IBM 3270 Workstation Program

User's Guide and Reference

Communications Family

IBM

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Communications Family

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This manual explains how to set up and use the IBM 3270 Workstation Program.

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Preface

Welcome to the *3270 Workstation Program User's Guide and Reference*. This book will help you:

- Customize your IBM 3270 Workstation Program (also referred to as the *workstation program*)
- Start "HELPER," the online tutorial
- Learn and use the workstation program functions.

How This Manual is Organized

Here is a quick "road map" to this book:

- **Part 1. Setting Up the IBM 3270 Workstation Program**

  The first part of this book describes the customization tasks you must perform to make the workstation program usable for your work station. This part is divided into the following four chapters:

  - **Chapter 1. Introduction to Customization**

    This chapter explains why you need to customize and outlines the steps you follow to perform this task.

  - **Chapter 2. Planning for Customization**

    This chapter tells you how to determine your hardware, choose the customization options you want, and fill out the customization worksheet.

  - **Chapter 3. Preparing for Customization**

    This chapter tells you how to load DOS and format your diskettes and fixed disk.

- **Chapter 4. Performing Customization**

  This chapter takes you through the three methods for customizing your workstation program:

  1. Default customization
  2. User-selected options customization
  3. Recustomization of a previously customized workstation program.

- **Part 2. Optional Setup Tasks**

  The second part of this book describes some tasks that you might want to perform to further refine your workstation program.

  - **Chapter 5. Setting Up Screen Profiles**

    This chapter explains how to adapt the windowing function to the work you do by creating screen profiles. You will also learn how to size, move, and color your windows.

  - **Chapter 6. Setting Up Your PC Applications to Run More Efficiently**

    This chapter explains how to add the INDRSTR command to the AUTOEXEC.BAT file so that notepad, autokey, and screen profile information will be restored automatically when you load your workstation program. You will also learn how to create a program information file (PIF) to improve the performance of PC applications, and a system information file (SIF) to describe requirements for system extensions you may want to add to enhance your work station's performance.

  - **Chapter 7. Redefining the Keys on Your Keyboard**

    This chapter shows you how to use the keyboard definition utility, should you want to redefine your keyboard layout for specialized use.

- **Part 3. Using the IBM 3270 Workstation Program**

  The third part of this book explains how to use the workstation program on your PC work station.

  - **Chapter 8. Loading the Workstation Program and Using HELPER**

    In this chapter you will learn how to load your customized workstation program, what to expect when the program is loaded, and how to start HELPER, the online tutorial.

  - **Chapter 9. Using Your Keyboard and Templates**

    This chapter explains how the keys work and the differences among the types of keyboards that can be used with the workstation program.

  - **Chapter 10. Using Your Sessions**

    This chapter explains how to work with host, notepad, and PC sessions. Managing multiple PC sessions with Multi-DOS is also explored.

  - **Chapter 11. Using Save/Restore**

    This chapter covers saving and restoring notepads, autokey recordings, and screen profiles. You will also learn how to create your own files for saving and restoring data.

  - **Chapter 12. Printing What's on Your Screen**

    You will learn how to print with your PC work station printer and the 3270 control unit printer. Some printer limitations are also discussed.

- **Chapter 13. Sending Files Between a Personal Computer and a Host**

  This chapter describes how to send and receive files between a PC work station and either a VM/CMS or an OS/TSO host. It discusses command structure and presents many examples. It also explains how to use Personal Services /370 to transfer files between a PC work station and host applications running under DISOSS.

- **Chapter 14. IBM/370 to IBM Personal Computer Enhanced Connectivity Facilities**

  This chapter introduces you to the Enhanced Connectivity Facilities and explains the steps involved in using this set of programs.

- **Chapter 15. Autokeying: Recording, Playing, and Erasing Automatic Keystrokes**

  In this chapter you will learn how to record, play, list, save, and erase autokey recordings.

- **Chapter 16. Copying Text from Window to Window**

  This chapter explains how to copy a block of text from one window to another.

- **Appendixes**

  The appendixes are as follows:

  - **Appendix A. Preparing the Controllers for Customization**

    This appendix contains information to assist the controller customization planner and the service coordinator with customizing the control unit for use with work stations operating with the IBM 3270 Workstation Program. References to specific control unit publications are provided.

- **Appendix B. Host Requirements for File Transfer**

  This appendix provides host system personnel with information about host file transfer requirements.

- **Appendix C. Storage Estimates for Customization**

  This appendix lists estimated storage requirements for the workstation program options to assist you in planning for customization.

- **Appendix D. Representations of Symbols in the Retrieve Table and Keyboard Definition Utility Panels**

  The appendix explains the meaning of the symbols on the keyboard definition utility panels.

- **Appendix E. Keyboard Layout Worksheets**

  The worksheets presented here are designed to assist you in redefining your keyboard.

- **Appendix F. Programmed Symbols**

  This appendix discusses the host programmed symbol sets on the 3270 PC.

- **Appendix G. Installing XMA and VDISK Device Drivers**

  This appendix explains how to install and use XMA and VDISK device drivers with the IBM 3270 Workstation Program. XMA and VDISK messages are also included.

- **Appendix H. IBM 3270 Workstation Program Keyboard Summary**

  The keyboard task tables explain how to perform over 150 different tasks and functions with the three keyboard types usable with the IBM 3270 Workstation Program.

- **Glossary**

The glossary defines terms that may be unique for this product.

Related Publications

The following books are related to the IBM 3270 Workstation Program and its prerequisite hardware and software:

- *Guide to Operations*

  The *Guide to Operations* shipped with your system unit contains information about your work station hardware. It tells you how to set up, use, and diagnose problems with the hardware.

- *3270 Personal Computer Hardware Introduction and Preinstallation Planning*

  This book contains information to help evaluate and plan for the 3270 PC hardware requirements at your site. For example, it lists the physical dimensions and electrical requirements for all 3270 PC hardware models.

- The following items are shipped with this book and the workstation program diskettes:

  - *IBM 3270 Workstation Program Problem Determination Guide and Reference*

    This book explains the procedures, messages, and return codes that will help you solve software problems.

  - IBM 3270 Workstation Program Keyboard Quick Reference Cards

    These cards are keyboard-specific synopses of information from the *User's Guide and Reference*. You can use the one that relates to your keyboard for quick reference. There are three cards in the workstation program package:

    - 3270 PC keyboard summary
    - Enhanced PC keyboard summary
    - AT and XT keyboard summary

  - IBM 3270 Workstation Program Keyboard Templates

    The keyboard templates provided in the package assist you in using the workstation program functions on your particular keyboard. There are three templates in the package:

    - Enhanced PC keyboard template
    - AT keyboard template
    - XT keyboard template

  - Customization worksheet

    This foldout card helps you to plan for your options before customizing the workstation program.

- *IBM 3270 Workstation Program Programming Guide*

  This book explains how to write application programs in Assembler language that use the functions provided with the IBM 3270 Workstation Program.

- *3270 PC High Level Language Application Programming Interface* (HLLAPI)

  The diskette and book that comes in this package make it possible for you to write application programs in high-level languages such as Basic, Pascal, or Cobol to use the functions provided with the IBM 3270 Workstation Program.

- *The IBM Programmer's Guide to the Server-Requester Programming Interface for the IBM Personal Computer and the IBM 3270 PC*

  This book explains how to write PC applications that request services from an application at an IBM System/370 type host system. In this relationship, the PC application is called the requester, and the host application is called the server. This book also contains the return codes that are generated at the work station if problems occur in transmitting requests or replies.

Note: Contact your local IBM Sales Representative for information on how to obtain copies of these books.

The Workstation Program Diskettes

The workstation program is shipped with this book on two types of diskettes: 5-1/4 inch and 3-1/2 inch. This is so that you can use either type of diskette drive. There are five 5-1/4 inch diskettes and four 3-1/2 inch diskettes. They include the following:

- The workstation program and file transfer utilities.

  These are contained on three 5-1/4 inch diskettes and on two 3-1/2 inch diskettes.

  You use these diskettes when you customize your workstation program, as explained in this book.

- The online tutorial, *Helper*.

  This is contained on one 5-1/4 inch diskette and on one 3-1/2 inch diskette.

  You can use this diskette to learn about the workstation program. This book tells you how to start the tutorial program.

- The Keyboard Definition Utilities and the Enhanced Connectivity Facilities.

  These are contained on one 5-1/4 inch diskette and one 3-1/2 inch diskette.

  You can use this diskette to do two things:

  - Redefine your keyboard layout as described in this book.
  - Make it easier for an application program at your work station to request services from an application program at your host system.

    To support this task, the diskette contains routines written in Pascal and C and macros written in Assembler language. These make it easier for an application program to use the IBM System/370 to IBM Personal Computer Enhanced Connectivity Facilities.

    The task of writing an application program to take advantage of these macros and routines is described elsewhere, in *The IBM Programmer's Guide to the Server-Requester Programming Interface for the IBM Personal Computer and the IBM 3270 PC* listed previously under "Related Publications."

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Chapter 1. Introduction to Customization

The IBM 3270 Workstation Program allows you to use the same keyboard and screen to work with up to:

- Six PC sessions,
- Four 3270 host sessions, and
- Two notepad sessions.

The workstation program can be used with the Personal Computer XT and Personal Computer AT, as well as the 3270 PC.

Before you can use the workstation program, you have to define your work station hardware and the functions you want the workstation program to perform. This task is called **customization**, and it is illustrated in Figure 1-1.

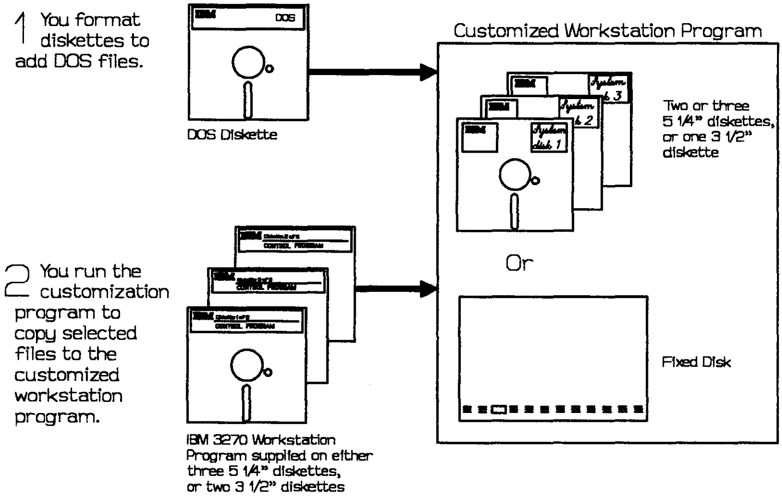

1 You format diskettes to add DOS files.
DOS
DOS Diskette
Customized Workstation Program
System disk 3
System disk 2
System disk 1
Two or three 5 1/4" diskettes, or one 3 1/2" diskette
Or
Fixed Disk
2 You run the customization program to copy selected files to the customized workstation program.
IBM 3270 Workstation Program supplied on either three 5 1/4" diskettes, or two 3 1/2" diskettes

Figure 1-1. Customizing Your Workstation Program

During customization, DOS files for managing your storage drives are combined with workstation program files to create a customized copy of the workstation program for use on your work station. When you customize your workstation program, you specify information about your work station hardware configuration and software requirements. The customization program uses the information you supply to copy the necessary files to produce a workstation program that is customized for your work station. The resulting customized workstation program may be stored on a fixed disk or on 3 1/2 inch or 5 1/4 inch diskettes, depending on your hardware configuration.

Note: The workstation program diskettes in the diskette holder contain all the program modules you might need, but cannot be used as is. They must be customized to include DOS files and some specific hardware information before you can run the workstation program.

Why You Need a Customized Workstation Program

The workstation program diskettes in the diskette holder contain programs and utilities that enable your work station to operate in a variety of hardware configurations and to perform a range of useful tasks. The customization program allows you—or whoever performs customization at your location— to select and copy the program files that support your configuration and the functions you want to perform.

Here's how it works:

1. You define your work station configuration and requirements on a short series of customization panels displayed on your screen—or you use the default customization program with pre-selected options to do this.
2. When you have completed your selections, you tell the customization program to create a copy of the customized workstation program.

3. The customization program copies all the correct program files to create a customized workstation program that you can use on your work station hardware.

The next sections briefly explain the types of information you must supply to define your work station configuration and requirements. This information includes:

- The control unit to which your work station is attached
- The PC hardware that makes up your work station
- The PC, host, and notepad sessions you want to use
- The special functions you want the workstation program to perform.

More information about the options in each of these categories is provided in Chapter 2, "Planning for Customization."

Defining Your Control Unit Options

Your work station communicates with a host computer through an IBM control unit. There are several types of control units, and each can have one of several different hardware configurations. The workstation program diskettes contain all the programs needed to handle any of these configurations. If you plan to have one or more host sessions, you must define the control unit configuration to the customization program, so that it can choose the program files your work station needs to communicate with the control unit.

Note: Your service coordinator—or your host system personnel—can use Appendix A of this book to prepare the controllers for customization. Contact your designated service coordinator before you begin planning for customization, to obtain information about the hardware configuration of your specific control unit.

Defining Your PC Hardware Options

The IBM 3270 Workstation Program also supports several PC hardware configurations. The workstation program diskettes contain programs that allow you to use this program with different system units and keyboard types. A workstation program customized for your work station specifies the PC hardware on which you want the workstation program to run.

Defining Your PC, Host, and Notepad Session Options

You can name and describe to the customization program up to six PC sessions, up to two notepad sessions, and up to four host sessions. You can also define enhancements you want to make to the system. You may want some sessions started automatically, for example, or you may want to install system extensions to make your work station more productive. The customization program is used to define these types of software requirements.

Defining Your Workstation Program Options

The workstation program offers many options and utilities to assist you in your work. You may want to copy text from window to window, record and play back a series of frequently used keystrokes (autokey recording), or use Multi-DOS to support multiple PC sessions, just to name a few. The workstation program must be customized so that the files which support the options you want to use are copied to your customized workstation program diskette.

How To Get a Customized Workstation Program

Now that you know why you need to have a customized workstation program, let's look at the two ways you can get one:

1. Your supervisor, or the person assigned to help you with your work station, may give you a copy of the customized workstation program that has already been set up for your work station.
2. You can customize your own workstation program.

If someone has given you a copy of the customized workstation program, it may be on a diskette called the **system diskette** or it can be on a fixed disk inside your system unit. If you are given a customized workstation program, you can skip to Part 3 of this book, "Using the Workstation Program," to learn how to load the workstation program and use your work station.

If you need to customize your own copy of the workstation program, continue with the next section of this chapter.

Steps in Customization

There are three main steps involved in the customization procedure. Each step may require the completion of several tasks. The number of tasks you will need to perform for each step depends on which customization procedure you select in Step 1. The steps and the tasks involved in each are outlined below.

- Step 1. Planning for customization
  - Determining your hardware
  - Selecting the correct customization procedure
  - Selecting customization options
  - Filling out the customization worksheets.
- Step 2. Preparing for customization
  - Loading the disk operating system (DOS) into memory
  - Formatting your diskettes or fixed disk drive.
- Step 3. Performing customization
  - Using the default customization program, or
  - Recustomizing, or
  - Selecting your own options for customization.

The next three chapters in Part 1 explain each of these steps and the tasks associated with them. If you follow the steps as they are presented here, you should be able to customize your workstation program successfully in a minimal amount of time.

Chapter 2. Planning for Customization

Since there are many customization options open to you, planning for customization is an important step. In this chapter you will learn how to:

- Determine your hardware
- Select the correct customization procedure
- Select customization options.
- Complete customization worksheets

Before You Begin

A customization worksheet has been provided to assist you with planning. The worksheet is a five-panel fold-out card that was wrapped with your keyboard quick reference cards in the workstation program package. Locate your worksheet and use it—or a copy of it—to keep track of your work station hardware configuration and workstation program options as you read the rest of this chapter.

The choices that appear in the box in item 1 of the worksheet concern your control unit. If you plan to have one or more host sessions, contact your designated service coordinator to obtain the requested control unit information before going on to the next section.

Determining Your Hardware

Determining what hardware your work station has consists of deciding:

- Which system unit you have
- Which keyboard you have

- Whether you have an XMA card
- What permanent storage devices you have
- Which printer is attached to your work station.

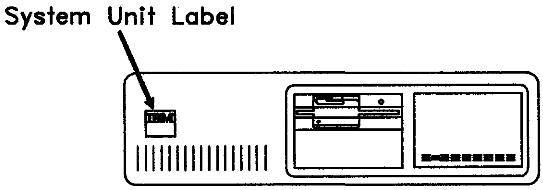
The next five sections assist you in making these decisions.

Which System Unit Do You Have?

The IBM 3270 Workstation Program supports the following system unit types:

- 3270 PC (including the 3270 Personal Computer AT)
- Personal Computer XT
- Personal Computer AT

The IBM label on the front left side of your system unit tells you which system unit type you have.



For the purpose of customization:

- The 3270 PC and the 3270 Personal Computer AT are both considered to be 3270 PCs.

Determine your system unit type and circle it in the area provided in item 2 of your customization worksheet.

If you are not familiar with how to use your system unit, look up the operating information in the front of the *Guide to Operations* binder that you received with your work station, and read about:

- Turning the system unit and display on and off
- Inserting and removing diskettes
- Handling diskettes
- Using a fixed disk if you have one.

Don't turn anything on and don't insert any diskettes before you have read this information. If you have already turned any of the units on, turn them off.

Which Keyboard Do You Have?

Since there are some keyboard-dependent differences in how the workstation program works on each system unit, the workstation program needs to know the type of keyboard with which you intend to run.

Each system unit has one of several types of keyboards attached to it. The discussion and illustrations that follow will help you determine which keyboard type you have. When you have identified your keyboard, circle it in the area provided in item 2 of your worksheet.

If you are using a 3270 PC system unit, you will have one of the following keyboards:

- 3270 PC keyboard
- Enhanced PC keyboard.

For 3270 PC hardware, the type of keyboard you have is not important for customization. However, you will notice later in this book that keystroke instructions differ for the two keyboards that can be used with 3270 PC hardware.

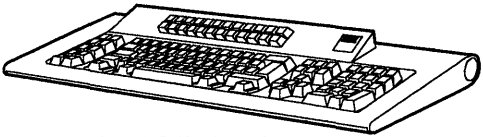
If you have a non-3270 PC system unit, you will have one of the following keyboards:

- Enhanced PC keyboard
- XT keyboard (XT only)
- AT keyboard (AT only).

For non-3270 PC hardware, the type of keyboard you use will have an effect on workstation program functions. Because there are fewer keys on the XT and AT keyboards, not all workstation program functions are available with these keyboards. You need to customize your workstation program for the keyboard type you will be using.

The next sections describe each of the keyboards to assist you in identifying your keyboard.

3270 PC Keyboard

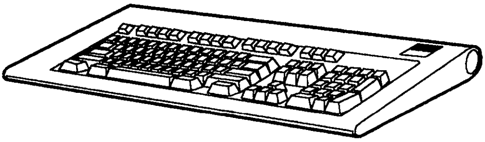


3270 PC Keyboard

The 3270 PC keyboard has three distinguishing features:

- Two rows of function keys labeled PF1 to PF24 above the typewriter section
- Ten control keys to the left of the typewriter section
- A row of eight switches on the underside of the keyboard.

Enhanced PC Keyboard

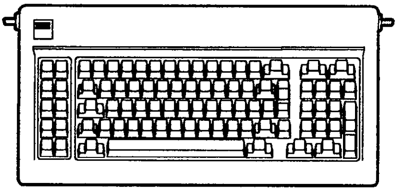


Enhanced PC Keyboard

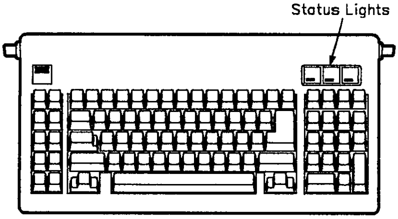
The Enhanced PC keyboard is easily recognized because it has:

- Just one row of function keys labeled F1 through F12 above the the typewriter section
- No control keys to the left of the typewriter section.

The XT and AT Keyboards



XT Keyboard



AT Keyboard

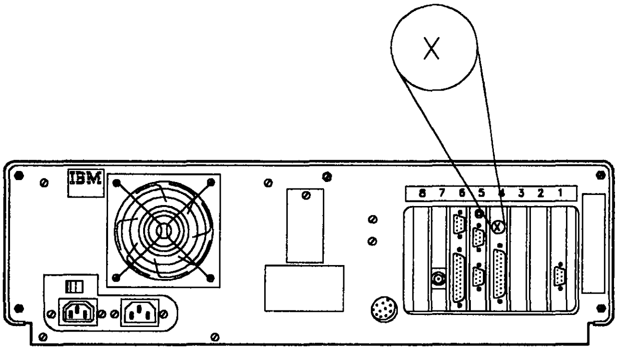
Both the XT and AT keyboards have two rows of function keys labeled F1 through F10 and located to the left of the typewriter section. In addition, the AT keyboard has three status lights located above the numeric keypad section on the right of the keyboard. These lights indicate if the Caps Lock, Num Lock, or Scroll Lock keys have been activated.

The XT and AT keyboards have some limitations when used with the IBM 3270 Workstation Program. These limitations will be discussed later in Part 3 of this book which describes how to use the workstation program.

Expanded Memory Adapter (XMA) Card

To determine if you have an XMA card installed, locate the expansion slots on the rear of your system unit. Look to see if the symbol **X** is stamped on one of the card slots. That is the XMA card. If you have an XMA card, circle the "Yes" response under XMA in item 2 of your worksheet.

Note: If you select "No" and then run the customized workstation program on a system with an XMA card installed, the workstation program will still use memory on the XMA card. In this instance, the last PC session you define during customization will be allocated any storage that remains when the workstation program is loaded, and could be as large as 594K (570K for a 3270 Personal Computer AT or Personal Computer AT, or 530K for a Personal Computer AT with EGA adapter).



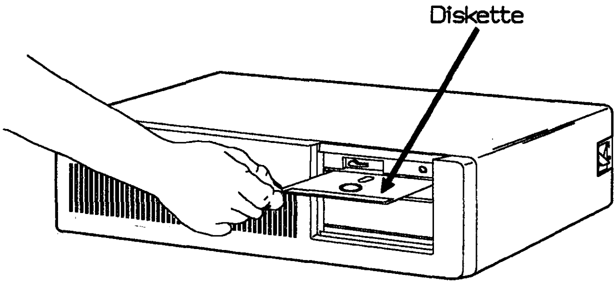
Permanent Storage Hardware

There are three possible configurations for the permanent storage of data:

- A single diskette drive
- Two diskette drives
- One or more diskette drives and one or more fixed disks.

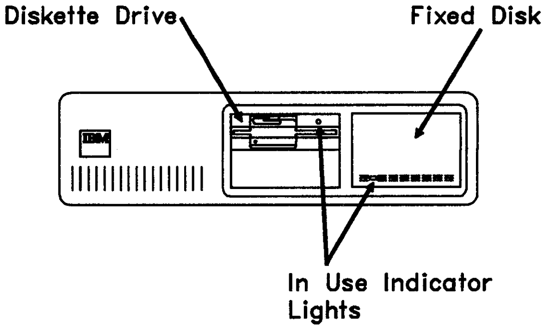
Determine which storage options your system unit has and enter the numbers for each type of drive in item 2 of your worksheet.

It is easy to identify diskette drives in your system unit. They are the openings on the front of your system unit into which you insert diskettes.



Note: If you have a 3270 Personal Computer AT or a Personal Computer AT, refer to the "operating" section of your *Guide to Operations* for a discussion of how to distinguish between high capacity diskette drives and double density diskettes drives. Your *Guide to Operations* also contains important information about selecting the right diskettes for each of these drives. Make sure you understand this information before continuing with the following instructions.

A fixed disk records data on a permanent disk installed inside the system unit. A closed panel with a red in-use indicator light at the bottom indicates the presence of a fixed disk in your system unit.



If you are not sure that you have a fixed disk drive, go to the chapter in your *Guide to Operations* that has operating instructions in it and look up the section on the fixed disk.

Work Station-Attached Printer

The workstation program supports ten different printers. The supported printers are listed in item 2 on your customization worksheet. Locate the model number of the printer attached to your work station and circle the correct response on the worksheet.

Selecting the Correct Customization Procedure

Now that you have identified your hardware, you need to choose the customization procedure that meets your work station configuration and requirements. You have three methods to choose from:

- Default customization
- User-selected options customization
- Recustomization.

Each of these methods is explained briefly in the discussion that follows.

Default Customization: The customization program on the IBM 3270 Workstation Program diskettes in the diskette holder has an option that you can use to create a default customized workstation program. This customization option copies a pre-selected set of workstation program files onto your customized workstation program diskettes or fixed disk. A customized workstation program created with the pre-selected options allows you to do a basic set of tasks that may suit your work station hardware configuration and requirements. This customization method is the simplest and helps you to start using your work station in a minimal amount of time.

User-selected Options Customization: Your work station may require options that are different than those that are pre-selected by the default customization program. If this is the case, you can use another customization program that allows you to select values for each customization option.

Recustomization: If you are using a previously created customized workstation program and need to change or add options, you can recustomize your workstation program.

Note: You can recustomize your workstation program only if it was originally created with Version 1.0 of the workstation program.

The hardware information that you have already determined and the discussion that follows will help you choose the customization method that is right for your work station.

Which Method is Right for You?

Figure 2-1 describes the PC hardware and control unit options selected by the default customization option. Compare the control unit options information you obtained from your service coordinator and your work station hardware configuration to the pre-selected values for these options. If all of your hardware and control unit options match the pre-selected options below, you may be able to use the default customization program option. If not all the options match—for instance, if you have a system unit other than the 3270 PC—you need to select your own customization options.

When you determine which customization procedure is right for your work station, enter your choice in item 3 on your information worksheet.

Customization Options	**Workstation Program Options Pre-selected by Default Customization**
PC Hardware Options	
System Unit	3270 PC
PC Printer	4201
Control Unit Options	
Terminal Type	CUT

Figure 2-1. Workstation Program Options Pre-selected by Default Customization

Even if all your hardware and control unit options match those selected by default customization, there are other reasons why you would choose to select your own customization options, for example:

- You need more than one PC session (you can have up to six).
- You need more than one host session (you can have up to four).
- You want to choose different names for host or PC sessions.
- You want to use system extensions.
- You want to use extended attributes or programmed symbols in a host session.

Consult Figure 2-2 to see additional host, PC, notepad, and workstation program options available with default customization. If these options describe the workstation program functions you need, you can use the default customization program option. If you have additional or different requirements, use the customization program to select your own options.

Customization Options	**Workstation Program Options Pre-selected by Default Customization**
Host Sessions	
Number of sessions	1
Name of session	B-HOST1
Extended attribute buffer	No
Programmed symbols	No
PC Sessions	

Figure 2-2 (Part 1 of 2). Additional Workstation Program Options Selected by Default Customization

Customization Options	**Workstation Program Options Pre-selected by Default Customization**
Number of sessions	1
Name of session	A-PC1
Initial program	COMMAND.COM
Notepad Sessions	
Number of sessions	2
Name of sessions	C-NOTEPAD1 D-NOTEPAD2
Workstation Program Options	
Copy	Yes
Multi-DOS	No
Autokey	Yes
AutoKey Area	2K
System extensions	No
Enhanced connectivity facilities	No
Outbound data stream preprocessing	No

Figure 2-2 (Part 2 of 2). Additional Workstation Program Options Selected by Default Customization

Deciding What to Do Next

Your next step depends upon which customization procedure you have decided to use.

- If you intend to use default customization continue with Chapter 3, "Preparing for Customization."
- If you are going to select your own customization options, continue with "Completing Your Customization Worksheet" on page 2-16.
- If you are recustomizing, continue with the next section.

Planning for Recustomization

Note: You can recustomize from a previously created system **only** if it is the same level of the workstation program. For example, you cannot recustomize a workstation program with options from a Level 3.0 customized control program.

If you already have a Version 1.0 customized workstation program, and you want to change some of the workstation program options, you can recustomize it. There are two methods of recustomization:

- Method 1. Create a new copy of the customized workstation program.
- Method 2. Revise your current copy of the customized workstation program.

Both methods of recustomization use the options from your current copy of the customized workstation program as the preset options for the customization program. You then have to change only those options for which you want new values. The methods differ only in how the customized workstation program is stored after you complete recustomization. In method 1, you make a new copy of the customized workstation program on new diskettes or fixed disk. In method 2, you revise the customized workstation program on your current diskettes or fixed disk.

Worksheet Entries for Recustomizing Using Method 1

If you use method 1 to recustomize, make the following entries in item 4 on your information worksheets:

- Enter the letter of the drive containing system disk 1 of your current customized workstation program (for example, drive A) for Preset Options.
- Enter a different drive letter (for example, drive B) for the Target category on your worksheet.

This is the drive to which your new customized workstation program will be copied when you create the customized system.

Worksheet Entries for Recustomizing Using Method 2

If you use method 2 to recustomize, make the following entries in item 4 on your information worksheets:

- Enter the letter of the drive containing system disk 1 of your current customized workstation program in the Preset Options category on your worksheet.
- Enter the same drive letter for the Target category on your worksheet.

  Your current customized workstation program diskettes will then be revised when you create the customized system.

In method 2, the customization program copies onto your current copy of the customized workstation program only the new files needed to support your option choices.

Note: If you change:

- The control unit terminal option (DFT or CUT)
- The host protocol option, or
- The system unit option,

method 2 will work only if you respond **Yes** to the messages that ask if you want to replace existing system files on your diskette. These messages appear on Panel 4 of the customization program when you begin copying your workstation program files. In this situation, all the files for your revised customized workstation program are copied onto your current copy of the customized workstation program, over-writing existing files.

Worksheet Entries for Changing Options for Recustomization

To find out what options were selected when your current workstation program was customized, you can use the DOS PRINT command to print the INDCFIG.FIL file. This file contains, in printable format, the contents, or image, of the display panels as they existed during customization when your customized workstation program was created. You can print this file on a printer attached to your work station by following the steps below:

1. Make sure your work station-attached printer is on.
2. Jump to a PC session.
3. Make sure your default drive contains your DOS files.
4. Insert the previously customized system diskette containing the INDCFIG.FIL file into drive A.
5. Type:

   ```
   print a:indcfig.fil
   ```

   If your customized workstation program is on your fixed disk, type:

   ```
   print c:indcfig.fil
   ```

When you have printed the contents of the INDCFIG.FIL file, refer to "Completing Your Customization Worksheet" on page 2-16 for assistance in choosing the workstation program options you want to change.

If you know which options you want to change and do not need to review the information on selecting options for customization, continue with one of the following sections:

- If you are using method 1 to recustomize, continue with "Formatting Your Diskettes or Fixed Disk Drive" on page 3-3.
- If you are using method 2 to recustomize, continue with Chapter 4, "Performing Customization."

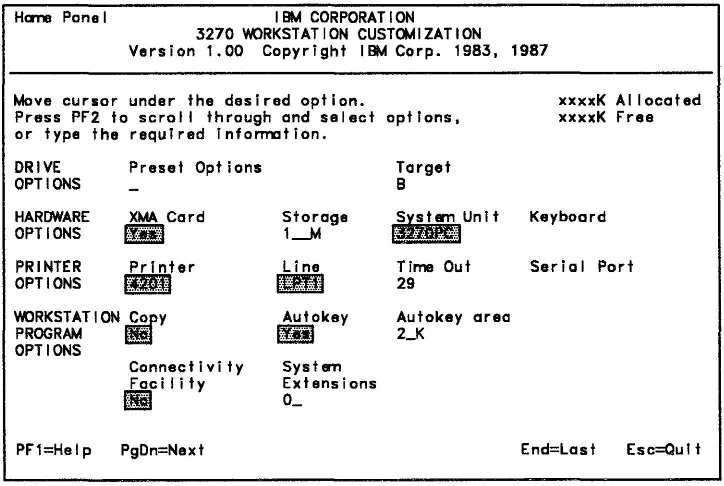
Completing Your Customization Worksheet

If you have been following along with the steps in this chapter, you have already completed the sections of your customization worksheets that describe control unit and work station hardware options. The remainder of this chapter describes other customization options and assists you in selecting the values that suit your work station requirements. Indicate the options you select on your worksheets as you read along.

If you wish to keep track of the approximate amount of storage allocated for options as you fill in your worksheets, refer to Appendix C, "Storage Estimates for Customization" on page C-1.

Worksheet Entries for the Home Panel

When you run the customization program, the first panel you see is called the "Home" panel. An example of this panel follows. This section will assist you in choosing the options for this panel and filling out the customization worksheet.



```
Home Panel                   IBM CORPORATION
                      3270 WORKSTATION CUSTOMIZATION
              Version 1.00  Copyright IBM Corp. 1983, 1987
--------------------------------------------------------------------
Move cursor under the desired option.                xxxxK Allocated
Press PF2 to scroll through and select options,      xxxxK Free
or type the required information.

DRIVE        Preset Options                Target
OPTIONS      _                             B

HARDWARE     XMA Card       Storage        System Unit   Keyboard
OPTIONS      Yes            1__M           3270PC

PRINTER      Printer        Line           Time Out      Serial Port
OPTIONS      4201           LPT1           29

WORKSTATION  Copy           Autokey        Autokey area
PROGRAM      No             Yes            2_K
OPTIONS

             Connectivity   System
             Facility       Extensions
             No             0_

PF1=Help   PgDn=Next                               End=Last   Esc=Quit
```

Four customization option categories are defined on the "Home" panel:

- Drive options
- Hardware options
- Printer options
- Workstation program options.

You have already determined your hardware options in the section "Determining Your Hardware" on page 2-1. The following discussion will assist you in selecting the other options presented on the "Home" panel.

Drive Options

This category is used to specify input and output diskette drives for customization. Enter your choices in item 4 on your information worksheet.

Preset Options: This option tells the customization program which drive the current options are to be read from.

- Leave the field blank if you have just set up your system unit and are customizing for the first time. You will start with the IBM-selected preset values provided by the customization program.
- Enter the letter of the drive containing your previously customized workstation program if you are recustomizing. All the option values selected when your workstation program was first created will then appear in the option fields on the customization panels.

Target: This option asks you which drive (Target) the customization program should copy the customized workstation program files to when you have finished selecting options.

- Enter the letter of the drive that will contain the formatted system diskettes or fixed disk onto which you want your customized workstation program copied.

- Enter the same drive letter you specified for "Preset Options," if you are recustomizing and want the new workstation program copied onto your previously customized workstation program diskette.

