to MS-DOS. Then remove your Reference diskette and insert your working copy of the Startup/Operating 1 diskette.

- If you have modified the gray-scale settings, press F1. The screen displays the current gray-scale assignments. If you want to make any changes, highlight `Change settings` and press **Enter**. The main setup menu appears again, and you can make any necessary changes.

When the settings are the way you want them, remove the Reference diskette and insert your working copy of the Startup/Operating 1 diskette in drive A. Then highlight `EXIT AND SAVE` and press **Enter**. At this point, the program resets the computer using the new configuration, and MS-DOS is reloaded. After you press **Enter** twice to respond to the date and time prompts, the `A>` prompt reappears on the screen.

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 the Hard Disk for Use

Before using your hard disk for the first time, you need to follow the steps described in this chapter to partition and format the disk. These steps prepare the disk to store MS-DOS and your data and program files.

WARNING

The steps described in this chapter erase any data currently stored on the hard disk. Therefore, do not perform these steps if your hard disk has already been prepared for use or has data stored on it. These instructions apply only to a new hard disk.

The hard disk in your computer has a much larger capacity than your diskette drive. A 20MB hard disk, for example, can store more than 20 million characters. This is equivalent to approximately 15 1.44MB diskettes. Using a hard disk reduces the number of diskettes you need and eliminates much of the diskette-swapping you do when you use diskettes. The computer is also able to read and write data on the hard disk much more quickly than it can on a diskette.

You generally do most of your work on the hard disk and use the diskette drive for tasks such as installing new software, exchanging data with other computers, and making backup copies of your programs and data files.

Backing up the hard disk is particularly important. Although the hard disk is very reliable, it is essential to back up all your hard disk files onto diskettes periodically, in case you accidentally lose some data. You can use `BACKUP` or `MENU` to back up your hard disk files. These commands are described in Chapter 5 and in the MS-DOS Reference Manual.

There are three essential steps involved in preparing the hard disk for use:

- Creating one or more partitions for the MS-DOS operating system
- Formatting the MS-DOS partition(s)
- Copying files from the Operating 2 and Reference diskettes to the hard disk.

Partitioning the disk prepares it to receive the MS-DOS system files. You use the FDISK program to perform this step.

Formatting a partition prepares the partition to receive data. You use the FORMAT command to perform this step.

You use the COPY command to copy essential MS-DOS programs and Epson-supplied utility programs from your Operating 2 and Reference diskettes to your hard disk.

Note

The instructions in this chapter assume that MS-DOS is the only operating system you are going to use on your hard disk. If you're going to use another operating system in addition to MS-DOS, you may need to create an additional partition. For information about how to do this, consult the chapter on FDISK in your MS-DOS manual. If you want to set up your hard disk to run another operating system only, consult the manual for that operating system.

With MS-DOS version 3.3, you can create one or more partitions on the hard disk. You must create a primary partition, which is where MS-DOS is stored and from which your computer loads the operating system. Additionally, you can create an extended partition, which you can use to store additional programs or data.

If you have a 20MB hard disk, you probably need only one partition. If you have a 40MB hard disk, however, it is best to create an extended partition in addition to the primary partition.

MS-DOS cannot use more than 32MB in a single partition, so creating an extended partition allows you to use the extra 8MB of space.

The primary partition automatically becomes drive C. If you create an extended partition (on either a 20MB or a 40MB hard disk), you can make it just one drive or break it into multiple drives. Each drive in the extended partition is assigned a drive letter, beginning with D, and you can define how much space you want each drive to have.

In the following procedures you'll enter MS-DOS commands and use the working copies of your Startup/Operating 1, Operating 2, and Reference diskettes. If you are new to computers and MS-DOS, this may be the first time you have used an operating system. The steps are simple, and you should not have any problems; however, if you do have questions, see Chapter 5 for basic information about using MS-DOS or see your MS-DOS manual for more detailed information about the operating system.

Creating a Primary Partition

The steps below describe how to create a primary partition of the maximum size: 20MB on a 20MB hard disk or 32MB on a 40MB hard disk. If you want the primary partition to be smaller, see the instructions for FDISK in your MS-DOS manual.

1. Make sure the computer is turned off.
2. Make sure the switch marked **HDD POWER** on the back of the computer is turned on.
3. Insert your working copy of the Startup/Operating 1 diskette into the diskette drive.
4. Turn on the computer.
5. Press **Enter** twice to accept the date and time shown (or enter the date and time if they are incorrect).

6. At the A> prompt, type **FDISK** and press **Enter**. The screen displays the **FDISK Options** menu.
7. Press **1** to select the **Create DOS Partition** option and press **Enter**. The screen displays the following menu:

```
Create DOS Partition
Current Fixed Disk Drive: 1
    1. Create Primary DOS partition
    2. Create Extended DOS partition
Enter choice: [1]
Press ESC to return to FDISK Options
```

8. Press **1**, then press **Enter**. The screen displays the following:

```
Create Primary DOS Partition
Current Fixed Disk Drive: 1
Do you wish to use the maximum size
for a DOS partition and make the DOS
partition active (Y/N).....? [Y]
Press ESC to return to FDISK Options
```

9. Press **Y**, then press **Enter**. The screen displays the following message:

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

10. Without removing the **Startup/Operating 1** diskette, press any key to restart the system.
11. Press **Enter** twice to accept the date and time shown.

The system now recognizes the **MS-DOS** partition and the **A>** prompt reappears.

Creating an Extended Partition

This section describes how to create an extended partition of 8MB, designated as drive D. If you completed the steps described in the previous section, you should already have a primary partition of 32MB if you have a 40MB hard disk. The primary partition is designated as drive C.

After you have formatted the partitions, your computer operates as if it had two separate hard disks—a 32MB drive C and an 8MB drive D. If you prefer a different arrangement—for example, a 20MB drive C and a 20MB drive D—or if you want to split your 20MB hard disk into two partitions, see the instructions for FDISK in your MS-DOS Reference Manual. The MS-DOS manual also describes how to create multiple drives in the extended partition.

Note

Splitting a hard disk into two logical drives does not require you to run the setup program to change the configuration information. The setup program is concerned only with the number of physical disk drives in your system.

Follow these steps to create an extended partition on the hard disk and designate it as drive D:

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

```
Total disk space is 1023 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 message:

```
Extended DOS partition created
```

You also see information about the partitions you have created.

6. Press **ESC** to return to the FDISK Options menu. FDISK automatically takes you to the Create Logical DOS Drive (s) option and displays 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**. The screen displays the following message and prompts:

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

9. Without removing your Startup/Operating 1 diskette from drive A, press any key to restart the system.
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.

Note

Once you have created the partitions, you must format each one. Formatting prepares the partition to receive programs and other data. The next two sections describe how to format a primary and extended partition.

Formatting the Primary Partition

Now that you have created drive C, the primary partition, you must format it. You can use the `SELECT` command to do this. `SELECT` automatically does the following:

- Formats the primary partition
- Allows you to assign a name (a volume label) to the partition
- Copies the MS-DOS Startup/Operating 1 files to the partition
- Creates an `AUTOEXEC.BAT` file in the primary partition to ensure that your computer boots MS-DOS correctly from drive C.

If you have an extended partition, use the `FORMAT` command to format drive D (and any additional drives in the extended partition). See “Formatting the Extended Partition,” the next section in this chapter.

After you have formatted drive C, you can boot the operating system automatically from the hard disk every time you turn on or reset your computer. You won't have to insert an MS-DOS system diskette in drive A to load the operating system.

To format drive C, follow these steps:

1. Insert your working copy of the Startup/Operating 1 diskette into the diskette drive.
2. If you don't see the `A>` prompt, type `A:` and press `Enter`.
3. 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 for the United States. If you want to substitute other codes, see your MS-DOS manual.

The screen displays the following message:

```
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)?
```

4. Press Y. The screen displays the following message:

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

5. Press Y, then press **Enter**. MS-DOS begins formatting the primary partition. The screen continuously displays the changing head and cylinder numbers of the drive.

Note

Because the formatting process takes a few minutes, your screen may go dark. Just press any key to make the information on the screen visible again,

When the procedure is complete, the screen displays the following message:

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


6. It is a good idea to enter a name (a volume label) for the partition to protect it from being accidentally reformatted later. If you want to name the drive, type a name of up to 11 characters, then press **Enter**. If you prefer not to name it, just press **Enter**.

The screen first displays disk space information. Then it displays the following message:

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

When all the files have been copied, the **A>** prompt reappears. The **SELECT** procedure is complete. Now you can format the extended partition, if you have one, using the procedure below.

Note

The **SELECT** command copies all the MS-DOS files on the Startup/Operating 1 diskette to your hard disk. To use the complete operating system, as described in this manual and in your MS-DOS manual, you also need to copy the files on the Operating 2 and Reference diskettes to your hard disk. See the next page for instructions.

Formatting the Extended Partition

If you have an extended partition (drive D), you need to format it also. Follow this procedure:

1. Insert your working copy of the Startup/Operating 1 diskette into the diskette drive.
2. If you don't see the **A>** prompt, type the following and press **Enter**:

```
A:
```

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

```
FORMAT D:
```

4. The screen displays this message and prompt:

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

5. Press **Y** and **Enter** to begin formatting the extended partition. The screen continuously displays the changing head and cylinder numbers. When the partition has been formatted, the screen displays the following message:

