

Academic System™ 6152

Quick Reference and Reference Diskette



130-0028
IBM Academic System™
6152
Reference Diskette

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Academic System™
6152
Quick Reference

First Edition (January 1988)

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The following information should be recorded and retained:

IBM Product Name	_____
IBM Model Number	_____
IBM Serial Number	_____
IBM Key Number	_____

- The product name is on the front of the cabinet.
- The model number of this product is located on the outside of the cabinet on the tag that states in part:
 "Type" or
 "Model."
- The serial number of this product is located on the outside of the cabinet and has a prefix of **S/N**.
- The serial number for the keys is located on the tag attached to the keys. Additional keys may be ordered from the address listed on the key tag.

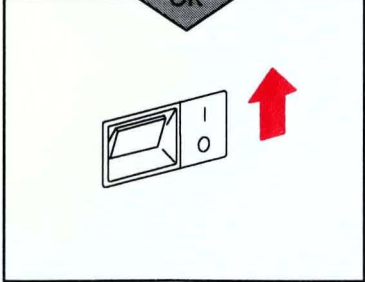
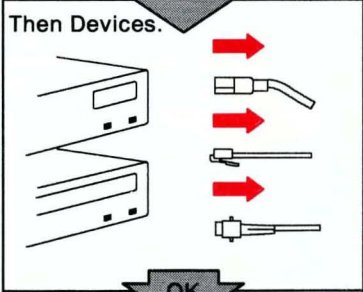
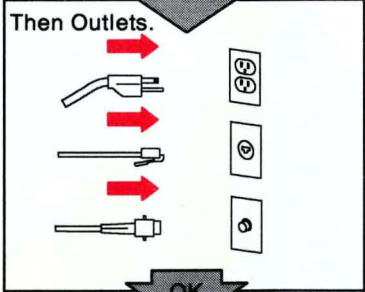
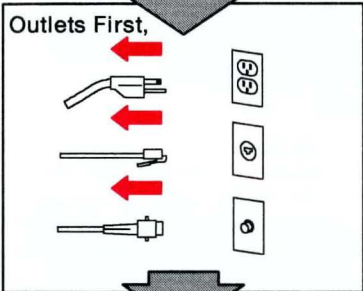
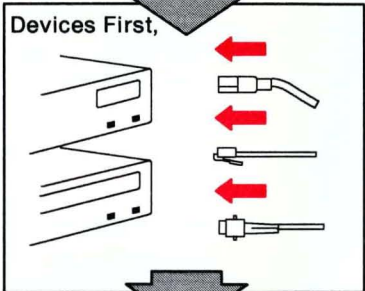
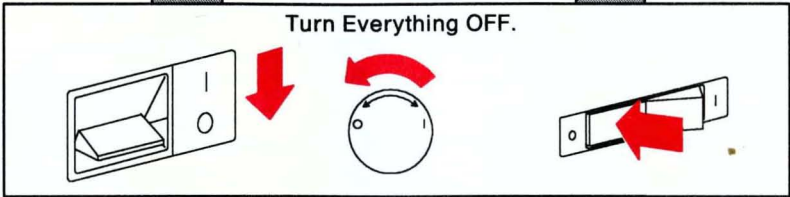


Electrical Safety

Electrical current from power, telephone, and communications cables is hazardous. Connect and disconnect cables as shown when installing, moving, or opening the covers of this product or attached devices.

To Connect

To Disconnect



The following statement applies to this IBM product. The statement for other IBM products intended for use with this product will appear in their accompanying materials.

Federal Communications Commission (FCC) Statement

Warning: This equipment generates, uses, and can radiate radio frequency energy and if not installed and used in accordance with the instruction manual, may cause interference to radio communications. It has been tested and found to comply with the limits for a Class A computing device, pursuant to Subpart J of Part 15 of FCC rules, which are designed to provide reasonable protection against such interference when operated in a commercial environment. Operation of this equipment in a residential area is likely to cause interference, in which case the user at his/her own expense will be required to take whatever measures may be required to correct the interference.

Instructions to User: If this equipment does cause interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

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

Properly shielded and grounded cables and connectors must be used for connection to the system host in order to meet FCC emission limits. Proper IBM cables are available from authorized dealers. IBM is not responsible for any radio or television interference caused by using other than the recommended cables or by unauthorized modifications to this equipment. It is the responsibility of the user to correct such interference.

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

How to Identify and Resolve Radio-TV Interference Problems

This booklet is available from the following:

FOB Public Contact Branch
Room 725
1919 M St. NW
Washington, DC 20554
Tele. (202) 634-1940

Consumer Assistance and Small Business Division
Room 254
1919 M St. NW
Washington, DC 20554
Tele. (202) 632-7000

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.

Related Publications

The following publications contain further information about the IBM Academic System 6152:

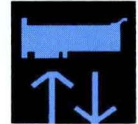
- *IBM Personal System/2 8550/8560 Hardware Maintenance Service*
- *IBM Personal System/2 8550/8560 Hardware Maintenance Reference*
- *IBM Academic System 6152 Hardware Maintenance Service Supplement*
- *IBM Academic System 6152 Hardware Maintenance Reference Supplement*
- *IBM Academic System 6152 Technical Reference*
- *IBM Personal System/2 8550/8560 Technical Reference*
- *Academic Operating System 4.3 for the IBM Academic System 6152*
- *Program Directory - IBM Academic Operating System 4.3.*

Contents

Introducing the IBM Academic System 6152	1
Description	2
Getting Started	4
Identifying the Computer Features	6
What Happens When the Computer Starts?	10
What Is the Reference Diskette?	12
Setting Passwords	15



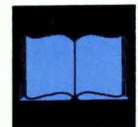
Installing IBM Options	19
How to Install an Option	20
System Unit Cover	21
Adapter	24
Drives	27
Installing a Math Coprocessor	38
Removing and Installing the Battery	39



Solving Computer Problems	41
How to Start Testing	42
Troubleshooting Charts	43
What If Testing Cannot Find the Problem?	45
How to Get Service	48



Appendix A: Additional Information	49
Ordering Additional Cover Lock Keys	49
Diskette Drives and Diskettes	49
Write-Protecting Diskettes	51
Moving the Computer	52
What Is IBM Cassette BASIC?	54
IBM Power Cords	55



Index	57
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Introducing the IBM Academic System 6152



The IBM Academic System 6152 is a high-performance floor standing computer. The computer consists of a keyboard and system unit, which is used with any of several available displays. The system unit has several built-in connectors so that you can add options easily. An option is an accessory piece of hardware that can be attached to or installed inside the system unit to expand the capabilities of the computer. Many options are available to meet your present and future needs.

This section contains:

Description	2
Getting Started	4
Identifying the Computer Features	6
What Happens When the Computer Starts?	10
What Do the Diskette and F1 Prompts Mean?	11
What Does the Password Prompt Mean?	11
What Is the Reference Diskette?	12
How to Start the Reference Diskette	14
Setting Passwords	15

Description

The IBM Academic System 6152 consists of an IBM Personal System/2™ Type 8560 with these additional features:

- RISC Adapter Card. The RISC Adapter Card is a processor adapter card that is installed in all IBM Academic System 6152 models. The RISC Adapter Card includes ROMP-C, the memory management unit (MMU) chip, a Floating Point Accelerator, and up to 8Mb of memory.
- Fixed disk drive adapter¹ and RISC Adapter Card memory in one of the following configurations:
 - One 20Mb fixed disk drive with 2 or 4Mb memory
 - One 44Mb fixed disk drive with 4 or 8Mb memory
 - One 70Mb fixed disk drive with 4 or 8Mb memory.
- One of the following local area network (LAN) adapters:
 - Ethernet² NICps/2³ Adapter
 - Token-Ring Network Adapter/A.
- IBM Monochrome Display 8604 (optional).
- Optional second 44Mb fixed disk drive.
- Optional second 70Mb fixed disk drive.
- IBM Display Adapter 8514/A (required for IBM 8604).

™ Personal System/2 is a trademark of the International Business Machines Corporation.

1 The 70Mb fixed disk drive uses the ESDI fixed disk drive adapter.

2 Trademark of Xerox Corporation

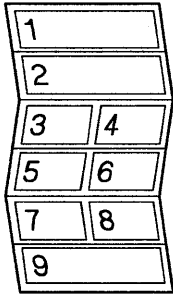
3 Trademark of Ungermann-Bass, Inc.

The following is a list of components of the IBM 6152 base system (not mentioned above):

- Power supply
 - Automatically switches to support 100-125 or 200-240 Vac, 50 or 60 Hz
 - 207 watts or 225 watts
- System board
 - 80286 Microprocessor - 10 MHz clock
 - 80287 Math Coprocessor connector
 - Video Graphics Array (VGA)
 - Eight expansion slots, including one occupied by the fixed disk drive adapter, one by the LAN adapter, and two by the RISC Adapter Card
 - Diskette drive controller
 - Parallel port
 - Serial port
 - Display connector
 - Keyboard connector
 - Pointing device connector
 - 1Mb Random Access Memory (RAM)
 - Complementary Metal Oxide Semiconductor Random Access Memory (CMOS RAM)
- Battery (to keep CMOS RAM active when power is off)
- Speaker
- 1.44Mb 3.5-inch diskette drive(s), one or two
- Cover lock
- 101-key keyboard.

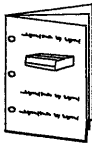
Getting Started

1. Unpack and set up the system unit, display, and keyboard.



Follow the instructions on the Setup Sheet.

2. Install any internal and external options.



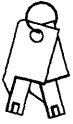
Use the instructions supplied with the option along with the "Installing IBM Options" section in this manual. Some examples of options are communications adapters, additional memory, and printers.

3. Record the system unit and key serial numbers.



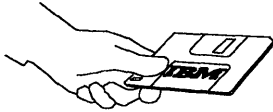
Write the information on page iii in this manual.

4. Lock the system unit cover to help protect the devices and options inside. Store the keys in a safe place.



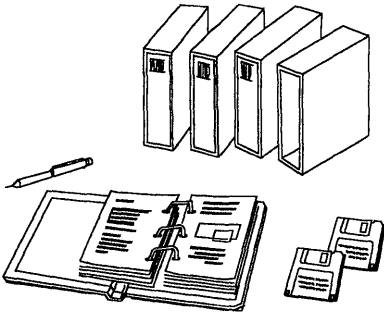
Use a cover lock key. The location of the cover lock is described on pages 6 and 7.

