User's Reference for

Computer

First Edition (April 1990)

This publication could include technical inaccuracies or typographical errors. Changes are periodically made to the information herein; these changes will be made in later editions. IBM may make improvements and/or changes in the product(s) and/or the program(s) at any time.

Address comments about this publication to IBM Corporation, Dept. F95/035-3, 740 New Circle Road N.W., Lexington, KY 40511 USA. Information you supply may be used by IBM without obligation.

For copies of publications related to this product, call toll free 1-800-IBM-7282. In Alaska call 1-414-633-8108.

IBM Program License and Limited Warranty Agreement

IBM provides this Program License and Limited Warranty Agreement for your IBM Personal System/1 computer. The IBM PS/1 computer "System" consists of the 1) machine and 2) licensed programs (Programs) IBM provides to you with the machine, excluding any programs IBM may include with your PS/1 which come with their own license agreements. This Agreement applies to the System, not to such excluded programs. You are responsible for the use of the System and results you obtain from it.

You indicate your acceptance of this Agreement by breaking the seal on the keyboard or by your initial use of the System.

License

Programs are licensed, not sold. IBM hereby licenses your use of Programs. This Agreement applies to Programs, including any replacement Programs, regardless of the media upon which they are recorded.

IBM owns, or has licensed from the owners, copyrights in Programs. IBM grants you no rights other than the license described in this Agreement. IBM or its licensors retain title to copies of Programs IBM provides to you and any copies made from them.

Your license is terminated when you are no longer the owner or the rightful possessor of the System. In such event, you agree to destroy all your copies of Programs. IBM may terminate your license if you fail to comply with the terms of this Agreement.

You may:

1) use each Program on only one machine at any one time;
2) copy each Program for backup or modification purposes; and
3) modify each Program and/or merge it into another program.

Any time you make a copy, or partial copy, of any Program, you must reproduce and include the copyright notice(s) on such copy.

You may transfer the System to another party by transferring the User's Reference, including this Agreement, and at least one complete, unaltered copy of each Program along with the machine. Also, you must either give to the other party, or destroy, all your other copies of Programs, including modified copies or portions of Programs merged into other programs. IBM licenses the other party when that party accepts the terms of this Agreement by initial use of the System.

You may not:

1) use, copy, modify, merge, or transfer copies of any Program, except as this Agreement provides;
2) reverse assemble or reverse compile any Program; or
3) sublicense, rent, lease, or assign any Program or any copy of it.

Limited Warranty

IBM grants the following limited warranty only if the PS/1 was originally purchased for use, and not for resale, from IBM or its Authorized Seller. This Agreement refers to such purchase as "Original Purchase." The System is subject to this limited warranty only if purchased and located in the United States or Puerto Rico.

The Warranty Period for the System is for one year from the Date of Original Purchase shown on your receipt. You should keep the receipt as it establishes proof of Original Purchase. You will need it to obtain warranty service.

If you transfer the System to another party during the Warranty Period, warranty service is available to that party for the remainder of the Warranty Period. Therefore, you should give the proof of Original Purchase to such party.

IBM warrants that the System will be in good working order and will conform to its functional descriptions in the User's Reference. During the Warranty Period, IBM or selected Authorized Sellers will provide warranty service at no additional charge. During such period, the System requires no specific preventive maintenance. You may obtain warranty service if the System 1) is defective in material or workmanship, 2) does not meet its functional descriptions, or 3) is otherwise not in good working order. IBM will make the System operate as warranted. Warranty service will be either repair or exchange, as IBM determines. If necessary, IBM will replace a Program(s) with a functionally equivalent Program(s). If, after repeated efforts, IBM is unable to make the System operate as warranted, you may return the System to IBM or your Authorized Seller for a full refund.

This limited warranty also applies to an IBM optional feature of the PS/1. IBM or its Authorized Seller may require you to deliver the feature together with the System to obtain warranty service.

The PS/1 will be newly manufactured from new and serviceable used parts. A part or PS/1 provided to you under warranty service may not be new but will be in good working order. Such part or PS/1 becomes your property. The replaced part or PS/1 becomes the property of IBM or its Authorized Seller.

IBM does not warrant uninterrupted or error-free operation of the System, that the functions contained in any Program will meet your requirements, or that IBM will correct all Program defects.

Under exchange service, IBM will exchange a part(s) or the System, as IBM determines. You must return the failing part(s) or System in a pre-paid shipping container which IBM will provide to you. Before such return, you must remove all your own equipment, programs, data and diskettes. IBM is responsible for risk of loss of, or damage to, the System while in transit or in IBM's possession. If you do not return the failing part(s) or System as required under exchange service, IBM will charge you for the part(s) or System provided to you. IBM will also charge you if the failing part(s) or System is not eligible for exchange service.

This limited warranty does not cover problems caused by accident, disaster, vandalism, misuse, abuse, unsuitable environment, Program modification, another product or device not under IBM warranty or service agreement, or unauthorized modification or service of the System. In addition, exchange service is not available to you if the part or PS/1 is defaced or altered.

This limited warranty does not apply to any Services, including those described in the User's Reference. Services are provided under their own agreements. IBM reserves the right to discontinue the provision of any Service without notice.

EXCEPT AS SPECIFICALLY PROVIDED IN THIS AGREEMENT, THERE ARE NO OTHER EXPRESS WARRANTIES. ALL EXPRESS AND IMPLIED WARRANTIES FOR THE SYSTEM, INCLUDING THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, ARE LIMITED IN DURATION TO THE WARRANTY

PERIOD. NO WARRANTIES, EXPRESS OR IMPLIED, WILL APPLY AFTER THIS PERIOD.

Some states do not allow limitations on how long an implied warranty lasts, so the above limitations may not apply to you. This limited warranty gives you specific legal rights. You may also have other rights which vary from state to state.

Limitation of Remedies

Your sole remedy under this Agreement is set forth in this section. IBM's liability to you for any cause whatsoever will be for actual damages only and will be limited to the greater of 1) $5,000 or 2) the money paid to IBM, or its Authorized Seller, for the System. This limitation will not apply to claims by you for bodily injury or damage to real property or tangible personal property for which IBM is legally liable.

In no event will IBM be liable for any lost profits, lost savings, third party damages, incidental damages, or other economic consequential damages, even if IBM or its Authorized Seller has been advised of the possibility of such damages.

The limitation of remedies described in this section also applies to any developer of a Program supplied to IBM. IBM's and the developer's limitations of remedies are not cumulative. Such developer is an intended beneficiary of this section.

Some states do not allow the limitation or exclusion of incidental or consequential damages, so the above limitation or exclusion may not apply to you.

General

You are responsible for payment of any taxes, including personal property taxes, resulting from this Agreement.

Neither you nor IBM may bring an action, regardless of form, arising out of this Agreement, more than two years after the cause of action arose. However, four years will apply to breach of the provisions of the section entitled "License."

This Agreement will be construed under the Uniform Commercial Code of the State of New York.

Obtaining Service

If there is a problem with the System, refer to the Trouble Shooting chapter of the User's Reference for help in determining the cause of the problem and the action to take. If, during the Warranty Period, you need warranty service, contact your Authorized Seller or call IBM at 1-800-765-4747. You may also call IBM if you have any questions about this limited warranty or to find the Authorized Seller for your area.

To obtain warranty service, you must provide proof of Original Purchase.

FCC Notice

The IBM Personal System/1™ computer generates and uses radio frequency energy. If the product is not installed or used properly, it may interfere with radio or television reception. It has been tested and found to comply with the limits for a Class B computing device pursuant to Part 15 of FCC rules, which are designed to provide reasonable protection against such interference when operated in a residential area.

If the product interferes with reception, which can be determined by switching the product off and on, try one or more of the following:

- Move the receiving antenna.
- Relocate the product in relation to the radio or television.
- Plug the product into a different outlet.

Properly shielded and grounded cables and connectors must be used for connection of peripherals in order to meet FCC emission limits. Proper cables are available from IBM Authorized Sellers. IBM is not responsible for any radio or television interference caused by using other than recommended cables or by unauthorized modifications to this equipment. It is the responsibility of the user to correct such interference. Unauthorized changes or modifications could void the user's authority to operate the equipment.

Safety Information

The construction of this machine provides extra protection against the risk of electric shock by grounding appropriate metal parts. The extra protection may not function unless the power cord is connected to a properly grounded outlet. This machine has a grounding-type (3-wire) power cord because grounding is necessary. It is the responsibility of the customer or the person installing the machine to connect it to a properly grounded outlet. Seek professional assistance before using an adapter or extension cord; such a device could interrupt the grounding circuit.

If this machine is connected to an outlet that has been incorrectly connected to the building wiring, serious electric shock could result.

For continued protection against the risk of electric shock and personal injury:

- Connect the machine only to a properly grounded outlet of the correct voltage.
- Make sure the machine is turned off before you connect or disconnect the power cord or other cables.
- Connect all other cables correctly before you plug the power cord into an outlet. You must first unplug the power cord from the outlet before you remove the other cables.
- Do not use the machine in an area where it can become wet.
- Keep hair and personal articles away from moving parts in the machine to avoid the possibility of getting them caught.
- Refer service or repairs to qualified personnel.
- There may be some increased risks of electric shock and personal injury during disassembly and servicing of this machine. You should have your machine serviced by professional service personnel.
- Installation instructions are provided for user-replaceable parts and options. Follow the instructions carefully.
- The safety features of some parts may not always be obvious. Therefore, replacement parts must have the identical or equivalent characteristics as the original parts.
- Peripheral equipment connected to this machine should meet the appropriate safety standards.

About This Book

This manual is a reference for the users of the IBM Personal System/1™ computer.

In the first chapter, *Getting to Know Your IBM Personal System/1™ Computer*, you are introduced to the hardware and software included with your system.

The next four chapters describe the four features shown on the System Menu, which is displayed when the system is turned on.

Information shows you the tutorials that are provided with the system. Online information services, including the Users' Club, are also available.

Microsoft® Works is an introduction to the many features of the Works program, which includes word processing, spreadsheet, database, and communications functions.

Your Software describes a feature that lets you run your own programs on the system.

IBM DOS is about the DOS Shell, which makes most of the functions of DOS available to you in an easy-to-use format. This chapter and those that follow are increasingly technical in content. Use these chapters as a reference when you need to know about a feature or function of IBM DOS and your system.

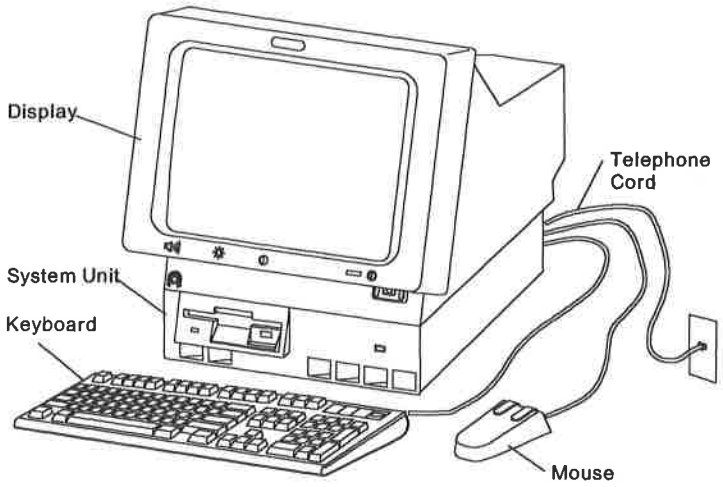
The *File System* of the DOS Shell is explained in this chapter. This function lets you manage your information, whether it is on diskettes or on a fixed disk.

More About Your System is about using diskettes, using DOS, and other aspects of the hardware and software.

Troubleshooting is helpful in clarifying and recovering from some error situations that may happen on the system.

The appendixes are for advanced uses of the system. They cover technical subjects such as customizing the DOS Shell and modem information.

Contents



The IBM Personal System/1™ computer

Getting to Know Your IBM Personal System/1™ Computer

This chapter introduces you to your IBM PS/1™ computer, also referred to as a "system." Make sure your system is set up, following the instructions in *Getting Started*.

Your system is made up of hardware and software. *Hardware* refers to the parts of the system you can see and touch. *Software* (programs) make your system work. A program is simply a set of stored instructions that let your machine do your work quickly and efficiently.

Hardware

Your system includes a system unit, a display, a keyboard, a mouse, and a telephone cord.

Your **System Unit** holds the system's processor, memory, disk drives, and other electronics. A built-in device called a modem lets you communicate with other computers through your telephone line. The connections for the keyboard, mouse, display, telephone cord, and printer are on the back of the system unit.

Your ™PHOTO GRAPHIC **Display** (monitor) is like a TV screen. It is also like a sheet of paper, because things you type show up on the screen. The system displays high-resolution (VGA) images and text, whether you have a black and white or a color display. The display, which may be tilted for viewing comfort, includes: the system power on/off switch and indicator light; slide controls for speaker/headphone jack volume, brightness, and contrast; and a one-eighth inch, 32-ohm headphone jack.

You use the **Keyboard** to type instructions that tell your system what to do, and to type in information such as letters or reports. Most of the keys are the same as a typewriter's. Your keyboard has additional keys that are labeled for various functions. You'll learn to use these keys in *System Tutorial* and *Works Tutorial*.

The **Mouse** is a *pointing device* that lets you move a pointer on your display to select items on the screen.

Software

The system comes with software (called programs) containing several integrated features that will help you do your work more efficiently. The programs are on several diskettes if your system does not have a fixed disk. If you have a fixed disk, these programs are already installed on the fixed disk.
Warning: Do not format the fixed disk. If you do, all the pre-installed programs will be erased.

If you purchase a fixed disk later, see "Copying the System Files to a New Fixed Disk" on page 75.

Tutorials

Two tutorials are included with the software to help you learn about your system. See "Information" on page 11 for more information about these tutorials.

Copying Programs to a Fixed Disk

If you have other software programs that did not come with the system, and you want to copy these programs to the fixed disk, the following sections will help you:

- "Creating a Directory" on page 66 will help you create a directory for storing your software. In Your Software, these directories are shown as file folders.
- "Copying a Diskette to a Fixed Disk" on page 68 will show you how to copy a diskette using File System in IBM DOS.
- "Your Software" on page 27 will show you how to open the folder (directory) where the programs are stored and run the programs.

Backing Up Your Diskettes and Fixed Disk

To avoid the possibility of losing data or programs, it is recommended that you make backup copies of the programs and information you have on your system.

The procedures for backing up diskettes are in "Disk Copy" on page 45. If you have a fixed disk, see "Backing Up and Restoring Your Fixed Disk" on page 88.

Available Options

These options are available for your system:

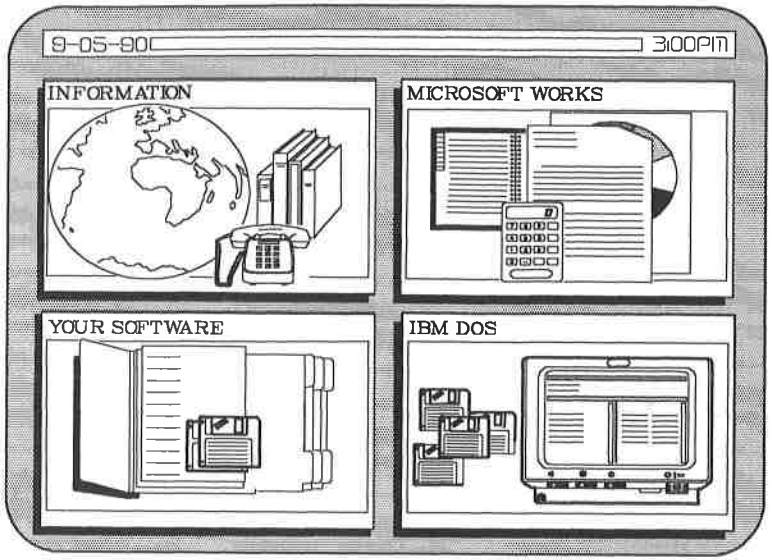
- The Memory Expansion Card lets you add additional memory to your system.
- The Fixed Disk option lets you store your programs and files on a fixed disk. The fixed disk is standard on some models.
- The 3.5-inch 1.44 MB Diskette Drive allows you to add a second 3.5-inch 1.44 MB diskette drive. (For units that do not have a fixed disk.)
- The 5.25-inch Diskette Drive allows you to run programs or use data on 5.25-inch diskettes. (For units that do not have a second 3.5-inch diskette drive installed.)
- The Adapter Card Unit provides three slots for adding adapter cards to your system. Two cards up to 280 mm (11 inches) long and one card up to 241 mm (9.5 inches) long can be installed. Please check the Users' Club for a list of supported adapter cards before purchasing this option or any adapter cards.

  If you add a memory card to the Adapter Card Unit, be sure the additional Memory Expansion Card is installed in the system unit.
- The Audio Card and Joystick allows you to attach an optional joystick or a MIDI interface cable. This feature allows you to play games using the joystick, and enhances the audio capabilities of your system. Some popular games are also provided with this option.
- Second Joystick. An adapter is included so two joysticks can be used to play games.
- The Color ™PHOTO GRAPHIC Display can be used to replace your black and white display and give your system vivid color. The color display is standard on some models.

Setup instructions come with each option.

The System Menu

When you turn on your system, the System Menu is displayed, giving you four choices. A pointer is located in the Information area of the screen. Using the mouse, you move the pointer to the item you want to select.



- When you select **Information** (by *clicking* the left mouse button), a world of information is at your fingertips. You can use the tutorials included in your system, and you can also access services available by using the modem and your telephone line.

  The *Users' Club* is a service especially for PS/1™ users. Using your telephone line, you can get answers to questions about your system, leave messages on an electronic bulletin board, and send messages to individual Users' Club members. The Users' Club is described on page 12.

  Prodigy® interactive personal service[1] (*the PRODIGY® service*) lets you use your telephone line to see the latest news, sports, and weather information, use financial and travel services, electronic bulletin boards, and much, much more. the PRODIGY® service is described on page 13.

  System Tutorial is an instructional program that will help you learn your system. It is described on page 13.

  Works Tutorial will help you learn Microsoft® Works, which includes many exciting features. This tutorial is described on page 14.

- **Microsoft® Works** is a four-part software program.

  In *Word Processing*, you can write letters or reports, move text around, and let Works check spelling and suggest synonyms for you.

  The *Spreadsheet* helps you prepare and format budgets, taxes, expense reports and so on. You can electronically total columns and rows, so it's easy to make changes and let Works do the calculating.

  In *Database* you can store names and addresses and then merge them with your letters, if you want to. You type them once and then use them over and over in letters, on envelopes, or labels. Database is also a great place to store lists of things such as a household inventory, items in a collection, or favorite recipes.

  The *Communications* feature lets you connect your system to other computers through your telephone line. You can send and receive information such as mail, messages, or programs.

  To learn Works, use the *Works Tutorial*; use the Works Reference manual for detailed information and advanced functions.

- **Your Software** is used to easily locate and run your programs, such as games your family enjoys or programs that you use at the office. Your Software works like a filing cabinet, showing how your programs are organized on your system. See page 27 for more information. *System Tutorial* describes the features of Your Software.

- **IBM DOS** displays a menu of useful tools for preparing diskettes for use, changing date and time, copying complete diskettes, and a File System for managing your information. See page 37 for more information. *System Tutorial* describes the features of IBM DOS.

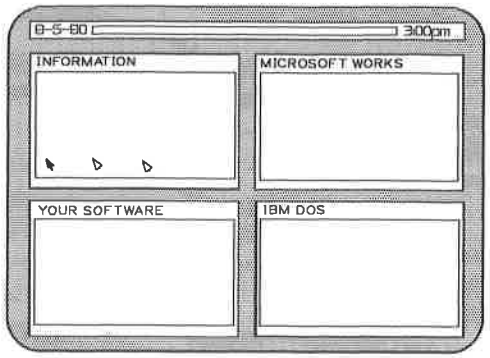
1 PRODIGY® is a registered service mark and trademark of the Prodigy Services Company.

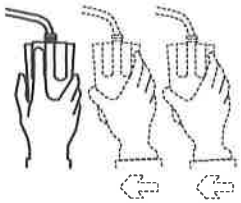
Selecting Items Using the Mouse or Keyboard

You can make selections from the screen by using either the mouse or the keyboard. Using either of these methods will be referred to as "selecting" in the remaining chapters of this publication.

Using the Mouse

To use the mouse, move the pointer on the display by sliding the mouse on your desk or table top until the tip of the pointer is touching the item you want to select.





Press and release the left mouse button. This is called "clicking" the mouse.

On some screens you can "double-click" the mouse to skip intermediate steps. Double click the mouse by pressing the left button twice in rapid succession. The tutorials that came with your system, and other program documentation, may give you examples of this use of the mouse.

You may be prompted by some programs to use the *right* mouse button to cause certain actions.