```
Format complete
```

It also shows information about the total disk space available on drive D. The **A>** prompt then reappears.

Copying the MS-DOS Files to the Hard Disk

Once you have formatted your partition(s), you need to copy the files on your Operating 2 and Reference diskettes to drive C. Follow the steps below.

1. Remove the Startup/Operating 1 diskette from drive A and insert the Operating 2 diskette in the drive.
2. You should still see the **A>** prompt. 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 your hard disk. As each file is copied, its name appears on the screen.

4. After copying, remove the Operating 2 diskette from drive A and insert the Reference diskette. Type the following and press **Enter**:

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

5. When you are finished copying, store your diskettes in a safe place.

Modifying the AUTOEXEC.BAT File

The SELECT procedure described above creates a file named AUTOEXEC.BAT on your hard disk. This file contains instructions that are executed by MS-DOS every time you boot your system from the hard disk. These instructions do the following:

- Tell MS-DOS where to find its essential system files
- Allow you to verify that the date and time are correctly set or change the date and time if necessary
- Install the appropriate keyboard information for the country in which you're using your computer.

Together, these instructions ensure that your system starts up properly each time you boot it from the hard disk. The instruction that installs the keyboard information, however, has the side effect of interfering with the mechanism that restores the backlighting to your screen after the backlight period has elapsed. To correct this problem, you need to make a simple modification to the AUTOEXEC.BAT file created by SELECT. To do so, follow these steps:

1. Type `COPY AUTOEXEC.BAT + CON AUTOEXEC.BAT` and press **Enter**.
2. Type `LIGHTON` and press **Enter**.
3. Press the **F6** key and then **Enter**.

WARNING

It is essential to modify the AUTOEXEC.BAT file created by SELECT. If you do not, you will not be able to restore the backlighting to your screen after the backlight period elapses.

Booting From the Hard Disk

Now you can boot your system (load MS-DOS) from drive C. Just make sure there is no diskette in drive A when you turn on or reset your computer.

Turn off the computer, wait at least five seconds, then turn it back on. After the computer completes its 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 system has successfully loaded MS-DOS from your hard disk.

From now on, each time you turn on or reset your computer, it automatically loads MS-DOS from the hard disk. Just make sure drive A is empty.

Chapter 4

Using the Equity LT-286

This chapter describes some basic procedures for using your Equity LT-286 computer.

Using the AC Adapter

The Equity LT-286 can be powered by its internal battery pack or by the AC adapter. When you connect the AC adapter to the computer and to an electrical outlet, the power to the computer is supplied from the outlet. At the same time, the AC adapter recharges the battery. Use the AC adapter whenever you have access to an electrical outlet; that way you'll preserve the battery's charge.

You can connect or disconnect the AC adapter while you are using the computer without interrupting any operation. For example, if you are not using the adapter and the **Power/Speed** light starts flashing (see below), you can connect the AC adapter without first turning off the computer. (You should do this immediately if the **Power/Speed** light starts to flash, to avoid losing data.)

Because the adapter can operate at voltages from 100 to 240 volts, you can use your Equity LT-286 in countries other than the United States, provided you have the appropriate adapter plug.

Use the AC adapter to recharge the battery as described in the next section.

Using the Battery

The battery pack inside the Equity LT-286 contains eight NiCad (nickel cadmium) batteries that power the computer when the AC adapter is not connected. The battery pack is rechargeable, and you should never have to replace it.

You need to recharge the battery pack at the following times:

- Before using the computer for the first time
- If the battery has not been used for a long time
- If the **Power/Speed** indicator light starts flashing (see “LED Indicators,” below).

After the **Power/Speed** light starts to flash, you have a maximum of 10 minutes before the battery charge is completely gone. If you continue using the computer without connecting the adapter, power runs out and you may lose data.

To recharge the battery, connect the AC adapter to the computer and to an electrical outlet. You can charge the battery whether the computer is on or off. For the maximum charge, leave the AC adapter connected for 12 hours. The battery pack cannot be overcharged, so don't worry if you leave it connected for more than 12 hours.

Remember the following when you are charging the battery:

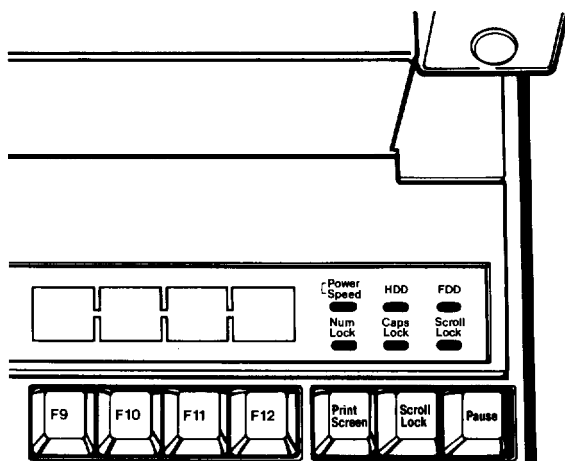
- Use only the AC adapter that comes with the Equity LT-286. Using a different one can damage the computer.
- It is best to charge the battery for at least eight hours. If you charge the battery for only short periods, it can run low sooner.

The length of time the battery can provide power after being charged depends on how you are using the computer. A fully charged battery provides approximately one hour and fifteen minutes of use for simple operations. If you are working with a program that makes extensive use of the hard disk or if you are using an external diskette drive, you may need to recharge the battery sooner.

To maximize the charge time your battery supplies, you should completely discharge and then recharge the battery from time to time. To do this, let the battery drain all the way down. When the **Power/Speed** LED starts to flash, save your work in progress (if any) and exit any program you are using. Leave the computer on, but do not use it. After about ten minutes, all LEDs should go dark, indicating the battery has been discharged. Then give the battery a full 12-hour charge.

LED Indicators

Above the keyboard on the right side are six LED (light-emitting diode) indicators that provide information about the computer's operation.



The **Power/Speed** LED is on whenever the computer is on. The color of this LED indicates the computer's current execution speed. If the microprocessor is running at 12 MHz, the light is green; if it is running at 8 MHz, the light is orange.

The **Power/Speed** LED serves another important function: it indicates when the battery charge is low. If this light is flashing, you should attach the AC adapter as soon as possible to avoid losing data or save your data files and turn off the computer if AC power is unavailable. (See "Using the Battery," above.)

The HDD (Hard Disk Drive) LED is on when your computer is reading data from or writing data to your hard disk.

The FDD (Floppy Disk Drive) LED is on when your computer is reading data from or writing data to your diskette drive.

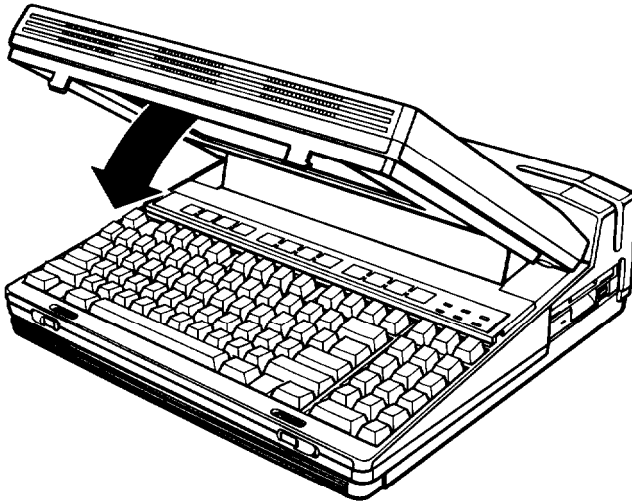
WARNING

Do not turn off your computer when either the HDD LED or the FDD LED is illuminated. Also, do not turn off the HDD switch when the HDD LED is illuminated or remove a diskette when the FDD LED is illuminated. If you do, you may lose data.

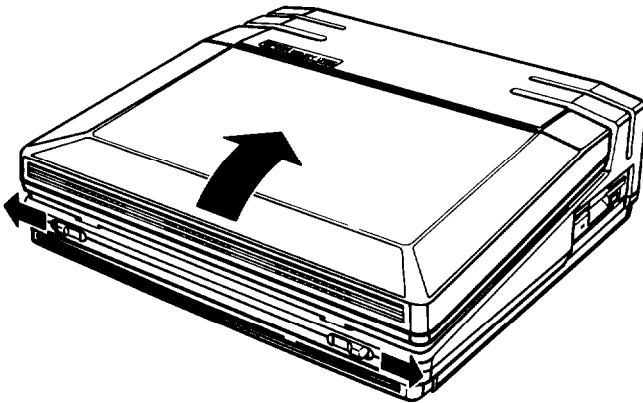
The Num Lock, Caps Lock, and Scroll Lock LEDs indicate whether the corresponding key functions are enabled. See “Special Keys on the Equity LT-286 Keyboard,” below.

Opening and Closing the Screen

When you are not using the computer or you want to move it, turn it off and close the screen, as shown below. Be sure the screen locks into the bottom part of the computer.



When you want to open the screen, slide the latch release buttons on both sides (shown below) away from the center. Then lift the screen back. You can position the screen at a variety of viewing angles.



Note

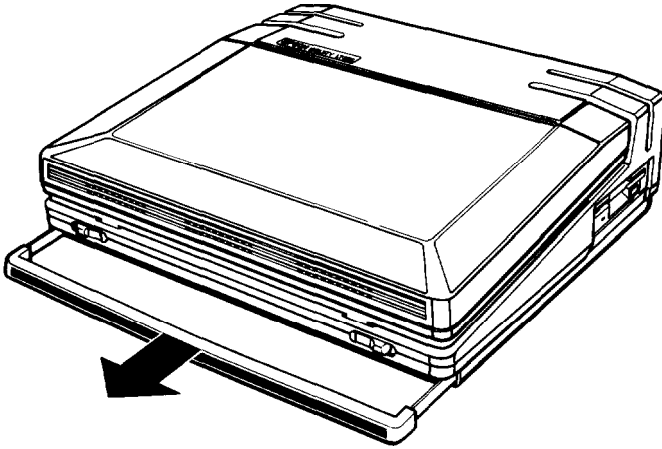
To prevent damage to the system, you cannot open the Equity LT-286 while it is standing upright on its back panel. Set the computer in a horizontal position before opening it.

If you close the screen while the computer is running, the screen's backlighting is automatically turned off to conserve battery charge. When you reopen the screen, the backlighting comes back on automatically, unless the backlight period has elapsed. If the screen is dark when you reopen it, press any key.

You may close and reopen the screen while a program is running without affecting the program in any way.

Using the Handle

The Equity LT-286 has a convenient carrying handle. To use the handle, pull it out from the bottom of the computer, as shown below.



Be sure the screen is closed whenever you carry the computer by its handle.

WARNING

To avoid accidental damage to your Equity LT-286, always store the computer in a horizontal position. Do not leave it standing upright on its back panel.

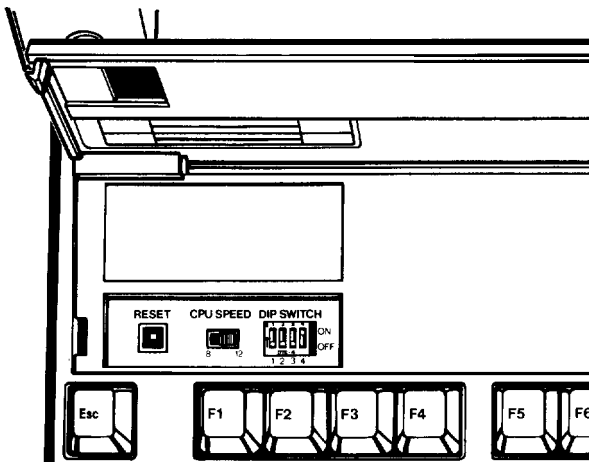
Selecting Execution Speed

The Equity LT-286 can operate at two execution speeds: 8 MHz and 12 MHz. At the higher speed, the computer performs all tasks more quickly. You can select the slower speed to run application programs that have specific timing requirements.

WARNING

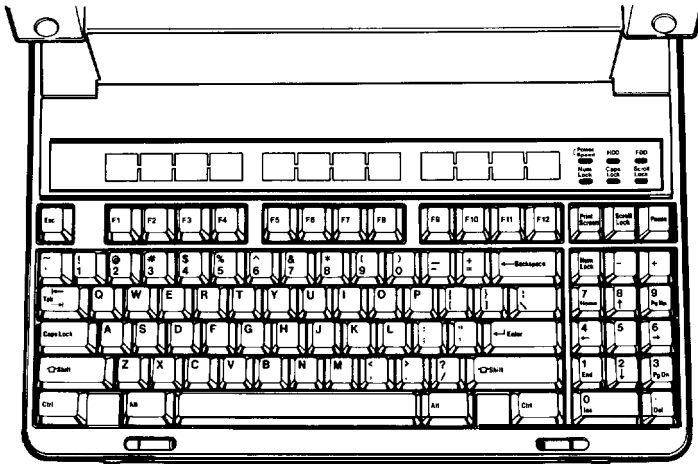
Do not change the execution speed while you are running a program. Always complete your current operation and exit the program first. However, it is not necessary to turn the computer off before changing execution speed.

To change the speed, move the CPU SPEED switch located above the keyboard.



Special Keys on the Equity LT-286 Keyboard

The illustration below shows the Equity LT-286 keyboard.



Certain keys on your keyboard serve special functions when your computer is running application programs. For instructions on how to use keys for specific software functions, consult the manual that came with the program you're running.

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

Table 4-1 describes special keys on the Equity LT-286 keyboard.

Table 4-1. Special keys

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 lowercase to uppercase; changes back to lowercase when pressed again. The numeric/symbol keys on the top row of the keyboard are not affected.
Shift	Changes the letter keys from lowercase to uppercase while held down and changes other keys from their normal characters or functions to their alternate characters or functions. When the Caps Lock LED is illuminated, changes letter keys from uppercase to lowercase.
Ctrl	Works with other keys to perform special functions, such as editing operations in MS-DOS and GW-BASIC.
Alt	Works with other keys to enter alternate character codes.
← Backspace	Moves the cursor back one space, deleting the character to the left.
↵ Enter	Ends a line of keyboard input or executes a command.
Ins	Turns the insert function on and off.
Del	Deletes the character at the cursor.
Home, End, PgUp, PgDn ↑ → ↓ ←	Control cursor location within application programs.
Num Lock	Changes the function of the cursor keys. For example, when the Num Lock function is on and you press ↓, you get the number 2.
Esc	In some application programs, cancels the current command line or operation.
F1 - F12	Perform special functions within application programs.
Print Screen	Prints text on the screen to the printer.

Key	Purpose
SYS Rq	Generates the system request function (not used in MS-DOS).
Scroll Lock	In some application programs, controls scrolling.
Pause	In some application programs, suspends the current operation.
Break	In some application programs, terminates the current operation.

Using the Function Key Template

The twelve keys marked F1 through F12 at the top of your keyboard are used in different ways in different application programs. Your Equity LT-286 comes with two function key templates. Use a pencil to label the template with the functions of each key. You can use both sides of the function key templates and erase your labels later if you need to. To insert a template, lift the flap above the function keys and then slide the template into the template window as shown below:



Using Diskettes

Diskette drives allow you to store data on diskettes and retrieve and use stored data. The Equity LT-286 has a 1.44MB 3 1/2-inch diskette drive; it also supports an optional external 5 1/4-inch diskette drive. This section explains how diskettes work and tells you how to do the following:

- Choose diskettes
- Care for diskettes
- Make backup copies
- Write-protect diskettes.

How Diskettes Work

The diskettes you use are made of plastic coated with a magnetic material and enclosed in a protective plastic case. Information is recorded in magnetic patterns on both surfaces of the diskette. Because data is stored magnetically, you can retrieve, record over, and erase data, just as you play, record, and erase music on cassette tapes.

When you insert a diskette in a drive, a metal shutter above the access area moves aside, exposing the diskette surface. When your computer reads data from or writes data to the diskette, it causes the diskette to spin within its plastic casing. Then a small read/write head positioned above and below the two diskette surface locates the appropriate position on the diskette and carries out the desired operation.

Choosing Diskettes for the Equity LT-286

Be sure to buy high-quality diskettes to use in your Equity LT-286. You can use two kinds of diskettes:

- 3 1/2-inch 720KB, soft-sectored, double-sided, double-density, 135 TPI diskettes
- 3 1/2-inch 1.44MB, soft-sectored, double-sided, high-density, 135 TPI diskettes.

720KB diskettes can store the equivalent of about 300 pages of text. 1.44MB diskettes can store twice as much information as 720KB diskettes, but the 3 1/2-inch diskette drives on some computers are not able to use these high-capacity diskettes. If you are planning to exchange data with a computer that has a 720KB diskette drive, you should use 720KB diskettes in your Equity LT-286.

If you have an external 5 1/4-inch 360KB diskette drive, use 5 1/4-inch, double-sided, double-density, soft-sectored, 48 TPI diskettes in this drive. These diskettes can hold about 150 pages of text. They are compatible with those used on the IBM PC, XT, and AT, so you can use diskettes prepared by one computer on the other.

If you have an external 5 1/4-inch 1.2MB (high-capacity) diskette drive, use 5 1/4-inch, double-sided, high-density, soft-sectored, 96 TPI diskettes in this drive. These diskettes can hold the equivalent of about 500 pages of text and are compatible with the high-capacity diskette drives used on some models of the IBM AT.

Because of their size difference, you cannot use a 3 1/2-inch diskette in a 5 1/4-inch drive or vice versa. If you have both types of drives, however, you can copy individual files or groups of files from one drive to the other with the COPY and XCOPY commands. See Chapter 5 or your MS-DOS manual for information about the COPY and XCOPY commands.

You need to format new diskettes before you can use them. Formatting prepares a diskette to receive data. Formatting also erases any data previously stored on a diskette, so be sure to format only new blank diskettes or diskettes that contain data you want to erase. See Chapter 5 for information about formatting diskettes.

Note

Double-sided, double-density 3 1/2-inch diskettes must be formatted to store 720KB of data. Double-sided, high-density 3 1/2-inch diskettes must be formatted to store 1.44MB of data.

Caring for Diskettes

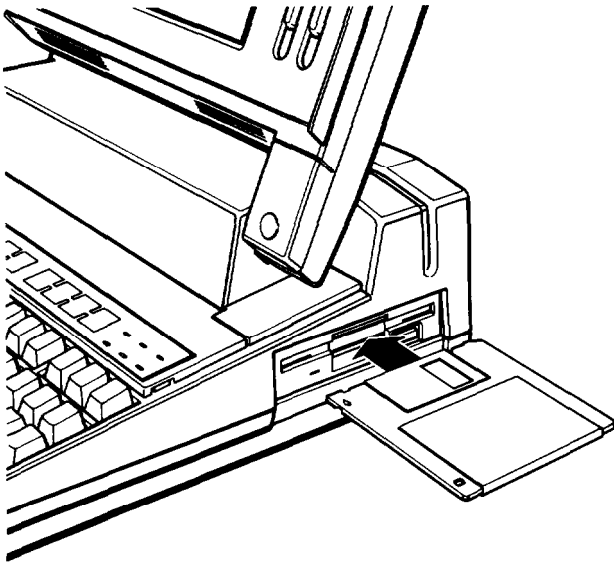
3 1/2-inch diskettes are sturdy and reliable but not indestructible. To avoid damaging your diskettes and losing data, take these precautions:

- Do not remove a diskette or turn off the computer while the diskette drive LED is on. This light indicates that the computer is copying data to or from a diskette. If you interrupt this process, you may 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.
- Keep diskettes away from magnetic fields. (Remember, diskettes store data magnetically; strong magnetic fields can scramble that data.) Don't set your diskettes on such common magnetic sources as electrical appliances, telephones, television sets, and loudspeakers.
- Keep diskettes in a moderate environment. They work best at room temperature and in normal humidity. Never leave diskettes sitting in the sun or in extreme cold or heat. The temperature in a car in the middle of summer or winter can cause severe damage.
- Do not expose a diskette's magnetic surface by sliding the metal shutter. Never touch a diskette's magnetic surface. The oil on your fingertips can damage it.
- Do not place anything on top of your diskettes, and make sure they do not get bent.
- Never wipe, brush, or try to clean diskettes in any way.
- Store diskettes properly in diskette containers.

If you use an external 5 1/4-inch diskette drive, be especially careful with your 5 1/4-inch diskettes. Because they are more flexible, and because they do not have a metal shutter protecting their magnetic surfaces, they are more easily damaged than 3 1/2-inch diskettes. Always keep 5 1/4-inch diskettes in their protective envelopes when you are not using them.

Inserting and Removing Diskettes

To insert a diskette into the drive, hold it with the label facing up and the arrow on the left side pointing into the computer:



Slide the diskette into the drive until you feel it click into place.

To remove a diskette, press the release button on the diskette drive. When the diskette pops out of the drive, pull it out and store it properly in a diskette container.

WARNING

Never remove a diskette or turn off the computer while the drive indicator light is on. This might cause loss of data. Also, be sure to remove all diskettes before you turn off the computer,

Making Backup Copies

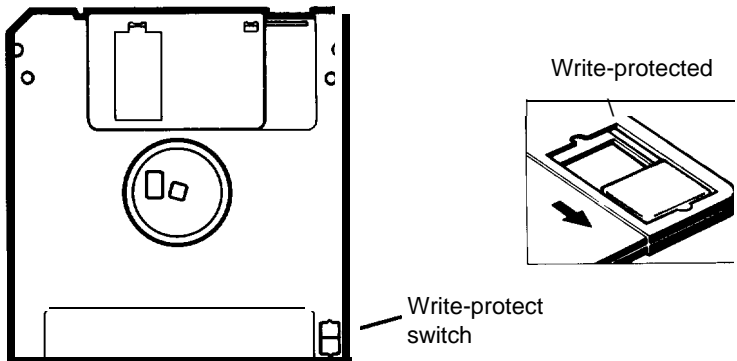
Copy all diskettes that contain programs, as you did the master system diskettes that come with the Equity LT-286. After you make your copies, store the originals in a safe place away from your working diskettes and use only the copies.

Chapter 1 describes how to make backup copies of your system diskettes. For general instructions on copying diskettes or hard disk files, see Chapter 5 or your MS-DOS manual.

Write-Protecting Diskettes

You can write-protect a diskette to prevent its data from being altered. When a diskette is write-protected, you can copy data from it, but you cannot store new data, modify existing data, erase files, or format the diskette.

The write-protect mechanism is a small switch on the lower-right corner on the back of the diskette. To write-protect the diskette, slide the switch down toward the edge of the diskette so there is a hole where the switch used to be.



To remove the write protection, move the switch up toward the center of the diskette so the hole is covered.

Using the Hard Disk Drive

Unlike a diskette, a hard disk is rigid and fixed in place. It is sealed in a protective environment free of dust and dirt, so you cannot see it. A hard disk stores data the same way as a diskette, but it works much faster and has a much larger storage capacity.

You can do almost all your work on the hard disk and copy your files to diskettes whenever you need to make backups or transfer data to another computer system. However, to ensure that you always have plenty of space available, keep only files you use regularly on the hard disk. Store your other files on diskettes.

Note

You must prepare a new hard disk before using it for the first time. Make sure you have completed all the procedures in Chapter 3 to prepare it.

Caring for the Hard Disk

To avoid damaging your hard disk, take these precautions:

- Keep your computer away from magnetic fields, such as electrical appliances, telephones, and loudspeakers.
- Keep your computer in a moderate environment. Hard disks work best at room temperature and in normal humidity.
- Never turn off the computer's power or the **HDD POWER** switch when the **HDD LED** is on. This light indicates that the computer is currently copying data to or from the hard disk. If you interrupt this process, you may lose data.
- Never attempt to open the hard disk unit. The disk itself is enclosed in an airtight container to protect it from dust.

Protecting the Data on Your Hard Disk

Although the hard disk is very reliable, it is essential to back up your hard disk files onto diskettes in case you lose some data accidentally.

Make backup copies of all your system and application program diskettes before copying the program files to the hard disk. Copy your data files frequently to keep your backup diskettes up to date.

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

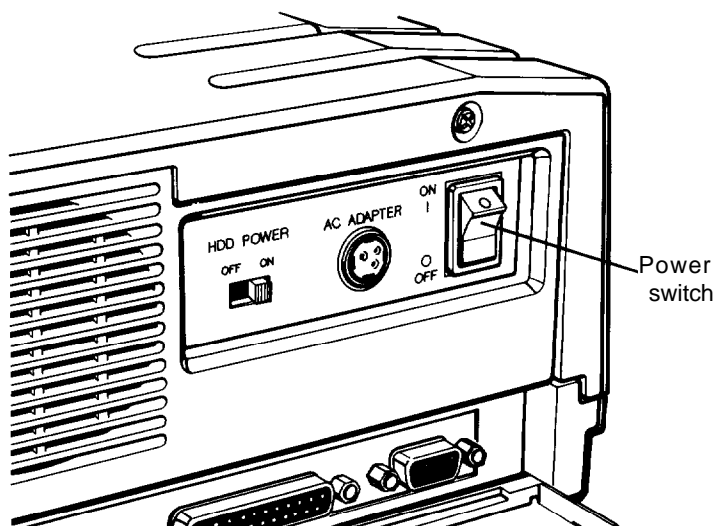
Improving Hard Disk Performance

Your Reference diskette includes two utilities, called HDCACHE and FASTOPEN, that can improve your hard disk's performance. For information about using these programs, see your MS-DOS manual.

Turning Off the Hard Disk

Your computer's hard disk has its own power switch. To avoid drive access problems, it is best to leave this switch on at all times. However, if you are running the computer without the AC adapter, you may want to turn the hard disk off when you are not using it to conserve battery charge. The hard disk drive consumes more of the battery's charge than a diskette drive. (Note that even if the hard disk power switch is on, the hard disk isn't on unless the computer is on.)

The hard disk switch is labeled **HDD POWER** and is located on the back of the computer, next to the AC adapter socket:



You can turn off the hard disk either before you turn on the computer or after:

- If you do not plan to use the hard disk at all, turn it off before you turn on the computer.
- If you need to load MS-DOS or an application program or to access files on the hard disk, leave the hard disk switch on when you turn on the computer, then turn it off later as described below.

Turning Off the Hard Disk Before Starting the Computer

If you are not going to use the hard disk at all, turn off the switch before turning on the computer. Insert a working copy of your Startup/Operating 1 diskette in drive A so that MS-DOS is loaded from that drive. When you turn on the computer, the screen displays this error message:

```
1780 - Disk 0 failure
```

```
(Resume = "F1" key)
```

Do not be concerned by this message; just press F1 to continue. Then use the computer as if it had no hard disk drive. That is, you perform all operations on the diskette in the diskette drive.

When you start the computer with the hard disk drive turned off, you cannot access the hard disk even if you subsequently turn it on. MS-DOS displays an error message if you issue any command involving drive C. To make your hard disk accessible again, save your data, exit the program you are running, then turn the computer off. Wait at least five seconds, then turn the hard disk switch on. Remove any diskette from drive A and turn the computer back on.

Turning Off the Hard Disk After Starting the Computer

If you want to use the hard disk at any time during your working session, start the computer with the hard disk switch turned on. After you have loaded your application program into memory, you may then be able to turn the hard disk drive off (if you do not need to use it). When you want to save your work to a file on the hard disk, you can then turn the hard disk switch back on again.

Note

Some application programs may not work with the hard disk drive turned off unless they are started from a diskette instead of from the hard disk. If you need to run a program of this kind and you need to turn the hard disk off to conserve battery power, use the diskette that came with the program and run it from drive A.

The following example shows the proper procedure for turning the hard disk off while the computer is on. The example assumes that you have started the computer with the hard disk on and have loaded MS-DOS from the hard disk.

1. At the MS-DOS C> prompt, type **A:** and press **Enter** to log onto drive A.
2. If you want to load an application program from the hard disk, do it now. Be sure to type **C :** in front of the name of the program. You must do this before you turn off the hard disk. You may also want to copy any files you will be using from drive C to drive A.
3. After you log onto drive A and copy any necessary files, you can turn off the hard disk.

Note

If you are still logged onto drive C when you turn off the hard disk, the next time you enter a command, the screen will display an error message. If this happens, turn the hard disk back on, then log onto drive A.

4. Continue running your application program, using drive A.
5. When you want to save your data on the hard disk, turn it on. Wait about ten seconds to allow the disk to reach operational speed, then enter the command for saving your data to drive C.

Resetting the Computer

You can reset the computer to reload the operating system or to restart a program. You may need to reset the computer if an error occurs and the computer does not respond to anything you type. However, resetting erases all data in the computer's temporary memory (RAM) that you have not stored, so reset the computer only as a last resort.

With some programs, you can recover from an error condition by holding down the Ctrl key and pressing C or holding down the Ctrl key and pressing **Break**. Because these two methods may not erase all data in RAM, you should try them before resetting the computer as described below.

WARNING

Do not reset the computer to exit a program unless you have to. Some application programs classify and store new data whenever you exit the program properly. If you reset the computer while such a program is running, you may lose data.

There are three ways to reset the computer. 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** while you press the **Del** key. The screen goes blank for a moment, and then MS-DOS is reloaded. (Be sure to remove any diskette from drive A when you do this, so that MS-DOS can be reloaded from the hard disk.) If this does not correct the problem, try the second method.
2. Press the **RESET** button, above the left side of the keyboard. 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 and turn off all peripherals. Then turn off the computer. Wait five seconds, then switch the power back on.

Turning Off the Computer

Before turning off your computer, save your data, exit the program you are using, and remove all diskettes from the diskette drives. Turn off your monitor and peripherals first, then turn off the computer. You do not have to turn off the hard disk.

Chapter 5

Using MS-DOS With Your Equity LT-286

Your Equity LT-286 comes with version 3.3 of MS-DOS. MS-DOS manages the routine work of your computer system, such as keeping the computer's memory organized, controlling the screen 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 use it only for running application programs, the few MS-DOS commands you need are introduced in this chapter. If you use advanced features or create your own programs, see your MS-DOS manual for a complete description of MS-DOS.

This chapter describes the following MS-DOS functions:

- Starting MS-DOS
- Exiting MS-DOS
- Changing the current drive
- The MS-DOS command format
- Entering MS-DOS commands
- Storing data
- Using directories
- Formatting diskettes
- Copying data
- Deleting data
- Using the Epson HELP utility
- Using the Epson MENU utility
- Using the XTREE utility

- Using an AUTOEXEC.BAT file
- Starting an application program
- Using the LIGHTON utility.

Starting MS-DOS

Before you can run an MS-DOS application program, MS-DOS must be running in memory. If you have prepared your hard disk according to the procedures described in Chapter 3, MS-DOS is loaded automatically from your hard disk whenever you turn on your computer (provided you do not have a diskette in the diskette drive).

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, **C>**.

Exiting MS-DOS

Before you turn off the computer, make sure the MS-DOS command prompt (either **C>** or **A>**) appears on the screen. Then remove your diskettes, turn off any peripherals, and then turn off the computer.

Changing the Current Drive

MS-DOS identifies your hard disk as drive C. Your 3 1/2-inch diskette drive is identified as drive A. If you have an external 5 1/4-inch diskette drive, that drive is recognized as drive B.

Note

If you wish, you may reverse the drive identifiers for the internal 3 1/2-inch and the external 5 1/4-inch diskette drives by setting DIP switch 2 on the back panel in the on position. See “Setting the DIP Switches,” in Chapter 1.

The `c>` prompt that appears when you load MS-DOS from the hard disk tells you that drive C, your hard disk, is the current drive. The current drive, also called the default drive, is the drive that MS-DOS uses for all commands unless you specify a different drive. For example, if the current drive is drive C and you type the name of a program, MS-DOS searches drive C for the program whose name you typed.

If you want to run a program or find a data file on a different drive, you must specify the name of that drive. You can do this either by logging onto that drive (making it the current drive) or by including the drive letter with the filename.

To log onto another drive, type the name of the drive followed by a colon. Then press **Enter**. For example, if the current drive is C and you want to log onto drive A, type **A:** and press **Enter**. Your screen now displays the **A>** prompt, showing that you are operating from drive A. Drive A continues to be the current drive until you log onto a different drive or turn off or reset your computer.

To access a program or file on another drive without first logging onto that drive, specify the drive identifier (the name of the drive followed by a colon) along with the filename. For example, if you are logged onto drive C and you want to run a program called WP that is stored on drive A, type **A :WP** and press **Enter**. MS-DOS runs the program on drive A but remains logged onto drive C.

The MS-DOS Command Format

To enter an MS-DOS command, you need to type the command in the correct format.

The MS-DOS command format consists of the command name, parameters, and delimiters. The command name tells MS-DOS the task you want to perform. Parameters are items that identify the data to be processed (such as a filename) and change the way a command works. Delimiters are characters such as spaces or commas that separate command names and parameters.

Some commands also have optional switches you can use. A switch is a type of parameter that alters the effect of a command.

Pathnames may be required in a command if you are specifying files that are not on the current drive or directory. A pathname tells MS-DOS where to find a file, and consists of one or more directory names separated by backslashes. See “Using Pathnames,” later in this chapter.

There are two kinds of MS-DOS commands: internal and 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 on a system diskette or on your hard disk. If the file is not stored in the current drive and directory, you may need to use a pathname when you enter an external command.

See your MS-DOS manual for more information on the command format and for detailed descriptions of each command.

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 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 one of two things:

- Use the backspace key to back up and correct the error
- 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**.

Storing Data

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

The kind of file you create depends on the MS-DOS commands or application program you use to create it. Because each program you use may create data files in its own particular format, you are likely to encounter problems if you try to read a file with a program other than the one that created the file.

Each file must have a unique filename so that MS-DOS can find it when you need to retrieve it. The filename consists of two parts, the name and the extension.

The name can be up to eight characters in length. You can use any characters except for blank spaces and the following symbols:

“ \ / [] : | < > + = ; . ?

It is a good idea to choose a name that describes the contents of the file.

The extension is optional and can be up to three characters long. You can use the extension to describe the type of data contained in the file—for example, TXT for a text file. When you use an extension, separate it from the filename with a period, like this:

DATA.TXT

Many application programs automatically add extensions to the data files you create, so you don't have to specify the extension when you name a file. Lotus 1-2-3® Release 2, for example, automatically uses the extension .WK1 for worksheet files. Microsoft Word® uses .DOC for its word processing files. Such default extensions help an application program distinguish its own data files from files created by other programs. If you have programs that use default extensions, you should avoid using those particular extensions in other contexts.

You can type the name and the extension in either lowercase or uppercase letters, but do not use uppercase or lowercase letters to distinguish between files. After you type the filename, MS-DOS converts all lowercase letters to capitals.

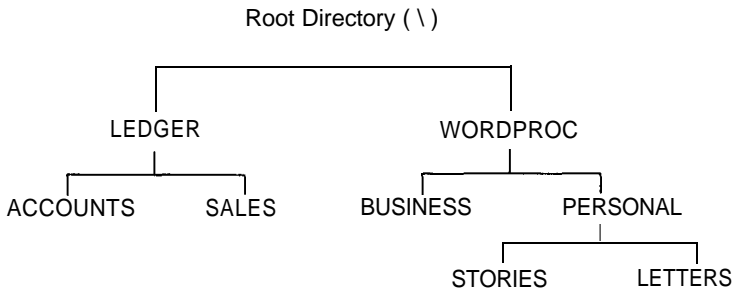
Using Directories

MS-DOS organizes files by storing them in directories. This makes it easy for you to find and manage your files. Directories also list specific information about each file, including the filename, the size of the file, and the date and time you last modified the file.

When you formatted your hard disk, MS-DOS created a single directory for the disk. This directory is called the root directory. Because the hard disk has room for hundreds of files, MS-DOS allows you to create additional directories, called *subdirectories*. Subdirectories allow you to organize your hard disk so that files of similar type or purpose are kept together. Without subdirectories, it would be difficult to keep track of all the files on your hard disk.

You can create subdirectories on your diskettes as well as on your hard disk. But you may not need to create them on diskettes, because diskettes hold fewer files.

The subdirectory structure of a hard disk can be represented with a tree-like diagram, like this:



In this example, the original directory (the root directory) has two subdirectories, named LEDGER and WORDPROC. Each of these subdirectories has subdirectories of its own. LEDGER has two, named ACCOUNTS and SALES; WORDPROC also has two, named BUSINESS and PERSONAL. Finally, the PERSONAL subdirectory of WORDPROC also has two subdirectories, named STORIES and LETTERS.

On your own hard disk, you can create a subdirectory structure that is more complex than this one. Or you may prefer to keep things simpler. Organize your disk to suit your own needs; you can modify the structure as your needs change.

In creating subdirectories, note the following points:

- Any directory can have any number of subdirectories (except the root directory, which can have a total of no more than 512 files and subdirectories).
- Subdirectories are named in the same way that files are. The name can include as many as eight characters (letters or numbers), and you can add an optional extension consisting of up to three characters.
- The root directory does not have a name; it is identified by a backslash (\).

The Current Directory

MS-DOS always recognizes one directory as the current, or default, directory, just as it always recognizes one drive as being the current, or default, drive. The current directory is the directory 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 current directory, you can either change directories (making a different directory current) or include a pathname in your command.

Six basic directory operations are described on the following pages:

- Listing the contents of a directory
- Using pathnames
- Creating directories
- Changing directories
- Copying from one directory to another
- Deleting a directory.

You may also want to read about XTREE, a utility provided by Epson that makes it easier to perform these functions, as well as others. You can use XTREE to generate a visual diagram of your subdirectory structure, to move quickly between directories, to add and remove directories, and so on. XTREE is described later in this chapter.

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 you are logged onto drive C but want to see a directory of the files on the diskette in drive A, type **DIR A:** and press **Enter**.

A directory listing looks like this:

```
Volume in drive A has no label
Directory of A:\
```

```
HELP      TXT   72103   5-24-88   9:42a
SETFC     EXE  18848   3-03-88   1:26p
SETMODE   EXE  23536   1-28-88   4:09p
MENU      EXE  16176   1-17-88   10:25a
SETXCOPY  EXE  19952   1-16-88   6:15p
SETATTR   EXE  14400   12-17-87  5:13p
SETRPLCE  EXE  14448   12-17-87  5:12p
SETRSTOR  EXE  22336   12-17-87  5:12p
SETBKUP   EXE  21024   12-17-87  5:11p
DU        EXE  23600   12-17-87  5:10p
HELP      COM   3654    12-09-87  1:14p
COMMAND   COM  25276   12-03-87  6:45p
GRAPH24   COM  10807   9-24-87   10:21a
GWBASIC   EXE  86192   12-04-86  7:55p
SETPRINT  EXE  5168    8-08-86   9:05a
EPSON     TXT   366     10-04-85  12:00p
   16 File(s)  289792 bytes free
```

To list the files in a different directory on the current drive, type the pathname of that directory. For example, to list the contents of the LEDGER subdirectory while logged onto drive C, type `DIR \LEDGER` and press `Enter`. (Pathnames are described below.)

Using Pathnames

Whenever you want to access a file that is not in the current directory, you must specify the file's pathname. A full pathname consists of one or more directory names separated by backslashes and followed by the filename. The pathname tells MS-DOS where your file is stored.

For instance, in the example shown on the previous page, if you had a file named APRIL.TXT stored in the subdirectory named LETTERS, the full pathname of that file would be:

```
\WORDPROC\PERSONAL\LETTERS\APRIL.TXT
```

The pathname tells MS-DOS where to look for a directory or file. In this case, the pathname tells MS-DOS to start at the root directory and go through two subdirectories (WORDPROC and PERSONAL) to find the LETTERS subdirectory. Once in the LETTERS subdirectory, MS-DOS finds the file called APRIL.TXT.

The backslash that starts this pathname tells MS-DOS to begin at the root directory. If you omit the backslash at the beginning of the pathname, MS-DOS begins, not at the root directory but at the current directory. Thus, for example, if the current directory is PERSONAL and you want MS-DOS to find the file APRIL.TXT, which is stored in the subdirectory LETTERS, you can specify the pathname like this:

```
LETTERS\APRIL.TXT
```

Because this pathname does not begin with a backslash, MS-DOS starts in the current directory (PERSONAL), moves to the subdirectory LETTERS, then finds the file APRIL.TXT. If you did begin with the backslash, MS-DOS would not find the file, because it is a subdirectory of PERSONAL, not of the root directory.

Note

MS-DOS offers some commands that reduce the need to specify pathnames. 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 that you don't have to type a full pathname every time you want to call up an application program or an MS-DOS command. The SUBST command lets you substitute a drive letter for a directory path; this can be helpful when you use a long path. The most convenient way to use these commands is in an AUTOEXEC.BAT file. See your MS-DOS manual for more information on these commands.

Creating Directories

The MKDIR command lets you create directories. To create the directory LEDGER under your root directory, for example, you would 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, you could type the following and press Enter:

```
MD \LEDGER\SALES
```

To check that the LEDGER directory is a subdirectory of the root directory, type DIR \ and press Enter.

The screen displays a list of files in the root directory, along with the names of any subdirectories of the root directory:

```
LEDGER          <DIR>          9-14-88  10:17a
WORDPROC        <DIR>          9-14-88  10:32a
COMMAND  COM      25307  3-17-87  12:00a
CONFIG  SYS       209    9-14-88  10:48a
AUTOEXEC BAT     309    9-14-88  12:11p
          3 File(s) 18625536 bytes free
```

The subdirectories are identified by the letters <DIR>. Thus, when you type DIR \ after creating the subdirectory LEDGER, you should find the entry LEDGER <DIR>, as well as the names of all the root directory files.

Changing Directories

To make a different directory the current directory, type CHDIR (or CD) followed by the pathname of the directory that you want to be current. This is called changing directories. For example, to change from any directory to the directory LEDGER (which is a subdirectory of the root directory), type the following and press Enter:

```
CD \LEDGER
```

The backslash identifies the LEDGER directory as a subdirectory of the root directory. Once you are in a directory, you can access any of the files it contains without typing the full pathname.

To change to a subdirectory of the current directory, you do not need to type the backslash. For example, if SALES is a subdirectory of LEDGER, then to change to the SALES directory while you are in LEDGER, you can type the following and press **Enter**:

```
CD SALES
```

To change from any directory to its parent directory (the directory of which it is a subdirectory), type the following and press **Enter**:

```
CD . .
```

The two periods are a special symbol that represents the parent directory.

To return to the root directory from any subdirectory, type the following and press **Enter**:

```
CD \
```

Copying From One Directory to Another

The COPY command lets you copy files from one directory to another. To use this command, you must specify the name of the file you want to copy, as well as the directory to which you want to copy the file.

For example, if you are in the LETTERS directory (see the diagram on page 5-6) and want to copy the file APRIL.TXT to the BUSINESS directory, type the following and press **Enter**:

```
copy APRIL.TXT \WORDPROC\BUSINESS
```

The command has three parts: the word COPY, the name of the file you want to copy (APRIL.TXT), and the name of the directory to which you want to copy this file (\ WORDPROC\BUSINESS). You must include spaces or commas between each of the three parts. The space characters or commas are the delimiters in this command.

Note

You can also copy files using XTREE, MENU, or the MS-DOS XCOPY command. See the sections later in this chapter on using XTREE and MENU, and see your MS-DOS manual for information about using XCOPY.

Deleting a Directory

If you no longer need a directory, you can remove it with the RMDIR command (which can be abbreviated RD). Before removing a directory, however, you must either delete any files it contains or move them to a different directory. You cannot delete a directory that is not empty. (To delete files from a directory, use the DEL or ERASE command. See “Deleting Data,” below.)

To delete an empty directory, such as the ACCOUNTS directory under LEDGER, type the following and press Enter:

```
RD    \LEDGER\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 store data on it. You need to do this only once, before you use the diskette for the first time.

You can also reformat previously used diskettes. Be aware, however, that reformatting erases all data on the diskette. Always be sure you no longer need any files on a diskette before reformatting it.

You can format two kinds of 3 1/2-inch diskettes. Double-sided, double-density diskettes can be formatted to hold 720KB of data. Double-sided, high-density diskettes can be formatted to hold 1.44MB. You may ordinarily prefer to use high-density diskettes, since they hold more information. But if you need to transfer files to another computer that cannot read 1.44MB diskettes, you can purchase double-density diskettes and use the 720KB format.

Note

Be sure to purchase the appropriate type of 3 1/2-inch diskettes for the format you want to use. Double-density diskettes may be formatted only for 720KB; high-density diskettes may be formatted only for 1.44MB.

Formatting a 1.44MB Diskette

To format a 1.44MB diskette:

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. For example, if FORMAT.COM is stored in a subdirectory named DOS, type `C> \DOS` and press **Enter**.
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 into drive A and press **Enter**.
4. When the diskette is formatted, you see this message:

```
Format complete  
1447664 bytes total disk space  
1447664 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 a 720-KB Diskette

To format a 720KB diskette:

1. If necessary, log onto drive C. If you are not in the directory where the file `FORMAT.COM` is stored, use the `CD` command to change to that directory.
2. When you see the `c>` prompt, type the following and press `Enter`:

```
FORMAT A: /N:9 /T:80
```

You see this prompt:

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

3. Insert the diskette you want to format into drive A and press `Enter`.
4. When the diskette is formatted, you see this message:

```
Format complete  
730112 bytes total disk space  
730112 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`.

Note

An easy way to perform the functions described above is through the `MENU` utility. See the section on `MENU` later in this chapter.

Copying Data

It is 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 DISKCOPY command to make an exact duplicate of a diskette
- You can use the COPY command to copy individual files
- You can use the BACKUP command to back up the files on a hard disk or diskette in a special format.

The COPY command is easier to use when you have only a few files to back up. The BACKUP command has some advantages when you want to back up many files at once.

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. You can also use the MS-DOS XCOPY command to copy whole subdirectories of files; see your MS-DOS manual for details.

Using the DISKCOPY Command

The DISKCOPY command lets you copy an exact image of one diskette onto another diskette. The two diskettes must be of the same size and type; that is, you cannot use DISKCOPY to copy data from a 3 1/2-inch diskette onto a 5 1/2-inch diskette or to copy data from a 1.44MB diskette to a 720KB diskette. You also cannot use DISKCOPY to copy data between a hard disk and a diskette.

To use DISKCOPY, follow these steps:

1. Make sure your original diskette (the one you are copying from) is write-protected. (See Chapter 4 for instructions.)

2. Log onto drive C (your hard disk) if you are not there already. If necessary, use the CD command to change to the directory containing the file DISKCOPY.COM.

3. At the `c>` 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. Insert the diskette you want to copy from (your source diskette) 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 (your target diskette) 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 files from memory to the target diskette, it prompts you to reinsert the source diskette so it can copy the remaining data to the computer's memory. Insert the source diskette in drive A and press any key.

7. Once DISKCOPY has copied the rest of the source diskette's files to the computer's memory, the screen prompts you to reinsert the target diskette so that the remaining data can be copied from memory to the target diskette. Insert the target 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 the COPY Command

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 another diskette or hard disk
- You can copy a group of files using wildcard characters (wildcard characters are explained below)
- You can copy one or more files and give them new names
- You can combine or merge files into one file.

A few simple rules apply to all uses of COPY:

- You must tell MS-DOS where to find the source file and where to store the target file.
- If an existing file on the target diskette or directory has the same name as the file you are copying, the copy automatically replaces the existing file. There is no warning that the existing file is being replaced, so be careful that you do not accidentally erase a file that you want to keep.
- If you are copying to a diskette, the diskette must be 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 a file named REPORT from the diskette in drive A to the hard disk (drive C), using the same name for the copy as for the original file, type the following and press **Enter**:

```
COPY A:REPORT C:
```

If you want to copy this file from the diskette in drive A to the hard disk, but want to change the name of the copy from REPORT to FACTS, type this command and press **Enter**:

```
COPY A:REPORT C:FACTS
```

To make a copy of this file on the diskette in drive A and assign the name FACTS to the copy, type the following and press **Enter**:

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

Note that in this case you must assign a new name to the **copy**, since MS-DOS does not allow two files in the same directory to have the same name.

For any of the previous examples, if you omit the drive identifier (A: or C:), the COPY command uses the current drive. For example, if the current drive is C and you want to copy the file REPORT from drive A to drive C, leaving the name of the file unchanged, you can enter the command as follows:

```
COPY A:REPORT
```

MS-DOS writes the copy to drive C because drive C is the current drive. You can save a few keystrokes by omitting the drive identifier of the current drive, but it is equally correct (and safer) to include all the drive identifiers.

An easy way to copy a group of files at once is by using wildcard characters in the filenames. A wildcard character is a character that stands for some other single character or group of characters. MS-DOS recognizes 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 current directory on the hard disk, type the following and press **Enter**:

```
COPY A:*.* C:
```

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? C:
```

Another task you can perform with the COPY command is 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
```

The three files are combined into one file in the order in which their names appear in the COPY command.

Using the BACKUP Command

The BACKUP command lets you store files in a special format for archive purposes. BACKUP is normally used to back up hard disk files; however, you can use BACKUP to copy files from any disk to another (hard disk to diskette, diskette to hard disk, diskette to diskette, **or** hard disk to hard disk).

Here are some of the advantages of using the BACKUP command:

- BACKUP is able to split large files between two or more diskettes. That is, if the diskette to which you are copying has only 200KB of available space, and the next file to be backed up occupies 300KB, the BACKUP command copies the first part of the file to the current diskette and the remainder to the next backup diskette. This results in more efficient diskette use.
- The BACKUP command can be used to perform incremental backups. That is, you can use BACKUP to copy only those files that have changed since the last time you used the BACKUP command. This also results in more efficient diskette use.
- The BACKUP command can format new diskettes as it copies files. You don't have to go through a separate formatting step when you use BACKUP.

Unlike DISKCOPY and COPY, which make readable copies of files, BACKUP creates files that you cannot use until you restore them to the disk by using the RESTORE command.

You can use switches with BACKUP to back up files created after a certain date or to specify files stored in a certain directory. You can also tell BACKUP to add only those files that have been modified since the last time you ran BACKUP. This process speeds up backup procedures you perform on a regular basis.

For complete instructions on the use of BACKUP and RESTORE, see your MS-DOS manual.

Note

An easy way to perform the functions of the BACKUP, RESTORE, COPY, and DISKCOPY commands is through the MENU program. See the section on MENU later in this chapter. You can also use the MS-DOS XCOPY command to copy one or more files; see your MS-DOS manual for details.

