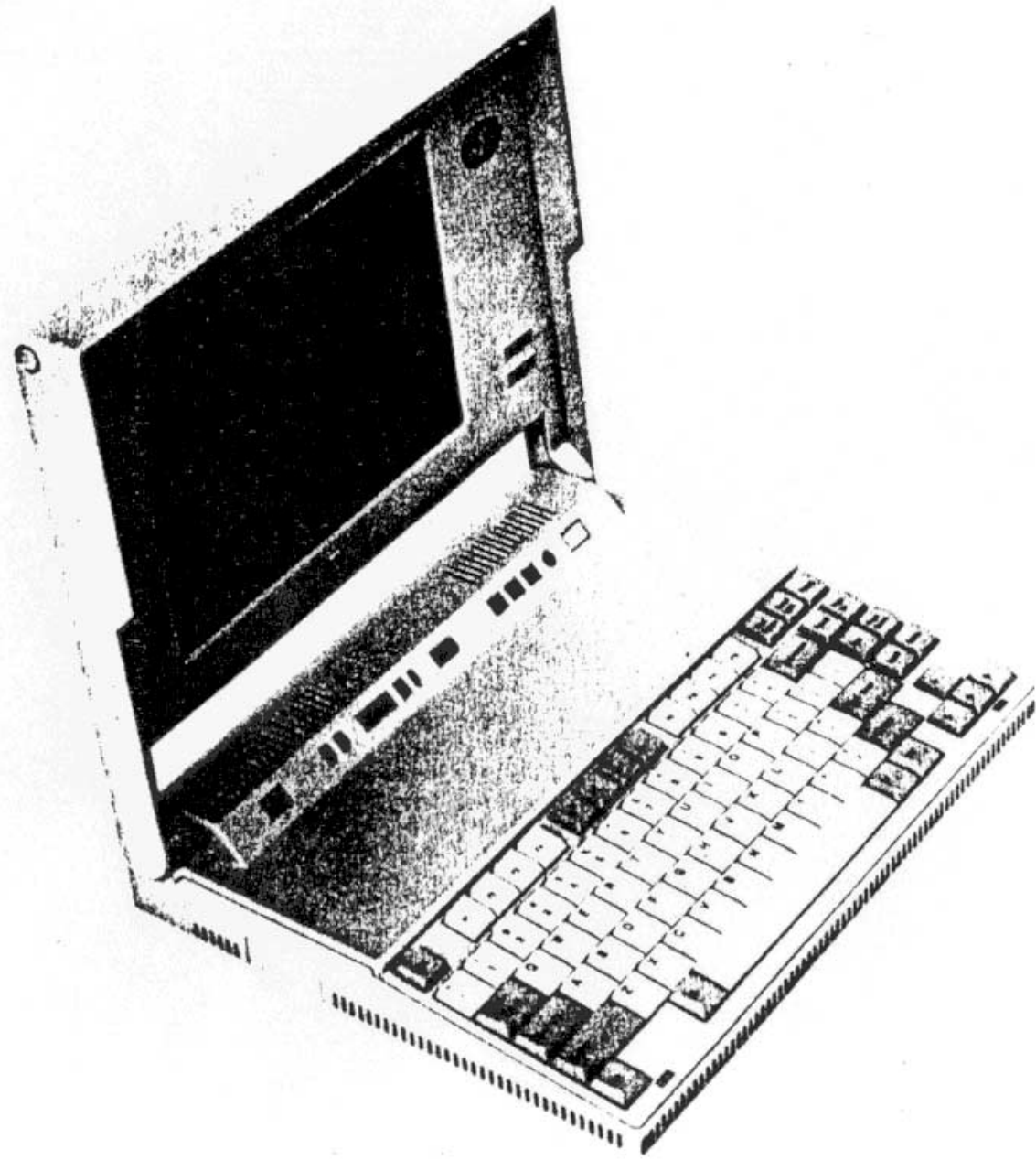




Personal System/2 Model L40 SX

Quick Reference



Notes:



Personal System/2
Model L40 SX

Quick Reference

First Edition (February 1991)

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CAUTION:

This product is equipped with a 3-wire power cord and plug for the user's safety. Use this power cord in conjunction with a properly grounded electrical outlet to avoid electrical shock.

The following information should be recorded and retained.

IBM Product Name	<i>IBM Personal System/2 Model L40 SX</i>
IBM Model Number	
IBM Serial Number	

- For the location of the type/model and serial numbers, see step 4 on page 8.
- The model number of this product has a preface of:
“Type” or
“Model.”
- The serial number of this product has a prefix of **S/N**.

CAUTION:

The backup battery (3V, 1200 mAh, UL" recognized component or equivalent) contains less than 500 mg of lithium and can be harmful to people and may explode if not properly used, handled, or disposed of, such as: (1) thrown into water, (2) overheated to more than 100°C (212°F), or (3) attempting to recharge, repair, or disassemble. Dispose of it as required by your company's safety procedures or local procedures.

CAUTION:

The standby battery contains a small amount of nickel and cadmium. Do not disassemble it, Incinerate it, or short-circuit it. Dispose of it as required by your company's safety procedures or local procedures.

CAUTION:

The fluorescent light contains a small amount of mercury. Dispose of it as required by your company's safety procedures or local procedures.

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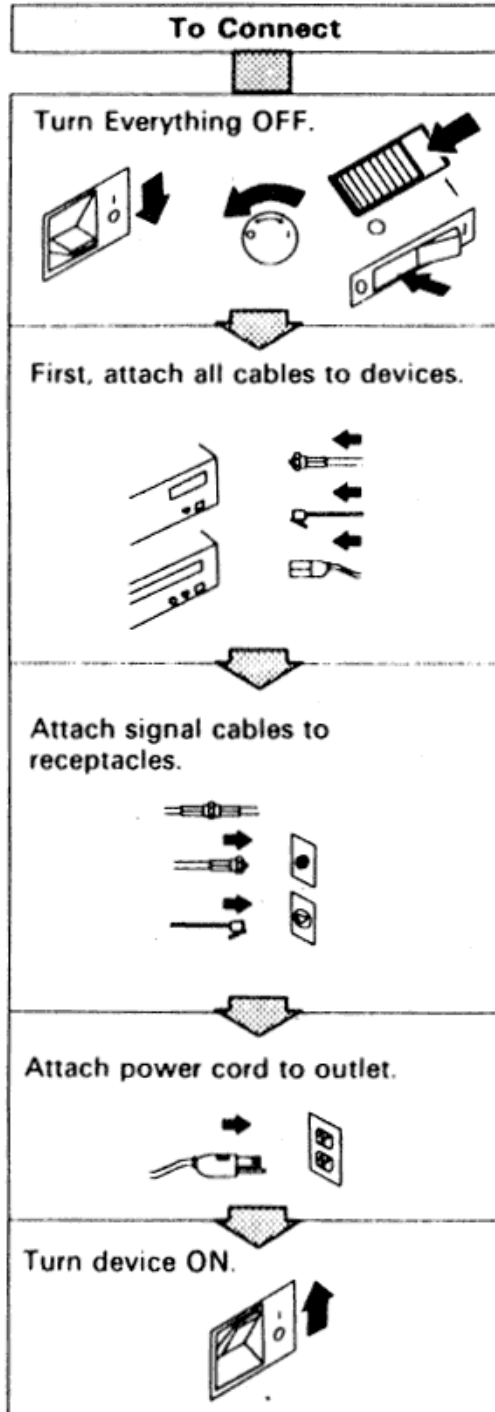
Intel	Intel Corporation
Lotus	Lotus Development Corporation
Microsoft	Microsoft Corporation

UL Underwriters Laboratories Inc.

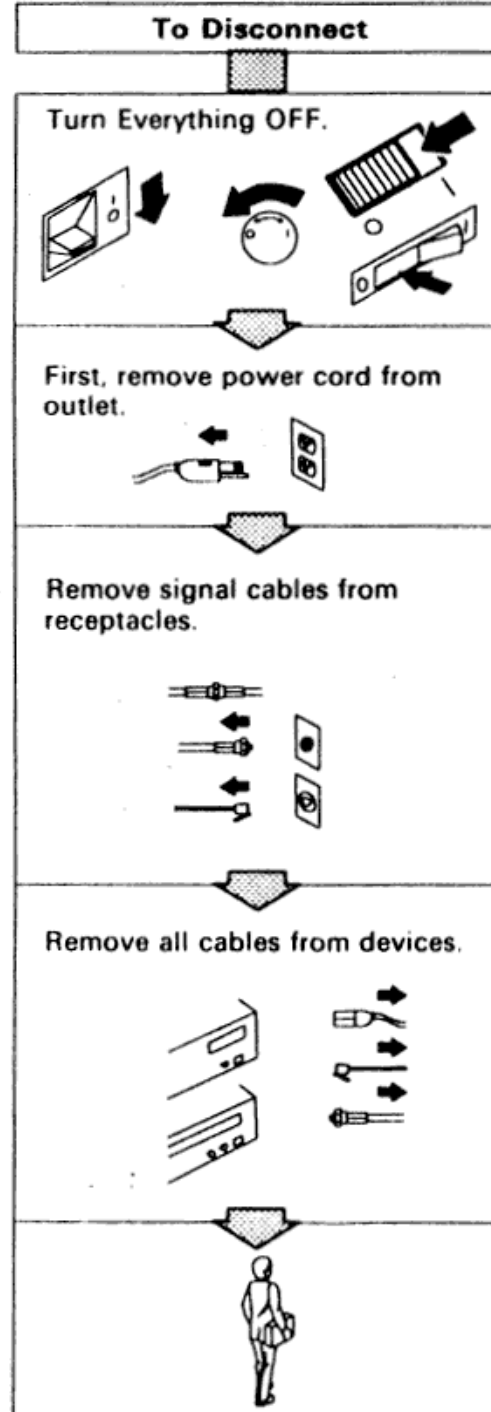


DANGER:

Electrical current from power, telephone, and communication cables is hazardous. To avoid shock hazard, connect and disconnect cables as shown below when installing, moving or opening the covers of this product or attached devices. The power cord must be used with a properly-grounded outlet.



Note: In the UK, by law, the telephone cable must be connected after the power cord.



Note: In the UK, by law, the power cord must be disconnected after the telephone line cable.

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Getting Started

This section provides information for carrying and caring for your computer and explains how to set up and start your computer.

This section contains:

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Carrying the Computer

When you carry the computer, follow these instructions.

- 1 Remove any diskette from the drive.
- 2 Turn off all attached options.
- 3 Unplug all external cables and cords connected to the computer.
- 4 Firmly close the display. It is recommended that the display be closed whenever the computer is moved in order to prevent any damage to data on the fixed disk.

You can now carry the computer. Using the carrying case and carrying the Reference Summary and the backup copy of the Reference Diskette are recommended.

Caring for Your Computer

For maximum computer efficiency, follow these instructions.

- To prevent damaging the LCD:
 - Avoid scratching to its surface
 - Avoid placing anything heavy on the LCD when closed
 - Avoid twisting or hitting to the LCD
- Keep your computer away from devices that generate a strong magnetic field such as a motor, refrigerator, or speaker.
- Your computer is designed to operate in temperatures between 5°C and 35°C (41°F and 95°F). However, if you plan to use the diskette drive, you should be aware that diskettes cannot be used below 10°C (50°F). If the temperature is outside this range, the temperature icon appears on the system status display; the computer automatically enters Suspend Mode.
- Keep your computer in a place where the humidity is between 5% and 95% (non-condensing). If the humidity is outside this

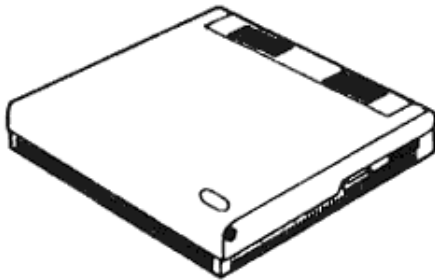
range, the dew point (humidity) icon appears on the system status display panel.

- If you do not use your computer for a long period, remove the rechargeable battery from the center compartment and keep it in a cool place.

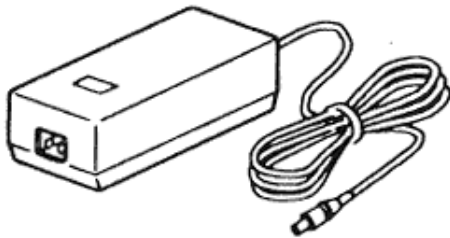
Before Setting Up

Before starting to set up, check that you have the following items. If any are missing or damaged, call your IBM Marketing Representative or IBM Authorized Dealer.

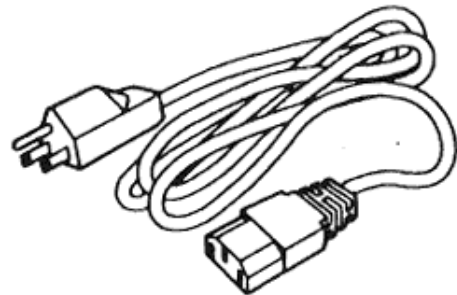
Model L40 SX



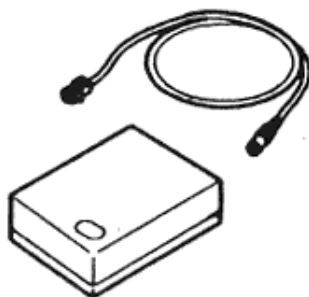
AC Adapter



Power Cord



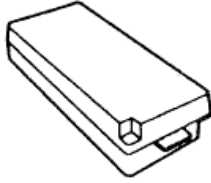
Numeric Keypad



Reference Diskette



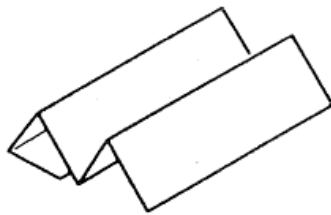
Rechargeable Battery



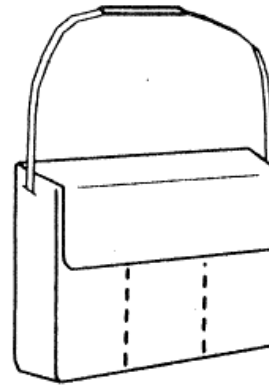
Quick Reference (this book)



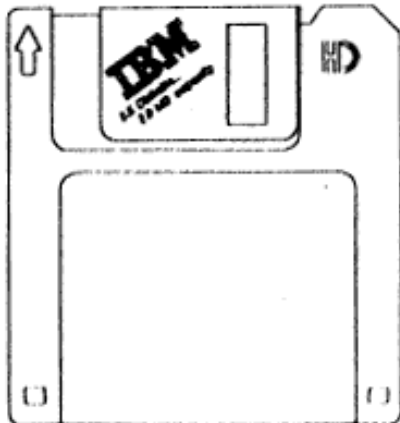
Reference Summary



Carrying Case



ATTENTION

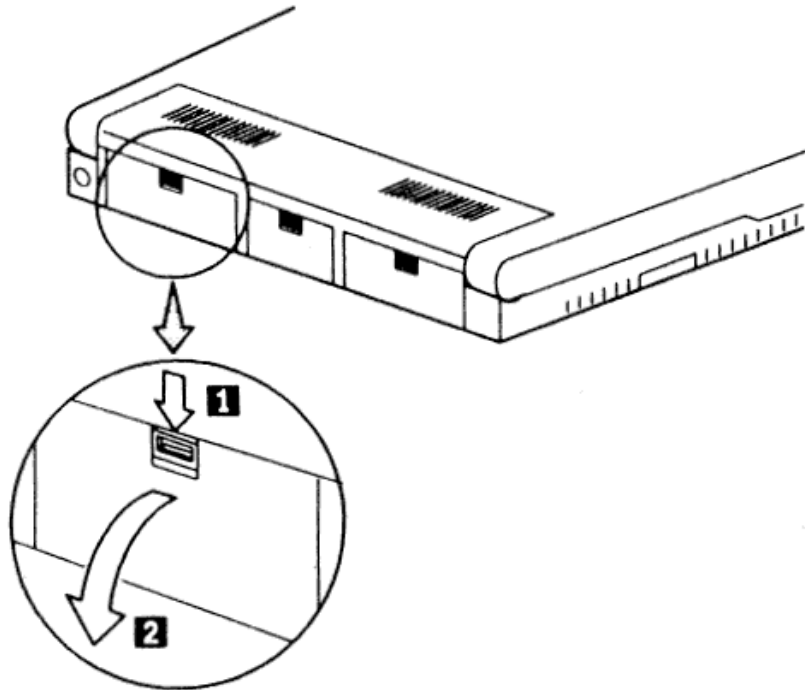


The setup procedure requires making a copy of the Reference Diskette. Obtain one blank diskette whose storage capacity is 2MB (Megabytes. 1MB = 1 048 576 bytes.). To identify a 2MB diskette, see page 84.

Setting Up Your Computer

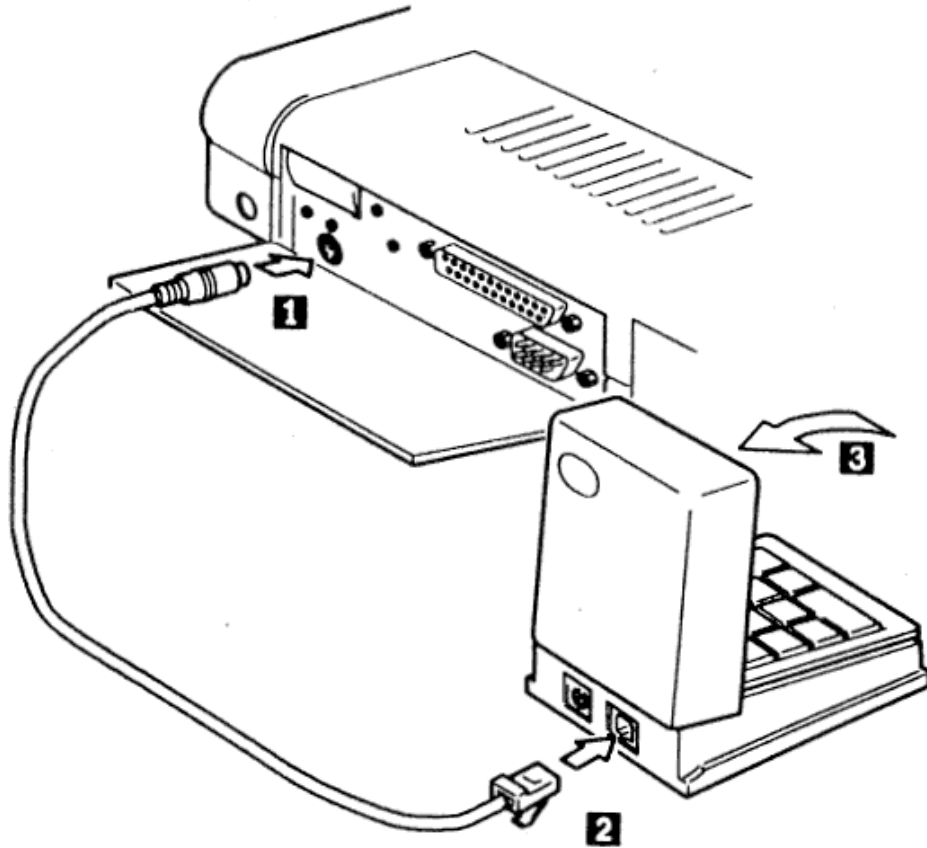
Set up your computer as follows.