  Note: If you are customizing on an AT and intend to load your customized workstation program from a 360Kb double density diskette drive, do not use a high capacity diskette drive to create your customized workstation program.

Hardware Options

You determined most of the options in this category in "Determining Your Hardware" on page 2-1. The only option remaining to enter is storage. Enter your choice in item 5 on your information worksheet.

Storage: In this field you specify the amount of storage you have in your system unit. The customization program uses this information to determine the actual storage available for your customized system.

- Enter 1 if you have an XMA card with 1M of storage installed in your system unit.
- Enter 2 if you have an XMA card with 2M of storage installed in your system unit.

  Note: If you are installing VDISK, refer to Appendix G for information on installing the XMA and VDISK device drivers before allocating XMA storage for the workstation program. This appendix explains how to calculate and reserve the amount of XMA storage you want the workstation program to use and how much storage to specify during customization.

- Enter a number from 256 to 640 if you do not have an XMA card. The value entered is the amount of storage (up to 640K) installed in your system unit.

Note: Even if you specify "No" for XMA during customization, you can still use your customized workstation program on a work station with an XMA card installed. Storage on the XMA card will still be used. When the workstation program is loaded, your PC sessions will be created with the amount of storage allocated during customization. Any additional storage on the XMA card will be added to your last PC session, which may be as large as 594K (570K for AT or 530K for an AT with EGA adapter).

Printer Options

This category is used to define your printer options so that the correct files to support your printer will be copied onto your customized workstation program. Enter your choices in item 6 on your worksheet.

Printer: You already determined your printer in the section "Determining Your Hardware" on page 2-1. You should have entered this information in item 2 of your worksheet.

Note: If you select none for the printer option, the remaining option fields in this category do not appear during customization. Continue with "Workstation Program Options" on page 2-20. Skip to item 7 on your worksheet.

Line: This option tells the customization program which line the printer is attached to.

Most printers are attached to LPT1. Accept this preset value unless you are certain that your printer is attached to a line other than LPT1. Select the option on your worksheets.

Time Out: This option tells the customization program how many seconds the workstation program should wait for a response from the printer when sending it data before concluding that the printer is not operating correctly.

Accept the preset value of 29 seconds, unless you know that a lower value will not affect the performance of your printer.

Serial Port: This option tells the customization program the value of a byte that describes the COM1 or COM2 serial port. A preset value has been assigned to each of the supported printers. This value appears automatically when the printer and the COM1 or COM2 ports are selected on the customization panel.

Accept the preset value unless you have specific hardware requirements.

Workstation Program Options

In this category you define the special functions you want your customized workstation program to have. Enter your choices in item 7 on your worksheet.

Copy: This option tells the customization program that you want the 3270 PC Copy function.

- Select **Yes** if:
  - You want to copy information from one window to another, or
  - You want to use the Save and Restore commands.

See Chapter 16 for an explanation of copying text from window to window. Refer to Chapter 11 for information on saving and restoring.

Autokey: This option tells the customization program whether or not you want to use the autokey function.

- Select **Yes** if you want to be able to record and play back any series of frequently used keystrokes.

See Chapter 15 for an explanation of the autokey function.

Autokey Area: This option tells the customization program how much storage to reserve for autokey recordings.

Enter a number from 2K to 30K if you selected **Yes** for the autokey function in the last option.

The amount of storage you need depends upon how many autokey recordings you will make. Unless you expect to make many autokey recordings, enter the preset value of 2K.

Connectivity Facilities: This option tells the customization program whether or not to install the PC router for the IBM Enhanced Connectivity Facilities.

- Enter **Yes** if you intend to use Enhanced Connectivity Facilities.
- Enter **No** if you do not have a use for these facilities.

Refer to Chapter 14 for a discussion of the Enhanced Connectivity Facilities.

System Extensions: In this field you specify the number of user-supplied system extensions that you intend to install on your customized workstation program. A system extension is a program routine that supplies added function to the workstation program.

- Enter the number (0 through 29) of systems extensions to be installed.

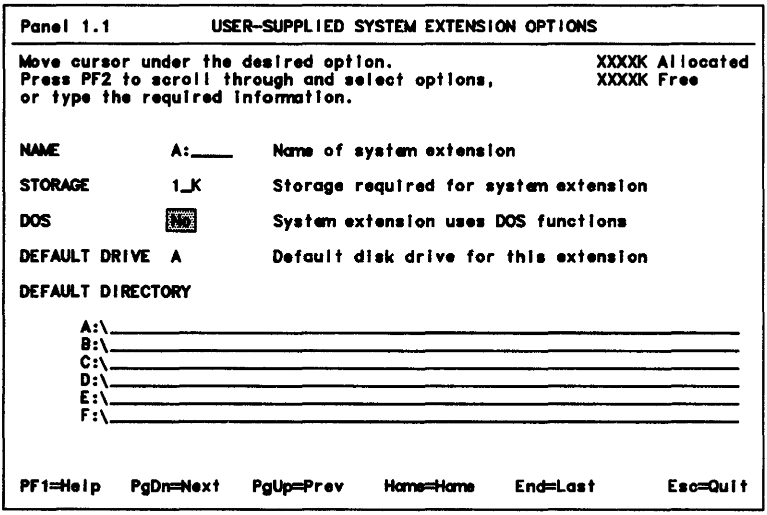
For example, to use outbound data stream preprocessing (ODSP) you need to write and install a system extension. Refer to the *IBM 3270 Workstation Program Programming Guide* for explanations of outbound data stream preprocessing and how to write system extensions. Once you have written your system extension, you can install it by following the customization steps below:

- Enter the number 1 for the systems extensions option explained above.
- Describe the system extension you have written to the workstation program. Refer to "Worksheet Entries for the User-Supplied System Extension Options Panel."
- Specify Yes for the ODSP option on the "Host and Notepad Options" panel. Refer to "Worksheet Entries for the Host and Notepad Options Panel" on page 2-24.

Worksheet Entries for the User-Supplied System Extension Options Panel

One "User-Supplied System Extensions Options" panel appears for each system extension you indicate on the "Home" panel. An example of this panel appears below. Enter your choices in item 8 on your customization worksheet.

Note: If you select 0 for the number of system extensions on the "Home" panel, no system extensions panel appears during customization. If you are not installing system extensions, continue with "Worksheet Entries for the Host and Notepad Options Panel" on page 2-24. Skip to item 9 on your customization worksheet.



```
Panel 1.1          USER-SUPPLIED SYSTEM EXTENSION OPTIONS
Move cursor under the desired option.                    XXXXK Allocated
Press PF2 to scroll through and select options,          XXXXK Free
or type the required information.

NAME            A:____     Name of system extension

STORAGE         1_K        Storage required for system extension

DOS             No         System extension uses DOS functions

DEFAULT DRIVE   A          Default disk drive for this extension

DEFAULT DIRECTORY

      A:\______________________________________________________
      B:\______________________________________________________
      C:\______________________________________________________
      D:\______________________________________________________
      E:\______________________________________________________
      F:\______________________________________________________


PF1=Help   PgDn=Next   PgUp=Prev   Home=Home   End=Last    Esc=Quit
```

Name: This option tells the customization program the name of the system extension to be loaded and run in the workstation program.

- Enter the letter for the drive on which your system extension resides, followed by the name of your system extension program.

  For instance, if you write a system extension called PREPRO.EXT to do Outbound Data Stream Preprocessing and store it on your fixed disked, enter:

  `C:PREPRO.EXT`

  for the system extension name.

Storage: This option tells the customization program the number of Kbytes of storage needed to run this system extension.

- Enter the required storage (plus 4K for DOS control blocks if the extension uses DOS after initialization).

DOS: This option tells the customization program whether this system extension requires other DOS functions in addition to initialization.

- Select **No** (preset) if DOS functions other than initialization are not required.
- Select **Yes** if your system extension does any DOS function calls.

Default Drive: This option tells the customization program the disk drive to be used by this system extension.

Note: Only fill in information for default drive and default directory if you selected **Yes** for DOS. If you select **No** for DOS, default drive and directory information will be ignored.

- Enter the letter of the default drive for the system extension.

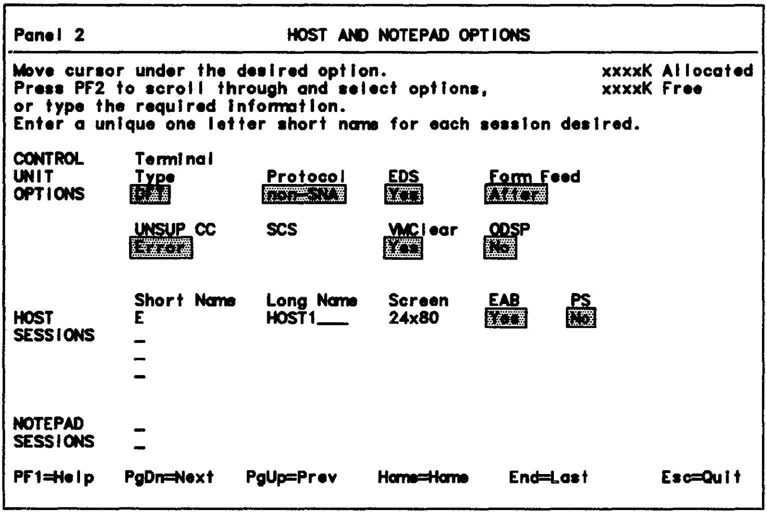
Default Directory: This option lists the first six drives that a system extension can use.

- Enter any needed path and subdirectory information for each drive that a system extension will use.

  Note: The directory name may have a maximum of 64 characters. See the *IBM Personal Computer Disk Operating System* manual for directory naming conventions.

Worksheet Entries for the Host and Notepad Options Panel

Panel 2, shown below, is called the "Host and Notepad Options" panel. The sections that follow will help you choose options for this panel and fill out your customization worksheet.



```
Panel 2                      HOST AND NOTEPAD OPTIONS
--------------------------------------------------------------------------------
Move cursor under the desired option.                     xxxxK Allocated
Press PF2 to scroll through and select options,           xxxxK Free
or type the required information.
Enter a unique one letter short name for each session desired.

CONTROL      Terminal
UNIT         Type          Protocol     EDS        Form Feed
OPTIONS      DFT           non-SNA      Yes        After

             UNSUP CC      SCS          VMClear    QDSP
             Error                      Yes        No


             Short Name    Long Name    Screen     EAB      PS
HOST         E             HOST1___     24x80      Yes      No
SESSIONS     _
             _
             _

NOTEPAD      _
SESSIONS     _

PF1=Help   PgDn=Next   PgUp=Prev   Home=Home   End=Last        Esc=Quit
```

Control Unit Options

Note: If you plan to have no host sessions, select **NONE** for "Terminal Type" and continue with "Notepad Sessions" on page 2-28.

By now you should have contacted your service coordinator to obtain the information about your control unit options that appears in the box in item 1 of your customization worksheets. Two additional control unit options remain for you to select. Fill in the information in item 9 on your worksheet.

Form Feed: This option tells the workstation program when in a print cycle you want the printer attached to your control unit to do an automatic form feed.

- Before printing
- After printing (preset)
- Both before and after printing
- None (no form feed).

This option is not shown if you select CUT for the "Terminal Type" option.

ODSP: This option tells the customization program that you intend to use outbound data stream preprocessing.

- Select **No** for this option unless you or someone else at your site has written a system extension to preprocess data sent down from a host system.
- Select **Yes** if you intend to install a system extension to preprocess host data. The system extension must be defined during customization.

Refer to the *IBM 3270 Workstation Program Programming Guide* for instructions on writing a system extension for use with ODSP.

Host Session Options

This category on panel 2 is used to describe the host sessions you wish to include in your customized workstation program. Enter the information in item 10 of your worksheets.

Short Name: Initially, this panel shows a preset short and long name for one host session.

- Enter a short name for each host session you wish to include in your customized workstation program.

  Short names are used as "nicknames" for your sessions and must be:

  - Unique
  - One-character
  - Alphabetic.

The preset short name for the first host session is E. You can accept this short name or enter another letter of your choice for this session (note that A is the preset short name for the first PC session). Lines are provided for the entry of short names for up to three more host sessions. Enter only as many short names as the number of host sessions you need.

Long Name: When you enter a short name for any additional session, the customization program displays a preset long name for that session also.

- Accept the preset long name or enter a long name that is meaningful to you and the way that you use your sessions.

  Long names:

  - Can be up to eight alphanumeric characters long
  - **Must** begin with an alphabetic character
  - Cannot contain embedded blanks.

Long names are optional. If you do not want a long name for any of your sessions, use the space bar to blank the long name option field.

The preset long names for each host are printed on the customization worksheet.

Screen: This option tells the workstation program the size of the host presentation space. The size is expressed as the number of rows by the number of columns that appear on your screen. The selections shown on your worksheet are for models of the 3278 display.

- Select the presentation space for your 3278 display type from the table in Figure 2-3. The preset value is 24X80.

3278 Model	Screen Presentation Space
Model 2	24X80
Model 3	32X80
Model 4	43X80
Model 5	27X132

Figure 2-3. Screen Presentation Space for 3278 Models

EAB: This option tells the workstation program to allocate memory for an extended attribute buffer for this host session.

- Select **Yes** if:
  - You want to use extended colors in your host session.
  - You want to use programmed symbol sets in your host session.

    Note: To use programmed symbol sets in a host, you need to have a programmed symbol (PS) card installed. This option is not available for non-3270 PC hardware.

PS: This option tells the workstation program which host session supports the programmed symbols sets.

Note: If you select **No** for the EAB option for this host session, the PS option becomes invalid for this host session and is not displayed. Skip this item on the worksheet if you select **No** for EAB.

You can allocate the programmed symbol sets to only one host. Initially, the programmed symbols sets are not allocated to any host session.

- Select **Yes** for one host to allocate the programmed symbol sets to that host session.

Note: Since you can select **Yes** for PS for one host only, if you assign them to a second host session, the PS option for the first host you assigned them to changes from **Yes** to **No**.

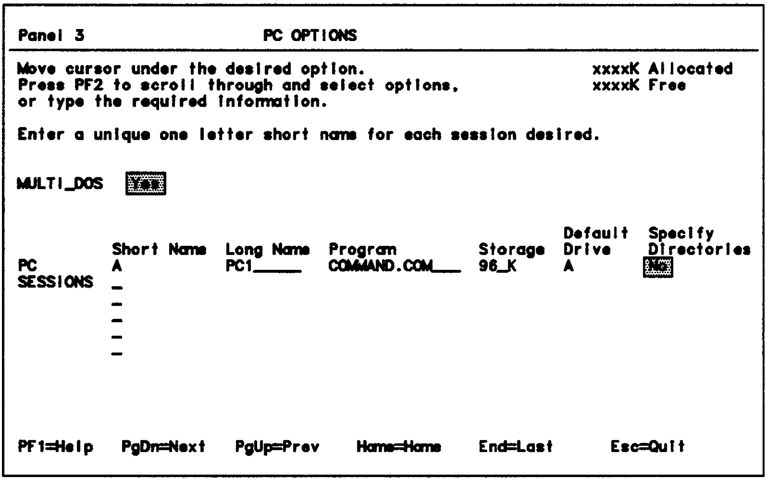
Notepad Sessions

You can have up to two notepad sessions. The naming conventions described for the host sessions in sections “Short Name” on page 2-26 and “Long Name” on page 2-27 are the same for notepad sessions. Enter your choice in item 11 on your worksheet.

Preset long names for the notepad sessions are printed on the worksheet.

Worksheet Entries for the PC Options Panel

An example of Panel 3, “PC Options,” is shown below. This section will assist you in choosing options to describe your PC sessions. Enter your choices in item 12 on your worksheet.



```
Panel 3                      PC OPTIONS
-----------------------------------------------------------------------
Move cursor under the desired option.                  xxxxK Allocated
Press PF2 to scroll through and select options,        xxxxK Free
or type the required information.

Enter a unique one letter short name for each session desired.

MULTI_DOS  Yes


                                                        Default  Specify
           Short Name  Long Name  Program        Storage Drive    Directories
PC         A           PC1_____   COMMAND.COM___ 96_K    A        No
SESSIONS   _
           _
           _
           _
           _


PF1=Help   PgDn=Next   PgUp=Prev   Home=Home   End=Last    Esc=Quit
```

Multi-DOS

This option tells the customization program that you want multiple DOS support for your work station.

If you elect to have more than one PC session, “Multi-DOS” is forced to **Yes** and you cannot select **No**.

- Select **Yes**—even if you intend to have only one PC session—if you have any of the following requirements:
  - You have any system extensions that require DOS.
  - You do not have an XMA card and intend to use the SPLIT and MERGE functions.
  - If you want to have a user.BAT file be the first program to run in a PC session.
  - You intend to use the IBM 3270 Keystroke Emulation Utility.
  - You intend to use API programs that create alternate presentation spaces (refer to the *3270 Workstation Program Programming Guide*).

For more information on Multi-DOS, refer to Chapter 10.

PC Sessions

This section of Panel 3 is used to describe your PC sessions. The type of information you need to supply is explained in the sections that follow.

Short Name and Long Name: Initially, this panel shows a preset short and long name for one PC session. Follow the same naming conventions that were explained in the sections “Short Name” on page 2-26 and “Long Name” on page 2-27.

The preset long names for PC sessions are printed on your worksheet.

- Enter names for the desired PC sessions on your information worksheets.

Program: This option tells the workstation program the name of the first program to run in a PC session when that session is first initialized.

COMMAND.COM, the preset option, runs the AUTOEXEC.BAT file. AUTOEXEC.BAT is created on your system diskette when you run the customization program and it contains the INDCIPL command. INDCIPL automatically loads the workstation program when you turn on your work station.

You have three options you can choose:

- Leave the COMMAND.COM preset
- Enter the name of a user .BAT file that you want to be the first program run in a PC session (requires Multi-DOS)
- Enter the name of the program you want to be the first to run in a PC session.

  Note: If you want to add other commands to the AUTOEXEC.BAT file, or create user-supplied .BAT files, refer to Chapter 6.

Storage: The values you enter here tell the customization program how many thousand (K) bytes of storage are to be allocated for each PC environment.

Notice the lines near the top of the "PC Options" panel that state:

```
xxxxK Allocated
xxxxK Free
```

When you run the customization program, actual storage values appear in place of the x's.

- Storage Allocated

  The value shown for the amount of storage allocated includes the storage required by DOS, plus the storage allocated to workstation program options selected on previous panels, plus the storage allocated to any user-supplied system extensions.

Note: This value includes the 96K already assigned to each PC session as the preset.

- Storage free

  The value shown for the amount of storage free is the approximate amount of storage you have left to allocate to your PC sessions and any device drivers installed through the CONFIG.SYS command. The storage you may allocate to your PC sessions should be the amount of free storage indicated, minus any storage required by device drivers that you plan to install. Refer to Appendix G for a discussion of installing XMA and VDISK device drivers.

If you have the XMA card installed in your system unit, you can select one PC session to be larger than the others. Your large PC session may be as large as 594K for a 3270 PC, 570K for a 3270 Personal Computer AT, or 530K for a Personal Computer AT with an EGA adapter. Your other PC sessions can each have a maximum of 384K.

Note: You may not be able to achieve the maximum storage on your large PC session if you have device drivers, user-supplied system extensions, or some maximal workstation program configurations.

- Enter a number if you want to assign an exact amount of storage to a PC session.
- Enter an asterisk (*) if you want the PC session to be as large as possible.

  This tells the customization program to assign any free storage to this PC session. Remember, the first PC session that you enter an asterisk (*) for will be your large session; all other PC sessions will be limited to a maximum of 384K.

Note: For 3270 Personal Computer AT users:

If you allocate a PC session greater than 430K, some degradation of performance may occur. The degree of performance degradation generally increases as the storage size increases to the maximum of 570K. To minimize performance degradation, follow the suggestions below.

- Do not allocate more storage than is required for the applications you intend to run in your large PC session.
- Define your large PC session last.

  When the system is loaded, the workstation program allocates the specified amount of storage to each PC session in the order in which you entered them during customization. Any storage that remains is added to the last PC session. If your last PC session is also your large PC session, it may be greater than 430K. This will not cause any performance degradation, as long as you did not allocate more than 430K when you defined the session in customization.

Fill in the storage for each PC session on your information worksheet.

Default Drive: This option tells the workstation program the disk drive for this PC session. When you load your workstation program, the program you specify in the "Program" option field must be in the root directory of this default drive.

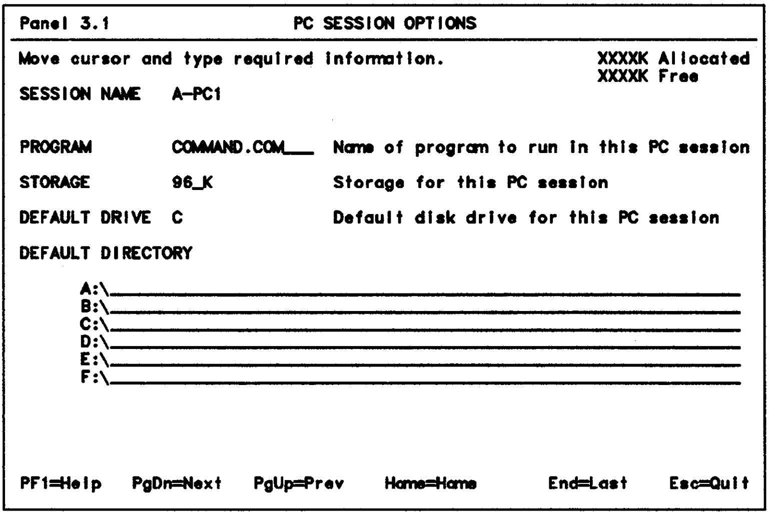
- Enter the letter of the default drive for the PC session.

Specify Directory: This option permits you to view another panel for each PC session if you have the need to supply path and subdirectory information for any of the drives the PC program will need to access.

- Select **Yes** if you wish to enter path and subdirectory information for any drive your PC program uses.
- Select **No** if you do not have the need to specify this information for any of your drives.

Worksheet Entries for the PC Session Options Panel

This is the "PC Session Options" panel.



```
Panel 3.1                        PC SESSION OPTIONS
-----------------------------------------------------------------------
Move cursor and type required information.              XXXXK Allocated
                                                        XXXXK Free
SESSION NAME    A-PC1

PROGRAM         COMMAND.COM___  Name of program to run in this PC session

STORAGE         96_K            Storage for this PC session

DEFAULT DRIVE   C               Default disk drive for this PC session

DEFAULT DIRECTORY

     A:\______________________________________________________
     B:\______________________________________________________
     C:\______________________________________________________
     D:\______________________________________________________
     E:\______________________________________________________
     F:\______________________________________________________



PF1=Help   PgDn=Next   PgUp=Prev   Home=Home     End=Last    Esc=Quit
```

One of these panels appears for each PC session for which you select **Yes** for the "Specify Directories" option field on Panel 3.

If you selected **No** for the "Specify Directories" option for all your PC sessions, you are done planning for customization. Continue with Chapter 3, "Preparing for Customization."

The options you select on panel 3 for "Session Name," "Program," "Storage," and "Default Drive" reappear on this panel. You can change any of these options except the "Session Name."

Default Directory

This option lists the first six drives that a PC session can use.

- Enter any needed path and subdirectory information in item 13 on your worksheet for each drive that a PC session will use.

  Note: The directory name may have a maximum of 64 characters. See the *IBM Personal Computer Disk Operating System* manual for directory naming conventions.

When you have completed your customization worksheet, continue with Chapter 3, "Preparing for Customization."

Chapter 3. Preparing for Customization

Now that you have completed the planning step, you need to prepare for customization. This step involves two tasks:

- Loading the Disk Operating System (DOS)
- Formatting your diskettes or fixed disk drive

Loading DOS into Memory

1. If your system unit is turned on, turn it off.
2. Open the levers on the diskette drives.
3. Remove any diskettes.
4. Insert the DOS diskette into drive A.

   Make sure you do not use the DOS Supplemental Programs diskette here.
5. Close the lever on drive A.
6. If you have a color display, turn it on.
7. Turn the brightness control on your display clockwise as far as it will go.
8. If you have an expansion unit, turn it on.
9. Turn the system unit on.
10. Watch for the power-on self-test (POST) to run.

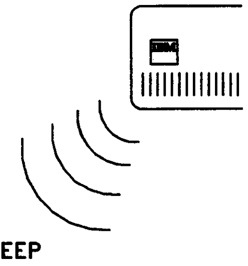
    Three things will happen:

    a. Up to the first 640K of storage in your system unit is tested. As it is tested, the amount of storage that was checked and is working appears in the upper left corner of your screen.

```
xxx KB OK
```

Note: This number changes until the available storage in your system (up to 640K) has been checked. When the number stops changing, the last number that appears is an indication of how much storage is available in your system unit. If this number is 640K or less, and you do not have an XMA card, the number displayed is the total amount of system storage. If you have an XMA card installed, the remainder of your storage will be checked when you load the customized workstation program. If the total storage checked stops at less than 384, you cannot use the default workstation program. Do not continue. For assistance, call your supervisor or the person assigned to help you with your computer.

b. You will hear one short "beep."



You may also hear the diskette drive hum and see the "in-use" lights flicker on and off.

c. The Disk Operating System will be loaded into memory and your screen will look like this:

```
Current date is Tue  1-01-1980
Enter new date: _
```

Notice the short blinking line that looks like an underscore (_). It is called a cursor. The cursor must be on the screen.

If your display does not look like this, go to the chapter in your *Guide to Operations* that deals with problems and follow the procedures there.

11. Adjust the brightness control until the display is clear.
12. Type the date in the format shown on the display and press the enter key (↵).

    The display then prompts you to enter the current time.
13. Type the time in the format shown on the display and press the enter key (↵).

DOS is loaded and you are now ready to format your diskettes or fixed disk drive.

Formatting Your Diskettes or Fixed Disk Drive

Before you can customize your IBM 3270 Workstation Program, you must format the diskettes or fixed disk drive onto which you intend to copy the customized workstation program. This section explains how to format your fixed disk drive or diskettes with the correct options.

What to Do If Something Doesn't Work Correctly

If you encounter any of the following problems while formatting, here's how to correct them.

- If you type a command incorrectly:
  - Before you press the enter key (↵), you can backspace and type the correct information.
  - After you press the enter key (↵), you will see a "Bad command or file name" message and the DOS prompt, A>. Type the correct command and press the enter key (↵).
- If you accidentally press the wrong key, see a message that you didn't expect, or are unable to fix a problem:
  - Press and hold the Ctrl key and then press the Break key.
  - You should see the DOS prompt, A>, reappear.
  - Start the formatting procedure over from the beginning.

Preparing Your Fixed Disk

If you do not have a fixed disk, skip this section and continue with "Formatting Your System Diskettes" on page 3-7.

If your fixed disk has already been prepared and formatted, continue with Chapter 4, "Performing Customization."

If your PC work station has a fixed disk to which you intend to copy the customized workstation program, you have to prepare the fixed disk before you can record on it. There are three steps in preparing your fixed disk:

1. Create a DOS partition on the fixed disk
2. Format the fixed disk
3. Copy the DOS files onto your fixed disk (this step is optional).

If you did not set up your system, the fixed disk may already have been formatted by the person who set it up. To be sure, ask your supervisor or the person you call for help with using your PC work station.

Warning: Formatting destroys all data on the fixed disk. Make sure that your fixed disk has not been formatted before proceeding with this operation.

Refer to your DOS manual for more complete instructions on creating the DOS partition and formatting your fixed disk.

Creating a DOS Partition on Your Fixed Disk.

1. Be sure the DOS diskette is still in drive A.
2. Type:
   ```
   fdisk
   ```
3. Press the enter key (↵).
4. Follow the prompts on the screen to create a DOS partition on the fixed disk.

   Note: If you plan to use any other operating systems in addition to DOS, then you should refer to "Partitioning the Fixed Disk" in the *Disk Operating System* manual and follow those instructions. Make sure that one of the partitions that you create is a DOS partition.

When the DOS prompt reappears, the task is completed.

Formatting Your Fixed Disk.

1. Be sure the DOS diskette is still in drive A.
2. Type:
   ```
   format c:/s/v
   ```

3. Press the enter key (↵).

   This command tells the FORMAT program to format drive C, copy the operating system files onto the formatted drive, and prompt the user to specify a volume label.

4. Follow the prompts that appear on your screen.

When the DOS prompt reappears, the task is completed.

Copying DOS Onto Your Fixed Disk

If you want to have all the DOS files on your fixed disk, you can copy them as explained below:

1. Be sure the DOS diskette is still in drive A.
2. Type:

   ```
   copy a:*.*  c:
   ```

3. Press the enter key (↵).

   This command tells the COPY program to copy all the files on drive A onto drive C.

4. Wait until the DOS files are copied onto your fixed disk, and the DOS prompt appears on your screen.
5. Remove the DOS diskette from drive A, and return it to the plastic holder in the back of the DOS book.
6. Insert the DOS Supplemental Programs diskette into drive A.
7. Close the lever on drive A.
8. Type:

   ```
   copy  a:*.*  c:
   ```

9. Press the enter key (↵).
10. Wait until the DOS prompt appears.
11. Remove the DOS Supplemental Programs diskette from drive A, and return it to the plastic holder in the back of the DOS book.

DOS is now stored on your fixed disk. You are now ready to customize your workstation program and copy it onto your fixed disk. Continue with Chapter 4, "Performing Customization."

Formatting Your System Diskettes

If your system unit does not have a fixed disk drive, you need to format the target diskettes to which you intend to copy your customized workstation program.

If you are performing default customization, you need to format either:

- Two 5 1/4 inch, 360K diskettes,
- One 5 1/4 inch, 1.2M diskette, or
- One 3 1/2 inch diskette.

If you are performing user-selected options customization, you need to format either:

- Three 5 1/4 inch, 360K diskettes,
- One 5 1/4 inch, 1.2M diskette, or
- One 3 1/2 inch diskette.

Note: If you have a 3270 Personal Computer AT or a Personal Computer AT, make sure you have the correct type of diskette for the drive that you will be using. Refer to the operating section of your *Guide to Operations* for a discussion of diskette and drive compatibility.

To format your blank diskettes:

1. Make sure that the DOS diskette is still in drive A.
2. Type the format command.
   a. If you have two diskette drives, type:

      ```
      format  b:/s/v
      ```

This command tells the FORMAT program to format the diskette in drive B, copy the operating system files onto the formatted diskette, and prompt the user to specify a volume label.

b. If you have only one diskette drive, type:

   ```
   format  a:/s/v
   ```

   This command tells the FORMAT program to format the diskette in drive A, copy the operating system files onto the formatted diskette, and prompt the user to specify a volume label.

3. Press the enter key (↵).
4. Follow the prompts on your screen.

   Note: If you have only one diskette drive, when you are prompted to insert a new diskette for drive A, remove the DOS diskette and insert your blank diskette before continuing.

5. When prompted for a volume label for your diskette, type:

   ```
   systemdisk1
   ```

6. Format the rest of your diskettes, giving the second diskette the volume label **systemdisk2**. If you need to format a third diskette, give it the volume label **utility**. You can use this third diskette to copy workstation program utilities during customization.
7. When you have finished formatting your diskettes, return the DOS diskette to the plastic holder in the back of the DOS binder.

From now on, your newly formatted diskettes will be called your *system diskettes*.

For more information about formatting diskettes, refer to your DOS manual.

You are now ready to customize your workstation program and copy it onto your system diskettes. Continue with Chapter 4, "Performing Customization."

Chapter 4. Performing Customization

In Chapter 2, "Planning for Customization," you selected and planned for the customization procedure that best suits your PC work station needs. In this chapter we describe each of the three methods of performing customization:

- Default customization
- User-selected options customization
- Recustomization.

Before You Begin

Before you begin, you need to have on hand:

- The IBM 3270 Workstation Program diskettes from the diskette folder.
- The correct number of formatted diskettes for the type of customization you are performing. Refer to "Formatting Your System Diskettes" on page 3-7.

  If you have a formatted fixed disk, you do not need the formatted system diskettes.
- Your filled out customization worksheets to assist you in customizing with user selected options.

Continue with one of the following sections of this book:

- The next section if you are performing default customization
- "Performing Customization with User-selected Options" on page 4-7 if you are performing user-selected options customization
- "Performing Recustomization" on page 4-6 if you are performing a recustomization.

Performing Default Customization

To select the default options to create a customized workstation program and copy it onto your fixed disk or system diskette:

1. Get the IBM 3270 Workstation Program diskettes from the plastic holder in the back of your binder. If your workstation program is on 5 1/4 inch diskettes, you will have three program diskettes. If your workstation program is on 3 1/2 inch diskettes, you will have two diskettes.
2. Insert the first workstation program diskette into drive A.
3. Close the lever on drive A.
4. Type one of the program commands below:
   a. If you are customizing to your fixed disk drive, type:

      ```
      indcfig default c:
      ```

   b. If you are customizing to a diskette, type:

      ```
      indcfig default b:
      ```

   Note: Even if you have only one diskette drive, use the command given in step 4b. For single diskette drive systems, the customization program renames drive A to drive B when it is time to copy files and prompts you to insert target system diskettes into drive B. If you have only one diskette drive, use drive A for both workstation program diskettes and target system diskettes.

5. Make sure you typed the appropriate command exactly with the spaces shown and the colon (:) at the end.
6. Press the enter key (↵).

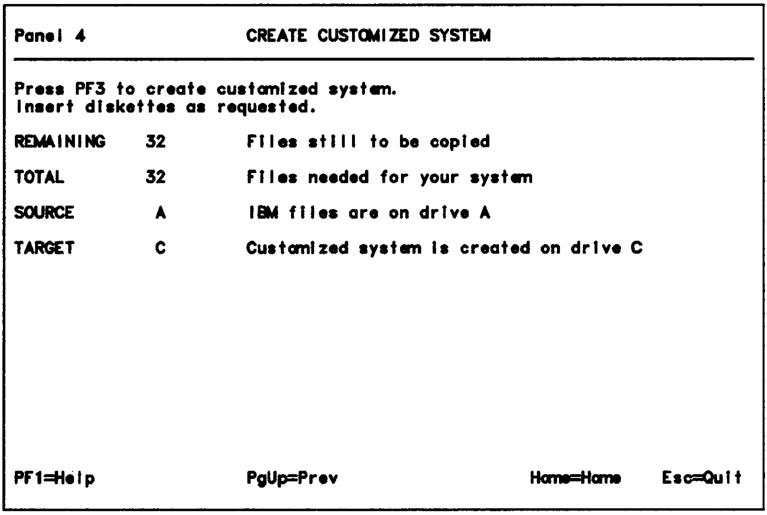
Notes:

a. Except in the case noted above, if you enter the letter of a drive that does not exist on your current system, you will see the message "Drive x does not exist." At the DOS prompt, retype the above command with the correct drive letter and press the enter key (↵).

b. If you do not specify a drive letter in the above command, the customization program will default to:

   - Drive C, if you have a fixed disk
   - Drive B, if you have only diskette drives.