Using the Keyboard

To use the keyboard, press the **Tab** key and the arrow keys (→, ↑, ←, and ↓) to move the cursor on the screen until it is touching the item you want to select. Then press the **Enter** key to select the item.

System Care

Do not use abrasive cleaners when cleaning the display screen surface. The screen surface is easily scratched; avoid touching the surface with pens, pencil points, and erasers.

To clean the screen surface, wipe gently with a soft cloth or blow on the screen to remove grit and other loose particles; then use a soft cloth moistened with a non-abrasive liquid glass cleaner.

Use only mild cleaning solutions and a damp cloth to clean the painted surfaces of the system.

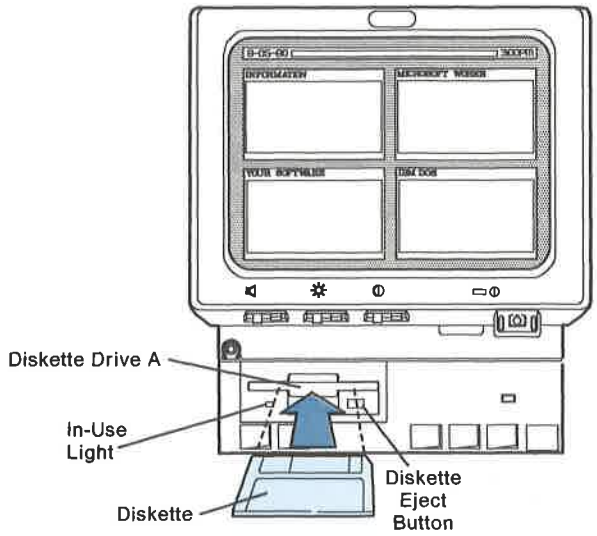
Do not place items on top of the display unit or cover any of the holes in the display unit or system unit. These holes provide air flow to keep your system from overheating.

Inserting and Removing Diskettes

If your system does not have a fixed disk, diskettes are used to store programs and files. You will be prompted by a screen message to insert diskettes when you select an item on the System Menu.

If you have a fixed disk, you will use diskettes to make backup copies of your files.

To insert a diskette:



1. Hold the diskette with the label side up and the metal end facing away from you.
2. Put the diskette into the diskette drive. When fully inserted, the diskette clicks into place.

To remove a diskette, press the blue eject button.

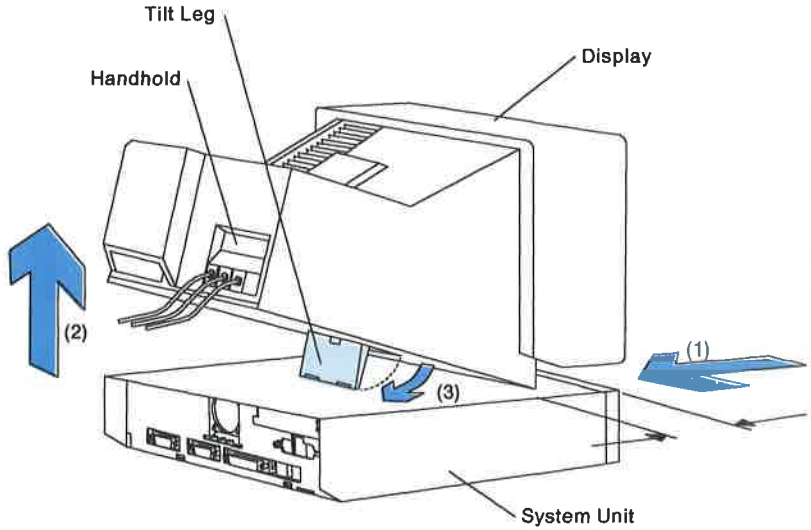
Warning: Never remove a diskette while the in-use light is on.

For more information on using diskettes, see "Working with Diskettes" on page 73.

Adjusting the Display

Your display can be tilted for viewing comfort. Follow these instructions carefully to avoid any possible damage to the display or system unit.

1. Move the display approximately 2 inches toward the rear of the machine. (Disregard this step if the display is not on the system unit.)

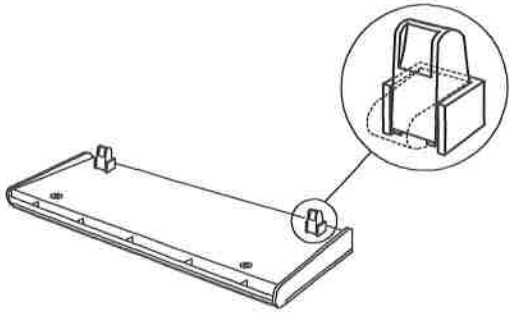


(Rear View)

2. Grasp the handhold and lift the *rear* of the display.
3. Pull the display tilt leg down and toward the rear of the display until it is fully extended and locks into place.
4. Reposition the display on the system unit.

Adjusting Keyboard Height

Your keyboard can be tilted by raising the legs on the bottom of the keyboard. When fully extended, the legs *snap* into place.

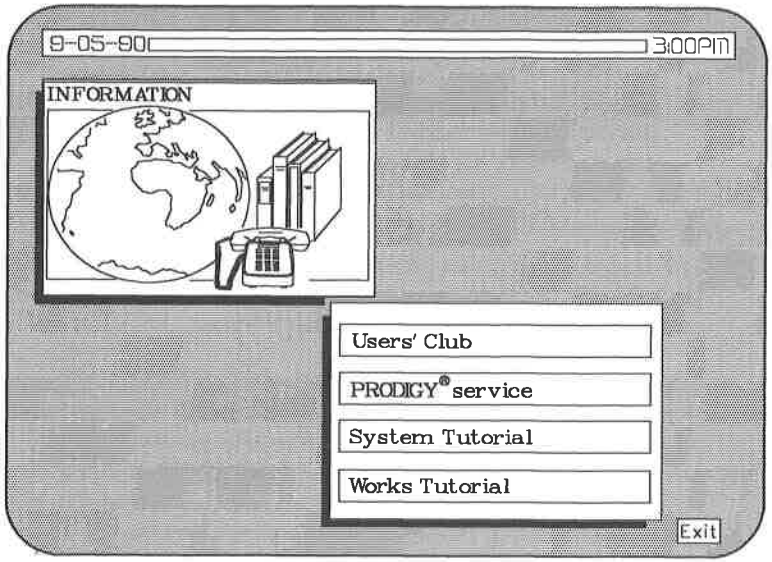


(Bottom View)

Information

Information puts a world of knowledge at your fingertips. Tutorials are available to help you learn about your system and Microsoft® Works. You can also use the modem and your telephone line to connect to the Users' Club[2] and the PRODIGY® service.

When you select Information, the following screen appears:



If you are a new user, you should go through *System Tutorial* before starting to use the system. It will help you get a better understanding of the hardware and software included in the system.

2 The Users' Club is a service provided by IBM to owners of IBM PS/1™, as specified in the documentation accompanying the system. The Club is not an association of "members." IBM reserves the right to determine the features and organization of the service provided.

Telephone Notes

To use the Users' Club and the PRODIGY® service, your system needs to be attached to a telephone line. The program will dial the access number after you have signed on and provided the information requested. You are responsible for payment of any telephone charges that may apply to the connection between your PS/1™ and the online information service.

- While you are using the telephone line for communications, do not pick up any telephone receiver on that line. If you do, the communications will be interrupted.
- If your telephone has a feature commonly known as "call waiting," communications could be interrupted when a second call is waiting to be answered. Contact your telephone company business office to determine how to disable the call waiting feature while using communications. Also see Appendix B, "Modem Instructions" on page 121.

Users' Club

The Users' Club gives you answers to many questions about your PS/1™, lets you leave messages for other users, and has other features designed for the PS/1™ user.

When you select Users' Club the first time, you are asked to enroll in the Users' Club and the PRODIGY® service. To enroll, you will need some information that is in the PRODIGY® service Phone Book and the other PRODIGY® service publications included with your system. Follow the screens to complete your enrollment in these exciting online services.

Once you are enrolled, you have access to all the features of the PRODIGY® service and the Users' Club for an initial trial period. Further information will be provided so you can continue to enjoy the many benefits of these services after the trial period.

Note: You will use the keyboard to select in the Users' Club. The mouse is not in operation.

Prodigy® Service

The PRODIGY® service gives you a window on the world. You can:

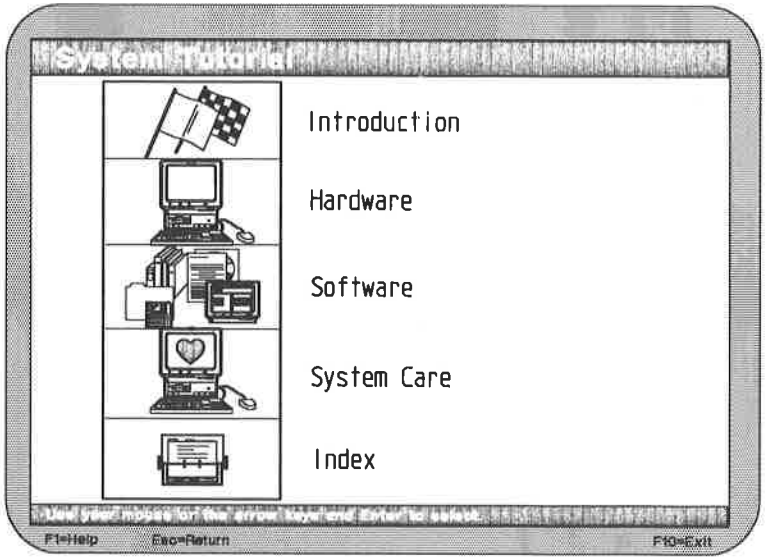
Send messages to friends
Plan vacation get-aways
Manage your investments
Shop for great values.

See the documentation that came with the the PRODIGY® service for installation and use information.

Note: You will use the keyboard to select in the PRODIGY® service. The mouse is not in operation.

System Tutorial

To learn about the system, select *System Tutorial*. This tutorial explains the various parts of the hardware and software and how your system operates.



If you are a first-time user, select **Introduction** to learn how to move through the tutorial and exit when you are through.

You can select items on the tutorial screens either by using the mouse or the keyboard. Pressing **Page Down** takes you to the next screen within a topic, unless other directions are on the screen.

Works Tutorial

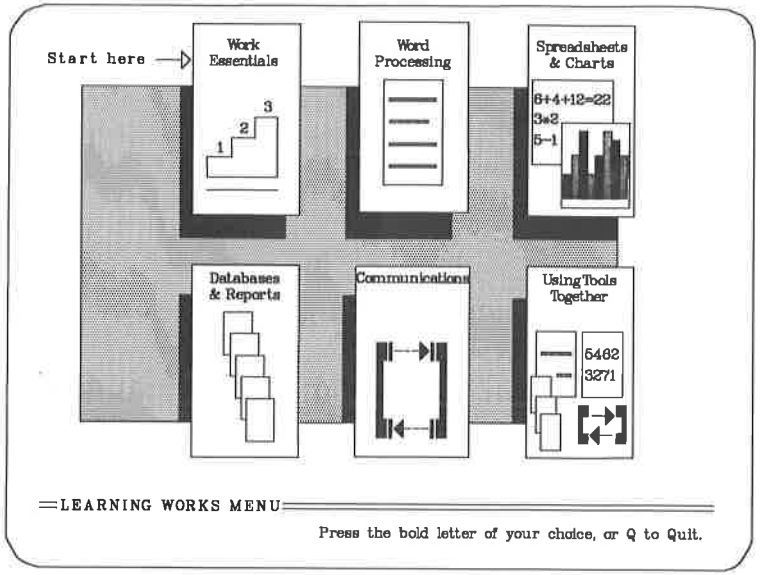
If you want to learn Microsoft® Works, select *Works Tutorial* from the Information menu. Typing your name on the first panel lets the tutorial keep a record of which sections you complete, like a bookmark.

After you type your name and press **Enter**, the Learning Works Menu appears.

Note: You will use the keyboard to select in the *Works Tutorial*. The mouse is not in operation.

Learning Works Menu

This screen lets you select any part of the *Works Tutorial* to learn or review. One letter of a word in each topic is **bold** or highlighted: it is brighter than the other letters. Press the highlighted letter on your keyboard to select a topic.



If you are a first-time user, you should complete all of the topics in Works Essentials first. Don't try to go through the *Works Tutorial* all at one time. For better results, take it in stages. Read a section, work through the examples, and practice what you've read. The *Works Tutorial* will mark which sections you have completed.

Note: Whenever you are using the Works program, you can switch at any time to the Works Tutorial to refresh your memory without ending the work you are doing. To do this:

1. Select the **Help** pull-down
2. Select **Works Tutorial**
3. Select the topic you want to learn and follow the lessons.

When you have finished the topic you want, exit the tutorial. The system will return you to Works at the point where you left.

Microsoft® Works

Microsoft® Works is a program included with your PS/1™. Works includes a word processor, a spreadsheet, a database, and a communications feature.

The Word Processor makes any kind of writing easier, from short memos to letters and reports. Spelling can be checked automatically, and letters can be saved for future use. Your letters can look professional with headers, footers, and titles plus many more features.

The Spreadsheet gives you powerful calculating ability plus the flexibility to create charts from your information. From simple financial records to complex tax records, Spreadsheet can handle it all.

The Database helps you organize your information such as addresses, phone numbers, and household inventories. Once the information is entered into Database, you can make different types of reports from the information.

With Communications, you can connect your system to other computers using your telephone line. You can then exchange information and access other dial-in communications services.

Your work can be *integrated:* information in a database can be used to create a variety of reports; charts and graphs can be created in spreadsheet; all can be printed as part of a letter in Word Processor. Communications allows you to send this information to another computer.

Learning About Works

Works Tutorial is an interactive program that introduces the user to the features of Works. If you are a new user of this program, see "Works Tutorial" on page 14 for more information.

Use the Works Reference manual for detailed information and advanced function information.

Starting Works

When you select Microsoft® Works on the System Menu, a screen is displayed on which you can select what you want to do in Works. The first item is highlighted. You can select this item or you can select a different item using the mouse or keyboard.

Managing Your Diskettes and Files

The following helpful hints about your system will help you manage your Works program and data, whether you have a one-drive system, a two-drive system, or a fixed disk system.

Using a One-Drive System

If your system has only one drive, create a *working copy* of the Microsoft® Works diskette to run the program and store your information.

Note: The license agreement allows you to use Microsoft® Works on only one machine at any one time.

There is room on the working copy diskette for storing several files.

The Working Copy

To make a working copy of your original Microsoft® Works diskette:

1. Make sure you have new blank diskettes of the same capacity (2 MB).
2. Select IBM DOS on the System Menu.
3. Select **Disk Copy** on the Start Programs screen and press **Enter**.
4. Follow the instructions on the screen for making a copy of the diskette. The original diskette is the *source* diskette; the blank diskette is the *target* diskette.
5. When copying is completed, remove diskettes and insert your IBM DOS diskette.
6. Label the newly created diskette "Microsoft Works."
7. Put the original in a safe place. It can be used to create more working diskettes in the future.

You will have to insert the Microsoft® Works Tutorial diskette when you want to use the Works Tutorial or the Thesaurus. You will be prompted to insert this diskette when it is needed.

When the Working Copy Diskette is Full

Normally, you save your information on your working copy of Works. If you run out of space, you can either make another working copy or save your data files on a separate data diskette.

If you make another working copy, you will need to customize the features such as alarm clock, macros, and dictionary as they were set on your previous working copy.

If you use a separate data diskette, use the Works diskette until you need to use File commands such as save; or until Works prompts you to change diskettes.

To save a new file on a data diskette:

1. Choose File, Save.
2. When the Save As dialog box appears, replace the working copy of Works with your data diskette.
3. Type a name for the file in the Save File As box.
4. Choose OK (Enter).

To open an existing file from a data diskette:

1. Choose File, Open.
2. When the Open dialog box appears, replace the working copy of Works with your data diskette.
3. Choose OK (Enter). The files on your diskette are now listed in the Files box.
4. Select the file you want in the Files box.
5. Choose OK (Enter).

Copying Files from One Diskette to Another

If you want to copy a file or files from one diskette to another and you have a one-drive system, use Copy a File on the IBM DOS Start Programs screen. See page 46 for more information.

Using a Two-Drive System

If your system has a second diskette drive, you will find it useful when using Works.

We recommend that you use the second diskette (drive B) to store your files and leave the working copy in drive A. This will let you store more information on each diskette because the space for the Works program is no longer needed. You will not need to make additional working copies of the Microsoft® Works diskette.

- Format several new blank diskettes for storing your data.
  - Select IBM DOS on the System Menu.
  - Select **Format a diskette** on the Start Programs screen.
  - Follow the instructions on the screen for formatting your diskettes.
  - Label each data diskette to indicate the type of information that is stored on it.
- To open a Works file that is stored on drive B:
  - Select File, Open Existing File.
  - Select drive B in the directory box. A list of files is displayed.
  - Select the file you want.
- To save a file on drive B, type *B:* in front of the file name when you are prompted. The file will be saved on drive B. Make sure your data diskette is formatted.
- Copying files from one diskette to another and making backup copies is simpler on a two-drive system because you can put the source diskette in drive A and the destination (target) diskette in drive B.

Using a Fixed Disk System

If your system has a fixed disk, the programs are already installed on the disk. However, you are advised to make a backup copy of all the programs and data on the fixed disk in case the disk is damaged or becomes inoperative for any reason.

To back up the fixed disk (drive C), see "Backing Up and Restoring Your Fixed Disk" on page 88.

Selecting Additional Printers

Diskette-Only System

If your system uses only diskettes, Works lists these printers on the Print, Printer Setup screen:

EPSONFX	Epson® FX series
ESPSONLQ2	Epson LQ 850, LQ 1050
IBMPROXL	IBM Proprinter™ II and XL
IBMXL24	IBM 24-pin Proprinter™ (the default printer)
IBMXL24D	IBM 24-pin Proprinter™, download fonts
OKI192	Okidata 192, 193

Additional printer files are found on the *System Tutorial* diskette, including the following:

EPLX800	Epson® LX 800, LX 1000
EPSONEX	Epson EX 800, LX 1000
EPSONLQ1	Epson LQ 800, LQ 1000
EPSONLX	Epson LX 80, LX 86
HPLASER	Hewlett-Packard® LaserJet, LaserJet +, II, IID
HPDESK1	Hewlett-Packard Deskjet
IBMGRAPH	IBM Graphics
IBMPRO	IBM Proprinter™
IBMPRO3	IBM Proprinter™ III, III XL
IBMQUICK	IBM Quickwriter®
IBMQUIET	IBM Quietwriter® I, II
IBMQWTR3	IBM Quietwriter® III
IBMWHEEL	IBM Wheelprinter
OKI292	Okidata 292, 293
PANA1080	Panasonic® KX-1080i, KX-P1592
PANA1092	Panasonic KX-1091i, 1092i
PANA1524	Panasonic KX-1524
STARNX15	Star Micronics NX-10/15
TOSHP351	Toshiba® P351/P351C
TOSH1340	Toshiba P1340
TTYWHEEL	Teletype

Note: Some printers have more than one file on the diskette. For example, IBMQUICK has both a .PRD and a .DAT file. Both are needed to support the printer.

To use a printer file from this list:

1. Exit from Works and select IBM DOS.
2. Copy the printer file or files you need to your working diskette.

   If you have a one-diskette system, copy the files to A:\PROGRAM. See "Copy a File" on page 46.

   If you have a two-diskette system, use File System to copy the files from drive B to the A:\PROGRAM directory. See "Copying a File" on page 68 for information on copying a file from one diskette to another.
3. Exit IBM DOS and select Works.
4. Select the correct printer file on the Print, Printer Setup screen in Works. This printer information is saved when you exit Works.

After you have created your working copy diskette, you may want to delete printer files you do not use from the working copy (not from the original diskette). This will give you more storage room on your working diskette.

Fixed Disk System

Works lists several printers on the Print, Printer Setup screen. If your printer is not listed, additional printer files are included in the C:\WORKS\PRINTERS subdirectory. Using Works, open the file PRINTER.WPS as a Word Processor file to view the list of printers and the files needed for each printer.

To use a printer file from this list:

1. Exit from Works and use the File System in IBM DOS.
2. Copy the printer file or files you need to the C:\WORKS\PROGRAM subdirectory. See "Copying a File" on page 68 for information on copying a file from one directory to another.
3. Exit IBM DOS and select Works.
4. Select the correct printer file on the Print, Printer Setup screen in Works. This printer information is saved when you exit Works.

Check the Users' Club for information about new printer drivers as they become available.

Works Enhancement Offer

If your printer is not listed above, you may be able to get the required printer files by sending in the postage-paid card included in your documentation package.

This special offer includes a Word Processing conversion program and additional printer drivers. Be sure that your printer is listed on the card.

The Word Processing conversion program lets you bring more types of word processing files into Works.