Deleting Data

To delete a file, type DEL and then the full name (including the extension, if any) of the file you wish to delete. For example, to delete the file named APRIL.TXT from the current directory; you would type the following and press Enter:

```
DEL APRIL.TXT
```

You may delete all the files in the current directory at once by typing the following and pressing Enter:

```
DEL *.*
```

For your protection, when you type DEL *.* MS-DOS asks if you are sure that is what you want to do. If you are sure, press Y, then Enter.

You can also use the ERASE command to delete files. ERASE works exactly like the DEL command.

Using the Epson HELP Utility

The Epson HELP utility provides on-line information on MS-DOS commands and 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 utility requires the two files `HELP.COM` and `HELP.TXT`. These files are located on the Operating 2 diskette. To run HELP from the hard disk, you must be logged onto the directory that contains these two files. If you copy `HELP.COM` to another directory on your hard disk or diskette, you must also copy `HELP.TXT` to the same directory.

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, then 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 `ESC`. Press `ESC` again to exit the HELP utility. The last command selected in HELP is displayed at the command prompt for easy reference.

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

1. At the command prompt, type **HELP** followed by the name of the MS-DOS command you want information about. Then 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. After you have seen enough help information, press **ESC** to exit the HELP program.

Using the Epson MENU Utility

Your Equity LT-286 comes with a utility by Epson called MENU. With this program you can display a menu of utilities and select the one you need. MENU is easy to use because it lets you execute several commands without having to remember the exact format for each one.

To access the MENU utility, log onto the directory that contains the file MENU.EXE. Type **MENU** at the command prompt and press Enter.

You see this main menu:

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

To select an option, use the arrow keys to highlight your selection, then press Enter.

Most options contain submenus; keep highlighting your selection and pressing Enter until you have selected the desired operation.

MENU Utility Options

The MENU utility offers five options. Here is a description of what each option does. Step-by-step instructions for using each option are provided in your MS-DOS 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 these MS-DOS commands: BACKUP, RESTORE, REPLACE, FC, ATTRIB, and XCOPY.

Disk Utilities	Lets you check, copy, compare, and format diskettes. This option gives you easy-to-use alternatives 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 powerful alternative to the MS-DOS MODE command.
Help	Lets you access the Epson HELP utility.
Enter DOS Command	Lets you run other MS-DOS commands without leaving 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 presents a visual diagram of your hard disk's directory tree, so you can see quickly how your files are organized. When you highlight a filename, XTREE displays the file's statistics in a 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 a corresponding letter key. 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 you have stored the file XTREE.EXE. Type `XTREE` at the `A>` or `C>` prompt and press Enter.

A title screen appears while XTREE reads your disk's directory, and then the XTREE menu 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 **FILE COMMANDS** list is displayed instead. This list shows you the commands you can use to perform file management operations.

You use the cursor keys (the four arrow keys, PgUp, PgDn, Home, and End), letter keys, function keys, Ctrl, and Alt 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 again to expand the file window, and press Enter one more time to return the cursor to the directory window.

Letter keys execute XTREE commands. The available XTREE commands appear on the **D** or **FILE COMMANDS** line at the bottom of your screen. The highlighted letter of the word (the **D** in **De**lete, 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. 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 combinations can be used to 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 function key commands and the key that executes each command on the lower right of your screen.

Cautions

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

- You can cancel commands, even commands in progress, by pressing **F3**. This stops any function.
- You can use the Attributes command (**Ctrl-A**) to give read-only status to all the files in the directories. Then, in order to erase a file, you must first remove its read-only status. (See your MS-DOS manual for details.)

- XTREE is limited in the number of files and directories it can handle. If you have more than 2,800 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 need 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 AUTOEXECBAT. When you load MS-DOS, it automatically looks for this file. If there is an AUTOEXEC.BAT file in the root directory, MS-DOS executes the commands in that file.

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

- Modify the PATH command to include the directories containing application 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 is loaded 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 else you want.

See your MS-DOS manual for instructions on using the PATH command, the PROMPT command, and any other commands you want to include in your AUTOEXEC.BAT file.

If you used the SELECT command to format your hard disk (see Chapter 3), you already have an AUTOEXEC.BAT file. The AUTOEXEC.BAT file created by SELECT contains the following MS-DOS commands:

```
PATH C:\;C:\DOS
KEYB US 437 C:\DOS\KEYBOARD.SYS
ECHO OFF
CLS
DATE
TIME
VER
```

Creating an AUTOEXEC.BAT File

You can create an AUTOEXEC.BAT file with any 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 (also called an ASCII text file), you can use that program to create your AUTOEXEC.BAT file. Just be sure to name the file AUTOEXEC.BAT and store it in the root directory of the hard disk.

Another way to create an AUTOEXEC.BAT file is by using the MS-DOS COPY command. To do this, follow the instructions below:

1. At the MS-DOS C> prompt, type the following and press **Enter**:

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

2. Type the commands you want to include in the file exactly as you want MS-DOS to execute 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.

3. Now press F6 and then **Enter**. COPY creates a file named AUTOEXEC.BAT and copies everything you just typed into that file. The AUTOEXEC.BAT file is stored in the root directory of your hard disk. From now on, the AUTOEXEC.BAT program is executed **every** time you load MS-DOS—which means every time you start or reset your computer.

Starting an Application Program

Any time you see the MS-DOS command prompt (**A>** or **C>**, for example), you can start using an application program. Just log onto the drive and directory containing your application program files (if necessary) and type the name of the program's executable file. (See the documentation for your application program if you are not sure what to type.) When you press **Enter**, MS-DOS begins running the application program. When you exit the program, the MS-DOS command prompt reappears. Be sure to exit the application program properly and return to the command prompt before turning off your computer.

Using the LIGHTON Utility

If you use memory-resident programs such as desktop accessories or the MS-DOS KEYB command, you may find that you cannot turn on the screen's backlighting once it has automatically turned itself off. If this happens, save any data files you are working on and reset your computer.

You can prevent this problem from occurring by using the Epson LIGHTON utility (on your Reference diskette). First load your memory-resident program, then enter the LIGHTON command (type **LIGHTON** and press **Enter**); this order is important. Another solution is to run the **Backlight period** portion of the setup program (see Chapter 2) and select **No** time limit.

If you use memory-resident programs that interfere with the backlit screen's operation, it is best to install them with a batch file that also includes `LIGHTON` as the last command. (See your MS-DOS manual for information about batch files.)

Note

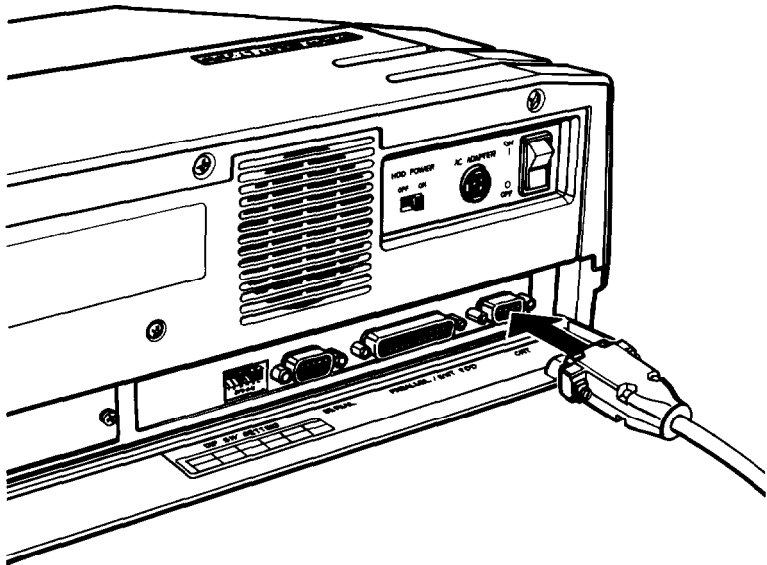
The `LIGHTON` program does not work with certain memory-resident programs. If you have a problem restoring the backlighting to your screen even after using `LIGHTON`, rerun the setup program and change the backlight period to No time limit.

Appendix A

Connecting an External Color Monitor

If you plan to use an external CGA-compatible color (RGB) monitor with your Equity LT-286, follow the instructions below to connect it to the computer:

1. Be sure both the computer and monitor (as well as any other peripherals) are turned off.
2. Place your monitor near the Equity LT-286. It is easiest to connect the monitor cable if the backs of the monitor and computer face you.
3. If necessary, connect the monitor cable to the monitor. (Some monitors come with permanently attached cables.)
4. Connect the appropriate end of the monitor cable to the connector marked CRT at the back of the computer, as shown below.



5. If the plug has retaining screws, tighten them with a screwdriver.
6. If necessary, plug the monitor's power cable into the power inlet on the monitor. (Some monitors come with permanently attached power cables.) Then plug the power cable into an electrical outlet.
7. Turn off DIP switch 4 above the keyboard to let the computer know you will be using a monitor instead of the LCD screen. (See "Setting the DIP Switches" in Chapter 1.)

When you are ready to use the computer, turn on the monitor and any other peripherals, then turn on the computer. Text will be displayed on the monitor screen instead of the computer screen.

Appendix B

Troubleshooting

You should not encounter any difficulties as you set up and use your Equity LT-286. You can correct most problems by adjusting a cable connection, changing a DIP switch setting, repeating a software procedure, or resetting the computer. If anything out of the ordinary happens, turn to this appendix for a solution.

Besides trying the suggestions in this appendix, you can run diagnostic checks on the various components of your computer system. See Appendix D, *Performing System Diagnostics*, for instructions.

If the suggestions in this appendix or Appendix D do not solve the problem, contact your 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. If necessary, call the Epson Customer Information number (1-800-922-8911) 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 (located on the back of the computer), its configuration (including the type of disk drives, monitor, and options), and the names and version numbers of any software you are using.

The Computer Won't Start

If your computer does not start up when you turn on the power switch, follow the steps below. (Also see the section on hard disk problems later in this appendix.)

1. Check that the **Power/Speed** light above the keyboard is on. If not, remove any diskettes from the diskette 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 **Power/Speed** light still does not come on, turn off the power switch. Check to see that the AC adapter is securely connected to both the computer and an electrical outlet. Make sure the green LED on the AC adapter is illuminated. 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, contact your Epson dealer.

The LCD Screen Is Blank

If the computer starts up but no image appears on the LCD screen, follow these steps to solve the problem:

1. Use the contrast switch and the brightness switch to adjust the screen display.
2. To save power, the LCD screen turns off automatically after a specified period of time. If this happens, press any key to restore the display. To change the time limit or turn off the light-off feature, see "Backlight Period" in Chapter 2.
3. If you still don't get an image on the screen, check to see that DIP switch 4 above the keyboard is in the on position to select the LCD screen as the display device. Also be sure that DIP switch 5 on the back panel is on. (See "Setting the DIP Switches" in Chapter 1 for instructions.)

4. If you are running the computer on battery power and the **Power/Speed** LED is off, flickering, or dim, most likely the battery is low. Turn off the computer, plug in the adapter, and then wait at least five minutes for the battery to recharge. Then turn the computer back on. See “Using the Battery” in Chapter 4 for instructions on how to fully recharge the battery.
5. If you still don’t get an image on the screen, contact your Epson dealer.

The Monitor Screen Is Blank

If you are using an external color monitor with the computer but no image appears on the screen, follow these steps to solve the problem:

1. Be sure the power switches on the computer and monitor are turned on.
2. Use the controls on the monitor to adjust the brightness and contrast.
3. Remove any diskette from drive A, then turn off the power switches on the monitor and the main unit. Check that the monitor’s power cable is securely connected to the monitor and to an electrical outlet, and that the monitor cable is properly connected to both the monitor and the computer. Then turn both power switches back on.
4. Check to see that DIP switch 4 above the keyboard is off to select the external monitor as the display device. Also be sure that DIP switch 5 on the back panel is on. (See “Setting the DIP Switches” in Chapter 1 for instructions.)
5. Turn off the power switches on both the computer and the monitor. Then check the electrical outlet for power. Plug a portable lamp into the outlet you are using for the monitor, then turn it on to see if the outlet supplies power.
6. If you still don’t see an image on your color monitor after following steps 1 through 5, contact your Epson dealer.

The Computer Locks Up

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

1. Wait a few seconds. Remember that some operations the computer performs take longer than others. For example, it takes the computer much longer to recalculate an entire spreadsheet than to record one figure. Also, GW-BASIC programs involving many calculations can take several minutes, or even hours, to complete.
2. If the computer remains locked up after you've waited a reasonable amount of time, follow the steps in Chapter 4 to reset the computer.

Note

Changing the execution speed while running an application program could cause the computer to lock up. Always exit the program you are working on before your change the execution speed.

Low Battery Problems

If the battery runs low, recharge it according to the instructions in Chapter 4.

The battery inside the Equity LT-286 should last as long as the computer does. However, if the battery seems to run low sooner than it should after being recharged, you can test it by following these steps:

1. Turn off the computer.
2. Connect the AC adapter to the computer and to an electrical outlet and let the battery charge for at least 12 hours.

3. Disconnect the AC adapter.
4. Turn the HDD switch off. Turn on the computer, but do not insert a diskette and do not use the computer. When the screen backlighting goes off, leave it off (do not press a key). Allow the computer to remain in this condition for an hour and 45 minutes. If the **Power/Speed** light starts to flash before the hour and 45 minutes is up, the battery is faulty. Contact your dealer to have the internal battery pack replaced.

Diskette Problems

If you have trouble with a diskette, see if any of the following questions applies:

1. Is the diskette damaged? To find out, use DISKCOPY to make a copy of the diskette. Using the copy, repeat the operation that caused the problem. If the operation works using the copy diskette, the original diskette is probably damaged. Discard the original diskette and use the copy instead.

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.

2. Is the diskette write-protected! If the write-protect switch is set, try moving the switch to remove the write protection. (Ordinarily, it's a good idea to leave program diskettes write-protected, but some programs don't work properly on write-protected diskettes.)
3. Try formatting a blank diskette to determine if the diskette drive is operating properly.

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. (See the instructions for setting up the hard disk in Chapter 3.) Then try the following steps:

1. Be sure the switch marked **HDD POWER**, on the back of the computer, is on.
2. If you cannot load MS-DOS 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. You can check this by typing the following and pressing **Enter**:

```
DIR C:\COMMAND.COM
```

If MS-DOS responds with the message `File not found`, use the `COPY` command to copy `COMMAND.COM` from the diskette to the root directory of the hard disk, then restart your system.

If `COMMAND.COM` is already in the root directory, use the `MENU` utility (see Chapter 5) or the `FC` command (see your MS-DOS manual) to compare the `COMMAND.COM` file on your diskette with the `COMMAND.COM` file in the root directory of your hard disk. If the files don't match, use the `COPY` command to replace the `COMMAND.COM` file 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 MS-DOS system files. (Hidden files are files whose names do not appear in a directory listing. MS-DOS normally keeps two hidden files in the root directory of your hard disk.)

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 load the operating system from a diskette but cannot access data stored on your hard disk, you may have accidentally repartitioned or reformatted part or all of the hard disk. Use the MS-DOS FDISK program to see if your hard disk has an active (bootable) MS-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 MS-DOS partition, back up 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 none of the above procedures works, contact your Epson dealer or have an authorized Epson Customer Care Center check your hard disk. Never open the airtight container that encloses the hard disk.