The "Create Customized System" panel now appears on your screen:



```
Panel 4                    CREATE CUSTOMIZED SYSTEM
______________________________________________________________________

Press PF3 to create customized system.
Insert diskettes as requested.

REMAINING     32           Files still to be copied

TOTAL         32           Files needed for your system

SOURCE         A           IBM files are on drive A

TARGET         C           Customized system is created on drive C











PF1=Help                   PgUp=Prev                  Home=Home     Esc=Quit
```

a. Press PF3 to create the customized system.

   Messages appear at the bottom of this screen to prompt you to insert diskettes into drives A and/or B at various times throughout the customization process.

b. Observe the messages closely and perform each requested operation.

c. When the message prompts you to insert a target system diskette into drive B, insert the requested system diskette that you formatted in Chapter 3.

   Note: If you have only one diskette drive, customization temporarily renames drive A to drive B so that you can copy files from one diskette to another. In this case, when you are prompted to insert a target diskette into drive B, you will actually insert it into drive A, but customization will know the difference. You will need to change diskettes frequently if you have only one diskette drive, so follow the messages closely.

d. If you are copying your customized workstation program to a fixed disk or diskette that already contains a copy of the workstation program, the following messages appear:

```
INDCU034  System files already exist on target disk
INDCU035  Do you want them replaced? (Y/N)
```

   Type a **Y** if you want to continue and replace the old workstation program files with the new level of the program. You should also replace system files if you have applied any APARs to your workstation program diskettes.

e. When you are prompted to insert workstation program diskette 2, remove the diskette from drive A and replace it with the requested diskette. Keep all the workstation program diskettes handy, because you may be prompted to reinsert them later in this procedure.

When all the files have been copied, the customization program returns you to DOS. You will see the DOS prompt appear on your screen.

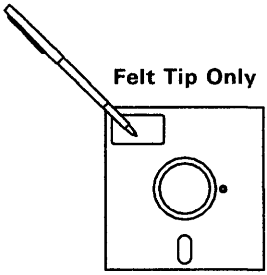
```
A>
```

7. Return the workstation program diskettes to the diskette holder.

   A copy of the customized workstation program is now on your fixed disk or system diskettes.

8. Use a felt-tipped pen to indicate the level of your customized workstation program on the labels of your system diskettes. Also include the volume label you selected when you formatted your diskettes.

9. You should make backup copies of your customized system diskette(s) for future use.



Your customized workstation program is now ready for you to load into your work station storage. Move to Chapter 8, "Loading the Workstation Program and Using HELPER."

Performing Recustomization

To recustomize, follow the procedure outlined below in "Performing Customization with User-selected Options," except for the following:

1. Insert system diskette 1 of your previously customized workstation program into the drive from which you want to read the "Preset Options" when you are prompted to do so after entering the drive letter for this option on the "Home" panel.

   The customization program reads the INDCFIG.DAT file from this diskette.

2. If you are using method 2 to revise a previously customized workstation program and you change any of the following options:

   - Terminal type
   - Protocol
   - System unit

   you must respond **Yes** to the following messages:

```
INDCU034  System files already exist on target disk
INDCU035  Do you want them replaced? (Y/N)
```

Performing Customization with User-selected Options

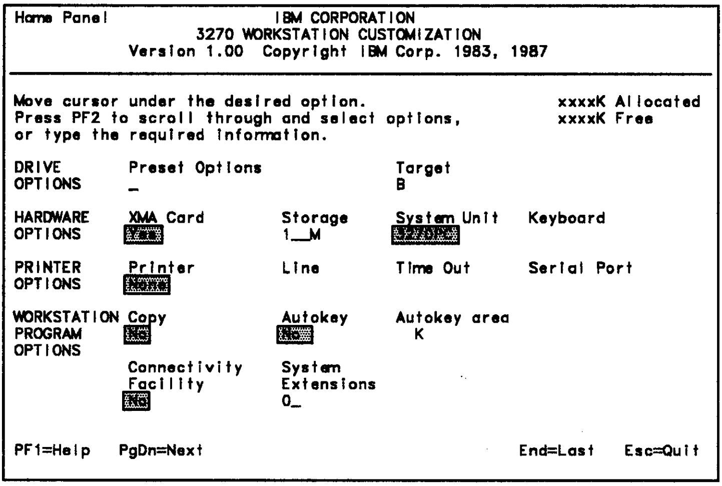
Once you have completed your information worksheets, you are ready to customize your own copy of the IBM 3270 Workstation Program.

To begin customization:

1. Get the IBM 3270 Workstation Program diskettes from the clear plastic holder in the back of your binder. If your workstation program is on 5 1/4 inch diskettes, you will have three program diskettes. If your workstation program is on 3 1/2 inch diskettes, you will have two diskettes.
2. Insert the first workstation program diskette in drive A.
3. Close the lever on drive A.
4. After the DOS prompt, type:

   `indcfig`
5. Press the enter key (↵).

   The following panel should appear on your screen:



```
Home Panel                    IBM CORPORATION
                        3270 WORKSTATION CUSTOMIZATION
              Version 1.00  Copyright IBM Corp. 1983, 1987
-------------------------------------------------------------------
Move cursor under the desired option.                xxxxK Allocated
Press PF2 to scroll through and select options,      xxxxK Free
or type the required information.

DRIVE        Preset Options               Target
OPTIONS      _                            B

HARDWARE     XMA Card       Storage       System Unit   Keyboard
OPTIONS      Yes            1__M          3270PC

PRINTER      Printer        Line          Time Out      Serial Port
OPTIONS      None

WORKSTATION  Copy           Autokey       Autokey area
PROGRAM      No             No              K
OPTIONS
             Connectivity   System
             Facility       Extensions
             No             0_

PF1=Help   PgDn=Next                           End=Last    Esc=Quit
```

This is the first customization panel, the “Home” panel. The option categories appear on the left of the panel. The name of each option appears above the option field. There are two types of option fields.

- Selectable option fields in which the preset values appear in reverse video.
- Entry option fields in which the preset values appear in green.

  If an entry option does not have a preset value, a green entry line appears.

Before you begin making entries on the “Home” panel, read the next three sections.

Before You Begin

If you are customizing for the first time, and are unfamiliar with how to use the customization panels, press PF1 to get to the general help panels. The general help panels explain:

- How to get help when you need it
- How to make selections and entries on the customization panels
- What keys are valid during customization
- How to move between panels.

Read the information contained on the four general help panels before starting to select options on your customization panels.

How to Exit from the Customization Program

You can exit from the customization program at any time by pressing Esc. If you exit from customization before you create a customized workstation program diskette, however, none of your option selections are saved.

Selecting Options on the Customization Panels.

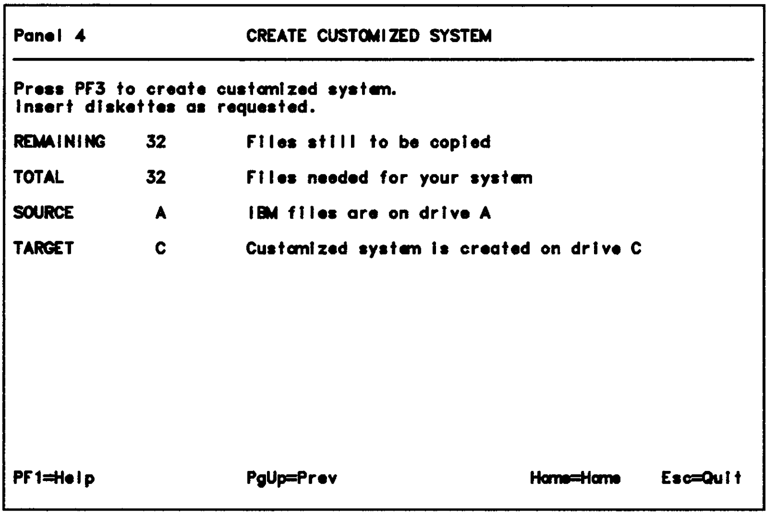
Using your information worksheets as a guide, move through the series of customization panels and select or enter the options you have chosen for your workstation program.

- To change a selectable option, move your cursor to the option field and continue pressing PF2 until the desired option is displayed.
- To change an enterable option, move the cursor to the option field and type the required information.

When you have finished selecting options on all the customization panels, the "Create Customized System" panel appears.

Create Customized System Panel

The "Create Customized System" panel is the last customization panel.



```
Panel 4                     CREATE CUSTOMIZED SYSTEM
--------------------------------------------------------------------------
Press PF3 to create customized system.
Insert diskettes as requested.

REMAINING    32             Files still to be copied

TOTAL        32             Files needed for your system

SOURCE        A             IBM files are on drive A

TARGET        C             Customized system is created on drive C








PF1=Help                    PgUp=Prev                  Home=Home    Esc=Quit
```

1. Press PF3 to create the customized system.

   Note: If you need to cancel the customization program before the customized system is created, press Esc. The message

   ```
   INDCU015  Customization incomplete-system not created
   ```

   is then displayed. This message tells you that the customization program did not finish copying all of the required files to the customized system diskette. You will not be able to use the system on that diskette.

   Messages appear at the bottom of this screen to prompt you to insert diskettes into drives A and/or B at various times throughout the customization program.

2. Observe the messages closely and perform the requested operation.

3. When the message prompts you to insert a target diskette into drive B, insert the requested system diskette that you formatted in Chapter 3.

   Note: If you have only one diskette drive, customization temporarily renames drive A to drive B so that you can copy files from one diskette to another. In this case, when you are prompted to insert a target diskette into drive B, you will actually insert it into drive A, but customization will know the difference. You will need to change diskettes frequently if you have only one diskette drive, so follow the messages closely.

4. If you are copying your customized workstation program to a fixed disk or diskette that already contains a copy of the workstation program, the following messages appear:

```
INDCU034  System files already exist on target disk
INDCU035  Do you want them replaced? (Y/N)
```

   Type a **Y** for yes if you want to replace the old workstation program files with the new level of the program. You should replace system files if you have applied any APARs to your workstation program diskettes.

5. When you are prompted to insert workstation program diskette 2 or 3, remove the diskette from drive A and replace it with the requested diskette. Keep all the workstation program diskettes handy, because you may be prompted to reinsert them later in this procedure.

   After the customization program has copied all your selected options, you will see this message:

```
INDCU038 Do you want the 3270 Workstation utilities copied? (Y/N)
```

   The 3270 Workstation utilities include programs to assist you with file transfer, saving and restoring, and creating system/program information files, just to name a few. You can copy these programs when you customize, or copy them later using the UTILCOPY.BAT file. This batch file is on workstation program diskette 2 of 3 for 5 1/4 inch diskettes and diskette 1 of 2 for 3 1/2 inch diskettes.

6. If you want these utilities copied during customization, enter **Y** for yes. When you are prompted to insert the utilities diskette, make sure you insert the correct target diskette into your target drive:

   - If you are customizing to 360K, 5 1/4 inch diskettes, use the third target diskette you formatted for copying your customized workstation program.
   - If you are customizing to a 1.2M, 5 1/4 inch diskette, or a 3 1/2 inch diskette, the utilities will fit on the same target diskette as your customized workstation program.

Customization Wrapup

After the customization program completes copying the necessary files for your customized workstation program, it displays the message:

```
INDCU36  Customization complete
```

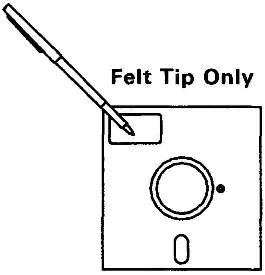
1. At this point, you can do one of the following:

   - Create another copy of the customized workstation program by pressing PF3
   - Press Esc to quit the customization program
   - Return to the customization panels and change options to create another customized workstation program.

2. The customization program creates a DOS file called AUTOEXEC.BAT on the customized system diskette. The customization program puts the INDCIPL command in this file.

Do not alter or remove the INDCIPL command in this file. It is the command that loads your IBM 3270 Workstation Program when you turn on your work station. You may include other DOS commands in AUTOEXEC.BAT, but be sure that they **follow** the INDCIPL command.

3. After customization is complete, return the workstation program diskettes to the diskette holder.
4. Use a felt-tipped pen to indicate the level of your customized workstation program on the labels of your system diskettes. Also include the volume label you selected when you formatted your diskettes.



5. You should make backup copies of your customized system diskette(s) for future use.

What to Do Next

You now have a customized workstation program. Part 2 explains some additional, though optional, setup tasks you might want to perform before using your work station. Alternatively, you may want to go directly to Chapter 8 and begin using your workstation program immediately. Optional setup tasks can be performed at any later time.

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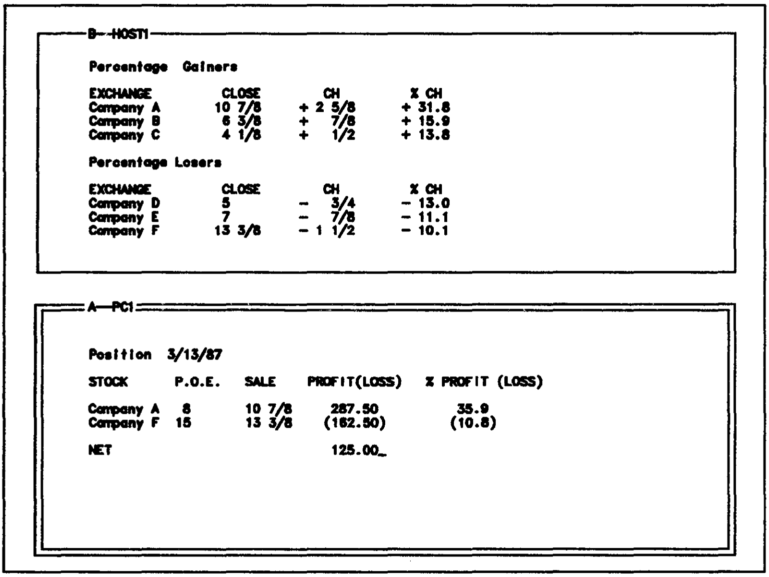
Chapter 5. Setting Up Screen Profiles

A major benefit of the IBM 3270 Workstation Program is the ability to use more than one application program at a time. You do this with **windows** on your work station screen. You have a window for each session you defined when you customized your workstation program. You can arrange different sets of windows, called **screen profiles**, depending on the types of applications you want to use.

For instance, suppose you want to view a host data file and take notes on it using a PC text processor. To do this, you might have a screen profile with windows arranged like those below.

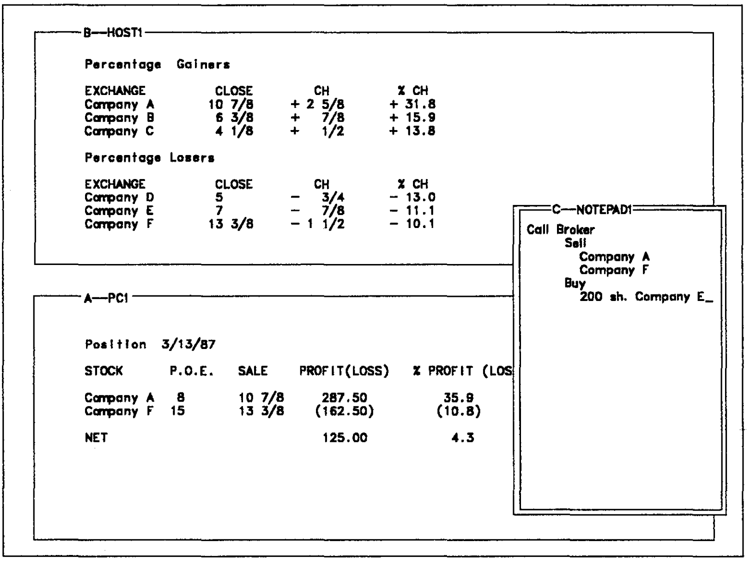


```
Percentage  Gainers

EXCHANGE          CLOSE        CH        % CH
Company A        10 7/8     + 2 5/8     + 31.8
Company B         6 3/8     +   7/8     + 15.9
Company C         4 1/8     +   1/2     + 13.8

Percentage Losers

EXCHANGE          CLOSE        CH        % CH
Company D         5         -   3/4     - 13.0
Company E         7         -   7/8     - 11.1
Company F        13 3/8     - 1 1/2     - 10.1
```

```
Position  3/13/87

STOCK       P.O.E.   SALE    PROFIT(LOSS)   % PROFIT (LOSS)

Company A    8       10 7/8    287.50          35.9
Company F   15       13 3/8   (162.50)        (10.8)

NET                            125.00_
```

As you review the data in window B—HOST1, you can make notes using a text processor or spreadsheet program in window A—PC1. As shown in the illustration, the PC window is the active window and has a double border. When you are finished, you can save your notes, or use the text processing program to print them. (See Chapter 10 for information on using host and PC sessions.)

Suppose, in addition, you decide you want to act on some data presented in the host file—perhaps with a phone call to someone later. You might want to have a screen profile that also contains a notepad window so that you can type a note to call the appropriate person. It might look like this:



```
B—HOST1

Percentage  Gainers

EXCHANGE         CLOSE        CH          % CH
Company A        10 7/8     + 2 5/8      + 31.8
Company B         6 3/8     +   7/8      + 15.9
Company C         4 1/8     +   1/2      + 13.8

Percentage Losers

EXCHANGE         CLOSE        CH          % CH
Company D         5         -   3/4      - 13.0
Company E         7         -   7/8      - 11.1
Company F        13 3/8     - 1 1/2      - 10.1
```

```
A—PC1

Position  3/13/87

STOCK       P.O.E.   SALE     PROFIT(LOSS)   % PROFIT (LOS

Company A    8       10 7/8     287.50          35.9
Company F   15       13 3/8    (162.50)        (10.8)

NET                             125.00           4.3
```

```
C—NOTEPAD1
Call Broker
     Sell
       Company A
       Company F
     Buy
       200 sh. Company E_
```

You can jump to the notepad session at any time to review things to be done, delete tasks you have completed, and add additional notes. You might even want to keep a calendar in one of your notepad windows. (See Chapter 10 for information on the use and limitations of notepad sessions.)

You already have a basic screen profile, screen profile 0. This was defined when your workstation program was customized, and it contains a window for each of the sessions specified at that time. You can use screen profile 0 as is, or rearrange the windows to suit your work station requirements. You cannot add or delete windows from screen profile 0, unless you recustomize your workstation program.

If you have several tasks that you do frequently, you can set up as many as nine additional screen profiles (numbered 1 through 9) with windows arranged to assist you with each task. To define a new screen profile, choose the windows you want in your new screen profile from the basic set of windows in screen profile 0. You can then size, arrange, and color them to suit the task you have in mind.

The remainder of this chapter explains how to customize screen profiles. You will learn how to:

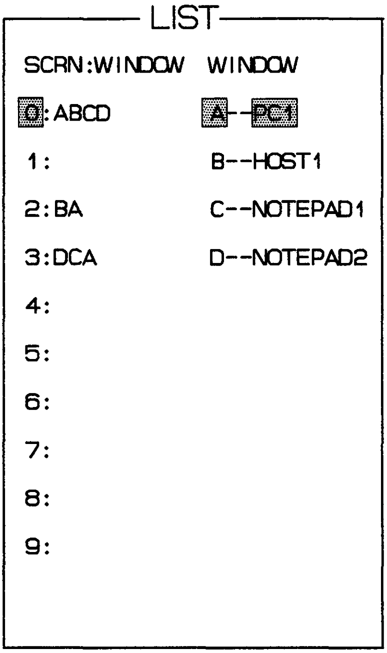
- List screens and windows
- Change the size and location of the windows on your screen
- Change the color of your windows and screens
- Create new screen profiles
- Add windows to your screen profile
- Delete windows from your screen profile.

List Screens and Windows

While you are in work station control mode, you can get a list of all your screens and windows. To do this:

1. Press the WSCtrl key (Shift + Esc on the Enhanced PC keyboard and XT/AT keyboards) to get into work station control mode.
2. Press the List key, PF1 (F1 on the Enhanced PC keyboard and XT/AT keyboards).

A list similar to the one shown below appears on your screen:



```
                 LIST
 SCRN:WINDOW    WINDOW
 0:ABCD         A--PC1
 1:             B--HOST1
 2:BA           C--NOTEPAD1
 3:DCA          D--NOTEPAD2
 4:
 5:
 6:
 7:
 8:
 9:
```

In this list, the left-hand column displays the number of each screen profile, followed by the short names of the windows defined for the profile. The windows defined for screen profile 0, for instance, are A, B, C, and D. The windows are listed in the order they would appear if you jumped from one to the next. The number in reverse video is the screen profile in use right now.

The list on the right gives the short and long names for all the windows that were defined when your workstation program was customized. Window A, shown here in reverse video, is the active window.

You can leave the list on the screen while you perform most work station control functions.

Note: If a help panel is already on the screen, List will cover it until List is turned off, or until Help is pressed.

Changing the Size and Location of the Windows on Your Screen

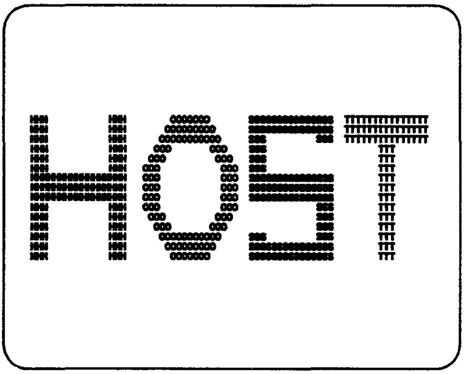
Note: If you are using the workstation program on a system unit with an XT or AT keyboard, the following method will not work on your work station. You must use API programming to change the size and location of your windows. Refer to the *IBM 3270 Workstation Program Programming Guide* for more information.

If all of your windows are full size, you may want to make them smaller and position them so that you can see them all on your screen at the same time. Or, if your windows are already sized, you may want to change the way they appear on your screen.

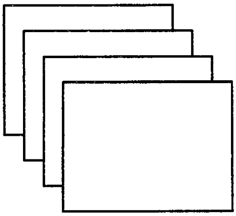
The instructions that follow tell you how to reorganize your full-size windows so that they all fit on one screen together, change their size, and move them around on the screen. After working along with the examples given here, you can experiment and arrange your windows to suit your needs.

Reducing the Size of Your Full-Size Windows and Moving Them Around

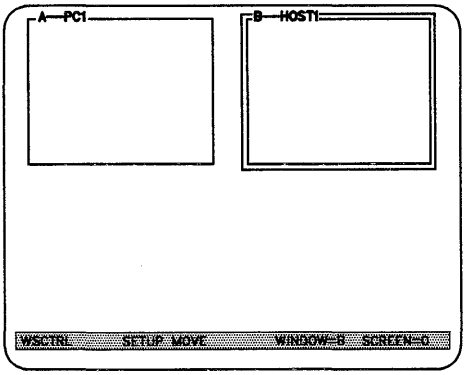
After you load your own version of the workstation program, your screen may look like this:



You are looking at your first full-size window. It doesn't look like a window because it fills the entire screen. You can't even see its border. All your windows start out full size unless your workstation program was customized with the default options. You can imagine that they are stacked one behind the other like sheets of paper.



If you have more than one window, we will show you how to arrange them so that you can see them on your screen at the same time. Even though they do not fill the entire screen, you can enlarge them when you want. Let's assume that you have at least two windows. We will show you how to arrange them to look like this:



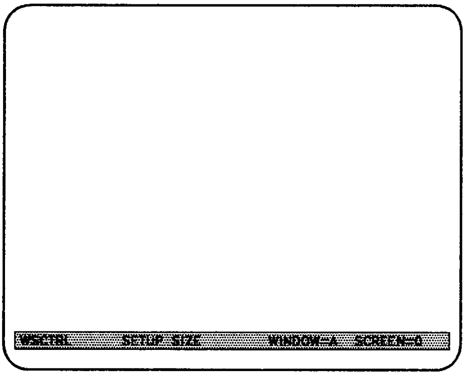
Follow these instructions, even if you have more than two windows. After you do the first two, you will know enough to do the rest on your own.

Changing the Size of the First Window

Let's place the first window in the upper left corner of your screen:

1. If you are not in work station control mode, press the WSCtrl key (Shift + Esc on the Enhanced PC keyboard).
2. Now press the Size key, PF12 (F12 on the Enhanced PC keyboard).

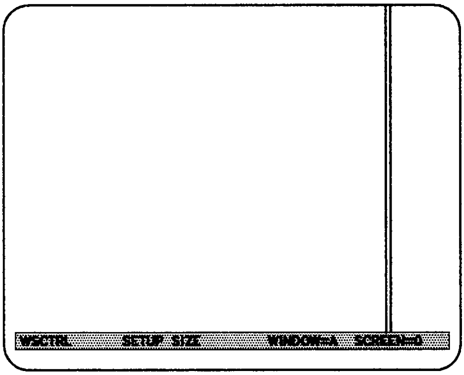
   Your screen should look similar to this:

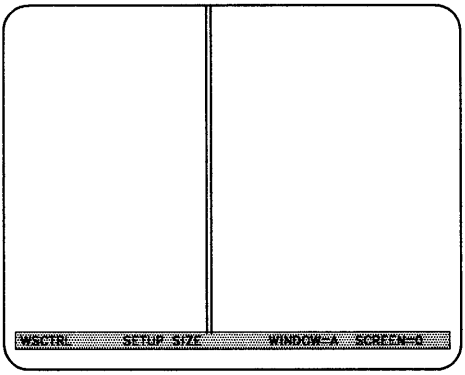
   WSCTRL   SETUP SIZE   WINDOW=A SCREEN=0

   Notice the work station control mode operator information area (OIA) across the bottom of your screen. The OIA keeps you informed about the task you are performing. In the above example, we are performing the setup task of sizing a window and we are working with window A of screen profile 0. The actual window and screen profile displayed on your work station may vary from what is shown here, but the words "setup" and "size" should appear in your OIA.
3. Press the black left cursor key. Throughout, you will use only the black cursor keys. Do not use the numeric keypad cursor keys.

The right border of the first window appears along the right side of your screen.


WSCTRL SETUP SIZE WINDOW=A SCREEN=0

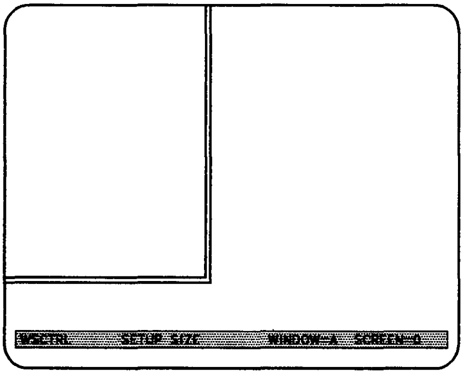
4. Press the left cursor key until the right border is near the center of the screen.


WSCTRL SETUP SIZE WINDOW=A SCREEN=0

You may begin to see part of the second window, which is behind the first, appear as the border moves to the left.

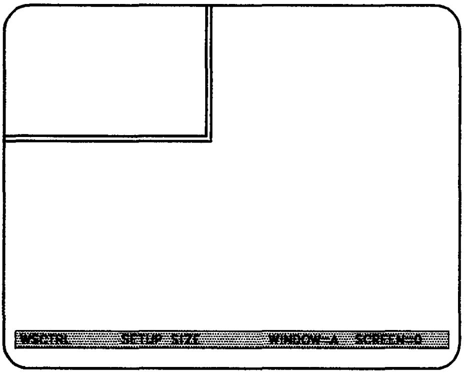
If you move the border too far to the left, use the right cursor key to move it back.

5. Press the up cursor key.


WSCTRL SETUP SIZE WINDOW=A SCREEN=0

The bottom border of the window appears along the bottom of your screen.

6. Continue pressing the up cursor key until the bottom border is near the center of the screen.

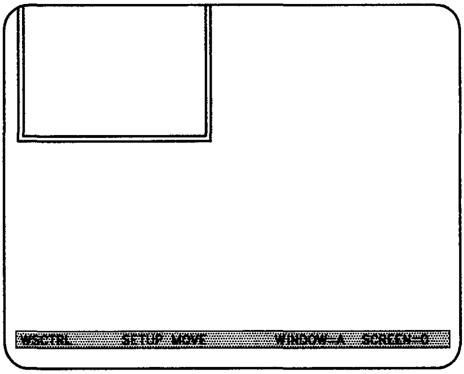

WSCTRL SETUP SIZE WINDOW=A SCREEN=0

If you move it up too far, use the down cursor key to move it back.

7. Press the move key, PF11 (F11 on the Enhanced PC keyboard).

   Notice that the word "move" appears in the OIA.

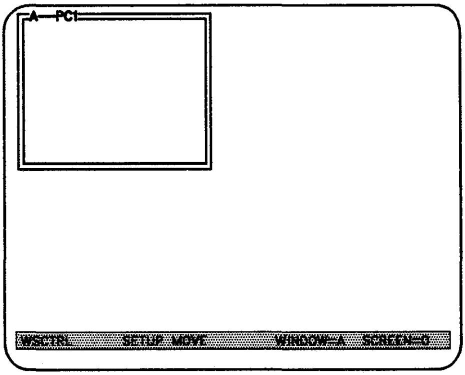
8. Press the right cursor key once.


WSCTRL SETUP MOVE WINDOW=A SCREEN=0

   The left border of the window appears along the left side of the screen.

9. Press the down cursor key once.

   The top border with the name of the window appears.


A—PC1
WSCTRL SETUP MOVE WINDOW=A SCREEN=0

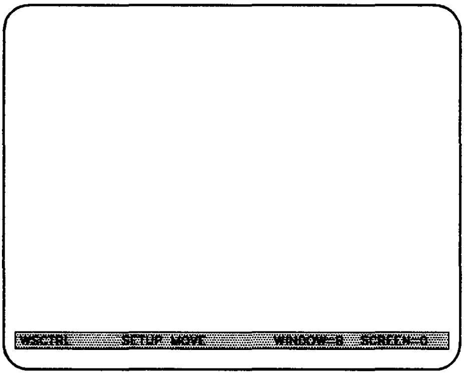
You now have your first window in the upper left corner of your screen. Leave it there while working on your second window.

Changing the Size of the Second Window

Let's place your second window in the upper right corner of the screen. First, change its size:

1. Press the Jump key (left Alt + Page Up on the Enhanced PC keyboard) to get to the next full-size window.

   Your second window appears and covers the entire screen.

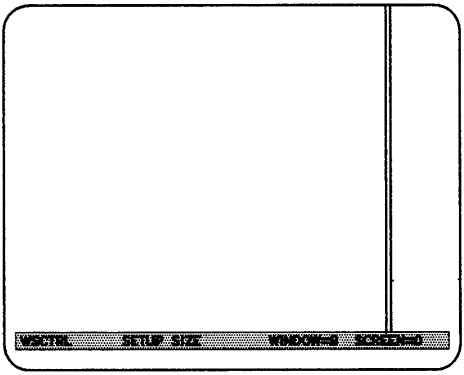


```
WSCTRL     SETUP MOVE          WINDOW=B  SCREEN=0
```

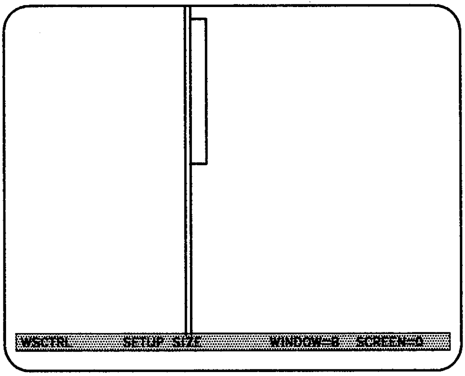
2. Press the size key, PF12 (F12 on the Enhanced PC keyboard).

3. Press the left cursor key.

   The right border of the second window appears.

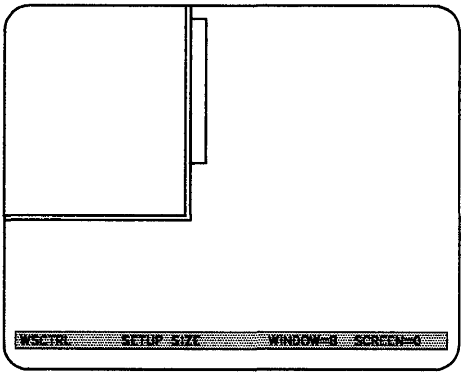

WSCTRL
SETUP SIZE
WINDOW=0
SCREEN=0

4. Keep pressing the left cursor key to move the border to the left until the edge of the first window begins to show.

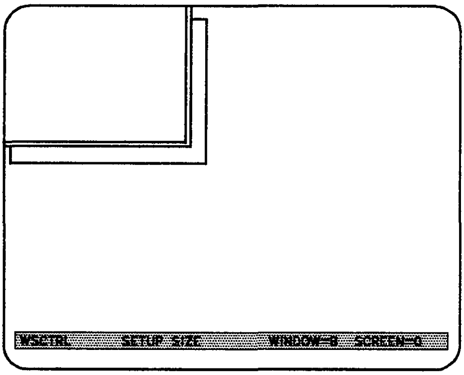

WSCTRL
SETUP SIZE
WINDOW=0
SCREEN=0

5. Press the up cursor key.

   The bottom border of the second window appears.


WSCTRL SETUP SIZE WINDOW=B SCREEN=0

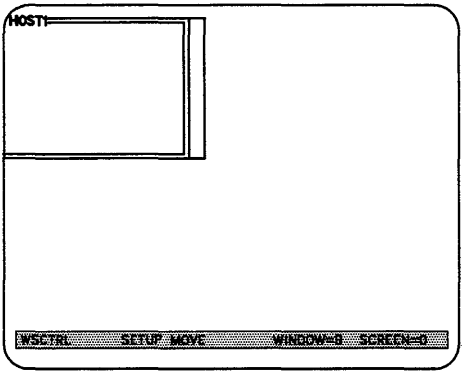
6. Keep pressing the up cursor key until the bottom of the first window also begins to show.


WSCTRL SETUP SIZE WINDOW=B SCREEN=0

   Your second window is now almost completely covering your first window.

7. Press the move key, PF11 (F11 on the Enhanced PC keyboard).

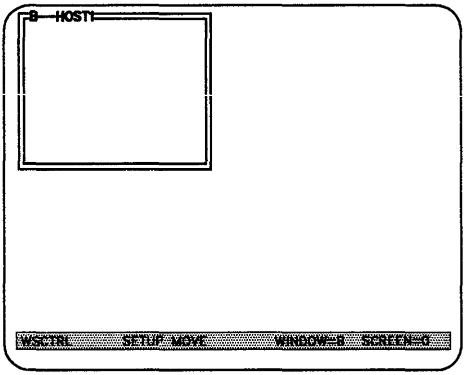
8. Press the down cursor key once.