When you receive a diskette containing additional printer files, use the SETUP program on the supplemental disk to select the printer file or files you need and copy them either to the A:\PROGRAM directory of the working copy diskette, or to the C:\WORKS\PROGRAM subdirectory of the fixed disk. Then, select **Print, Printer Setup** and select the correct printer.

Communications and Works

The ability to communicate with other computers is provided by the built-in modem (an electronic device that transmits signals to other computers). The modem in your PS/1™ communicates at speeds of 300, 1200 and 2400 bits per second (bps) in full duplex.

When you are communicating from Works to a remote computer, you may need to know which communications settings are supported by the modem. In Works, the default speed is 1200 bps, but it can be changed to 300 or 2400 bps. For instance, if the other modem can run only at 2400 bps, the modem in your machine must be set at 2400 bps to be compatible.

If you need to know how to change some settings on the modem, see "Communications Settings" on page 122.

Saving Changes to Works

If you have created or changed macros, alarm clock reminders, or other Works settings, they are saved when you exit the Works program using File, Exit Works.

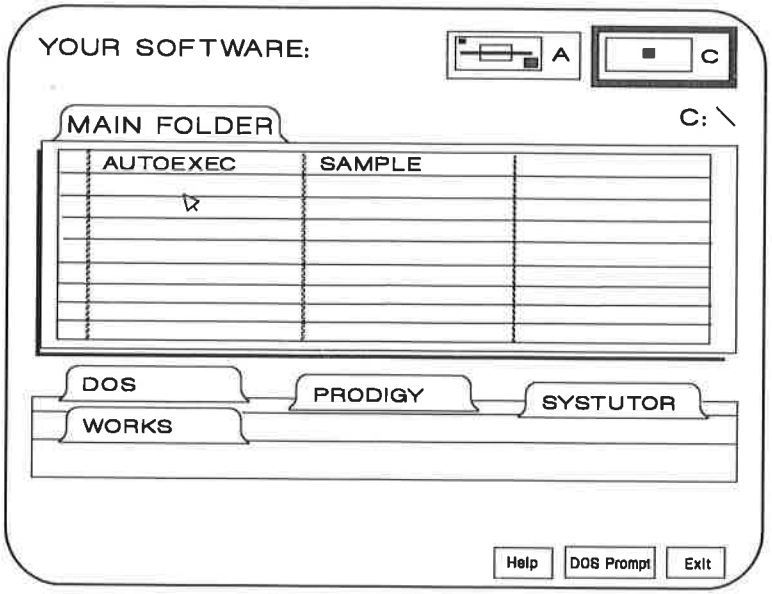
As you exit in this manner, you will also be prompted if you have not saved changes to files you have created or have been using. Otherwise, you might accidentally lose some of your work. Therefore, it is recommended that you always exit Works before you turn off your system.

Your Software

This feature allows you to locate and quickly run programs that are on your diskette or fixed disk.

Programs on a fixed disk and on diskettes are contained in *folders.* Since a fixed disk can contain many programs, it usually has a number of folders. In this way, programs that are related to each other can be grouped together in one folder. For example, one folder may contain game programs, another financial programs, and a third educational programs. Since each folder has its own name, this arrangement makes it easy to find and run the program you want. Simply select the right folder, then select the right program.

When the System Menu is displayed, select **Your Software.** A screen appears similar to the one shown below.

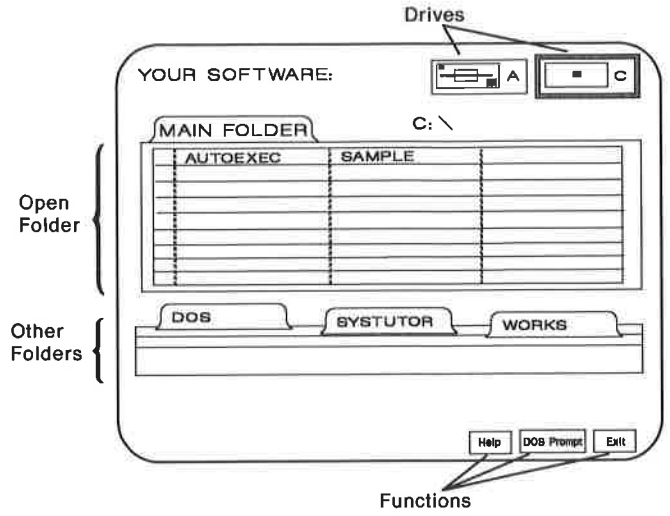


How the Screen is Organized

The screen in Your Software is organized into four areas: the Drives, the Open Folder, Other Folders, and Functions.

Drives

The illustration shows a system that has two drives; drive A, the diskette drive, and drive C, the fixed disk. The picture of drive C is *highlighted*, which shows it is the active drive.



The Open Folder

This area shows you a list of all the programs contained in the open folder. (Only the *programs* are listed; other files are not shown.) Only one folder can be open at a time. You can start a program by selecting it from the list.

If there are more programs in the folder than will fit on the screen, select **Page Down** in the open folder to see the others.

Other Folders

If the open folder contains other folders, they are shown in this area. If you select one of these folders, it becomes the open folder. If there are more folders than will fit on the screen, select **Page Down** in the other folder area to see the others.

Functions

Along the bottom of the screen are several selections:

- **Help** gives you assistance with Your Software. You can also get help by pressing **F1**.
- **DOS Prompt** takes you directly to the DOS Command prompt (A:> or C:>). You can also display the DOS Command prompt by pressing **Shift**+**F9**. You can type DOS commands at this prompt. The DOS Command prompt is discussed further on page 77.
- **Exit** returns you to the System Menu.
- **Close Folder** closes the folder you are in and re-opens the folder containing it. **Close Folder** only appears when the open folder is contained in another folder.

Using Your Software

Selecting in Your Software

Using the mouse, move the pointer until the tip is touching the item you want to select and then press the left button.

Using the keyboard:

- Pressing **Tab** moves the pointer between the areas of the screen: Drives, Open Folder, Other Folders, and Functions. Pressing **Shift** + **Tab** moves the pointer backward in these areas. These keys will be explained later in this section.
- In the Drives, Open Folder, and Other Folders areas, use the arrow keys to move between the items.
- Press **Enter** to select the drive, program, folder, or function you want.

Selecting a Different Drive or Diskette

If you want to select a different drive:

1. Move the pointer until the tip is touching the picture of the drive you want to select.
2. Press the left mouse button or press **Enter**.

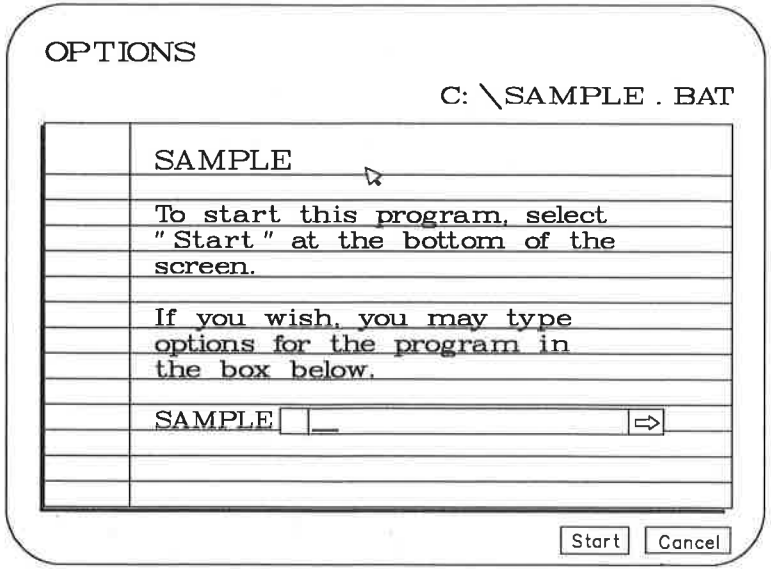
   This drive becomes active and its main folder is shown as the open folder.

If you change the diskette in the active drive, select the drive again and the main folder of the new diskette is opened.

Starting a Program

To start one of the programs in the open folder, select the name of the program:

- If your program does not need special options to run, *double-click* the mouse by pressing the left button twice in rapid succession. This immediately starts your program.
- If your program needs options to run, click the mouse *once* or press **Enter**. The Options screen appears. In this illustration, we have selected a program called SAMPLE.



- Type the options that are needed to run the program and press **Enter** or select **Start**. Your program's instructions will tell you if any options are needed.
- If there are no options, press **Enter** or select **Start**.
- If you do not want to run the program, select **Cancel**.

When you exit from a program, the Your Software screen usually appears. However, if the screen has an **Ok** prompt, when you exit a program, you have run a BASIC program.

If this prompt is displayed, type *system* and press **Enter** to return to the open folder.

Opening Other Folders

To run a program from a different folder on the active drive, click the mouse on the tab of the folder or select it using the keyboard. This folder becomes the open folder, and you can start any of these programs.

For example, if you select the DOS folder, a list of the programs in the DOS folder is displayed.

To return to the main folder, select **Close Folder**.

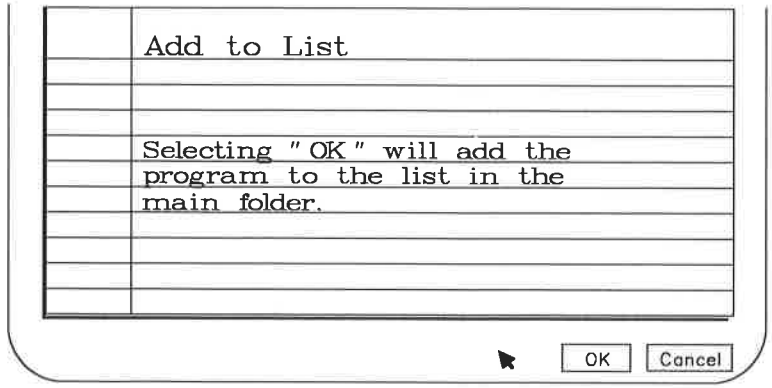
Customizing the Main Folder

The main folder list can be customized to include programs you use frequently. By adding the name of a program to the main folder list, you create a shortcut method of running the program. You can then run the program from the main folder, even though the program still resides in the other folder.

Adding a Program to the Main Folder List

When you are in a folder other than the main folder, and you select a program, **Add to List** appears on the Function Line of the Options screen.

You can add this program to the main folder list by selecting **Add to List**. A prompt appears, asking you to select **OK** if you want to add the program to the main folder list, or **Cancel** if you do not.



If you select OK, the program is listed in the main folder.

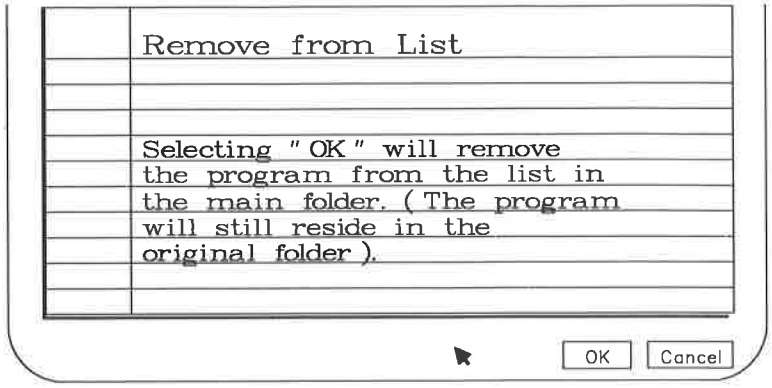
The program is still in the other folder, but you can now start the program from the main folder. This saves the steps of finding and opening the folder that contains the program.

Removing a Program from the Main Folder List

If you want to remove a program from the main folder list, select the program. If the option **Remove from List** appears on the Function line of the Options screen, the program you have selected was previously added to the main folder list and can now be removed.

If you select **Remove from List**, a prompt appears, asking you to select **OK** if you want to remove the program from the main folder list.

If you do not want to remove the program from the list, press **Cancel**.



Select "OK" and the program is removed from the main folder list and will only appear in the other folder.

Note: The program is *not* removed from the other folder.

Additional Information

Starting a "Bootable" Diskette

Some programs and games, called *bootable programs*, require you to start the system from drive A. Bootable programs do not use the built-in system functions. Instead, they manage your whole system. To start a bootable program:

1. Make sure the System Menu is displayed.
2. Insert the diskette in drive A.
3. Press **Alt**+**SysRq**. The system restarts ("boots") from the diskette in drive A and the program in drive A will run.

This procedure only works from a diskette in drive A.

When you want to go back to the PS/1™ built-in programs:

1. Exit from the program in drive A.
2. Turn off the system power.
3. Wait 5 seconds and then turn on system power.

Naming Folders

The name of a folder is chosen when the folder is created. The term *main folder* always refers to the folder that is opened when you select a disk or diskette.

The main folder is created when the disk or diskette is formatted and is sometimes referred to as the *volume label* of the disk or diskette. The name you choose is recorded on the diskette so the system will be able to later identify it for you. If your system has an IBM fixed disk, it has the volume label name of MAIN FOLDER. See page 45 for more information on volume labels.

Other folder names are the names of directories or subdirectories. These may be created by programs when they are installed on your fixed disk or you may create one yourself, if you like, using the File System of IBM DOS. See "Creating a Directory" on page 66 for more information.

It is useful to have a different, descriptive name for each diskette to make it easier to find the right one. However, you may choose any name you wish or enter no name at all. If you enter no name, its main folder name is left blank in Your Software.

For IBM DOS Users

If you are an experienced DOS user, you will recognize the similarities between Your Software and IBM DOS.

- In IBM DOS, the main folder is called the *root directory* of a disk. The other folders are known as *directories* or *subdirectories*. See "Using DOS 4.00" on page 77 for more information on IBM DOS.
- The only files shown in the folders are those having extensions of .COM, .EXE, .BAT, and .BAS. The extensions are not shown; only the filenames are listed.
- If a program and a batch file having the same name are in a folder together, the name only appears once on the screen. When you run such a program, the DOS rules of precedence for running programs are followed: .COM, .EXE, and .BAT.
- If you select a BASIC program, BASIC is loaded for you and the program begins to run. If the program exits to the BASIC **Ok** prompt, type the *SYSTEM* command to return to Your Software.
- The *path* is listed above the open folder. For example, the **C:\DOS** path means you are looking at the programs in the DOS directory on drive C.
- Opening a folder is like changing directories using the **CD** command.
- Closing a folder is like moving to the parent directory using the **CD ..** command.
- Reselecting the active drive is like using the **CD** command to move to the root directory.
- Selecting a different drive is like typing that drive name at DOS Command Prompt. This changes the current drive to the new selection.
- The tab on the main folder shows the volume label of the disk. Volume labels should be created when diskettes are formatted. The DOS Label command can be used to change volume labels.
- When you add a program to the main folder list, a .BAT file is created in the root directory. When you remove a program from the list, the .BAT file is deleted.

IBM DOS

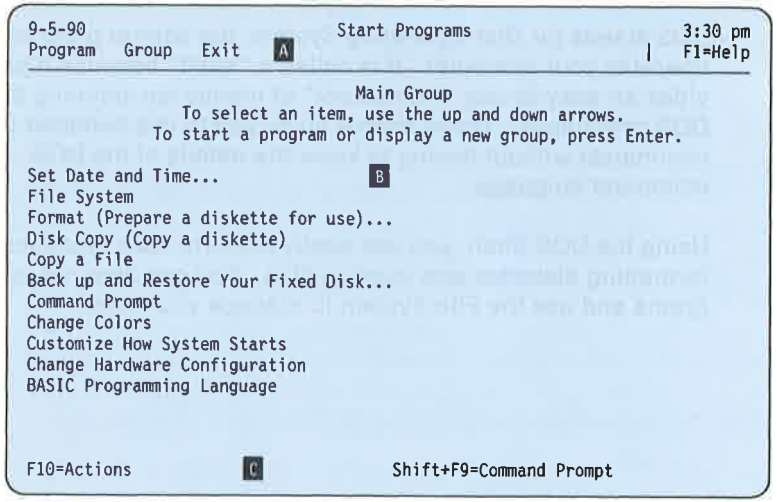
When you select IBM DOS on the System Menu, you enter a group of screens known as the *DOS Shell*.

DOS stands for *Disk Operating System*, the control program that operates your computer. It is called a "shell" because it provides an easy-to-use "framework" of menus surrounding the DOS commands. These menus allow you to use common DOS commands without having to know the details of the DOS command language.

Using the DOS Shell, you can easily perform such functions as formatting diskettes and copying files. You can also run programs and use the File System to manage your files.

The Start Programs Screen

The first screen you see in the Shell is Start Programs. This screen contains the Main Group, which is a list of programs and groups of programs in the Shell.



Note the following areas on the Start Programs screen:

A Action Bar. Pull-down menus containing commands appear when you select the items on the action bar. To exit a pull-down without making a selection from the pull-down items, press **Esc**. If you are using a mouse, click outside the pull-down.

B Group Contents area. Programs and groups of programs are listed. Groups of programs are followed by an ellipsis (...), indicating that this is a group of functions or programs.

C Function Key information. Pressing **F10** switches the selection cursor between the action bar and the list of programs. When **Esc=Cancel** appears on a screen, use it to return to a previous screen. Pressing **Shift+F9** displays the DOS Command Prompt (A:> or C:>).

The **F1** key is listed at the top right of the screen. By pressing **F1**, Help is available on all selectable items.

Selection Cursor

When the Start Programs screen is displayed, the first item in the group contents area is highlighted. This highlighting is called the *selection cursor*. As you move the selection cursor around the screen, other items will be highlighted.

Selecting Items in DOS Shell

The DOS Shell is designed to be used with the mouse, the keyboard, or both.

Using a Mouse

The mouse pointer on your screen looks like this:

As you slide the mouse on a desk or table top, the pointer moves on the screen. To select items using a mouse:

1. Move the mouse until the tip of the pointer rests on or over the item on the screen.
2. Press and release the left button to select the item. This is called *clicking* the mouse.

In certain places in the Shell, you must *double-click* the mouse by pressing the left button twice in quick succession. Double-clicking requires a little practice.

Selecting Items Using the Keyboard

Using certain keys, you can move the selection cursor to various areas of the screens and select items or programs.

These keys are active when Start Programs is displayed.

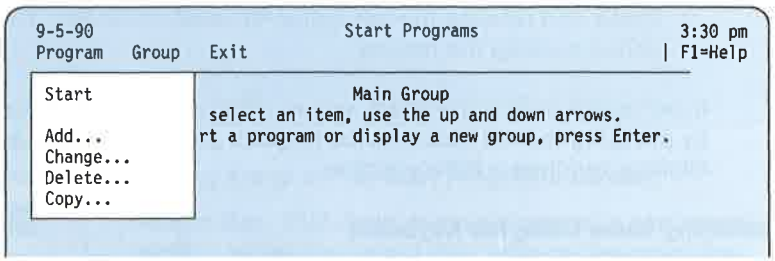
1. Press **F10** to move the selection cursor between the action bar and the Main Group list.
2. Use the arrow keys (↑, ↓, →, or ←) to move the selection cursor to an item; then press **Enter** to select an item, either on the action bar or in the group contents area.

The Start Programs Action Bar

The action bar has three items: **Program, Group,** and **Exit**.

- Pressing the **F10** key always moves the selection cursor to or from the action bar.
- Pressing the arrow keys (→ or ←) moves the selection cursor to other items on the action bar.
- Pressing ↑ or ↓ when an action bar item is highlighted displays the pull-down menu for that item.
- When one of the action bar items is selected, a pull-down menu is displayed with more items from which to select.
- You can type the underlined letter of a menu item and that item will be selected.

When you select **Program** on the action bar, the following pull-down is displayed:



Start is highlighted when this pull-down is displayed. If you select Start, the program that is highlighted will start.

You can also add a program to the Main Group, change the way a selected program runs, delete a program from the Main Group, or Copy the name of a program to another group from this pull-down.

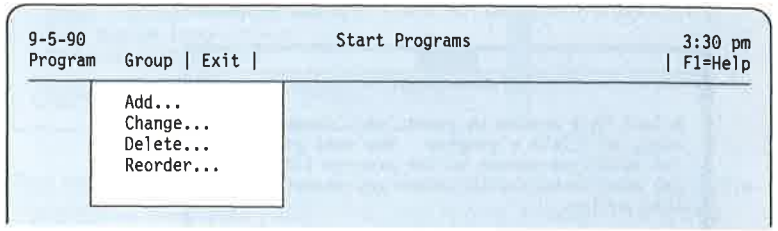
Appendix A, "Customizing the DOS Shell" on page 101 discusses how to change the items in the Main Group.

An ellipsis (...) after an item in any pull-down in the Shell means that other screens follow, requesting more information and guiding you through the activity.

If the item name appears in a lighter shade or is slightly "blurred," it means that the item is not selectable at this time.

Note: When you exit from a program on a one-drive system, the message "Insert diskette with Batch File" may appear. Insert the IBM DOS diskette.