- 1 Open the left compartment cover in order of ① and ②

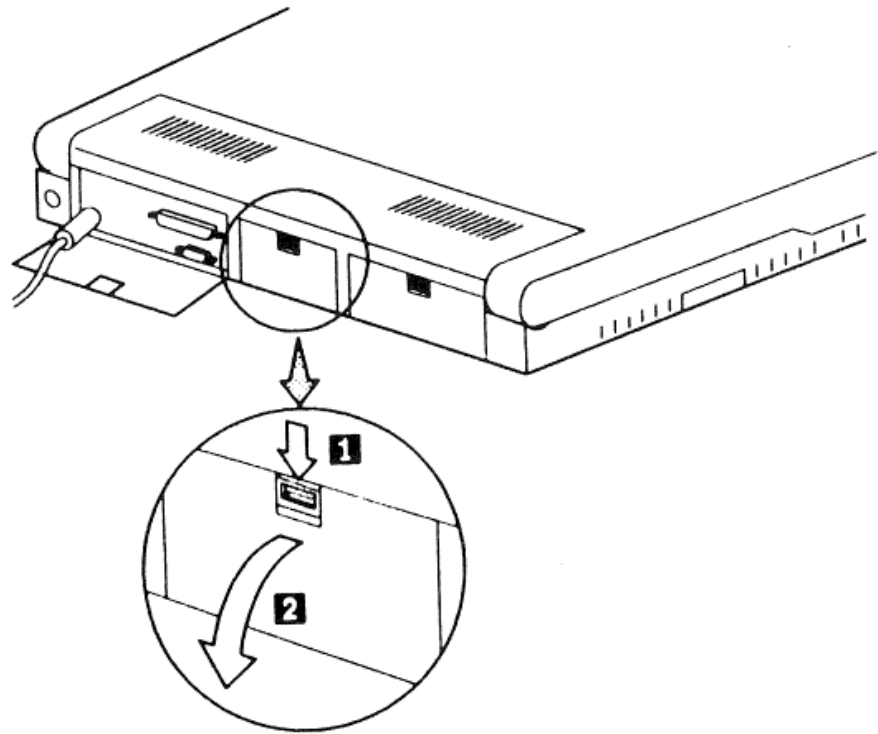


2 Connect the numeric keypad connector in order of **1** and **2**

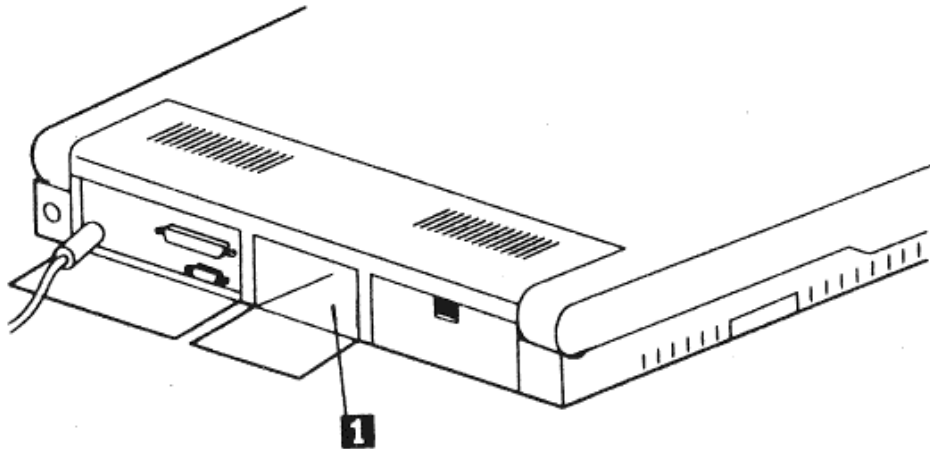
Open the cover of the numeric keypad **3**



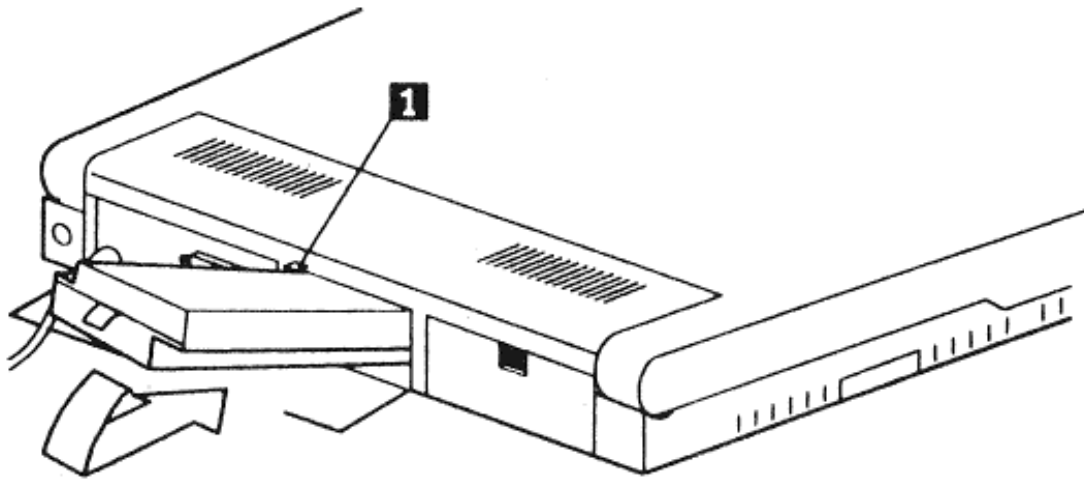
- 3** Open the center compartment cover in order of **1** and **2**



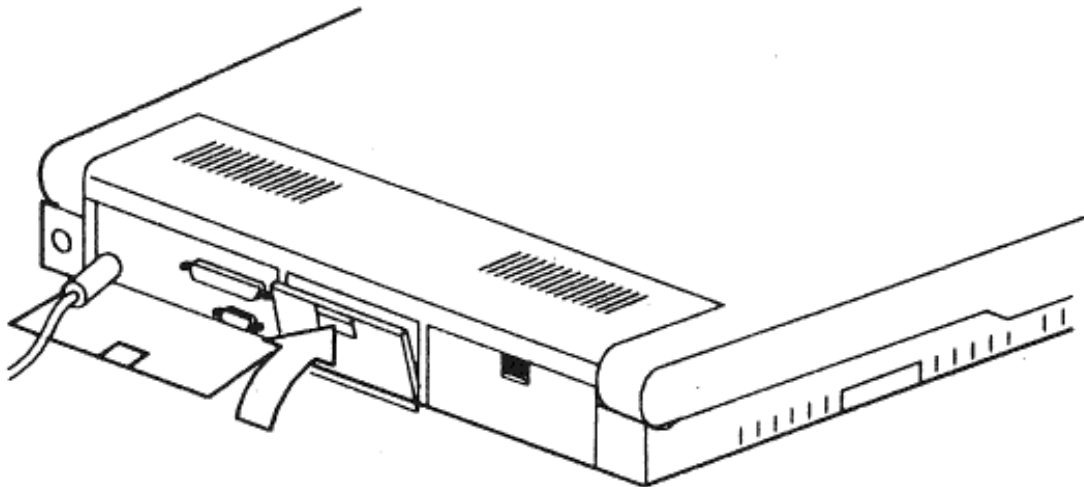
- 4** Write the machine model and serial numbers **1** on page iv.



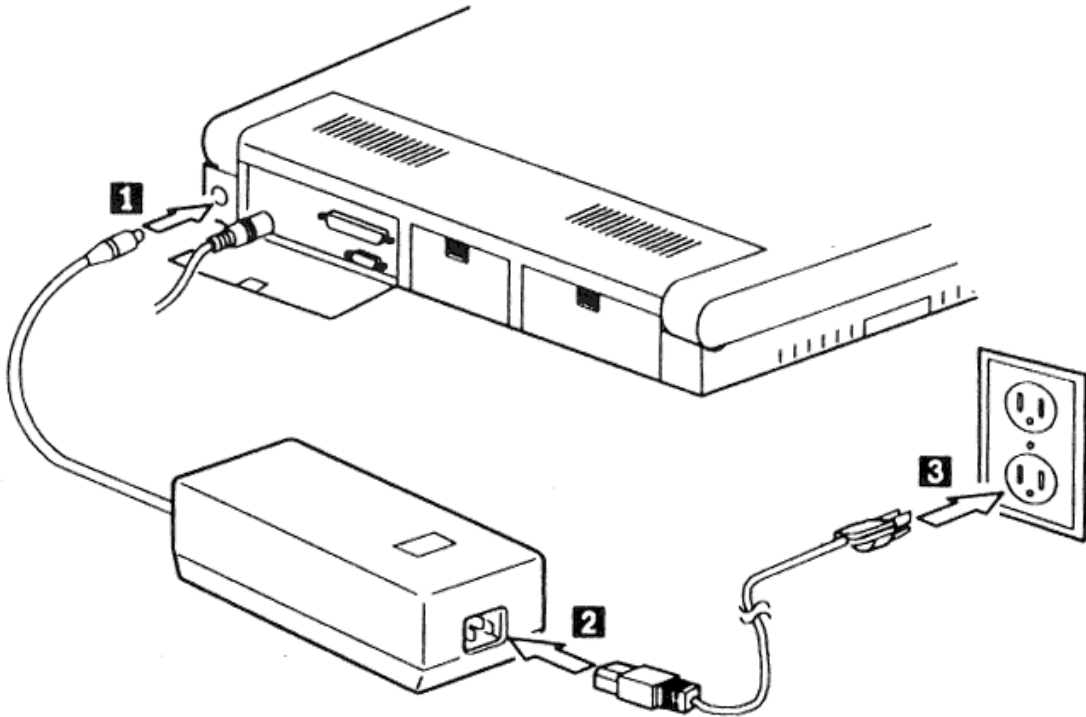
- 5** Insert the rechargeable battery into the center compartment by tilting it to clear the latch **1** lower the battery and press it in until it clicks into place.



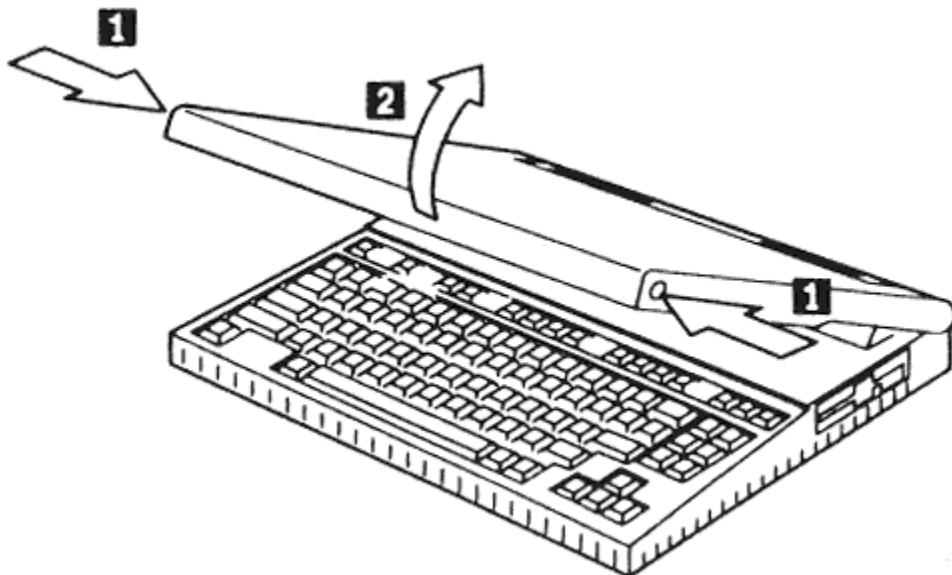
- 6** Close the center compartment cover.



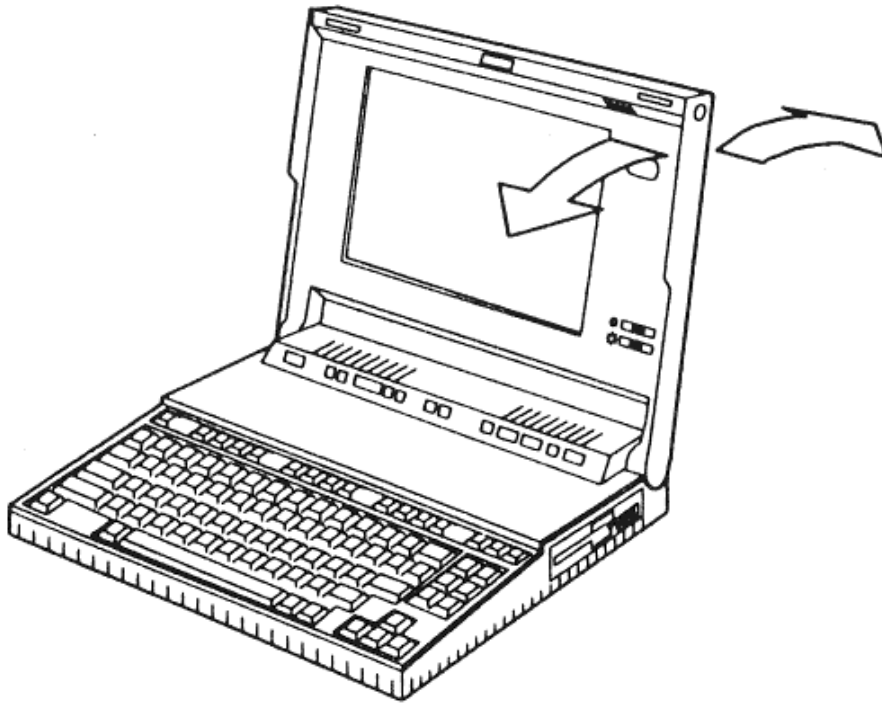
- 7** Plug the AC adapter into the computer **1**. Plug the power cord into the AC adapter **2**; plug the other end into a properly grounded electrical outlet **3**.



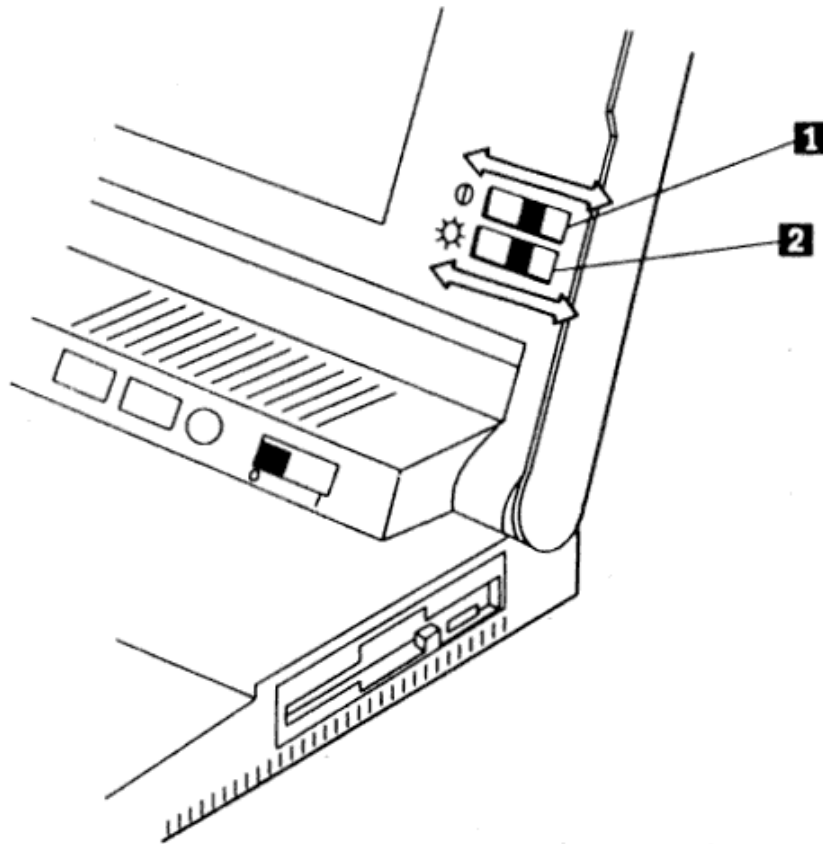
- 8** Push in the release buttons **1** and lift to raise the display **2**



- 9** Adjust the display angle for your viewing comfort by moving it back and forth.



- 10** Set both Contrast **1** and Brightness **2** Controls to their middle position.



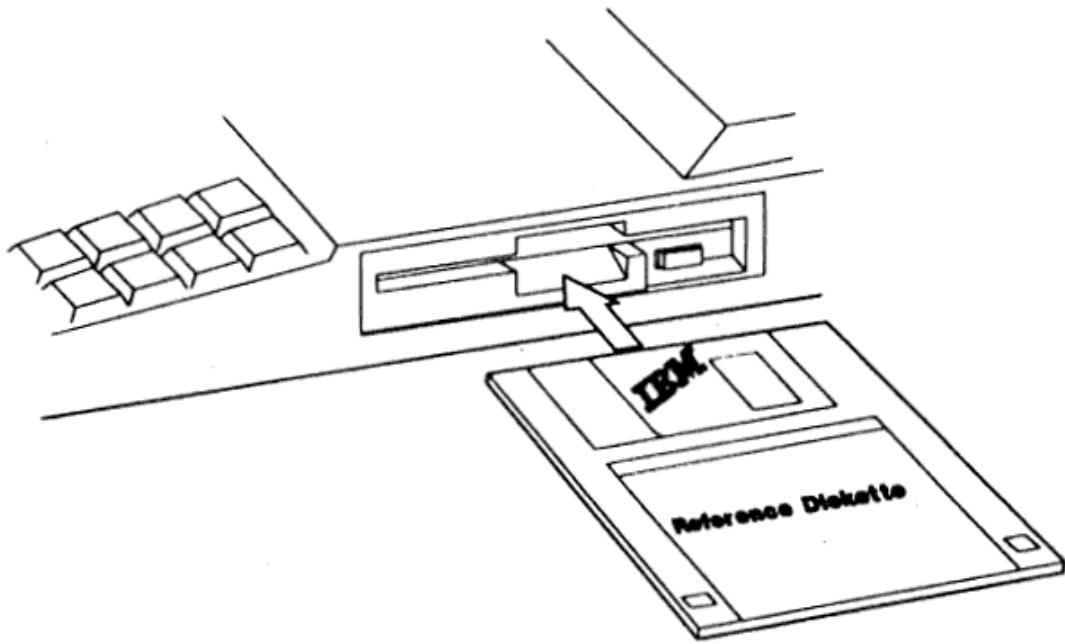
- 11** Gather the following diskettes in one place.

- The Reference Diskette.
- A blank diskette whose storage capacity is 2MB. Ensure that it is write-enabled.

Notes:

- a. For how to identify a 2MB diskette, see page 84.
- b. For how to write-enable the diskette, see page 85.