HOST1
WSCTRL
SETUP MOVE
WINDOW=B
SCREEN=0

The top border of the second window appears.

9. Press the right cursor key once.

The left border appears. Now the second window is covering the first.


B
HOST1
WSCTRL
SETUP MOVE
WINDOW=B
SCREEN=0

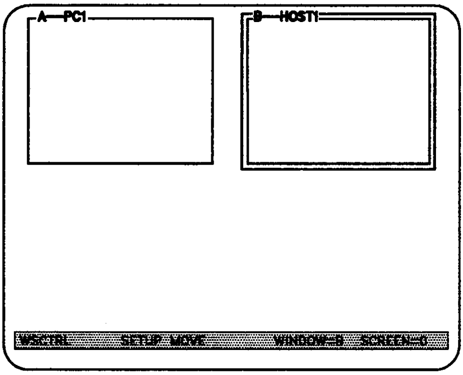
It doesn't matter if the two windows are not exactly the same size.

Now, let's move the second window to the upper right corner of the screen.

10. Press the right cursor key.

    The window moves to the right.

11. Keep pressing the right cursor key until the window has reached the position that you want on the right side of the screen.



Cornering: Another way to move windows is to corner them. To do this, press PF10 (F10 on the Enhanced PC keyboard). Note that the active window moves to the upper left corner of the screen and its top and left borders disappear. Keep pressing PF10 until the window is in the corner you want. Use the move key, PF11 (F11 on the Enhanced PC keyboard), and the cursor keys to move the window until the borders reappear on the screen.

You have now changed the size of and moved your first two windows. If the two windows do not fit exactly, you can use the PF11 or PF12 keys (F11 or F12, respectively, on the Enhanced PC keyboard) and the cursor keys to adjust their size or move them so that they fit. If you have other windows, you can arrange them in the same way as the first two. Remember to use:

- The Jump key (left Alt + Page Up on the Enhanced PC keyboard) to choose the next window.
- The PF12 key (F12 on the Enhanced PC keyboard) and the cursor keys to change the size.

- The PF11 key (F11 on the Enhanced PC keyboard) and the cursor keys to move the window.
- The PF10 key (F10 on the Enhanced PC keyboard) to corner a window.

Now that you know how to rearrange your windows, take a few minutes and put them where you like them.

When you are done, press the WSCtrl key (Shift + Esc on the Enhanced PC keyboard) again, to exit from work station control mode.

You can now begin using your new screen profile, but first you should save your changes.

Saving Your Window Changes

Whenever you make changes to your windows, you should save the changes before you turn off your system. If you don't, they will be lost and you will have to make them over again the next time you turn on your system.

To learn how to save your changes, see Chapter 11.

Changing the Color of Your Screen and Windows

Figure 5-1 illustrates the changes you can make to window colors.

Windows	Base Colors	Allowable Color Changes
PC	White text on black background	PC application programs that use colors will determine what colors appear and where. You cannot change them.
Host	Red, green, blue, and white, as used by the host application program	You can change foreground and background colors[1]. You can also emphasize selected words in text by using different colors, blinking characters, bold type, underscoring[2], or reverse video.
Notepad	Green text on black background	You can change foreground and background colors[1]. You can also emphasize selected words in text by underscoring[2], blinking characters or reverse video. If you want to emphasize selected words with different colors, however, you must do so with the black background.

[1] You can keep these changes to the base colors in force by saving your screen profile (see Chapter 11).

[2] Underscoring will not work if you are using non-3270 PC hardware with an EGA monitor.

Figure 5-1. Allowable Window Color Changes

Concerning host session colors, some host applications can override colors you select. The following message appears:

```
INDWS029  Color setting override: Changes may not show
WSCTRL     SETUP COLOR BKGND _
```

When the host application program ends processing, the changes you have made will appear in the window.

Concerning notepad session colors, the same message will appear if you try to change colors that have already been changed. To make further changes, you must first return to the base colors.

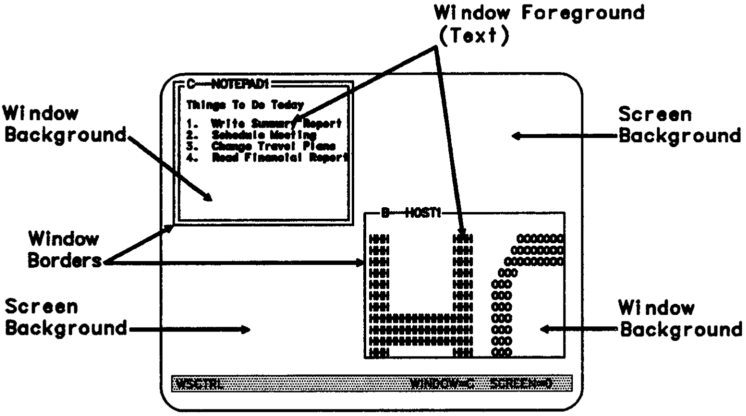
This section will tell you how to:

- Change the color of the background in your windows
- Change the color of the text in your windows
- Change the color of the screen behind your windows
- Use the 3270 base colors in your host or notepad windows.

Note: If you are using the workstation program on a system unit with an XT or AT keyboard, the following methods for changing colors will not work on your work station. You must use API programming to change the color of your screen and windows. Refer to the *IBM 3270 Workstation Program Programming Guide* for information on using API programming.

What to Look For

If you have a color monitor, you can color these areas of the windows and the screen:


Window Foreground (Text)
Window Background
Screen Background
Window Borders
Screen Background
Window Background
C—NOTEPAD1
Things To Do Today
1. Write Summary Report
2. Schedule Meeting
3. Change Travel Plans
4. Read Financial Report
B—HOST1
WSCTRL
WINDOW=C SCREEN=0

Changing the Background Color of a Window

1. To begin, use the Jump key (left Alt + Page Up on the Enhanced PC keyboard) to choose the window you want to color.
2. If you are not in work station control mode, press the WSCtrl key (Shift + Esc on the Enhanced PC keyboard).
3. For background, press PF24 (Shift + F12 on the Enhanced PC keyboard).

   The line at the bottom of your screen changes to:

   ```
   Select the color setting desired by using the color coded keys.
   WSCTRL     SETUP COLOR BKGND _
   ```

4. To select a color, press the Alt key and one of the color keys, PF13 through PF20 (Shift + left Alt + one of F1 through F8 on the Enhanced PC keyboard).
5. If you don't like the color you chose, repeat step 4 with a different PF or F key.
6. If you are finished changing colors, press the WSCtrl key (Shift + Esc on the Enhanced PC keyboard) to go back to using your windows for work.

Changing the Foreground Color in a Window

1. To begin, use the Jump key (left Alt + Page Up on the Enhanced PC keyboard) to choose the window you want to color.
2. If you are not in work station control mode, press the WSCtrl key (Shift + Esc on the Enhanced PC keyboard).
3. For foreground, press PF23 (Shift + F11 on the Enhanced PC keyboard).

   This line at the bottom of your screen changes to:

```
Select the color setting desired by using the color coded keys.
WSCTRL     SETUP COLOR FRGND _
```

4. To select a color, press the Alt key and one of the color keys, PF13 through PF20 (Shift + left Alt + one of F1 through F8 on the Enhanced PC keyboard).
5. If you don't like the color you chose, repeat step 4 with a different PF or F key.
6. If you are finished changing colors, press the WSCtrl key (Shift + Esc on the Enhanced PC keyboard) to go back to using your windows.

Changing the Screen Background Color

To begin:

1. If you are not in work station control mode, press the WSCtrl key (Shift + Esc on the Enhanced PC keyboard).
2. For the screen background, press PF22 (Shift + F10 on the Enhanced PC keyboard).

   The line at the bottom of your screen changes to:

```
Select the color setting desired by using the color coded keys.
WSCTRL     SETUP COLOR SCBK _
```

3. To select a color, press the Alt key and one of the color keys, PF13 through PF20 (Shift + left Alt + one of F1 through F8 on the Enhanced PC keyboard).
4. If you don't like the color you chose, repeat step 4 with a different PF or F key.
5. If you are finished changing colors, press the WSCtrl key (Shift + Esc on the Enhanced PC keyboard) to go back to using your windows for work.

Using the Base Colors in Your Host and Notepad Windows

To change back to the base colors in a host or notepad window:

1. Use the Jump key (left Alt + Page Up on the Enhanced PC keyboard) to choose the host or notepad window you want.
2. If you are not in work station control mode, press the WSCtrl key (Shift + Esc on the Enhanced PC keyboard).
3. Press the base key, PF21 (Shift + F9 on Enhanced PC keyboard), and the window changes to the four base colors.

4. When you are finished, press the WSCtrl key (Shift + Esc on the Enhanced PC keyboard) to go back to using your windows.

Saving Your Color Changes

Whenever you make changes to your windows, you must save the changes before you turn off your system. If you don't save them, they will be lost and you will have to make them over again the next time you turn on your system.

Refer to Chapter 11 to learn how to save and restore screen profiles.

Creating New Screen Profiles

Note: If you are using the workstation program on a system unit with an XT or AT keyboard, the following method will not work on your work station. You must use API programming to create new screen profiles. Refer to the *IBM 3270 Workstation Program Programming Guide* for information on using API programming.

Screen profile 0 includes a window for each host, notepad, and PC session your workstation program was customized for. Although you can rearrange the windows in Screen 0, you still have to work with all of them. You cannot add or delete windows from Screen 0 unless you recustomize your workstation program. The arrangements that you can devise for Screen 0 may not always fit your needs. You may want to create your own screen profiles if you:

- Need a special arrangement of windows for certain types of work
- Find it more convenient to limit the number of windows on your screen.

The following sections explain how to create and work with new screen profiles.

Determining the Active Screen Profile

To determine which screen profile and window are active, you need to be in work station control mode. If you are not in work station control mode, press the WSCtrl key (Shift + Esc on the Enhanced PC keyboard).

An OIA line similar to the one below appears at the bottom of your screen:

```
WSCTRL                  WINDOW=A SCREEN=0
```

The letter after WINDOW is the short name of the active window. The number after SCREEN is the active screen profile.

To change screens, press Shift + ChgSc (left Alt + Home on the Enhanced PC keyboard).

If you have only one screen profile, the following message appears:

```
INDWS040 Cannot use ChgSc: All other screens are empty
WSCTRL                  WINDOW=A SCREEN=0
```

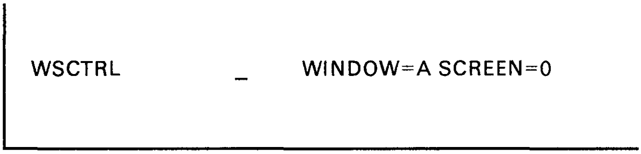
If you do not see this message, the number for the screen will be other than 0, meaning that you have other screens defined for you. You can press Shift + ChgSc (left Alt + Home on the Enhanced PC keyboard) repeatedly to page through the screen profiles that have been defined for your workstation program. To view all the screen profiles that have been set up for your workstation program, use the List key, PF1 (F1 on the Enhanced PC keyboard) as explained in “List Screens and Windows” on page 5-3.

Setting Up a New Screen Profile

To set up a new screen:

1. If you are not in work station control mode, press the WSCtrl key (Shift + Esc on the Enhanced PC keyboard).

   An OIA line similar to the following appears at the bottom of your screen.

   ```
   WSCTRL          _        WINDOW=A SCREEN=0
   ```

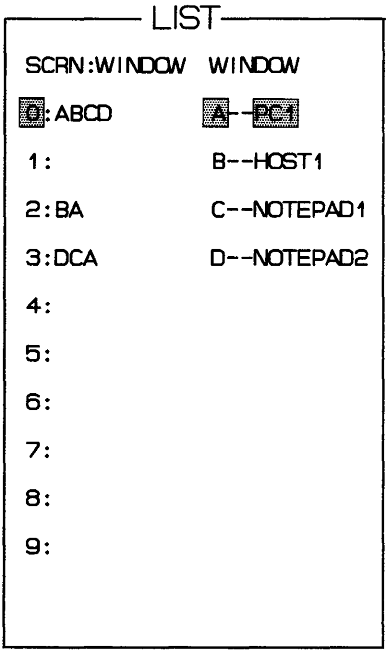
   This line shows that window A on screen 0 is active.

2. If your windows are enlarged, press the Enlarge key (left Alt + Insert on the Enhanced PC keyboard) to make them smaller.

3. Type a number from 1 through 9.

   This is the number of the new screen. You can choose any number that is not already being used for another screen.

4. If you are not sure which screens are available, press the PF1 key (F1 on the Enhanced PC keyboard) to list the screen profiles. Screen profile numbers that have no windows listed with them are not in use and available for definition. For example,



```
LIST
SCRN:WINDOW  WINDOW
0:ABCD       A--PC1
 1:          B--HOST1
2:BA         C--NOTEPAD1
3:DCA        D--NOTEPAD2
4:
5:
6:
7:
8:
9:
```

Screens 1 and 4 through 9 are not being used.

5. You can press the PF1 (F1 on the Enhanced PC keyboard) key again to remove the list.

6. Type the number of the screen that you want to define.

   Your screen goes blank. If you choose 1, the line changes to:

```
WSCTRL                    WINDOW=  SCREEN=1
```

7. Type the short name of each of the windows you want to add to this screen profile.

   The windows appear on your new screen as you type their names. The line at the bottom shows the short name of the window that you just added. For example, if you typed A, the line would look like this:

   ```
   WSCTRL           _        WINDOW=A SCREEN=1
   ```

   You can add one or more of the windows from Profile 0. If you don't remember the short names of the windows, you can press the PF1 key again to look at the list. It also lists all your windows.

8. When you have the windows you want on your screen, you can move them around and change their size. See the section "Changing the Size and Location of the Windows on Your Screen" on page 5-5, and follow those instructions.

9. When you are ready, press the WSCtrl key (Shift + Esc on the Enhanced PC keyboard) to go back to your work.

Adding a New Window to One of Your Screens

At any time, you can add any window from screen 0 to screens 1 through 9.

To add a new window:

1. If you are not in work station control mode, press the WSCtrl key (Shift + Esc on the Enhanced PC keyboard).

This line should appear at the bottom of your screen:

```
WSCTRL              _          WINDOW=A SCREEN=0
```

This line shows, for example, that window A on screen 0 is active.

2. If this is not the screen profile you want, type the number of the screen to which you want to add a window.

   That screen profile appears on your screen. For example, if you typed 2, the line at the bottom changes to:

   ```
   WSCTRL              _          WINDOW=B SCREEN=2
   ```

3. If you do not remember all the windows in this screen profile, press list, PF1 (F1 on the Enhanced PC keyboard) to see which windows have been assigned to it.
4. Type the short name of the window you want to add to this screen profile.

   You can add any of the windows from screen 0 that are not already in screen 2. The window appears on your screen as you type its name. If your windows are full size, the new window also fills the screen. The line at the bottom shows the short name of the window that you just added. For example, if you added window D:

   ```
   WSCTRL              _          WINDOW=D SCREEN=2
   ```

5. When you have added the window you want, you can move it around and change its size. See the section "Changing the Size and Location of the Windows on Your Screen" on page 5-5, in this chapter and follow those instructions.
6. When you are ready, press the WSCtrl key to go back to your work.

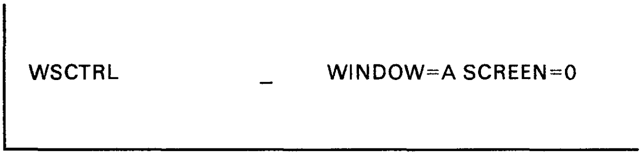
Removing a Window from a Screen Profile

You may have been using a screen for a while and now decide to remove a window. You can do this at any time on any of your screens except Screen 0.

To remove a window:

1. If you are not in work station control mode, press the WSCtrl key (Shift + Esc on the Enhanced PC keyboard).

   This line should appear at the bottom of your screen:

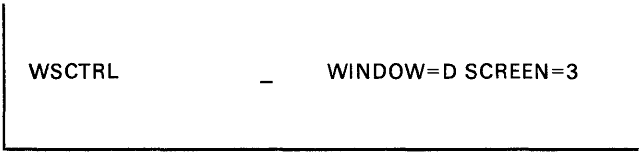


```
WSCTRL          _       WINDOW=A SCREEN=0
```

   This line shows, for example, that Window A on Screen 0 is active.

2. Type the number of the screen profile you want to change.

   That screen profile appears on your screen. For example, if you typed 3, the line changes to:



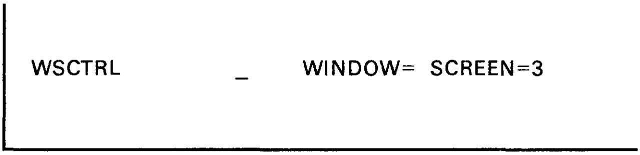
```
WSCTRL          _       WINDOW=D SCREEN=3
```

3. If you are not sure of the number, press PF1 (F1 on the Enhanced PC keyboard) to list your screen profiles.

4. Type the short name of the window you want to remove from this screen, or press the Jump key (left Alt + Page Up on the Enhanced PC keyboard) to activate the window you want to remove.
5. For the window delete function, press Alt + enlarge (left Alt + F7 on the Enhanced PC keyboard).

   The window disappears from your screen, and the line at the bottom changes to show the next window that is active.

   If you remove all the windows from a screen profile, that profile becomes empty. The line at the bottom of the screen looks like this:

   ```
   WSCTRL          _        WINDOW=  SCREEN=3
   ```

   You cannot reach an empty screen profile by using the ChgSc key. It remains empty until you add windows to it again.
6. When you are ready, press the WSCtrl key (Shift + Esc on the Enhanced PC keyboard) to go back to your work.

Saving the Changes to Your Screen Profiles

Whenever you make changes to your windows or screens, you should save these changes before you turn off your system. If you don't, they will be lost. You will have to make them over again the next time you turn on your system.

Refer to Chapter 11 to learn how to save and restore screen profiles.

Choosing the Screen Profile You Want to Use

If you have set up your own screen profiles in addition to Screen 0, you will need to know how to choose the one you want to use. To choose a screen profile:

1. Press Shift + ChgSc (left Alt + Home on the Enhanced PC keyboard).

   The next screen profile containing windows appears. The screens are kept in numerical order.

2. To go to the next screen profile in numerical order that contains windows, press Shift + ChgSc (left Alt + Home on the Enhanced PC keyboard) again.

You can also choose a screen profile in work station control mode:

1. Press the WSCtrl key (Shift + Esc on the Enhanced PC keyboard).
2. Type the number of the screen profile you want.

   The screen profile you requested appears.

3. Press the WSCtrl key (Shift + Esc on the Enhanced PC keyboard) again to go back to your work.

Chapter 6. Setting Up Your PC Applications to Run More Efficiently

There are a number of ways to improve the performance of PC applications on your PC work station. In this chapter, you will learn how to:

- Add commands to your AUTOEXEC.BAT file
- Start PC applications automatically
- Create Program Information Files (PIFs) to improve performance of application programs
- Create System Information Files (SIFs) for system extensions.

Adding Commands to Your AUTOEXEC.BAT File

Batch files contain one or more DOS commands that are run one at a time. DOS has a batch file of its own that runs every time you turn on your system unit. It is called the AUTOEXEC.BAT file, and you can use it to do some things automatically. The next section shows you how to add the INDRSTR command to the DOS AUTOEXEC.BAT file so that it will automatically restore:

- Changes to your windows or screens
- Notes in your notepad sessions
- Keystroke recordings.

You can add other commands to the AUTOEXEC.BAT file. For instance, you might want to use this file to automatically load and start a program in a PC session.

Note: You can also create your own batch files. In "Starting PC Applications Automatically" on page 6-5 you'll learn how to create a simple batch file to automatically load a program in a PC session. To learn more about the AUTOEXEC.BAT file, and batch files in general, see your DOS manual.

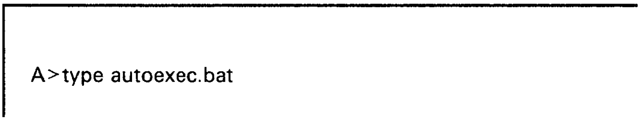
Adding the INDRSTR Command to the AUTOEXEC.BAT File

Chapter 11 explains the commands used to save and restore changes you make while using your workstation program. Any time you make changes to your screen profiles, add notes to a notepad, or create a new autokey recording, you should save these changes using the INDSAVE command. To restore your saved changes, you use the INDRSTR command. You can have your changes restored automatically every time you load the workstation program if you put the INDRSTR command in your AUTOEXEC.BAT file.

To add the INDRSTR command to the AUTOEXEC.BAT file:

1. Jump to a PC window that has DOS.
2. Make sure your default drive contains your workstation program.
3. Type:

   ```
   type autoexec.bat
   ```



```
A>type autoexec.bat
```

4. Press the Enter key (↵).

   The contents of your AUTOEXEC.BAT file will appear on your screen.

5. Make sure there are no INDRSTR commands in the file. If INDRSTR is in the file, you do not need to add it again. If it is not, continue.

6. Now, type:

   `copy autoexec.bat + con: autoexec.bat`

```
A>copy autoexec.bat + con: autoexec.bat
```

7. Press the Enter key (↵).

   This response appears on your screen:

```
A>copy autoexec.bat + con: autoexec.bat
AUTOEXEC.BAT
CON
_
```

8. Type:

   `indrstr`

   Your screen should look like this:

```
A>copy autoexec.bat + con: autoexec.bat
AUTOEXEC.BAT
CON
indrstr_
```

9. Press the Enter key (↵).
10. Press the PF6 (F6 on the Enhanced PC keyboard) key.

    You will see this response:

```
^Z
```

11. Press the Enter key (↵).
12. Wait for this message:

```
^Z
        1 File(s) copied
```

You have now added the INDRSTR command to the AUTOEXEC.BAT file. The next time you turn on your system, anything that you saved with the INDSAVE command will reappear automatically.

Warning: Do not make any changes or add anything in the AUTOEXEC.BAT file before the command that begins INDCIPL. This command loads the workstation program and must, therefore, be run first.

Starting PC Applications Automatically

You can set up your Multi-DOS PC sessions so that each one will come up with the program or function of your choice every time you load the workstation program. To do this:

- Use a DOS editor or the DOS COPY CONsole command to create a batch file for each PC session.
- Enter the name of the program you want started in that session when you load the workstation program.
- Customize your workstation program to start the batch file each time you load the workstation program.

Note: The batch file must be in the root directory of the drive where it is stored.

For example, suppose you want the Personal Editor program to come up in your PC2 session window every time you load your workstation program. The next two sections describe one way to do this.

Creating the Batch File

You can create a batch file with any DOS editor or by using the DOS COPY CON command. Let's call our file **pc2.bat** and use the COPY CON command to create it as follows:

1. Jump to a PC window that has DOS.
2. Make sure your default drive contains your customized workstation program and the DOS COPY utility.

3. Type

   `copy con pc2.bat`

   at the DOS prompt.

```
C>copy con pc2.bat
```

4. Press the Enter key (↵).

   The cursor moves down to a blank line.

5. Type the command that loads the Personal Editor program:

   `pe`

6. Press the Enter key (↵).
7. Press the PF6 (F6 on the Enhanced PC keyboard) key.

   This symbol appears on the display:

```
^Z
```

8. Press the Enter key (↵).
9. Wait for this message:

```
^Z
        1 File(s) copied
```

This is an example of how to use the DOS COPY CON command to create a batch file. The next section explains how to use this batch file with your 3270 Workstation Program.

Customizing Your Workstation Program to Run the Batch File

Now that you have created your batch file, you must customize your workstation program so that it runs the batch file each time you load the workstation program.

Let's continue with our example and customize your system to bring up Personal Editor in PC session 2 using your pc2.bat file.

You have probably already customized your workstation program, but you can easily recustomize it to add this additional function. For more information on recustomizing your workstation program, refer to "Planning for Recustomization" on page 2-13 and "Performing Recustomization" on page 4-6.

1. Jump to a PC session.
2. Remove workstation program diskette 1 from the diskette holder and insert it into diskette drive A.
3. Close the drive door.
4. Type:

   ```
   indcfig
   ```

5. When the "Home Panel" appears, enter the letter of the drive containing your customized system diskette for both "Preset Options" and "Target" under the drive options category.
6. Scroll to the "PC Options" panel.
7. Move the cursor to the line describing the PC session you want to use the batch file with.
8. Move the cursor right to the "Program" option field and type the name of the batch file:

   ```
   pc2.bat
   ```

9. Move the cursor right to the "Default Drive" option field and type the letter of the drive in which you will have the Personal Editor program when you load the workstation program.

In our example, we will have it in drive C.

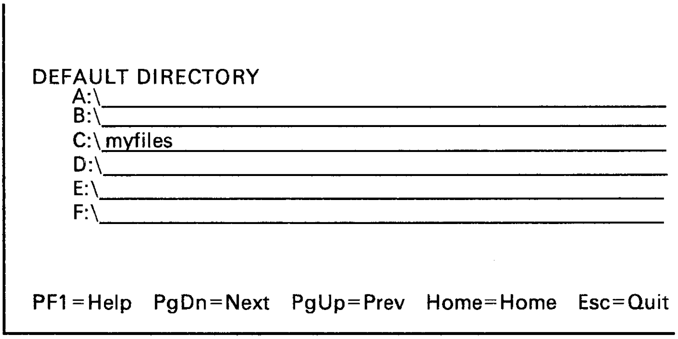
10. If the Personal Editor program is not in a subdirectory, skip the next four steps and continue with step 15.
11. If the Personal Editor program is in a subdirectory, move the cursor right to the "Select Directories" option field and press PF2 until YES appears.
12. Press PgDn to get to the "PC Session Options" panel for the PC session you want the batch file to run with.
13. Check the PC session name and the program name displayed on the panel to make sure you have the correct PC session panel.
14. Move the cursor to the DEFAULT DIRECTORY line for the default drive and fill in the subdirectory information.

    In our example, the Personal Editor program is in a subdirectory called MYFILES on the C drive.

    For this example, type:

    `myfiles`

    on the DEFAULT DIRECTORY line next to the C:\



```
DEFAULT DIRECTORY
    A:\___________________________________________
    B:\___________________________________________
    C:\myfiles____________________________________
    D:\___________________________________________
    E:\___________________________________________
    F:\___________________________________________


PF1=Help   PgDn=Next   PgUp=Prev   Home=Home   Esc=Quit
```

15. Go to the last customization panel and press PF3 to customize your workstation program.
16. Exit customization.

The next time you load the workstation program, it will automatically read the "pe" command from the "pc2.bat" file and load Personal Editor into PC session 2. You can repeat this process to bring up different programs on each of your PC sessions. Just remember to have the actual program, in this case Personal Editor, inserted in the drive you specified on the customization panel. If you don't, the workstation program will not be able to load the program.

If you want to learn more about the AUTOEXEC.BAT file and about creating batch files, read about Batch Commands in the *Disk Operating System* manual.

Using Program Information Files

Many application programs written for the IBM PC assume that the PC is dedicated to run a single application program at a time. In addition, some of these application programs take advantage of facilities available in the PC that are not supported by DOS, bypass the DOS facilities to run more efficiently, or do not conform to the DOS BIOS protocol. These applications perform normally in the single DOS environment for which they were designed.

The 3270 PC Multi-DOS environment allows you to use multiple, concurrent PC sessions. In these sessions you may run existing PC applications or PC applications that you have written to the API. A program information file (PIF) that describes the characteristics of each application can assist Multi-DOS in coordinating the performance of your PC applications. Although your applications will still run without a PIF, you may find that having a PIF improves the performance of an application. This is especially true if your program does not conform to the DOS BIOS protocol, since Multi-DOS must take special action when this type of application is running.

Note: The PIF for an application program must be in the same directory as the application program when you run it.

The IBM 3270 Workstation Program contains a consolidated PIF file, 3270PC.PIF, that describes several PC applications and 3270PC utilities. This file is copied to your customized control program diskette when you customize for Multi-DOS. If your PC application is included in the table that follows, program information for this application is supplied by the 3270PC.PIF file. If your application program is not included in the list below, or you have written your own application with the API, you should either use the INDSPIF (System/Program Information File) utility to create a PIF that contains data about that PC application, or add the information to the 3270PC.PIF.

The following table shows the applications of IBM and others whose PIFs are included in 3270PC.PIF, the consolidated PIF:

Application	**Name of PIF**
BASIC	BASIC.PIF
BASICA	BASICA.PIF
COBOL Compiler	COBOL.PIF
Display Write 1	DW1.PIF
Display Write 2	DW2.PIF
Display Write 3	DW3PG.PIF
Professional Editor	EDIT.PIF
Easy Writer™	EW1.PIF
FORTRAN Compiler Pass 1	FOR1.PIF
FORTRAN Compiler Pass 2	FOR2.PIF
Graphing Assistant	GRAPH.PIF
Link	LINK.PIF
Multiplan Electronic Worksheet 1.10	MP80.PIF
IBM Assembler	ASM.PIF
IBM Macro Assembler	MASM.PIF
PASCAL Compiler Pass 1	PAS1.PIF
PASCAL Compiler Pass 2	PAS2.PIF

Application	**Name of PIF**
Personal Editor	PE.PIF
PeachText	PEACHTXT.PIF
Reporting Assistant and PFS-Report 1.05	REPORT.PIF
123 Spreadsheet Graphics™	123.PIF or LOTUS.PIF
PC Writer	PCW.PIF
Script/PC	SCRIPT.PIF
Visicalc 1.2	VC80.PIF or VC.PIF
Writing Assistant	WRITE.PIF
3270 Keystroke Emulation	INDEML.PIF INDKB.PIF
Configuration	INDCFIG.PIF
Display Environment	INDDENV.PIF
Display Memory	INDDISP.PIF
Dump	INDPREP.PIF
File Transfer	TRANSFER.PIF
Initialization	INDCIPL.PIF
Merge	INDMERGE.PIF
Patch	INDPATCH.PIF
Receive	RECEIVE.PIF
Restore	INDRSTR.PIF
Save	INDSAVE.PIF
Send	SEND.PIF
Split	INDSPLIT.PIF
System/Program Information File	INDSPIF.PIF
Trace	TRACE.PIF

Note: For more information on program information files, refer to the *IBM 3270 Workstation Program Programming Guide.*

The next three sections discuss:

- Some considerations before creating PIFs
- Planning for PIFs
- Using the INDSPIF utility to create PIFs.

Considerations Before Creating Program Information Files (PIFs)

If you have a PC application running in a Multi-DOS environment, there are several things to consider before creating a PIF for that file.

First, consult the table in the previous section to make sure that program information for your application has not already been included in 3270PC.PIF. If your application is included in the consolidated PIF file, you do not need to create a PIF for it.

Second, supplying a PIF is optional. If you do not include a PIF with your application, however, the system assumes that it does not conform to the DOS BIOS protocol. This may reduce your program's performance. Your program might:

- Be suspended if it is not running in the active window.
- Cause the window to be blank when it is not the active window.

It is, therefore, advisable to create a PIF file to improve the performance of your application.

Third, if you decide to create a PIF for your application, you need to decide if you want to add this information to the consolidated PIF, 3270PC.PIF or create an individual PIF. Before you create or update a PIF, consider the following:

- If you add to the consolidated PIF, you will use 12 bytes of diskette storage.
- If you create an individual PIF, you will use 1K byte on a diskette and 4K bytes on a fixed disk, adding one file and one directory entry.
- Some PC applications call in other "hidden" files. You should create PIFs for these files as well.

Fourth, if you write a PC application of your own that uses the API, you should use INDSPIF to review the INDIBM2.SIF file that contains the values that will be allocated for system resource requirements for each PC session. INDIBM2.SIF is contained on the workstation program diskettes. Refer to "How to View and Update INDIBM2.SIF" on page 6-28.

Continue with the next section, "Completing Your PIF Information Worksheet," to plan for creating a PIF.

Completing Your PIF Information Worksheet

Before you use the INDSPIF utility, determine all of the necessary information you need to include by completing the PIF worksheet provided below. The PIF worksheet contains categories that correspond to the data entry fields on the INDSPIF interactive panels.

Your planner or technical support person should help you complete this worksheet, or should complete it for you before you use the INDSPIF utility. All you must do is answer yes or no to a series of questions about your PC application.

The following table is a copy of the INDSPIF worksheet that you can use.

	Program 1	**Program 2**	**Program 3**
What does the program do?			
Storage required			
Entries on INDSPIF Panel 1 of 1			
Program name			
Interrupt Vectors			
Display	Y N	Y N	Y N
Foreground	Y N	Y N	Y N
8087	Y N	Y N	Y N
Timer	Y N	Y N	Y N
Keyboard	Y N	Y N	Y N
Memory	Y N	Y N	Y N

Follow the steps below to fill out you PIF information worksheet.

1. **What does the program do?**

   Write down a brief description of what the program does. This information is for your own reference.

2. **Storage required**

   How much storage does your program need to run?

   This information is also for your own reference. You may need to know how much storage a program requires in order to determine the size of a PC environment for customization.

3. **Program name**

   What is the name of the file that starts your program?

   Write down the name of the .COM or .EXE file that starts your program.

   When you start a PC application, the workstation program looks for the application's PIF. The system first looks in the consolidated PIF, 3270PC.PIF. If it doesn't find a PIF there, it looks for an individual PIF. The name of your PIF must be the same as the name of the PC application file that starts your application program. The file extension must be .PIF, and this file must be on the same diskette drive and same directory as your PC application.

4. **Interrupt Vectors**

   What is the range of interrupt vectors that the application takes over directly?

   If the vectors are taken over with a DOS Interrupt `X'21'`, function call `X'25'`, then do not count these. Enter the lowest and the highest interrupt vectors taken over. Do NOT include vectors `X'08'`, `X'09'`, `X'1B'`, and `X'1C'`. For example, if the application takes over vectors `X'08'`, `X'42'`, and `X'43'`, enter `42-43`. Any BASIC or compiled BASIC program uses (at least) vectors `X'80'-X'FF'`.

   If the range includes any vectors below `X'80'`, then all other PC applications are suspended while this application is running in the active window. They will be suspended even if they conform to the DOS BIOS protocol, since the foreground application could take over an interrupt vector needed by a background application. This would result in an unwanted transfer of control between tasks. Whenever you leave the active window by pressing the Jump key (Left Alt + Page Up on the Enhanced PC keyboard) or selecting a window, the application is suspended and the state of the machine is saved.