5. Start and review the IBM Academic System 6152 Reference Diskette (hereafter called *Reference Diskette*).



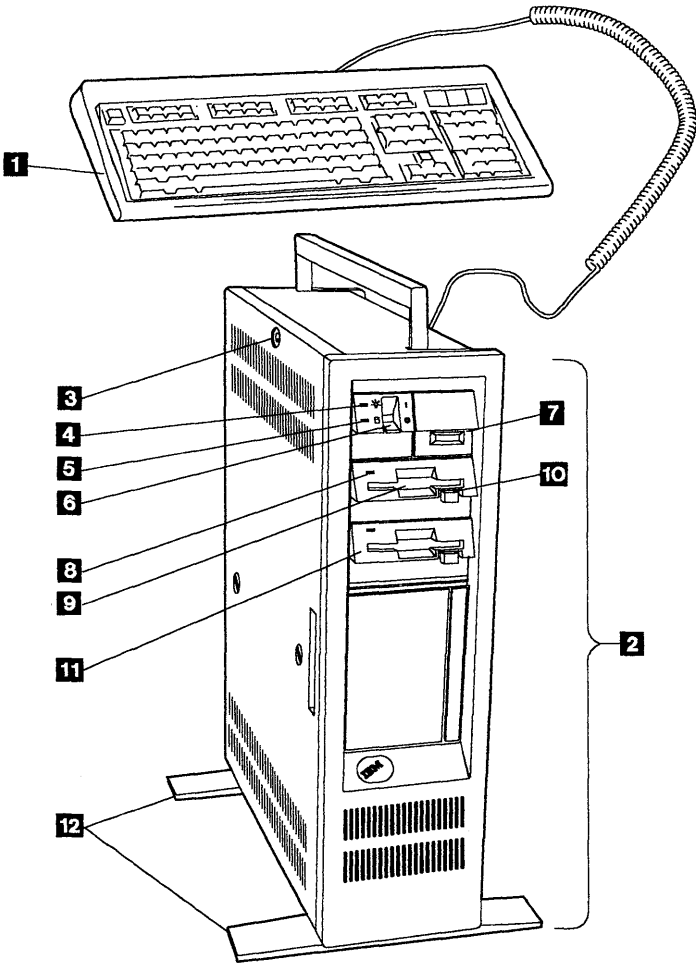
Use this diskette as a starting point to acquaint yourself with the features of the computer. After reviewing the diskette, be sure to set the date and time and make a backup copy of the diskette.

6. Install your operating system and application programs.

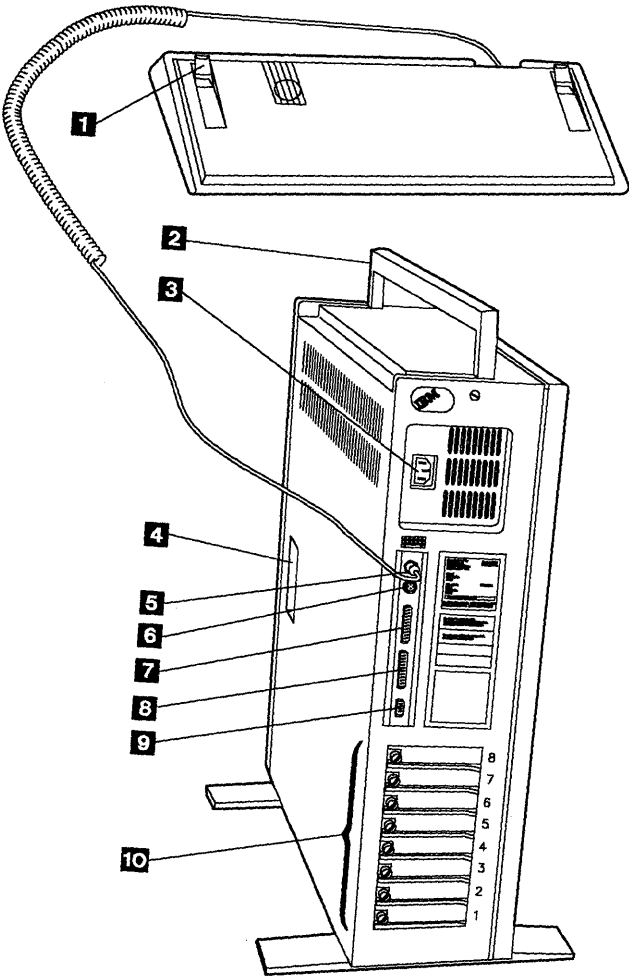


Follow the instructions that come with their manuals and diskettes.

Identifying the Computer Features



- 1 Keyboard** is used to enter information into the computer. The keyboard cable connects the keyboard to the system unit.
- 2 System Unit** is the main part of the computer. It contains the microprocessors, memory, and drives.
- 3 Cover Lock**, if locked, helps protect the devices and options inside the system unit.
- 4 Power-Good Light** comes on when the system unit is turned on.
- 5 Fixed Disk Drive In-Use Light** comes on when a drive is reading data from or writing data to a fixed disk.
- 6 Power Switch** turns the system unit on and off.
- 7 Serial Number** is the system unit's unique identification number. You should record this number on page iii in this manual.
- 8 Diskette Drive In-Use Light** comes on when the drive is reading data from or writing data to a diskette.
- 9 Diskette Drive A** is the primary diskette drive. To start a program that is on a diskette, you usually insert the diskette into this drive. For information about using diskettes, see page 51.
- 10 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 51 for more information).
- 11 Diskette Drive B** (optional) is the secondary diskette drive.
- 12 System Unit Feet** stabilize the system unit.



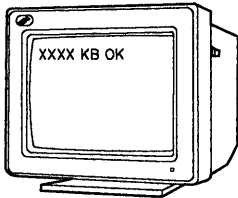
- 1 Keyboard Feet** adjust the angle of the keyboard.
- 2 Carrying Handle** is provided for lifting the system unit. The system unit weighs more than 18kg (40 lb). It is recommended that two people lift it.
- 3 Power Cord Connector** is where the system unit power cord plugs in.
- 4 Hand Slots** are on both sides of the system unit. They are provided to help slide the system unit across the floor.
- 5 Keyboard Connector** is where the keyboard cable plugs in. A keyboard icon is embossed above the keyboard connector for easy identification.
- 6 Mouse or Pointing Device Connector** is where a mouse or other pointing device cable plugs in.
- 7 Parallel Connector** is where a printer signal cable usually plugs in.
- 8 Serial Connector** is where a modem or serial printer signal cable usually plugs in.
- 9 Display Connector** is where a display signal cable usually plugs in. However, some displays require their signal cable to be plugged into an adapter that is installed in an expansion slot. The correct connection depends upon the type of display you have. Contact your IBM Marketing Representative if you are uncertain.
- 10 Expansion Slots** allow the installation of adapters inside the system unit so you can expand the capabilities of the computer. The slots are numbered 1 through 8 and correspond with the slot numbers listed in the configuration. A fixed disk drive adapter is installed in slot 8, the RISC Adapter Card in slot 4 (and also takes up slot 5), and the LAN adapter in another open slot. The IBM Display Adapter 8514/A (optional) must be installed in slot 6 (the extended slot).

For information about the configuration, see page 12.

What Happens When the Computer Starts?

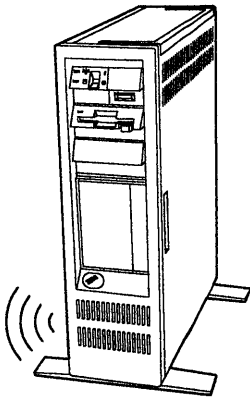
This is what happens when you turn on the computer (system unit and display):

1. You see a KB OK message on the screen.



The computer memory size is being tested. The number increases until it matches the amount of memory installed.

2. You hear one beep.



The computer has successfully completed its internal self-tests.

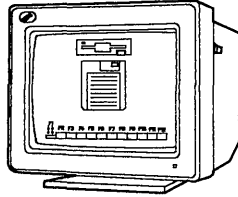
3. You see one of these on the screen:

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

If anything other than the above happens, there is a problem. To fix the problem, see "Solving Computer Problems" on page 41.

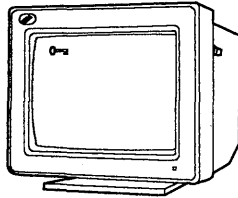
What Do the Diskette and F1 Prompts Mean?

After the computer is turned on and successfully completes its internal self-tests, it tries to read from a diskette in drive A. If there is no diskette in drive A, it tries to read from the fixed disk drive. If the disk operating system (DOS) is not installed on the fixed disk, the computer displays the Diskette and F1 Prompts. These prompts indicate that you should insert a diskette into drive A and press the F1 key to start the diskette.



What Does the Password Prompt Mean?

If a power-on password is set, the Password Prompt appears each time the computer is turned on and successfully completes its internal self-tests. Before you can use the computer you must type the correct password and press Enter. (See "Set a Power-On Password" on page 15 for more information.)



What Is the Reference Diskette?



The Reference Diskette is a permanently write-protected diskette. You can *read* information from the diskette, but you cannot *write* (record) information onto it. Make a backup copy of the diskette as soon as possible. Once the copy is made, put the original diskette in a safe place and always use the backup copy.

The Reference Diskette contains the following programs:

- **Backup the Reference Diskette** makes a backup copy of the original Reference Diskette onto another diskette, but not onto a fixed disk drive. To make the backup copy, you will need a blank 2.0Mb capacity diskette that is not write-protected (see “Write-Protecting Diskettes” on page 51).

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

- **Set configuration** is used to view, change, back up, and restore the computer configuration.

The computer automatically sets its configuration when the Reference Diskette is started or when “Run automatic configuration” (see below) is selected. During automatic configuration, the computer makes a list of what it sees as being installed and assigns each of those items to operate a certain way. This configuration information is stored in the computer memory and is kept active by the battery even when the computer is turned off. If the battery is removed or replaced, the configuration information is lost.

The configuration lists the following:

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

Whenever you change, remove, or install either an IBM option or the battery, you must start the backup copy of the Reference Diskette so the computer can update the configuration.