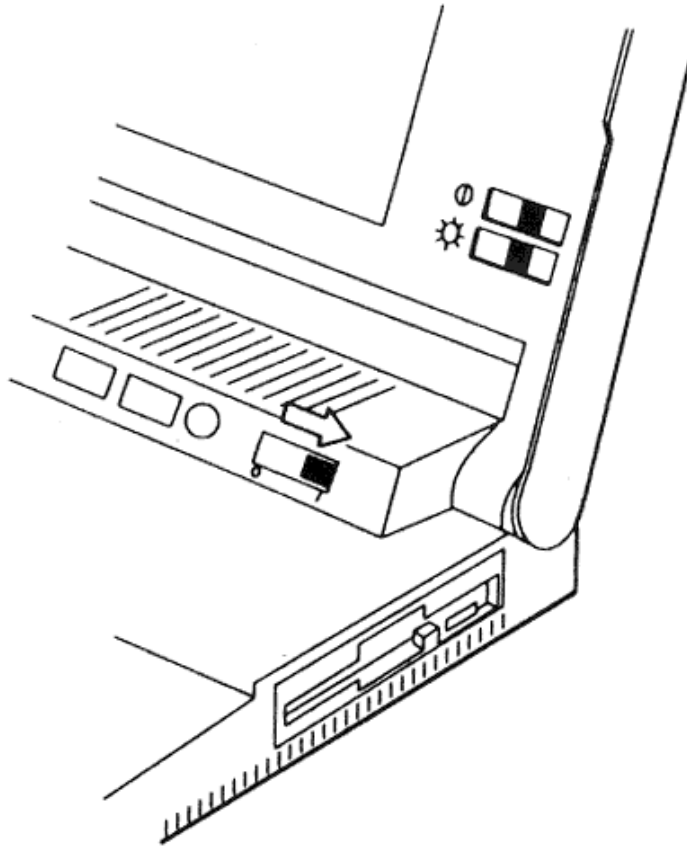
- 12** Insert the Reference Diskette, with the label facing up and metal-shutter end first, into the drive. Make sure the diskette clicks into place.



13 Is the computer turned on?

No Turn on the computer as shown in the following figure.

Yes Press Ctrl+Alt+Del.

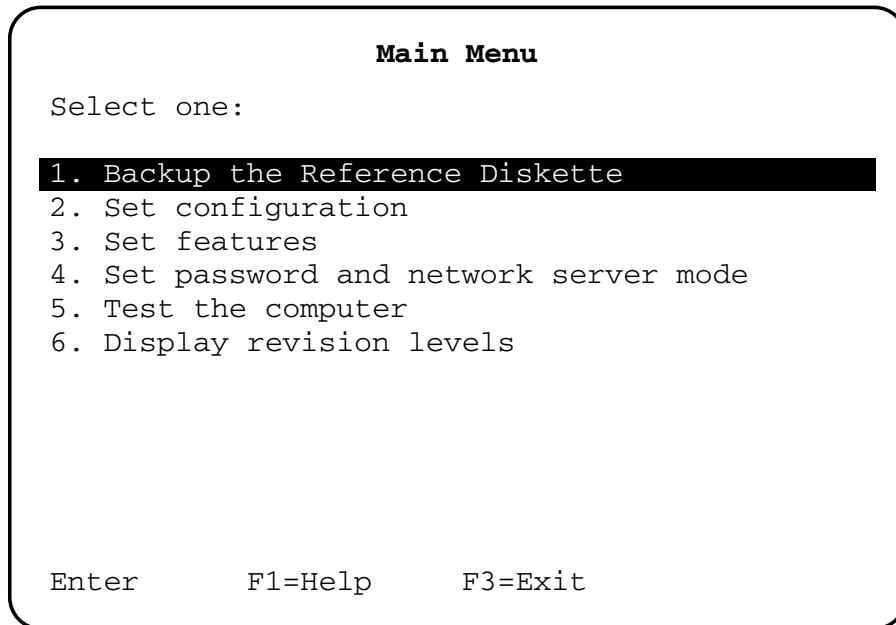


After a short wait, a large IBM-logo appears on the screen.



If a screen other than the above appears, or nothing appears, go to step 2 on page 69.

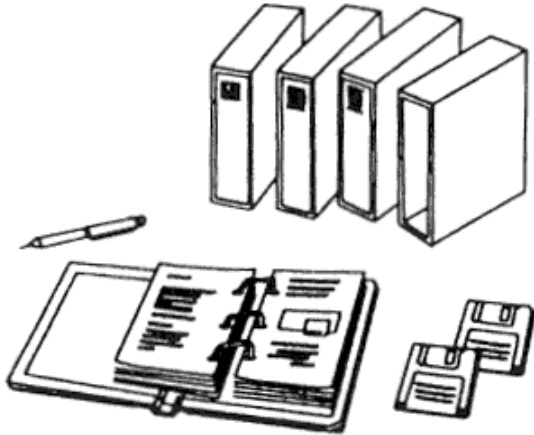
- 14** Press Enter; the following screen should appear. Otherwise, follow the instructions on the screen until the following screen appears.



Follow the instructions on the screen to make a backup copy of the Reference Diskette.

- 15** Remove the backup copy of the Reference Diskette from the diskette drive. Store it in a safe place. Turn off the computer.

16 Install your operating system and application programs.



Follow the instructions that come with these manuals and diskettes.

17 If you installed OS/2, do the following to install the Power Management Device Driver program.

- a. Insert the backup copy of the Reference Diskette into the drive.
- b. At the OS/2 prompt, type `A:PMNGINST` and press Enter.
- c. If the installation was successfully completed, remove the backup copy of the Reference Diskette.
- d. Press `Ctrl +Alt +Delete` to restart the system.

18 If you use the EMS memory under DOS 4.00, install the EMS memory manager. The instructions are provided in Appendix C. "Installing the EMS Memory Manager" on page 95.

19 If you install the Microsoft® Windows V3.0, change the line, **device=C:\himem.sys**, of CONFIG.SYS file to **device=C:\himem.sys /M:2** during the installation. After the installation, add a line, **EMMEXCLUDE=E000-EFFF**, to SYSTEM.INI file.

® Microsoft is a trademark of Microsoft Corporation.

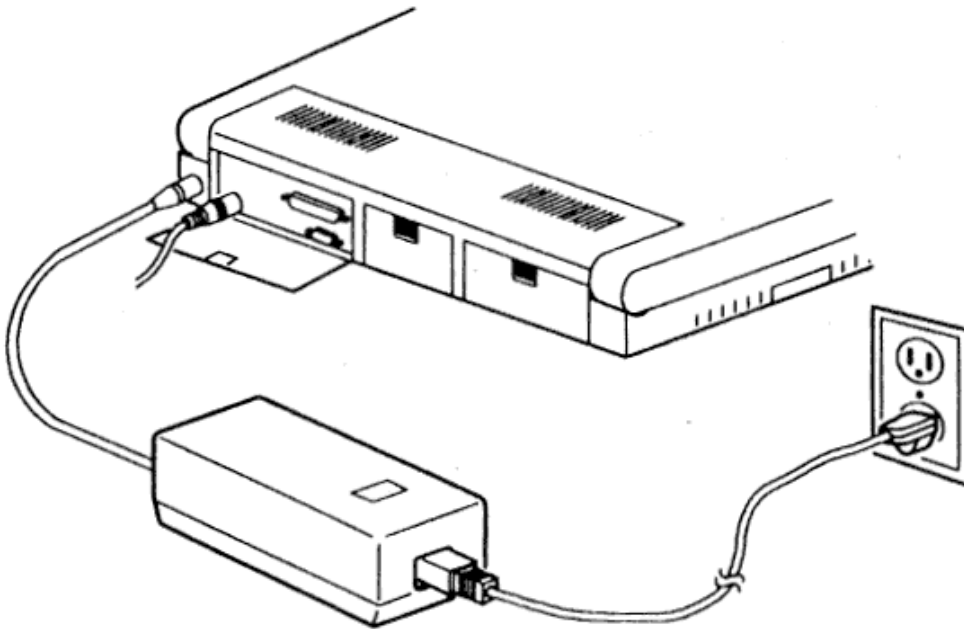
Important

The rechargeable battery is not charged at the time of shipment. Therefore, a **FIRST CHARGE** is necessary for operating the computer with the rechargeable battery.

To charge:

Leave the AC adapter connected. The battery charges if the computer is turned on or off. It takes approximately 10 hours to charge the battery if the computer is turned on or off.

If you have the battery quick charger, use it to minimize the charging time.



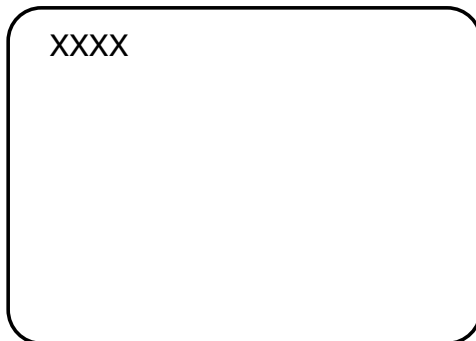
This completes the setup of your computer.

You can set a power-on password for your security. Refer to "Setting Passwords" on page 49.

Starting Your Computer

This section explains start-up after the power is turned on, and provides steps to ensure it is working properly.

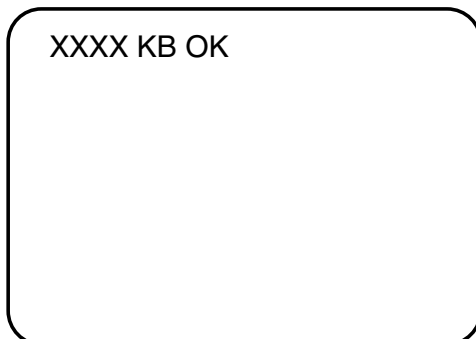
- 1** Turn on the power switch.



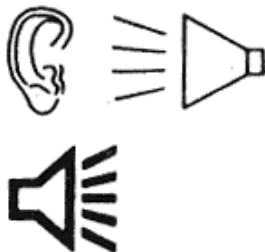
The computer automatically starts its self-test.

The computer memory is now being tested. The number (XXXX) increases until it matches the amount of usable memory.

- 2** The following screen appears.



- 3** One beep sounds and the speaker icon is displayed on the system status display panel at the same time.



The computer has successfully completed its self-test.

2 You see one of these on the screen:

- Password Prompt
- Error Prompt
- Diskette and F1 Prompts
- The beginning of your program.

If something else appears, there is a problem. To fix the problem, go to "Solving Computer Problems" on page 67.

Password Prompt

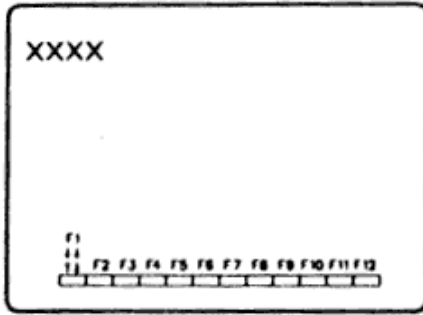


Meaning: The computer is requesting that you enter the power-on password. When a power-on password is set, the password prompt (0-n) appears each time the computer is turned on.

Note: There is a case in which the password prompt does not appear but you must enter the power-on password. It is when the computer returned to Resume Mode. For more information, see "Power-On Password" on page 49.

Action: Type the correct power-on password and press Enter.

Error Prompt

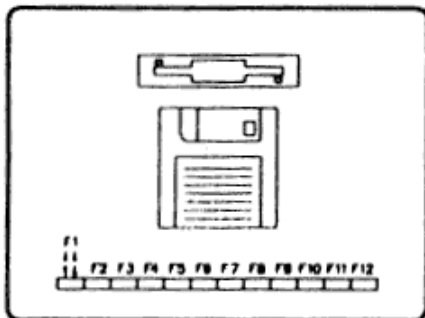


Meaning: The computer detected an error during the self-test. The cause of the error is one of the following.

- There is a problem with the computer.
- The computer configuration is not set correctly with the backup copy of the Reference Diskette.

Action: Insert the backup copy of the Reference Diskette into the diskette drive and press F1. Follow the instructions on the screen. If the instructions do not remove the error prompt, have the computer serviced.

Diskette and F1 Prompts



Meaning: There is no operating system installed on the fixed disk (hard disk). Or no diskette or an unreadable diskette is in the diskette drive. When the computer is turned on, it tries to read from one of these two sources.

Action: Insert a diskette with your operating system on it into the diskette drive and press F1 to start the diskette.

Introducing the IBM Personal System/2 Model L40 SX

The IBM¹ Personal System/2¹ Model L40 SX (hereafter referred to as the Model L40 SX) is a new generation of IBM personal computer. Because of its compact size and light weight, it can be easily carried from place to place. Furthermore, the rechargeable battery makes the Model L40 SX well suited to operate outside an office environment, such as in a car, train, or other place where no external power source is available.

Although the Model L40 SX is small, it can support a wide range of application programs compatible with the IBM Personal Computer AT¹.

The distinctive qualities of the Model L40 SX are:

- Laptop size computer
- Battery powered
- High-performance 32-bit microprocessor
- High-resolution liquid crystal display (LCD)
- Memory expandable up to 18 MB
- High capacity fixed disk drive (hard disk drive)
- Diskette drive

This section contains:

Basic Features	22
Accessory.....	22
Optional Features	22
Identifying the Computer Features	24
System Status Display	28

¹ IBM, Personal System/2, and Personal Computer AT are trademarks of the International Business Machines Corporation.

Basic Features

Rechargeable battery

This is installed at the rear of the computer and supplies power necessary to operate the computer.

Numeric keypad

This is an external keypad consisting of 17 data keys labeled with 0 through 9 and special characters. The numeric keypad also has a connector for a mouse.

AC Adapter

This is a portable power device that converts ac voltages into dc that allows you to operate the Model L40 SX with ac power.

Accessory

Deluxe Carrying Case

This provides additional carrying capacity and convenience.

Optional Features

You can have the system capabilities expanded by installing the following options. Contact your IBM Marketing Representative or IBM Authorized Dealer.

Update Configuration

If optional features other than the quick charger, spare rechargeable battery are installed, update the system configuration using the **Run automatic configuration** program of the backup copy of the Reference Diskette. For more information, see "Using the Reference Diskette" on page 43.

- **Internal Data/Fax Modem**

This is a dual function modem that not only operates as a data modem but also as a facsimile (Fax) modem.

The data modem operates at a speed of up to 2400 bps in full-duplex mode. The fax modem can be operated at a speed of up to 9600 bps in half-duplex mode.

Note: This optional feature is available only in the U.S. and Canada.

- **Math Coprocessor**

This enables your computer to perform high-speed arithmetic operations.

- **Memory Module Kit**

This upgrades the memory size of your computer by installing 2MB-, 4MB, or 8MB-memory module kits into 2 expansion memory connectors inside the computer.

Note: You cannot select the combination of two 4MB-memory module kits; select one 4MB- and one non-4MB-memory module kits.

- **Quick charger**

Is a device that completely charges the rechargeable battery in about 2 hours. To charge the rechargeable battery, you remove it from the computer, then set it on the quick charger.

- **Serial Adapter**

This provides a second serial RS-232D interface for external communication. Operating instructions are covered in Appendix B, "Operating Instructions for the Serial Adapter" on page 91.

- **Spare Rechargeable Battery**

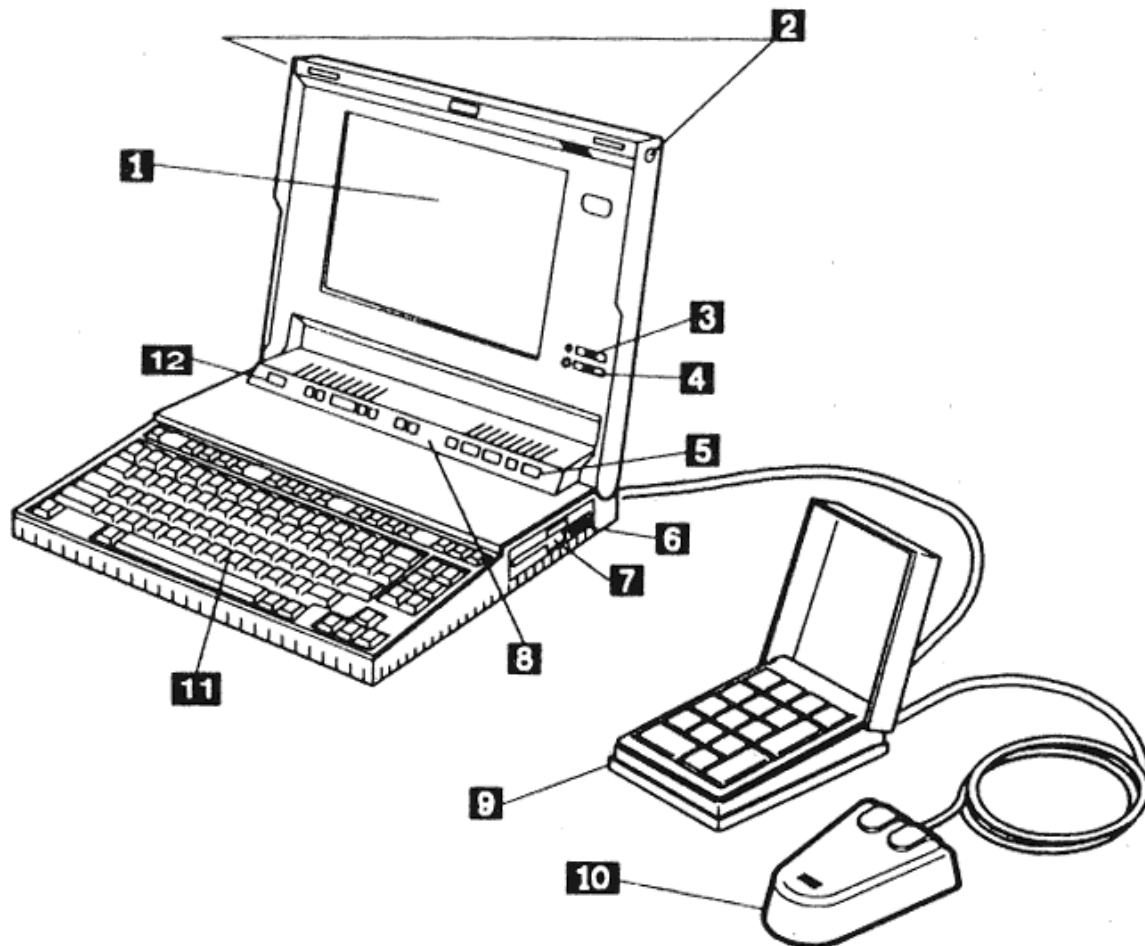
This allows you to continue your work without delay. For more information, see page 34.

- **Trackpoint**

Is a pointing device that can be used in both track ball and mouse modes.

Identifying the Computer Features

This section identifies and describes each computer feature.



1. **Display (LCD, liquid crystal display)** presents the computer output. You can also use an external PS/2¹ display by connecting it to the external PS/2 display connector at the rear of the computer.
2. **Release Buttons** are located on both sides of the computer. Pushing these buttons causes the upper part of the computer to pop-up slightly so that you can easily open the computer.
3. **Contrast Control** adjusts the contrast of the display.