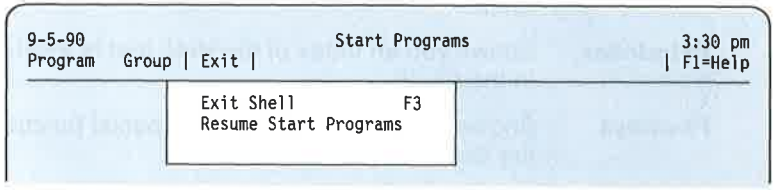
When you select the next item in the action bar, the **Group** pull-down is displayed.



The items in the Group pull-down let you add, change, or delete a group item, or rearrange the order in which the items appear. The ellipsis (...) following each item means that a pop-up screen will be displayed asking for more information.

Select the **Exit** pull-down. The items in the Exit pull-down let you exit the Shell or resume Start Programs.

Note: You can press **Esc** to exit any of the pull-downs without selecting an item.

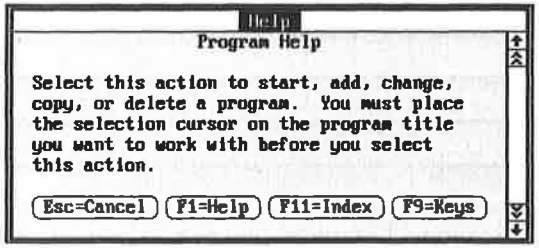


You can also press **F3** to exit the Shell. The System Menu appears when you exit the Shell.

Online Help

Online help is always available to you in the Shell. When you press the **F1** key, a Help pop-up is displayed for the item highlighted with the selection cursor.

As an example, highlight **Program** on the action bar, then press **F1** to view the Help for the Program selection.



Similar Help information is available to you at any time in the Shell.

The keys used within the Help screens are:

Esc=Cancel Lets you cancel Help, and return to your previous screen.

F1=Help Shows you how the Help function works in the Shell.

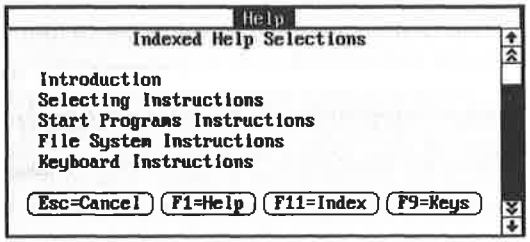
F11=Index Shows you an index of the Help that is available in the Shell.

F9=Keys Shows you the keys that have special functions in the Shell.

Page Down Scrolls down one screen, if possible.

Page Up Scrolls up one screen, if possible.

For example, while the Help screen is displayed, press **F11** to see the Help index.



The Help index first shows important topics, and then an alphabetic list of the Shell Help. You can move through the index using **Page Down**, **Page Up**, ↓, or ↑ (or the mouse). Information on using the mouse to move through a listing is found under "The Scroll Bar" on page 55.

Press **Esc** when you are ready to exit Help.

Main Group Items

The DOS Shell has two levels of groups: the Main Group and subgroups. The Main Group can have as many as 16 items, consisting of programs and groups.

The items in the Main Group allow you to manage your system and the files that are on your fixed disk or diskettes. To select these items, you must *double-click* the mouse. You may also move the selection cursor to the item you want and press **Enter**.

The Main Group lists these selections:

```
Set Date and Time...
File System
Format (Prepare a diskette for use)...
Disk Copy (Copy a diskette)
Copy a File
Back up and Restore Your Fixed Disk...
Command Prompt
Change Colors
Customize How System Starts
Change Hardware Configuration
BASIC Programming Language
```

Set Date and Time

Set Date and Time allows you to change the date and time that are shown at the top of the screen.

When you select this item, a screen is displayed where you can choose to update either date or time.

When setting the date, type the date (*month-day-year*), as 9-15-1990, for example.

When setting the time, type the time (*hours:minutes*) as in the following example:

```
3:12pm     (or)      15:12
```

Note that there is no space between 3:12 and pm.

File System

The File System allows you to view and manage your directories and files. File System is explained on page 49.

Format a Diskette

A new blank diskette must be formatted to prepare it for use. Formatting also erases any information that was on the disk previously. When this item is selected, the following menu appears:

```
Format a 3½" 2.0 MB diskette (1.44 MB)
Format a 3½" 1.0 MB diskette (720 KB)
Format a 5¼" 360 KB diskette
Format a 5¼" 1.2 MB diskette
```

The numbers in parentheses indicate the capacity of the diskette after it is formatted.

Select the type of diskette you want to format. The system will prompt you to insert the diskette for the correct drive. Formatting begins when you press **Enter**. When you format a diskette, you are prompted for a volume label for the diskette. You may enter a label of up to 11 characters. In Your Software, the volume label is used as the main folder name.

Note: See "Working with Diskettes" on page 73 for more information about formatting diskettes for special purposes.

Disk Copy

Disk Copy (Copy a diskette) allows you to copy an entire diskette. This is useful for making backup copies of diskettes.

When you select this item, the Diskcopy Utility is displayed. The system assumes you want to copy from drive A to drive A. Change the drive name as desired and press **Enter**.

Insert the diskette you want to copy (SOURCE diskette) and press any key to continue.

Follow the prompts to complete the diskcopy procedure.

Note: Copying a diskette to another diskette will erase all the information on the disk to which the information is being written (the TARGET diskette).

Both the source and target diskettes must be the same size and the same capacity.

Copy a File

Copy a File allows you to copy a file from one diskette or drive to another diskette or drive.

If you have a one-drive system, use this function rather than the Copy... function in File System. The diskette drive is called both drive A and drive B using this function.

1. Select **Copy a File...**. You are prompted to enter the name of the file you want to copy. Note that **b:** is already in the pop-up panel. Do not type over the b:.
2. Press → twice and type the file name to be copied.
3. Press **Enter**. You are prompted to type the new file name. Note that **a:** is already in the pop-up panel. Do not type over the a:.
4. Press → twice, type the new file name, and press **Enter**. (If it is the same as the original file name, simply press **Enter**.) You are prompted to insert the diskette for drive B.
5. Insert the diskette on which the file is stored and press **Enter**. You are prompted to insert the diskette for drive A.
6. Insert the diskette to which you want to copy the file.

Back Up and Restore Your Fixed Disk

You should periodically make a backup copy of the information on your fixed disk. Then, if any information is erased or if the disk is damaged, you can restore the information from your backup copy.

When you select **Back Up and Restore Your Fixed Disk**, a menu appears from which you can choose to back up your entire fixed disk, or back up only the changes since your last backup copy was made.

See "Backing Up and Restoring Your Fixed Disk" on page 88 for more information about using this feature.

Command Prompt

Command Prompt takes you to the DOS command prompt where you can use all the DOS commands. To enter DOS commands that are not available in the Shell, select **Command Prompt** on the Main Group screen. The command prompt screen looks like this:

```
When ready to return to the DOS Shell, type EXIT then press enter.

IBM DOS Version 4.00
   (C)Copyright International Business Machines Corp 1981, 1990
   (C)Copyright Microsoft Corp 1981-1986

C:\DOS >_
```

Note: You can also reach the DOS command prompt by pressing **Shift+F9** at any point in the Shell.

You can use all the DOS commands from this prompt. For further information on DOS commands, see either *Using DOS 4.00* or *DOS 4.00 Command Reference*, which are described in "Related Publications" on page 90.

To return to the Shell, type *EXIT* at the command prompt. Press **Enter**. You are returned to the Shell at the point where you left it. If you were in File System, the directory will look the same as it was before you went to the command prompt.

Change Colors

This selection allows you to change the colors of the DOS Shell.

Press the arrow key (either ← or →) to see the color selections available. To select a new color, press **Enter**. To leave the colors as they were, press **Esc**.

Customize How System Starts

Your system normally starts from built-in DOS and displays the System Menu. Certain options are selected; for example, Num Lock is normally on.

Additional flexibility has been provided so you can customize how the system starts. You can control keyboard options, where the operating system is found, and which application is displayed. You can also choose to read an AUTOEXEC.BAT and CONFIG.SYS from disk instead of from the built-in DOS.

See "Customizing How Your System Starts" on page 80 for more information on using this feature.

Change Hardware Configuration

If you add certain options to your system (such as more memory or a diskette drive), the system senses the new option and will test it each time the system is started.

However, if you remove an option, an error message may be displayed. Use Change Hardware Configuration to update the configuration of the system and eliminate the error message.

See "Changing Hardware Configuration" on page 85 for more information.

BASIC Programming Language

This selection starts the IBM BASIC command interpreter, which is a programming language.

When you select BASIC Programming Language, a pop-up screen reminds you to type *system* and press **Enter** when you want to leave the BASIC screen.

If you want to learn more about BASIC, you will need the *IBM Personal Computer BASIC Reference*. See "Related Publications" on page 90 for more information.

IBM DOS File System

The File System is used to view and manage your files, which are organized in directories on your disks.

Using Files, Drives, and Directories

When you store information in your computer, it is called a *file*. To save a file, you must give it a *file name*. When naming a file, select a name that is easily associated with the subject of the file.

File Names

A file name is one to eight characters long. You can use any combination of the following characters to name your file:

- A through Z (either lower or uppercase letters)
- 0 through 9
- ! @ # $ % & ( ) - _

Here are some examples of file names:

```
BUDGET
ABC-2
HOUSHOLD
```

The optional *file name extension* consists of one to three characters. The extension is separated from the file name by a period. Some programs (such as Works) add a file name extension to the name you give your file. If not, you can use the file name extension to help you identify the contents of your file.

File name extensions must immediately follow file names and a period, with no spaces or blanks.

When naming your data files, do not use the following extensions: .EXE; .COM; BAS; or .BAT. These extensions are reserved for special purposes.

Here are some examples of file names and extensions:

```
SALES.FEB
ABC-2.LST
```

Works adds the following extensions to your files to identify the program in which they were created:

- .WPS for Word Processor files
- .WKS for Spreadsheet files
- .WDB for Data Base files
- .WCM for Communications files

Be sure to include the extension when you refer to a file that has a file name extension.

Drive Names

The drives on your system are given letter names. Depending on which computer model you bought, you may have more than one drive. Disk drives are named as follows:

The first diskette drive is always referred to as drive A.

If you have installed a second diskette drive, this will be referred to as drive B.

Note: On a one-drive system, the diskette drive is referred to as both drive A and drive B.

On your system, DOS is built into a special disk in Read-Only Memory (ROM). This ROM disk is referred to as drive C if you do not have a fixed disk, or drive D if you have a fixed disk. See "The Built-in ROM Disk" on page 77 for more information.

Here is an example of a drive name and file name with an extension:

```
A:\FILENAME.EXT
```

Note that the backslash (\) is included with the drive name to indicate the *root directory* of the drive.

Current Drive

The drive you are using to run programs or store information is called the *current drive*.

Directories

Information on a computer is organized in *directories*. The main directory on a disk is called the *root* directory. A directory can be created in the root directory. A *subdirectory* is created in a directory. Files or programs can be stored in the root directory, in a directory, or in a subdirectory.

You may organize your disk by grouping files containing related information in the same directory. This makes it more convenient to find your information, and to make copies of your files for backup.

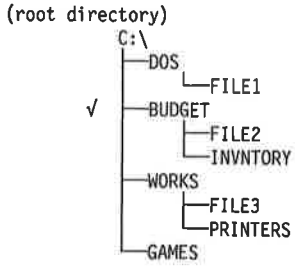
It helps to think of the root directory on a disk as a file folder. If you have a fixed disk, the root directory is called the Main Folder. A directory is like a folder within the main folder, and a file (or program) is like a piece of paper stored in the folder. This concept is used in Your Software.

For information about creating directories, see "Working with Directories and Files" on page 66.

Directory Tree

A directory tree is a diagram of the directories on a system as they branch out from the root directory. In Your Software, these directories are symbolized by file folders.

The following is an example of a directory tree:



A symbol (√) is next to the current directory. The directory tree on your system will look different than this example. The root directory (C:\) has several directories connected to it. Some of the directories have subdirectories connected to them.

There is more information on displaying files in "Options" on page 60.

Current Directory

Whichever directory you are using is called the *current directory*. If you are working in the root directory, then the root is your current directory. If you are working in the DOS directory, that is the current directory.

The current directory is shown in the Current Drive and Path area on the File System screen.

Changing Directories

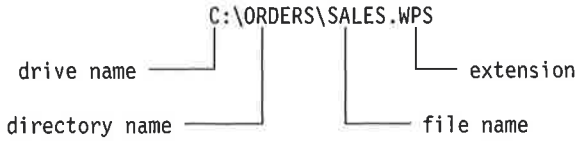
To change directories, select the directory you want from the directory tree. The current directory symbol is moved to the directory you chose and the files on that directory are displayed.

Using Paths to Find Files

When you are prompted to enter a file name, enter the file name and extension. However, if the file is not located on the current drive or directory, you must also enter the drive name and directory information so the computer knows where to find the file. This drive and directory information is called the *path*. Think of the path as describing the "location" of the file.

When you type a file name, type the directory name surrounded by backslashes (\), immediately before the file name (and extension, when used). *Do not* include spaces or blanks.

The following is an example of a file named SALES.WPS, stored in directory ORDERS on the fixed disk.



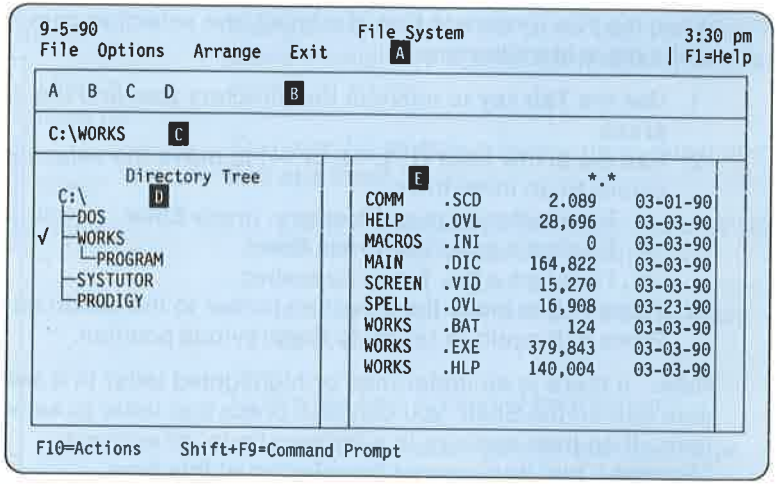
If you want to specify a file named HOUSHOLD.BGT in the BUDGET directory on drive C, you enter:

```
C:\BUDGET\HOUSHOLD.BGT
```

For information about finding a file when you only recall part of the file name, see page 65.

The File System Screen

The File System is used to view and manage your files, which are organized in directories on your disks. Select **File System** on the Main Group of the DOS Shell to start the File System. The following screen is displayed:



Note the following areas in the File System screen:

- **A** Action Bar
- **B** Drive Identifier area. The disk in Read-Only Memory (ROM) is shown as either drive C or drive D, depending on the drives installed in your system.
- **C** Current Drive and Path
- **D** Directory Tree area
- **E** File List area. The ***.*** at the top of the list indicates that all file names and extensions are shown in this list. A symbol is displayed by each file name. If the symbol looks like a card, the file is a program. A page with the corner turned down indicates the file is a text file.

Selecting **Exit** and then selecting **Exit File System** (or pressing **F3**) returns you to the Start Programs menu.

If the message "Number of Files exceeds allowable maximum" is displayed, it means that there is insufficient memory to display all the files on your disk. See page 97 for more information.

Selecting Items In File System

Using the Mouse

Move the pointer to the item you want to select, press and release the left button. This is called "clicking" the mouse.

Using the Keyboard

When the File System is first displayed, the selection cursor is in the drive identifier area.

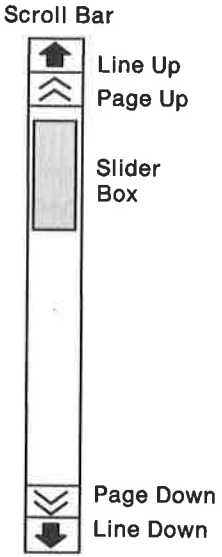
1. Use the **Tab** key to move to the directory tree and file list areas.
2. Use the arrow keys (↑, ↓, →, or ←) to move the selection cursor to an item; then:
   - To select a drive or directory, press **Enter**.
   - To start a program, press **Enter**.
   - To select a file, press **Spacebar**.
3. Press **F10** to move the selection cursor to the action bar. Press **F10** again to return to the previous position.

Note: If there is an underlined or highlighted letter in a selectable item in the Shell, you can also press that letter to select the item. If an item appears in a lighter shade, or appears "blurred," that item cannot be selected at this time.

The Scroll Bar

On several screens in the Shell, a *scroll bar* appears near the right edge of the screen. The scroll bar indicates how far you have scrolled through a list of files.

Using the Mouse on the Scroll Bar



Using the arrows on the scroll bar, you can move through the file list a line at a time or a screen at a time.

To move the selection cursor up or down one line at a time:

1. Place the mouse pointer over the Line Up or Line Down arrow on the scroll bar.
2. Press the left mouse button. If the button is held, the cursor will continue to move up or down.

To see the next screen of information:

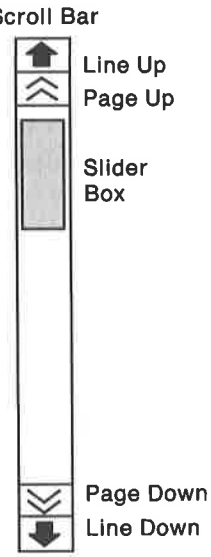
1. Place the mouse pointer over the Page Down arrow symbol in the scroll bar.
2. Press the left mouse button. The next screen of information is displayed.

If the left button is held, the list continues to scroll. When the arrows appear in a lighter shade, no further scrolling in that direction is possible.

Dragging the Slider Box: You can also place the pointer over the slider box, press and hold the left mouse button, and move the mouse pointer up or down to *drag* the slider box up or down.

When you release the left button, the list scrolls to the position that is relative to the position of the slider box in the scroll bar.

Using a Keyboard on the Scroll Bar



To scroll through the file list using the keyboard:

1. Make sure the selection cursor is in the file list area.
2. Press ↓, ↑, **Page Down**, or **Page Up** to move the cursor.

The slider box moves in relation to the position of the selection cursor in the list of files.

When the arrows at the top or bottom of the scroll bar appear in a lighter shade, no further scrolling in that direction is possible.

Selecting and Deselecting Files

Before you can perform any task involving files (such as copying), the files affected must be *selected*.

Using a Mouse

To select a file, place the mouse pointer over the file name; then click once. The symbol beside that file name is highlighted to show that the file is selected.

To select all the files listed in the file list:

1. Place the mouse pointer over **File** at the action bar; then click once. The pull-down is displayed.
2. Place the mouse pointer over **Select all**; then click once.

To deselect a file, place the mouse pointer over the selected file name; then click once.

To deselect all the files you have selected:

1. Place the mouse pointer over the **File** item at the action bar; then click once. The pull-down is displayed.
2. Place the mouse pointer over **Deselect all**; then click once.

Using a Keyboard

To select a file:

1. Tab to the file list area.
2. Use the arrow keys (↑ or ↓) to move the selection cursor to the file you want to select.
3. Press the **Spacebar**. The symbol beside the file name is highlighted to show that the file is selected. If you press **Spacebar** again, the highlighting is removed.

To select all the files listed in the file list:

1. Select **File** at the File System action bar.
2. Select **Select all** from the pull-down. The symbol by each file in the list is highlighted. Any action you take now affects all the selected files.

To deselect a file that is highlighted, move the highlighted bar to the file name and press the **Spacebar**. The symbol by that file name is no longer highlighted.

To deselect all the files you have selected:

1. Select **File** at the File System action bar.
2. Select **Deselect all** from the pull-down. The symbols by all the file names are no longer highlighted.

Note: Before beginning a task such as copying, deleting, or moving files, it is always a good idea to check to make sure that only the files you want are selected.

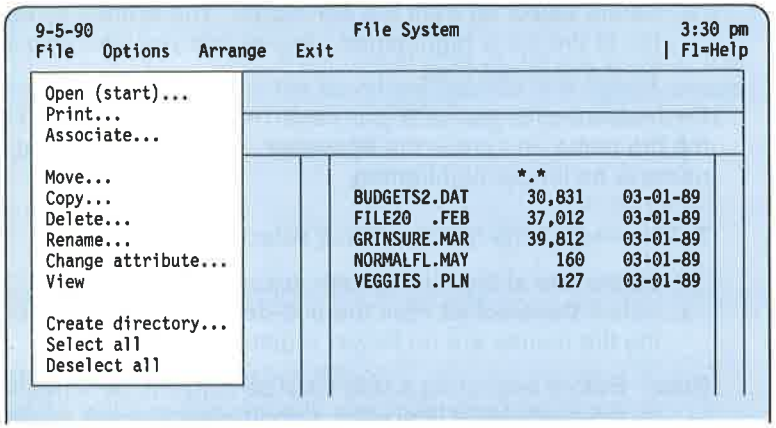
After you have performed an operation on a file or files (such as copying, viewing, or printing) the file that was previously selected is now deselected. The Shell deselects files after you perform an operation on the selected files.