5. **Display**

   Does the program write directly into the display buffer?

   Answer yes if your application writes directly into the display buffer (`X'B000:0000'` through `X'B000:3FFF'` or `X'B800:0000'` through `X'B800:BFFF'`).

   The application is suspended whenever it is not running in the active window.

6. **Foreground**

   Should your program be allowed to run only in the foreground?

   Answer yes if you want your program to be suspended when it is not running in the active window. This option is provided for performance only.

   The application is suspended when it is not running in the active window

7. **8087**

   Does the program use the 8087 math coprocessor?

   Answer yes if the program uses the 8087 (or 80287 on the AT) math coprocessor.

8. **Timer**

   Does your application reprogram the timer and/or the speaker?

   Answer yes if your application:

   - Writes directly to the speaker IO port.
   - Takes over the timer `(X'08')` or timer-tick `(X'1C')` interrupt vectors. Answer yes even if the vectors are taken over with a DOS Interrupt `X'21'`, function call `X'25'`.

The application is suspended whenever it is not running in the active window.

9. **Keyboard**

   Does the program take over the keyboard interrupts?

   Answer yes if the program takes over the keyboard `X('09')` or keyboard-break `(X'1B')` interrupt vectors. Answer yes even if the vectors are taken over with a DOS Interrupt `X'21'`, function call `X'25'`.

   The application is suspended whenever it is not running in the active window.

10. **Memory**

    Does the program determine how much memory is available by reading the word at memory location `0000:413`?

    Answer yes if the program reads the word at `0000:413`.

The application is suspended whenever it is not running in the active window.

Note: Generally, for an application to run under Multi-DOS, it should not compete with other applications for non-shareable resources. The most common example of this competition for resources is the reading or writing to fixed memory addresses. An application should only read or write to addresses within its own address space. If it needs to interact with the hardware, it should do so by issuing BIOS function calls, DOS function calls, or 3270PC API function calls.

There are some program characteristics that are not and cannot be supported by the workstation program. An application will cause system failure if it:

- Programs the Intel 8259 Interrupt Controller chip.
- Programs the Intel 8253 timer chip.
- Programs the Intel Programmable Peripheral Interface chip.
- Takes over interrupts 50 through 57 or 7A.
- Disables interrupts for an extended period of time.
- Disables DMA.
- Jumps to hard-coded addresses in the BIOS. All BIOS calls should be made via the interrupt mechanism.

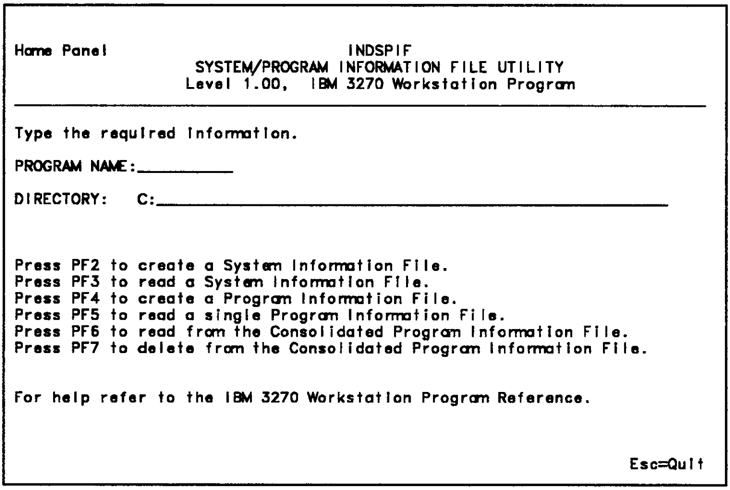
Creating and Modifying Program Information Files (PIFs)

You can use the INDSPIF utility to create, update, or delete a PIF. To create a PIF, use the values entered on the PIF worksheet provided by your technical coordinator.

To create, update, or delete a .PIF file, follow these steps:

1. Make sure you are in application mode.
2. Use the Jump key (Left Alt + Page Up on the Enhanced PC keyboard or Alt + Esc on XT/AT keyboards) to select a PC session which has DOS running in it.
3. Make sure the diskette containing the INDSPIF utility is in the default drive.
4. Type: INDSPIF at the DOS prompt `A>indspif`

5. You will see the "home" panel for the INDSPIF utility. It will look like this:



```
Home Panel                        INDSPIF
                   SYSTEM/PROGRAM INFORMATION FILE UTILITY
                  Level 1.00,  IBM 3270 Workstation Program
─────────────────────────────────────────────────────────────────────

Type the required information.

PROGRAM NAME:_________

DIRECTORY:   C:______________________________________________


Press PF2 to create a System Information File.
Press PF3 to read a System Information File.
Press PF4 to create a Program Information File.
Press PF5 to read a single Program Information File.
Press PF6 to read from the Consolidated Program Information File.
Press PF7 to delete from the Consolidated Program Information File.


For help refer to the IBM 3270 Workstation Program Reference.


                                                             Esc=Quit
```

6. Type in the name of the program for which you are creating, updating, or deleting a PIF.

7. Type the name of the directory where either the individual or consolidated PIF is located.

8. Now press the appropriate key, depending on your task:

   - Press PF4 if you want to create a new PIF for a PC application.

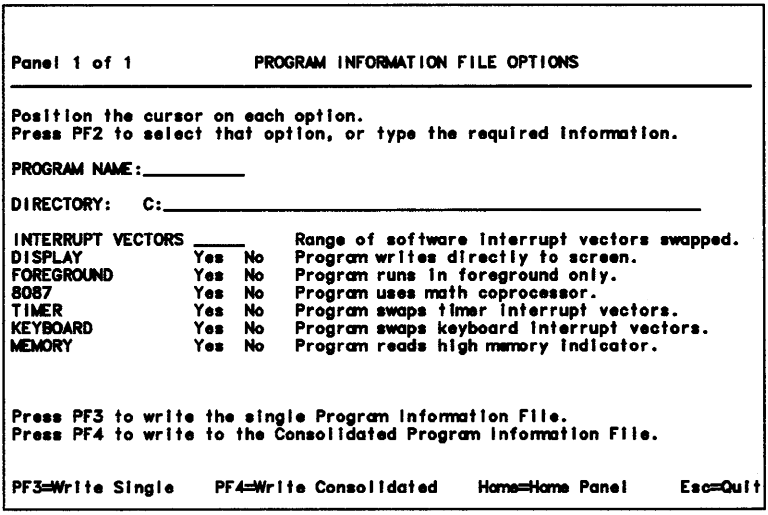
   - Press PF5 if you want to read the values in an individual PIF.

   - Press PF6 if you want to read the values in the PIF provided with the consolidated PIF.

   - Press PF7 if you want to delete an entry from the consolidated PIF. You will exit the utility once you delete the file.

You may then either update the values or enter new information about the program characteristics and storage requirements of your PC application. This information should be provided by your planner on the PIF worksheet described previously.

9. After you press a PF key (other than PF7), you will see the Program Information File Options panel. It will look like this:



```
Panel 1 of 1              PROGRAM INFORMATION FILE OPTIONS
_____________________________________________________________________________

Position the cursor on each option.
Press PF2 to select that option, or type the required information.

PROGRAM NAME:__________

DIRECTORY:   C:________________________________________________

INTERRUPT VECTORS _____     Range of software interrupt vectors swapped.
DISPLAY           Yes  No   Program writes directly to screen.
FOREGROUND        Yes  No   Program runs in foreground only.
8087              Yes  No   Program uses math coprocessor.
TIMER             Yes  No   Program swaps timer interrupt vectors.
KEYBOARD          Yes  No   Program swaps keyboard interrupt vectors.
MEMORY            Yes  No   Program reads high memory indicator.


Press PF3 to write the single Program Information File.
Press PF4 to write to the Consolidated Program Information File.

PF3=Write Single    PF4=Write Consolidated    Home=Home Panel    Esc=Quit
```

10. Type in the name of the program for which you are creating a PIF.

11. Type the name of the directory where you want the PIF to be placed.

12. Using the PIF worksheet provided by your planner, place the cursor on either **Yes** or **No** for the option you want to select, and press PF2 to select that option. The option you select will then be highlighted in reverse video.

13. Select any remaining options in the same way.

14. When you are ready, either press PF3 to write an individual PIF or PF4 to add this information to the consolidated PIF, 3270PC.PIF.

Creating and Modifying System Information Files

You may use the Application Programming Interface (API) to develop your own system extensions. System extensions are service routines that may be accessed from programs or tasks in any environment. These services run as part of the workstation program and are in the system all the time. In other words, system extensions are loaded at the same time as the workstation program.

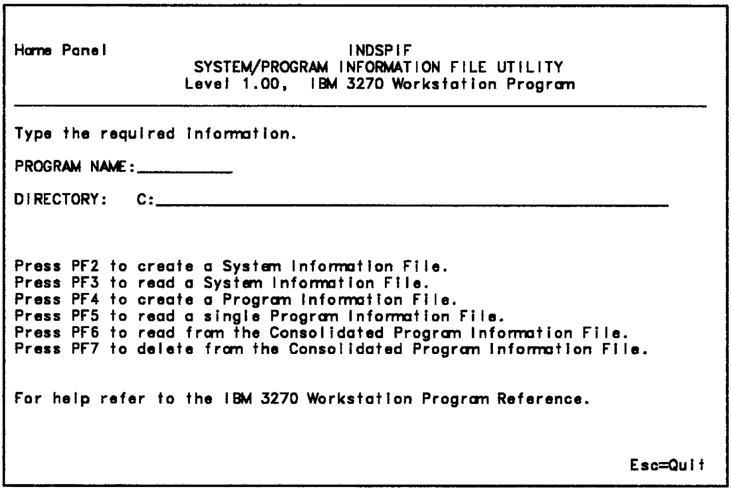
Before you load a system extension, you must use the INDSPIF utility to create a system information file (SIF) containing information about its system resource requirements. A SIF tells the workstation program how much storage it will need to support the data structures it uses for your system extension. To create a SIF for a system extension, you must enter information about it on the "System Information File Options" panel of the INDSPIF Utility.

To either create or modify a SIF, follow these steps:

1. Make sure the diskette containing the INDSPIF utility is in the default drive.
2. Type: INDSPIF at the DOS prompt

   ```
   A>indspif
   ```

   You will see the "home" panel for the INDSPIF utility.



```
Home Panel                      INDSPIF
                SYSTEM/PROGRAM INFORMATION FILE UTILITY
               Level 1.00,  IBM 3270 Workstation Program
_____________________________________________________________________

Type the required information.

PROGRAM NAME:__________

DIRECTORY:   C:______________________________________________________


Press PF2 to create a System Information File.
Press PF3 to read a System Information File.
Press PF4 to create a Program Information File.
Press PF5 to read a single Program Information File.
Press PF6 to read from the Consolidated Program Information File.
Press PF7 to delete from the Consolidated Program Information File.


For help refer to the IBM 3270 Workstation Program Reference.


                                                             Esc=Quit
```

3. Type in the name of the program for which you are creating a SIF.

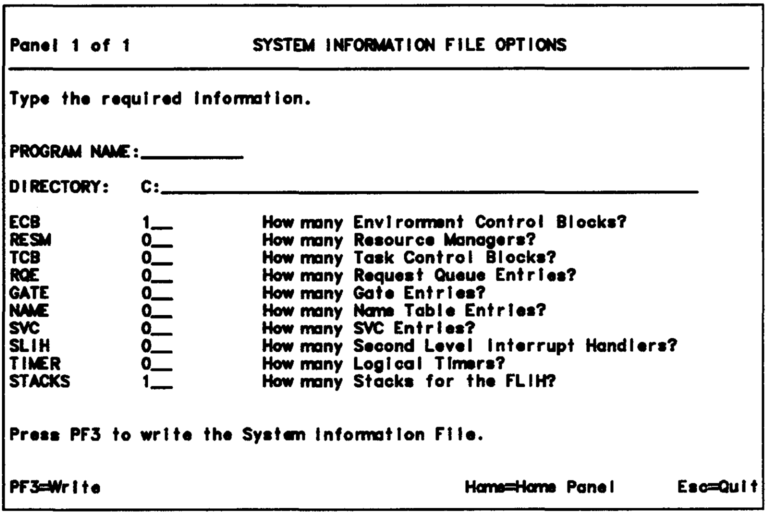
4. Type in the name of the directory where you want the SIF to be placed.

5. Press PF2 to create a new SIF for the specified program. Press PF3 to read the values from an existing SIF for this program.

   You may then either update the values or enter new information about the resource requirements of your system extension.

6. If you have pressed the PF2 key, you will see the “System Information File Options” panel as shown in the following illustration. You can now enter new information about the resource requirements of your system extension.

   If you have pressed the PF3 key, the panel will have current values entered in the blanks. You can now modify any of these values.



```
Panel 1 of 1              SYSTEM INFORMATION FILE OPTIONS

Type the required information.

PROGRAM NAME:________

DIRECTORY:    C:______________________________________________

ECB           1__          How many Environment Control Blocks?
RESM          0__          How many Resource Managers?
TCB           0__          How many Task Control Blocks?
RQE           0__          How many Request Queue Entries?
GATE          0__          How many Gate Entries?
NAME          0__          How many Name Table Entries?
SVC           0__          How many SVC Entries?
SLIH          0__          How many Second Level Interrupt Handlers?
TIMER         0__          How many Logical Timers?
STACKS        1__          How many Stacks for the FLIH?

Press PF3 to write the System Information File.

PF3=Write                                   Home=Home Panel      Esc=Quit
```

7. Enter the appropriate numbers in the input field next to each system extension option (explained in the next section).
8. When you are ready, press PF3 to create the SIF for the program you created.

How to Determine What Numbers to Enter on the System Information File Options Panel

The following list explains each system extension option and how to determine what number to enter on the "System Information File Options" panel.

1. ECB: environment control blocks

   This is the environment your system extension will be running in. This number is set to 1 when the panel is displayed. Do not change this number.

2. RESM: resource managers

   The number of resource managers created by your system extension. A resource manager is created by an Identify Resource Manager service request. Determine the maximum number of Identify Resource Manager service requests your code will issue and enter this number in the RESM field.

3. TCB: task control blocks

   The number of tasks created by your system extension. A TCB is created by a Create Task Entry service request. Determine the number of Create Task Entry service requests your code will issue and enter this number in the TCB field.

4. RQE: request queue entries

   An estimate of the number of request queue entries likely to be used by the system extension at any given time. Every time your code issues one of the following, an RQE is used and later returned to the free pool:

   - The Make a Request service uses 1 RQE.
   - A Make a Request service with a reply type of `X'10'` (no notification of request completion, copy parameter list) uses 2 RQEs.
   - The Claim Semaphore service uses 1 RQE.
   - The Dequeue Data service uses 1 RQE.
   - All of the following service requests use 1 RQE:
     - Session information services
     - Keyboard services
     - Window management services
     - Host interactive services
     - Presentation space services
     - 3270 keystroke emulation services
     - Copy services
     - Translate service
     - Operator Information Area services

  - Multiple DOS services
  - The Stop Environment service
  - The Suspend Environment service
  - Semaphores.

   Determine the maximum number of these service requests that may be pending at any time. Enter this value in the RQE field.

5. GATE: gate entries

   The total number of gate service entries put in the gate table by your module. For example, if 5 gates are created, each with 2 gate service entries, then 10 is the number you specify for this system extension option. A gate is created by a Create Gate Entry service request. Add up the number of service entries you specify on each Create Gate Entry service request your code will issue. Enter this number in the GATE field.

6. NAME: name table entries

   The number of names put in the name table by your module. A name is created every time you issue a supervisory object service request that uses the name option to assign a name to the object. Add up all the supervisory object service requests that your system extension issues with the name option and enter this number in the NAME field.

7. SVC: services

   The total number of entries put into the SVC table by your module. The following items take an entry in the SVC table:

   - Tasks

   - Components

   - Fixed length queues

   - User exit tables

   - Gates (not the entries in the gate table, but the actual gates).

To determine this value, add up all the Create Task Entry, Create Component Entry, Create Semaphore Entry, Create Fixed-Length Queue Entry, Create User Exit Table Entry, and Create Gate Entry service requests your system extension will issue. Enter that value in the SVC field.

8. SLIH: second level interrupt handlers

   The number of unique second-level interrupt handlers installed by your module. A second-level interrupt handler is created every time you request the Install a Hardware Interrupt Handler service or the Install an Interrupt Handler service. Determine the maximum number of these requests your code will issue and enter this number in the SLIH field.

9. TIMER: logical timers

   The number of logical timers created by your module. A TIMER is created every time you issue a Get Logical Timer service request. Determine the maximum number of Get Logical Timer service requests your code will issue and enter this number in the TIMER field.

10. STACKS: number of stacks

    For systems that have an XMA card installed, you may want to specify one or more stacks. You must do so if your PC applications install interrupt handlers that swap stacks and then enable. The STACK field will not be multiplied by the number of PC sessions you have customized for.

    Notes:

    a. You should not increase this field above the default unless absolutely necessary, since it allocates large areas of storage for stack use.

    b. Increasing this field will not affect the way your system extension runs.

For more information on coding system extensions, and descriptions of the supervisor services used in system extensions, consult the *IBM 3270 Workstation Program Programming Guide.*

The INDIBM2.SIF File

The INDIBM2.SIF is a file that you receive with the workstation program. INDIBM2.SIF contains default values for the resource requirements that will be used by your PC applications. These resources are the same as those listed on the "System Information File Option" panel on page 6-23.

The values in INDIBM2.SIF are default values for your customized system. Except for the stack resource, which is only allocated once, the system will allocate this number of resources to **each** PC environment that you are customized for.

When to Update INDIBM2.SIF

You should update INDIBM2.SIF if:

- You write an application to the API, and its system resource requirements do **not** match the default requirements for the system. These default requirements are contained in the file INDIBM2.SIF, which is shipped on the workstation program diskette. If you decide to update INDIBM2.SIF, remember that this file is read in when you IPL your system. After the file is updated, you must re-IPL your system to read in the new values in this file.
- If you want to use 3270 keystroke emulation in one or more PC sessions, you must update INDIBM2.SIF for every session in which you want to run this utility. (See the section "Using 3270 Keystroke Emulation" on page 6-29.)
- If you want to run an application which installs a hardware interrupt handler that swaps stacks and enables interrupts on an XMA system.

How to View and Update INDIBM2.SIF

To look at and change the values in INDIBM2.SIF:

1. Type `INDSPIF` at the DOS prompt.
2. You will see the "home" panel for the INDSPIF utility.
3. Enter INDIBM2 as the program name.
4. Press PF3 to see the default values for INDIBM2.SIF.
5. On the "System Information File Options Panel," you will see information about the system storage requirements for PC applications that run on the workstation program.
6. Look at the default values that are highlighted on the panels.
    - If these values are adequate for your PC application, exit the utility.
    - If the values are not adequate for your application, then position the cursor under the desired option, and enter a new value. Remember, if you need more control blocks than are specified as defaults, **add** the amount you need to the existing values and enter the total. Don't alter any of the values that are sufficient for your system. For an explanation of how to determine these values, see the following section, "How to Determine What Numbers to Enter on the System Information File Options Panel" on page 6-23. Press PF3 to update INDIBM2.SIF. Then exit this utility.

Note: If you change the values in INDIBM2.SIF, you must re-IPL the entire system in order for these new values to take effect.

Using 3270 Keystroke Emulation

To use 3270 keystroke emulation, you must be customized for Multi-DOS. 3270 keystroke emulation allows you to use 3270 keystroking in a personal computer session. Before you can use 3270 keystroke emulation, you must update INDIBM2.SIF to account for the system resources that this program requires.

How to Update INDIBM2.SIF for 3270 Keystroke Emulation

For every PC session where you want to load 3270 keystroke emulation, you must add values to the INDIBM2.SIF file. To do this:

1. Type `INDSPIF` at the DOS prompt.
2. You will see the Home Panel for the INDSPIF utility.
3. Enter INDIBM2 as the program name.
4. Press PF3 to see the default values for INDIBM2.SIF.
5. On the "System Information File Options" panel, you will see information about the system storage requirements for PC applications that run on the workstation program.
6. Look at the default values that are highlighted on the panels.
7. For each personal computer session where you want to load 3270 Keystroke Emulation, add:
   - One TCB entry
   - Two SVC entries
   - Two NAME table entries.
8. Then, press PF3 to update INDIBM2.SIF and exit this utility.

   Note: If you change the values in INDIBM2.SIF, you must re-IPL the entire system in order for these new values to take effect.

How to Activate 3270 Keystroke Emulation

To activate 3270 Keystroke Emulation, issue the command:

```
INDEML
```

at the DOS prompt

3270 keystroking will be active in that session if you are running a program that uses 3270 keystroke emulation. (Refer to the *IBM 3270 Workstation Program Programming Guide* for information on the 3270 keystroke emulation API.)

Note: You may also add the command `INDEML` to a .BAT file that runs in your PC session.

Chapter 7. Redefining the Keys on Your Keyboard

This chapter explains how to use the 3270 Workstation Program keyboard definition utility to redefine the meaning of the keys on your attached keyboard.

Note: This utility will work on all models of the 3270 PC or on a Personal Computer AT with an Enhanced PC keyboard.

The keyboard definition utility diskette is included in a plastic pocket at the back of the workstation program package.

The 3270 Workstation Program keyboard definition utility allows you to design your own keyboard layout for both host and personal computer sessions. You may want to move a particular program's function keys so that they correspond in all sessions. For example, you may want the PF keys on a personal computer session editor to match those of your host editor. You can do this using the keyboard definition utility.

If you have already redefined your keys for the Version 3.0 control program release, you can just copy that layout onto the new system diskette by using the Copy Table utility (INDRCTAB). See "Using the Copy Table Utility (INDRCTAB)" on page 7-2 for more information about this utility.

The keyboard definition utility is a program that runs in a personal computer session. It displays a series of panels that enable you to:

- Rearrange the keys for the host and PC sessions of either the 3270 PC keyboard or the Enhanced PC keyboard
- Redefine all the functions on a key or each function independently of the rest of the functions on the key

- Swap, copy, or delete any of the keyboard functions and remap them in almost any position on your host keyboard
- Retrieve functions that you have deleted from your keyboard.

The following sections explain how to plan your new keyboard layout and how to use the keyboard definition program.

Once a new keyboard layout is created, you can copy the modified keyboard tables onto your customized system disk or diskette and use your new keyboard layout.

Note: Make a backup copy of the keyboard definition utility diskette using the DOS DISKCOPY command.

Using the Copy Table Utility (INDRCTAB)

If you have already redefined your keyboard layout for the Version 3.0 control program release, you can use INDRCTAB to copy the layout onto your new customized system disk or diskette as follows:

1. Locate your Version 3.0 control program keyboard definition utility diskette, and have available the 1.0 workstation program keyboard definition utility diskette and your customized system.
2. Make sure that the Version 1.0 workstation program keyboard definition utility diskette is in the active drive.
3. At the DOS prompt, type

```
A>indrctab
```

You will receive the following message:

```
INDKD101 Insert your R3.0 KDU diskette in the active drive.
         Press Enter to continue or enter Q to quit
```

4. Insert your 3.0 keyboard definition utility diskette in the active drive and press Enter.

   Note: At any time, you may enter a **Q** to quit the procedure.

   You will receive the following message:

   ```
   INDKD102 Insert your R1.0 KDU diskette in the active drive.
            Press Enter to continue or enter Q to quit
   ```

5. Then insert your Version 1.0 keyboard definition utility diskette and press Enter.

   The copy table utility now copies your 3.0 modified keyboard layout onto your 1.0 keyboard definition utility diskette. You now have the option of copying this layout onto your 1.0 customized system. You will see this message:

   ```
   INDKD103 Copy the R1.0 file onto your system diskette?
            Enter Y for yes or N for no
   ```

   If you choose **N** for no, a copy of your 3.0 modified keyboard layout is stored on the Version 1.0 keyboard definition utility diskette for future use.

If you choose **Y** for yes, you will be prompted to enter the location of your customized system:

```
INDKD104 Enter the drive name and path for your system diskette
         or enter Q to Quit
```

Enter the drive name (i.e., **a:**). Also, if you used a path to store your customized system, include the the path information (**\sys**) If you specified either the **a** or **b** drives, you will then be prompted to insert your Version 1.0 customized system diskette in the drive you specified:

```
INDKD105 Insert your R1.0 system diskette in drive x:
         Press Enter to continue or enter Q to quit
```

You now have a copy of your modified keyboard layout on the Version 1.0 customized system disk or diskette.

Planning Your Keyboard Layout

There are two keyboards that can be used with the 3270 Workstation Program Keyboard definition utility. Before you can plan your new keyboard layout, you must determine which keyboard you have and what hardware you are using it with.

Consult the section in chapter 2 entitled, "Determining Your Hardware" to gather this information.

Preparing to Define Your Keyboard Layout

Before you begin using the keyboard definition utility, you should:

- Make a backup copy of the keyboard definition utility diskette using the DOS DISKCOPY command
- Understand some of the terms it uses on its panels
- Plan the keyboard layouts you want and be aware of special key combinations
- When changing a previously defined keyboard layout, make use of the previous diskette
- Know how the keyboard definition utility panels are organized.

Terms Used in the Panels

Terms used in keyboard definition utility panels that you should know are:

- Host versus PC sessions
- Default versus current keyboard layouts
- Key shift states
- Modes
- Restricted keys

Host and PC Sessions

When you define keys, you define them in Panel 1 of the keyboard definition utility as working that way in one of two classes of sessions:

HOST	If you want to rearrange the key functions that are active in a host session, notepad session, and workstation control mode.

PC	If you want to rearrange key functions that are active in a personal computer session. **Note:** Pressing WSCtrl puts your keyboard in host mode. The active key functions will be the host key functions.

Default and Current Keyboard Layouts

The keyboard definition utility recognizes two types of keyboard layouts:

- The *default* layout is the keyboard arrangement IBM has supplied for you.
- The *current* layout is the keyboard arrangement you have most recently defined using the utility.

Each time you use this program, you must specify which keyboard layout you want the program to change.

Notes:

1. If you have never used this program to define a keyboard layout, your default and current layouts are identical.
2. If you have already made changes to your current layout, and want to keep them, you should have saved this layout and copied it onto another diskette before attempting to rerun the utility.
3. If you have already made and saved changes to your current layout and then you choose the default layout on Panel 1, the default layout automatically over-writes those changes.
4. Saving or filing a new keyboard layout will automatically erase the existing current file on the diskette.

Key Shift States

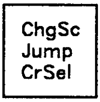
Keys on either the 3270 PC keyboard or Enhanced PC keyboard can have up to three functions. These functions can be invoked by pressing:

- The key itself
- The key with the Shift key
- The key with the Alt key.

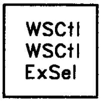
An example of the key with three functions is the Jump key on the 3270 PC keyboard. Printed on the top of this key are:

- **ChgSc:** This indicates that you change your current screen profile to the next one when you press the key with the Shift key.
- **Jump:** Printed just under **ChgSg**, this indicates that you change the current window to the next one when you press the key alone.
- **CrSel:** On the front side of the key, this indicates that you mark the source and target areas for a Work Station Control Mode copy operation when you press the key with the Alt key.

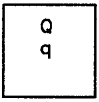
The keyboard definition utility provides panels 3.1 through 3.3 for you to change specific key functions. Below are examples of how these keys are shown on the panels:



A



B



C

On key **A**, there are three functions as described above.

On key **B**, you can toggle in and out of Work Station Control Mode (WSCtrl) using either the key alone or the key with the Shift key. You select 3270 Entry Assist in a host session when you press the key with the Alt key.

On key **C**, the key pressed with the Shift key gives you a capital "Q". The key alone gives you a lowercase "q". The key pressed with the Alt key gives you nothing.

Modes

Each time you perform a keyboard change, you choose whether that change will affect all or only one of the functions on the key(s) involved. The number of functions affected is determined by the *mode* you select:

FULL	Causes the change to affect all of the functions of a key. Full is the default mode. In full mode on Panels 3.1 to 3.3, you identify each key involved by placing the cursor on any position on the key and pressing PF2.
SINGLE	Causes the change to affect only one function on the shift state of the key. In single mode on Panels 3.1 to 3.3, you identify the function involved by positioning the cursor on that function and pressing PF2.

Restricted Keys

For the most part, any function of any key may be moved to any shift state of any other key as desired. A certain set of keys, however, can only have copying or swapping among themselves. These are called **restricted keys**. Generally, restricted keys can only be acted upon in full mode. Functions that have been deleted from restricted keys, however, can only be retrieved in single mode.

On the panels and on the keyboard layout worksheets in Appendix B, restricted keys are indicated by a double border.

The following table lists the restricted keys for the 3270 PC Keyboard and the Enhanced PC Keyboard:

Enhanced Keyboard Host Session	**Enhanced Keyboard PC Session**	**3270 PC Keyboard Host Session**	**3270 PC Keyboard PC Session**
Alt ShfLk Ctrl Shift L Shift R	(None)	Alt L Alt R ShfLk Ctrl Shift L Shift R	ChgSc Enlrg Jump WSCtrl

Use the Aids and Worksheets

Once you have determined which keyboard you have, you can use the keyboard layout worksheets in Appendix B to design your new keyboard layout. The completed keyboard worksheets will help you keep track of new key locations.

Some Considerations

While you are planning your new keyboard layout, keep in mind the following.

- Restricted keys should be moved only in full mode and only within other restricted key locations (see "Restricted Keys" on page 7-8).
- Only one key arrangement for each type of keyboard session can be kept on the same keyboard definition utility diskette or on the PC system. That is, you can keep one key arrangement for each of the following on the same diskette:
  - Enhanced PC keyboard, host session
  - Enhanced PC keyboard, PC session
  - 3270 PC keyboard, host session
  - 3270 PC keyboard, PC session.
- You should assign the WSCtrl key to the same position in both host and PC sessions. You should *not* delete the

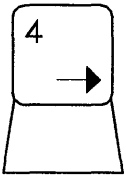
WSCtrl key from the host session unless you delete it from the PC session as well. Functions present in both sessions should be placed on the same location in each session.

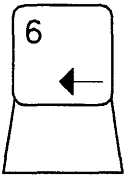
- Once you have changed keyboard functions for the host category of sessions, all such sessions have the same host keyboard layout. In the same manner, all your PC sessions will have the same PC keyboard layout.

Special Key Combinations

Some special key combinations occur in the PC session for all three keyboards. Before you redefine key functions on the numeric keypad and control key areas, you should keep in mind:

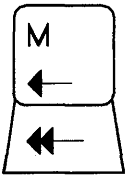
- Regardless of how you rearrange the functions on the numeric keypad, the NumLk function of a key in this area remains with the lowercase function. For example, if you swap the numeric pad left cursor and right cursor keys, the functions for your new keys would be:





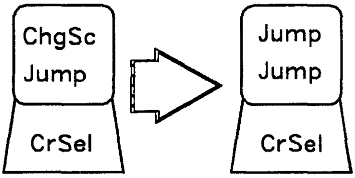
However, if you press NumLk and then press the cursor left key, you will get a “4.”

- Regardless of how you rearrange key functions in the control key areas, the Caps Lock + Shift function will always give you the lowercase function of whatever is in the uppercase position of the key. For example, if you copy the capital M to the uppercase of the right control key area left cursor key, the functions for that new key will be:



However, if you press CapsLk and then Shift, you will get a lowercase "m."

- If you delete the **Break** function from your keyboard layout, you can get it back by retrieving the **ScrLk** key.
- Regardless of how you rearrange your PC session keyboard, pressing CapsLk with a key will always give you the unmodified uppercase function of whatever is on the lowercase position of the key. For example, if you copy the Jump function over the change screen (ChgSc) function on that key, your new key would look like this:



However, if you press CapsLk with this key, you will get the change screen function.

Note: The following note applies only to the 3270 PC keyboard.

- In the typewriter key area, there are certain keys that are not affected by CapsLk. When you press CapsLk along with these keys, you produce the character on the lowercase position of the key. Regardless of how you rearrange these keys, CapsLk will always give you the unmodified lowercase character on the key. For example, if you swapped the lowercase and uppercase characters on a key, CapsLk along with the modified key will produce the character that was on the lowercase position of the key **before** you modified it.

Changing a Previously Defined Keyboard Layout

If you want to change a keyboard layout that you have previously defined, you must use the utility diskette you used before. Be sure that you have a backup copy of the utility before you use it.

Using Help Panels

While you are using the keyboard definition utility, you can press PF1 to display help panels.

There are two different types of help panels:

Help for Individual Panels
Each keyboard definition utility panel has its own help panel(s). For help with a particular keyboard definition utility panel, press PF1 while that panel is on the screen. The help panels describe what is displayed and what actions may be performed on the utility panel.

Global Help Panels
Press PF1 on any individual help panel to display the global help panels, which give you general advice on how to use the keyboard definition utility panels. For example, global help panels describe restricted keys and tell you how to recognize them on Panels 3.1 through 3.3.

To exit any help panel, press End.

Using the Keyboard Definition Utility

Setting up a new keyboard layout takes place in the following steps:

1. Loading the keyboard definition utility
2. Making your keyboard changes
3. Saving your changes and exiting the program
4. Activating the new layout.

Loading the Keyboard Definition Utility

Note: If you want to print the keyboard panels after you have updated them, use this utility with the 3270 Workstation Program loaded.

To begin the keyboard definition program and display Panel 1:

1. Load DOS, if you have not already done so.

   The DOS command prompt **A>** should be displayed.

   Note: If you have not already done so, use the DOS **DISKCOPY** command to make a back-up copy of the keyboard definition utility.

2. Insert your *backup* diskette for the utility into diskette drive A.

   The IBM 3270 Workstation Program does not need to be loaded for you to use this utility.

3. At the DOS prompt, type:

   ```
   A>INDRKDU
   ```

4. Press Enter (↵). You will see the message

   ```
   Loading....
   ```

   until Panel 1 is displayed.