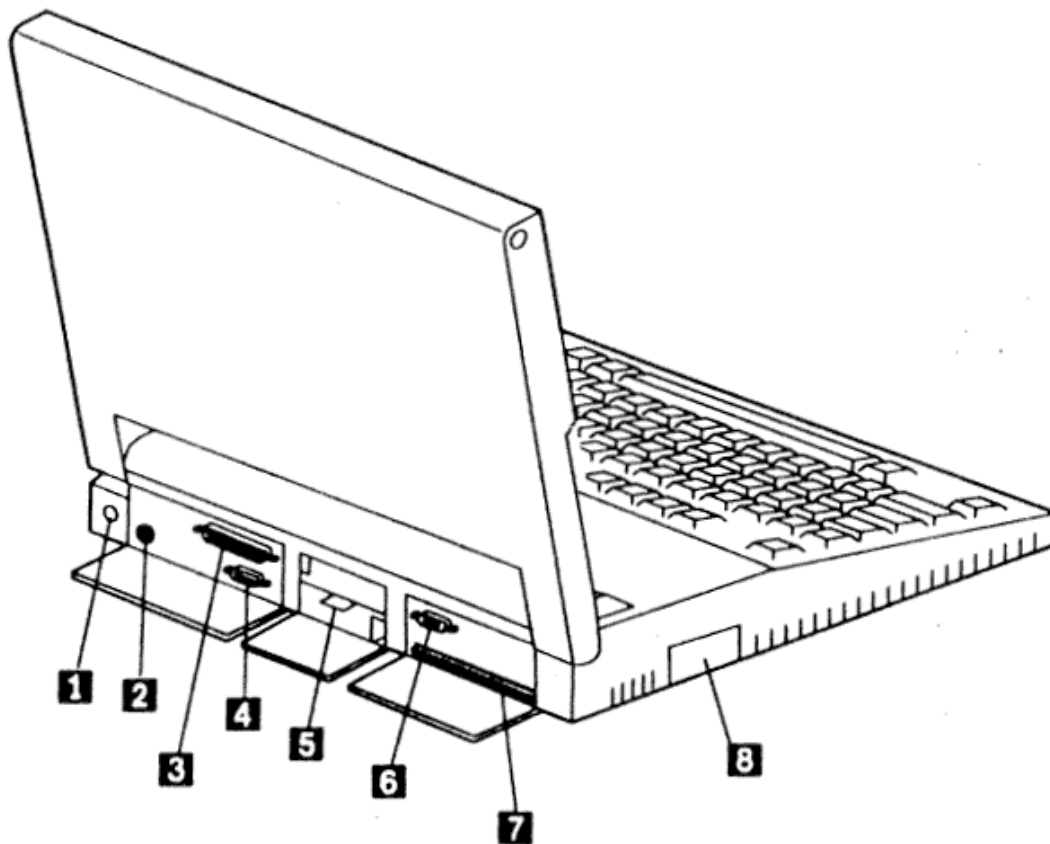
¹ PS/2 is a trademark of the International Business Machines Corporation.

4. **Brightness Control** adjusts the brightness of the display.
5. **Power Switch** turns the computer on (1) and off (O).
6. **Diskette-Eject Button** releases a diskette from the drive. 1.44 is printed on the button to indicate that it is a 1.44MB diskette drive (see page 83 for more information).
7. **Diskette Drive** reads data from or writes data to a diskette. For information about using the correct diskettes, see page 83.

Note: Because the diskette drive can be affected by a magnetic field, you should not use the system unit near electric appliances such as a TV set or a speaker. If you use a PS/2 or other display near the system unit, set it more than 13 cm (5 inches) away from the diskette drive.

8. **System Status Display** shows the computer status by using small symbols called icons (see page 28 for the meaning of each symbol).
9. **Numeric Keypad** is an auxiliary input device consisting of 17 data keys and is connected to the pointing-device connector at the rear of the computer. The numeric keypad has a connector to accept a mouse.
10. **IBM Mouse** is an optional pointing device and can be connected either to the numeric keypad or to the pointing-device connector at the rear of the computer.
11. **Keyboard** is used to enter information into the computer.
12. **Economy Switch** determines the processing speed of the computer to economize on power usage. There are two modes.

If **A** (automatic) mode is selected, the computer varies its processing speed depending on how much activity occurs. This mode conserves battery power. If the **M** (manual) mode is selected, you can run the computer at a fixed processing speed specified on the **Set Features Main Menu** (see page 56), which will not optimize battery life.



1. **Power Jack** is where the AC adapter plugs in.
2. **Pointing Device Connector** is where a mouse or keypad cable plugs in. When you connect the numeric keypad into this connector, a mouse can be plugged into the connector on the rear of the numeric keypad.
3. **Parallel Connector** is where a printer or scanner signal cable plugs in.
4. **Serial Connector** is where a serial device cable plugs in. It is fully programmable and supports asynchronous communications.
5. **Rechargeable Battery** supplies the power required to the computer. The rechargeable battery can be removed.

Note: This computer has two additional batteries installed inside the computer: the backup battery and the standby battery. For more information, see "Power Sources" on page 32.

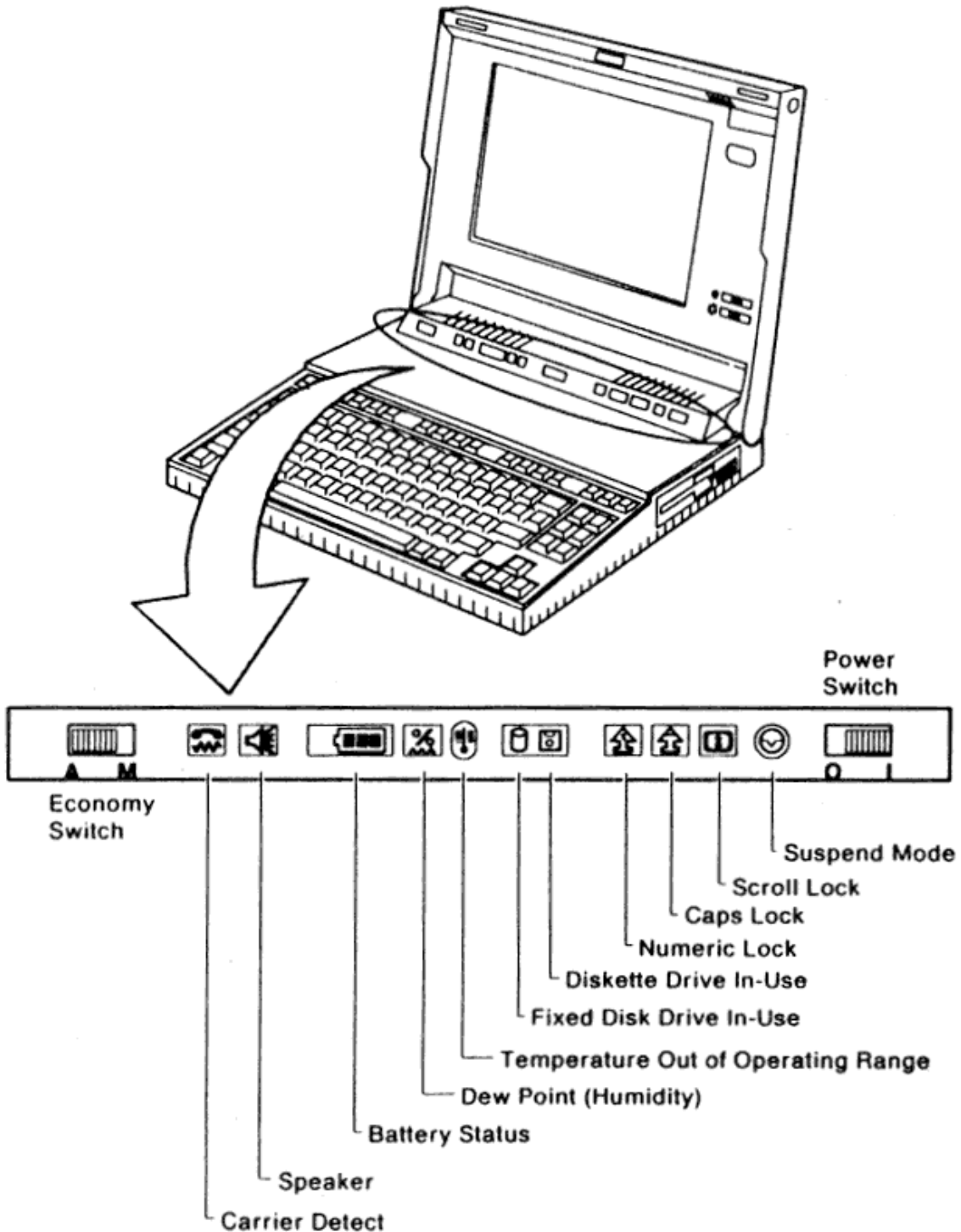
6. **External PS/2 Display Connector** is where a display signal cable plugs in if you use an external PS/2 display.











Note: If a PS/2 display is used, the LCD display is disabled.







7. **System Expansion Connector** offers an IBM Personal Computer AT compatible interface.
8. **Communication Interface Connector** is reserved for the output of the serial adapter (optional) or the internal data/fax modem (optional) for external communication.

System Status Display

This section identifies icons and explains each. Icons are displayed on the system status display panel. Icons indicate status of the computer.



Icon	Meaning
	<p>Appears when the computer has entered Suspend Mode. This icon stays on as long as the computer is in Suspend Mode.</p> <p>See "Suspend and Resume Modes" on page 40 for more information about Suspend Mode.</p>
	<p>Alternately turns on and off each time the Scroll Lock key is pressed.</p>
	<p>Alternately turns on and off each time the Caps Lock key is pressed.</p> <p>Caps lock specifies a certain character set based on the keyboard language used. Characters a through z (English) are converted to A through Z.</p>
	<p>Alternately turns on and off each time the Num Lock key is pressed.</p> <p>Numeric lock fixes the upshifted character selection on the numeric keypad.</p>
	<p>Appears when the drive is reading from or writing data to a diskette.</p>
	<p>Appears when the drive is reading data from or writing data to the fixed disk.</p>
	<p>Appears when the temperature is outside the operating range of the computer, between 5°C and 35°C (41°F and 95°F); accompanied by one long and one short beeps. Power off and do not use until the temperature of the computer is within the operating range.</p> <p>This icon disappears when the temperature of the computer is within the operating range.</p>
	<p>Appears when the humidity is outside the operating range of the computer, between 5% and 95%; accompanied by one long and one short beeps.</p> <p>This icon disappears when the humidity returns to acceptable range.</p>
	<p>Appears indicating that the speaker sounded.</p> <p>This icon blinks until any key input or mouse operation is performed.</p>
	<p>Appears when the communication link is established.</p>

Icon	Battery Status	Meaning
	Battery, Full	Appears when more than 67% of power remains in the rechargeable battery.
	Battery, Mid	Appears when 33 to 67% of power remains in the rechargeable battery.
	Battery, Low	<p>Appears when less than 33% of power remains in the rechargeable battery.</p> <p>When the remaining power of the battery is less than 3%, the computer emits three beeps and the icon starts blinking. After blinking for a while, this icon turns off and the computer enters Suspend Mode. In this case, do either of the following within 1 hour.</p> <ul style="list-style-type: none"> • Connect the AC adapter without removing the rechargeable battery. • Replace the rechargeable battery of low power with the fully-charged spare rechargeable battery. Refer to note 3 on page 41.
	Charging, Full	Indicates that the rechargeable battery is being charged and is almost completed.
	Charging, Mid	Indicates that the rechargeable battery is being charged and is 33 to 67% charged.
	Charging, Low	Indicates that the rechargeable battery is being charged and is less than 33% charged.

Operating Your Computer

This section provides information for operating the Model L40 SX.

This section contains:

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Power Sources

The Model L40 SX contains the following power sources:

- Rechargeable battery
- AC power using the AC adapter

Either of the two sources can power the computer. Use of the AC adapter is recommended when line current is available. This keeps the rechargeable battery charged and ready to use when line current is unavailable.

- Backup battery

Used to maintain stored-data (such as configuration information, date, and time) after powering off. This battery is not rechargeable and is IBM dealer-replaceable; not customer-replaceable.

- Standby battery

Supplies power to the computer during replacement of the rechargeable battery. However, the standby battery is not charged at the time of shipment. It takes 48 hours to automatically charge it using the AC adapter. Therefore, do not replace the rechargeable battery in Suspend Mode during that time. Do not operate the computer with only the standby battery. This battery is rechargeable but is IBM dealer-replaceable; not customer-replaceable.

The Model L40 SX can be operated by any of the following different power sources:

- Rechargeable battery
- AC adapter.

Using the Rechargeable Battery

CAUTION:

To avoid possible danger, follow the instructions listed below.

- Do not touch the battery terminals together with any metal parts.
- Keep the battery away from fire.
- Always keep the battery terminals clean. When they are contaminated, clean them with a soft cloth.
- Do not soak the battery in water or expose to rain.
- Do not attempt to disassemble the battery.
- Avoid any mechanical shock.

When disposing of the rechargeable battery, comply with the law of your locality or your company's safety standards.


Before Using the Rechargeable Battery


The battery is not charged at the time of shipment. Complete charging is essential before using. The working hours of the rechargeable battery may be shorter after the first charging, but this will improve after repeated charges and discharges.

When Not Using the Rechargeable Battery for a Long Period

If you do not use the rechargeable battery for a long period, remove it from the computer and keep it in a cool place. The rechargeable battery should be charged at least once every 6 months to extend the battery life.

Knowing the Amount of Power

While operating the computer, you can monitor the amount of remaining battery power on the system status display panel. If the computer detects a battery-low condition, the icon  starts blinking after three beeps to indicate that it is time to charge the rechargeable battery. For information on how to charge the rechargeable battery, see page 39.

Warning: This blinking icon  indicates that the rechargeable battery urgently needs charging and that less than 3% of the full power of the battery remains. The computer will enter Suspend Mode in approximately 1 minute to preserve data. *Do not leave the computer in this condition for more than 1 hour as this can shorten the life span of the battery.* For more information, see page 30.

For Your Convenience

Usually, a complete charge makes it possible to use the battery for up to 3 hours depending on applications and the configuration. However, a fully-charged battery gradually loses its charge if not used for a month or so. In this condition, the battery does not reach full charge by charging it only once.

It is recommended that you obtain a spare rechargeable battery so you can immediately replace the rechargeable battery with the low charge and continue your work without delay. The low battery can be replaced without losing data or saving an application. The low battery can be recharged later when you are not operating the computer. See "Charging the Rechargeable Battery" on page 39.

A spare rechargeable battery (part number 79F0197) can be ordered from IBM or an IBM Authorized Dealer.

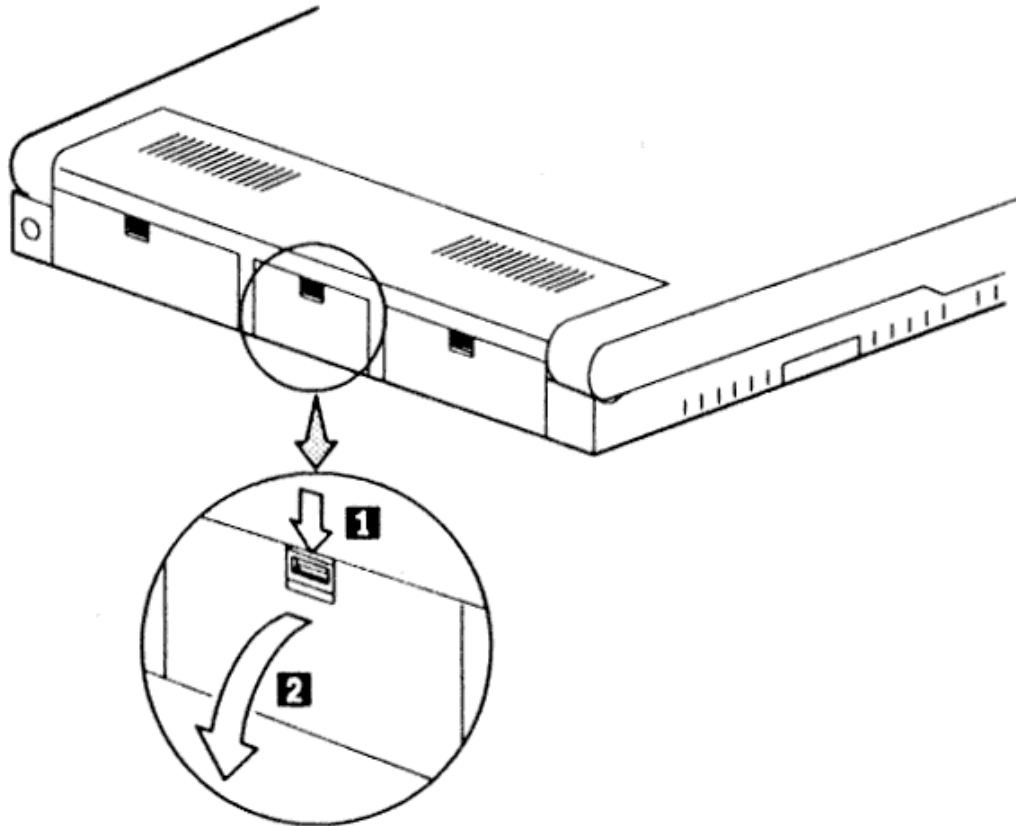
Removing the Rechargeable Battery

To remove the rechargeable battery, follow the instructions below.

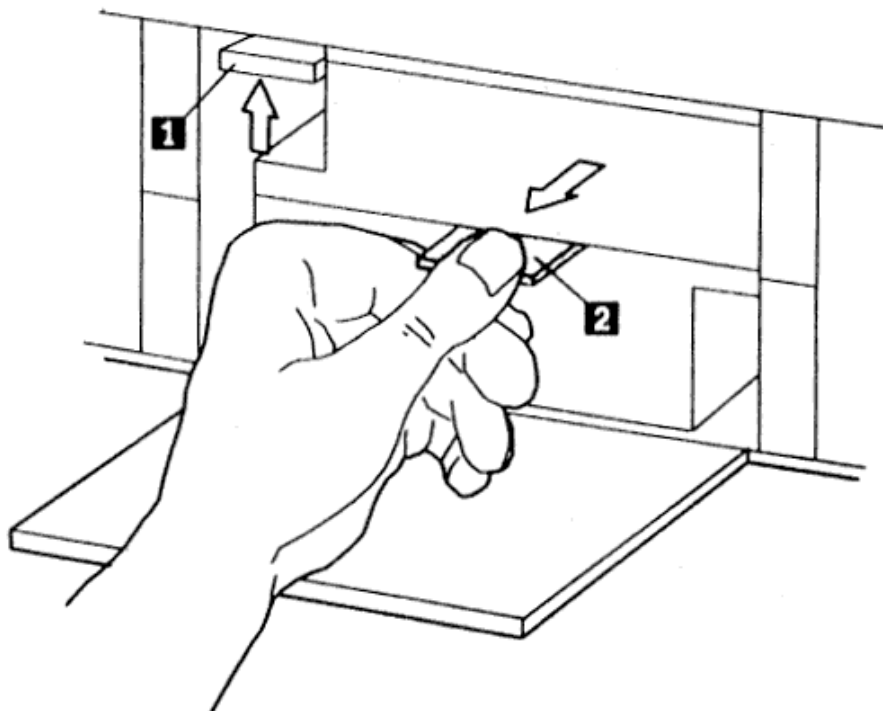
Note: Do this operation 48 hours after you start using the computer because it takes 48 hours to automatically charge the standby battery that supplies power to the computer during replacement of the rechargeable battery. The above is true of the computer that you restarted using after a long period.