“Set configuration” contains the following programs:

- **View configuration** displays the present configuration stored in the computer memory.
 - **Change configuration** is used to make changes to the configuration stored in memory. Changing the configuration lets you tailor the computer operation to your needs.
 - **Backup configuration** copies the configuration stored in memory onto the backup copy of the Reference Diskette. Use this program if you make changes to the configuration so that you will have a copy of the changes in the event the battery is removed or replaced.
 - **Restore configuration** retrieves the configuration copied by “Backup configuration” and restores it to the computer memory. Use “Restore configuration” after the battery is removed or replaced.
 - **Run automatic configuration** causes the computer to configure itself automatically and store the information on the backup copy of the Reference Diskette.
- **Set features** is used to:
 - **Set date and time** so that you have the convenience of recording the date and time of your computer activities. Once the date and time are set, the computer battery keeps them current, even when the computer is turned off.
 - **Set passwords** to help restrict the use of the computer by unauthorized persons. Three types of passwords are available: for power-on, the keyboard, and the network server.
 - **Set keyboard speed** to change the speed at which the keyboard responds when you type.
 - **Copy an option diskette** is used if you are installing an IBM option that comes with a diskette and instructions to update the backup copy of the Reference Diskette. This option diskette contains the testing program and configuration information for the option. Be sure to follow the instructions supplied with the option.
 - **Move the computer** prepares and protects the fixed disk drive for moving.

- **Test the computer** tests the computer hardware. If a problem occurs during this testing, an error message appears with the cause of the problem and the action to take.

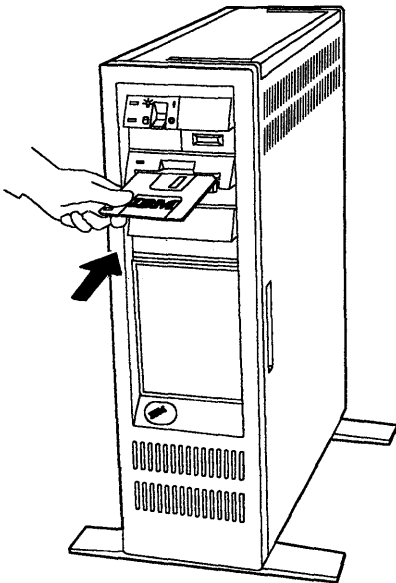
How to Start the Reference Diskette

If the computer is off:

1. Insert the backup Reference Diskette, with the label up and metal-shutter end first, into drive A. Make sure the diskette clicks into place.
2. Turn on the computer and follow the instructions on the screen.

If the computer is already on:

1. Insert the backup Reference Diskette, with the label up and metal-shutter end first, into drive A. Make sure the diskette clicks into place.
2. Press and hold the Ctrl and Alt keys; then press the Del key. Release them all.
3. Follow the instructions on the screen.



Setting Passwords

These instructions are also on the Reference Diskette in the "Set features" program. Because the computer must be turned off, then on again to follow some of the password instructions, the information is provided here for your convenience.

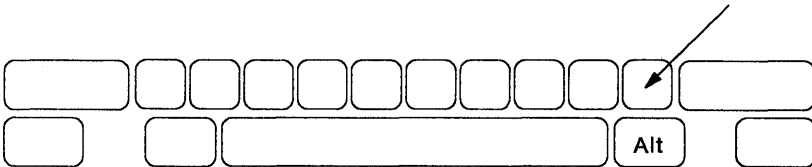
Set a Power-On Password

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, a small key (see page 11) appears. 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, and try again.

To set a power-on password, start the backup copy of the Reference Diskette (see page 14). Go to the main menu and select "Set features," then "Set passwords." Next, select "Set power-on password" and follow the instructions on the screen.

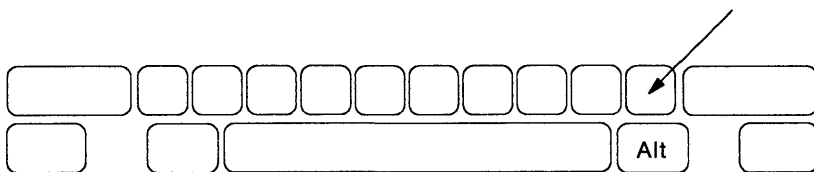
Change a Power-On Password

To change your power-on password, turn on the computer. When the password prompt appears, type your current password, then press the key located above the right Alt key. Type your new password (no more than seven characters), and press Enter.



Remove a Power-On Password

To remove your power-on password, turn on the computer. When the password prompt appears, type your current password, then press the key located above the right Alt key, and press Enter.



Forget the Power-On Password?

To remove the power-on password because you forgot it, you must remove the battery from inside the system unit for at least **20 minutes** to erase the memory containing your password. (See page 39 for instructions on removing the battery.)

Set the Network Server Mode

If your computer is a server on a network, you can set a network server mode. Your computer can now be turned on so other computers on the network can access your fixed disk drive while your keyboard is locked.

Before setting a network server password you must first set a power-on password (see page 15). After setting a power-on password, set the network server mode by going to the Main Menu of the Reference Diskette and selecting "Set features," then "Set passwords."

Then select "Set network server mode" and follow the instructions on the screen.

Remove the Network Server Mode

To remove the network server mode, start the backup copy of the Reference Diskette (see page 14). Go to the main menu and select "Set features," then "Set passwords." Then select "Set network server mode." When you are asked "Set network server mode?" press N and Enter.

Set a Keyboard Password

Setting a keyboard password lets you lock the keyboard without turning the computer off. To set a keyboard password, you must first install the keyboard program from the Reference Diskette onto the fixed disk or diskette that contains your disk operating system (DOS).

Installing the keyboard password program:

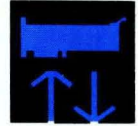
Start the backup copy of the Reference Diskette (see page 14). Go to the Main Menu and select "Set features," then "Set passwords." Then select "Set keyboard password" and follow the instructions on the screen. After installing the keyboard program, continue with the following.

Setting and using a keyboard password:

Go to the DOS prompt (usually "A>" or "C>"), then:

- To **lock the keyboard**, type *KP* and press Enter. The keyboard is locked when you hear a beep.
- To **unlock the keyboard**, type your keyboard password and press Enter. The keyboard is unlocked when you hear a beep. (If the keyboard remains locked, type the power-on password that was active when you turned on the computer, then press Enter to unlock the keyboard.)
- To **change the keyboard password**, type *KP/c* and press Enter.
- To **remove the keyboard password**, turn off the computer.

Installing IBM Options



This section provides instructions for installing IBM options inside the system unit to expand the capabilities of the computer. The system unit has several built-in connectors so that you can add options easily. For information about these connectors and where cables connect to the system unit, see pages 8 and 9.

IMPORTANT: Use this section to install only IBM options that are designed for this computer.

This section contains:

How to Install an Option	20
System Unit Cover	21
Removing the System Unit Cover	21
Installing the System Unit Cover	22
Adapter	24
Installing an Adapter	24
Removing an Adapter	27
Drives	27
Installing a Fixed Disk Drive	27
Installing a Diskette Drive	33
Removing a Diskette Drive	36
Installing a Math Coprocessor	38
Removing and Installing the Battery	39

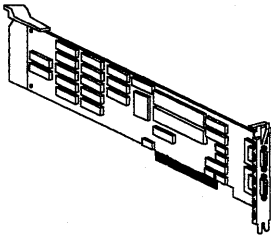
How to Install an Option

The system unit, display, and keyboard should be unpacked and set up.

1. Follow the instructions supplied with the option, if you have not already done so.

Be sure to follow the instructions supplied with the option because some options come with a diskette and instructions to update the backup copy of the Reference Diskette. This option diskette contains the testing program and configuration information for the option. (See "Copy an option diskette" on page 13 for more information.)

2. If the option instructions referred you to this manual for specific instructions, follow the instructions necessary from this section to install that option. For example, to install an adapter, you would follow the instructions from this section for:



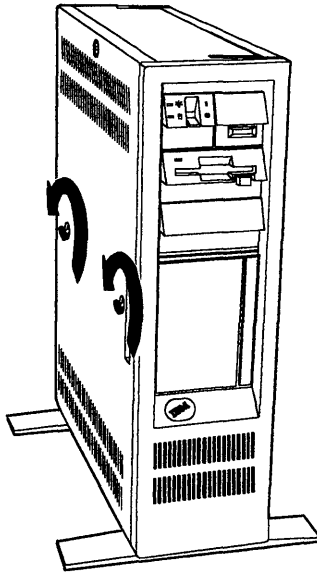
- a. "Removing the System Unit Cover" on page 21.
 - b. "Installing an Adapter" on page 24.
 - c. "Installing the System Unit Cover" on page 22.
3. For the option to work after installation, you must start the backup copy of the Reference Diskette (see page 14) and follow the instructions on the screen to run automatic configuration. (See "Set configuration" on page 12 for more information.)
 4. When installation is complete, store the option instructions and any diskettes with this manual.

Note: Your computer may look different from the illustrations, depending on installed adapters and other options.

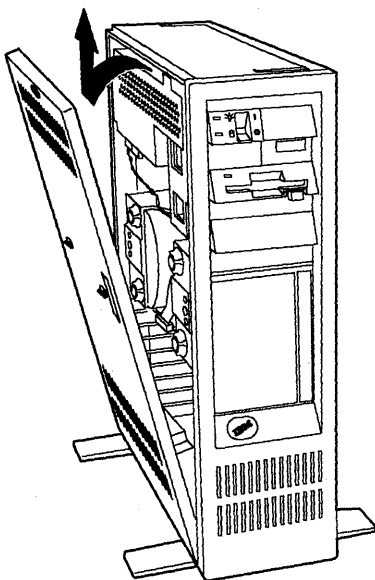
System Unit Cover

Removing the System Unit Cover

1. Turn off the computer (system unit and all attached options such as the display and printer).
2. Unplug all computer power cords from electrical outlets. Then make a note of all cables and cords connected to the rear of the system unit and disconnect them.
3. Check that the cover is unlocked.
4. Use a coin to loosen the cover screws.