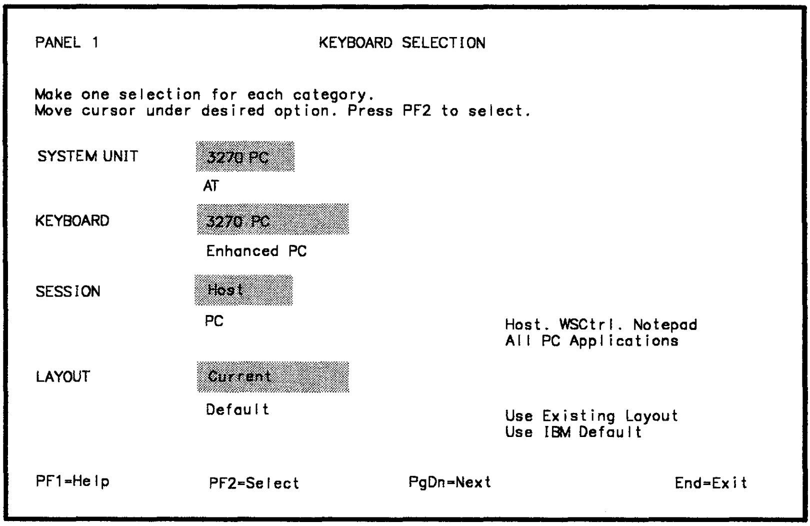
Making Your Keyboard Changes

The keyboard definition utility provides the following panels for you to make your changes:

- Panel 1 to choose the keyboard, type of session, and layout you want to change
- Panel 2 to confirm your choices
- Panels 3.1 through 3.3 for you to make changes to specific keys and functions.

Choosing Options on Panel 1

On Panel 1, you indicate the hardware you want to use the new keyboard layout on, and which session and layout you wish to modify (see Figure 7-1). The default selections are highlighted in reverse video.



```
PANEL 1                          KEYBOARD SELECTION

Make one selection for each category.
Move cursor under desired option. Press PF2 to select.

SYSTEM UNIT       3270 PC
                  AT

KEYBOARD          3270 PC
                  Enhanced PC

SESSION           Host
                  PC                      Host. WSCtrl. Notepad
                                          All PC Applications

LAYOUT            Current
                  Default                 Use Existing Layout
                                          Use IBM Default

PF1=Help          PF2=Select        PgDn=Next             End=Exit
```

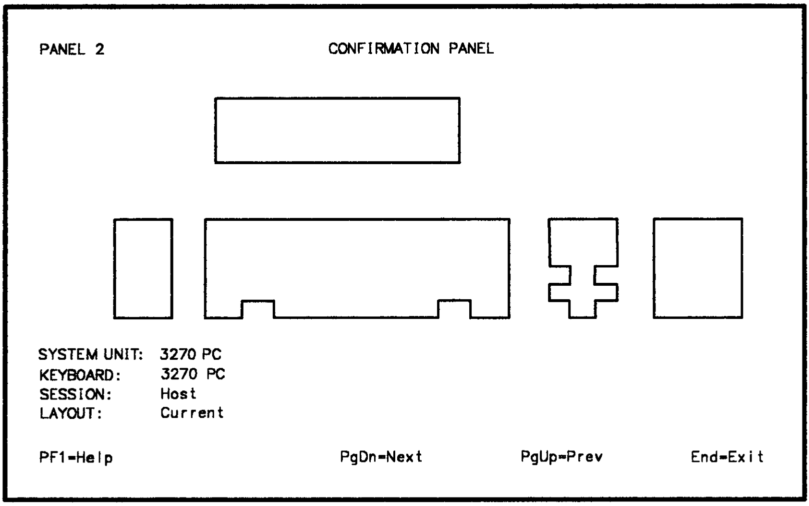
Figure 7-1. Panel 1, Keyboard Selection

To select the hardware you have, position the cursor on the correct option name and press PF2.

After you have selected your system unit, keyboard, session, and layout, press PgDn to go to Panel 2.

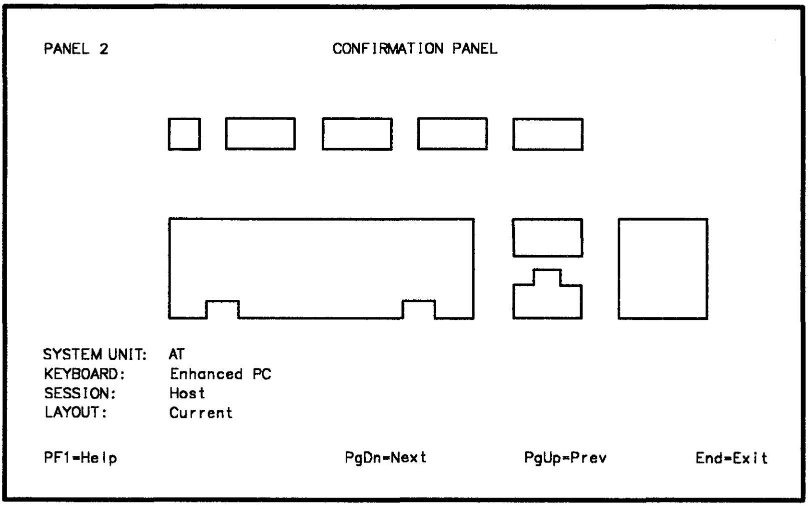
Confirming Your Choices on Panel 2

Panel 2 displays a picture of the keyboard and a listing of the keyboard, system unit, session type, and layout that you selected on Panel 1. Figure 7-2 shows the 3270 PC keyboard, and Figure 7-3 the 3270 Enhanced PC keyboard.



```
PANEL 2                          CONFIRMATION PANEL

SYSTEM UNIT:  3270 PC
KEYBOARD:     3270 PC
SESSION:      Host
LAYOUT:       Current

PF1=Help                          PgDn=Next          PgUp=Prev          End=Exit
```

Figure 7-2. Panel 2, Confirmation for 3270 PC Keyboard



```
PANEL 2                          CONFIRMATION PANEL

SYSTEM UNIT:   AT
KEYBOARD:      Enhanced PC
SESSION:       Host
LAYOUT:        Current

PF1=Help                         PgDn=Next        PgUp=Prev        End=Exit
```

Figure 7-3. Panel 2, Confirmation for 3270 Enhanced PC Keyboard

Check to make sure that the panel and items shown on Panel 2 match what you have chosen on Panel 1. If they do not, press PgUp to return to Panel 1 and select your options.

If the information is correct, press PgDn to go on to Panel 3.1.

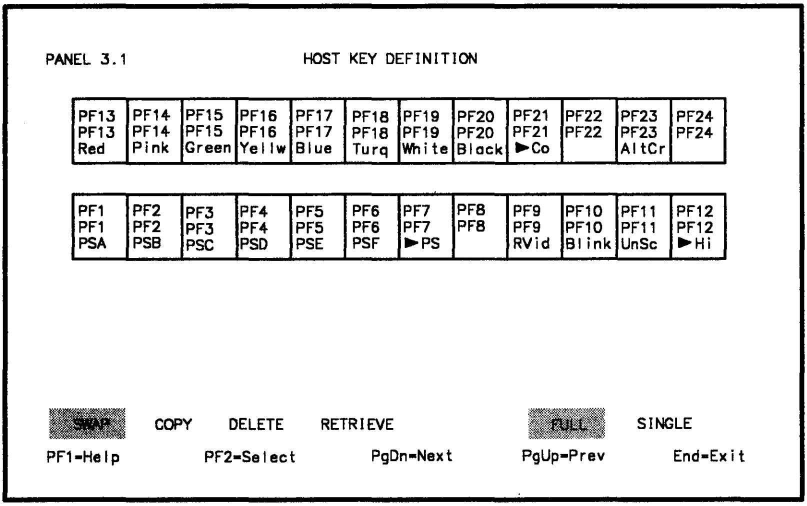
Redefining Functions on Panels 3.1 through 3.3

Panels 3.1 to 3.3, the keyboard panels, allow you to change your keyboard layout. For each change to the keyboard, use the panel(s) to select the following:

- The mode of the change (full or single). See "Modes" on page 7-8 for more information.
- The type of change operation (swap, copy, delete, or retrieve).
- The source key and target key involved in the change.

For each type of keyboard, there are three keyboard panels, each displaying different keyboard areas. Use the PgDn key to view each of the three keyboard areas. The PgUp key will return you to Panel 2 from any screen in Panels 3.1-3.3.

For example, if you selected the 3270 PC keyboard option, the host session option, and the default layout on Panel 1, your first keyboard panel, Panel 3.1, displays the PF key area as shown in Figure 7-4.



PANEL 3.1 HOST KEY DEFINITION

PF13 PF13 Red	PF14 PF14 Pink	PF15 PF15 Green	PF16 PF16 Yellw	PF17 PF17 Blue	PF18 PF18 Turq	PF19 PF19 White	PF20 PF20 Black	PF21 PF21 ►Co	PF22 PF22	PF23 PF23 AltCr	PF24 PF24

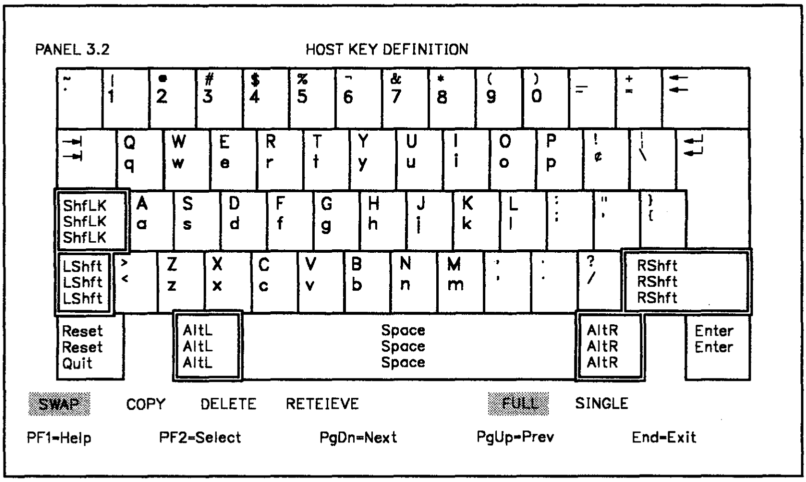
PF1 PF1 PSA	PF2 PF2 PSB	PF3 PF3 PSC	PF4 PF4 PSD	PF5 PF5 PSE	PF6 PF6 PSF	PF7 PF7 ►PS	PF8 PF8	PF9 PF9 RVid	PF10 PF10 Blink	PF11 PF11 UnSc	PF12 PF12 ►Hi

SWAP COPY DELETE RETRIEVE FULL SINGLE

PF1=Help PF2=Select PgDn=Next PgUp=Prev End=Exit

Figure 7-4. Panel 3.1, Host Key Definition on 3270 PC Keyboard: PF Keys

Press the PgDn key to move to Panel 3.2, the second keyboard panel. This panel displays the typewriter key area (see Figure 7-5):


PANEL 3.2 HOST KEY DEFINITION

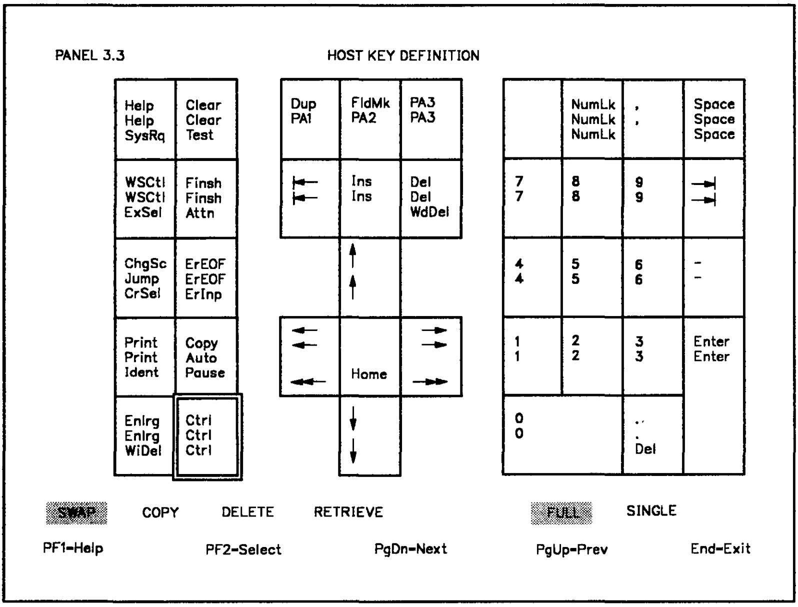
1
2
3
4
5
6
7
8
9
0
Q q
W w
E e
R r
T t
Y y
U u
I i
O o
P p
ShfLK ShfLK ShfLK
A a
S s
D d
F f
G g
H h
J j
K k
L l
LShft LShft LShft
Z z
X x
C c
V v
B b
N n
M m
? /
RShft RShft RShft
Reset Reset Quit
AltL AltL AltL
Space Space Space
AltR AltR AltR
Enter Enter

SWAP COPY DELETE RETEIEVE FULL SINGLE

PF1=Help PF2=Select PgDn=Next PgUp=Prev End=Exit

Figure 7-5. Panel 3.2, Host Key Definition on 3270 PC Keyboard: Typewriter Key Area

Press the PgDn key to move to Panel 3.3, the third keyboard panel. This panel displays the control key areas (see Figure 7-6):



PANEL 3.3

HOST KEY DEFINITION

Help Help SysRq
Clear Clear Test
WSCtl WSCtl ExSel
Finsh Finsh Attn
ChgSc Jump CrSel
ErEOF ErEOF ErInp
Print Print Ident
Copy Auto Pause
Enlrg Enlrg WiDel
Ctrl Ctrl Ctrl
Dup PA1
FldMk PA2
PA3 PA3
Ins Ins
Del Del WdDel
Home
NumLk NumLk NumLk
Space Space Space
7 7
8 8
9 9
4 4
5 5
6 6
1 1
2 2
3 3
Enter Enter
0 0
Del
SWAP
COPY
DELETE
RETRIEVE
FULL
SINGLE
PF1=Help
PF2=Select
PgDn=Next
PgUp=Prev
End=Exit

Figure 7-6. Panel 3.3, Host Key Definition on 3270 PC Keyboard: Control Key Areas

You can return to the first keyboard panel by pressing PgDn again. To return to Panel 2, press PgUp.

How to Perform the Change Operations

Warning: You should assign the WSCtrl key to the same position in both host and PC sessions. You should *not* delete the WSCtrl key from the host session unless you delete it from the PC session as well. Functions present in both sessions should be placed on the same location in each session.

This section describes each of the four types of operation you can use to change your keyboard:

SWAP	If you want to exchange the position of one key function with another, use the swap operation.
COPY	If you want to make a key function available at more than one location on your keyboard, use the copy operation. You can copy the key function over an existing function on the target key.
DELETE	If you want to delete a key function from a key, use the delete operation.
RETRIEVE	If you want to recover a key function that was deleted or over-written from your keyboard, you must use the retrieve operation.

Only one change operation can be active at a time; the active operation appears in reverse video. It remains active until you select a different one. After you complete an operation, the cursor returns to SWAP. The operation selected remains highlighted in all cases.

You can perform a change operation that affects a single key function (single mode) or all of the functions on a key (full mode). See "Modes" on page 7-8 for more information on modes.

Note: Restricted key functions may be placed on restricted key locations only.

How to Reset a Change Operation or Key Selection

You may accidentally select the wrong change operation, source key, or source key function. If you do, you can reset and begin again:

- **If you selected the wrong change operation**, move your cursor to the desired change operation and press PF2.

- **If you selected the wrong key or key function**, you have two choices:
  - Leave your cursor on the selected key or key function that is wrong and press PF2.
  - Move your cursor to any of the change operations at the bottom of the panel and press PF2. This will cancel the previous operation, and the source key will no longer be highlighted.
- **If you selected the source/target key for DELETE**, then the operation is complete. You must select another change operation to correct the problem.

SWAP

SWAP allows you to exchange the positions of one key (the source) with another (the target).

To perform a swap operation:

Note: If SWAP is already highlighted, skip to Step 3.

1. Position your cursor on SWAP at the bottom of your screen.
2. Press PF2.

   You have selected the swap operation. SWAP appears in reverse video.
3. If you want to exchange all the key functions on a key with all those on another, position your cursor on FULL.

   If you want to exchange only one key function on a key with one on another, position your cursor on SINGLE.
4. Press PF2. Your selected mode appears in reverse video.
5. Go to the keyboard panel that displays the first key you want to exchange. Press PgDn to get to another keyboard panel, if necessary.
6. Position your cursor on one of the keys or key functions you want to exchange. This is your source.

7. Press PF2.

   You have selected the first key in your swap operation. Your source appears in reverse video.

   Note: If you accidentally select the wrong key or key function, you can reset your selection by leaving your cursor on the source key and pressing PF2. You can then select another source.

8. If your target is on another panel, locate it by pressing PgDn.
9. Position your cursor on the target key or key function.
10. Press PF2.
11. The swap is complete. You can perform another swap operation, select another change operation and mode, or end the program.

SWAP Example 1: Suppose you use colons more often than semicolons. You might like to exchange these two functions so you won't have to press Shift to type a colon. Swap allows you to exchange the positions of these two functions.

1. Select the swap operation. SWAP is active by default and appears in reverse video. (If you had to make the swap operation active, you would place the cursor on SWAP and press PF2.)
2. Select the mode. The swap operation you are performing involves rearranging two key functions on one key. To move individual functions, SINGLE must be active. Position the cursor on SINGLE and press PF2. SINGLE appears in reverse video.
3. Display the keyboard panel with the keyboard area that contains the colon/semicolon key. (If your screen displays another keyboard area, you can switch by pressing PgDn as many times as necessary to reach the panel. When you use PgDn, the selections you have already made remain active.)

4. Now select the source function. Place the cursor on the colon and press PF2. The colon appears in reverse video.
5. Select the target in the same way. Place the cursor on the semicolon and press PF2.
6. The two keys are swapped and the source key is no longer highlighted.

SWAP Example 2: Suppose that you want to move all the functions of the PF1 key to the position of the Tab key, and move the Tab key functions to the position of the PF1 key.

1. Select the swap operation. If the swap already appears in reverse video, you do not have to select it again. (If the swap operation is not active, position the cursor on SWAP; press PF2.)
2. Select the mode. Because you want to exchange all of the positions of the PF1 key with all of the corresponding positions of the Tab key, you need full mode. Unless FULL already appears in reverse video, position the cursor on FULL and press PF2. FULL then appears in reverse video.
3. Select the source and target keys involved.

   To select PF1, position the cursor on any of the functions of the PF1 key; press PF2. The PF1 key appears in reverse video. Now go to the keyboard area where Tab appears by pressing PgDn. Position the cursor on the Tab key and press PF2. The change is displayed.

COPY

Copy allows you to copy the function(s) on a key (the source) to another position on the keyboard (the target).

To perform a copy operation:

Note: If COPY is already highlighted, skip to Step 3.

1. Position your cursor on COPY at the bottom of your screen.
2. Press PF2.

   COPY appears in reverse video.
3. If you want to copy all of the key functions on a key to another key, position your cursor on FULL.

   If you want to copy only one key function onto another, position your cursor on SINGLE.
4. Press PF2.

   Your selected mode appears in reverse video.
5. Go to the keyboard panel that displays the key function or functions you want to copy. Press PgDn to get to another keyboard panel, if necessary.
6. Position your cursor on the key or key function you want to copy. This is your source.
7. Press PF2.

   You have selected the first key in your copy operation. Your source appears in reverse video.

   Note: If you accidentally select the wrong key or key function, leave your cursor on that function and press PF2. You can then select another source.
8. If your target is on another panel, locate it by pressing PgDn.
9. Position your cursor on the target key or key function. You can copy the key function over an existing function on the target key.

   Note: To recover functions that have been deleted or overwritten, refer to the section "RETRIEVE" on page 7-27.
10. Press PF2.

11. The copy is complete and displayed on the panel. The source key is no longer highlighted.

    You can now perform another copy operation, select another change operation and mode, or end the program.

COPY Example: Suppose you want the back tab function to be available at its current position and also at the position of the uppershift Esc key. This requires a copy operation.

1. Select the copy operation. Position the cursor on COPY and press PF2. COPY appears in reverse video.
2. Select the mode. Because you are copying only one function from the Back Tab key, you need single mode. If SINGLE does not already appear in reverse video, position the cursor on SINGLE and press PF2.
3. When you use the copy function, the first key you select is the source key. It will be copied. For this example, you must first display the keyboard panel containing the Back Tab function. Press the PgDn key to move to the panel containing this function.
4. Select the key function you want to copy. Place the cursor on Back Tab and press PF2. The Back Tab function appears in reverse video.
5. Select the target position to which the function will be copied. In this example, you must press PgDn to display the keyboard area containing the position of the uppershift Esc key. Then position the cursor on the uppershift Esc key and press PF2. The copy is complete and displayed on the screen. The source key is no longer highlighted.

DELETE

DELETE lets you delete an individual key function or all of the functions on a key.

To perform a delete operation:

Note: If DELETE is already highlighted, skip to Step 3.

1. Position your cursor on DELETE at the bottom of your screen.
2. Press PF2.

   DELETE appears in reverse video.
3. If you want to delete all the key functions on a key, position your cursor on FULL.

   If you want to delete only one key function on a key, position your cursor on SINGLE.
4. Press PF2.

   Your selected mode appears in reverse video.
5. Go to the keyboard panel that displays the key function or functions you want to delete. If necessary, press PgDn to move to this panel.
6. Position your cursor on the key function or functions you want to delete.
7. Press PF2.
8. The delete operation is complete. You can perform another delete operation, select another change operation and mode, or end the program.

   Note: To recover functions that have been deleted or overwritten, refer to the section "RETRIEVE" on page 7-27.

DELETE Example: Suppose you want to remove the window-delete (⌦) function from your keyboard.

1. Select the delete operation. Position the cursor on DELETE and press PF2. DELETE appears in reverse video.
2. Select the mode. Because you are deleting only one function on a key, you need single mode. Position the cursor on SINGLE and press PF2. SINGLE appears in reverse video.

3. Go to the keyboard panel that displays the window-delete (▭) key. If necessary, press PgDn to move to this panel.
4. Select the key function. Place the cursor on the window-delete (▭) function and press PF2. Window delete (▭) is deleted from that position on the keyboard.

RETRIEVE

RETRIEVE allows you to recover characters, symbols, and functions in single mode that have been previously removed from your keyboard.

Note: If you delete the **Break** function from your keyboard layout, you can get it back by retrieving the **ScrLk** key.

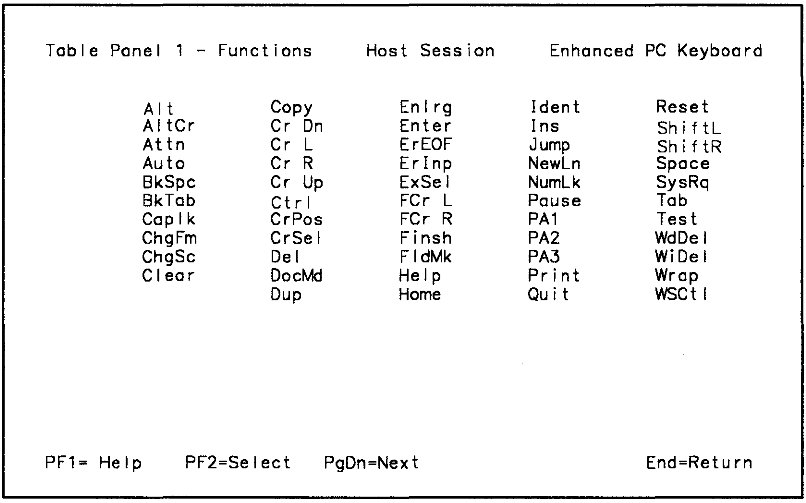
To perform a retrieve operation:

1. Position your cursor on RETRIEVE at the bottom of your panel.
2. Press F2.

   You have selected the retrieve operation. Table Panel 1, the retrieve table, appears. For example, suppose you wanted to retrieve a function for the host session of the Enhanced PC keyboard. Figure 7-7 shows the retrieve table panel that you would see.

   Note: Even if RETRIEVE is already highlighted, you must select RETRIEVE to activate it again.

   The retrieve function automatically forces single mode. This assures that you retrieve only one function per operation.



```
Table Panel 1 - Functions     Host Session     Enhanced PC Keyboard

          Alt       Copy      Enlrg     Ident     Reset
          AltCr     Cr Dn     Enter     Ins       ShiftL
          Attn      Cr L      ErEOF     Jump      ShiftR
          Auto      Cr R      ErInp     NewLn     Space
          BkSpc     Cr Up     ExSel     NumLk     SysRq
          BkTab     Ctrl      FCr L     Pause     Tab
          Caplk     CrPos     FCr R     PA1       Test
          ChgFm     CrSel     Finsh     PA2       WdDel
          ChgSc     Del       FldMk     PA3       WiDel
          Clear     DocMd     Help      Print     Wrap
                    Dup       Home      Quit      WSCtl




PF1= Help    PF2=Select    PgDn=Next                      End=Return
```

Figure 7-7. Table Panel 1, Host Functions on the Enhanced PC Keyboard

3. Position your cursor on the function you want to restore to your keyboard. If necessary, use PgUp or PgDn to display the panel containing this function. (See Appendix D for a list of the keyboard functions on Panels 3.1 through 3.3 that have a different name or symbol on the retrieve table panel.)

   Note: To return to the previous keyboard panel without selecting a key, press the End key.

4. Press PF2.

   The keyboard panel you were on when you selected the retrieve operation appears.

5. If the key to which you want to copy the retrieval function is not on this panel, switch to the one you want by pressing PgDn until it appears.

6. To locate your target, position your cursor on the area you want to copy the retrieved key function to. This is your target. If there is already a key function in your target area, that function will be over-written by the new key function.

   Note: Restricted functions on the retrieve table panel are highlighted in color in this book. On color monitors, they will be blue. These functions can only be put on keys that are double-bordered.

7. Press PF2.
8. The retrieve operation is complete. You can perform another retrieve operation, select another change operation and mode, or end the program.

   To perform another retrieve, you must select RETRIEVE again even though it is still highlighted.

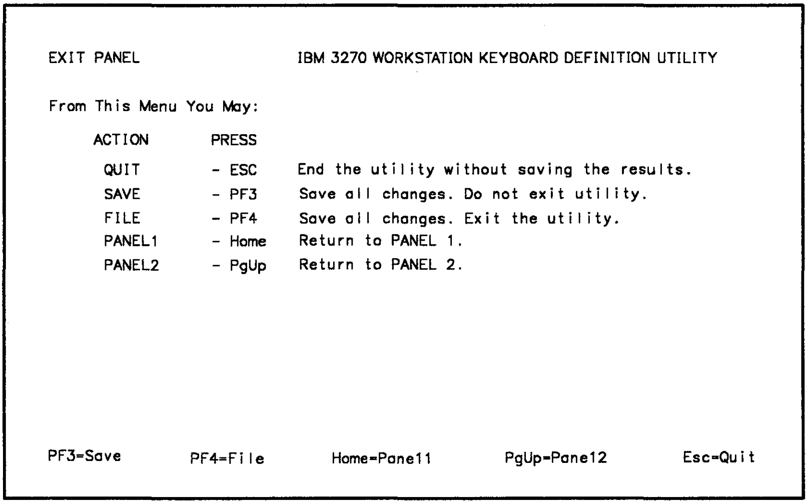
RETRIEVE Example: Suppose you copied the Clear function onto the position of the lowercase letter z. Now you want to restore z to your Enhanced PC Keyboard. The retrieve operation allows you to do so.

1. Select the retrieve operation. Position the cursor on RETRIEVE and press PF2.
2. Your screen leaves the keyboard panel and displays the retrieve table panel.
3. Position the cursor on the letter, symbol, or function you want to reassign to your keyboard. For this example, lowercase z is your source. Place the cursor on lowercase letter z and press PF2. It is selected, and your screen returns to the previous keyboard panel.
4. Display the keyboard area to which you want to restore the letter z. If necessary, press PgDn to switch keyboard areas.
5. Position the cursor on your target. Press PF2. The change appears on your display.

Saving Changes and Ending the Program

Note: If you have the IBM 3270 Workstation Program loaded, you can press Shift + Print to make a copy of the redefined keyboard layout (Panels 3.1 through 3.3) for reference.

When you have finished making changes, press the End key. The Exit panel, as shown in Figure 7-8, appears.



```
EXIT PANEL                    IBM 3270 WORKSTATION KEYBOARD DEFINITION UTILITY

From This Menu You May:

    ACTION       PRESS

     QUIT        - ESC      End the utility without saving the results.
     SAVE        - PF3      Save all changes. Do not exit utility.
     FILE        - PF4      Save all changes. Exit the utility.
     PANEL1      - Home     Return to PANEL 1.
     PANEL2      - PgUp     Return to PANEL 2.






PF3=Save        PF4=File        Home=Panel1        PgUp=Panel2        Esc=Quit
```

Figure 7-8. The Exit Panel Displays Choices for Ending the Utility

You are shown five options on the exit panel.

QUIT	QUIT allows you to exit the keyboard definition utility and discard all the changes you have made since you last used SAVE. To quit the utility, press the Esc key.
SAVE	SAVE allows you to write all the changes you've made to the diskette and remain in the utility.

To save:

1. Make sure the keyboard definition utility diskette is in the active drive.

2. Press PF3.

You will write your changes onto the 3270 Workstation Program keyboard definition utility diskette and over-write the current keyboard definition. The Exit Panel will continue to be displayed.

FILE

FILE allows you to write all the changes you've made to the diskette and exit from the utility.

To file:

1. Make sure the keyboard definition utility diskette is in the active drive.
2. Press PF4.

You will write your changes onto the 3270 Workstation Program keyboard definition utility diskette, over-write the current keyboard definition, and exit the utility. Continue with "Copying the Keyboard Definition onto Your Customized System" on page 7-32.

PANEL 1

You use Panel 1 to change keyboard, session, or layout. To return to Panel 1, press Home.

- If you made no changes or saved all changes, the utility displays Panel 1.
- If you have made changes and not saved them, the utility displays this message:

  ```
  INDKD009   Returning to panel
  1 cancels unsaved changes
  ```

  You may either:

  - Press PF3 on the Exit Panel to save the changes.

  Or:

- Press Home again to discard unsaved changes and return to Panel 1.

PANEL 2 Press PgUp to return to Panel 2, the "Confirmation" panel. From here, you can press PgDn to continue making changes to the keyboard, session, and layout selected on Panel 1.

Copying the Keyboard Definition onto Your Customized System

Note: In the following section, the term INDSKTM*.COM refers to either INDSKTM.COM or INDSKTMD.COM. If you are using a 3270 PC, the file containing your modified keyboard layout will be named INDSKTM.COM. If you are using a Personal Computer AT, your modified keyboard layout will be named INDSKTMD.COM.

The file INDSKTM*.COM on your keyboard definition utility diskette now contains the keyboard layout you have just changed. In order to use this new keyboard definition, you must also copy it onto your customized system diskette or fixed disk.

Note: When you copy INDSKTM*.COM from the keyboard definition utility diskette onto your system, you will overwrite the default INDSKTM*.COM file that you copied during customization. If you want to restore your default keyboard layout later, you can copy it from the workstation program diskette back onto your customized system.

To copy your keyboard definition onto your customized system:

1. Locate the customized system diskette that contains the file INDSKTM*.COM. If you have a fixed disk, then your **C** drive will contain the file. This file contains the default keyboard layout for the customized system.
2. Make sure you are in a PC session with DOS loaded. The DOS prompt should appear on the screen.

3. Use the DOS COPY command to copy the file INDSKTM*.COM from your keyboard definition utility diskette onto your customized system disk or diskette.

Making Multiple Copies

You can use this procedure to copy your keyboard layout onto other customized systems. You will not then need to run the utility again to define a matching keyboard layout for someone else.

Activating Your Current Definition

After you have copied INDSKTM*.COM onto your customized system, you can activate and use your new keyboard layout. You can activate your keyboard layout in two ways:

- **If your workstation program is loaded:**
    1. Switch to your host session by pressing the Jump key, if necessary.
    2. If you are logged on to your host(s), log off or disconnect.
    3. Make sure your INDSKTM*.COM file has been copied onto your customized system disk or diskette. If your customized system is on a diskette, insert it in the active drive.
    4. Re-IPL by pressing Ctrl + Alt + Del.

       The workstation program logo appears. Your current keyboard definition is now active.
- **If your workstation program is not loaded:**
    1. Make sure your INDSKTM*.COM file is on the same diskette as your customized system disk or diskette. If your customized system is on a diskette, insert it in the active drive.
    2. IPL by pressing Ctrl + Alt + Del.

The workstation program logo appears. Your current keyboard definition is now active.

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Chapter 8. Loading the Workstation Program and Using Helper

You should now have your own copy of the customized workstation program you are going to use every day. Before you can use your customized workstation program, you must load it into your work station storage. In this chapter, we will show you how to load your customized workstation program from one or more system diskettes or from a fixed disk. There are two ways of loading your workstation program, depending on whether your system unit is on or off.

Before You Begin

Before starting to operate your work station, you should know how to do the following:

- Turning the units on and off
- Inserting and removing diskettes
- Handling diskettes
- Using a fixed disk if you have one.

If you are not familiar with these operations, refer to the operating instructions in the front of your *Guide to Operations* binder.

Loading the Workstation Program from One or More System Diskettes

If Your System Unit is Off

1. If you have a separate control on your display, make sure your display is turned on.
2. Insert your system diskette as follows:
   - If you have only one system diskette, insert it into drive A.
   - If you have more than one system diskette and you have two diskette drives, insert system diskette 1 into drive A and system diskette 2 into drive B.
   - If you have more than one system diskette and you have only one diskette drive, insert system diskette 1 into drive A.

     Note: If you are using a one-diskette drive system, you may be prompted to insert diskettes while loading.
3. Close the lever(s) on the drive door(s).
4. Turn your system unit on.

   The next thing you will see is the Power-On Self-Test. If you are using only one diskette drive to load the customized workstation program, you will then receive the following message:

```
INDSY064 xxxxxxxx.xxx not found. Insert diskette with this file
                Press R to retry or A to abort
```

   Load system diskette 2 into drive A and press R.

5. If you receive the above message again, reinsert system diskette 1 and follow the prompts until your system is completely loaded.

If Your System Unit is On

1. Insert your system diskette as follows:
   - If you have only one system diskette, insert it into drive A.
   - If you have more than one system diskette and you have two diskette drives, insert system diskette 1 into drive A and system diskette 2 into drive B.
   - If you have more than one system diskette and you have only one diskette drive, insert system diskette 1 into drive A.
2. Close the lever(s) on the drive door(s).
3. Press Ctrl + Alt + Del.

   You will hear a beep and the system will begin to load. If you are using only one diskette drive to load the customized workstation program, you will receive the following message:

   ```
   INDSY064 xxxxxxxx.xxx not found. Insert diskette with this file
               Press R to retry or A to abort
   ```

   Load system diskette 2 into drive A and press R.
4. If you receive the above message again, reinsert system diskette 1 and follow the prompts until your system is completely loaded.