1 Close the display.

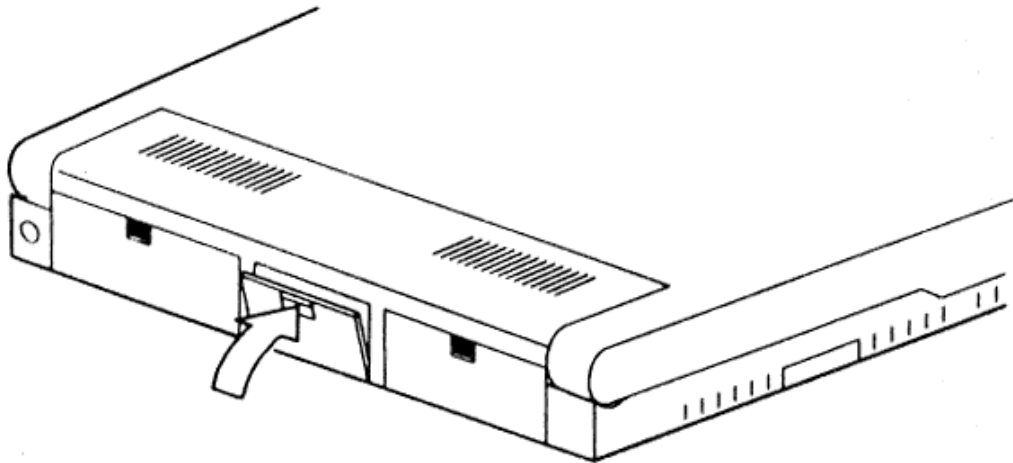
- 2 Open the center compartment cover in order of ❶ and ❷.



- 3 Raise the latch ❶ to release the rechargeable battery. Holding the tab ❷, pull the rechargeable battery out of the center compartment.



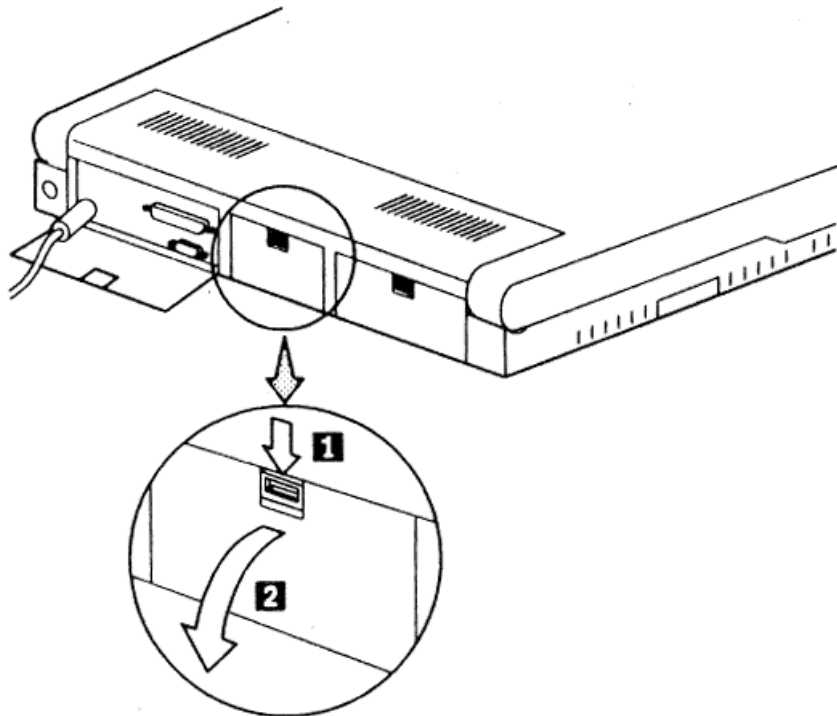
- 4 Close the center compartment cover.



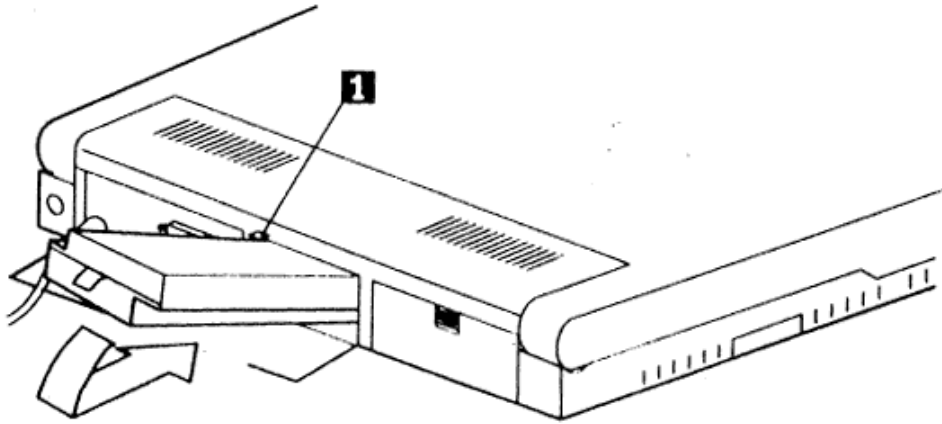
Installing the Rechargeable Battery

To install the rechargeable battery, follow the instructions below.

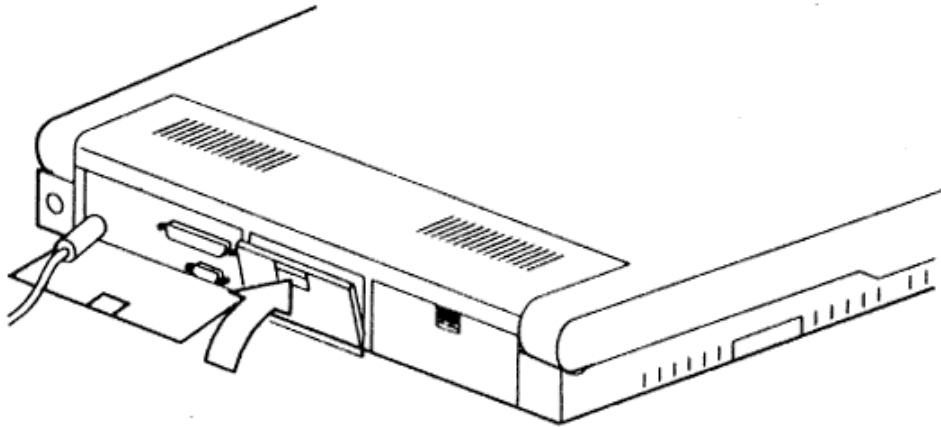
- 1 Open the center compartment cover in order of **1** and **2**.



- 2** Insert the battery into the center compartment by tilting it to clear the latch **1** ; lower the battery and press it in until it clicks into place



- 3** Close the center compartment cover.



The AC Adapter

Warning: The AC adapter is for use only with the Model L40 SX. Do not connect it to any other device. Do not use any AC adapter with the Model L40 SX, other than those authorized by IBM.

The AC adapter enables the Model L40 SX to operate under standard ac power at frequencies of 50 to 60 Hz and voltages of:

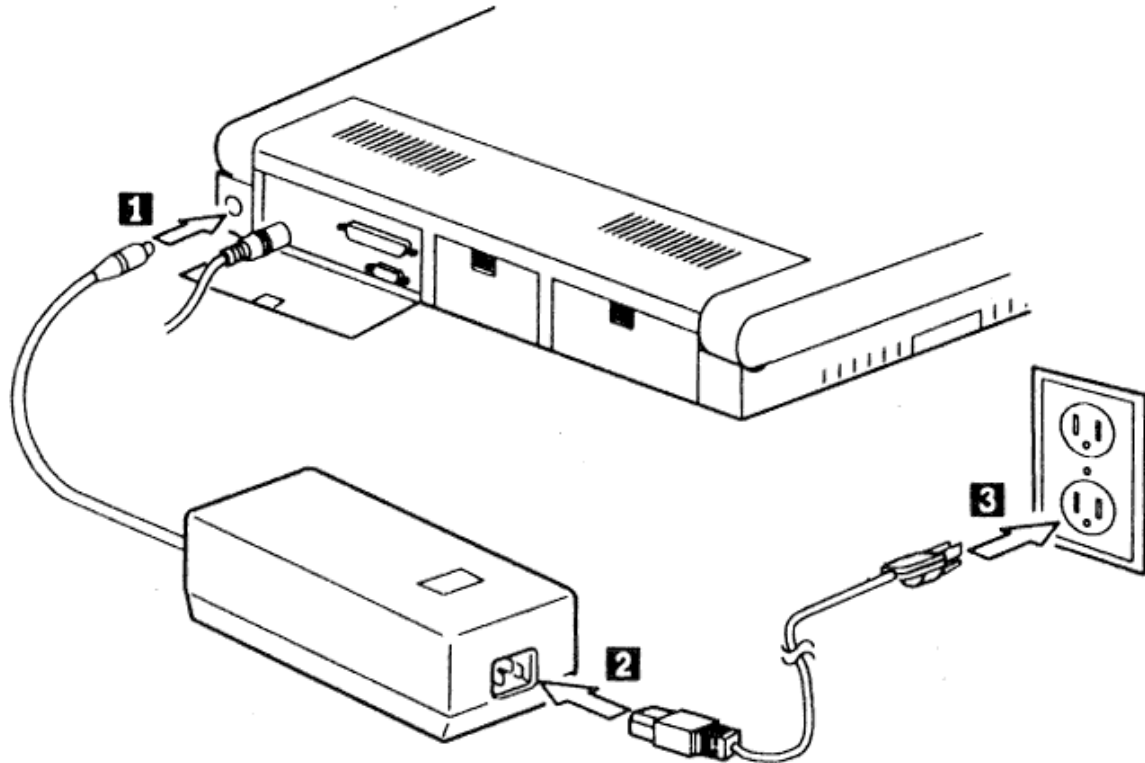
Low range: 100-125 V ac (nominal)

High range: 200-240 V ac (nominal)

Using the AC Adapter

To use the AC adapter, follow the instructions below.

Plug the AC adapter into the computer **1** . Plug the power cord into the AC adapter **2** ; plug the other end into a properly grounded electrical outlet **3** .



Note: If the AC adapter is connected, you can operate the computer even with the rechargeable battery removed. However, if you want to use the AC adapter during Suspend Mode, connect the AC adapter without removing the rechargeable battery.

Charging the Rechargeable Battery.

Warning: Do not attempt to charge the battery with any charging device other than the one recommended by IBM.

The rechargeable battery automatically begins charging when it is installed and the AC adapter is plugged in. Charging continues even when the Model L40 SX is operating.

It takes approximately 10 hours to fully charge the rechargeable battery if the computer is turned off or operating.

Note: It is normal for the rechargeable battery to be warm during or after charging.

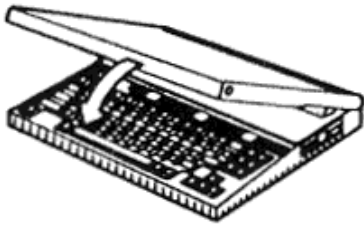
Suspend and Resume Modes

The Model L40 SX is a battery-powered computer with unique techniques to conserve battery power. For example, if the display is closed while operating the computer, it automatically enters Suspend Mode and all tasks are stopped to save power, and their present states are stored in the computer memory. Later, when the display is opened, the computer automatically returns to Resume Mode and restores the same states as when it entered Suspend Mode.

Entering Suspend Mode

The computer enters Suspend Mode when one of the following happens.

- Closing the display



Ensure Suspend Mode

1. When you close the display to successfully enter Suspend Mode
 - Two beeps sound when entered Suspend Mode from VM86 mode.
 - One beep sounds when entered Suspend Mode from any other mode.
2. To again enter Suspend Mode immediately after Resume Mode, close the display about 5 seconds after ensuring that you once returned to Resume Mode by one beep. Otherwise, you cannot know which mode the computer is in because the display has been closed even though the computer is still in Resume Mode.

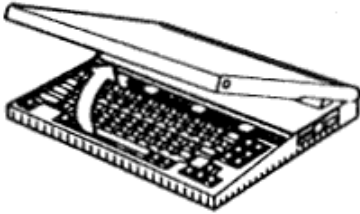
- Issuing the PS2 OFF command in the Set features program
- Setting the System power off after option to XX minutes
- Battery-low condition is detected. For more information, see page 30.

- The temperature is outside the operating range, 5°C through 35°C (41°F through 95°F).

Returning to Resume Mode

The computer returns to Resume Mode when one of the following happens.

- Opening the display after closing the display to enter Suspend Mode



Ensure Resume Mode

1. When you open the display to return to Resume Mode, one beep sounds.
2. To return to Resume Mode immediately after Suspend Mode, open the display about 5 seconds after ensuring that you once entered Suspend Mode by two or one beep. Otherwise, the application system may be hung up. In this case, you have to turn off and turn on the computer to restart the application program.

- Issuing the PS2 ON at HH:MM:SS command in Set features program
- Ring Indicator is activated on the communication interface.

Notes:

1. When the computer is powered only by the rechargeable battery and is in Suspend Mode, if you want to use the AC adapter, connect it without removing the rechargeable battery.
2. If you set your power-on password, you must enter the power-on password when the computer returns to Resume Mode. For more information, see "Power-On Password" on page 49.

3. To change the rechargeable battery while in Suspend Mode, close the display, wait 5 seconds after the one or two beeps, replace the battery within 1 minute, and then open the display to resume operation. If the computer has been in Suspend Mode because of the low battery power, no beep sounds even though the display is closed.
4. When you enter Suspend Mode from VM86 mode, a saving in battery power is smaller.
5. Attached devices, such as a printer and a serial device, may be reset or lose their configuration when returning to Resume Mode. The application using the devices should be restarted after resuming.
6. When you are using the trackpoint or a mouse and the computer is entering Suspend Mode, stop the trackpoint or mouse operation until the computer returns to Resume Mode.

Very Important

Do not change the diskette in the drive while the computer is in Suspend Mode. Otherwise, information from the previous diskette may be written onto the new one after the computer returns to Resume Mode.

Using the Reference Diskette

The Reference Diskette provided with the Model L40 SX contains the following programs.

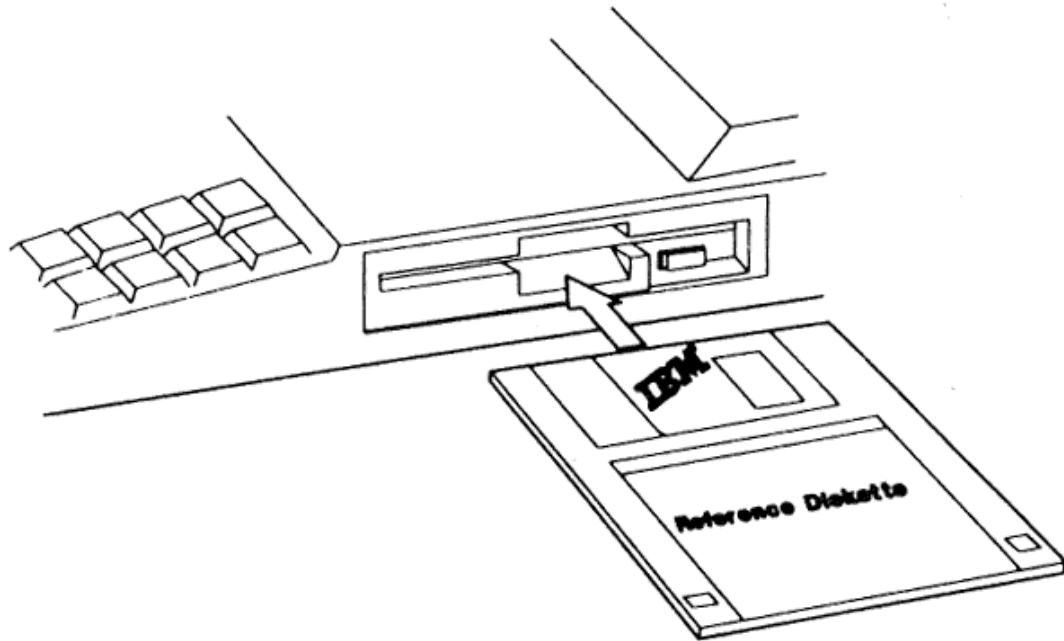
- **Backup the Reference Diskette** to make a backup copy of the Reference Diskette
- **Set configuration** to tailor the computer to your needs
- **Set features** to operate your computer more effectively
- **Set passwords and network server mode** to prevent unauthorized access to your computer
- **Test the computer** to test the computer hardware
- **Display revision levels** to show the machine level
- **EMS memory manager** to use the main storage above 1MB boundary as the EMS memory
- **Power management device driver** to use Suspend and Resume Modes under OS/2
- **Sample batch programs for the set features program** to set or change many operational features using one command.

The Reference Diskette is a permanently write-protected diskette. You can read information from the diskette, but you cannot write (record) information onto the diskette. Therefore, making a backup copy of the diskette is necessary to use the above programs.

Once the backup copy is made, put the original diskette in a safe place and always use the backup copy.

Starting the Reference Diskette

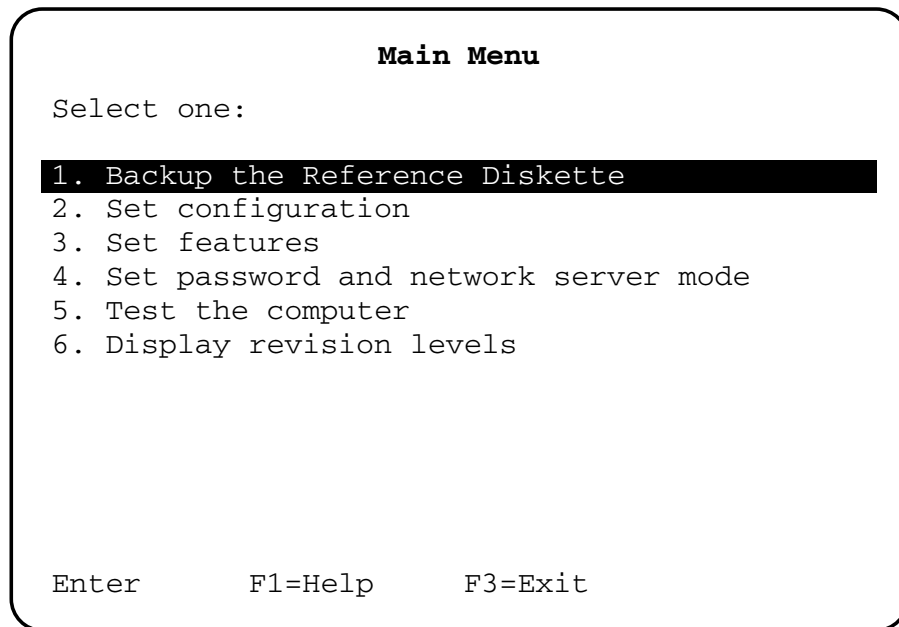
- 1 Insert the Reference Diskette, with the label facing up and metal-shutter end first, into the drive. Make sure the diskette clicks into place.



- 2 Is the computer turned on?
Yes Press Ctrl+Alt+Del.
No Turn on the computer.
- 3 The following screen appears.



- 4 Press Enter: the following screen should appear. Otherwise, follow the instructions on the screen until the following screen appears.



Follow the instructions on the screen.

The following briefly explains each program that appears on the **Main Menu** after starting the Reference Diskette.

Backup the Reference Diskette

Makes a copy of the original Reference Diskette onto another diskette, but not onto a fixed disk drive. To make the backup copy, you need a blank 2.0MB capacity diskette that is not write-protected (see "Write-Protecting Diskettes" on page 85).

Whenever you need to use the Reference Diskette, always use the backup copy. This ensures that the backup copy contains your computer's current configuration information and testing programs.

Set configuration

This is used to view, change, back up, or restore the computer configuration, and to run automatic configuration.

During configuration, the computer makes a list of what it sees as being installed and assigns those items to operate a certain way. Then this configuration information is stored in the computer memory and is kept current by the backup battery even when the computer is turned off.

The configuration lists:

- Installed memory size
- Built-in connectors and their assignments
- Installed IBM options with their location and assignments.

View configuration

Shows you the present configuration stored in the computer memory.