The File System Action Bar

The File System action bar has four items. Each item, when selected, displays a pull-down showing the tasks that can be performed by selecting that item.

File

The File pull-down allows you to perform any of several different actions on a selected file or directory. When you select **File** on the action bar, the following pull-down is displayed:



On all these pull-downs, items that appear in a lighter shade or are "blurred" are not selectable at this time.

Before using some of these features, a file must be selected in the file list area. More details on these features can be found in the Help pop-ups. See also page 66 for more information on some of these commands.

Open runs a selected program.

Print causes a selected file to be printed if the DOS PRINT program has been loaded into memory. To activate this feature, select the PRINT command from the DOS folder in Your Software, using the following option: /D:PRN

Associate is used to associate file name extensions with a selected program. When a file is associated with a program, the Shell starts the program each time you select a file with that extension.

Move creates a copy of the selected file in another directory, then erases the selected file.

Copy creates a copy of the selected file. To copy a file on a one-drive system, see "Copy a File" on page 46.

Delete erases the selected file or directory.

Rename lets you rename a file or directory.

Change attribute lets you change the attributes of the selected file. Possible choices are: **H**idden, **R**ead Only, and **A**rchive. For example, if a file has the Read Only attribute, you cannot change or erase it. If it is necessary to erase such files, the attribute must be removed using this feature.

View allows you to quickly view the contents of a file.

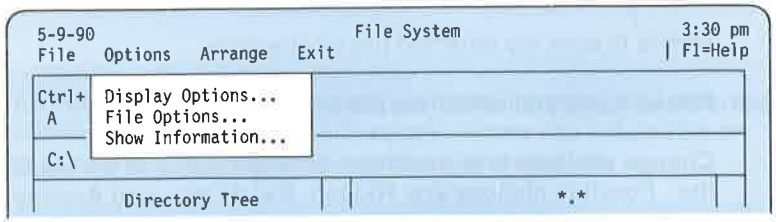
Create directory lets you create a new directory in which to store files, much like labeling a file folder.

Select all selects all the files in the directory so you can take action on them as a group.

Deselect all lets you remove the selection cursor from a group of files that have been selected.

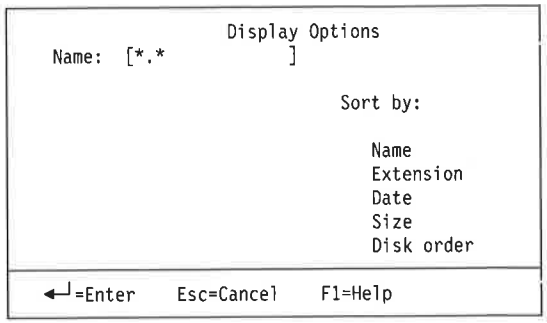
Options

Options allows you to control how the files are sorted and what information is displayed. The Options pull-down looks like this illustration:



Display Options

Display Options lets you control how the file list is displayed.



The File System screen shows you the files in one directory. You can specify which files you want displayed by entering a name or partial name. All the files in the current directory are shown when *.* is used in the file name field of the Display Options pop-up. You can also sort this list by name, extension, date, size, or disk order.

After you have entered the file name and the sort information, select **Enter**. The new file list is displayed.

File Options

File Options lets you select whether you will see confirmation panels when you delete a file or copy a file.

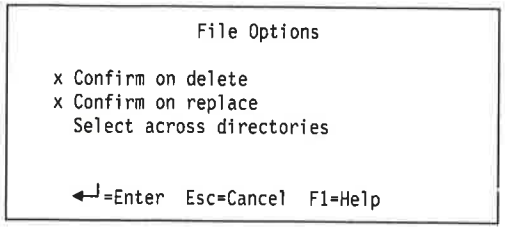
You can also choose to select files from more than one directory at a time.

Eliminating Confirmation Panels

Each time you delete, copy, or move a file in the Shell, a confirmation pop-up is displayed so that you can verify the activity. By selecting **Options** at the action bar, you can deactivate this pop-up. When you restart the Shell, these pop-ups are again activated.

1. Select **File System** from the Main Group.
2. Select **Options** at the File System action bar.
3. Select **File options...**.

   The following pop-up is displayed:



   Note that the selection symbol is displayed in front of **Confirm on delete** and **Confirm on replace**.

   - Confirm on delete is used when you delete a file or files.
   - Confirm on replace is used when you copy or move a file or files.

4. Move the selection cursor to the item you want to change.
5. Press the **Spacebar** to remove the selection symbol. You can also click the mouse to remove the selection symbol.
6. Select **Enter**. This saves your entries and returns the selection cursor to the action bar.

Warning: With the selection symbol removed, this item is deselected; the confirmation pop-up for the function is no longer displayed.

Selecting Files Across Directories

In the Shell, when you select a file, then change directories, the selected file is deselected. By using the following steps, you can select files in more than one directory at the same time.

1. Select **File System** from the Main Group.
2. Select **Options** at the File System action bar.
3. Select **File options...** from the pull-down.
4. Move the selection cursor to **Select across directories**. Note that there is no selection symbol displayed in front of **Select across directories**. Whenever this item is not selected, you cannot select files in more than one directory at a time.
5. Press the **Spacebar** or click the mouse. An X appears in the box to the left of the selection.
6. Select **Enter**. This saves your entries and returns the selection cursor to the action bar.

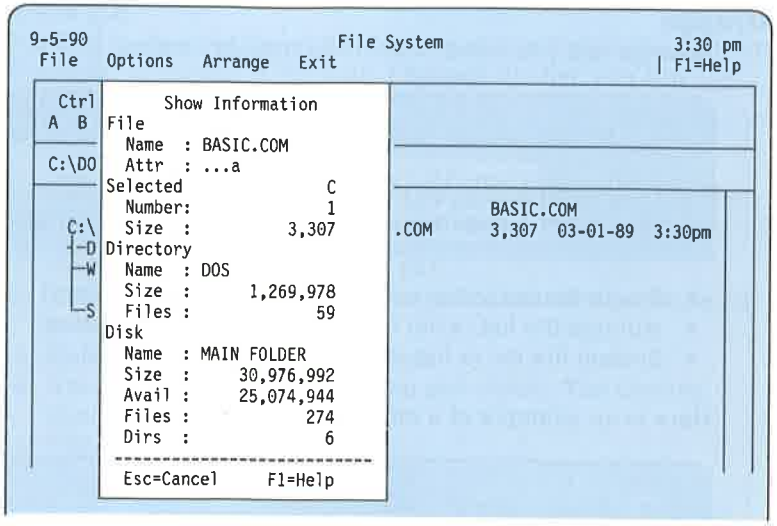
You can now select files in more than one directory at the same time.

When you exit the Shell, this option is deactivated. Selection across directories is always allowed if the *System file list* is displayed. See page 65 for more information.

Show Information

Show Information lets you see information about the selected file and the directory it is on.

For example, if you select a file called BASIC.COM in the DOS directory and then select **Show Information...** on the Options pull-down, a screen similar to the following is displayed:



The Show Information panel has the following information:

File The name of the most recently highlighted file and its attribute.

The attribute is an indicator of the file's status. The **a** attribute means *archive*. Other possible attributes are **h** (hidden), **s** (system), and **r** (read only). Changing attributes is done on the File pull-down.

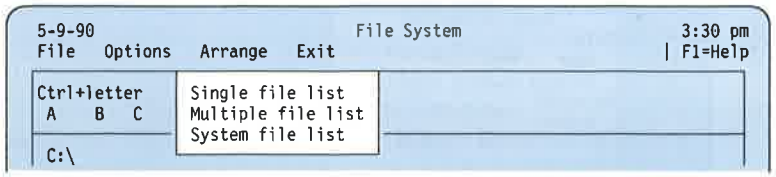
Selected The drive selected, and the number and size of files selected. *It is a good idea to check how many files are selected before you delete files.*

Directory The name and size of the directory containing the most recently highlighted file. Also shown is the number of files in that directory.

Disk The volume label and capacity of the disk, how much space the disk still has available, the number of files on the disk, and the number of directories on the disk.

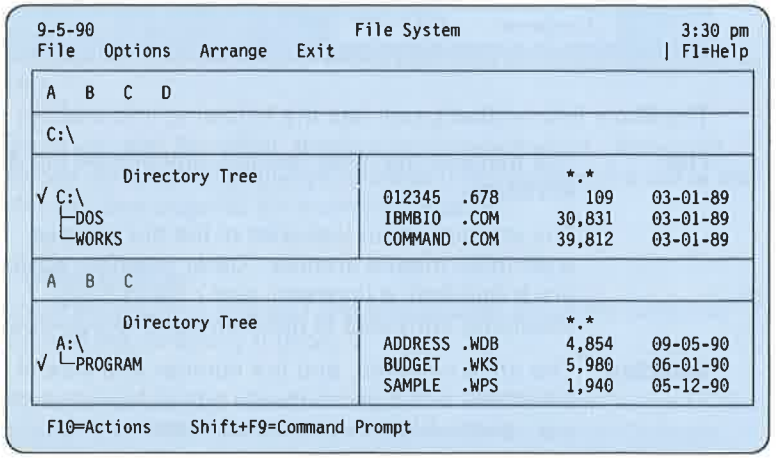
Arrange

Arrange lets you select from three display choices:



- Single file list (a list from a single drive or directory)
- Multiple file list (a list from two drives or directories)
- System file list (a list of all files in all directories).

Here is an example of a multiple file listing.



The multiple file list lets you view two directories at the same time. They can be on the same drive or on two different drives. The screen displayed here shows the root directory on drive C (C:\) and the PROGRAM directory on drive A (A:\PROGRAM)

To display **a different directory on the same drive,** select a different directory in one of the directory trees.

To display **directories on two drives,** select another drive letter in one of the drive identifier areas.

The drive you selected now replaces one of the displays. As you move the selection cursor to the different areas of the screen, the path area changes to reflect the currently active drive and directory.

System File List

The File System list normally displays all the files in the current directory. However, if you select **System file list**, you can display a list from all directories on the current drive at the same time.

For example, using this procedure you could display a list of all files on the disk having the .EXE extension.

1. Select **Arrange** on the action bar.
2. Select **System file list**. A list of files on all directories is displayed.
3. Select **Options** on the action bar.
4. Select **Display options...** on the pull-down. The Display Options pop-up is displayed.
5. Type over the asterisks:

   *.EXE

6. Press **Enter**.

Note: The * is a *global* character. When you use it in place of the file name, all the files with that extension, regardless of their names, are listed in the list of files.

The same is true if you use the global character in the extension position. Typing FILENAME.* lists all the files named FILENAME, regardless of their extensions.

If you type the name of a specific file, such as HOUSHOLD.BGT in the Display Options pop-up, only that file is shown.

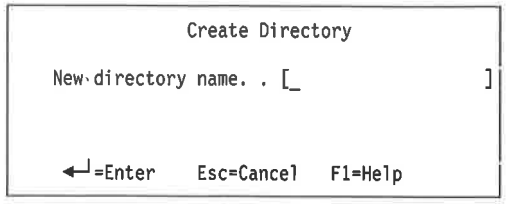
Working with Directories and Files

The Shell enables you to perform a variety of operations related to directories and files. You can:

- Create a directory
- View the contents of a file
- Copy files from one directory to another
- Delete files
- Rename the directory
- Delete directories.

Creating a Directory

Select **File** on the File System screen. Select **Create Directory...** on the pull-down. The Create Directory pop-up appears.



Any directory you create is a subdirectory of the current (selected) directory. For example, if you are displaying the BUDGET directory when you select Create Directory, the directory you create will appear as a subdirectory of the BUDGET directory.

A directory can have up to 8 letters in its name, the same as a file name. The directory name will appear as the folder name in the Other Folder area of Your Software.

Viewing a File

On the File pull-down, selecting View allows you to quickly view the contents of a file. You can view plain text (ASCII) files and also hexadecimal files.

Follow these steps to view the file:

1. Display the directory containing the file you want to view.
2. Select the file on the file list. The symbol by the file name is highlighted.
3. Return the selection cursor to the action bar; then select **File.**
4. Select **View** on this pull-down.

   The file you chose is displayed.

   Note the action keys shown at the bottom of the screen. For example, you can press **F9** to view a file in hexadecimal (base 16 numbering system used by programmers). Press **F9** again to return to ASCII (readable text).
5. Press **Esc** to return to the File System display.

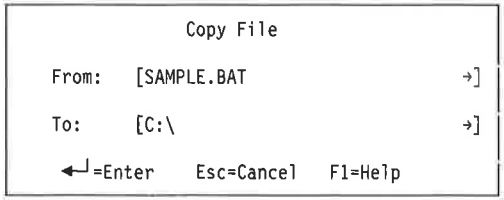
Note that the file that was previously selected is now deselected. The Shell deselects files after you perform an operation.

Copying a File

The steps used to copy a file can also copy several files at once, if they are all selected on the file list.

To copy a file from one directory to another:

1. Select the file on the file list (the symbol is highlighted).
2. Select **File** on the File System screen.
3. Select **Copy...** on the File pull-down. The Copy File pop-up is displayed.



4. Type the path to the drive and directory where you want the copy of the file to appear. You can also specify a different file name, if you want.
5. Press **Enter**.

Note: If another file exists on the target directory having the same file name as the file you are copying, you will be prompted to confirm that you want to replace the existing file.

To copy a file or files from one diskette to another if you have a one-drive system, see "Copy a File" on page 46.

Copying a Diskette to a Fixed Disk

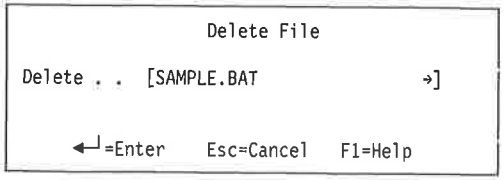
If you want to copy the files from a diskette to a directory on the fixed disk, follow these steps:

1. Select the diskette drive (A or B).
2. Select **File**.
3. Select **Select all**. All the files on the diskette are selected.
4. Select **Copy** on the File pull-down. The Copy File pop-up is displayed.
5. Type the path (drive name and directory). For example, type *C:\ORDERS* if the files are to be stored in the ORDERS directory on the fixed disk.
6. Select **Enter**.

Deleting a File

The procedure for deleting a file can also delete several files at once, if they are selected on the file list.

1. Select the file you want to delete.
2. Select **File** on the Action Bar.
3. Select **Delete...** on the File pull-down. The file name appears on the Delete File pop-up.

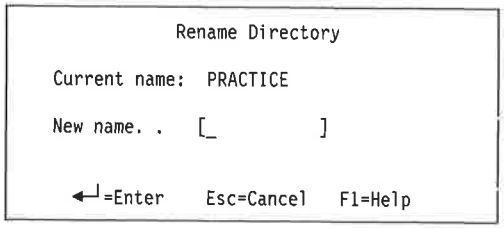


4. Press **Enter** if the file listed is to be deleted. You are now prompted to confirm that you want to delete the file.

Renaming a Directory

Renaming a directory is similar to other functions on the File pull-down of the File System screen.

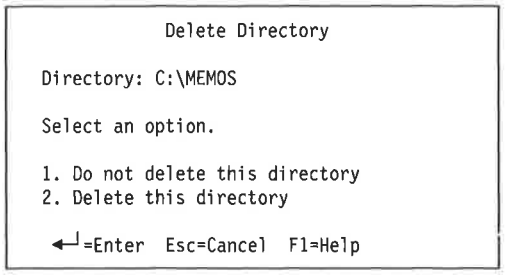
1. Select the directory you want to rename and make it the current directory.
2. Select **File** on the action bar.
3. Select **Rename...** on the File pull-down. The Rename Directory pop-up appears.



4. Type the new name for the directory.
5. Press **Enter**. The new name for the directory appears on the Directory Tree.

Deleting a Directory

1. Select the directory you want to delete and make it the current directory.
2. Select **Delete** on the File pull-down. The Delete Directory pop-up is displayed, with the name of the current directory inserted. This pop-up gives you the option to either delete or not delete the directory that you have selected.



Note: In order for a directory to be deleted, it cannot contain files or other directories. If you attempt to delete a directory that is not empty, you see a message that access is denied. If you see this message, press **Esc** to return to the action bar, delete or move the contents of the directory, then delete the directory.

The selection cursor is on **1. Do not delete this directory**.

3. If the correct directory (in this case, C:\MEMOS) is identified in the pop-up, and you want to delete it, select **2. Delete this directory** and press **Enter**. The directory is deleted and does not appear on the Directory Tree.

Shell Special Key Assignments

Some keys perform special tasks in the DOS Shell. These key assignments are listed in the figure below. (When a pop-up is displayed over the File System or Start Programs, not all these key assignments are active.)

Some of the keys shown here are explained in Appendix A, "Customizing the DOS Shell" on page 101.

Task	Key
Cancel	Esc
Enter	Enter
Move the cursor	↑ or ↓ or → or ←
Switch areas in File System	Tab
Single file select and deselect	Spacebar
Scroll information	Page Up or Page Down
Help	F1
Save information when adding or changing a program	F2
Exit the Shell from Start Programs	F3
Return to Start Programs from File System	F3
Create separator mark in a command options list	F4
View files in ASCII or Hex	F9
Keys when in Help	F9
Switch to and from action bar	F10
Index when in Help	F11
Switch to the DOS command prompt	Shift+F9

More About Your System

This section contains more information about your system and instructions for tasks such as working with diskettes, using DOS 4.00, and IBM PC BASIC.

Working with Diskettes

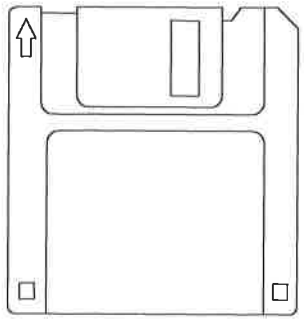
You must format new blank diskettes before using them. To format diskettes, use the function in DOS Shell called **Format (prepare a diskette for use)....**

However, if you need to create a diskette that includes the system files (bootable), follow these steps:

1. Display the DOS Command Prompt by using **Shift** + **F9**.
2. Insert a blank diskette of the correct capacity in drive A
3. Type *FORMAT A: /S* and press **Enter**. When formatting is finished, type *EXIT* to return.

Your system unit contains a 1.44 MB diskette drive (**1.44** is printed on the eject button). This drive uses only 3.5-inch diskettes.

This illustration shows a 2.0 MB capacity diskette which, when formatted, holds 1.44 MB of information. The letters HD, which stand for High Density, may be printed on the diskette, and there are two square holes in the bottom corners of the diskette.



The diskette drive can also format and use 1.0 MB capacity diskettes which, when formatted, hold 720 KB of information. A 1.0 MB diskette has only one square hole.

When using 2.0 MB and 1.0 MB diskettes, remember:

- A 2.0 MB diskette must be formatted to 1.44 MB using a 1.44 MB diskette drive.

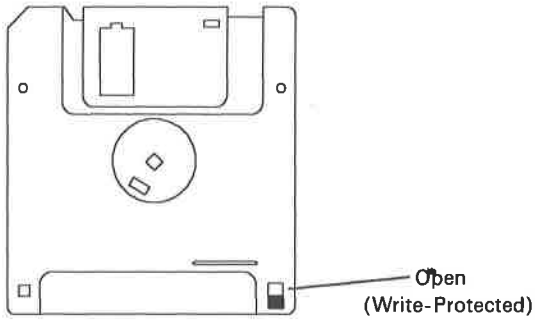
  Do not format a 2.0 MB diskette to 720 KB. If you format a 2.0 MB diskette to 720 KB, there is a possibility it will not be reliable even if reformatted to 1.44 MB.

- A 1.0 MB diskette must be formatted to 720 KB. The DOS Format command defaults to a 1.44 MB format when a 1.44 MB drive is used.
- If you are transferring diskettes between systems that have different capacity drives, make sure the diskettes are compatible with both machines. A 2.0 MB diskette must not be used in a 720 KB drive.
- When creating diskettes by using commands that format as they write (such as Diskcopy), be sure the target diskette has the appropriate capacity.

Write-Protecting Diskettes

Most diskettes have a write-protect tab that protects the information on the diskette. When a diskette is write-protected, you cannot write information on it or erase information from it.

- To prevent writing on or erasing from a diskette, slide the write-protect tab so the hole is open.
- To allow writing on or erasing from a diskette, slide the write-protect tab so the hole is closed.



Copying the System Files to a New Fixed Disk

The system includes an Install program that can be used to install the PS/1™ software on a *new* fixed disk.