Appendix C

Power-On Diagnostics

The built-in permanent memory in your computer (ROM) contains a series of diagnostics programs. These programs are run automatically by the system every time you turn on the power. The diagnostics programs test the components of your system, such as the ROM, RAM, keyboard controller, timer, video controller, diskette driver, and hard disk controller.

When you turn on the power, the computer performs the tests described in this appendix. If an error is found, an error code and an error message are displayed. If the error is serious, the computer cancels further checking and halts the system. The error message remains on the screen, but the computer is inoperable. Write down the error message and code number and call your Epson dealer.

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.

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, the computer may halt with no further information. If this happens, contact your Epson dealer as soon as possible.

If the computer finds an error on the system board, this message is displayed:

10x-system board error

where x is a number from 1 to 8 that represents the specific circuit

in which the error is found. Your dealer needs this information to find and correct the problem.

If an I/O or 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 system clock and CMOS RAM. If the system options have not been set, one of the following messages is displayed:

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

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

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

```
164-Memory size error  
    (Run SETUP in DIAGNOSTICS)
```

RAM Check

The computer now begins to check the RAM installed on the main system board. During this check, this message is displayed:

```
xxxxxxx KB Ok
```

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

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

```
201-Memory error
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 computer, you see this message:

```
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
```

Video and Video Controller Check

The computer next checks the video and video controller. If an error occurs, you see this message:

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

Diskette Drive Seek Check

The computer checks its diskette drives by testing the drive mechanism for any malfunction. If any seek errors are found, you see this message:

```
601-Diskette error
```

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, 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:

```
1780-Disk 0 failure  
1790-Disk 0 error
```

Appendix D

Performing System Diagnostics

This appendix describes how to check the operation of the main unit and peripheral devices of your system. 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.

Starting System Diagnostics

To start the system diagnostics program, follow these steps:

1. Insert the Reference diskette in drive A.
2. Turn on or reset the computer. Press **Enter** to respond to the DATE and TIME prompts. The diagnostics program loads automatically and displays the main menu:

```
OPERATION MENU
```

```
1 - Setup
```

```
2 - System diagnostics
```

```
0 - Exit to DOS for more utilities
```

```
Enter selection number:
```

3. Press **2** to select System diagnostics and then press **Enter**.

When you start the system diagnostics, the computer checks the system's configuration. Once this check is completed, the screen displays the DEVICE LIST, a list of the devices available for testing. This list includes only the devices that are installed in the system.

The screen looks something like this:

```
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)?

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

Note

If DIP switch I on the rear panel of the computer is set in the off position, the DEVICE LIST includes item 14, dot-matrix printer, whether or not a printer is physically connected to the system. This is normal. To perform the dot-matrix printer test, however, you must have a dot-matrix printer attached.

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. You see 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 **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 (80287)
- 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 **0** followed by **Enter**.

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**.

Selecting a Test

From the DEVICE LIST, select the device to be tested. Type the number of the device, then press **Enter**. The following menu appears:

```
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 up 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 only once, press 1 and **Enter**. Depending on the device you have selected, the program may then display 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 is  
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 whether errors occur. This prompt then appears:

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

Type the number of times you want 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 are displayed. 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**. To request a printout, first make sure your printer is turned on and on-line, with paper loaded. Then press **Y** and **Enter**. If the printer is not ready, the following message is displayed:

```
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 appendix describes the tests you can run on the system's internal devices and on the optional devices connected to your computer. The program displays the titles of each test on the screen.

For a complete list of the error codes and messages that are displayed by these tests, see the table at the end of this appendix.

System Board Check

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

- The 80286 CPU chip
- The system ROM
- The real-time clock, CMOS RAM, and battery
- The main integrated circuits.

The checks made on the 80286 CPU chip are very comprehensive and ensure that the CPU instruction set, including protected-mode operation, is functioning correctly. If an error occurs, write down the error message, or print it out, and contact your Epson dealer. 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.

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 count of memory is displayed after each block that is tested without an error. The final message is usually:

000640KB OK

If an error occurs, write down the error message, or print it out, and contact your Epson dealer. Attempting to correct memory errors yourself may violate your warranty agreement.

Note

Extended memory above 640KB, which is normally not available to MS-DOS, is checked using the protected mode of the 80286 CPU chip.

Keyboard Check

Use this option to check the operation and 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 select the appropriate keyboard layout so that the test display matches the keys on your keyboard. You see this menu:

```
KEYBOARD SELECT MENU
```

- 1 - US ASCII
- 2 - United Kingdom
- 3 - French
- 4 - German
- 5 - Italian
- 6 - Spanish

- 0 - Exit

```
Enter selection number:
```

Choose the appropriate option for your keyboard layout (for example, if you're using the Equity LT-286 in the United States, choose option 1), and press **Enter**.

The screen then displays a diagram showing the layout of your keyboard. To test the keyboard input, press any key on your keyboard. The character for the key you press appears in the appropriate rectangle on the keyboard diagram. If you hold the key down, the character blinks. You can test as many keys as you like this way.

If all the keys function correctly and match the characters displayed, press **Y** and then **Enter**.

If all the keys function but the characters displayed do not match the keys, press **Y** 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 **N** and **Enter**. Make a copy of the error code and message, or print them out, and contact your Epson dealer.

Monochrome Display Adapter and CRT Check

Use this option to verify the operation of a monochrome adapter and display. This test includes several checks that allow you to identify particular problems related to the monochrome display. To run this check, you must be using a monochrome monitor attached to a monochrome display adapter in an expansion chassis. DIP switches 5 and 6 on the rear panel must both be off.

You can select the individual checks from this menu:

MONOCHROME 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.

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 appears 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:

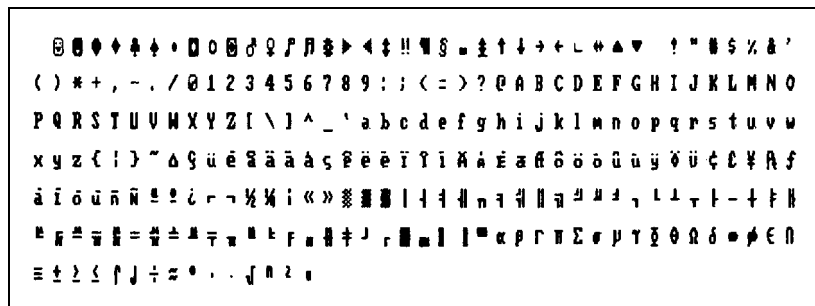
Is the display correct (Y/N)?

Press **Y** and then **Enter** if the display is correct.

If the display attributes are not correct, adjust the brightness and contrast on your display 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 included in the internal character generator are displayed 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 display 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 sequence. 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

Use this option to check the operation of your video controller and screen. The test includes several checks that allow you to identify specific video problems.

You select the individual checks from the following 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 - Color video check
- 9 - Sync check
- 10 - Run all above checks
- 0 - Exit

Enter selection number:

If an error occurs during any of these tests, write down the error message, or print it out, and then contact your Epson dealer. When you are finished with the test, press 0 and **Enter** to return to the DEVICE LIST.

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, 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 video display attributes, press 2 and then Enter.

Several messages are displayed showing examples of all the possible display attributes and colors. (On the LCD, the colors appear as gray tones.) Check the information on your screen and respond to the prompt:

Is the display correct (Y/N)?

Press Y and Enter if the display is correct.

If the colors or gray tones are not correct, adjust the controls on your LCD screen or monitor. If they are still incorrect, or if any of the other attributes are not correct, press N and Enter.

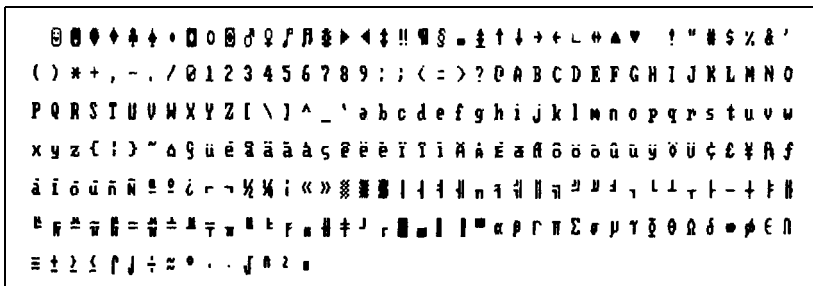
Note

On the LCD display, this test is run with gray scale mode 2 in effect, regardless of how the DIP switches are currently set. Table 1-2, in Chapter 1, lists the mapping of colors to gray tones in mode 2.

Contact your Epson dealer to verify any display problems.

Character Set Check

To check your 80-column character set, press 3 and then Enter. The character fonts that are included in the internal character generator are displayed. Check your screen display against the following illustration:



The same pattern is displayed again; this time, the squares are cyan, white, and magenta, and the background is red. These colors are called Color Set 1. If these colors are also correct, press Y and then Enter to end the test.

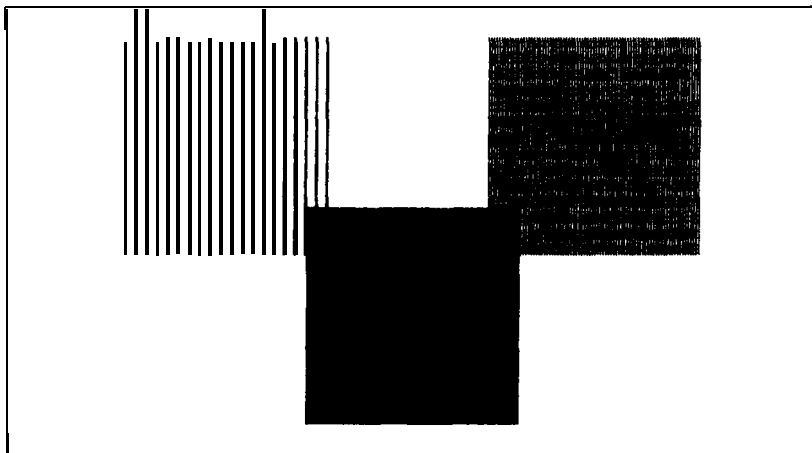
Note

On the LCD display, this test is run with gray scale mode 2 in effect, regardless of how the DIP switches are currently set. Table 1-2, in Chapter 1, lists the mapping of colors to gray tones in **mode 2**.

If any colors are displayed incorrectly, check the adjustment of your monitor (if you are using an external monitor) and be 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 and then Enter. The screen displays three patterned squares like the ones shown below:

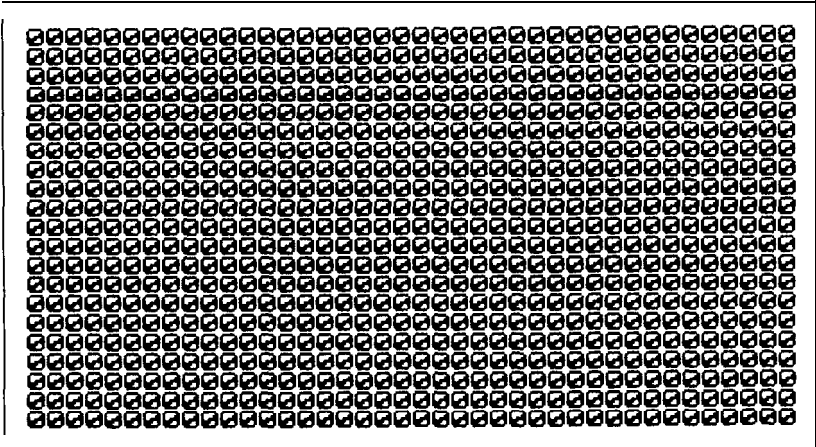


If the patterns on your screen are clear and distinct, press **Y** and then **Enter**. If any pattern is not clear, first check the adjustment of your monitor (if you are using an external monitor), and then make sure that both ends of the cable are plugged in firmly. If a problem persists, press **N** and **Enter** to display the error message.

Screen Paging Check

To check your system's screen paging, press **7** and **Enter**.

Your computer's display memory 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 this pattern for screen 0:



When you have examined this screen, press any key to display the next page. The eight display pages, numbered 0 through 7, are displayed sequentially.

After the eighth page is displayed, you see this 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.

Color Video Check

Option 8, Color video check, displays 16 different screens, each with a different color and a message indicating the color. (On the LCD display, the colors appear as shades of gray.) The screens show the colors in the order shown below:

- | | |
|-------------|---------------------------|
| 1 - Black | 9 - Grey |
| 2 - Blue | 10 - Light blue |
| 3 - Green | 11 - Light green |
| 4 - Cyan | 12 - Light cyan |
| 5 - Red | 13 - Light red |
| 6 - Magenta | 14 - Light magenta |
| 7 - Brown | 15 - Yellow |
| 8 - White | 16 - High-intensity white |

Note

On the LCD display, this test is run with gray scale mode 2 in effect, regardless of how the DIP switches are currently set. Table 1-2, in Chapter 1, lists the mapping of colors to gray tones in mode 2.

To start this test, press 8 and then **Enter**. Press any key to display each screen. On the last screen, this prompt appears:

Is the display correct (Y/N)?

If all the colors are correct, press Y and **Enter** to end the test. If any color is displayed incorrectly, check the adjustment of your monitor (if you are using an external monitor) and be 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 10 and Enter.

When you choose this option, all video checks 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 Drive and Controller Check

Use this option to test the performance of your diskette drive. This test sequence includes several checks that allow you to identify particular problems related to your diskette drive.

To run these tests, you need a formatted 1.44MB or 720KB diskette so the tests can write data on the diskette in the drive. If you are testing an external 5 1/4-inch diskette drive, you also need a formatted 5 1/4-inch diskette for that drive.

Start the tests by selecting option 6 from the DEVICE LIST menu. After you choose the number of times to run the tests, the screen displays this menu:

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

- 1 - Sequential seek check
- 2 - Random seek check
- 3 - Write, read check
- 4 - Speed check
- 5 - Disk change check
- 6 - Run all above checks

- 0 - Exit

```
Enter selection number:
```

Before any checks are performed, the program determines the number of diskette (floppy disk) drives installed in your computer. If you have two drives, 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, write down the error code and message and contact your Epson dealer. Always have diskette drives serviced by your dealer.

When you finish running the checks, press **0** and **Enter** to return to the **DEVICE LIST** menu.

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 39 for a 360KB 5 1/4-inch diskette and 79 for a 3 1/2-inch diskette or a 1.2MB 5 1/4-inch diskette.

Select option 1 from the menu to start this test. The program displays the number of each track it finds, counting down from 79 or 39 to 0.

The seek is performed by each head, so you see the count twice. If no errors occur, the menu reappears.

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 sequentially. 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 track on the diskette, starting at the center. Select option 3 from the menu to start this test.

WARNING

This **test** destroys all data on the diskette in the selected drive. If you are testing drive A, be sure to remove your Reference diskette from the drive and replace it with a blank, formatted diskette.

The program displays the current track number as each track is tested.