Change configuration

Changes the configuration stored in the computer memory. Changing the configuration lets you tailor computer operation to your needs.

Backup configuration

This copies the configuration stored in the computer memory onto the backup copy of the Reference Diskette. If you have made changes to the configuration, back up (copy) the configuration in the event the backup battery is removed or replaced.

Remember, computer configuration is stored in the computer memory and kept current by the backup battery. If the backup battery is removed or replaced, the configuration information is lost.

Restore configuration

This retrieves the configuration copied by "Backup configuration" and restores it into the computer memory. Use "Restore configuration" after the backup battery is removed or replaced.

Run automatic configuration

This is used when you want the computer to automatically configure itself. During automatic configuration, the computer makes a list of what it sees as being installed and assigns those items to operate a certain way.

Set features

Use this to set and change operational characteristics for your convenience.. This program also helps minimize the use of battery power by specifying options associated with power management.

See "Changing Operational Features" on page 54 for more information.

Set passwords and network server mode

This prevents the use of the computer by unauthorized persons. Three password methods available for the Model L40 SX are:

- Power-on password
- Network server mode
- Keyboard password

See "Setting Passwords" on page 49.

Test the computer

This tests the computer hardware. If a problem occurs during this testing, an error message appears showing the cause of the problem and the action to take.

Display revision levels

This displays the machine level that is used by service personnel.

Setting Passwords

Passwords restrict the use of the computer by unauthorized persons.

Instructions for setting passwords are also on the Reference Diskette. The information is provided here for your convenience as the computer must be turned off, then on again to follow some of the password instructions.

Power-On Password

Do Not Forget Your Power-On Password

Record your power-on password. If you forget your power-on password, take your system unit to IBM or an IBM authorized dealer. A service charge may be incurred.

Setting a power-on password helps restrict the use of the computer by unauthorized persons. The password can be no more than seven characters and does not appear when typed. Once the power-on password is set, whenever you turn on the computer, the password prompt O-T appears (see "Password Prompt" on page 19).

Note: Once set, a power-on password is required not only when powering-on but also when you return to Resume Mode. When you return to Resume Mode, the password prompt and any other messages do not appear. The cursor does not move as you type the power-on password, but it is input. Then press Enter; the cursor is unlocked and you can use your application.


To use the computer, you must type the correct password and press Enter. When the password is entered correctly, an OK appears momentarily. If the password is entered incorrectly, a key with an X over it appears. If you have not entered the password correctly after three tries, you must turn off the computer, then on, to try again.

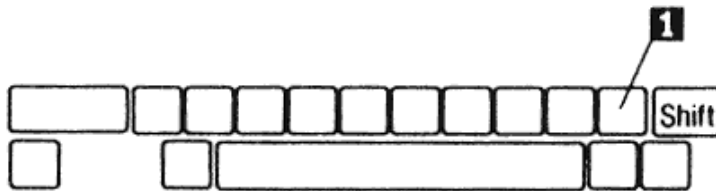
- **To set a power-on password**

- 1 Start the backup copy of the Reference Diskette (see page 44).

- 2 Select Set passwords and network server mode on the Main Menu and press Enter.
- 3 Select Set power-on password and press Enter. Follow the instructions on the screen.
- 4 Write down the power-on password and store it in a safe place.


- **To change a power-on password**

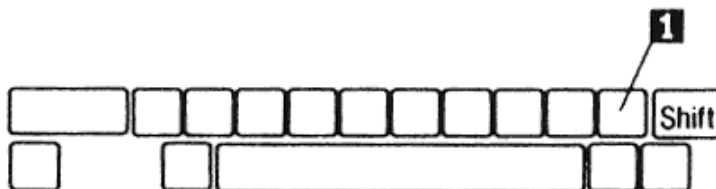
- 1 Turn on the computer.
- 2 When the password prompt  appears, type your current password, then press the key **1** located to the left of the right Shift key.



- 3 Write down your new power-on password (seven characters or less) and store it in a safe place.
- 4 Type the password and press Enter.

- **To remove a power-on password**

- 1 Turn on the computer.
- 2 When the password prompt  appears, type your current password, then press the key **1** located to the left of the right Shift key.



- 3 Press Enter

Network Server Mode

If your computer is a server on a network, you can set network server mode. Before setting the network server mode, you must first set a power-on password. To set a power-on password, see page 49. Your computer can now be turned on so other computers can access your fixed disk drive while your keyboard is locked.

- **To set the network server mode**

1. Start the backup copy of the Reference Diskette (see page 44).
2. Select **Set passwords and network server mode** on the Main Menu and press Enter.
3. Select **Set network server mode** and press Enter. Follow the instructions on the screen.

- **To remove the network server mode**

1. Start the backup copy of the Reference Diskette (see page 44).
2. Select **Set passwords and network server mode** on the main menu and press Enter.
3. Select **Set network server mode** and press Enter. Follow the instructions on the screen.
4. When asked **Set network server mode?**, type **N** and press Enter.

Keyboard Password

Setting a keyboard password lets you lock the keyboard without turning the computer off. If a power-on password has been set (page 49), it can also serve as your keyboard password.

You need to first install the keyboard password program from the Reference Diskette onto the fixed disk drive or diskette that contains DOS, before a keyboard password can be set.

- **To Install keyboard password program**

Before installing keyboard password program, set your power-on password.

1. Start the backup copy of the Reference Diskette (see page 44).
2. Select **Set passwords and network server mode** on the Main Menu.
3. Select **Install keyboard password program** and follow the instructions on the screen.

- **To Install keyboard password**

1. Remove the backup copy of the Reference Diskette.
2. Press Ctrl+Alt+Del.
3. **Start Programs** panel of DOS appears. Select **File System** and press Enter.
4. **File System** panel appears. Press Shift+F9.
5. At the c:\> prompt, type **KP /c** and press Enter. Follow the instructions on the screen.

- **To lock the keyboard**

Type KP and press Enter. The keyboard is locked when you hear a beep.

- **To unlock the keyboard**

1. Type your keyboard password (usually the same as your power-on password).

Note: While entering your keyboard password, the cursor does not move. However, your keyboard password is input.

2. Press Enter. The keyboard is unlocked when you hear a beep.

- **To remove the keyboard password**

Turn off the computer.

- **To change the keyboard password**

This procedure allows you to set a keyboard password that is different from your power-on password.

1. Go to Start Programs panel of DOS. Select File System and press Enter.
2. File System panel appears. Press Shift+F9.
3. At the c:\> prompt, type KP /c and press Enter; follow the instructions on the screen.

Notes:

1. Ensure that the keyboard password program is installed on the fixed disk or diskette that contains DOS. Go to the DOS prompt (usually A > or C >).
2. The keyboard password program works only with DOS.
3. If you reset the computer (using Ctrl+Alt+Del) and then lock the keyboard, the computer acts as if you typed **KP /c**.

Changing Operational Features

The Model L40 SX is designed so you can change its operational features to operate it more effectively. Usually, you do not need to change any of them because of the default options set at the time of shipment. However, you may want to change some or all of them to suit your needs.

Operational Features You Can Set and Change

The operational features you can set and change are:

- Operational convenience
 - Updating date and time
 - Changing keyboard speed
 - Switching speaker sound
 - Specifying display features.
- Power management
 - Internal device power-off time
 - System power-off time
 - System speed
 - Power control for communication devices.

You change and set them using the **Set features** program or sample batch programs supplied by the Reference Diskette.

Setting and Changing the Operational Features

There are three ways to set and change the operational features:

- To start the backup copy of the Reference Diskette each time you want to use it. For more details, see "Starting the Set Features from the Reference Diskette" on page 56.
- To store the Set features program on your fixed disk or diskette including the control program.

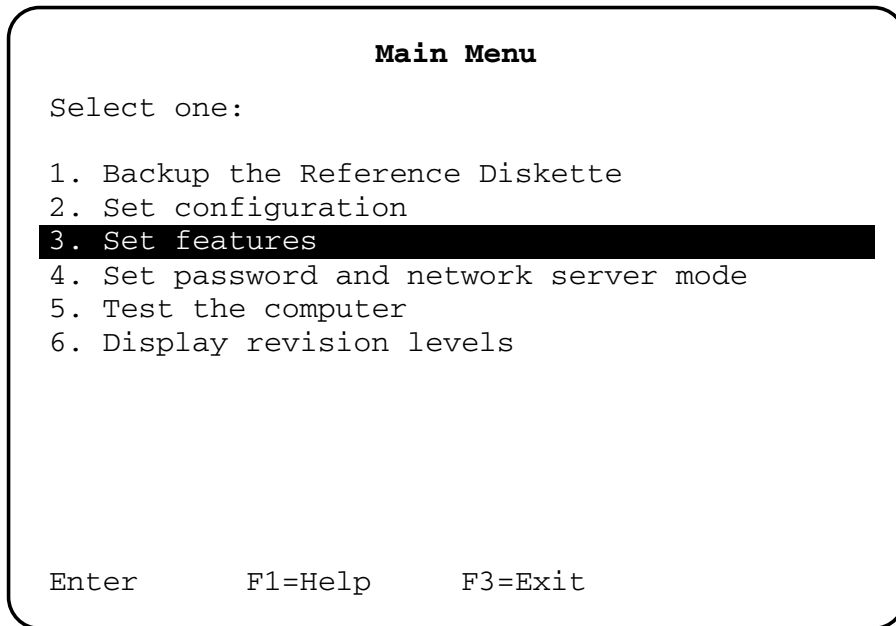
This can be done by selecting **Install set features program** on the **Set Features Main Menu**. Once the program is resident on your fixed disk or diskette, you can call and change any of the operational features by entering commands at the command line,

or by running a batch file containing these commands. For more details, see "Starting the Set Features Program with Commands" on page 62.

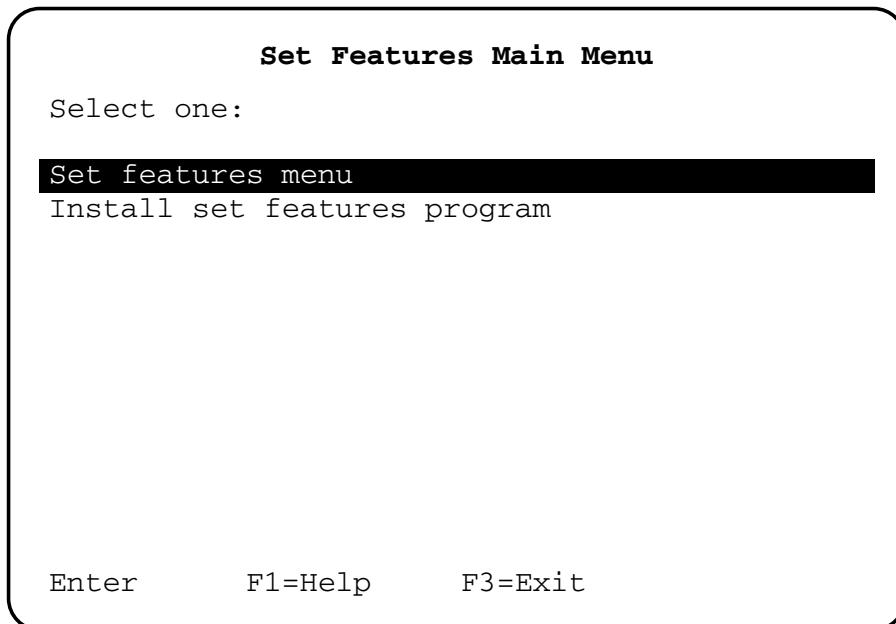
- To copy sample batch programs from the backup copy of the Reference Diskette onto your fixed disk or diskette. For more details, see "Using the Sample Batch Programs" on page 66.

Starting the Set Features from the Reference Diskette

1. Start the backup copy of the Reference Diskette to display the Main Menu (see page 44 on how to start the Reference Diskette).
2. Select set features and press Enter.



3. The following screen appears. Select **Set features menu** and press Enter.



4. Position the cursor at the desired item and press Spacebar to display possible selections one by one, then press Enter to save the selection.

The Set Features Menu consists of two screens as shown in the following two figures. Using F8 and F7, you can switch from one screen to the other to select desired items.

Online help is always available when you press F1 on these screens.

Set Features Menu Page 1 of 2

Type in changes or press the spacebar to select.
Press Enter to save the changes. Use the ↑ or ↓ to move the highlighted bar.

Type in the current date and time:

1 Current Date: [00-00-1990]
 Current Time: [00:00:00]

Select keyboard operation:

2 Speed: [Medium]
 Click: [On]

Select speaker on/off:

3 System audio: [On]
 Low battery alarm: [On]

Enter F1=Help F3=Exit F8=Fwd

Type in changes or press the spacebar to select.
Press Enter to save the changes. Use the ↑ or ↓ to move the highlighted bar.

Type in the automatic power-off time (0 = Always on):

5 Display off after: [10] min.
Fixed disk off after: [10] min.
System power off after: [20] min.

Select display features:

4 LCD display mode: [LCD Color Reversed]
Display device: [LCD]

6 Select speed: Auto: [High Performance]
Manual: [20]

Select power on/off:

7 Onboard Parallel power: [On]
Onboard Serial power: [On]
Serial Adapter power: [On]

Enter F1=Help F3=Exit F7=Bkwd

Maintaining Operational Convenience

Key	Purpose	Option
1	<p>Updating Date and Time</p> <p>Sets and scores the current date and time.</p>	<p>Current Date:</p> <p>DD:MM:YYYY</p> <p>Current Time:</p> <p>HH:MM:SS</p>
2	<p>Changing Keyboard Speed</p> <p>Changes the speed at which the keyboard responds when you type.</p> <p>Turning the click sound of the keyboard on or off can also be specified.</p>	<p>Speed:</p> <p>Slow</p> <p>Medium</p> <p>Fast</p> <p>Click:</p> <p>On</p> <p>Off</p>
3	<p>Switching Speaker Sound</p> <p>If the System audio is set to Off, you can suppress the alarm sound that indicates invalid operation.</p> <p>The low battery alarm sounds when the remaining power of the rechargeable battery is less than 33%. If you specify Off for the Low battery alarm option, you can suppress both the alarm and the speaker icon except for when you turn on the computer.</p>	<p>System audio:</p> <p>On</p> <p>Off</p> <p>Low battery alarm:</p> <p>On</p> <p>Off</p>
4	<p>Specifying Display Features</p> <p>Selects both mode and type of display attached to the computer.</p> <p>If you want to change the LCD display mode option and your system runs under the OS/2, first change the mode and shut down all running OS/2 applications, then restart your system.</p> <p>If no display is attached, LCD is automatically displayed on the screen.</p>	<p>LCD display mode:</p> <p>LCD Color Reversed</p> <p>LCD Mono Reversed</p> <p>LCD Color</p> <p>LCD Mono</p> <p>Display device:</p> <p>CRT</p> <p>LCD</p>
<p>Note: Default option is highlighted in the Option column.</p>		

Managing Power Usage

Key	Purpose	Option
<p>5</p>	<p>Internal Device Power Off Time</p> <p>Automatically turns off internal devices and system power if no keyboard input or other device activity occurs in a specified time.</p> <p>Fixed disk power is turned on when the system attempts to read or write to the fixed disk.</p> <p>Pressing any key causes the display to turn on again; however, that keystroke is accepted by the system as input.</p> <p>System power is resumed only when the display is lowered and raised. See page 41.</p> <p>Other internal devices such as diskette drive automatically turn off when not in use. No action is required by you to turn these devices on or off.</p>	<p>Display off after:</p> <p style="padding-left: 40px;">10 (1 through 20) mins</p> <p>Fixed disk off after:</p> <p style="padding-left: 40px;">5 (1 through 20) mins</p> <p>System power off after:</p> <p style="padding-left: 40px;">20 (1 through 20) mins</p> <p>Note: If 0 is specified, no automatic power-off is assumed.</p>
<p>6</p>	<p>System Speed</p> <p>Minimizes power usage by changing the processing speed.</p> <p>You can specify two values, one for the Auto (automatic) mode, the other for the Manual (manual) mode.</p> <p>The value for the Auto mode becomes effective when the economy switch is set to A, the value for the Manual mode becomes effective when the economy switch is set to M.</p>	<p>Auto:</p> <p style="padding-left: 40px;">High Performance Long Battery Life</p> <p>Note: If you select High Performance, use of the AC adapter is recommended.</p> <p>Manual:</p> <p style="padding-left: 40px;">20 MHz 10 MHz 5 MHz</p> <p>Note: If you use the serial port at a line speed of above 9600 bps, to avoid data loss, it is recommended that 20 MHz be specified.</p>

Maintaining Operational Convenience

Key	Purpose	Option
<p>7</p>	<p>Power Control for Communication Devices</p> <p>You can determine whether power is supplied to each external device port. To minimize power usage, select option Off for the port when no device is connected.</p> <p>Note: You can set the Onboard Parallel power to Off when both the Onboard Serial power and the Serial Adapter power (or the Data/Fax Modem power) are set to Off.</p>	<p>Onboard Parallel power:</p> <p>On Off</p> <p>Onboard Serial power:</p> <p>On Off</p> <p>Serial Adapter power:</p> <p>On Off</p> <p>Note: This option is available and displayed when the serial adapter is installed.</p> <p>Data/Fax Modem power:</p> <p>On Off</p> <p>Note: This option is available and displayed when the internal data/fax modem is installed.</p>
<p>Note: Default option is highlighted in the Option column.</p>		

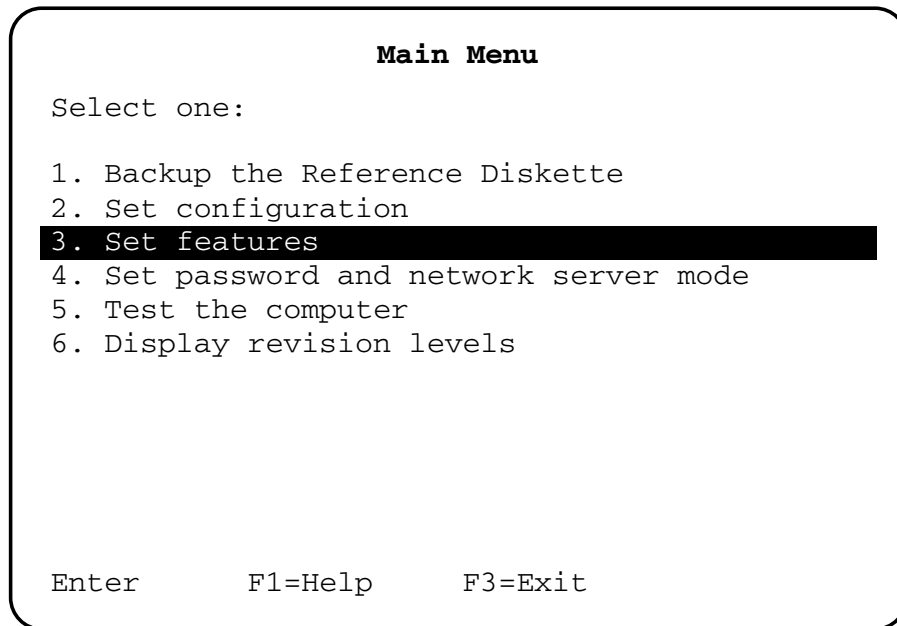
Starting the Set Features Program with Commands

To change any of the operational features with commands, you first need to copy the Set features program from the backup copy of the Reference Diskette onto your fixed disk or diskette.