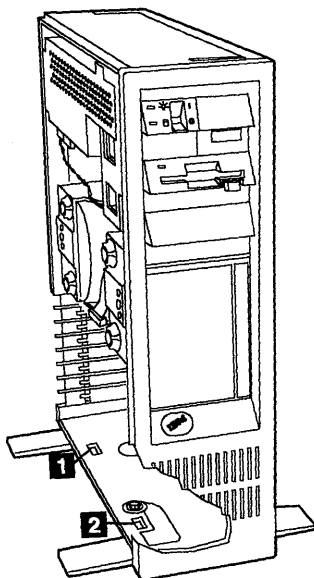


5. Remove the cover.

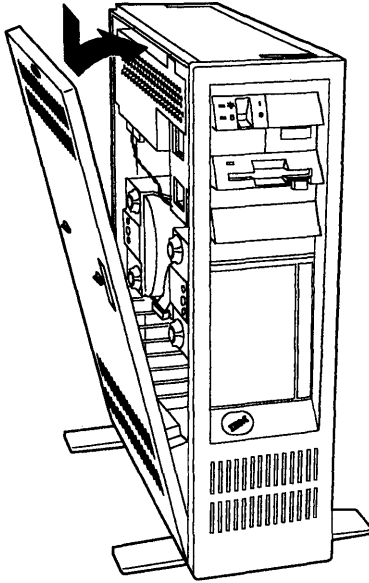


Installing the System Unit Cover

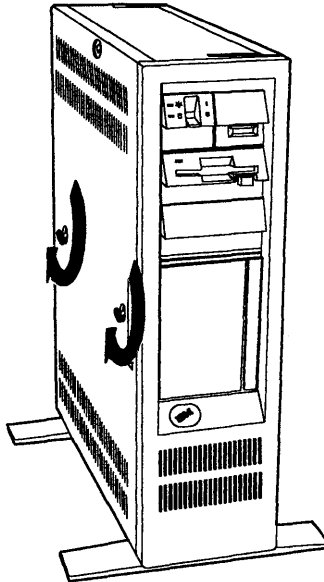
1. Locate **1** and **2**.



2. Align the cover latches with the cut-outs and install the cover.



3. Tighten the screws using a coin.



4. Lock the cover to help protect the devices and options inside the system unit.
 5. Connect all cables and cords to the rear of the system unit. Then plug all computer power cords into electrical outlets. (For information on where cables connect, see pages 8 and 9.)
-

Adapter

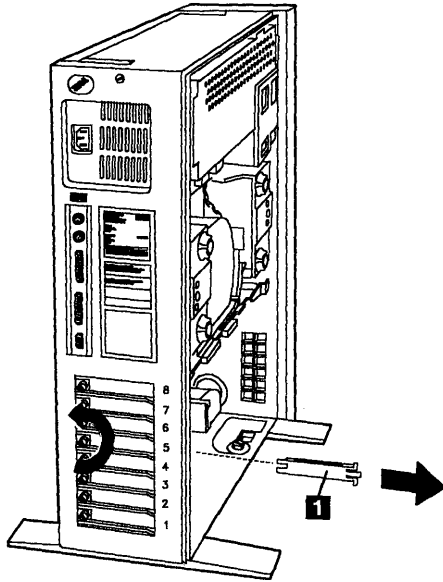
This section explains the procedures for installing and removing adapters.

Note: The IBM Display Adapter 8514/A must be installed in the extended slot (slot 6).

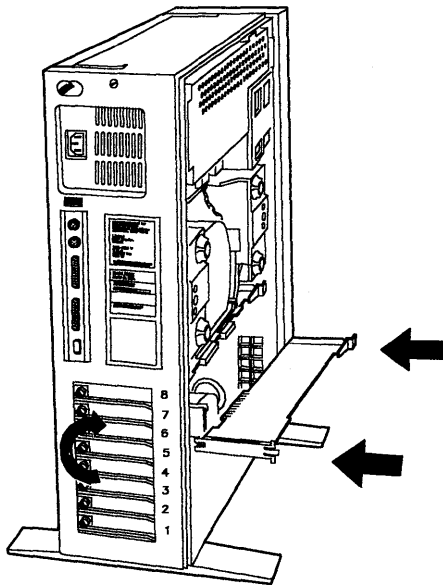
Installing an Adapter

1. Check the instructions supplied with the adapter to see if the backup copy of the Reference Diskette needs to be updated or if the adapter must be installed in a specific expansion slot.
2. Turn off the computer and unplug all cords and cables. Then remove the cover (see page 21).
3. Locate the expansion slots numbered 1 through 8 on the rear of the system unit. Look inside the system unit and find an expansion slot that does not have an adapter installed.

4. Before installing the adapter into the available expansion slot, you must remove the expansion slot cover. To do this, loosen the screw (use a coin if it is too tight) and remove the expansion slot cover **1**. You may discard the expansion slot cover.



5. Press the adapter firmly into the expansion slot connector until the adapter clicks into place. Then tighten the screw.

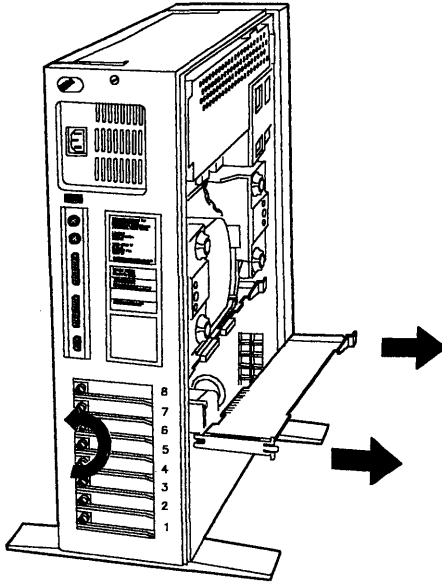


6. Install the cover (see page 22), then plug in all cords and cables.
7. Start the backup copy of the Reference Diskette (see page 14) and follow the instructions on the screen to run automatic configuration. (See "Set configuration" on page 12 for more information.)

Removing an Adapter

Use these instructions if you are removing an adapter to upgrade it or change its location.

1. Turn off the computer and unplug all cords and cables. Then remove the cover (see page 21).
2. Make a note of the adapter location and any internal cables connected to it, then disconnect any cables.
3. Loosen the screw and remove the adapter.



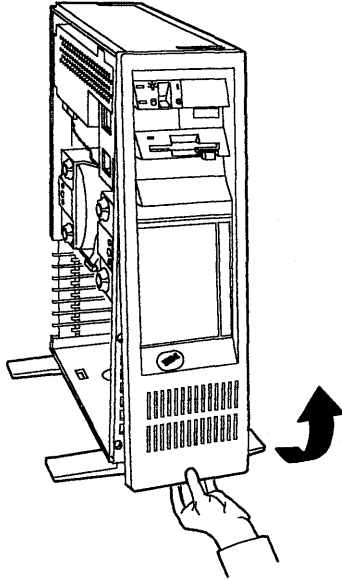
4. To install the adapter, see the instructions on page 24.

Drives

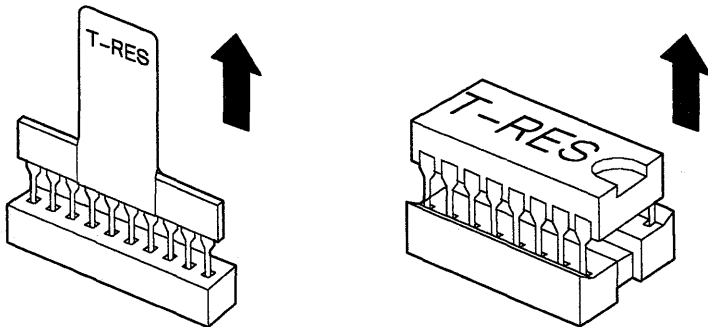
Installing a Fixed Disk Drive

1. Turn off the computer and unplug all cords and cables. Then remove the cover (see page 21).

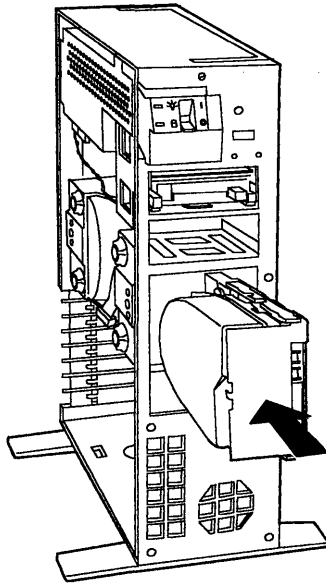
2. Remove the system unit cover plate by firmly pulling it away.



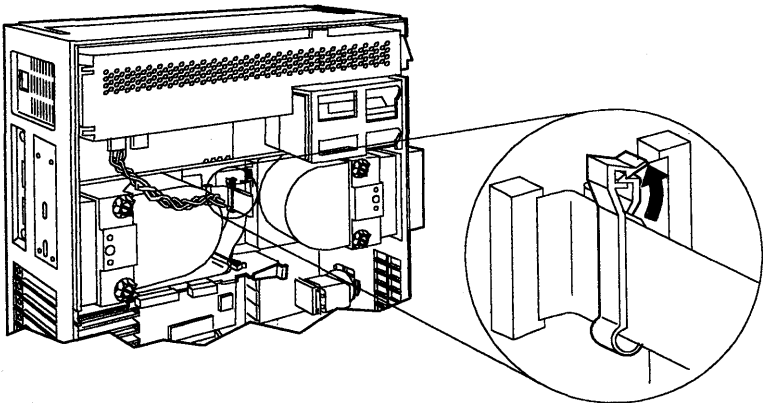
3. Before installing an additional 44 or 70Mb fixed disk drive, you must remove its terminating resistor. There are two different types of terminating resistors. The terminating resistors for the 44 and 70Mb disk drives have "T-RES" printed on them. Using the illustrations below, find and remove the terminating resistor from the fixed disk drive.