Speed Check

This test checks the revolution speed of the diskette drive. Select option 4 from the menu to start this test. You see a message similar to this:

```
The disk rotation speed should be more
than 294.0 rpm and less than 306.0 rpm.
```

The computer spins the diskette for a few seconds, then displays a message like this:

```
The disk rotation speed is now 300.8 rpm.
```

Note

The rotation speed of a 3 1/2-inch diskette should be 300.0 rpm. The rotation speed of a 5 1/4-inch diskette should be 360.0 rpm. This check permits a tolerance of plus or minus two percent,

The diskette continues to spin, and the display is updated every few seconds. To stop the test, press any key; the menu reappears.

If you try to perform a speed test without inserting a diskette, or if a read error occurs, you see this message and prompt:

```
Disk is defective or not installed
properly. Press ENTER to return to the
menu.
```

Disk Change Check

This test checks the ability of the diskette drive to detect that a diskette has been removed or inserted.

Note

Disk changes cannot be detected by 360KB 5 1/4-inch drives.

Select option 5 from the menu to start this test. You see the following message:

```
DISK CHANGE CHECK
Remove the disk from drive A.
```

As soon as you remove the diskette, you see the following message:

```
Re-insert the disk into drive A.
```

Re-insert the diskette. If no errors occur, the menu reappears. An error occurs if the drive is malfunctioning or if you do not remove or replace the diskette within a certain time.

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 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 (80287) Check

Use this option to check the operation of the 80287 math coprocessor if you have one installed in your computer. To start the test, select option 7 from the DEVICE LIST menu.

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 reset the 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 computer's primary parallel port.

To perform the test, you must insert a special loop-back connector into the parallel port so that the computer can check the 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.

Note

If you connect a parallel printer cable instead of a loop-back connector, you will get errors.

When you select option 9 from the DEVICE LIST menu, you see this message:

```
PARALLEL PORT CHECK
```

```
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.

Serial Port (RS-232C Port) Check

Use this option to test the functions of the primary serial communications (RS-232C) port.

To perform the test, you must insert a special loop-back connector into the serial port so that the computer can check the individual pins of the port. Contact your dealer if you need a loop-back connector. Note that a different loop-back connector is required to test the parallel port.

When you select option 11 from the DEVICE LIST menu, you see this message:

```
SERIAL PORT CHECK
```

```
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 are displayed during this part of the test unless an error occurs.

The second test is an echo back check during which the port sends data to itself in a fixed data format, at all the possible baud rates. When this test begins, you see this message:

```
RS-232C echo back check - at various
baud rates
Current baud rate is 75
Current test data is 00
```

Each baud rate is tested in turn, and the display informs you of the progress of the test. If the port does not become ready correctly, a timeout error occurs. If any data received does not match the data sent, a verify error occurs, and the computer reports the transmitted and received data at the time of the error.

The final test is an echo back check during which the port sends data to itself at 9600 baud, using various data formats. At the start of the test, you see this message:

```
RS-232C 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 the port's individual pins.

This test is identical to the check for the primary serial port. For more details, see the preceding section.

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 used by the Equity LT-286
- The ability of your printer to produce bit-image graphics and print images from 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 on-line. Press Y and then **Enter** to continue, or press **␣** and **Enter** to return to the menu.

When you continue the test, the computer checks to see whether the printer is responding correctly. This test detects whether the printer is off-line or whether an interface error exists. If no errors occur, the computer sends a repeating sequence of ASCII characters and dot graphics data to the printer until you press any key. The pattern looks like this:

```
Text data (20H-7FH,A0H-FFH)
!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNPOQRSTUVWXYZ{\|^_`abcdefghijklmnopqrstuvwxyz{|}~
!""#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNPOQRSTUVWXYZ{\|^_`
abcdefghijklmnopqrstuvwxyz{|}~
Bit-image data (00H-FFH)
.....
```

The text data includes all the characters commonly used by programs that require foreign languages or graphics characters. If your printer prints different characters from the ones you see in the illustration, you may need to take care with certain software.

The bit-image graphics 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 or GRAPH24 program to print out copies of graphics screens.

Note

Even if you run the test for only a short time, your printer may store many characters in its memory. To stop printing, take the printer off-line and then turn it off.

Hard Disk Drive and Controller Check

Use this option to test the performance of the hard disk drive installed in your computer. If any errors occur, have your dealer check and service the drive.

WARNING

As a precaution against losing data on your hard disk, you should back up your hard disk before running these checks.

When you select option 17 from the DEVICE LIST, you see this menu:

HARD DISK DRIVE AND CONTROLLER CHECK MENU

- 1 - Seek check
- 2 - Write, read check
- 3 - Read, verify check
- 4 - Run all above check

- 0 - Exit

Enter selection number:

Press the number corresponding to the test you want to run and press Enter. When you are finished with all checks, press 0 and Enter to return to the DEVICE LIST menu.

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 innermost cylinder.

Select option 1 from the menu to start this test. The program displays the number of each cylinder it finds, counting 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 is redisplayed.

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.

N o t e

This test destroys all data on the innermost cylinder of the hard disk drive. This cylinder is reserved for diagnostics, however, and is never used for storage by MS-DOS. Therefore, data created by MS-DOS is not destroyed.

Select option 2 from the menu to start this test. You see this message:

```
The data on the highest physical
cylinder maybe destroyed by this check.
Enter Y to start this check.
Enter N to return to the menu.
```

Press Y and then **Enter** to continue 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 is reported, make a note of the code and message. Then consult your dealer.

Read, Verify Check

This test reads and verifies data from all tracks of the disk, checking each cylinder and using all heads.

Select option 3 from the menu to start this test. The program displays the number of each cylinder it finds. 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 showing the results of the test. For example, if your hard disk has three bad tracks, you see:

```
BAD TRACKS . . . . .3  
READ ERROR TRACKS . . .0  
GOOD TRACKS . . . . .2457
```

Press **Enter** to return to the menu after viewing the table. Don't worry if there are some bad tracks on the disk. They have been marked by the manufacturer and are not used to store data.

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 hard disk drive and controller are performed automatically in sequence. Although you do not start each test, you must still supply the appropriate responses to progress from one test to the next.

When you see a prompt warning you that the data on the highest physical cylinder may be destroyed, press **Y** and then **Enter** to continue with the test. (The highest numbered cylinder is reserved for diagnostics and is never used for storage by MS-DOS. Therefore, data created by MS-DOS is not destroyed.)

Alternate Parallel Port Check

Use this option to test the functions of an additional parallel port. To perform the test, you must insert a special loop-back connector into the alternate parallel port so that the computer can check the port's individual pins.

This test is identical to the check for the primary parallel port. For more details, see the section describing the parallel port check earlier in this appendix.

Parallel Port (on Video Adapter) Check

Use this option to test the functions of a parallel port on a video adapter card. To perform the test, you must insert a special loop-back connector into the port so that the computer can check the port's individual pins.

This test is identical to the check for the primary parallel port. For details, see the section describing the parallel port check earlier in this appendix.

Exiting System Diagnostics

When you finish running the system diagnostics, press 0 and Enter to return to the OPERATION MENU. Then press 0 and Enter to reset the computer. When the OPERATION MENU appears again, press 0 and Enter again, this time to return to MS-DOS. When the MS-DOS command prompt reappears, remove the Reference diskette.

Error Codes and Messages

Table D-1 lists all the error codes and messages that may appear during diagnostic checks.

Table D-1. Error codes and messages

Error code	Message
System board	
101	80286 CPU ERROR
102	27xxx 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	612 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	80286 INSTRUCTION ERROR
114	80286 PROTECT MODE ERROR 1
115	80286 PROTECT MODE ERROR 2
Memory	
201	MEMORY/PARITY ERROR
Keyboard	
301	8042 ERROR
301	KEYBOARD ERROR
302	KEYBOARD IS NON-STANDARD OR DEFECTIVE
303	KEYBOARD LOCKING ERROR

Monochrome display adapter and CRT 401 402 403 404	V-RAM ERROR VIDEO SIGNAL ERROR ATTRIBUTE ERROR CHARACTER SET ERROR
Color graphics adapter/display 501 503 504 505 506 507 508 510	V-RAM ERROR ATTRIBUTE ERROR CHARACTER SET ERROR 40-COLUMN CHARACTER SET ERROR COLOR GRAPHICS ERROR 640x200 GRAPHICS MODE ERROR SCREEN PAGING ERROR COLOR VIDEO ERROR
Floppy disk drives /controller 601 602 603 604 605 606 607	FLOPPY DISK CONTROLLER ERROR SEQUENTIAL SEEK ERROR RANDOM SEEK ERROR WRITE ERROR READ ERROR DISK CHANGE CHECK REMOVE ERROR DISK CHANGE CHECK INSERT ERROR
Math coprocessor (80287) 701 702 703 704 705 706 707 708 709 710	NOT INSTALLED COPROCESSOR INITIALIZE ERROR COPROCESSOR INVALID OPERATION MASK ERROR COPROCESSOR ST FIELD ERROR COPROCESSOR COMPARISON ERROR COPROCESSOR ZERO DIVIDE MASK ERROR COPROCESSOR ADDITION ERROR COPROCESSOR SUBTRACTION ERROR COPROCESSOR MULTIPLICATION ERROR COPROCESSOR PRECISION ERROR
Parallel port 901	ERROR PIN <i>p</i>

Serial port (RS-232C) 1101 1101 1102 1103	<i>control signal</i> ALWAYS LOW <i>control signal</i> ALWAYS HIGH TIMEOUT ERROR VERIFY ERROR
Alternate serial port 1201 1201 1202 1203	<i>control signal</i> ALWAYS LOW <i>control signal</i> ALWAYS HIGH TIMEOUT ERROR VERIFY ERROR
Dot-matrix printer 1401	<i>status</i>
Hard disk drive and controller 1701 1702 1703 1704 1705 1706	SEEK ERROR WRITE ERROR READ ERROR HEAD ERROR ERROR DETECTION ERROR ERROR CORRECTION ERROR
Alternate parallel port 2101	ERROR PIN p

Appendix E

Specifications

Main Unit

CPU	80286 microprocessor, 8 MHz or 12 MHz clock speed; speed may be switched without rebooting
Main memory	640KB
Math coprocessor	80288 microprocessor (optional) for use at 8 MHz

Interfaces

Parallel	Standard 8-bit parallel, 25pin, D-type female connector
Serial	RS-232C, programmable, asynchronous, 9-pin, D-type male connector
Video	RGB color monitor support (CGA-compatible)
Speaker	Internal, non-adjustable
Option slot	One 8-bit slot, signal-compatible with IBM XT

Keyboard

	Attached, 88/89 sculpted keys
Layout	58-key QWERTY main keyboard; 17-key numeric/cursor keypad; 12 user-definable function keys; Esc, Print Screen/Sys Rq, Scroll Lock, Pause/Break; LEDs for Num Lock, Caps Lock, Scroll Lock

Mass Storage

Hard disk	Internal 20MB or 40MB hard disk designed for low power consumption; separate hard disk power switch; 78ms average access time (20MB hard disk)
Diskette drive	1 internal 1.44MB 3 1/2-inch diskette drive; external 5 1/4-inch (360KB or 1.2MB) diskette drive supported

Display

High-contrast paper-white LCD display with fluorescent backlighting; CGA-compatible, with four switch-selectable gray-scale modes; continuous brightness and contrast controls; power-saving feature

External RGB monitor supported (CGA-compatible)

Power Supply

Internal, rechargeable NiCad battery pack (4400 milliamperes); approximately 1.25 hour usage

15 volt AC adapter (can recharge battery pack while operating computer)

Power Requirements

100-240 VAC, 50/60 Hz

NiCad rechargeable battery pack,
9.6 volts

Physical Dimensions

Height	4.33 inches (110 mm)
Width	14.17 inches (360 mm)
Depth	12.79 inches (325 mm) (with handle retracted)
Weight	17.7 lbs (8.1 kg)

Environmental Requirements

Temperature	Operating: 41° to 95° F (5° to 35° C) Non-operating: -4° to 122° (-20° to 50°C)
Humidity	Operating: 20% to 50% (non-condensing) Non-operating: 10% to 90% (non-condensing)
Altitude	Operating: 0 to 9800 ft (0 to 3000 m) Non-operating: 0 to 32,000 ft (0 to 10,000 m)

Note

When traveling by airplane, it is best to take your LT-286 into the passenger compartment as carry-on luggage to prevent it from being stored in an unpressurized storage compartment.

Options

Modem	Internal 300/1200-baud or 1200/2400-baud Hayes-compatible, auto-dial
Memory	2MB expansion modules (SIMMs); up to 4MB expansion memory supported on system board
Expansion chassis	One 8-bit expansion slot One 16-bit expansion slot
Carrying case	Soft case for carrying computer

Glossary

80286

An integrated circuit, or chip; the central processing unit (CPU) of your Equity LT-286.

80287

A special-purpose integrated circuit that can be used to assist the 80286 and speed up certain kinds of arithmetic calculation. The computer's system board has a socket to accommodate an optional 80287 math coprocessor.

AC adapter

The device that converts AC voltage from a wall socket into the proper DC voltage to power your Equity LT-286. The AC adapter delivers sufficient power to recharge the NiCad battery pack while you operate the computer.

Application program

A software program designed to perform a specific task, such as word processing, spreadsheet analysis, or database management.

ASCII

American Standard Code for Information Interchange. A standard system for encoding text characters, such as letters, numbers, and punctuation symbols. An ASCII character occupies one byte of storage. Files stored under the 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.

AUTOEXEC.BAT file

A special kind of batch file that is executed automatically by MS-DOS each time the computer is turned on or reset.

Backlighting

The internal fluorescent illumination of the computer's LCD screen. LCD screens that are not backlit are not legible without an external source of light.

Backlight period

The length of time your LCD screen stays illuminated in the absence of keyboard activity. To restore the backlighting to your screen after the backlight period has elapsed, press any key. To change the backlight period, run the setup program (see Chapter 2).

Backup

A copy of a program, data file, or disk, kept in case the original is damaged or lost.

Batch file

A text file containing one or more MS-DOS commands, each stored on a separate line. Batch files are used to automate MS-DOS operations. When you type the name of the batch file (with or without its .BAT extension), each command in the file is executed in sequence.

Baud rate

A measure of the speed of data transmission. Usually equivalent to bits per second.

Bit

A binary digit (0 or 1). The smallest unit of information that can be stored by a computer. Eight bits make one byte.

Boot

To load a program or an operating system into the computer's memory.

Byte

A sequence or group of eight bits. In the ASCII encoding system, a byte represents one character of data.

CGA

Color Graphics Adapter. A type of color monitor that can display graphics. You can plug a CGA monitor directly into the built-in CRT connector on the back panel of the Equity LT-286.

Character

Anything that can be printed or displayed in a single space on the page or screen, including numbers, letters, punctuation marks, and graphic symbols.

Chip

A hardware component of your system (formally known as an integrated circuit). Examples of chips include memory chips and the 80286 microprocessor.

CMOS

Complementary Metal-Oxide Semiconductor. A method of making integrated circuits (chips).

CMOS RAM

A special type of low-power memory in your Equity LT-286, used to record information about your system's configuration, as well as the current date and time. Unlike ordinary RAM, CMOS RAM is backed up by a small battery and therefore is not erased when the computer's power switch is turned off.

Code

A system of symbols for representing data or instructions. Also, any software program or part of a program.

COM1

The name that MS-DOS uses to identify the primary serial port.

COM2

The name that MS-DOS uses to identify a secondary serial port.

Command

An instruction you enter on a keyboard to direct the computer to perform a specific function.

COMMAND.COM

The program file that enables MS-DOS to carry out commands such as DIR, COPY, and ERASE. COMMAND.COM must be stored in the root directory of your hard disk if you want to boot MS-DOS from the hard disk.

Command prompt

The message that tells you MS-DOS is loaded and ready to receive instructions. The MS-DOS command prompt ordinarily displays the current operating drive (A> or C>, for example). You can add other information to the command prompt by using the PROMPT command.

Configuration

The particular arrangement of the hardware components of your computer. Your configuration, for example, might include a printer and an internal modem, as well as your built-in hard disk and diskette drive.

Control code

A command (generated by holding down the Ctrl key and pressing another key on the keyboard) that instructs the computer to perform a specific function.

Controller

A hardware component of your computer that oversees the operation of the hard disk or diskette drive.

Coprocessor

An optional integrated circuit (chip) that assists the CPU in performing certain tasks.

CPU

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

CRT

Cathode Ray Tube. A type of video display. A color monitor is an example of a CRT.

CRT connector

The socket on the back panel of your Equity LT-286 where you plug in the cable of a color monitor.

Current directory

The directory you are working in. MS-DOS executes a command in the current directory unless you include a pathname with the command.

Current drive

The disk drive (A or C, for example) you are currently using. MS-DOS executes a command in the current drive unless you include a drive identifier with the command.

Cursor

The highlighted marker that shows your position on the screen and moves as you enter and delete data.

Cylinder

A storage area on a hard disk. A cylinder on a hard disk is analogous to a *track* on a diskette.

Data

Information stored or processed by a computer.

Data diskette

A formatted diskette used to store data files.

Data file

This term usually refers to files you create by means of an application program (for example, a memo created by a word processor), as opposed to files containing program code.

Data length

The number of bits per character in serial transmissions.

Default

A value or setting that takes effect when the computer is turned on or reset. Also, a response to a command that is presumed to be correct unless you override it.

Default directory

A synonym for current directory.

Default drive

A synonym for current drive.

Delimiter

A character (usually a semicolon, comma, or a 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. Examples include your hard disk, diskette drive, LCD screen, and printer.

DIP switch

A small two-position switch used to supply configuration information to the computer (or to a device). DIP stands for Dual Inline Package.

Directory

A logical subdivision of a hard disk or diskette. Generally synonymous with subdirectory. See Chapter 5.

Disk

A general term meaning either a diskette or a hard disk.

Disk drive

The physical device (either a hard disk drive or a diskette drive) that allows the computer to read from and write to a disk. A diskette drive has a slot into which you insert a diskette. A hard disk is permanently sealed inside the computer.

Diskette

A flat piece of flexible plastic coated with magnetic material and used to store data. Also called a floppy disk.

Diskette drive

The physical device that enables the computer to read from and write to a diskette.

DOS

Short for MS-DOS. The Disk Operating System that controls the computer's input and output functions. See *Operating system*.

Double-density

A type of diskette. Double-density 3 1/2-inch diskettes have a capacity of 720KB.

Drive identifier

The letter name of a diskette drive or hard disk, followed by a colon (A: or C:, for example).

EGA

Enhanced Graphics Adapter. A type of video monitor that can display graphics. You can install a video card for an EGA monitor in the Equity LT-286's optional expansion chassis.

Executable file

A file containing program instructions. In MS-DOS, executable files must have an extension of .BAT, .COM, or .EXE. To execute an executable file, type its name at the command prompt (with or without the extension).

Execution speed

The speed at which the CPU can execute commands. The Equity LT-286 can run at 8 MHz or 12 MHz. Also called clock speed, or operating speed.

Expansion chassis

An optional device containing two expansion slots. The slots can accommodate devices (such as high-resolution graphics adapters or additional memory) that can extend the capabilities of your computer.

Expansion slot

A particular kind of connector that can accommodate an option card. The expansion slot in your Equity LT-286, for example, can be used to connect an internal modem to your system.

Extension

A suffix of up to three characters that can be added to a filename.

External command

An MS-DOS command that is stored in a program file. The FORMAT command, for example, is stored in the file FORMAT.COM. To perform an external command, MS-DOS must be able to find the appropriate program file. External commands are distinguished from internal commands (such as DIR or ERASE), which are not stored in separate program files.

File

A group of related pieces of information (sometimes 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 perform 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 erase an old one) so that it can store information. Formatting a disk divides it into tracks and sectors and creates addressable locations on it.

Graphics

Lines, angles, curves, and other non-alphanumeric data.

Gray-scale mode

The mapping of colors to shades of gray on the LCD screen. In mode 0, all colors are displayed as black or white. In modes 1 and 2, colors are mapped to preset shades of gray. Mode 3 is user-definable; any color may be mapped to any shade of gray. Use the setup program (Chapter 2) to define mode 3. Use keyboard DIP switches 2 and 3 (Chapter 1) to select a gray-scale mode.

GW-BASIC

Microsoft's extended version of the BASIC programming language. GW-BASIC is included on your Operating 2 diskette.

Hard disk

A sealed mass storage device used to store data permanently. A hard disk can process data more rapidly and can 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 commonly used by programmers.

Hidden file

A file whose name is not listed by the DIR command. MS-DOS stores two hidden files in the root directory of your hard disk. Some application programs also create hidden files.

High-density

A type of diskette. High-density 3 1/2-inch diskettes can be formatted to store 1.44MB of data.

Input/output (I/O) port

See Port.

Interface

A hardware or software connection that is used to transmit data between equipment or programs.

Internal command

An MS-DOS command, such as DIR or ERASE, that is not stored in a separate program file. Internal commands may be executed from any drive or directory.

Kilobyte (KB)

A unit used to measure storage space in a computer's memory or on a disk. One kilobyte equals 1,024 bytes.

LCD

Liquid Crystal Display. A form of flat panel display.

LED

Light Emitting Diode. A substance that is illuminated when electricity passes through it. The six indicator lights above the Equity LT-286 keyboard are LEDs.

LIGHTON

An Epson utility program that enables you to restore the screen backlighting by pressing any key, even when a memory-resident program that alters the normal BIOS keyboard handler is running.

Log on

To make a drive or directory the current drive or directory.

Main unit

The part of the computer that houses the central processing unit, the random access memory, the disk drives, and other supporting circuitry.

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 the oscillation frequency of a computer's internal timing clock. One megahertz is one million cycles per second. The Equity LT-286 operates at 8 or 12 MHz.

Memory

The area where the computer stores data. Memory contents may be permanent (ROM) or temporary (RAM). See also ROM and RAM.

Memory expansion module

An optional component that adds memory to your computer.

Memory-resident program

A program that can be called on while another program is running. An example might be a notepad utility that you can access while working in a spreadsheet program. The Epson LIGHTON utility is a memory-resident program.

Microprocessor

A CPU chip, such as the 80286. See CPU.

Modem

A device that allows a computer to send or receive data over a telephone line.

Monitor

The piece of hardware that contains the screen and displays information.

Motherboard

The main circuit board of your computer. Also called the system board.

MS-DOS

An operating system from Microsoft that comes with your computer. See *Operating system*.

NiCad

The type of battery used by your Equity LT-286. NiCad stands for nickel-cadmium.

Numeric keypad

The number keys grouped on the right side of the keyboard.

Operating speed

The speed at which the CPU can execute commands. The Equity LT-286 has operating speeds of 8 MHz and 12 MHz. **Also** called execution speed or clock speed.

Operating system

A collection of programs that allows a computer to control its operations. The operating system determines how programs run on the computer and supervises all input and output. Your computer comes with MS-DOS, an operating system by Microsoft.

Option card

A circuit board that you install in a slot in your main unit or expansion chassis. Option cards provide additional capabilities, such as more memory or an internal modem.

Parallel

A type of interface that transmits data in groups of bits. Distinguished from *serial*, a type of interface in which bits are transmitted one at a time.

Parameter

A term added to a command that tells the computer how to perform the command (for example, what data file to use or what particular conditions to look for).

Parity

Data signals sent during communications to detect transmission errors.

Partition

To divide a hard disk into logical sections for use by one or more operating systems. A hard disk must be partitioned before it can be formatted, even if only one operating system is going to be used on the disk.

Pathname

The list of directories the operating system must search through to locate a file. For example, the pathname for a file named CONTRACT.TXT that is located in the BUSINESS subdirectory is \ BUSINESS \ CONTRACT.TXT.

Peripheral

An external device, such as a printer or modem, connected to a computer.

Port

An input/output socket on a computer to which you can connect a peripheral.

Power-on diagnostics

A set of self-testing routines performed automatically by the computer every time you turn it on. See Appendix C.

Program

A disk file that contains coded instructions telling the computer what to do and how to do it.

Prompt

A message displayed on the 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 save on a diskette or hard disk.

Read

To copy 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 in the computer that keeps track of the current time and date even when the computer's power is turned off.

Reset

To reload a computer's operating system so you can retry a task or begin using a different operating system. Resetting erases the computer's RAM.

RGB

Red-Green-Blue. A type of color monitor.

ROM

Read Only Memory. The portion of the computer's memory that contains permanent instructions and cannot be modified. The power-on diagnostic programs, for example, are stored in ROM. Unlike RAM, ROM retains its contents even after the computer's power has been turned off.

Root directory

The top-level directory on a diskette or hard disk. The root directory is designated by a backslash (\). All other directories are subdirectories of the root directory or of other subdirectories.

RS-232C

A standard serial interface. You can easily connect an RS-232C-compatible device to your Equity LT-286.

Sector

A contiguous section of a disk track that provides an address at which the computer can access data.

Self test

A diagnostic procedure performed automatically when the computer is turned on.

Serial

A type of interface in which data is transmitted one bit at a time (as distinguished from parallel, a type of interface in which data bits are transmitted in groups).

Software

The programs that enable the computer to perform the tasks and functions you indicate.

Source diskette

The diskette that you are copying files from, as opposed to the target diskette, which is the diskette you are copying files to.

Stop bit

A signal sent in serial communications to mark the end of a character.

Subdirectory

A disk directory that branches down from another subdirectory or from the root directory.

Switch

An option added to an MS-DOS command that affects the way the command works. See Parameter.

System diagnostics

A set of programs you can run to verify the integrity of the computer's hardware components. See Appendix D.

System diskette

A diskette from which the operating system can be booted. An MS-DOS system diskette must contain the file COMMAND.COM plus two hidden MS-DOS program files. To create a system diskette, use the /S switch with the FORMAT command (for example, FORMAT A: /S).

Target diskette

The diskette that you are copying files to, as opposed to the source diskette, which is the diskette you are copying files from.

TPI

Tracks Per Inch. A measure of the density with which data can be stored on a diskette.

Track

A circular region on a diskette, which is divided into sectors. Each side of a 1.44MB or 720KB diskette has 80 concentric tracks. Each side of a 360KB 5 1/4-inch diskette has 40. On a hard disk, tracks are called cylinders.

Utility program

A type of application program designed to perform housekeeping chores, such as copying files, creating directories, and so on. HELP, MENU, SELECT, and XTREE are examples of utility programs.

VGA

Video Graphics Array. A type of video monitor that can display graphics. You can install a video card for a VGA monitor in the Equity LT-286's optional expansion chassis.

Volume label

A name (up to eleven characters in length) you can assign to a diskette or hard disk. To format a diskette and create a volume label, use the /V switch with the FORMAT command, or use the SELECT program. To add or change a volume label for a diskette or hard disk that has already been formatted, use the MS-DOS LABEL command or the XTREE program.

Wildcard character

A character that represents an unknown character or group of characters. MS-DOS recognizes two wildcard characters: * and ?. The asterisk represents a group of characters, and the question mark represents a single character.

Write

To record data on a disk.

Write-protect

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

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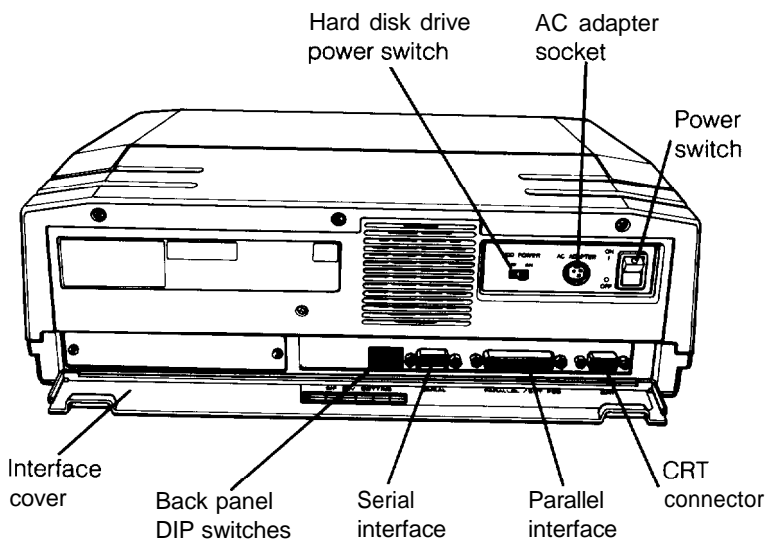
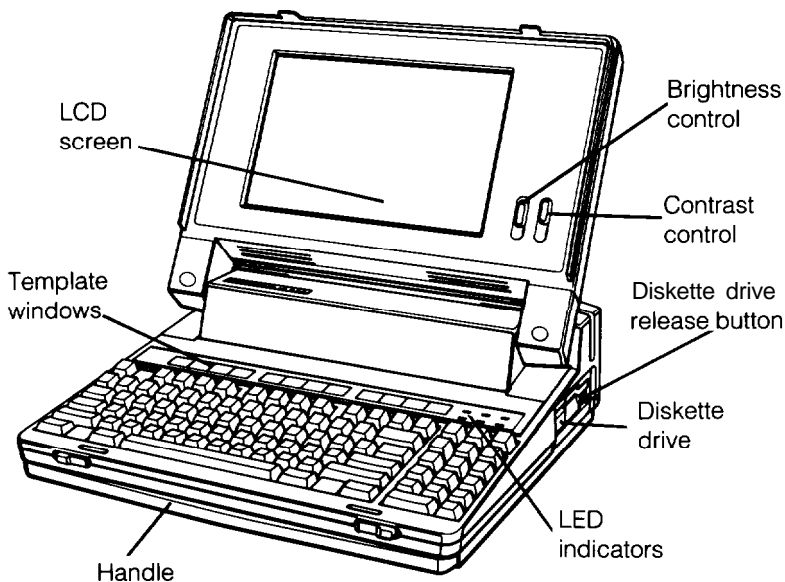
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