Note: Pressing Ctrl + Alt + Del while a PC session is active only restarts that PC session. The application that was running is stopped and COMMAND.COM is run in the active PC session. Even if you customized for a particular program or batch file to run in that session, restarting the PC session will not restart that program or batch file. To reload the entire system and begin the program you customized for, jump to a host session and press Ctrl + Alt + Del or power off and on again.

Loading the Workstation Program from Your Fixed Disk

If Your System Unit is Off

1. Make sure that your diskette drive is empty and the lever is up.
2. If you have a separate control on your display, make sure your display is turned on.
3. Turn your system unit on.

The next thing you will see is the Power-On Self-Test and the workstation program logo screen.

If Your System Unit is On

1. Make sure that your diskette drive is empty and the lever is up.
2. Press Ctrl + Alt + Del.

You will hear a beep and the workstation program will begin to load.

Continue with the next section.

Watching the Power-On Self-Test (POST)

What to Expect

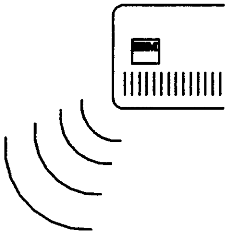
As you watch the POST run, the same three things that happened when loading DOS in Chapter 2 will happen again, but now they are slightly different.

1. Up to the first 640K of storage in your system is checked, and the amount that is working appears in the upper left corner of your screen.

```
xxx KB OK
```

This is the same as before.

2. You will hear one short "beep".



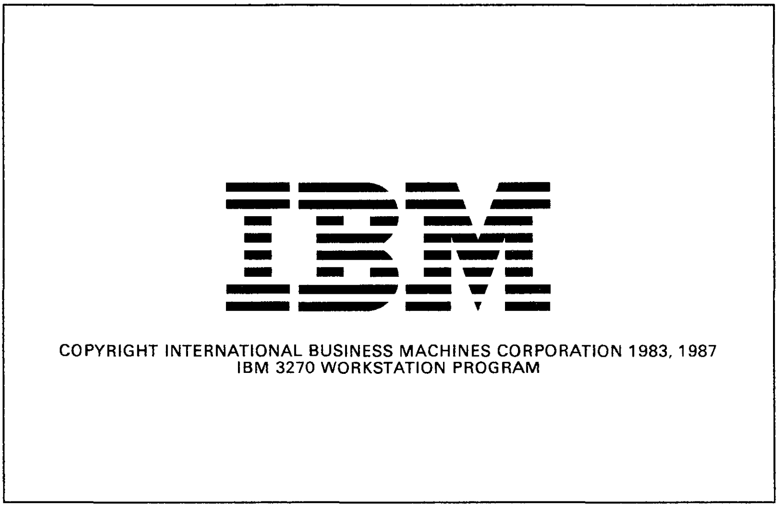
BEEP

This is the same.

You will still hear the diskette drive hum and see the "in use" lights flicker on and off.

3. When the POST is finished, the 3270 Workstation Program is loaded into memory. If you have an Expanded Memory Adapter (XMA) card, the storage on this card is checked during the workstation program loading sequence. The following screen may appear while the program is loading.

Note: If you have customized for any host sessions, a host session will be the first window to appear. If you are not customized for any host sessions, then a PC window will appear first. This PC window will display the IBM logo if you are customized for only one PC session. If you are customized for Multi-DOS, the logo will disappear and you will see the DOS prompt.



COPYRIGHT INTERNATIONAL BUSINESS MACHINES CORPORATION 1983, 1987
IBM 3270 WORKSTATION PROGRAM

If you have an XMA card installed, you will also see messages INDST008 and INDST009 verifying the XMA storage.

Understanding What is On Your Display Screen

Your hardware configuration and the options you chose during customization will determine what your display screen looks like after loading.

- If your windows are sized, press the Enlarge (▫↔□) key (left Alt + Insert on the Enhanced PC keyboard or Alt + NumLk on the AT/XT keyboards).
- If necessary, press the Jump key (left Alt + Page Up on the Enhanced PC keyboard or Alt + Esc on the AT/XT key-

board) until the PC window appears that contains the DOS prompt.

```
A>
```

Note: The notepad window(s) will appear in sequence before the host window. Press jump again until the host window is displayed.

Using HELPER, the Online Tutorial

If your work station is a 3270 PC, you can first use HELPER to learn about the workstation program before looking over the rest of the information in this book. Otherwise, continue with the remaining chapters in this part.

Some Things You Should Know

HELPER will take you from 2 to 4 hours to complete. You may spread this out over several days. You may want to use the Table of Contents at the beginning of each unit to plan your time. We recommend that you work in segments of 20 to 30 minutes. We also recommend that you work through the units in the order that they appear. You may want to wait until you have mastered the basic functions before you try the advanced functions.

Some Things You Will Need

Before you begin, you will need:

- Your system diskette with the customized workstation program.

  If your workstation program is on your fixed disk, you do not need a system diskette.

- The Online Tutorial diskette from the back of this book.

If your system is running, continue with the next section. If your system is not running, refer to the instructions in this chapter for loading the workstation program before continuing.

Starting HELPER

1. If you have not already loaded your workstation program into your work station storage, do so now.
2. Make sure the DOS prompt on the screen is for diskette drive A.

```
A>
```

3. If it is not, type: `a:`
4. Press the Enter key.

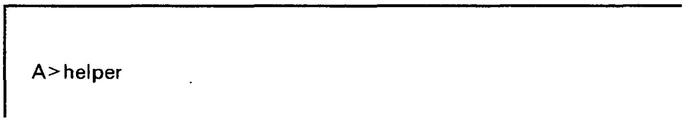
   The prompt will change to the A drive.

```
C>a:

A>
```

5. If you have a diskette in drive A, remove it.
6. Insert the HELPER diskette into drive A, and close the lever.

7. Type:

   `helper`



```
A>helper
```

8. Press the Enter key.

   The “Welcome to HELPER” panel will blink on your screen. Then you will see a panel with information that will assist you in running the tutorial program.

   Note: If you can’t see the entire screen, press (▫↔□) the Enlarge key (left Alt + Insert on the Enhanced PC keyboard or Alt + NumLk on the AT/XT keyboards).

9. Follow the instructions on the HELPER panel to continue with the tutorial.

Chapter 9. Using Your Keyboard and Templates

Your hardware configuration, especially your keyboard, will determine the way your customized workstation program works. There are fewer keys on the AT and XT keyboards than on the 3270 PC and Enhanced PC keyboards. Because of this, not all workstation program functions have corresponding keystrokes on the AT or XT keyboards. Also, because of internal hardware differences between the system units, the way your windows work may vary.

This chapter will explain the differences and similarities between the keyboards and describe how windows may look on various hardware configurations. Specifically, this chapter describes:

- How key sequences are described in this manual
- How the keyboards are organized
- How the keys work
- How to use the keyboard templates
- Work station control mode functions available on the AT and XT keyboards.

How Key Sequences Are Described in This Manual

Since each keyboard has a different number of keys in a slightly different arrangement, the keystroke sequences you use to activate some of the functions depend on which keyboard your work station is equipped with. These differences are noted throughout this manual. Whenever keystroke sequences vary, the instructions for the 3270 PC keyboard appear first followed by the Enhanced PC keyboard instructions in parenthesis. In some cases, these may be followed by instructions for the AT and XT keyboards.

For example,

```
WSCtrl key (Shift + Esc on the Enhanced PC
keyboard or Shift + Esc on the AT/XT keyboards).
```

Since many workstation program functions described in this manual cannot be used with the AT and XT keyboards, key sequences for these keyboards are not described. Appendix A lists all workstation program functions and the keystroke combinations for these functions on each of the five keyboards. Also, see the section entitled, "Work Station Control Mode Functions Available on the XT and AT Keyboards" at the end of this chapter. For specific information on each keyboard, refer to the following sections:

- If you have a 3270 PC keyboard, read the next section, "3270 PC Keyboard" on page 9-3.
- If you have the Enhanced PC keyboard, skip the next section and read "Enhanced PC Keyboard" on page 9-3.
- If you have the AT keyboard or the XT keyboard, read "Personal Computer AT Keyboard" on page 9-4.

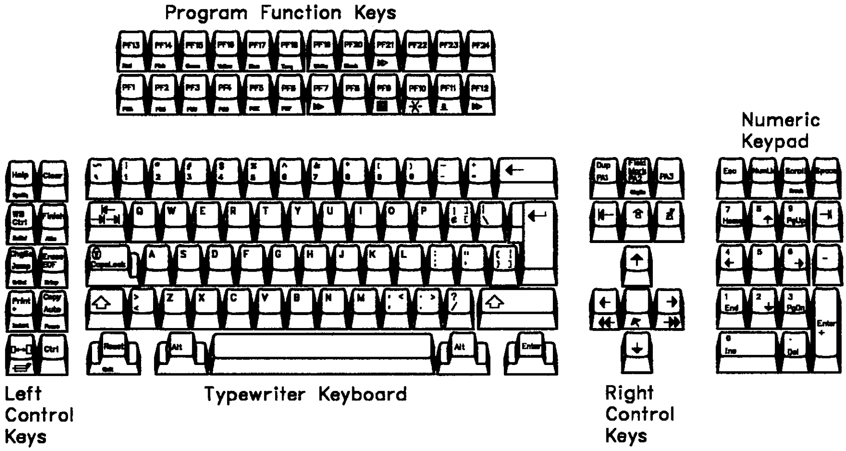
How the Keyboards Are Organized

According to organization of the keys, the keyboards that can be used with the 3270 work station are grouped into the following categories:

- 3270 PC keyboard
- Enhanced PC keyboard
- Personal Computer XT keyboard
- Personal Computer AT keyboard

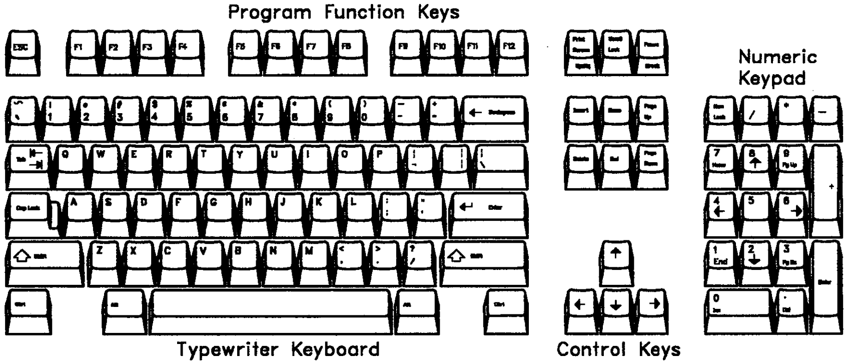
3270 PC Keyboard

Your 3270 PC keyboard is divided into five areas:


Program Function Keys
Numeric Keypad
Left Control Keys
Typewriter Keyboard
Right Control Keys

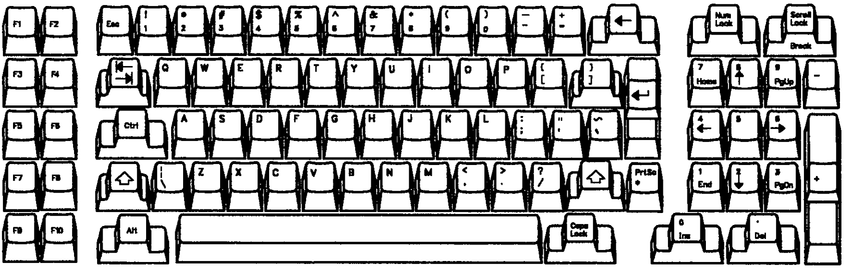
Enhanced PC Keyboard

Your Enhanced PC keyboard is divided into four areas:


Program Function Keys
Numeric Keypad
Typewriter Keyboard
Control Keys

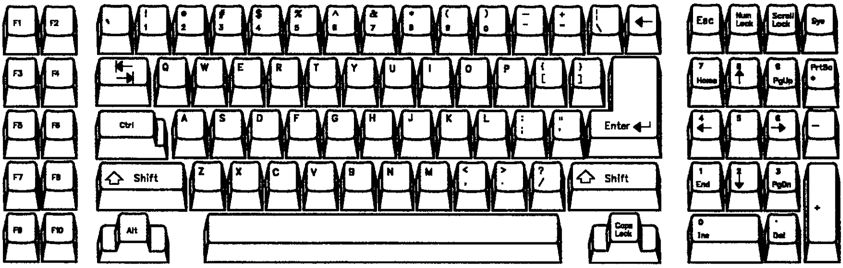
Personal Computer XT Keyboard

Your XT keyboard is divided into three areas:


F1
F2
F3
F4
F5
F6
F7
F8
F9
F10
Esc
Ctrl
Alt
Caps Lock
PrtSc
Num Lock
Scroll Lock
Break
Home
PgUp
End
PgDn
Ins
Del
Program Function Keys
Typewriter Keyboard
Numeric Keypad

Personal Computer AT Keyboard

Your AT keyboard is divided into three areas:


F1
F2
F3
F4
F5
F6
F7
F8
F9
F10
Ctrl
Enter
Shift
Shift
Alt
Caps Lock
Esc
Num Lock
Scroll Lock
Sys
Home
PgUp
PrtSc
End
PgDn
Ins
Del
Program Function Keys
Typewriter Keyboard
Numeric Keypad

How to Use the Keys

Most of the typewriter keys you will use work like the keys on a typewriter. Some of the keys that have more than one use are shown with:

- Markings on the front side (alternate case)
- Markings in different colors (the black and the blue keys on the 3270 PC keyboard).

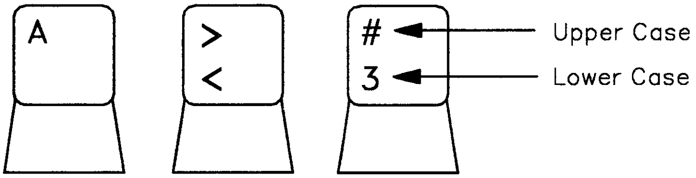
Others act as toggle switches (press once to power on the function, press again to turn it off).

The next sections explain how to use these keys.

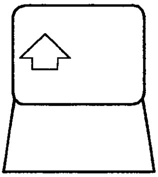
Using Upper and Lower Case

Most keys have an upper and lower case. The letters A through Z, the numbers 1 through 0, and the special symbols have upper and lower case. These work like the keys on a typewriter.

For lower case, press the key by itself.

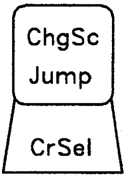


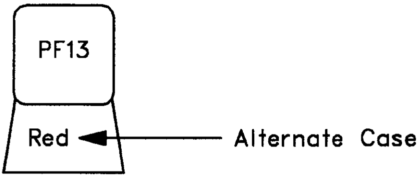
For upper case, press and hold the shift key and then press the key you want.



Using Alternate Case - the Marks on the Front

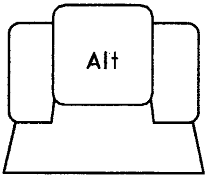
You will notice that some of the keys are labeled on the front. For example:


ChgSc
Jump
CrSel


PF13
Red
Alternate Case

The markings on the front are for the alternate function.

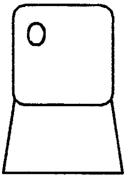
For alternate case, press and hold the Alt key and then press the key you want.

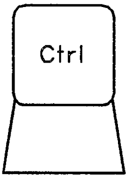


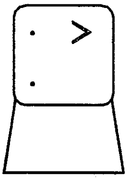
Using Keys with Black and Blue Markings

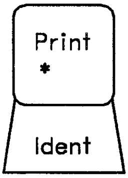
Note: This section applies only if you have a 3270 PC keyboard.

Most of the keys on your 3270 PC keyboard have black markings. Some keys have blue markings, and others have both. For example:








Print
*
Ident

The keys with the black markings work as labeled when you are using a personal computer, a host computer, or a note pad session, or when controlling your work station in work station control mode.

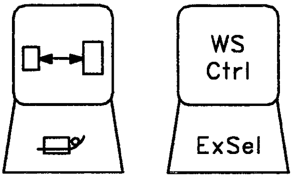
In general, the keys with the blue markings work as labeled when you are working with a PC session.

The keys with both black and blue markings work in two ways:

1. The blue markings work only in a PC session.
2. The black markings work everywhere else.

Using Toggle Keys

The toggle keys work like switches. Press them once to turn them on, and press them again to turn them off. For example, on the 3270 PC keyboard:



The enlarge key (left Alt + Insert on the Enhanced PC keyboard or Alt + NumLk on the AT/XT keyboards) enlarges and reduces your active window. For example, if your windows are smaller than full size, pressing the key once enlarges the active window to fill the screen. Pressing the enlarge key again reduces the window to its original size.

The WSCtrl key (Shift + Esc on the Enhanced PC keyboard or Shift + Esc on the AT/XT keyboards) toggles you in and out of work station control mode.

Try pressing these keys to see how they work.

How to Use the Keyboard Templates

Keyboard templates that can be used with a 3270 work station are of the following types:

- 3270 PC keyboard templates that come with your keyboard
- Enhanced PC, PC XT, and Personal Computer AT templates that are included at the back of your User's Guide package.

3270 PC Keyboard Templates

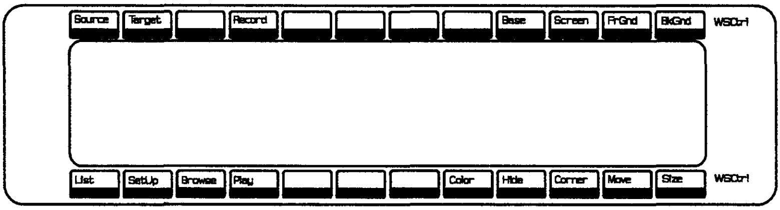
If you have a model of the 3270 PC that includes the 3270 PC keyboard, you received two templates with your work station. These templates fit around the program function (PF) keys on your 3270 PC keyboard. They help you remember what the PF keys do. Each template has two sides. One of the templates has these sides:

- Work Station Control
- Work Station Control and Entry Assist.

The other template has these sides:

- Work Station Control, Entry Assist, and X.25 Network Communications
- Blank.

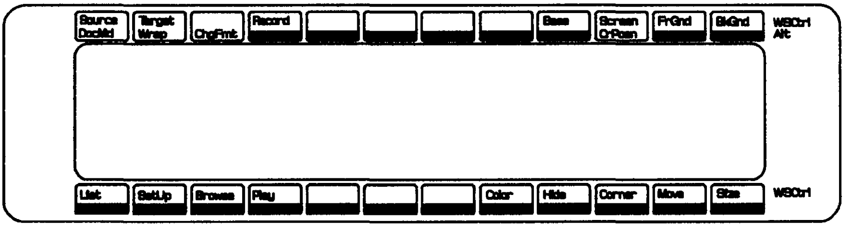
The Work Station Control side looks like this:


Source
Target
Record
Base
Screen
FrGnd
BkGnd
WSCtrl
List
SetUp
Browse
Play
Color
Hide
Corner
Move
Size
WSCtrl

This is the side you should begin with.

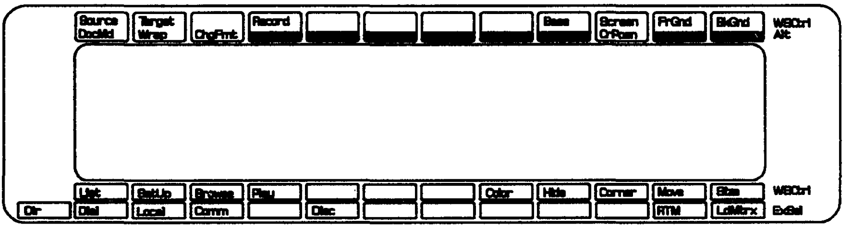
This is the side you should begin with.

The Work Station Control and Entry Assist side looks like this:


Source
DocMd
Target
Wrap
ChgFmt
Record
Base
Screen
CrPosn
FrGnd
BkGnd
WSCtrl
Alt
List
SetUp
Browse
Play
Color
Hide
Corner
Move
Size
WSCtrl

Use this side if your host computer has Entry Assist. The *IBM 3270 Information Display System: Entry Assist RPQ (8K1147) User's Guide* explains how to use the Entry Assist keys.

The Work Station Control, Entry Assist, and X.25 Network Communications side looks like this:


Source
DocMd
Target
Wrap
ChgFmt
Record
Base
Screen
CrPosn
FrGnd
BkGnd
WSCtrl
Alt
List
SetUp
Browse
Play
Color
Hide
Corner
Move
Size
WSCtrl
Clr
Dial
Local
Comm
Disc
RTM
LdMtrx
ExSel

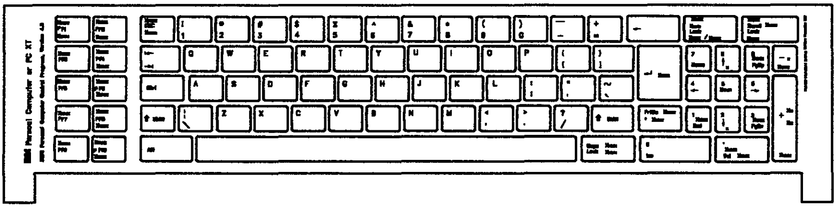
Use this side if your host computer has Entry Assist and is connected to an X.25 network. The *IBM 3270 Information Display System: X.25 Operation*, GA23-0204, describes how to use the X.25 keys.

There is also a blank side which you can use to create your own template. Fill it in as a reminder of the PF keys that you use with one of your programs.

Enhanced PC, XT, or AT Keyboard Templates

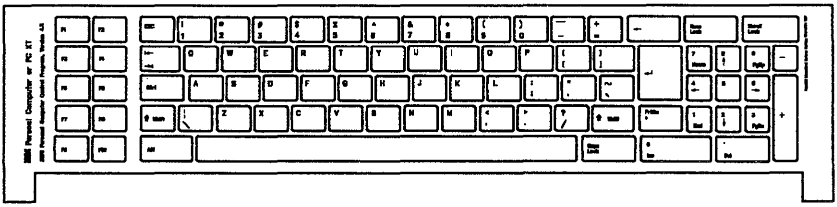
The IBM 3270 Workstation Program package includes keyboard templates to assist you in using the Enhanced PC, AT, or XT keyboards with the workstation program. The keyboard template fits around your keyboard and shows the location of host and work station control functions.

One side contains all the keyboard functions available with the workstation program. Personal computer, host, and work station control functions are color coded. For example, one side of the AT keyboard template looks like this:



Use this side if you you need to use key functions that are not engraved on the keys.

The other side contains only the functions engraved on the keys. For example, the other side of the AT keyboard template looks like this:

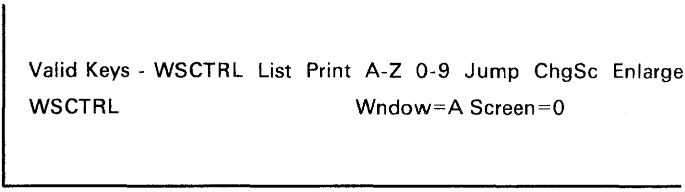


You can use this side to create your own template. Fill it in as a reminder of the PF keys that you use with one of your programs, or write down new key locations that you might have created using the keyboard definition utility.

Work Station Control Mode Functions Available on the AT and XT Keyboards

If you are using the AT or XT keyboard on non-3270 PC hardware, a subset of the work station control mode functions will be available to you. When you press WSCtrl, the operator information area will display a list of valid keys. To see this list:

- Press WSCtrl (Shift + Esc on the AT or XT keyboards).
- You will see the following line appear at the bottom of your display screen. This line is called the work station control mode operator information area (OIA).



```
Valid Keys - WSCTRL  List  Print  A-Z  0-9  Jump  ChgSc  Enlarge
WSCTRL                            Wndow=A Screen=0
```

The following keys will help you perform tasks on your work station. To perform these tasks, you would press:

WSCTRL (Shift + Esc)	Press this key to get into work station control mode and perform tasks with any of the valid keys listed in the OIA. Press WSCtrl again to toggle this function off.
List (PF1)	Press this key to display a list of the windows and screens that are defined for your customized system. Unless you have created more screen profiles using the API, only screen profile zero will be defined. See Chapter 5 for more information on List.
Print (PrtScr)	Press this key to print the contents of your display screen on the printer attached to your work station. Use the Quit key (Ctrl + F10) if you want to stop the print.

A-Z and 0-9

Press the appropriate keys in this range to **select** a window or screen profile. Press the letter that corresponds to the window's short name to select a window and make it active. When you select a window, you make that window the active window. Press the number of the desired screen profile to switch to that screen.

Note: Unless you have created other screen profiles using the API, you cannot add or delete windows from a screen profile.

Jump (Alt + Esc)

Press this key to move from window to window. Jump works the same way on all five keyboards. It moves from one window to another in a sequence. When you jump to a window, you make that window the active window.

ChgSc (Alt + ScrLk)

Press this key to move from screen profile to screen profile. ChgSc works the same way on all five keyboards. It moves from one screen to another in a sequence.

Enlarge (Alt + NumLk)

Press this key to make a sized window full screen. This function works the same way on all five keyboards.

Note: If you are using an AT/XT keyboard, your windows will be full screen size by default. You will only need the enlarge function if you have sized your windows using the API.

Chapter 10. Using Your Sessions

In this chapter, you will learn how to:

- Understand the difference between presentation spaces and windows
- Understand the Operator Information Area (OIA)
- Use windows
  - Select windows
  - Enlarge and reduce windows
  - Use Browse
  - Use Autowindowing
- Get HELP information
- Work with the three types of 3270 work station sessions:
  - Host computer sessions (up to four)
  - Notepad sessions (up to two)
  - Personal computer (PC) sessions (up to six)
- Use Multiple PC Sessions
  - Display the amount of storage in each session using the INDDENV command
  - Merge PC sessions for more space using the INDMERGE utility
  - Split up PC sessions for more sessions using the INDSPLIT utility
- Use 3270 keystroke emulation.

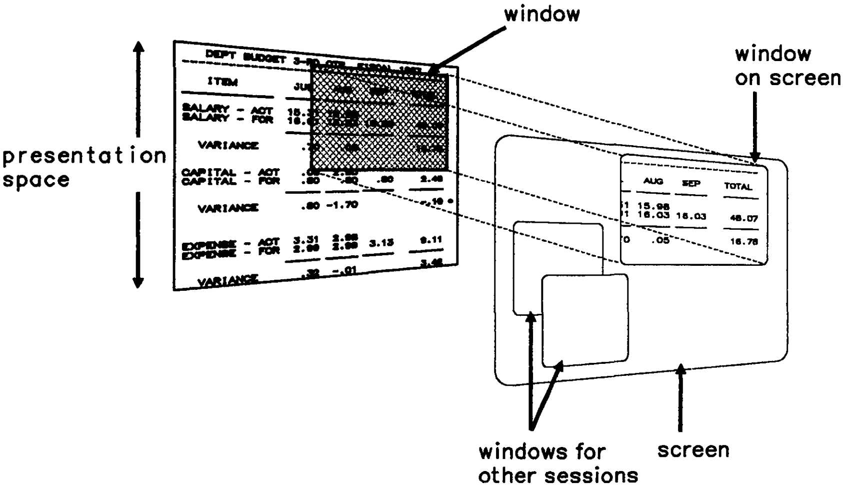
Presentation Spaces and Windows

A **presentation space** represents the area that contains the data that goes to your display screen during a 3270 host session, an IBM Personal Computer session, or a notepad session. With the IBM 3270 Workstation Program, you can simultaneously display up to 12 sessions on one screen (six PC sessions, four host sessions, and two notepads). This means that if you have 12 sessions on your screen, you will have 12 corresponding presentation spaces.

Each presentation space may be viewed through a **window** on your screen. Windows let you see the data within each presentation space. A window can be the same size as your full PC work station display screen; or the window can be as small as one character. You may use the work station control functions like browse and autowindowing, to see what is in your presentation space. If a window is smaller that your presentation space, you may use the work station control functions like size and enlarge, to make the window dimensions match those of the presentation space. These functions are described in detail in Chapter 5.

Note: If you are using the workstation program on a system unit with an XT or AT keyboard, you must use API programming to change the size and location of your windows.

The important point to remember is that a window is your means of viewing the data in the presentation space. The diagram below shows the relationship between a presentation space and a window.



Understanding the Operator Information Area (OIA)

The operator information area (OIA) is the bottommost line of your screen where you receive information about the status of your work station and your host, notepad, and personal computer sessions.

In work station control mode, the OIA is white with black letters and contains the cursor.

Application mode includes three types of sessions: host, notepad and personal computer. Each type of session has its own operator information area (OIA), which is the color of the active window.

The OIA automatically covers the last line of your display screen in a host or notepad session. In a notepad session, the OIA contains information about the window short name and the specific notepad function you are using (i.e., color or highlighting). In a host session, the OIA contains host information. If your host system is customized for control unit terminal (CUT), you can display an alternate OIA by pressing Ctrl + WS Ctrl (Ctrl + Shift + Esc on the Enhanced PC and AT/XT keyboards). This alternate OIA contains information about the workstation program, such as the window short name.

In personal computer sessions, the OIA also appears at the bottom of your screen. However, since PC sessions use more lines of your screen than host or notepad sessions, you will not see the OIA area for the active session unless you press Ctrl + WS Ctrl keys (Ctrl + Shift + Esc on the Enhanced PC and AT/XT keyboards). Then the operator information area overlays the last line of your display screen. You can toggle the personal computer session OIA off by pressing Ctrl + WS Ctrl (Ctrl + Shift + Esc on the Enhanced PC and AT/XT keyboards) again.

Note: If you are using non-3270 PC hardware, a PC session will have no OIA along the bottom of its window. To find the window name, press the WSCtrl key (Shift + Esc on the Enhanced PC keyboard or Shift + Esc on the AT/XT keyboards). The short name will be displayed in the work station control mode OIA.

Using Windows

In using the 3270 work station windows, you can:

- Select a window, that is, make it active
- Enlarge and reduce the size of your windows
- Browse the presentation space behind a window
- Browse a personal computer graphics window
- Use autowindowing

Selecting a Window

To use or change a window, you must first select it. Selecting a window makes it active. On the screen, the active window has a double border around it. You select a window and make it active with the Jump key (Left Alt + Page Up on the Enhanced PC keyboard or Alt + Esc on the AT/XT keyboards) or by typing the window short name while in work station control mode.

To select a window:

1. Press the Jump key (Left Alt + Page Up on the Enhanced PC keyboard or Alt + Esc on the AT/XT keyboards).

   The next window in alphabetical order will appear. The window short name is the single letter in the upper left corner of the border.
2. To go to the next window in order, press the Jump key (Left Alt + Page Up on the Enhanced PC keyboard or Alt + Esc on the AT/XT keyboards) again.

You can also choose a window in work station control mode by typing the window's short name:

1. Press the WS Ctrl key (Shift + Escape on the Enhanced PC keyboard or Shift + Esc on the AT/XT keyboards).
2. Type the short name of the window you want.

   The window you name will become the active window on your screen. Continue with other work station control mode functions, or
3. Press WS Ctrl (Shift + Esc on the Enhanced PC keyboard or Shift + Esc on the AT/XT keyboards) again to go back into application mode.

If you have windows that overlap on the screen, the active window will always be on top. The other windows may be completely or partly covered.

Enlarging and Reducing Windows

If you have several windows arranged and sized on one screen, you may not be able to see everything in them. You can view a sized window by moving the cursor to the edge of the active window. When the cursor reaches the edge, any text you can't see will move so that you can see it. This is called **autowindowing**, and is described later in this chapter. Another way to view more of the text is to make your windows larger.

To enlarge your windows:

1. Use the Jump key (Left Alt + Page Up on the Enhanced PC keyboard or Alt + Esc on the AT/XT keyboards) to choose the window you want to use.
2. Press the Enlarge key ▫↔□ (Left Alt + Insert on the Enhanced PC keyboard or Alt + NumLk on the AT/XT keyboards) once.

   The active window will fill the screen. Behind it, all of the windows will be enlarged.

To reduce the enlarged windows:

1. Press the Enlarge key ▫↔□ (Left Alt + Insert on the Enhanced PC keyboard or Alt + NumLk on the AT/XT keyboards) again.

The enlarged windows return to their original size. The Enlarge key (Left Alt + Insert on the Enhanced PC keyboard or Alt +NumLk on the AT/XT keyboards) works in both application mode and work station control mode.

Browsing the Presentation Space behind a Window

Note: The browse function is not available if you are using an AT or XT keyboard.

When you browse a window, you are looking at the presentation space behind the window. The window does not move. The information in the presentation space moves up, down, to the left, and to the right, depending on how you use the cursor movement keys.

If you browse far enough, the cursor will no longer be visible in the window. However, when you press WSCtrl to leave Browse, the window will be active and the text in the window will move so that the cursor is visible again.

To browse a window:

1. Press WS Ctrl (Shift + Escape on the Enhanced PC keyboard).
2. Use the Jump key (Left Alt + Page Up on the Enhanced PC keyboard) or type the short name to select the window you want to browse.
3. Press PF3, the Browse key (F3 on the Enhanced PC keyboard).
4. Use the black cursor movement keys to move the data in the presentation space. By using the cursor movement keys, you can move data up, down, to the left, or to the right so that it is visible in the window. For example, use right cursor movement key to move the information to the right until the portion you want to see appears in the window.
5. Use the Jump key (Left Alt + Page Up on the Enhanced PC keyboard) or type the short name of another window, if you want to browse another window.
6. Press WS Ctrl (Shift + Escape on the Enhanced PC keyboard) when you are finished.

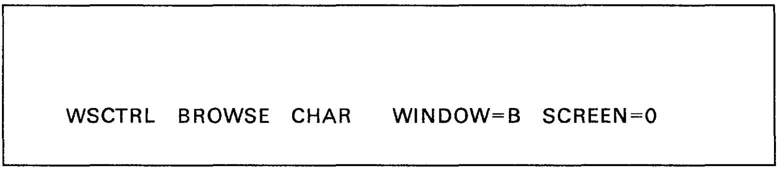
Browsing a Personal Computer Graphics Window

Note: This utility will work only for 3270 PC hardware.

You can browse a personal computer window **PEL by PEL** while running a graphics application in the active personal computer window. This means you can browse your window picture element (PEL) by picture element instead of character by character by using the black cursor movement keys. To do this:

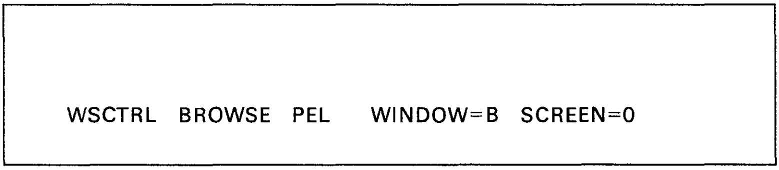
1. Press WS Ctrl (Shift + Escape on the Enhanced PC keyboard).
2. Use the Jump key (Left Alt + Page Up on the Enhanced PC keyboard) or type the short name of the window to select the window you want to browse.
3. Press PF3, the Browse key (F3 on the Enhanced PC keyboard).