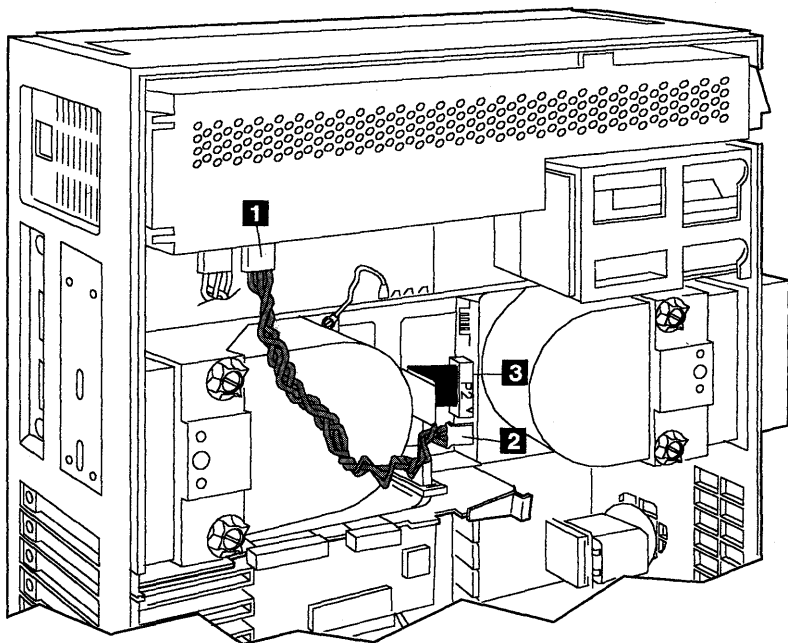
4. Align the fixed disk drive with the brackets and slide it in three-fourths of the way.



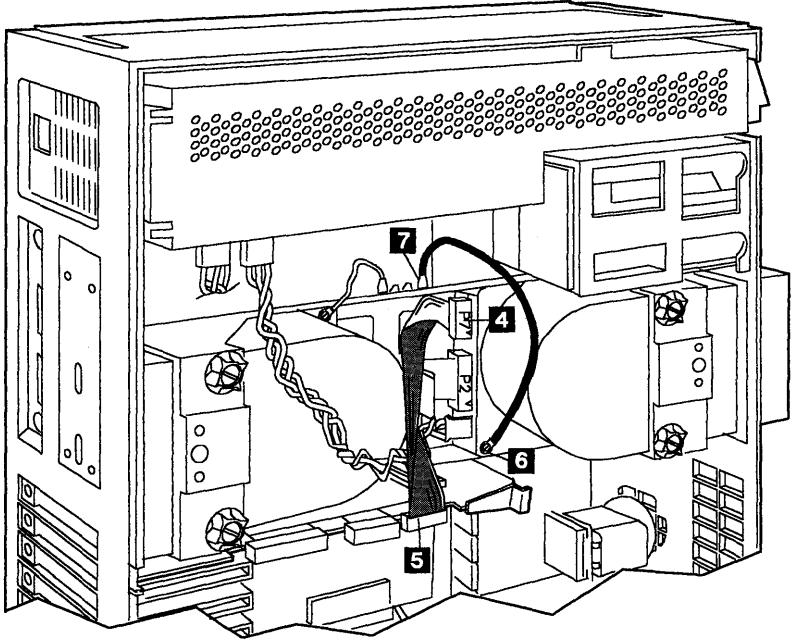
5. Before connecting cables to the fixed disk drive, remove the top cable clip from inside the system unit and discard it.



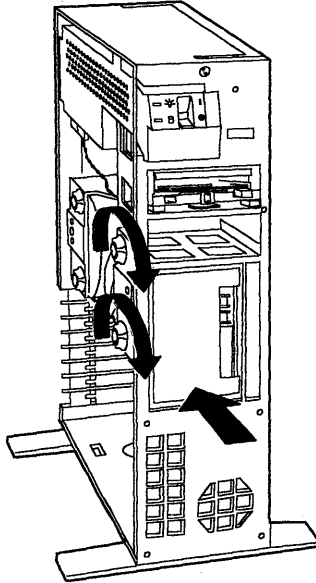
6. Connect the cables to the fixed disk drive as follows:
- Get the twisted cable supplied with the fixed disk drive and find the end that has four prongs. Firmly connect this end to **1**. Then connect the other end to **2**. (The ends connect only one way. If you have difficulty connecting an end, turn it over and try again.)
 - Inside the system unit find the unattached flat cable end marked "P2." With the "P2" facing you, connect the cable to **3**.



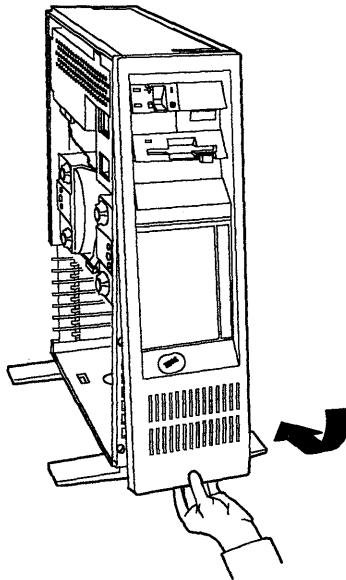
- Get the flat cable supplied with the fixed disk drive and find the end marked "P7." With the "P7" facing you, connect the cable to **4** . Then connect the other end to **5** with the "P6" facing down.
- Get the ground wire supplied with the fixed disk drive and connect either end to the prong on the fixed disk drive at **6** , then connect the other end to the prong at **7** .



7. Slide the fixed disk drive in all the way and tighten the knobs.



8. Install the system unit cover plate by pressing its top post into the top hole of the system unit and then firmly pressing the bottom of the cover plate in until it snaps into place.

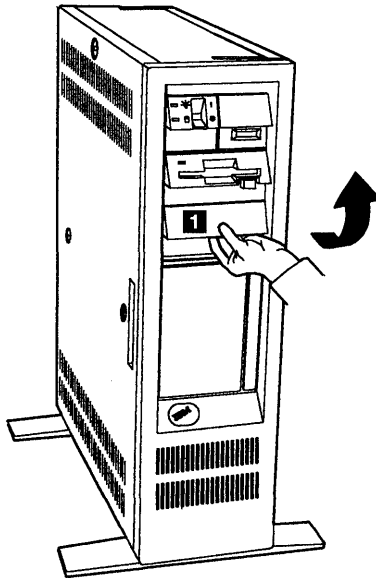


9. Make sure all the cables you connected to the fixed disk drive are tucked inside the system unit.
10. Install the cover (see page 22), then plug in all cords and cables.
11. Start the backup copy of the Reference Diskette (see page 14). Display the Main Menu and select "Set configuration," then follow the instructions on the screen. This automatically configures the fixed disk drive for correct operation. (See "Set configuration" on page 12 for more information.)

Installing a Diskette Drive

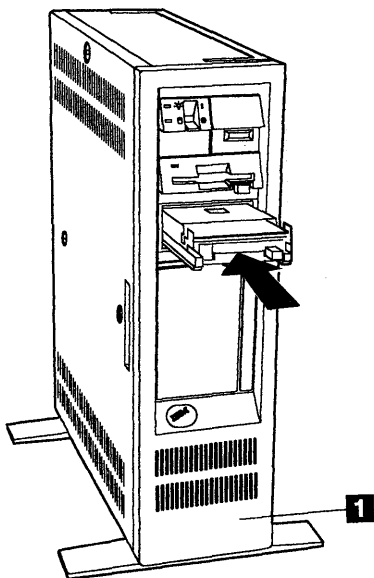
These instructions may also be used for installing an option other than a diskette drive.

1. Turn off the computer and unplug all cords and cables.
2. Remove the blank diskette drive cover plate by firmly pulling it away.



3. Firmly slide the diskette drive into the system unit until it clicks into place.

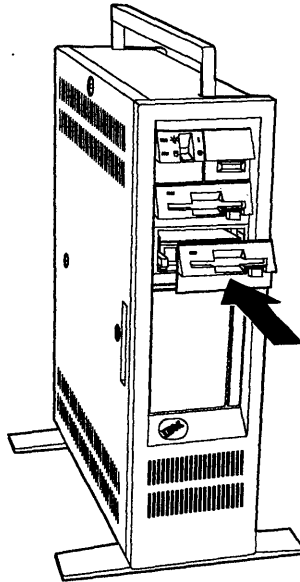
Note: If you removed the system unit cover plate, then install it and continue with step 4.



4. Are you installing an option other than a diskette drive?

Yes Get the blank diskette drive cover plate you removed (see step 2) and firmly press it back into place until it clicks, then continue with step 5.

No Get the longer cover plate supplied with the diskette drive (you may discard the shorter cover plate). Align the longer cover plate with the diskette drive and firmly press it into place until it clicks. Save the blank diskette drive cover plate you removed in step 2. If the diskette drive is ever removed, the blank cover must be installed.

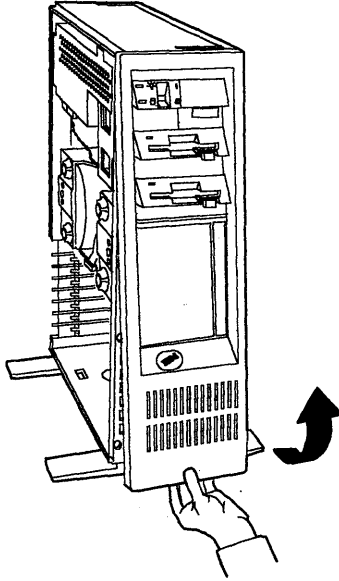


5. Plug in all cords and cables.

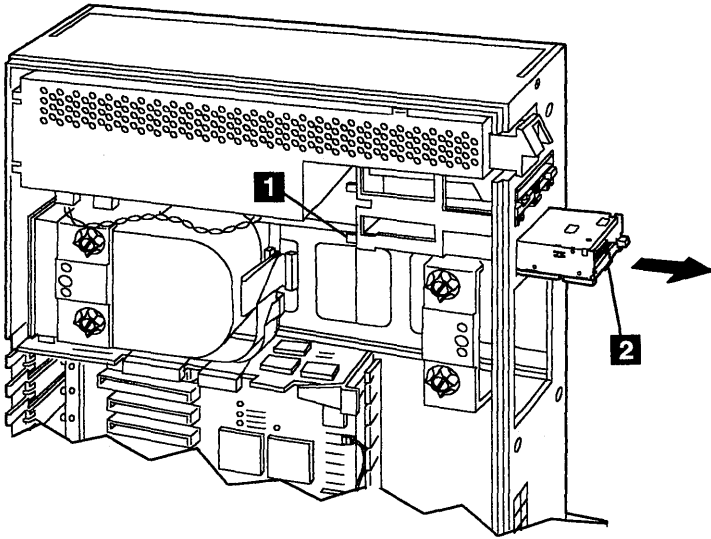
6. Start the backup copy of the Reference Diskette (see page 14) and follow the instructions on the screen to run automatic configuration. (See "Set configuration" on page 12 for more information.)