To install the PS/1™ software onto your fixed disk, follow this procedure:

1. Insert the IBM DOS diskette into drive A.
2. On the System Menu, select **Your Software**.
3. Select the diskette symbol (drive A)
4. Select the INSTALL folder (subdirectory)
5. Select the INSTALL program.
6. Select **Start**.
7. Follow the instructions on your display.

When the Install program is finished, follow the prompt to restart the system.

Special Keys on Your Keyboard

Using Print Screen

Pressing **Print Screen** will print the screen that is displayed if it is a text screen.

To print screens that have pictures or other graphic images, the GRAPHICS program must be loaded into memory first. Select the GRAPHICS program from the DOS folder in Your Software. When you are prompted for options, type the /R option and select **Start**.

Now, when you press **Print Screen**, the screen is printed correctly. Graphics screens are printed in reverse video (black on white).

Using the Pause Key

Pressing **Pause** will usually stop a screen action temporarily. For example, if the contents of a file are being displayed on the screen, Pause will stop the scrolling until you type another key.

Using Caps Lock

The Caps Lock key is similar to the Shift Lock key on a typewriter, except that the numbers and punctuation marks remain in lowercase when Caps Lock is on.

Using NumLock

NumLock is on when you start your system, unless you have customized the system and turned it off. NumLock must be on when you use the numeric keypad to enter numbers.

Using Combination Keys

Some functions are activated by pressing two keys at once. For example, **Shift** and **F9** (written as **Shift** + **F9**) are used at times to display the DOS Command Prompt.

To use this key combination, press and *hold* the **Shift** key while you press the **F9** key.

Ctrl + **Break** is used to stop the operation of some programs and return the system to normal conditions.

Ctrl + **Alt** + **Delete** is used to restart the system using the built-in DOS and system functions.

Using DOS 4.00

Many common DOS commands are included on the IBM DOS menus and within Works. For example, formatting a diskette can be done from IBM DOS, or from Works.

However, if you are familiar with the Disk Operating System (DOS) and you want to use commands that are not on the menus, you can exit from the PS/1™ menu system and use DOS commands from the command prompt.

Displaying the DOS Command Prompt

You can display the DOS Command Prompt from several places in the system.

You can reach the DOS command prompt by pressing **Shift** + **F9** from the System Menu or the IBM DOS Start Programs screen. You can also reach the DOS command prompt from Your Software by selecting **DOS Prompt** at the bottom of the screen or by pressing **Shift** + **F9**.

Note: If you go to the DOS command prompt from within Works, you will not have as much free memory as when you go to the DOS command prompt from the other locations mentioned.

If you want the command prompt to appear when the system is started, see "Customizing How Your System Starts" on page 80.

For a complete listing of DOS books available, see "Related Publications" on page 90.

Returning from the DOS Command Prompt

Type *EXIT* at the command prompt. You are returned to the screen where you selected the DOS Command Prompt.

The Built-in ROM Disk

The system has a disk in Read-Only Memory (ROM) that contains system files. DOS messages will refer to this disk as a "network drive."

This ROM disk appears on the File System in IBM DOS as drive C if you have a diskette-only system, or as drive D if you have a fixed disk.

You can copy files from the ROM disk; but you cannot change any of the files that are on this disk. You cannot store any information on this disk; all your information must be stored on diskette or on the fixed disk, drive C.

Using Batch Files

A batch file is a special file containing DOS commands. When you process a batch file, DOS processes the commands included in the batch file, one at a time. Grouping commands in a batch file saves time because you do not have to repeatedly type in commands from the command prompt.

Batch files can have any filename, but the extension must be .BAT.

Batch files are discussed in detail in *Using DOS 4.00*. See "Related Publications" on page 90 for more information about DOS books.

Starting Another Operating System

You can restart the system using a different operating system from drive A or drive C.

You can do this by using "Customizing How Your System Starts" on page 80. You can also use the following method:

When the System Menu is displayed, press **Alt** + **SysRq**.

The system will start from drive A if a diskette is inserted, or from drive C if you have a fixed disk.

When you want to return to the built-in System Menu, you must restart the system (also known as *booting the system*). Turn the system off, wait five seconds, then turn the system on. You may also restart the system by pressing **Ctrl** + **Alt** + **Delete**.

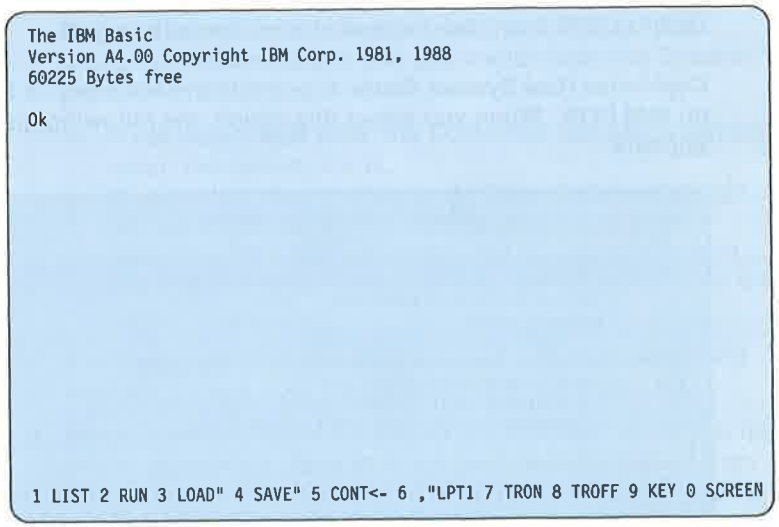
Using IBM Personal Computer BASIC

You can start the BASIC program either from Your Software or from IBM DOS.

From Your Software, select the DOS folder on drive C or the DOS diskette in drive A. The BASIC program is in this folder.

From IBM DOS, select **BASIC Programming Language**. A pop-up screen reminds you to type *SYSTEM* and press **Enter** when you want to leave the BASIC screen.

The IBM BASIC screen appears, which looks like this:



If you are not familiar with BASIC and you want to create programs, you should obtain the *IBM Personal Computer BASIC Reference*. See page 90.

To exit the BASIC screen, the BASIC **Ok** prompt must be displayed. Type *SYSTEM* and press **Enter**.

Note: Programs written in BASIC language can easily be run from the Your Software feature of your PS/1™. See "Your Software" on page 27.

Customizing How Your System Starts

Your system normally starts from built-in DOS and displays the System Menu. Certain options are preset; for example, NumLock is normally on.

Additional flexibility has been provided so you can customize how the system starts. When you make a change, it is remembered when you turn off the system. The change is in effect when you turn the system on.

You can control keyboard options, where the operating system is found, and which application is displayed when the system starts. You can also choose to read an AUTOEXEC.BAT and CONFIG.SYS from disk instead of from the built-in DOS.

Customize How System Starts appears in the Main Group listing on IBM DOS. When you select this option, the following menu appears:

```
                    CUSTOMIZE HOW SYSTEM STARTS
Enter=Save changes          ESC=Cancel                          F1=Help

Keyboard Options
      NumLock setting at power-up:     ► on     off
      Keyboard speed                   ► normal     fast

Choose where the computer looks for the operating system
    ► Start from built-in DOS
      Try Diskette first (otherwise start from built-in DOS)
      Try Diskette first, then try fixed disk

When the System Starts From Built-in DOS, the Following
Options Can be Set:

      Begin at:
         ► Built-in Menu          Your Software
           Microsoft WORKS        IBM DOS
           Prodigy(R) Service     DOS Prompt
           Users' Club
      Read Config.sys:     ► Built-in      From Disk
      Read Autoexec.bat:   ► Built-in     From Disk
        Disk to read from:     A:      ► C:
```

The ► symbol indicates that the feature is selected. If your system does not have a fixed disk, the selections will be slightly different on this screen.

Keyboard options lets you specify the keyboard functions you want to be active:

- NumLock activates the numeric keypad so you can easily type numbers.

- Keyboard speed controls the repeat speed when you hold down a key.

Choose where the computer looks for the operating system lets you tell the system where to look when starting the system. DOS is built into the system, and there is a "bootable" DOS operating system on the IBM DOS diskette or on the fixed disk.

If you start your system from diskette and no operating system is found, the system will look on either the fixed disk or use built-in DOS, depending on the option you choose.

Starting from Built-in DOS

When you start from built-in DOS:

- **Begin at** lets you start an application automatically as though you had selected that application from the System Menu. For example:
  - If you select **IBM DOS**, the DOS Shell will be displayed when the system starts.
  - If you select **Your Software**, the Your Software screen will be displayed each time you start the system.
  - Selecting **DOS Prompt** allows you to display the DOS command prompt instead of the System Menu when the system is started.

  When you exit from the application, the System Menu will appear. To exit from the DOS prompt, you type *EXIT*.
- **Read CONFIG.SYS** and **Read AUTOEXEC.BAT** gives you the choice of reading these from the built-in ROM disk or from drive A or drive C (if you have a fixed disk).

  If you select From Disk instead of Built-in as the source of these files, you can then specify where the files are located. The files must be in the root directory of the disk. See "Creating and Changing the AUTOEXEC.BAT" on page 84 for instructions on creating these files.

Running the Customization Program

Customize How System Starts appears in the Main Group listing on IBM DOS. You can customize your system as your needs change so it operates most efficiently for you.

You can also run the customization program directly from Your Software. The CUSTOMIZ program is in the DOS folder.

To change items on the Customize How System Starts screen:

1. Select the item using the mouse pointer. The ► symbol appears next to the item you have selected.

   You can also select items by using the arrow keys to move the highlighted area and then pressing **Spacebar** to select an item.

2. Press **Enter** to accept the changes you have made. When you restart the system, these options will be active on your system.

   If you want to exit without saving the changes, press **Esc**.

Resetting All Options to the Default

You can reset all the customization options to their original defaults. This can be helpful if you need to recover from errors caused by other operating systems or from errors in AUTOEXEC.BAT or CONFIG.SYS. Follow this procedure:

1. Turn the system off.
2. Hold down both mouse buttons.
3. Turn on system power. You can release the mouse buttons when the System Menu appears.

All the settings are returned to their defaults.

Creating and Changing the CONFIG.SYS

If you want to specify certain options when the system starts, you must have a CONFIG.SYS file in the root directory of your diskette or disk.

The CONFIG.SYS on the IBM DOS diskette or the fixed disk contains commands similar to the following:

```
FILES=12
INSTALL=SHELLSTB.COM
```

You can modify this file using Works, and put it on whatever disk you want.

Note: The command `INSTALL=SHELLSTB.COM` must be included in your CONFIG.SYS file if you want the System Menu to be displayed.

To modify the file using Works:

1. On the Works File screen, select Open existing file.
2. Select CONFIG.SYS either from the fixed disk or the IBM DOS diskette and press **Enter**.
3. Select Word Processor as the type of file.
4. After you have modified the file, select Save on the File menu. The file is saved as a text file because it was a text file originally.

Creating and Changing the AUTOEXEC.BAT

When the system starts, an AUTOEXEC.BAT file is run from built-in DOS. This file loads the mouse driver and performs some other system functions.

If you want to run your own AUTOEXEC.BAT when the system starts, you must have an AUTOEXEC.BAT file in the root directory of your diskette or fixed disk. There is an AUTOEXEC.BAT on the IBM DOS diskette or on the fixed disk.

You can modify the file using Works.

1. On the Works File screen, select Open existing file.
2. Select AUTOEXEC.BAT either from the fixed disk or the IBM DOS diskette and press **Enter**.
3. Select Word Processor as the type of file.
4. After you have modified the file, select Save on the File menu. The file is saved as a text file because it was a text file originally.

The AUTOEXEC.BAT that is on the IBM DOS diskette or the fixed disk contains commands similar to these:

```
@ECHO OFF
MOUSE >NUL
PROMPT $P$G
```

To modify this file, you need to know the commands you want to run when the system is started. More information can be found in *Using DOS 4.00*, which is listed in "Related Publications" on page 90.

Note: Text files are also referred to as ASCII files in some documentation.

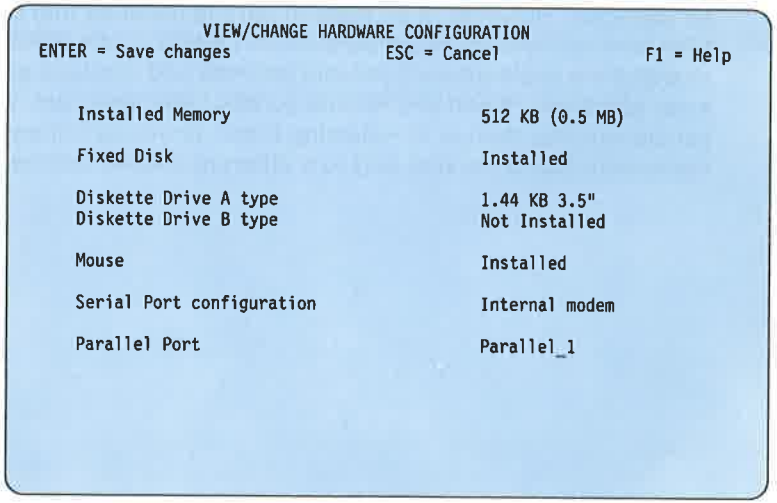
Changing Hardware Configuration

You can change your system by adding or removing hardware components. If you add certain options to your system (such as more memory or a diskette drive), the system senses the new option and will test it each time the system is started. The components sensed by the system include:

Additional memory
Diskette drive (A or B)
Fixed disk
Mouse
Internal modem
Audio Card and Joystick

However, if you remove a hardware component, an error message may be displayed. Use Change Hardware Configuration from the Start Programs screen in IBM DOS to update the configuration of the system and eliminate the error message. The system senses the new configuration and marks the changes with the ► symbol.

You can also change the configuration of the serial and parallel ports using this feature.



Select Enter to accept the changes. The changes will be in effect when the system is restarted.

Screen Contents

Installed Memory shows the total amount of memory in your system. This includes *base* memory and *extended* memory.

Fixed Disk shows a compatible fixed disk is installed.

Diskette Drive A senses a 3.5-inch 1.44 MB drive.

Diskette Drive B senses a 3.5-inch 1.44 MB drive, a 5.25-inch 360 KB drive, or a 5.25-inch 1.2 MB compatible drive.

Mouse shows a compatible mouse is installed.

Note: The Audio Card and Joystick only appears on the screen if it is installed.

Serial Port configuration. The status of the system board serial port is shown. If you have an adapter card installed in the adapter card unit that conflicts with the system board setting for this address (COM 1), the serial port is disabled. If you have removed the conflicting adapter or changed its address to COM 2, use the configuration program to restore the status of the serial port.

Parallel Port. The parallel port configuration seldom needs to be changed. However, if an adapter card is installed that conflicts with the system board parallel port address, the system changes the system board parallel address and displays an error message. When you run the configuration program, you can accept this change by selecting Enter, or you can change the system board parallel port to a different unused address.

Changing Serial or Parallel Port Configuration

You can change the configuration of the system board serial port or parallel port. The possible settings are:

Serial Port

Internal modem
Serial 1
Disabled (neither is active)

Parallel Port

Parallel 1
Parallel 2
Parallel 3
Disabled

To change the configuration of one of these:

1. Select the option you want to change from the right column.
2. Click the mouse, press **Spacebar**, ←, or → to change the highlighted item. Each of the possible settings will be shown in turn. The ► symbol indicates the option has been changed.
3. Press **Enter** to accept the new configuration. The changes will be active the next time you start the system.

Note: If an option is not functional or is installed incorrectly, the screen may show the option is disabled or is not installed. See "Troubleshooting" on page 91.

Backing Up and Restoring Your Fixed Disk

To avoid the possibility of losing information from your fixed disk, it is recommended that you make a complete backup copy of the programs and information on your fixed disk. If information or programs are erased, you can restore them using your backup copy.

Back Up and Restore Your Fixed Disk appears in the Main Group listing on IBM DOS. When you select this option, you have the following choices:

```
Back up your entire fixed disk
Back up changes to your fixed disk
Restore your fixed disk
```

If you are backing up your fixed disk for the first time, you will need 6 or more blank diskettes having 2.0 MB capacity. Label the first diskette "IBM DOS Backup." Label the other diskettes numerically.

The system will format the diskettes as they are used, if they are not already formatted. When a diskette is formatted successfully, the message "Format another?" appears. Answer **n** and the backup procedure will continue. Answer **y** only if the diskette was not formatted successfully.

Select **Back up your entire fixed disk** and follow the prompts to complete the backup copy. The first diskette created is a backup copy of the DOS directory. The first files to be copied to the DOS backup copy are those that are needed to restore your data to a new fixed disk. After that, the remainder of the files on the DOS directory are backed up. If there are more files on the DOS directory than will fit on the DOS backup diskette, the message "Insufficient disk space" appears. Insert the next diskette and continue with the backup procedure. Keep the diskettes in a safe place in case they are needed to restore lost information to your fixed disk.

Select **Back up changes to your fixed disk** if you want to back up only the information that has changed since the last backup copy was made. You will be prompted to insert your *last* backup diskette. As the changed information is backed up, you may be prompted to insert additional diskettes.

If you select **Restore your fixed disk**, you will be prompted to insert the backup diskettes to restore any information that has been erased from your disk.

Warning: Follow the prompts carefully to avoid copying older information to the disk. You should only restore information that has been deleted and that you want to restore to the disk.

- If you cannot use the DOS Shell, or if the RESTORE program is erased, you can run Restore from the DOS backup copy you created.
- Other DOS commands such as FDISK and FORMAT are also on the DOS backup disk.
- If you see read or write errors, or if the fixed disk is unusable, see "Troubleshooting" on page 91.

Moving Your System

If your system unit has a fixed disk drive, you should back up your data files before moving your system. You can also use Back Up and Restore your Fixed Disk on IBM DOS to make this backup copy.

1. Turn off the system unit.
2. Turn off all external options (display, printer, and others).
3. Unplug the system unit power cord from the electrical outlet.
4. Unplug the power cords of any external options from the electrical outlets.
5. Remove and secure all cables and cords.
6. If you saved the original shipping cartons and packing materials, use them to pack the units. If you are using different cartons, cushion the units to avoid any damage.

Related Publications

The following publications may be useful if you need to learn more about DOS commands and the operation of the system. They are available from 1-800 IBM 7282. In Alaska call 1-414-633-8108.

Using DOS 4.00
By using examples, this book explains how to manage your information from the command prompt, how to change the configuration of your system, and how to create and change batch files.

DOS 4.00 Command Reference
This book provides detailed information on the commands used in IBM DOS, and contains tables relating tasks to these commands.

DOS 4.00 Technical Reference and Application Programming
This book is written for programmers who develop applications for IBM Personal Computers and IBM Personal System/2® computers.

Technical Reference for IBM Personal System/1™ Computer
This reference is useful to those technicians or programmers designing system-specific hardware and software for the IBM PS/1™.

BIOS Interface Technical Reference for IBM Personal System/1™ Computer
This reference is useful to those who are designing programs or hardware to interface with the IBM PS/1™.

IBM Personal Computer BASIC Reference
This book provides instructions in using the BASIC language to create your own programs.

Hardware Maintenance Service for IBM Personal System/1™ Computer
Information about servicing and ordering parts for the IBM PS/1™ are contained in this book.

Troubleshooting

Problems with your system can be caused by software, hardware, or both. This section contains symptom charts, error codes, and error messages to help you determine the cause of a problem and the action to take.

When the system is turned on, a self-test is performed automatically. If all parts of the system pass this test, **1 beep** sounds. This indicates the system is operating normally.

If you get any other number of beeps, or if an error code is displayed on the screen, use the procedures in this chapter.

Page numbers in parentheses show where a subject is located in the manual, in case you need more information. For example: "Make sure the diskette is formatted (45)" shows that format information is on page 45.

Preliminary Checklist

Before you proceed with this chapter, use this checklist.

Determine that:

- Your system unit and display are connected correctly.
- The electrical outlet is not controlled by a wall switch or a dimmer switch. If you are using a power strip, make sure it is plugged in and turned on.
- The unit is plugged in and turned on. The power light on the display should be lit if power is reaching the unit.
- The contrast and brightness controls on the display are adjusted properly.
- The correct diskette is inserted (if applicable).

Record any error codes and messages you see when trying to use the system. Check for these error codes and messages in the following pages.

Symptom Index

If your system fails and there is no error code, check this index for symptoms and follow the procedure shown.

If you do not find your symptom or error code, see "Getting Additional Help" on page 100.