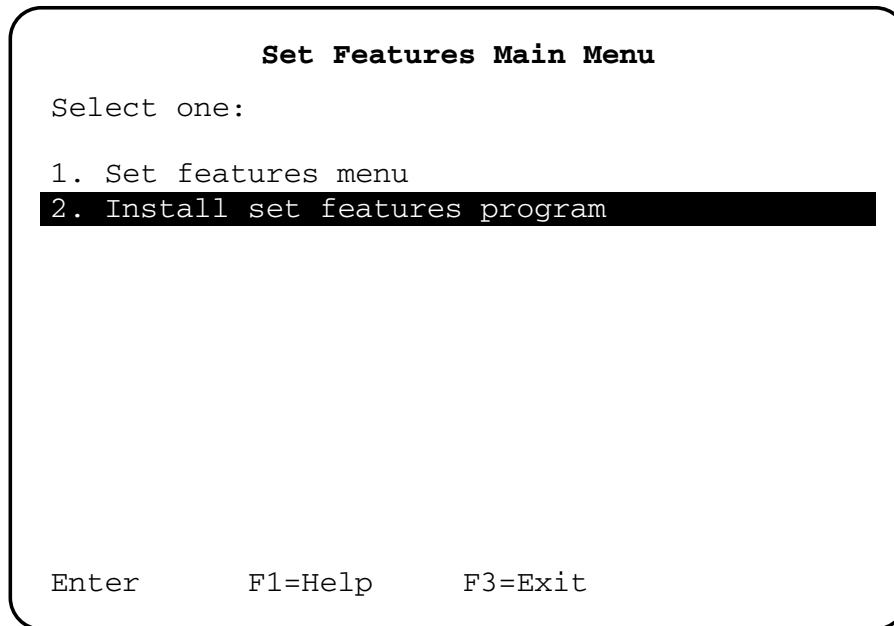
If you have not done so, follow the instructions below, otherwise go to "Commands" on page 64 on how to use the command.

Copying the Set features program

1. Start the Reference Diskette to display the Main Menu (see "Starting the Reference Diskette" on page 44).
2. Select **Set features** and press Enter.



3. The following screen appears. Select **Install set features program** and press Enter. Follow the instructions to copy the Set features program.



Commands

All feature items can be accessed either by entering commands or by running a batch file containing these commands. The following describes the commands.

Format

PS2 *option1 option2*

option1:

<i>Value</i>	<i>Meaning</i>
SET	Performs a command
? Help	Displays the format of all the commands available.

option2:

<i>option 1</i>	<i>First Value</i>	<i>Second Value</i>
[SET]	Audio	ON OFf
SET	AUTO	Battery Performance
[SET]	DISK	XX minutes (0-20)
[SET]	DIS play map*	Color Mono
[SET]	Keyboard C lick	ON OFf
[SET]	Keyboard S peed	Fast Med Slow
[SET]	LC d	XX minutes (0-20)
[SET]	LCD CRT *	
[SET]	LOW battery alarm	ON OFf
SET	MA nual	20 10 5
[SET]	Modem	OFf On
[SET]	Normal *	
—	OFf	
—	ON at	HH:MM:SS
[SET]	Parallel	OFf ON

<i>option1</i>	<i>First Value</i>	<i>Second Value</i>
[SET]	POwer off	XX minutes (0-20)
[SET]	Reversed*	
[SET]	SERial	OFF On
[SET]	SERial Adapter	OFF On

Notes:

The following explains [SET], SET, and — in the left column of this table.

[SET] Indicates that you can omit the value, **SET**, for *option1*. If you specify **SET**, the command you enter is stored and remains in the computer memory even though the power, switch is turned off. If you do not specify **SET**, the command is no longer in effect when the power switch is turned off.

SET Indicates that you cannot omit the value, **SET**, for *option1*.

— Indicates that you cannot specify the value, **SET**, for option 1.

* Indicates that this command is not supported in the OS/2 environment.

Usage Note: When using any of these commands, type only highlighted letters in the above tables.

Examples: The following shows some examples of commands to modify the operational features.

Command	Meaning
PS2	Displays the Set Features Menu.
PS2 XXXX	Shows the command syntax if XXXX is invalid.
PS2 ?	You can see all available commands in format on the screen using this command.
PS2 H	Shows instructions on how to use the commands.
PS2 K S F	Sets the highest keyboard speed.
PS2 SET LO OF	Sets the battery-low alarm to off. This command is restored at the next system power up.
PS2 OF	Enters Suspend Mode immediately.
PS2 ON 23:59:01	Returns to Resume Mode at 23:59:01.

Using the Sample Batch Programs

Three sample batch programs are provided so you can set or change one or all operational features using one command:

- **DEFAULT**
This program sets all the operational features to the default values. The default values are the same values as set in the factory.
- **TRAVEL**
This program sets all the operational features related to the power supply by the rechargeable battery to the values that make the battery life as lengthy as possible.
- **PRINTCOM**
This program turns off and on the parallel, serial, and communication interface connectors at the same time.

Installing the Sample Batch Programs

1. Insert the backup copy of the Reference Diskette.
2. Install a sample batch program using the copy command peculiar to the operating system, DOS or OS/2.

Note: Both DOS and OS/2 versions are provided for each sample batch program. **.BAT** of a filename identifies a DOS version (for example, **DEFAULT.BAT**) while **.CMD** of a filename identifies a OS/2 version (for example, **DEFAULT.CMD**).

Usage Note:

1. When you use the TRAVEL command, ensure that the economy switch is set to **A** to conserve battery power.
2. The format of the PRINTCOM command is PRINTCOM OFF or PRINTCOM ON.
3. You can copy and modify any of the sample batch programs to make a new batch program tailored to meet your system configuration or preference.

Solving Computer Problems

Problems with your computer can be caused by software, hardware, or both. You can test the hardware yourself using computer internal self-tests and the testing programs on the backup copy of the

Reference Diskette. If a hardware problem occurs during this testing, an error message appears with the cause of the problem and the action to take.

By using the Reference Diskette, the Troubleshooting Charts, and the other information in this section, you should be able to solve the problem yourself or obtain a considerable amount of information about the problem.

Always use the backup copy of the Reference Diskette. The backup copy should contain your computer's current configuration information and testing programs.

IMPORTANT

Use this section to test IBM products only. Non-IBM products may give misleading errors or incorrect computer responses. Refer to the instructions supplied with those products for testing information.

This section contains:

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Notes:

Testing

1. Start the backup copy of the Reference Diskette (see page 44).
2. Does this screen appear?



Yes The computer has completed its internal self-tests. Press Enter.

- If the Main Menu appears, select Test the computer and follow the instructions on the screen to start the testing program.
 - If the computer did not beep, the speaker is not working and you should have the system serviced. If you are not sure about the beep, turn the computer off, then on again.
 - If you cannot go beyond the IBM screen, have the system serviced.
 - If the testing stops and does not continue, have the system serviced.
- If the Main Menu does NOT appear, the internal self-test found a problem. Follow the instructions on the screen.

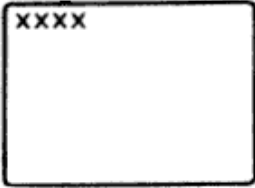
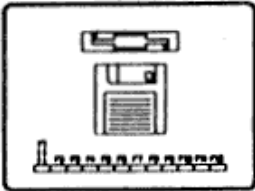
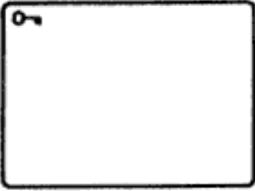
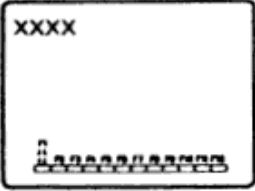
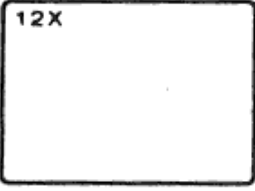
No If the AC adapter is not connected, connect it and go to step 1 again. If the AC adapter is connected, locate the problem in "Troubleshooting Charts" on page 70 and follow the prescribed actions.

Troubleshooting Charts

Display Problems

Problem	Action
Blank screen plus no beeps. Note: If you are not sure about the beeps, turn the computer off, then on again. If no beep sounds, the speaker icon is not displayed.	Check to see if: <ol style="list-style-type: none">1. The charged rechargeable battery is correctly installed.2. The AC adapter is connected to the computer and the power cord is plugged into a working electrical outlet (see page 38 on how to use the AC adapter).3. The power switch is on.4. The Math Coprocessor just installed is installed correctly. If the above items are correct and the screen still remains blank, have the system serviced.
Blank screen plus one beep. Note: Any beep is always accompanied by a display of the speaker icon.	Check to see if: <ol style="list-style-type: none">1. Both brightness and contrast controls on the LCD display are properly adjusted when an external PS/2 display is not attached.2. An external PS/2 display is turned on and the brightness and contrast controls are turned up. When an PS/2 display is attached, the LCD remains blank. If the above items are correct and the screen remains blank, have the system serviced.
Blank screen plus two or more beeps. Note: Any beep is always accompanied by a display of the speaker icon.	If the Dew point (humidity) icon or the Temperature icon does not turn on, have the system serviced.
Only the cursor appears.	Have the system serviced.
Screen is unreadable or distorted.	Have the system serviced.
Wrong characters appear on the screen.	Have the system serviced.

Messages on the Screen






Message	Action
<p>Numbers.</p> 	<p>The computer's internal self-test found an error. Check to see:</p> <ol style="list-style-type: none">1. That you have the backup copy of the Reference Diskette in the drive.2. That the diskette is inserted correctly-with the label up and metal-shutter end inserted first-into the drive. (See "Starting the Reference Diskette" on page 44.) <p>If you cannot start the Reference Diskette and display the screen shown in step 2 on page 69. have the system serviced.</p>
<p>Diskette and F1 prompts.</p> 	<p>Check to see:</p> <ol style="list-style-type: none">1. What the Diskette and F1 Prompts mean on page 20.2. That you have the backup copy of the Reference Diskette in the drive.3. That the diskette is inserted correctly- with the label up and metal-shutter end inserted first-into the drive. (See "Starting the Reference Diskette" on page 44.) <p>If the above items are correct and both prompts remain, have the system serviced.</p>
<p>Password Prompt.</p> 	<p>A power-on password is set. To use the computer, type the correct power-on password and press Enter (see pages 19 and 49). If the power-on password is not working properly, have the system serviced.</p>
<p>Error Prompt.</p> 	<p>Check to see:</p> <ol style="list-style-type: none">1. What the Error Prompt means on page 20.2. That you have the backup copy of the Reference Diskette in the drive.3. That the diskette is inserted correctly-with the label up and metal-shutter end inserted first-into the drive. (See "Starting the Reference Diskette" on page 44.)
<p>— or — A screen or message that is not listed above.</p>	<p>If the above items are correct and you cannot display the screen shown in step 2 on page 69, have the system serviced.</p>
<p>Resume failure.</p> 	<p>Turn off the computer power, then turn on again. Input data that was not saved before entering Suspend Mode may be lost. If any error code other than 12X appears, have the system serviced.</p> <p>Note: This error code may appear if the computer is stored or used in a wrong environment. However, if this error code appears frequently, have the system serviced.</p>






Notes:

What If Testing Cannot Find the Problem?

If the testing programs on the backup copy of the Reference Diskette cannot find the problem, use the troubleshooting charts that follow to find your computer problem.

Icons on the System Status Display Panel

Icon	Action
 Remains on	<p>When the computer is in Suspend Mode, this icon appears but does not blink. When the computer is in Resume Mode, this icon blinks. If this icon remains on when the computer is not in Suspend or Resume Modes. check to see:</p> <ol style="list-style-type: none">1. The AC adapter is connected and the rechargeable battery is installed.2. The AC adapter is connected. <p>If either of the above items is correct, go to the section of the temperature icon on page 74.</p>
	<p>The diskette is now being read or written. If this icon stays on, check to see that:</p> <ol style="list-style-type: none">1. The diskette is good and not damaged. Try a backup copy if you have one.2. The diskette is inserted correctly-with label up and metal-shutter end inserted first-into the drive.3. Your software program is OK (see page 79). <p>If the above items are correct and this icon still remains, have the system serviced.</p>
	<p>The fixed disk is now being read or written. If this icon stays on, have the system serviced.</p>
	<p>This icon appears indicating that the speaker sounded. This icon blinks until any key input or mouse operation is performed. If this icon stays on, have the system serviced.</p>
	<p>Appears when the communication link is established. If this icon stays on, have the system serviced.</p>

Icon	Action
	<p>The temperature is outside the operating range of the computer between 10°C and 35°C (50°F and 95°F).</p> <p>Check to see if:</p> <ul style="list-style-type: none"> The computer has been left or used in too cold or too hot a place. <p>If the above items are OK, power off or close the computer display and let it cool down or warm up. After the computer cools or warms, turn on the computer power or open the display.</p> <p>If this icon still remains, have the system serviced.</p>
	<p>Excessive humidity has been detected.</p> <p>Power off the computer or close the computer display and remove the computer from humid atmosphere. If this icon still remains when the computer power is restored or the display is opened, have the system serviced.</p>
	<p>The numeric lock is in effect.</p> <p>Press the Num Lock key again to release the numeric lock.</p>
	<p>The caps lock is in effect.</p> <p>Press the Caps Lock key again to release the caps lock.</p>
	<p>The scroll lock is in effect.</p> <p>Press the Scroll Lock key again to release the scroll lock.</p>

Power Problems

Problem	Action
A wrong battery-status indicator remains on.	Have the system serviced.
A fully-charged rechargeable battery is discharged too soon.	<ol style="list-style-type: none">1. Check to see if the rechargeable battery you are using has been charged more than 10 hours with the AC adapter.2. Check to see if the Auto option of the Set Features Menu is set correctly and the economy switch is set to automatic mode. For automatic mode and the Auto option, see pages 25 and 60.3. Repeat complete charge and discharge several times, if the battery has not been used for a long period. Note: Usually, a complete charge makes it possible to use the battery for approximately 3 hours. However, a fully-charged battery gradually loses its charge if not used for a month or so. In this condition, the battery does not reach full charge by charging it only once.4. Have the rechargeable battery checked or the system serviced.
Battery-Low Indicator remains on.	The over-current protection device inside the rechargeable battery has been activated. Wait for several hours and use it again. If the problem still appears, replace the rechargeable battery or have the system serviced.

Keyboard, Pointing Device Problems

Problem	Action
All or some keys on the keyboard do not work.	If the testing programs on the Reference Diskette do not find the problem, have the system serviced.
The mouse or pointing device does not work.	If the testing programs on the Reference Diskette do not find the problem, check the instructions supplied with the mouse or pointing device for additional testing information. If no testing information is available, have the mouse or pointing device serviced.
The numeric keypad does not work.	Check if the cable between the numeric keypad and the computer is properly connected. If the cable check is OK, have the system serviced.

Notes:

Printer Problems

Problem	Action
The printer does not work.	<p>Check to see that:</p> <ol style="list-style-type: none">1. The printer is turned on and is online.2. The printer signal cable is plugged into the parallel connector on the computer. For the location of the parallel connector, see page 27.3. The Onboard Serial power option of the Set Features Menu is set to On if the printer is connected to the serial connector.4. The Onboard Parallel power option of the Set Features Menu is set to On if the printer is connected to the parallel connector. <p>If the above items are correct and the printer still does not work, run the tests described in the printer manual. If the tests show the printer is OK, have the system serviced.</p>

External PS/2 Display Problems

Problem	Action
Blank screen	<p>Check to see if:</p> <ol style="list-style-type: none">1. The power cord for the PS/2 display is plugged into a working electrical outlet and into the PS/2 display.2. The PS/2 display is turned on and the brightness and contrast controls for the PS/2 display are turned up.3. The signal cable for the PS/2 display is plugged into the external PS/2 display connector on the system. Some of the signal cables may not be able to plug into the external PS/2 display connector,4. The Display device option of the Set Features Menu is set to CRT. <p>If the above items are correct and the screen of the PS/2 display remains blank, run the display tests described in the instructions supplied with the PS/2 display. If those tests show the PS/2 display is OK, have the system serviced.</p>

Problem	Action
Screen Is unreadable or distorted.	<p>Check the display mode of the screen. Reverse video can affect graphic images.</p> <p>If the above item is correct and the screen is still unreadable or distorted, run the tests described in the instructions supplied with the PS/2 display. If those tests show the PS/2 display is OK, have the system serviced.</p>
Wrong characters appear on the screen.	Have the system serviced.

Option Problems

Problem	Action
An IBM option that used to work does not work now.	<p>Check to see:</p> <ol style="list-style-type: none"> 1.If the option came with its own testing instructions, follow those instructions to test the option. 2.If the option came with instructions to update the backup copy of the Reference Diskette, follow the instructions supplied with the option. 3.If the serial adapter is installed, <i>On</i> is specified for the Serial Adapter power option of the Set Features Menu, or the PS2 command, <code>PS2 SET SER A O</code> (or <code>PS2 SER A O</code>) is performed. 4.If the internal data/fax modem is installed, <i>On</i> is specified for the Data/Fax Modem power option of the Set Features Menu, or the PS2 command, <code>PS2 SET M O</code> (or <code>PS2 M O</code>) is performed. <p>If the above items are correct and the testing programs on the Reference Diskette found no problem, have the system and option serviced.</p>

Software Problems

Problem	Action
Is your software program OK?	<p>To determine if problems are caused by the software, check to see if:</p> <ol style="list-style-type: none">1.The software is designed to operate on your computer.2.Your computer meets the minimum requirements to use the software. Refer to the manuals supplied with the software to verify this.3.Other software works on your computer.4.The software you are using works on another computer.5.You received any error messages when using the software program. Refer to the manuals supplied with the software for a description of the messages and solutions to the problem. <p>Some programs may require you to change the LCD display mode option of the Set Features Menu shown on page 59.</p> <p>If the above items are correct and the problem remains, contact your place of purchase for help.</p>

Intermittent Problems

Problem	Action
----------------	---------------

Does your computer have an Intermittent problem?

A problem may be difficult to find because it occurs only occasionally. If your computer has such a problem, check to see that:

1. All cables and cords are tightly connected to the rear of the computer and attached options.
2. If the problem occurs only when the computer is powered by the rechargeable battery, replace it with a fully charged one.

If the above actions do not correct, write down what the problem is and what the computer is doing when the problem occurs. Then contact your place of purchase for help.

Reference Diskette Problems

Problem	Action
----------------	---------------

Is your backup copy of the Reference Diskette current?

Always use your backup copy of the Reference Diskette as it should contain the current configuration information and testing programs for your computer. (See "Set configuration" on page 46 for more information.) If the backup copy is not current, the computer may not find all problems when you run the testing programs.

Getting Service

If the computer needs service, you can:

- Take it to an IBM authorized dealer
- Call IBM for service.

When requesting service, describe the error message or problem. Error messages help identify what service action is required and help provide quick and efficient service to you.

Note: If the message, **have the system serviced**, appears on the screen, have the following (if any) as well as the system unit serviced.

- AC adapter
- Internal data/fax modem
- Math coprocessor
- Memory module kit
- Rechargeable battery
- Serial adapter
- Trackpoint.

For your convenience, write down service phone numbers here:

Notes:

Appendix A. Additional Information

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Diskette Drives and Diskettes

Diskette drives and diskettes are identified by their storage capacity (for example, 1.44MB diskette drive; 2MB diskette).