Removing a Diskette Drive

1. Turn off the computer and unplug all cords and cables. Then remove the cover (see page 21).
2. Remove the system unit cover plate by firmly pulling it away.



3. Remove the diskette drive. To do this, press and hold in the release latch **1** while pressing and holding up the release latch **2** and sliding the drive out.



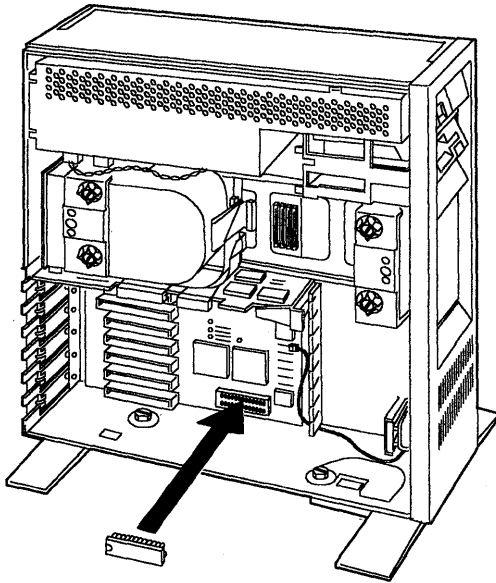
4. Store the diskette drive in a safe place for future use.
5. If you are installing an option into the diskette drive B position, go to page 34, and follow steps 3 through 6.

Installing a Math Coprocessor

IMPORTANT: Make sure the math coprocessor you are installing is designed for this computer.

1. Turn off the computer and unplug all cords and cables. Then remove the cover (see page 21).
2. If there is an adapter installed in expansion slot 1, 2, or 3, temporarily remove those adapters to install the coprocessor, then continue with step 3. (See page 27 for instructions on removing an adapter.)
3. Install the coprocessor. To do this, find the notch on the coprocessor. With the notch facing to the rear of the system unit, carefully align the pins of the coprocessor with the openings in the socket and firmly press the coprocessor into place.

Note: If you have difficulty, first align the bottom row of pins with the openings, then apply downward pressure to align the top row of pins.



IMPORTANT: If the math coprocessor is not installed correctly, the computer will not work.

4. If you removed an adapter in step 2, install it (see page 24).

5. Install the cover (see page 22), then plug in all cords and cables.
6. Start the backup copy of the Reference Diskette (see page 14) and follow the instructions on the screen to run automatic configuration. (See "Set configuration" on page 12 for more information.)

Removing and Installing the Battery

CAUTION

The lithium battery presents a fire, explosion, or severe burn risk.

Do NOT recharge it, remove its polarized connector, disassemble it, heat it above 100°C (212°F), incinerate it, or expose its cell contents to water.

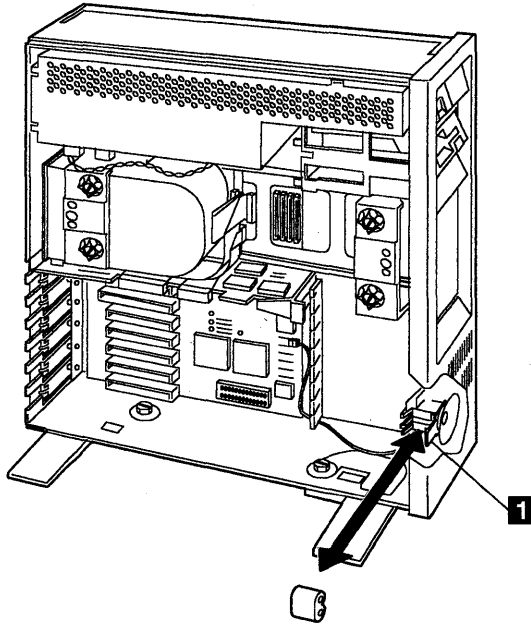
Dispose of the battery as required by local ordinances or regulations. When replacing the battery, use only Part No. 72X8498. Use of another battery could result in ignition or explosion of the battery. Replacement batteries can be ordered from IBM or IBM Authorized Dealers.

The configuration information is lost from the computer memory when the battery is removed or replaced. After removing and installing the battery, you must start the backup copy of the Reference Diskette and follow the instructions on the screen to run automatic configuration.

1. Turn off the computer and unplug all cords and cables. Then remove the cover (see page 21).

2. Remove the battery. To do this, press and hold the latch **1** toward the front of the system unit while removing the battery.

Note: If you are removing your password, wait for at least 20 minutes to erase the memory containing your password before installing the battery.



3. Install the battery. To do this, press and hold the latch **1** toward the front of the system unit while installing the battery.
4. Install the cover (see page 22), then plug in all cords and cables.
5. Start the backup copy of the Reference Diskette (see page 14) and follow the instructions on the screen to run automatic configuration. (See "Set configuration" on page 12 for more information.)

If you previously backed up the configuration, display the Main Menu of the Reference Diskette and select "Set configuration" then "Restore configuration" and follow the instructions to restore your original configuration. (See "Restore configuration" on page 13 for more information.)

Solving Computer Problems



Problems with your computer can be caused by software, hardware, or both. You can test the hardware yourself with the assistance of the 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 provide a considerable amount of information to the service technician.

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

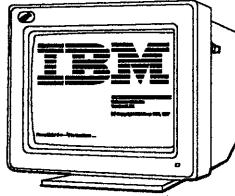
IMPORTANT: Use this section to test only IBM products. Non-IBM products may give misleading errors or incorrect computer responses. Refer to the instructions supplied with those products for testing information.

This section contains:

How to Start Testing	42
Troubleshooting Charts	43
What If Testing Cannot Find the Problem?	45
How to Get Service	48

How to Start Testing

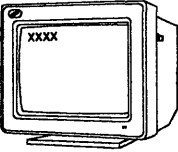
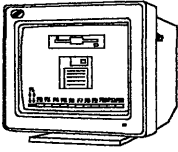
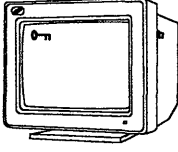
1. Start the backup copy of the Reference Diskette (see page 14).
2. Look at the display. Has this screen appeared?



- Yes** The computer has successfully completed its internal self-tests. To start the testing programs, follow the instructions on the screen and select "Test the computer."
- **If the computer did not beep**, the speaker is not working and you should have the system unit serviced. If you are not sure about the beep, turn the computer off, then on again.
 - **If you cannot go beyond the IBM screen**, check to see that the keyboard cable is plugged into the correct connector on the system unit (see pages 8 and 9). If the connector is correct, have the system unit, the keyboard, and the keyboard cable serviced.
 - **If the testing stops and does not continue**, have the system unit serviced.
- No** Find the problem in the Troubleshooting Charts and take the action described.

Troubleshooting Charts

DISPLAY PROBLEMS	ACTION
<p>Blank screen plus no beeps.</p> <p>Note: If you are not sure about the beeps, turn the computer off, then on again.</p>	<p>Check to see if:</p> <ol style="list-style-type: none"> 1. The system unit power cord is plugged into a working electrical outlet and into the system unit. 2. The cables connected to the system unit are tight. To do this, power off the computer and disconnect all cables. Then reseal the cables, making sure that they are properly connected and tight. Power on the computer. (For information on where cables connect, see pages 8 and 9.) 3. The system unit power switch is on. 4. A math coprocessor just installed is installed correctly (see page 38). <p>If the above items are correct and the screen remains blank, have the system unit serviced.</p>
<p>Blank screen plus 1 beep.</p>	<p>Check to see if:</p> <ol style="list-style-type: none"> 1. The display power cord is plugged into a working electrical outlet and into the display. 2. The display is turned on and the Brightness and Contrast controls are turned up. 3. The display signal cable is plugged into the correct connector on the system unit. The correct connector depends upon the type of display. Some displays plug into the display connector. Other displays plug into an adapter that may be installed in an expansion slot. (See the display connector on pages 8 and 9.) <p>If the above items are correct and the screen remains blank, run the display tests described in the instructions supplied with the display. If the tests show the display is OK, have the system unit serviced.</p>
<p>Blank screen plus 2 or more beeps.</p>	<p>Have the system unit serviced.</p>
<p>Only the cursor (_) appears.</p>	<p>Have the system unit serviced.</p>
<p>Screen is unreadable or distorted.</p>	<p>Run the display tests described in the instructions supplied with the display. If the tests show the display is OK, have the system unit serviced.</p>
<p>Wrong characters appear on the screen.</p>	<p>Have the system unit serviced.</p>

MESSAGES ON THE SCREEN	ACTION
<p>Numbers.</p> 	<p>The computer internal self-tests 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 drive A. 2. That the diskette is inserted correctly (label up and metal-shutter end first) into drive A. (See "How to Start the Reference Diskette" on page 14.) <p>If the above items are correct and you cannot get the screen shown in step 2 on page 42, have the system unit 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 11. 2. That you have the backup copy of the Reference Diskette in drive A. 3. That the diskette is inserted correctly (label up and metal-shutter end first) into drive A. (See "How to Start the Reference Diskette" on page 14.) <p>If the above items are correct and both prompts remain, have the system unit serviced.</p>
<p>Password Prompt.</p> 	<p>A power-on password is set. To use the computer, you must type the correct password and press Enter (see pages 11, 15, and 16).</p> <p>If the power-on password is not working properly, have the system unit serviced.</p>
<p>ROM error.</p>	<p>Have the system unit serviced.</p>
<p>You receive a screen or message that is not listed above.</p>	<p>Check to see that:</p> <ol style="list-style-type: none"> 1. You have the backup copy of the Reference Diskette in drive A. 2. The diskette is inserted correctly (label up and metal-shutter end first) into drive A. (See "How to Start the Reference Diskette" on page 14.) <p>If the above items are correct and you cannot get the screen shown in step 2 on page 42, have the system unit serviced.</p>

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 following troubleshooting charts.