Symptom	Action
No beep during self-test; No sound	• Make sure the volume control is turned up and no headphones are connected. • Check that the display cables are securely connected.
More than one beep in self-test; Continuous beep	An error code appears. See "Error Codes" on page 95.
System shuts down without warning	Check: • Power cable is firmly plugged into wall receptacle. • For blown fuses or power failure. • Cables are firmly connected to system unit. • Turn the system off; wait 5 seconds; turn the system on.
Any of the following: • Totally blank screen • No cursor displayed • Only the cursor is displayed • Screen is unreadable • Other Display problems.	• Check that system unit and display cables are securely connected. • Check that unit is plugged in and turned on. • Check that the power indicator light is on. • Adjust contrast and brightness controls on display.
Can't read diskette; can't format diskette.	• Make sure you are using the correct type diskette and it is formatted correctly (45). • Try to read a known good diskette. If it works, the first diskette is bad.
Can't write to diskette	• Make sure the diskette is formatted correctly (45). • Make sure the diskette is not write-protected (74). • Make sure you are writing to the correct drive. • Make sure there is room on the disk for the information. Try using an empty, formatted diskette.

Symptom	Action
Keyboard inoperative or only some keys work	• Make sure the keyboard is firmly attached to the correct port. (not the mouse port). Check the symbols on the rear panel of the system unit. • Make sure you are on a screen that allows typing. Some screens do not. • Turn the machine off; wait 5 seconds; turn the machine on.
Mouse does not move the cursor	• Move the mouse on a smooth desk or table top. • Make sure the current screen allows the use of the mouse. • Make sure the mouse is firmly connected to the mouse port (not the keyboard port). Check the symbols on the rear panel of the system unit. • Turn the machine off; wait 5 seconds; turn the machine on.
Joystick doesn't work	• Make sure the current screen allows the use of a joystick. • Make sure the joystick is firmly plugged into the correct connector on the system unit. • Make sure the audio/joystick card is installed correctly.
Communications problems (Prodigy, Users' Club, or Works communications feature)	• Make sure the telephone cord is securely plugged into the phone outlet in the wall and on the system. • Make sure the phone line is operational. Plug in a known good phone to the same outlet where the system was plugged in, and make sure you can place a call. • Make sure you are calling the correct number. • Make sure no one is using the telephone while you are communicating with another system. • If some communications programs work but not others, the program may be configured incorrectly.
Out-of-memory messages	See "Out-of-Memory Messages" on page 97.

Symptom	Action
Any printer error or external option problem (other than display).	• If you are trying to print a graphic screen, run the GRAPHICS program first (75). • Make sure the printer is connected correctly to electrical power and to the system. • Make sure the printer is turned on and is online or ready. • Make sure the ribbon and paper are loaded correctly. • Continue with the printer documentation or the documentation for the external option.
Any other error message	Error messages can be from DOS or from an application program. See "DOS Error Messages" on page 98.
Any other symptoms	See "Getting Additional Help" on page 100.

Error Codes

When the system starts, listen for the number of beeps. (Make sure the volume control is turned up and no headphones are plugged in.)

2 short beeps indicates an error code is displayed. If the error code does not appear in the list that follows, see "Getting Additional Help" on page 100.

If your system displays any of the following error messages, take the action listed. If your system displays more than one error message, take the action listed for the *first* message. Error messages are displayed in the upper left part of the screen.

If the actions listed do not correct the problem, see "Getting Additional Help" on page 100.

(In the charts below, **X** can be any number.)

Error Message	Failing Unit and Action
111 - Parity Error	A memory unit in the adapter card unit has failed. Turn off the system; wait 5 seconds; turn on the system. This error should rarely occur.
114 - Option Adapter Failure	Failing unit: System unit and adapter card unit. Make sure all adapters are securely attached.
161 - Memory Error	Failing unit: System unit. Turn the system off; wait 5 seconds; turn the system on. The 161 error should not reoccur.
162 - Configuration Error	Failing unit: System unit and adapter card unit. If you have removed an option, use "Changing Hardware Configuration" on page 85 to change the configuration.
163 - Set Date and Time	Failing unit: System unit. The clock module on the system board may not be set correctly. Using Set Date and Time on IBM DOS, type in the date and time (44).
164 - Memory Size Error	Failing unit: System unit. If you have removed memory, use "Changing Hardware Configuration" on page 85 to set configuration.

Error Message	Failing Unit and Action
1XX - System Unit Failure	Failing unit: System unit. See "Getting Additional Help" on page 100.
2XX - Memory Error	Failing unit: System unit and adapter card unit. See "Getting Additional Help" on page 100.
301 - Keyboard or System Unit Error	Failing unit: System unit and keyboard. Make sure that the keyboard is connected correctly and that a key is not being held down. If a key is not being held down, turn off the system unit, wait 5 seconds, and then turn on the system unit.
3XX - Other 300 Errors	Failing unit: System unit and keyboard. See "Getting Additional Help" on page 100.
6XX - Diskette Error or system board	Failing unit: System unit and/or 5.25-inch diskette drive. Check the cables to the 5.25-inch drive, if one is installed. Make sure they are securely attached. If the diskette cannot be read, have the drive serviced. If the diskette can be read, have the system unit serviced.
11XX - Internal Modem Error	Failing unit: System unit. See "Getting Additional Help" on page 100.
1380 - Audio Card and Joystick	Failing unit: System unit and/or Audio Card and Joystick See "Getting Additional Help" on page 100.
17XX - Fixed Disk Error	Failing unit: System unit. See "Getting Additional Help" on page 100.
2401 - Video Error or one long and two short beeps	Failing unit: System unit and display. Make sure the display cables are firmly connected to the system unit.
860X - Mouse Error	Failing unit: System unit and mouse. Check that the mouse cable is securely attached to the correct port.

Out-of-Memory Messages

If you attempt to run a program and get a message that says there is not sufficient memory to run the program, you may have to change the way your system operates before you can run the program.

Some of the system memory is used to operate the system. Programs that remain resident, such as GRAPHICS and PRINT, also use memory. Additional memory is also used when you go to the DOS command prompt from Works. For that reason it is recommended that you reach the DOS command prompt through Your Software or through IBM DOS.

If you have customized your system to load programs when the system starts, these programs may occupy memory. See "Customizing How Your System Starts" on page 80. It may be possible to change the CONFIG.SYS and AUTOEXEC.BAT files so that fewer programs are loaded when the system is turned on.

If that does not allow you to run the program you want, you may want to add more memory to the system. See your Authorized Seller or the Users' Club for more information.

DOS Error Messages

A complete list of DOS error messages is found in *Using DOS Version 4.00*. See "Related Publications" on page 90 for more information. The following is a condensed list of some instructions that apply to many common error messages.

When an error message is displayed, it usually follows this pattern:

```
Not ready reading drive A
(type of error) (device on which the error occurred)
Abort, Retry, or Fail?
(allowable actions to take)
```

Not Ready

There are several Not Ready messages, depending on the device on which the error occurred.

For example, the error message **Not ready reading drive A** means that diskette drive A is not ready to read a diskette. Common causes of this error are as follows:

- The diskette is not fully inserted.
- The diskette inserted is not properly formatted.

Below the error message is a line that reads **Abort, Retry, Fail?**. You can type **A** for Abort, **R** for Retry, or **F** for Fail.

If you type **A**, the system will try to stop processing the command. You may try typing **A** more than once. If this is not effective, you may have to insert a diskette and type **R** for Retry. The command will then be completed. If you type **F**, the error is returned to the application program. Depending on the application program, information can be lost if you type **F**.

If the message **Not ready writing PRN** appears, it could mean:

- The printer is not turned on.
- The printer does not have enough paper or is busy.

Action: Correct the error and try again. The first letter of the allowable action must be entered to continue.

File Not Found

This message can mean one of several things:

- The file does not exist. Check the file name and extension and make sure you have typed the name and extension with only a period separating them (FILENAME.EXT).
- The file is on another drive or directory. Make sure your current drive and directory is where the file is located.
- The file has the Hidden attribute and cannot be accessed.

Insert diskette with batch file

You have left a program that began from a diskette with a batch file and the system is trying to return to that diskette.

Insert the diskette you started from and press **Enter**.

Bad command or file name

You have typed a command incorrectly or the system cannot find the file by that name.

Check the spelling of the command or file name, make sure it is in the current drive and directory, and try again.

Customization Errors

If you customize the system to read AUTOEXEC.BAT from drive A, and the system fails to start correctly, you may see an error message and the prompt: **Abort, Retry, Fail?**.

Do *not* type **A** (for Abort). Insert a diskette and type **R** (Retry) or type **F** (Fail). If you select Retry, the system will try to read from drive A; if you select Fail, it will start from the built-in DOS.

If your system fails to start correctly when reading AUTOEXEC.BAT or CONFIG.SYS from drive C, you can follow this procedure:

- Turn off the system.
- Hold down both mouse buttons, and turn on the system. Release the buttons when the System Menu is displayed.

This *resets all configuration* to the default settings. Correct your AUTOEXEC.BAT or CONFIG.SYS files and customize the system to read the files at startup.

Getting Additional Help

There are several ways to get assistance with your PS/1™ and answers to your questions.

- The Users' Club is available on the Information menu. Using your telephone, you can access the Users' Club during extended hours every day, including weekends and holidays, and find a great deal of information about your PS/1™. You can also leave messages asking for help with your questions.
- Your Authorized Seller may have technical assistance and repair service available.
- Contact IBM at 1-800-765-4747 for assistance in solving your system problems. This toll-free number is available daily, including evenings and weekends.

Be sure to have any error code or error message information available when you call, including model type and serial number. The model type and serial number is found on the back of the machine. For your convenience, write the numbers here:

Model Type _____ Serial Number _____

Appendix A. Customizing the DOS Shell

This appendix provides detailed information to help you fully utilize the power and flexibility of the DOS Shell. You can:

- Add a program to the Main Group
- Add a subgroup of programs to the Main Group
- Add programs to a subgroup of programs
- Copy programs from one group to another.

The DOS Shell has two levels of groups: the Main Group and subgroups. Each group can have as many as 16 items. The Main Group is on the first screen when you start the Shell.

On the following screen, two groups have been added to the Main Group: **Home Budgets...**, and **Games...**. Each of these names is followed by an ellipsis (...) to indicate that they are groups of programs.

```
9-5-90                          Start Programs                    3:30 pm
Program   Group   Exit                                          | F1=Help

                                Main Group
                    To select an item, use the up and down arrows.
                 To start a program or display a new group, press Enter.

Set Date and Time...
File System
Format (Prepare a diskette for use)...
Disk Copy (Copy a diskette)
Copy a File
Back up and Restore Your Fixed Disk
Command Prompt
Change Colors
Customize How System Starts
Change Hardware Configuration
BASIC Programming Language
Home Budgets...
Games...


F10=Actions                          Shift+F9=Command Prompt
```

A Word About Groups

The Main Group is the first level of the Shell's two-level group structure. The Main Group can contain both groups and programs; subgroups (the second level of the group structure) can contain only programs.

For example, a home budget group might contain several financial analysis programs. You could title such a group "Home Budgets" and add that title to the Main Group. Then when you select Home Budgets from the Main Group (by pressing **Enter**, or double-clicking with the mouse), you see a subgroup titled "Home Budgets."

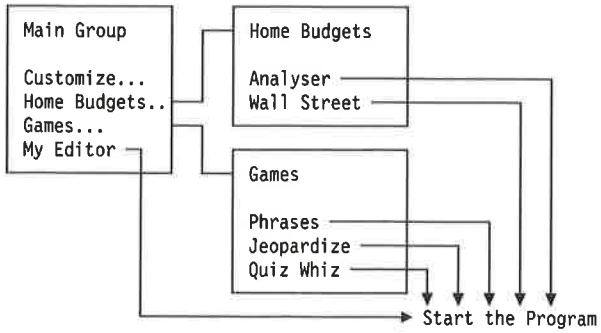
Using a One-Drive System

If you have a one-drive system, you have to insert the correct diskette when you select a program or group of programs in the Shell.

If the program or group of programs are on a different diskette, insert that diskette *before* you select the program. Otherwise, the message "Bad command or File Name" will appear and you will have to repeat the process.

The following figure is an example of a group structure. When **Home Budgets...** is selected from the Main Group, you can start any of the programs listed in that group.

A program can be started by pressing **Enter** or (double-clicking with the mouse) either in the Main Group or in a subgroup.

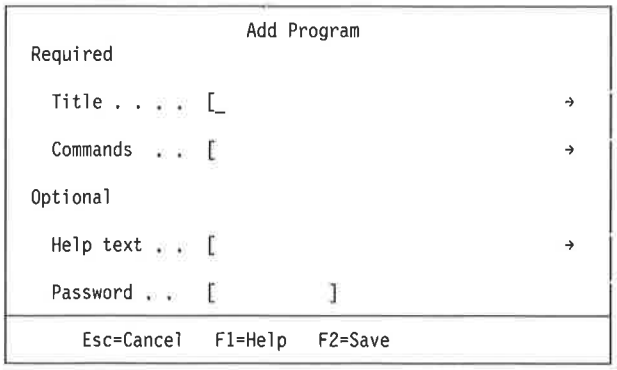


Adding Programs to the Main Group

You can add the titles of programs you have on your fixed disk or diskette to the Main Group or to a subgroup of the Shell and start them from there.

Follow these steps to add a program to the Main Group:

1. Select **Add...** from the **Program** pull-down. The following pop-up appears:



   The first two entry fields in this pop-up are required entries; the next two, for help text and a password, are optional. The cursor is at the **Title...** entry field.

2. Type the title you want to appear in the group to identify this program. A program title can have a maximum of 40 characters, including blank spaces.

   For example, if you have a program installed on your system called My Editor that you want to be able to start from the Main Group, you can type "My Editor" for a title.

3. Move to the **Commands...** entry field.

4. Type the *program startup command* (PSC) for this program.

   The documentation that comes with an application program tells you the command to use to start the program. This command is called the *program startup command* (PSC) and it must include the change directory or path commands, if needed.

   For example, the documentation for a program called *My Editor* might tell you to type ME to start the program. ME is then the PSC for this program.

   Some programs have other PSC's to further define the way your program works. When entering more than one command on the Commands line, press the **F4** key to mark the end of each command. For information on additional program startup commands offered in the Shell, and for detailed instructions on entering PSC's, refer to "Program Startup Commands" starting on page 111.

5. Add help text or a password, if needed.

   - If you want to create your own Help pop-up from this program, move the cursor to the **Help text** entry field. Enter any help that you want to have available when pressing **F1** for help on this program. You can enter up to 478 characters in this field.
   - If you want to add a password, move the cursor to the **Password** entry field and enter a password.

     A password can be up to eight characters long. You might enter a password if you want only certain people to access this program, or if you want to be the only one who can access the program. **Entering a password is optional.**

     If you associate a password with a program, you cannot access that program without first entering the password. **Make a note of your password in a safe place for later reference.** Each time an attempt is made to access this program, a prompt appears and asks for the password. Access is denied until you enter the password.

6. Press **F2** to save your entries.

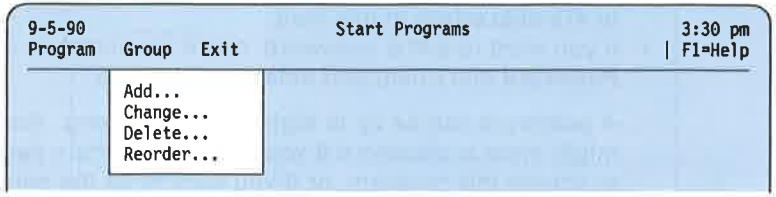
The program title you entered now appears in your group contents area and you can select it to start the program.

Adding Groups to the Main Group

You can organize your programs so that related programs are collected together in a subgroup.

To do this, add a group to the Main Group. Then you can add programs to the new subgroup, or you can copy programs to the new subgroup from the Main Group or other subgroups. (Refer to "Copying Programs from One Group to Another Group" on page 108.)

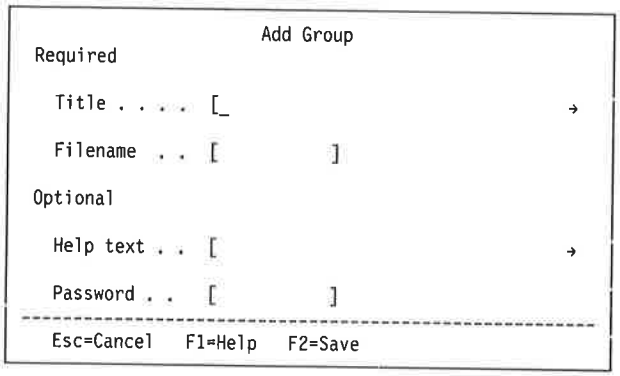
When you select **Group** from the Start Programs action bar, the following screen appears:



- **Add...** allows you to add a group of programs to the list on the Main Group.
- **Change...** lets you modify the entries that were made when the selected group was added. This includes the title, the file name, any help text that was added, and the password.
- **Delete...** lets you erase a subgroup.
- **Reorder...** lets you place an item in a different location in the Main Group list.

Before you can change, delete, or reorder an item in the Main Group, that item must first be selected.

When you select **Add...** from the pull-down, the following pop-up is displayed:



The first two entry fields are required entries; the next two, for help text and a password, are optional.

To add a group of programs:

1. At the cursor, type the *group title* you want to appear in the Main Group contents area. A group title can have a maximum of 37 characters, including blank spaces. For example, if you want this group to contain all your home budgeting programs, you might enter "Home Budgets."
2. Type the *file name* where the group information will be kept. The file name can be any name you like and can have up to eight characters. (Press **F1** to see a list of the characters that cannot be used in this entry field and to get additional information on creating file names.
3. If you do not want to add help text or a password, press **F2** to save your entries.

   The group title you entered now appears in your Main Group. You can select this group and add the programs you want in it.

   Note: The Shell adds an ellipsis (...) after group titles to help distinguish between groups and programs.

   If you want to add help text, move the cursor to the **Help text** entry field. Enter here any help that you want to have available when pressing **F1** for help on this group. You can enter up to 478 characters in this field.

   If you want to add a password, move the cursor to the **Password** entry field.

4. Enter a password.

   A password can be up to eight characters long. You might enter a password if you want only certain people to access this group, or if you want to be the only one who can access this group.

Entering a password is optional. If you associate a password with a group item, you cannot access that item without first entering the password. **If you choose to use a password with a group item, make a note of it in a safe place for later reference.** Each time an attempt is made to access this group, a prompt appears and asks for the password. Access is denied until you enter the password.

If you want to copy programs from the Main Group to the group you just added, use the method described in "Copying Programs from One Group to Another Group" below.

Adding Programs to a Subgroup

To add a program to a subgroup, you must be in that subgroup.

In the content area of the Main Group, choose the subgroup to which you want to add a program. The subgroup you selected is displayed. (If there are no programs in a subgroup, a message appears saying "Group is empty.")

Follow the steps listed in "Adding Programs to the Main Group," which start on page 104.

Copying Programs from One Group to Another Group

If there are programs in one group that you want to have in another, you can copy them to the other group. Then you can delete them from the first group, or leave them in both groups, if you wish.

1. Select the program you want to copy to another group.
2. Select **Program** at the action bar.
3. In the Program pull-down, select **Copy...**.

   The selection cursor is at the program that you previously selected.
4. If you are in a subgroup, press **Esc** to reach the Main Group.

5. Select the subgroup to which you want to copy the program.

   The subgroup you chose is displayed on the screen.
6. Press the **F2** key to complete the copy. (You can press the **F3** key to cancel the copy.)
7. Press **Esc** to return to the Main Group. The selection cursor is at the title of the subgroup you just left.

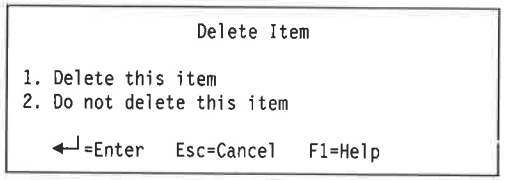
The program is now listed in both groups: the group to which it was copied, and in the group from which it was copied. If you want to delete this program from the source group, follow the next procedure.

Deleting a Program from a Group

To delete a program from a group, follow these steps.

1. Move the selection cursor to the program title that you want to delete.
2. Select **Program** at the action bar.
3. Select **Delete...**.

   The following pop-up is displayed:



   If you do not want to delete the program, select item **2**.
4. To delete the program, press **Enter**.

Adding Predefined Subgroups to the Main Group

The Shell makes it possible for you to install subgroups that are supplied by someone else. These subgroups are contained in a *FILENAME.MEU* file.

As an example, if someone gave you a series of programs and a file called PROGTOOL.MEU that lists them, you could add this group of programs by the following procedure:

1. Copy the *PROGTOOL.MEU* file to the directory containing the DOS Shell. (This is usually the DOS directory on the fixed disk or the IBM DOS diskette.)
2. Select **Group** from the Start Programs action bar.
3. Select **Add...** from the Group pull-down.
4. At the **Title** entry field, type the title that you want to appear in the Main Group.
5. Move to the **Filename** entry field.
6. Type the name of the supplied file (PROGTOOL), leaving off the .MEU.

   If you want to add help information or a password, follow the directions listed on page 106 under "Adding Groups to the Main Group."
7. Press **F2** to save the information.

The title you entered appears on the Main Group. When you select it from there, the subgroup is displayed with the list of selectable programs.