The Model L40 SX operates with a 1.44MB diskette drive. This drive uses 1MB or 2MB 3.5-inch diskettes. Other IBM computers may operate with 720KB diskette drives that use only 1 MB 3.5-inch diskettes.

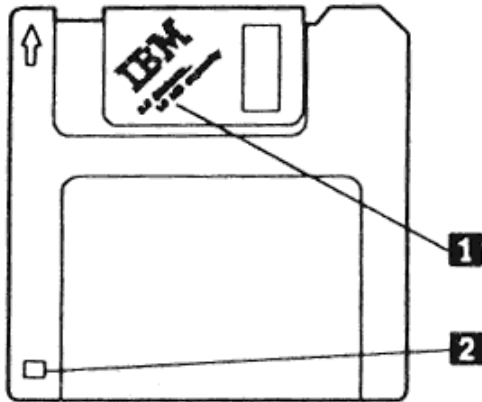
The 1 MB diskettes can be used in both 720KB and 1.44MB diskette drives; however, 2MB diskettes can be used in 1.44MB diskette drives only. If you intend to transfer diskettes between computers that have diskette drives with different capacities, use only 1MB diskettes formatted to 720KB.

Identifying Diskette Drives

A 1.44MB diskette drive has 1.44 printed on the diskette-eject button. A 720KB diskette drive has no identification mark.

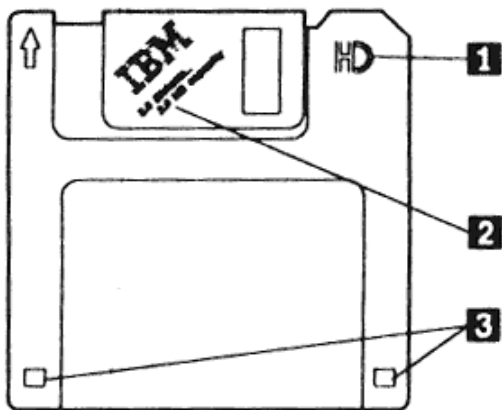
Identifying Diskettes

A 1MB diskette looks like this:



It is usually labeled 1.0MB capacity or 2DD **1** and has a square cutout **2**

A 2MB diskette looks like this:



It has the letters HD **1** is usually labeled 2.0MB capacity **2** and has two square cutouts **3**

Formatting Diskettes

A diskette must be formatted to prepare it for use. Your operating system manual describes the commands for formatting diskettes. When using commands that format a diskette before writing (for example, the DOS command DISKCOPY), be sure the target diskette has the appropriate storage capacity.

1MB Diskettes must be formatted to 720KB. You can do this with either a 720KB or 1.44MB diskette drive. When you use a 1.44MB diskette drive, be sure to specify a format of 720KB; otherwise the diskette will be formatted to 1.44MB with unpredictable results.

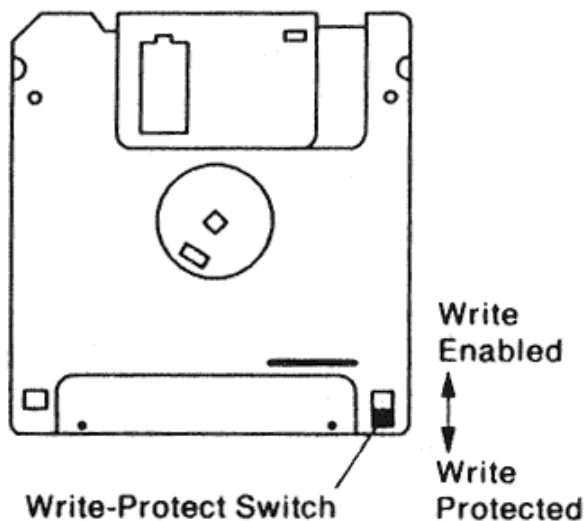
2MB Diskettes must be formatted to 1.44MB. To do this, you must use a 1.44MB diskette drive.

Write-Protecting Diskettes

It is possible to format a diskette or write (record) information onto a diskette unintentionally. Important information could be lost. For this reason, you should write-protect important diskettes. Some diskettes like the Reference Diskette are permanently write protected. When diskettes are write protected, you can read from the diskettes, but you cannot write onto them.

To locate the write-protect switch, turn the diskette over with the label facing down.

- **To prevent writing** onto a diskette, slide the switch down.
- **To enable writing** onto a diskette, slide the switch up.



The IBM Disk Cache

Technical Information

IBMCACHE.SYS is a device driver that allows a portion of the computer memory to be used as a fixed disk cache (see the DOS manual for information about device drivers and the Buffers command). It can speed up application programs by keeping in the cache fixed disk data that is accessed repeatedly. When an application program requests fixed disk data that is already in the cache, the data is sent directly to the application program. This is quicker than if the data had to be read from the fixed disk again. Only one IBMCACHE.SYS device driver can be installed. It uses about 8KB of memory plus the size of the cache. All fixed disks attached to the computer are supported.

The installation program IBMCACHE.COM copies IBMCACHE.SYS from the backup copy of the Reference Diskette to the root directory of fixed disk drive C, and creates or modifies the fixed disk CONFIG.SYS file to contain a statement with this format:

device = \ibmcache.sys [sssss] [/E] [/Pn]

[sssss] is the cache size in K Bytes, and is specified as a decimal value. The valid range is 16 to 512 if low memory is used, 16 to 15360 if extended memory is used. The default cache size is 64KB for low memory, 128KB for extended memory.

[/E] tells IBMCACHE.SYS to use extended memory. The default condition is for IBMCACHE.SYS to use low memory.

Note: High-speed communications may overrun and create data Errors if the cache is in extended memory. Also, IBMCACHE.SYS is compatible with VDISKSYS, but may possibly conflict with other extended memory applications.

[/Pn] is the cache page size in sectors. Valid values for n are 2, 4, and 8. The default page size is 4. Some application programs may perform better with different page size values.

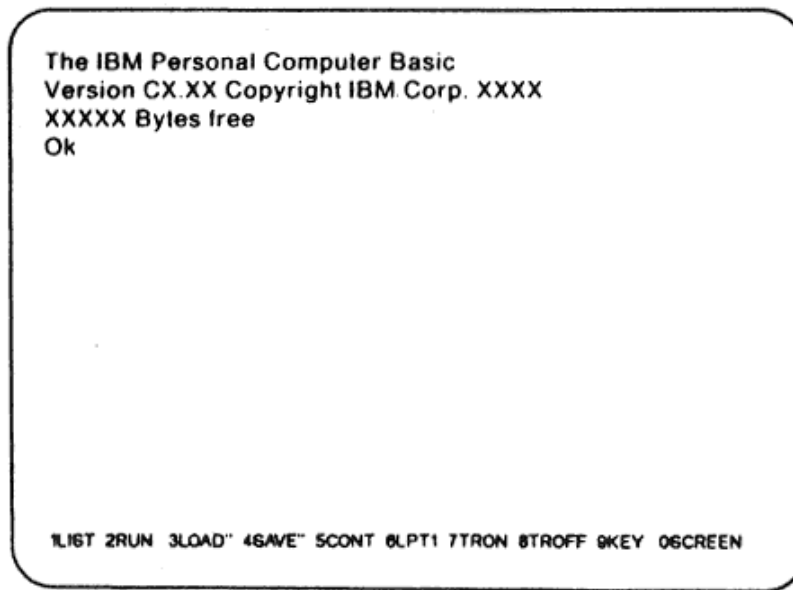
IBM Cassette BASIC

IBM Cassette BASIC (Beginner's All-Purpose Symbolic Instruction Code) is built into the Model L40 SX to help maintain software compatibility with other *IBM* computers. Cassette BASIC is the lowest version of BASIC and is not intended for production use because no information can be saved. For more information about BASIC, refer to the *IBM BASIC* manual (not included with this product).

Note: If your computer has a fixed disk drive with an operating system already installed, you will not be able to start Cassette BASIC.

To start Cassette BASIC:

1. Remove the diskette from the diskette drive.
2. Turn on the computer.
3. When the F1 and Diskette Prompts appear, press F1.
4. When the following screen appears, Cassette BASIC is loaded and ready to use:



IBM Power Cords

For your safety, IBM provides a power cord with a grounded attachment plug to use with this IBM product. To avoid electrical shock, always use the power cord and plug with a properly grounded outlet.

IBM power cords used in the United States and Canada are listed by Underwriters Laboratories (UL) and certified by the Canadian Standards Association (CSA).

For units intended to be operated at **115 volts**: Use a UL-listed and CSA-certified cord set consisting of a minimum 18 AWG, Type SVT or SJT, three-conductor cord, a maximum of 15 feet in length and a parallel blade, grounding-type attachment plug rated 15 amperes, 125 volts.

For units intended to be operated at **230 volts (inside the U.S.)**: Use a UL-listed and GSA-certified cord set consisting of a minimum 18 AWG, Type SVT or SJT, three-conductor cord, a maximum of 15 feet in length and a tandem blade, grounding-type attachment plug rated 15 amperes, 250 volts.

For units intended to be operated at **230 volts (outside the U.S.)**: Use a cord set of a minimum 18 AWG, and a grounding-type attachment plug rated 15 amperes, 250 volts. The cord set should be marked HAR and have the appropriate safety approvals for the country in which the equipment will be installed.

IBM power cords for a specific country are usually available only in that country:

IBM Power Cord Part Number	Use In These Countries
6952291	Argentina, Paraguay, Uruguay
6952300	Bahamas, Barbados, Bermuda, Bolivia, Canada, Cayman Islands, Colombia, Costa Rica, Dominican Republic, Ecuador, El Salvador, Guatemala, Guyana, Haiti, Honduras, Jamaica, Japan, Korea (South), Mexico, Netherlands Antilles, Nicaragua, Panama, Peru, Philippines, Saudi Arabia, Suriname, Taiwan, Trinidad (West Indies), United States of America, Venezuela
6952311	Australia, New Guinea, New Zealand, Papua
1838574	Thailand
6952320	Austria, Belgium, Bulgaria, Czechoslovakia, Egypt, Finland, France, Germany, Greece, Hungary, Iceland, Indonesia, Netherlands, Norway, Poland, Portugal, Romania, Spain, Sweden, Turkey, Yugoslavia
6952329	Denmark
6952347	Bangladesh, Pakistan, South Africa, Sri Lanka
6952356	Abu Dhabi, Albania, Antigua, Bahrain, Brunei, Dubai, Fiji, Hong Kong, India, Ireland, Kenya, Kuwait, Macau, Malaysia, Nigeria, Oman, People's Republic of China, Qatar, Singapore, United Kingdom
6952365	Switzerland
6952374	Chile, Italy
6952383	Israel

Notes:

Appendix B. Operating Instructions for the Serial Adapter

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Introduction

This appendix provides information for operating the IBM Personal System/2 Serial Adapter for Model L40 SX.

Note: The IBM Personal System/2 Serial Adapter for Model L40 SX is an IBM service or IBM Authorized Dealer installed option.

Word Length

5-, 6-, 7-, and 8-bit are supported.

Stop Bit

1, 1.5, and 2 are supported.

Line Speed

50 through 19200 bps are supported.

Pin Assignments

The following table shows the Serial Adapter external connector pin assignments.

Pin No.	Signal Name	Direction	Description
3	TX DATA	Out	Transmit Data
2	RX DATA	In	Receive Data
7	RTS	Out	Request to Send
8	CTS	In	Clear to Send
6	DSR	In	Data Set Ready
5	GND		Signal Ground
1	DCD	In	Data Carrier Detect
4	DTR	Out	Data Terminal Read
9	RI	In	Ring Indicator

Modem Connection

The example in Figure 1 shows the Serial Adapter modem connection using the cable.

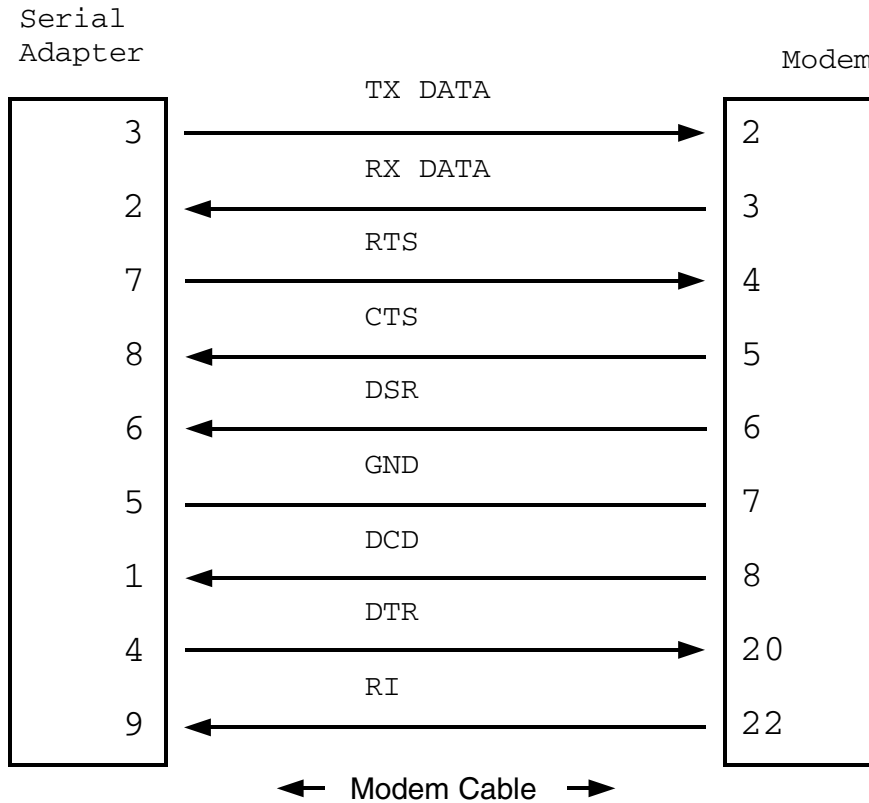


Figure 1. Example of the serial Adapter modem Connection

Notes:

Appendix C. Installing the EMS Memory Manager

This appendix explains how to install the EMS (expanded memory specification) memory manager.

The EMS memory manager supports the Lotus*/Intel"/Microsoft EMS under DOS 4.00. The EMS memory manager allows other device drivers, such as the RAM disk, to use the main storage above 1MB boundary as the EMS memory.

The EMS memory manager must be installed in the CONFIG.SYS file as the first device driver.

Note: The EMS memory manager is designed to support only the IBM Personal System/2 Model L40 SX.

How to Install the EMS Memory Manager

The section describes how to install the EMS memory manager.

1. Insert the backup copy of the Reference Diskette into the diskette drive.
2. At the DOS prompt, type **COPY A:\MM.SYS C:** and press Enter.
3. Edit the CONFIG.SYS file using EDLIN.COM or other editor programs. The format and explanation of parameters and values are shown below.

Format:

```
device = mm.sys [/Contexts = nnn]
                [/Depth = nn]
                [/Exclude = xxxx-xxxx]
                [/Frame = xxxx]
                [/Handles = nnn]
                [/Include = xxxx-xxxx]
```

* Lotus is a trademark of Lotus Development Corporation.

" Intel is a trademark of Intel Corporation.

[/Test]
[/Fulldisplay]
[/Showoptions]

[/Contexts = nnn]: *nnn* is the number of contexts for windows 0 through 3 that can be saved by processes using the EMS memory. Specify a decimal value. The valid range is 3 to 255. The default is the number of handles that are allocated.

[/Depth = nn]: *nn* is the number of consecutive contexts that can be saved for a given handle before a restore must be initiated. Specify a decimal value. The valid range is 1 to 32. The default is 1.

[/Exclude = xxxx-xxxx]: *xxxx-xxxx* is a range of addresses that should not be used for the EMS mapping. By default, the EMS memory manager automatically includes areas known to contain ROMs or video RAM. This parameter allows you to exclude a range of addresses that might be included by the automatic selection process. Specify hexadecimal segment addresses. You can specify as many exclude ranges as necessary and these can overlap.

[/Frame = xxxx]: *xxxx* is the starting address for the 64KB EMS window frame. By default, the start for the EMS window frame is selected automatically by the memory manager software. This parameter allows you to explicitly choose the address. Specify a hexadecimal segment addresses on a 16KB boundary where no ROM or RAM resides.

[/Handle = nnn]: *nnn* is the number of handles available for programs that use EMS memory. The valid range is 3 to 255. The default is 255.

[/Include = xxxx-xxxx]: *xxxx-xxxx* is a range of addresses that should always be used for the EMS mapping. By default, the EMS memory manager automatically exclude areas known to contain ROMs or video RAM. This parameter allows you to include a range of addresses that might be excluded by the automatic selection process. Specify hexadecimal segment addresses. You can specify as many include ranges as necessary and these can overlap.

[/Test]: Specifies that memory be tested at power-on. Because the EMS memory is tested by the BIOS, normally you do not need to specify this parameter.

[/Fulldisplay]: Specifies that the EMS memory manager display information about the EMS configuration after its sign-on.

[/Showoptions]: Specifies that the EMS memory manager show its command line options after its sign-on.

Defining the EMS Memory Size: The amount of memory that is available for the EMS memory is determined by the system BIOS. In general, the system BIOS SETUP program allows you to set the amount of memory to be used as the EMS memory. The memory manager uses:

- Any memory not configured as extended memory, or
- System memory as the EMS memory.

Memory Manager Error Messages:

This section provides explanations of error messages issued by the EMS memory manager.

- Context depth must be between 1 and 32 -

Explanation: An invalid number of contexts was specified. The number specified cannot be 0 and must not be greater than 32. See page 96 for the Contexts parameter.

- Expected equal after parameter -

Explanation: One of the parameters on the command line expected an equal symbol (=) after the parameter, but none was found.

- Internal error In hardware Interface -

Explanation: A general hardware error was detected.

- Invalid exclusion specified -

Explanation: The Exclude parameter was specified incorrectly. See page 96 for the Exclude parameter.

- Invalid inclusion specified -

Explanation: The Include parameter was specified incorrectly. See page 96 for the Include parameter.

- Invalid number specified -

Explanation: A number was expected, but non-numerals or a number containing characters or symbols was found.

- Invalid page frame address specified -

Explanation: The page frame address specified is not available for banking. The EMS memory manager requires a 64KB area above C000 that is free of expansion ROM and RAM.

- Invalid parameter specified -

Explanation: One of the parameters specified on the command line in your CONFIG.SYS file is invalid.

- No expanded memory available -

Explanation: No expanded memory is available for use.

- No 64k page frame available -

Explanation: The EMS memory manager was unable to find a 64KB window for the page frame. For the EMS memory manager to operate, a 64KB window free of expansion ROM or RAM must exist above C000.

- Number of contexts cannot exceed 255 -

Explanation: The number of contexts specified is above 255. The number of contexts specified must be between 3 and 255. See page 96 for the Contexts parameter.

- Number of contexts must be at least 3 -

Explanation: The number of contexts specified is below 3. The number of contexts specified must be between 3 and 255. See page 96 for the Contexts parameter.

- Number of handles cannot exceed 255 -

Explanation: The number of handles specified is above 255. The number of handles specified must be between 3 and 255. See page 96 for the Handle parameter.

- Number of handles must be at least 3 -

Explanation: The number of handles specified is below 3. The number of handles specified must be between 3 and 255. See page 96 for the Handle parameter.

- RAM address error detected -

Explanation: An address error was detected during the expanded memory tests.

- RAM data error detected -

Explanation: A data error was detected during the expanded memory tests.

- RAM parity error detected -

Explanation: A parity error was detected during the expanded memory tests.

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