DISKETTE DRIVE PROBLEMS	ACTION
Diskette drive in-use light stays on.	<p>If there is a diskette in the drive, check to see that:</p> <ol style="list-style-type: none"> 1. The diskette is good and not damaged. Try another backup copy if you have one. 2. The diskette is inserted correctly (label up and metal-shutter end first) into drive A. 3. Your software program is OK (see page 47). <p>If the above items are correct and the diskette drive in-use light stays on, have the system unit serviced.</p>

KEYBOARD, MOUSE, OR POINTING DEVICE PROBLEMS	ACTION
Some or all keys on the keyboard do not work.	If the testing programs on the Reference Diskette do not find the problem, have the keyboard and keyboard cable 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.

PRINTER PROBLEMS	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 correct connector on the system unit. (For the location of the printer connector, see pages 8 and 9.) <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 printer cable checked and the system unit serviced.</p>

OPTION PROBLEMS	ACTION
<p>An IBM option that was just installed does not work.</p>	<p>Check to see that:</p> <ol style="list-style-type: none"> 1. The option is designed for the computer. 2. The option is installed correctly. <p>Some options come with a diskette and instructions to update the backup copy of the Reference Diskette. This option diskette contains the testing program and configuration information for the option. Before installing the option, update the backup copy of the Reference Diskette with this option diskette. Be sure to follow the instructions supplied with the option. (See "Copy an option diskette," on page 13, for more information.)</p> <ol style="list-style-type: none"> 3. You have not loosened any other installed options or cables. 4. After installation of the option, the backup copy of the Reference Diskette was started for the computer to automatically configure itself. <p>If the above items are correct and the testing programs on the Reference Diskette found no problem, have the system unit and option serviced.</p>
<p>An IBM option that used to work does not work now.</p>	<p>Check to see:</p> <ol style="list-style-type: none"> 1. That all of the option hardware and cable connections are tight. 2. If the option came with its own testing instructions. Use those instructions to test the option. 3. If the option came with a diskette and instructions to update the backup copy of the Reference Diskette. Be sure to check the instructions supplied with the option. (See "Copy an option diskette," on page 13, for more information.) <p>If the above items are correct and the testing programs on the Reference Diskette found no problem, have the system unit and option serviced.</p>

SOFTWARE PROBLEMS	ACTION
<p>Is your software program OK?</p>	<p>To determine if problems are caused by the software, check to see if:</p> <ol style="list-style-type: none"> 1. Your computer meets the minimum requirements to use the software. Refer to the manuals supplied with the software to verify this. 2. The software is designed to operate on your computer. 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, and that you referred to the manuals supplied with the software for a description of the messages and solutions to the problem. <p>If the above items are correct and the problem remains, contact an IBM service technician for help.</p>

INTERMITTENT PROBLEMS	ACTION
<p>Does your computer have an intermittent problem?</p>	<p>A problem may be difficult to find because it occurs just once in a while. If your computer has such a problem, check to see that:</p> <ol style="list-style-type: none"> 1. All cables and cords are tightly connected to the rear of the system unit and attached options. 2. When the computer is turned on, air flows from the rear of the system unit at the fan grill. If there is no air flow, the fan is not working. This causes the system unit to overheat and turn itself off. <p>If the above items are correct and the problem remains, write down what the problem is and what the computer is doing when the problem occurs. Then contact an IBM service technician for help.</p>

REFERENCE DISKETTE PROBLEMS	ACTION
Is your backup copy of the Reference Diskette current?	<p>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 12 for more information.) If the backup copy is not current, problems with the computer may not be found if you are running the testing programs.</p> <p>Some options come with a diskette and instructions to update the backup copy of the Reference Diskette. This option diskette contains the testing program and configuration information for the option. If you installed an option, check its instructions to see if it came with such a diskette.</p>

How to Get Service

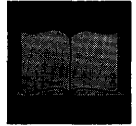
If the computer needs service, you can:

- Call an IBM authorized service technician to come and repair it.
- Take it to an IBM authorized service center for repair.

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

For your convenience, write down service phone numbers here:

Appendix A: Additional Information



Ordering Additional Cover-Lock Keys	49
Diskette Drives and Diskettes	49
Identifying Diskette Drives	49
Identifying Diskettes	50
Formatting Diskettes	50
Write-Protecting Diskettes	51
Moving the Computer	52
What Is IBM Cassette BASIC?	54
IBM Power Cords	55

Ordering Additional Cover-Lock Keys

You can obtain information for ordering additional or replacement keys by writing to the address given on the tag attached to the keys. When requesting additional keys, be sure to include the key serial number.

Diskette Drives and Diskettes

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

The IBM Personal System/2 Model 60 operates with 1.44Mb diskette drives. These drives use 1Mb or 2Mb 3.5-inch diskettes. Other IBM computers may operate with 720Kb diskette drives that use only 1Mb 3.5-inch diskettes.

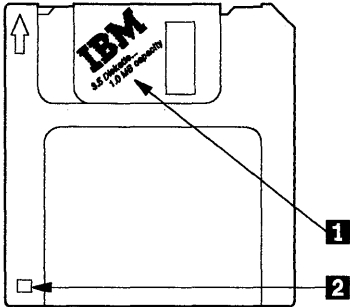
The 1Mb diskettes can be used in both 720Kb and 1.44Mb diskette drives; however, 2Mb diskettes can be used in 1.44Mb diskette drives only. If you intend to transfer diskettes between computers that have diskette drives with different capacities, use only 1Mb diskettes formatted to 720Kb.

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.

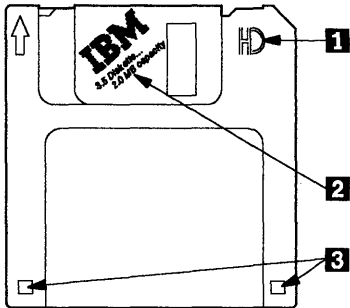
Identifying Diskettes

A 1Mb diskette looks like this:



It is usually labeled "1.0 Mb capacity" or "2HC" **1**, and has a square cutout **2**.

A 2Mb diskette looks like this:



It has the letters "HD" **1**, is usually labeled "2.0 Mb 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 a 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.

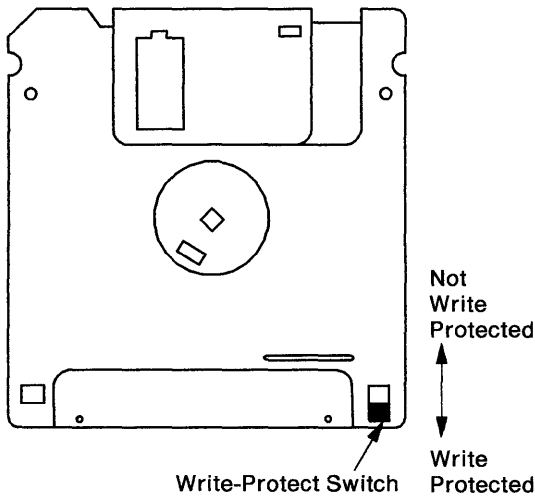
2Mb Diskettes must be formatted to 1.44Mb. To do this, you must use a 1.44Mb diskette drive.

Write-Protecting Diskettes

It is possible to format a diskette or write (record) information onto a diskette unintentionally. Important information could be lost. Therefore, 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.

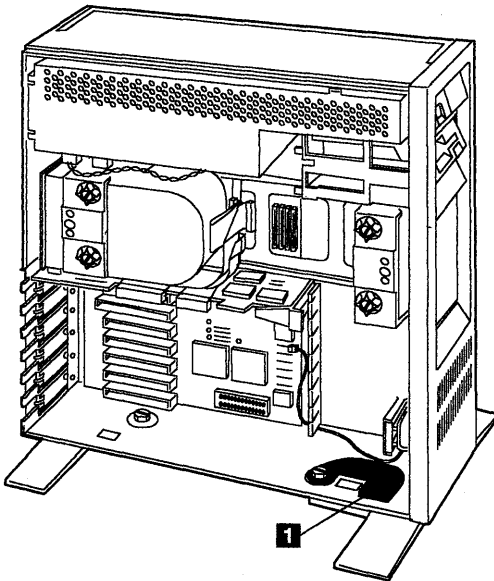
To locate the write-protect switch, turn the diskette over with the label facing down.



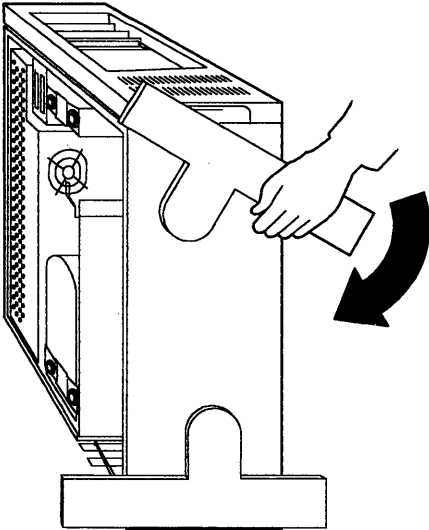
- **To prevent writing** onto a diskette, slide the switch down.
- **To allow writing** onto a diskette, slide the switch up.

Moving the Computer

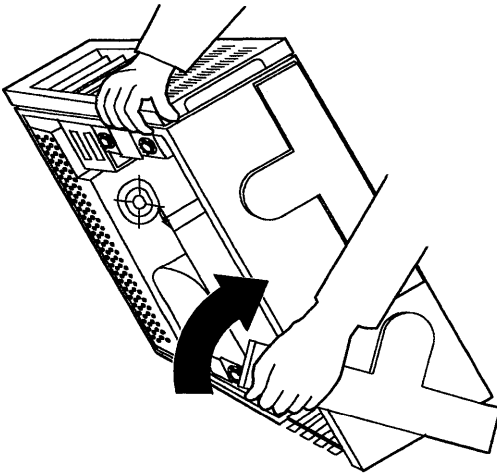
1. Back up (copy) all files (data) on the fixed disks before moving the system unit. Normal shipping and handling can cause loss of data from fixed disks. Refer to your operating system manual for backup instructions. You cannot use the backup programs on the Reference Diskette to back up a fixed disk.
2. Start the backup copy of the Reference Diskette and select "Move the computer" to prepare the fixed disk drive for moving.
3. Remove any diskettes from the drives. Be sure to store the backup copy of the Reference Diskette in a safe place.
4. Turn off the computer (system unit and all attached options).
5. Unplug all the computer power cords from electrical outlets. Make a note of all cables or cords connected to the rear of the system unit and disconnect them.
6. Use the instructions that follow to pivot the system unit feet in.
 - a. Remove the cover (see page 21) and note the location of the flat metal piece **1**.