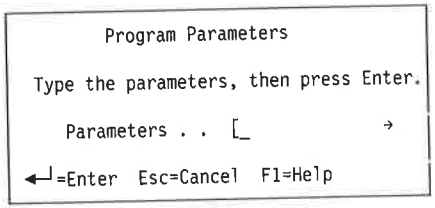
Program Startup Commands

When you add a program to one of your Shell groups, you are asked for program startup commands (PSCs). The simplest PSC consists of what you type to start the program. These are identified in the documentation that came with the program. When adding a program to the Shell, enter this command in the **Commands** entry field. If you need to enter more than one PSC for a program, press **F4** at the end of each command.

Optional Program Startup Commands

On page 104, PSCs are discussed and the Add Program pop-up is illustrated. There are other, optional PSCs that you can use in the **Commands** entry field to further define the way your program works. For example, by adding special commands on the **Commands** line of the Add Program pop-up, you can request one or more prompts for information each time the program is started.

Each prompt pop-up consists of a title, an instruction line, and an entry field, and is displayed when you start the program. The default prompt looks like this:



By using program startup commands offered in the Shell, the title, instruction line, and entry field prompt lines can have information that is specific to your needs. (The information entered in response to the prompt is passed as a *parameter* to the program you are starting.) In addition, you can tailor the activities of the program in other ways.

Following is a list of PSC options that the Shell offers. The options shown in brackets control the information in the prompt pop-up. These must be entered between the brackets. Options shown between brackets can be combined inside one set of brackets. The options shown without brackets must be entered outside the brackets.

[ ] To perform the default prompt each time the program is started.

[/T".."] To define a title for the prompt pop-up. The maximum length for the title is 40 characters.

[/I".."] To define an instruction for the prompt pop-up. The maximum length for the instruction is 40 characters.

[/P".."] To define a prompt for the entry field in the prompt pop-up. The maximum length for the prompt is 20 characters.

[%n] To save what you have entered (the value) in the **Parameters...** area (entry field) for future use. The "n" can be any number from 1 through 10. When used, **%n** must be the first character or characters inside the brackets.

%n To save the value entered for use in a following PSC. For example, if the value (%n) was a filename saved in a previous command in the PSC, **print %1** would cause the file to be printed each time this selection is made. When used, this option must be entered outside the brackets.

[/D".."] To have a default value appear in the entry field each time a program's prompt is displayed. You can change this default value at run time by typing over it and clearing any remaining characters. This entry can be up to 40 characters long.

[/D"%n"] To have a default value appear in the entry field each time a program's prompt is displayed. This default is a previously entered value saved with the **[%n]** option. You can change this default value at run time by typing over it and clearing any remaining characters. This entry can be up to 40 characters long.

[/R] To clear the default value in the entry field when the first key pressed is any key other than an edit key.

[/L"n"] To set the maximum length of the entry field to fewer than 127 characters. The maximum length is 127 characters. If the length is not specified or is invalid, the maximum length is used.

[/M"e"] To allow the use of only existing file names. The existence of the value entered will be verified before the PSC is executed.

[/C"%n"] To save the **%n** value entered in the preceding task as the value for this parameter for the current task; otherwise, **%n** has no value.

[/F".."] To check for the existence of the file specified. This entry can be up to 76 characters long and can be used more than once. For example, /F"d:*path**filename*." This check takes place after the **Enter** key has been pressed on the prompt pop-up, and is used to ensure that the proper diskette is in the drive before the Shell is suspended to execute the program startup commands. If the file exists, the PSC continues. If the file does not exist, a beep sounds and the pop-up is displayed again. This parameter has no effect on the format of the prompt and is not included in the program startup commands which are executed.

/# To substitute the drive letter and a colon into the PSC. (This designates the drive from which the Shell was started.) These characters must be entered outside the brackets.

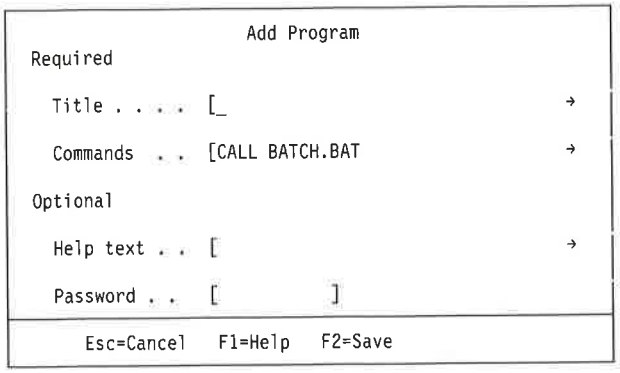
/@ To substitute the path from the ROOT from which the Shell was started, including the current directory, into the PSC. The path is not preceded by a back slash. These characters must be entered outside the brackets.

Note: Any batch file command, with the exception of GOTO statements, can be used as a program startup command. (When using the FOR command, the "n" in %n must be alphabetic.) Any characters in the PSC, other than the optional commands, are passed to the DOS batch file processor exactly as written. A direct substitution is made by the Shell for any PSC option used outside of the brackets. The information entered in response to the prompt is substituted for each set of brackets and its enclosed options.

Press **F4** at the end of each command when entering more than one program startup command in the **Commands** entry field.

Batch Files

To start a batch file using a PSC, the batch file name must be preceded by CALL. If the batch file name is not preceded by CALL, the program will not return properly on completion. For example, to start a batch file named BATCH.BAT, you would enter the following PSC at the **Commands** entry field on the Add Program pop-up:



If you want to use some of the options offered for program startup commands, you must include the contents of the batch file in the PSC. Use the bracketed options to prompt for any required parameters.

ECHO and PAUSE Commands

It is useful to insert a PAUSE command at the end of each PSC list so that, before returning to the Shell from your program, you can view any DOS messages that may appear.

If you add an ECHO command with a message statement to your PSC list, that message appears on your screen. The ECHO message can be whatever remark is correct for the program you are starting.

In the following example, the ECHO command and the remark "Insert diskette with ME in drive A" is used:

```
Commands. . [ECHO Insert diskette with ME in drive A||PAUSE||ME
```

(Note that, in this example, the PSC list is shown as one long line. On the screen, this is a **scrollable field**, and the commands are entered in a continuous string.) After the || symbol (that separates commands when you press **F4**), the PAUSE command

is entered. By entering this command, the following is displayed when the My Editor program is selected:

```
insert diskette with ME in drive A
Press any key to continue . . .
```

At the ECHO command, you are prompted to insert the correct diskette. At the PAUSE command, the system displays the message "Press any key to continue...."

Using Additional Program Startup Commands

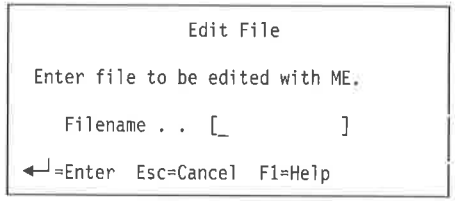
If you add a program (for example *My Editor*) to one of your groups, you can enter the following in the **Command** entry field:

```
ME [/T"Edit File"/I"Enter file to be
edited by ME."/P"Filename . . "/L"12"]||
```

Following is a definition of the program startup commands in this example:

ME	Is the PSC for the program.
/T"Edit File"	Defines the title you have chosen for the prompt.
/I"Enter file to be edited by ME."	Is the instruction line.
/P"Filename . . "	Defines the prompt for the value field.
/L"12"	Says that 12 characters is the maximum number of characters that can be entered in the value field.
||	Is the symbol that appears when you separate commands by pressing the **F4** key.

After entering these program startup commands for the My Editor program, when you select **My Editor** from the group, you see the following prompt:



1. Type the name of the file you want to edit in the entry field. This can be the file name of an existing file or a file you want to create.

   For example, if you enter MYFILE.DOC at the prompt, the ME editor is started using that file name as a parameter.

2. Press **Enter**.

Any DOS command, except a GOTO command, can be entered as a PSC. For example, to add a PRINT command to the command list shown previously, the commands are entered as follows:

```
ME [%1/T"Edit File"/I"Enter file to be edited by ME."
/P"Filename . . "/L"12"]||PRINT %1
```

The **%1** causes the parameter entered in response to the prompt pop-up to be passed to the PRINT program also. The PSC list entered in this way still gives you the prompt when the program is selected, and it sends the document to print before returning to the Shell.

DOS Shell Startup Options

The DOS Shell is started on your system in graphics mode and certain other options are turned on. The figure below shows the startup options that are in effect on your system.

Startup Option	Meaning
/MOS:PCIBMDRV.MOS	Identifies the mouse driver.
/MENU	Activates Start Programs in the Shell
/DOS	Activates File System in the Shell
/PROMPT	Allows access to the command prompt.
/EXIT	Activates the **exit Shell** option.
/MAINT	Activates the ability to do maintenance in Start Programs.
/COLOR	Activates the **Change Colors** option.
/TRAN	Allows operation of the DOS Shell in transient mode (except the base driver).
/MEU:SHELL.MEU	Identifies the filename of the Main Group structure for Start Programs.
/CLR:SHELL.CLR	Identifies the filename of the color setup to use. SHELL.CLR is the default.
/MUL	Provides multiple File System directory and file buffers.
/SND	Activates sound while running the shell
/SWAP	Activates saving (swapping) File System directory and file information to a disk file while performing tasks at the Shell command prompt or activating a program. (If the computer is turned off without exiting the Shell, or if there is a power failure, a temporary file is left on the disk. These files need to be deleted on occasion so as not to clutter up the fixed disk.) The /SWAP option increases Shell performance and is most effective on a fixed disk.
/DATE	Displays the date and time.

If you want to start the Shell in text mode, or change some other options, the following information will be useful to you.

Text or Graphics Mode

The Shell can be displayed in either text or graphics mode. If no mode is selected, the highest available video mode is used.

If you want to display the Shell in text mode, add the /TEXT command to the @SHELLC command in the DOSSHELL.BAT.

Note: Some programs can be accessed successfully from the Shell only when the Shell is operating in text mode.

If you want to operate the Shell in graphics mode and still use programs that are Terminate and Stay Resident (TSR), you can switch to the command prompt from the Shell by pressing **Shift** + **F9**. At the command prompt, which operates in text mode, you can switch to the TSR program.

Additional Startup Commands

There are additional options that can be added to the DOSSHELL.BAT to change the way the Shell operates.

Startup Option	Meaning
/LF	Sets the mouse for left-hand use.
/TEXT	Displays the Shell in text mode.
/CO1	Displays the Shell in 16-color, high-resolution 520 x 350 graphics (mode 10).
/CO2	Displays the Shell in two-color, high-resolution 640 x 480 graphics (mode 11).
/CO3	Displays the Shell in 16-color, high-resolution 520 x 480 graphics (mode 12).
/MOS:PCMSDRV.MOS	Activates the Microsoft serial mouse driver, part number 037-099.
/MOS:PCSPDRV.MOS	Activates the Microsoft parallel mouse driver, part number 037-099.
/B:*n*KB	Specifies the amount of memory to be used for the File System buffer. For example, an entry of /B:3KB specifies a 3 KB buffer. With this option, you can restrict the Shell's use of memory. This is particularly significant when operating the Shell in resident mode.
/COM2	Allows serial mouse to be used on a second serial port, if one is installed. (Installation default is COM1.)

Mouse Driver Alternatives

The Shell comes with three mouse drivers, as shown in the figures above. A different mouse driver can be used with the Shell if its interface specification matches those of one of the three mice supported. If you use a mouse outside the Shell, a device driver must be provided for that mouse and identified with a DEVICE= statement in the CONFIG.SYS file.

The Shell also supports any mouse if its interface specifications match the Microsoft® specifications. (To use this method requires 5–12 KB, whereas the three drivers described in the table require 1 KB.)

If you install such a mouse, remove all /MOS statements from the DOSSHELL.BAT file, then restart the system.

Some TSR programs do not recognize mouse support. If you use a mouse with the Shell and access a TSR program, you may see a shadow of the mouse pointer in the TSR program. This does not affect the way your TSR program works and may be ignored.

Changing Startup Options

Using Works, edit the DOSSHELL.BAT file (either on the root directory of the fixed disk or on the IBM DOS diskette).

The entries on the line beginning with "SHELLC" are the installed startup options. You can add to this list or delete any of them. For example, if you want to set up your system for use with a left-hand mouse, you can add /LF to the list of options. You can add /LF anywhere in the string. The entire string of options must be on one line in the DOSSHELL.BAT file.

After you complete any changes or additions that you want to make, save the file as a TEXT file and restart the system.

Note: If conflicting options are specified, an invalid option is entered, or an option is misspelled, an error message is displayed.

Appendix B. Modem Instructions

The built-in modem in your PS/1™ communicates at speeds of 300, 1200 and 2400 bits per second (bps) in full duplex. The use of leased lines is not supported.

FCC and Telephone Company Requirements

1. This equipment complies with Part 68 of the FCC rules. A label is affixed to the cover of the built-in modem that contains, among other things, the FCC registration number, USOC, and Ringer Equivalency Number (REN) for this equipment. If these numbers are requested, remove the front bezel, slide the top cover forward to see the label, and provide this information to your telephone company.
2. The REN is useful to determine the quantity of devices you may connect to your telephone line and still have those devices ring when your number is called. In most, but not all areas, the sum of the RENs of all devices should not exceed five (5.0). To be certain of the number of devices you may connect to your line, as determined by the REN, you should call your local telephone company to determine the maximum REN for your calling area.
3. If the built-in modem causes harm to the telephone network, the telephone company may discontinue your service temporarily. If possible, they will notify you in advance; if advance notice isn't practical, you will be notified as soon as possible. You will be advised of your right to file a complaint with the FCC.
4. Your telephone company may make changes in its facilities, equipment, operations, or procedures that could affect the proper operation of your equipment. If they do, you will be given advance notice so as to give you an opportunity to maintain uninterrupted service.
5. If you experience trouble with this built-in modem, contact your Authorized Seller, or the IBM Corporation, Old Orchard Road, Armonk, NY 10502, 1-800-765-4747, for repair/warranty information. The telephone company may ask you to disconnect this equipment from the network until the problem has been corrected, or until you are sure the equipment is not malfunctioning.

6. No customer repairs are possible to the modem. If you experience trouble with this equipment, contact your Authorized Seller or see the Troubleshooting section of this book for information.
7. This equipment may not be used on coin service provided by the telephone company. Connection to party lines is subject to state tariffs. Contact your state public utility commission or corporation commission for information.
8. When ordering network interface (NI) service from the Local Exchange Carrier, specify service arrangement USOC RJ11C.

Warning: Excessive voltages can appear on telephone lines, especially during lightning storms. You may want to unplug the computer and the telephone lines to avoid any possible damage to sensitive electronic parts during such storms.

Communications Settings

When you are communicating from Works to a remote computer, you may need to know which communications settings are supported by the modem.

The modem supports up to eight data and parity bits, which is common in most modems.

In Works, the default speed is 1200 bps. In the PRODIGY® service and the Users' Club, the default speed is 2400 bps.

It is advisable to disable "call waiting" when you are using your telephone for communications. Be sure to check with your local telephone company to determine if you can disable call waiting and what sequence to use.

As an example, in some areas the following dialing sequence will disable call waiting for this call only:

```
70(# or *),,,(complete telephone number)
```

The commas (,,,) tell the modem to pause while the command is being executed, then the phone number is dialed.

Note: Auto answer should not be left on when the modem is not being used for communications. If auto answer is left on, dialing will be interrupted by the modem tone.

While you are using the telephone line for communications, do not pick up any telephone receiver on that line. The communications will be interrupted if you do.

Frequently Used Modem Commands

The built-in modem is compatible with the Hayes AT command set. The following commands are the most frequently used. A complete listing of commands is in the *Technical Reference for IBM Personal System/1™ Computer*.

CODE/ COMMAND	FUNCTION
AT	Begins the command line. The modem is ready to accept a command.
A/	Repeats the last command given, if it is not preceded by AT or followed by a carrier return.
A	Answers the call immediately.
Ds	The modem automatically dials a telephone number **"s"** where "s" is a complete phone number. The command can also include the following codes: s=P Pulse dialing s=R Dial an "originate-only" modem s=T Touch-tone dialing s=, Pause while dialing s=@ Wait for at least 30 seconds for a valid ringback followed by 5 seconds silence before next symbol s=; Return to command state after dialing s=! Go off-hook 0.5 seconds s=W Wait for dial tone
En	Sets Echo on/off n=0 Echo off n=1 Echo on (default)
Hn	On/Off Hook n=0 On hook (default) n=1 Off hook
Ln	Sets the speaker volume n=0 Low Volume n=1 Low Volume n=2 Medium volume (default) n=3 High Volume

CODE/ COMMAND	FUNCTION
Mn	Controls when the speaker is in use n=0 Speaker Off n=1 Speaker is On except when receiving (default) n=2 Speaker always On n=3 Speaker Off when dialing or receiving
On	On Line n=0 Go on line n=1 Retrain at 2400 bps
Qn	Sends result codes n=0 Result codes sent (default) n=1 Result codes not sent
Vn	Sets the way that the Result code is sent n=0 Result code is sent as numbers n=1 Result code is sent as words (default)
Xn	Sets the type of Result code sent n=0 Basic Result code set(0 to 4) n=1 Extended result code set (0 to 5, and 10) n=2 Extended result code set (0 to 6, and 10) n=3 Extended result code set (0 to 7, and 10) n=4 The whole Result code is sent (0 to 10) (default)
Z	Resets the modem to the defaults
+ + +	Escape sequence Return to command state

Return Codes

Digit Code	Word Code	Meaning
0	OK	Command was executed without error
1	Connect	Connected at 300 bps
2	Ring	Ringing signal detected
3	No carrier	Carrier is lost or not heard
4	Error	Error in the command line Invalid command Command line exceeds buffer Invalid character format
5	Connect 1200	Connected at 1200 bps
6	No dial tone	No dial tone during the time out period
7	Busy	The line being called is busy
8	No answer	The line being called did not answer within the time out period
10	Connect 2400	Connected at 2400 bps
	WORD FORM	Preceded and terminated by CR LF

For a complete listing of the Return Codes, Modem Registers, and Bit Maps used by this modem, see the *Technical Reference for IBM Personal System/1™ Computer*.

Appendix C. Using Additional Memory

Some models of PS/1™ have 512 KB of memory. On these models, you can expand the memory to 1.0 MB by the addition of the 512 KB memory option. You can also add a memory expansion card to the Adapter Card Unit.

DOS can address memory up to 640 KB. When you add the 512 KB memory card, 128 KB is added to the original 512 KB, giving you a total of 640 KB of base memory. The memory addresses between 640 KB and 1.0 MB are reserved for system uses, such as video display buffers and BIOS. The extra 384 KB in the memory option is assigned addresses above 1.0 MB and is called *extended* memory. The maximum addressable memory is 16 MB.

Using Extended Memory

Extended memory can be used by some programs for temporary storage. One such program is VDISK, which stands for Virtual Disk. The VDISK program is on the IBM DOS diskette or the fixed disk.

Programs run faster from a VDISK than from the fixed disk.

Creating a VDISK

When you have a VDISK, it appears on the IBM DOS and Your Software screens as one of the drives in your system. You can copy programs to this disk, and run them from there.

Note: Do not use this drive to store any data files you create. Store your data files on diskette or on the fixed disk. The contents of a virtual disk are erased when the power fails or when the system is turned off!

There is a total of 384 KB of Extended Memory on the 512 KB Memory Card. If you use all of this extended memory for a VDISK, none will be available for other uses. In the following example, insert the size of the VDISK you want to create.

1. Change the configuration of your system so it reads the CONFIG.SYS from drive A or C when the system starts. See "Customizing How Your System Starts" on page 80 for information.
2. Create or modify the CONFIG.SYS file on your fixed disk or startup diskette to contain the following statement:

   ```
   DEVICE=C:\DOS\VDISK.SYS 384 /E
   ```

   Omit the C:\DOS directory information if you are starting from diskette drive A.

   The 384 KB in the example can be changed to the size you need. The **/E** in the command tells the system to use extended memory for the VDISK program. For more information on creating a VDISK, see *Using IBM DOS 4.00*. For more information, see "Related Publications" on page 90.
3. Make sure the VDISK.SYS program is on the root directory of drive C or your startup diskette. If you have a diskette-only system, the VDISK program is on the IBM DOS diskette.
4. Start the system (or press **Ctrl**+**Alt**+**Delete**). The VDISK is created when the system starts.

Expanded Memory

Some programs use Expanded Memory, not Extended Memory, when space beyond 640KB is needed. Expanded Memory is not supported directly by the PS/1™. However, it is possible to purchase EMS hardware adaptors to be installed in the Adaptor Card Unit. There is also commercially available software that allows Extended Memory to to be treated as Expanded Memory.

Index

D

E

F

G

H

I

K

L

M

N

O

P

R

S

T

U

V

W

Y