- b. Carefully lay the system unit on its back. Then while lifting the flat metal piece up, pivot the foot down.



- c. While tilting the system unit slightly to the side, pivot the other foot up.



- d. Install the cover (see page 22). Continue with step 7 on page 54.

7. Pack the computer (system unit and all options). If you saved the original boxes and packing materials, use them to pack the computer. If you are using different boxes, cushion the computer well to avoid any damage. Moving the computer without packing it properly may result in damage. If you have any questions or need help, call your IBM Marketing Representative.

What Is IBM Cassette BASIC?

IBM Cassette BASIC (Beginner's All-Purpose Symbolic Instruction Code) is built into the IBM Academic System 6152 to help maintain software compatibility with other IBM computers. Cassette BASIC is the lowest version of BASIC and is not intended for productive use as no information can be saved. For more information about BASIC, refer to the *IBM BASIC* manual (not included with this product).

Note: If you have already installed an operating system on the fixed disk drive, you will not be able to start Cassette BASIC.

To start Cassette BASIC:

1. Remove any diskettes from the diskette drives.
2. Turn on the computer.
3. When the Diskette and F1 Prompts appear, press the F1 key.
4. When the following screen appears (where X is any number), Cassette BASIC is loaded and ready to use:

```
The IBM Personal Computer Basic  
Version CX.XX Copyright IBM Corp. XXXX  
XXXXX Bytes free  
Ok
```

```
!LIST 2RUN 3LOAD* 4SAVE* 5CONT 6LPT1 7TRON 8TROFF 9KEY 0SCREEN
```

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, use the power cord and plug with a properly grounded electrical outlet.

IBM power cords used in the United States and Canada are listed by Underwriter's Laboratories (UL) and certified by the Canadian Standards Association (CSA). These power cords consist of:

- Electrical cables type SVT or SJT
- Attachment plugs complying with National Electrical Manufacturers Association (NEMA) 5-15P
- Appliance couplers complying with International Electrotechnical Commission (IEC) Standard 320, Sheet C13.

The part number for this cord is 62X0663.

Index

A

- adapter
 - installing 20, 24
 - location (see expansion slots) 8, 9
 - removing 27
- application programs 5

B

- backup
 - configuration 13
 - for moving 52
 - reference diskette 12
- BASIC, cassette 54
- battery
 - part number 39
 - removing and installing 39
- blank screen 43

C

- cable, keyboard (see keyboard connector) 8, 9
- cassette BASIC 54
- configuration
 - backup 13
 - change 13
 - installing an option 20
 - restore 13
 - run automatic 13
 - set 13
 - view 13
- connectors
 - display 8, 9
 - keyboard 8, 9
 - modem 8, 9
 - mouse 8, 9
 - parallel 8, 9
 - pointing device 8, 9

- power cord 8, 9
- printer 8, 9
- serial 8, 9
- coprocessor, math 38
- copy
 - option diskette 13
 - reference diskette 12
- cover lock, system unit
 - description 7
 - keys 5
 - location 6
 - ordering keys 49
 - when to unlock 21
- cover, system unit
 - installing 22
 - lock 5, 6, 7
 - removing 21

D

- date and time, set 13
- disk operating system (DOS) 11, 17
- diskette and F1 prompts 11
- diskette drives
 - compatibility 49
 - description 7
 - eject button 6, 7
 - identifying 49
 - in-use light 6, 7
 - installing 33
 - location 6
 - problems 45
 - 1.44Mb 6, 7, 49
 - 720Kb 49
- diskettes
 - capacity 49
 - compatibility 49
 - formatting 50
 - HC 50
 - HD 50
 - how to write-protect 51
 - identifying 49
 - removing (see eject button) 6, 7
 - 1Mb 49, 50
 - 2HC 49
 - 2Mb 49, 50
- display

- blank screen 43
- connector 8, 9
- Diskette and F1 prompts 44
- messages on the screen 44
- problems 43, 44

DOS prompt 17

drives

- diskette drive description 7
- diskette drive eject button 6, 7
- diskette drive in-use light 6, 7
- diskette drive location 6
- diskette drive problems 45
- diskette drive, installing 33
- diskette drive, removing 36
- fixed disk drive in-use light 6, 7
- fixed disk drive, how to move 52
- fixed disk drive, installing 27
- 1.44Mb diskette drive 6, 7

E

- eject button, diskette 6, 7
- electrical safety v
- error
 - ROM 44
 - software 47
- expansion slots
 - installing an adapter 24
 - location 8, 9

F

- fan problems 47
- features
 - date and time 13
 - keyboard password 17
 - keyboard speed 13
 - network server mode 16
 - passwords 13
 - power-on password 11, 15
 - time and date 13
- feet, system unit 7
 - description 7
 - location 6
 - pivoting 52

- fixed disk drive
 - in-use light 6, 7
 - installing 27
 - moving 52
- formatting diskettes 50

H

- hand slots, system unit 8, 9
- handle, carrying 8, 9

I

- in-use lights
 - diskette drive 6, 7
 - fixed disk drive 6, 7
- installing
 - adapter 20, 24
 - battery 39
 - cover, system unit 22
 - diskette drive 33
 - fixed disk drive 27
 - keyboard program 17
 - math coprocessor 38
 - network server mode 16
 - options 4, 20
 - power-on password 15
- internal self-tests, computer 42

K

- KB OK message 10
- keyboard
 - cable (see keyboard connector) 8, 9
 - connector 8, 9
 - feet 8, 9
 - icon (see keyboard connector) 9
 - lock 17
 - problems 42, 45
 - set password 17
 - set speed 13
 - unlock 17
- keys, ordering 49

L

- LAN Adapter 9
- lock, cover
 - description 7
 - keys 5
 - location 6
 - ordering keys 49
 - when to unlock 21

M

- math coprocessor, installing 38
- memory size 10
- messages
 - KB OK 10
 - on the screen 44
- modem connector 8, 9
- mouse
 - connector 8, 9
 - problems 45
- moving the computer 52

N

- network server mode, set 16

O

- operating system 5
- option
 - adapter, installing 24
 - adapter, removing 27
 - automatic configuration 13
 - copy an option diskette 13, 20
 - diskette drive, installing 33
 - diskette drive, removing 36
 - expansion slots 8, 9
 - fixed disk drive, installing 27
 - how to install 20
 - math coprocessor 38
 - problems 46
 - run automatic configuration 13, 20

P

- parallel connector 8, 9
- password
 - keyboard 17
 - network server mode 16
 - power-on 15
 - problems with 44
 - prompt 11
 - removing, power-on 16
- pointing device
 - connector 8, 9
 - problems 45
- power cord connector, system unit 8, 9
- power switch 6, 7
- power-good light 6, 7
- power-on password 11
- power-on password, set 15
- printers
 - connector 8, 9
 - problems 45
- problems
 - blank screen plus no beeps 43
 - blank screen plus one beep 43
 - blank screen plus 2 or more beeps 43
 - diskette and F1 prompts 11, 44
 - diskette drive 45
 - display 43
 - fan 47
 - how to start testing 42
 - intermittent 47
 - keyboard 42, 45
 - math coprocessor 43
 - messages on the screen 44
 - mouse 45
 - no beep 42, 43
 - numbers on the screen 44
 - only the cursor appears 43
 - option 46
 - password prompt 44
 - pointing device 45
 - printer 45
 - reference diskette 48
 - ROM error 44
 - screen is unreadable or distorted 43

- software 47
- speaker 42
- testing cannot find the problem 45
- wrong characters appear on the screen 43
- programs, application 5
- prompt
 - diskette and F1 11
 - DOS 17
 - F1 and diskette 44
 - password 11, 44

R

- reference diskette 5
 - copy an option diskette 13, 20
 - description 12
 - how to start it 14
 - make a backup copy 12
 - move the computer 13, 52
 - set configuration 13
 - set features 13
 - test the computer 14, 42
- removing
 - adapter 27
 - battery 39
 - cover, system unit 21
 - diskette (see diskette eject button) 6, 7
 - diskette drive 36
 - power-on password 16
- repair, getting service 48
- RISC Adapter
 - description 2
 - expansion slot position 9
- ROM error 44

S

- safety, electrical v
- screen, blank 43
- self-tests, computer 10, 42
- serial connector 8, 9
- serial numbers
 - recording iii, 4

- system unit 6, 7
- service, how to get it 48
- set
 - configuration 13
 - date and time 13
 - features 13
 - keyboard password 17
 - keyboard speed 13
 - network server mode 16
 - power-on password 15
 - time and date 13
- setup sheet 4
- slots
 - expansion 8, 9
 - hand 8, 9
- solving computer problems
 - how to start testing 42
 - intermittent problems 47
 - messages on the screen 44
 - troubleshooting charts 43
- speaker problems 42
- starting the computer 10
- system unit 1
 - cover 21
 - description 7
 - feet 6, 7
 - hand slots 8, 9
 - location 6
 - power switch 6, 7
 - power-good light 6, 7
 - serial number 6, 7
- system unit connectors
 - display 8, 9
 - keyboard 8, 9
 - modem 8, 9
 - mouse 8, 9
 - parallel 8, 9
 - pointing device 8, 9
 - power cord 8, 9
 - printer, parallel 8, 9
 - serial 8, 9

T

testing

- cannot find the problem 45
 - computer internal self-tests 10, 41, 42
 - how to start testing 42
 - memory size 10
 - stops 42
 - troubleshooting charts 43
- time and date, set 13
- troubleshooting charts
- diskette drive problems 45
 - display problems 43
 - intermittent problems 47
 - keyboard problems 45
 - messages on the screen 44
 - mouse problems 45

- option problems 46
- pointing device problems 45
- printer problems 45
- reference diskette problems 48
- software problems 47
- solving computer problems 41

W

- write-protect diskettes 51

Numerics

- 1.44Mb diskette drives 6, 7, 49
- 1Mb diskettes 49, 50
- 2Mb diskettes 49, 50
- 720Kb diskette drives 49



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