   At this point, you can browse the data in the window character by character. Your OIA looks like this:



```
WSCTRL  BROWSE  CHAR    WINDOW=B  SCREEN=0
```

4. Now press Alt + PF3 to browse PEL by PEL.
5. Use the black cursor movement keys to browse the information in the window. Your OIA looks like this:



```
WSCTRL  BROWSE  PEL    WINDOW=B  SCREEN=0
```

6. To leave browsing PEL by PEL, press Alt + PF3 again. You will then be browsing character by character again.

Autowindowing

When you are working in a window, you do not need to enlarge your window to type in data. As you type, the characters will always appear within the window. When the characters you are typing reach the right edge of the window, the information on the left side of the window moves out of sight, character by character. When you reach the bottom line of the window, the top line of type will disappear from your screen to make room for the new line you are entering. This means you can keep on typing without worrying about reaching the window borders until you reach the end of the presentation space. Then the cursor wraps to the opposite side from where it was.

Getting Help Information

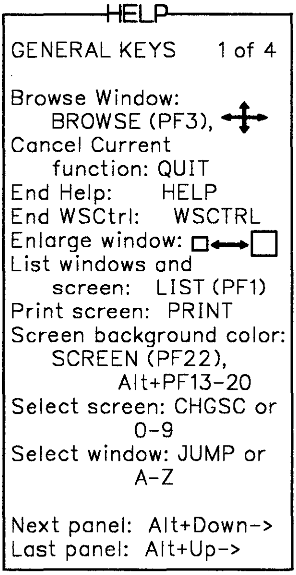
While you are in work station control mode, you can get help information on your screen.

Note: If you are using an AT or XT keyboard, online help is not available.

To get help:

1. Press the WSCtrl key (Shift + Esc on the Enhanced PC keyboard) to get into work station control mode.
2. Press the Help key.

This Help panel appears on your screen:



```
HELP
GENERAL KEYS     1 of 4

Browse Window:
    BROWSE (PF3), ✥
Cancel Current
    function: QUIT
End Help:     HELP
End WSCtrl:    WSCTRL
Enlarge window: □←→□
List windows and
    screen:   LIST (PF1)
Print screen:  PRINT
Screen background color:
    SCREEN (PF22),
           Alt+PF13-20
Select screen: CHGSC or
           0-9
Select window: JUMP or
           A-Z

Next panel:  Alt+Down->
Last panel:  Alt+Up->
```

This is the first of a set of help panels that you can see. It tells you which keys you are allowed to press from your current position in work station control mode. Use Alt + the down cursor key to move through the four help panels.

3. Take a few minutes to look through the information on the help panels.

4. When you are finished with the help panels, press the Help key.

5. Press the WSCtrl key (Shift + Esc on the Enhanced PC keyboard) again to return to your work.

Using a Host Computer Session

Before you can begin working in a host computer session, you must select the host session you want and log on. For information on selecting windows, see the previous section, "Selecting a Window."

Working in Your Host Session

After you have chosen the host session you want to use, you can:

- Enter any host command
- Run any host session application program.

Refer to the instructions or user's manuals listed below for your host system if you need more information.

Remember that your keyboard is logically attached to the active host session. The keys will function as described for an application mode host session.

At any time, you can use the Jump key (Alt + Page Up on the PC Enhanced keyboard or Alt + Esc on the AT/XT keyboard) to go to another window.

Where to Find More Information

For more information on using your host computer, consult these sources or see your host system administrator.

- For information about using VM/370 CMS:

  VM/SP: CMS Primer,

  VM/SP: CMS User's Guide,

  VM/SP: CMS Command and Macro Reference,

  VM/SP: System Product Editor User's Guide, *VM/SP: System Product Editor Command and Macro Reference,*

VM/SP: Quick Guide for Users,

VM/SP: CP Command Reference for General Users.

- For information about using OS/VS2 TSO:

  OS/VS2 TSO Terminal User's Guide,

  OS/VS2 TSO Command Language Reference.

Using a Notepad Session

A notepad session is like a sheet of paper on which you can write notes to yourself. What you can enter is limited to the size of the screen. In application mode, you can:

- Use a window assigned to a notepad
- Edit text in a notepad
- Type in multiple colors in a notepad window
- Save the contents of a notepad window.

Selecting a Notepad Session

To use a notepad session, you must first select it:

1. Use the Jump key (Alt + Page Up on the Enhanced PC keyboard or Alt + Esc on the AT/XT keyboard) to choose the notepad window you want.
2. If you want to enlarge the window, press the Enlarge key (Left Alt + Insert on the Enhanced PC keyboard or Alt + NumLk on the AT/XT keyboard).
3. Type anything you want in this window.

At any time, you can use the Jump key (Alt + Page Up on the Enhanced PC keyboard or Alt + Esc on the AT/XT keyboard) to go to another window.

Editing a Notepad

Notepad provides you with six functions that will help you edit lines and blocks of lines quickly. These functions allow you to:

- Delete a line
- Insert a line
- Duplicate a line
- Copy a line or block of lines over existing text
- Copy a line or block of lines between lines of text
- Move a line or block of lines.

When your notepad is active, you can press PF10 to view a help panel for these functions.

Editing lines

To **Delete** a line,

1. Move the cursor to the line you want to delete
2. Press **PF1**
3. The line disappears

The line below the one you deleted moves up and becomes the line with the cursor.

To **Insert** a line,

1. Move the cursor to the line directly below the one you want to insert
2. Press **PF2**

3. The new line will be inserted directly above the line with the cursor and the rest of the lines will move down one line each. Just be sure that you have at least one blank line at the bottom of your screen.

To **Duplicate** a line,

1. Move the cursor to the line you want to duplicate
2. Press **PF3**
3. The line the cursor was on when you pressed PF3 is duplicated. The lines below the duplicated line move down one line. Just be sure you have at least one blank line at the bottom of your screen.

Editing Blocks of Lines

To edit blocks of lines, you must first mark the source block.

To **mark the source**,

1. Move the cursor to the first source line. Your cursor can be at any point on that line.

   If you want to copy only one line, continue with Step 6.

   If you want to mark a block of lines, continue with Step 4.
2. Press **PF7**
3. The ◄—► symbol will mark the beginning of the first source line.
4. Move the cursor to the last source line. Your cursor can be at any point on that line.
5. Press **PF7**
6. The ◄—► symbol will mark the end of the source block.

   At any time, you can reset your choices by pressing Reset.

7. Move the cursor to the target line. The copy function will copy the marked block in the space above this line. If you are copying a line or block of lines, make sure that there is enough space to insert the block of lines. You will copy the line or block of lines into a space you have created. Keep in mind the following:
   - The target cannot be within the source or you will hear a beep when you try the copy operation.
   - There must be enough space to fit the line or block of lines or you will hear a beep when you try the copy operation.
8. Now press
   - PF4 to **Copy Overlay** (copy the block over existing text)
   - PF5 to **Copy Insert** (copy the block between existing text blocks)
   - PF6 to **Move** (move the block to a specified area).

Typing in Multiple Colors in a Notepad Window

Note: This feature is available only with the 3270 PC or Enhanced PC keyboards.

If you have a color display, you can type in multiple colors in a notepad session.

When you are in a notepad session, you can set colors while you are in application mode and type information in more than one color. You use the color keys, PF13 through PF19 (Shift + F1-F8 respectively on the Enhanced PC keyboard) in the Program Function key area. Here's how to do it:

1. Go into application mode.
2. Press Alt with one of the color keys, PF13 through PF19 (Shift + F1-F8 respectively on the Enhanced PC keyboard), for the color you want for the next character.

The window will have a black background and blue borders after you type the first character. The characters continue to be typed in the color you chose.

The color you choose shows in the operator information area. The color symbol appears as a colored oval next to a stick figure. As you change colors, the oval changes to the corresponding color.

3. To change a color, press Alt and another color key, PF13 through PF19 (Shift + F1-F8 respectively on the Enhanced PC keyboard).
4. You can turn off a color by pressing Alt + PF21 (Shift + F9 on the Enhanced PC keyboard). When you type now, characters appear in green, the default color.

You must save any changes you have made to your notepads before you power off or before you press the Clear key. Refer to Chapter 11 for information on how to save changes to your notepads.

If you press the Clear key, any changes you have made to the notepad disappear and your window goes back to green text on a black background. Any characters you type now appear as the default foreground color. For further information on color, see Chapter 5.

Using a Personal Computer Session

In application mode, you can use DOS commands and run programs in your PC sessions. DOS is the only operating system that can be used with the IBM 3270 Workstation Program.

Selecting a Personal Computer Session

After you have loaded your workstation program and your windows are on the screen, you can select a PC session, as follows:

1. Use the Jump key (Left Alt + Page Up on the Enhanced PC keyboard or Alt + Esc on the AT/XT keyboard) to choose the PC window you want.
2. Press the Enlarge key ▫↔□ (Left Alt + Insert on the Enhanced PC keyboard or Alt + NumLk on the AT/XT keyboard) if you want the window to fill the screen.
3. Look for the DOS prompt if DOS is running in that session:

   ```
   A>
   ```

   or:

   ```
   C>
   ```

4. Or look for the information or messages that the PC program normally puts on the screen if a program is running in that session.

You are now ready to begin using your PC session. Each PC session looks and works as if it were running on an IBM Personal Computer.

At any time, you can use the Jump key (Left Alt + Page Up on the Enhanced PC keyboard or Alt + Esc on the AT/XT keyboard) to go to another session.

Some Considerations

- Make sure you've allocated enough storage to run an application in a given PC session.
- Programs such as virtual disks or print spoolers are system extensions and must be installed before INDCIPL executes.
- You must have more than 96K bytes of storage for the PC session in which you run a DOS FORMAT.
- You may only use diskettes that are formatted with DOS. Games and other applications that are not formatted with DOS will not work and will result in system message INDSY062. See the *3270 Workstation Program Problem Determination Guide* for more information about this message.
- If you re-IPL a PC session, any AUTOEXEC.BAT residing on your `A>` or `C>` drive will be executed just as it would on a PC running DOS only. The result may not be what you intended.

Working in Your PC Session

After you have selected the PC session you want to use, you can do the following:

- Enter a DOS command, if you have DOS running in that session.
- Start a PC application program that will run in the storage allocated to that session.
- Use a PC application program if it is already running.
- Enter the BASIC or BASICA commands to write a BASIC program.
- If your workstation program is customized for Multi-DOS, enter the INDEML command to use 3270 Keystroke Emulation in the PC session. (See the section "Using 3270 Keystroke Emulation" in this chapter.)

Using Multiple PC Sessions

With the Multi-DOS facility, you can customize your system for up to six personal computer sessions. You can tailor these PC sessions to meet your needs by specifying at customization a storage size for each and by assigning PC applications to run in given windows.

If you have more than one PC session, you will probably have more than one PC application running at the same time. These PC applications may compete for certain system resources, such as display memory. This competition for system resources may temporarily keep programs in other sessions from running or using the display screen. When this happens, you may see:

- Some programs stop running temporarily
- Some PC windows become blank.

You can get a program running again or get the blank window to return by pressing the Jump key (Left Alt + Page Up on the Enhanced PC keyboard) to activate the window.

If you have multiple PC sessions, create a program information file (PIF) for each PC application to let the system know what characteristics the application displays. Your application can run without a PIF, but having this file will improve the application's performance. Program information files are discussed later in this chapter. For more information on program information files, refer to Chapter 6.

Considerations Before Using Multiple PC Sessions

Before you begin running PC applications with Multi-DOS, consider the following limitations or restrictions:

- If you are debugging a program using the DOS DEBUG command and you stop the program from executing by pressing the Ctrl + Break keys, the registers of the running program are lost. You should not attempt to continue running the program.

- Any applications that reprogram the timer will behave poorly when you attempt to run them with other applications that reprogram the timer. For example, two BASIC applications that play music may sound off key if you try to run them simultaneously.
- If you edit the same file in two PC sessions, you will lose one update and may lose the file entirely.
- If you try to format a diskette in more than one PC session simultaneously, you will create an unusable diskette.
- If you execute `copy *.*` from more than one PC session simultaneously to the same disk, the command will fail and destroy data on the diskette.
- If you execute Ctrl + Print Screen from more than one PC session simultaneously, the text will intermix on the printer and the result will be unreadable.
- Do not attempt to run two asynchronous programs at the same time.
- Programs like CHKDSK (Check Disk) that display the available storage and free storage, will return different numbers in each PC session. These numbers indicate the top of storage for the given PC session and will vary from session to session.
- A program that uses the API and that is not well-behaved may not run if it is not in the active PC session. You should not jump to another PC window while such an application is running in the active window.
- Do not attempt to run the same program in two or more PC sessions simultaneously, since both sessions may fail. This may occur if the program uses temporary files, writes to specific memory locations, or writes to specific ports. Running the program in two or more sessions at the same time causes it to compete with itself for these system resources.

- You must use the same level of DOS on all diskettes and/or fixed disks that you use on your system. Re-IPLing a PC session with a different version of DOS will cause the system to fail.

- You cannot use TOPVIEW. For non-XMA systems, Visicalc® Business Forecasting Model[1] cannot be loaded so that its base segment address is higher than `'8000'x`. It may overlay the workstation program, resulting in system failure. Run INDDENV to see which session is lowest in memory (the one at the top of the INDDENV list). Try running the program in the PC session listed at the top of the INDDENV list.

- If you change your CONFIG.SYS file, you must re-IPL the whole system in order to use the new CONFIG.SYS file. Go into work station control mode and press Ctrl + Alt + Del.

- If you change your 3270PC.PIF file, you must re-IPL the whole system in order to use the new 3270PC.PIF file. Go into work station control mode and press Ctrl + Alt + Del.

- When you use the **/M** option with BASICA, always be sure to specify enough storage for the program to be loaded. If you specify a value that is too small, the system may fail.

- Applications that depend on the ANSI.SYS file will fail when you attempt to run them in Multi-DOS. ANSI.SYS will be installed if placed in the CONFIG.SYS file, but it will not produce the desired effect. If you want to use application that depend on the ANSI.SYS file, then do not customize for Multi-DOS.

- The DOS BREAK function is turned off when you re-IPL your system. If you have an application that depends on the BREAK function, it must be turned back on manually after IPL.

---

[1] Trademark of VisiCorp.

Merging PC Sessions For More Space

Note: If you have the Expanded Memory Adapter Card (XMA Card) installed, this section does not apply. Recustomize to change the storage size of your PC sessions. To use the INDMERGE command, you must have a diskette containing this utility. This diskette should be in the active drive.

Once you start using multiple PC sessions, you may find that some are not large enough for the programs you want to run. They may need more storage than their sessions have available, or they may run faster with extra space.

You might have an unused PC session that is large enough. As an alternative, you can use the INDMERGE utility to temporarily combine the system resources of more than one PC session into a larger PC session. You assign this larger PC session its own name and amount of storage. This new PC session will exist only until you power off or re-IPL your system.

Note: It is best to merge only PC sessions that are not running other applications, since the INDMERGE command will stop whatever is running in the session to be merged.

The panel-driven INDMERGE utility is described in the following sections.

Obtaining Information About Your PC Sessions

Before you combine any of your PC sessions, you should issue the INDDENV command to obtain important information about your PC sessions.

Note: If you have the XMA Card installed, you can use INDDENV, but you cannot use INDSPLIT or INDMERGE. To use the INDDENV command, you must have a diskette containing this utility. This diskette should be in the active drive.

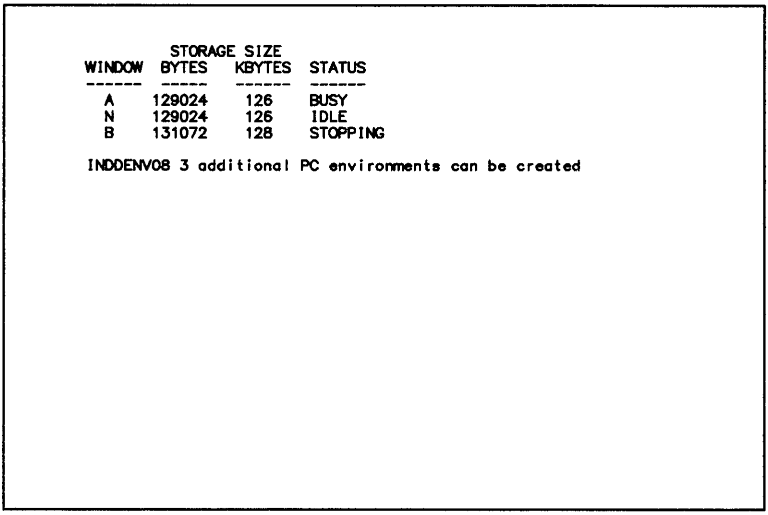
The INDDENV, or display environment, command tells you:

- The names and sizes of your PC sessions.
- Which sessions are next to one another in storage. The sessions are listed in order from low memory at the top of the list to high memory at the bottom of the list. You can only merge sessions that are next to one another in memory.
- The status of each PC session. A session may be either IDLE, BUSY, or STOPPING.
    1. An IDLE session has COMMAND.COM loaded and will show a DOS prompt. This session is ready for a DOS command.
    2. A BUSY session has an application currently running in it. If you try to split or merge this session, the application will stop running. The session you run INDDENV in will be busy.
    3. A STOPPING session might be in the process of IPLing, splitting, or merging, or there may be a problem with the application that was running in that window. You should select that window and check on the application that was running in it before you proceed with a split or merge task.

To display this information about all your PC sessions, type:

```
A>inddenv
```

A list of all your sessions will appear:



```
            STORAGE SIZE
WINDOW   BYTES    KBYTES   STATUS
------   -----    ------   ------
  A     129024     126     BUSY
  N     129024     126     IDLE
  B     131072     128     STOPPING

INDDENV08 3 additional PC environments can be created
```

You can display information on an individual session by adding a PC session's window short name at the end of the INDDENV command. For example:

```
A>inddenv A
```

This command will display information about the PC session in window A only.

Using the INDMERGE Panels

To temporarily combine several small sessions into one large session:

1. Figure out how much space your program needs to run.
2. Issue an INDDENV command, if necessary, to find out how much memory a given session has, and to check which sessions are next to one another in memory. You can only merge sessions that are next to one another in memory. Remember that INDMERGE will cause a program running in a window to stop.
3. From any PC session that has DOS, type:

   ```
   inddenv
   ```

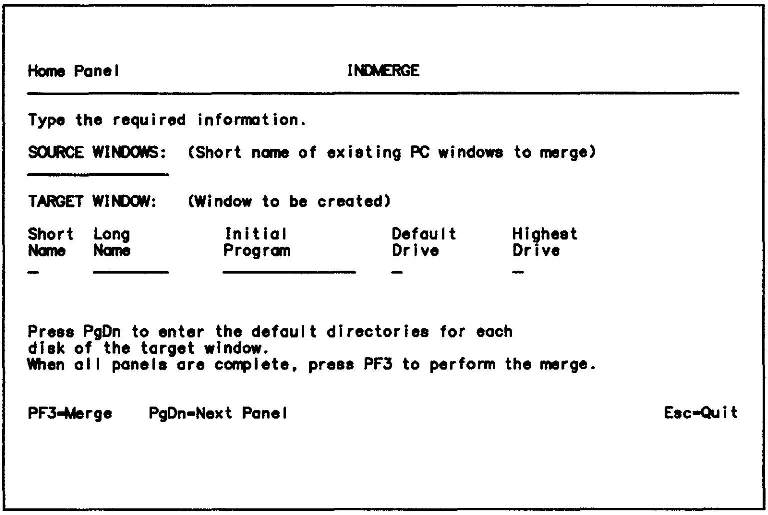
4. Look for the sessions that are idle and next to one another in storage. Decide which ones you will combine to create the space you need.

   Let's assume you need 250K. In our example, sessions A, N, and B are next to one another in storage. Their combined size is 384K. You may decide to combine only N and B, since their combined storage (254) is more than enough for your needs.

5. When you are ready, type the INDMERGE command next to the DOS prompt:

   ```
   A>indmerge
   ```

You will see the following INDMERGE panel appear on the screen.



```
Home Panel                              INDMERGE
__________________________________________________________________________

Type the required information.

SOURCE WINDOWS:  (Short name of existing PC windows to merge)
__________

TARGET WINDOW:   (Window to be created)

Short  Long         Initial           Default      Highest
Name   Name         Program           Drive        Drive
_      ______       ___________       _            _


Press PgDn to enter the default directories for each
disk of the target window.
When all panels are complete, press PF3 to perform the merge.

PF3=Merge    PgDn=Next Panel                                      Esc=Quit
```

6. For the source windows, enter the short names of the windows you want to merge.

7. For the Target window:

   - Enter the short name you want to assign to your target window. You cannot use the name of an existing window, unless it is also one of the source windows.

   The following information is optional. Defaults will be used if you leave these fields blank.

   - Enter the window's long name. You can assign up to 8 characters as a name. The default is PCx, where x is the short name.

   - Enter the initial program to be loaded in this session. Include filetype, for example, COM, EXE, or BAT. The default is COMMAND.COM.

- Enter a default drive for this session. This is the letter that will appear in the DOS prompt. Also, if you did not specify a drive letter in the initial filespec, the system will search the default drive for your program. If you don't specify a letter for the default drive, then it will be `C>` for a fixed disk, and `A>` for a two-diskette drive system.
- Enter the letter of the highest drive that a program in this session will have access to. The default is the highest drive in your configuration.

Notes:

a. If you include a drive letter, the system searches the default directory of that drive for the program. If you do not include a drive letter, the system searches the default directory of the drive specified as default drive.

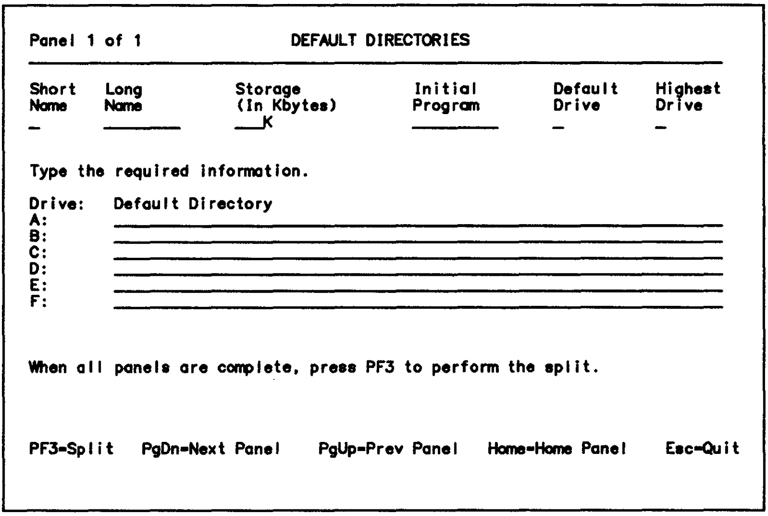
b. If your program is found, it is loaded. If you exit your program, the workstation program will attempt to load COMMAND.COM from the active drive.

c. If your initial program is not found, the workstation program will attempt to load COMMAND.COM.

d. If the initial program is a .BAT file, the .BAT file should be loaded in the base directory. COMMAND.COM should be in the subdirectory for the default drive for the session.

e. If COMMAND.COM cannot be found when the workstation program attempts to load it, message INDSY062, "Cannot load COMMAND.COM," will appear. To recover, insert a diskette containing COMMAND.COM and press Alt+ Ctrl+Del.

After you have entered the required information, press PgDn to enter the default directories for the target window. The default directory panel looks like this:



```
Panel 1 of 1                    DEFAULT DIRECTORIES
______________________________________________________________________
Short   Long          Storage           Initial        Default  Highest
Name    Name          (In Kbytes)       Program        Drive    Drive
_       ________      __K               _________      _        _

Type the required information.

Drive:  Default Directory
A:      ______________________________________________________________
B:      ______________________________________________________________
C:      ______________________________________________________________
D:      ______________________________________________________________
E:      ______________________________________________________________
F:      ______________________________________________________________


When all panels are complete, press PF3 to perform the split.


PF3=Split   PgDn=Next Panel   PgUp=Prev Panel   Home=Home Panel   Esc=Quit
```

Default directories are the directories that DOS will search for commands and files, unless told otherwise.

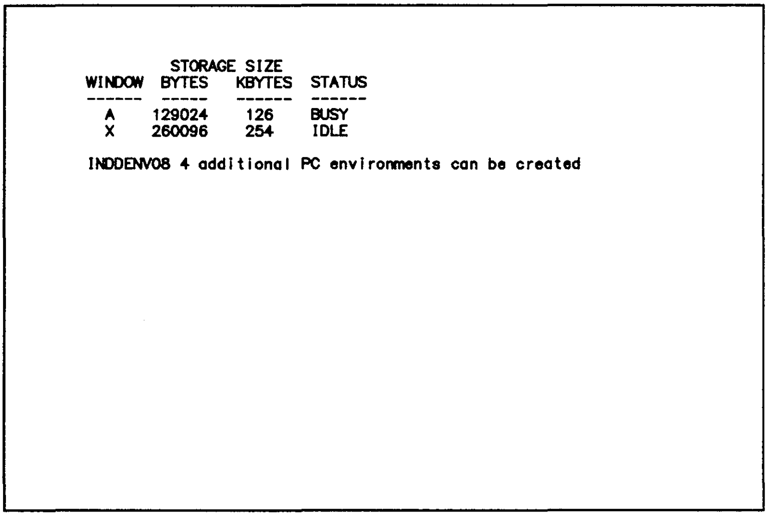
Make sure you have the program and its program information file loaded in the default drive and default directory before you press PF3.

When you have entered the necessary information, press PF3 to perform the merge. The windows you merged will disappear. Any new sessions created by the merge are added behind the other existing windows.

Now type the following command at the DOS prompt to verify the merge:

```
A>inddenv
```

You will see a new list that shows the environment you have created from the sessions you merged. It may look like this:



```
            STORAGE SIZE
WINDOW  BYTES    KBYTES  STATUS
------  -----    ------  ------
  A     129024    126    BUSY
  X     260096    254    IDLE

INDDENV08 4 additional PC environments can be created
```

This list shows the new window, x, which was created by combining the memory from N and B in the example.

You can use this new window as you would any other window. The new window will remain until you turn off your system or until you decide to merge it with another window or split it up. The next section describes how to use the INDSPLIT panel-driven facility to create several sessions from one large PC session.

Splitting One PC Session for More Sessions

Note: If you have the XMA Card installed, this section does not apply. Recustomize to change the storage size of your PC sessions. To use the INDSPLIT command, you must have a diskette containing this utility. This diskette should be in the active drive.

As you are working with your PC sessions, you may find that you need more sessions than you set up. You have two choices:

1. You can recustomize your system to permanently change the way your system is set up. See Part 1 for details on customization.
2. You can temporarily create extra sessions from the ones you have already. You do this using the INDSPLIT panel-driven utility described in the next section.

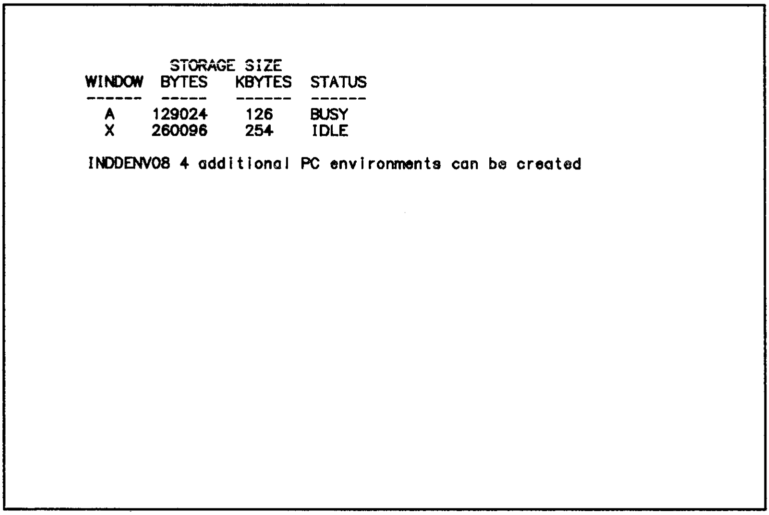
Using the INDSPLIT Panels

To split one large session into several smaller sessions:

1. Decide how many additional sessions you need.
2. From any PC session that has DOS, type:

```
A>inddenv
```

A list of all your sessions will appear:



```
          STORAGE SIZE
WINDOW  BYTES    KBYTES  STATUS
------  -----    ------  ------
  A     129024    126     BUSY
  X     260096    254     IDLE

INDDENV08 4 additional PC environments can be created
```

Your list will show the names and sizes of your PC sessions. You now know how much storage each session has. Decide which session you want to split and how many smaller sessions you want to create. Remember that you need at least 10K bytes of storage for each new session you want to create, and at least 96K bytes of additional storage if you want to run COMMAND.COM in them. Some applications may require even more storage.

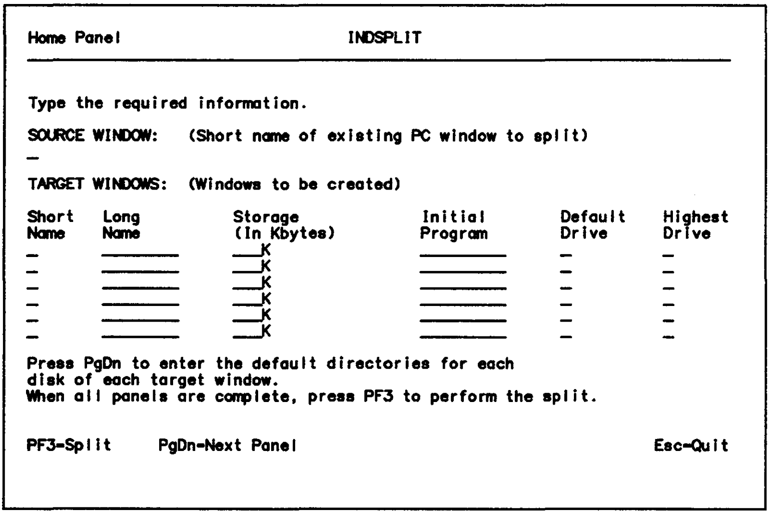
This list will also tell you whether the sessions are IDLE, BUSY, or STOPPING. You should only split up sessions that are idle, or that have applications running in them that you don't mind terminating. INDSPLIT will cause a program running in a window to stop. Idle sessions are not currently running any program in them.

In the above example, you may split up either A or X.

3. When you are ready, type the INDSPLIT command next to the DOS prompt:

```
A>indsplit
```

You will see the INDSPLIT panel appear on the screen:



```
Home Panel                          INDSPLIT
____________________________________________________________________

Type the required information.

SOURCE WINDOW:   (Short name of existing PC window to split)
_

TARGET WINDOWS:  (Windows to be created)

Short   Long          Storage          Initial      Default    Highest
Name    Name          (In Kbytes)      Program      Drive      Drive
_       ________      ___K             ________     _          _
_       ________      ___K             ________     _          _
_       ________      ___K             ________     _          _
_       ________      ___K             ________     _          _
_       ________      ___K             ________     _          _
_       ________      ___K             ________     _          _

Press PgDn to enter the default directories for each
disk of each target window.
When all panels are complete, press PF3 to perform the split.

PF3-Split      PgDn-Next Panel                              Esc-Quit
```

4. For the source window, enter the short name of the window you want to split.

5. For each target window:

   a. Enter the short name you want to assign to your target window. You cannot use the name of an existing window, unless it is also the source window.

   The following information is optional and can be entered for each target window or left blank. Defaults will be used if you leave these fields blank.

   b. Enter the window's long name. You can assign up to 8 characters as a name. The default is PCx, where x is the short name.

   c. Enter the initial program to be loaded in this session. Include filetype, for example, COM, EXE, or BAT. The default is COMMAND.COM.

      Notes:

      1) In order to load two or more programs from the same drive, they must be located on the same diskette or fixed disk.

      2) If you include a drive letter, the system searches the default directory of the fixed disk or diskette for the program. If you do not include a drive letter, the system searches the default directory of the drive specified as default drive.

      3) If your program is found, it is loaded. If you exit your program, the workstation program will attempt to load COMMAND.COM from the active drive.

      4) If your initial program is not found, the workstation program will attempt to load COMMAND.COM.

      5) If the initial program is a .BAT file, the .BAT file should be loaded in the base directory. COMMAND.COM should be in the subdirectory for the default drive for the session.

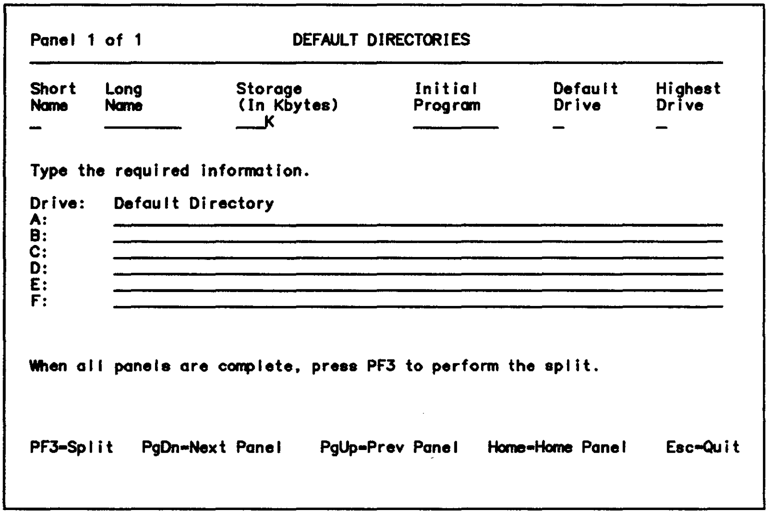
6) If COMMAND.COM cannot be found when the workstation program attempts to load it, message INDSY062, "Cannot load COMMAND.COM," will appear. To recover, insert a diskette containing COMMAND.COM and press Alt + Ctrl + Del.

d. Enter a default drive for this session. This is the letter that will appear in the DOS prompt. Also, if you did not specify a drive letter in the initial filespec, the system will search the default drive for your program. If you don't specify a letter for the default drive, then it will be `C>` for a fixed disk, and `A>` for a two-diskette drive system.

e. Enter the letter of the highest drive that a program in this session will have access to. The default is the highest drive in your configuration.

6. When you are ready, press PgDn to enter the default directories for each session you wish to specify default directories for.

   The default directory panel looks like this:

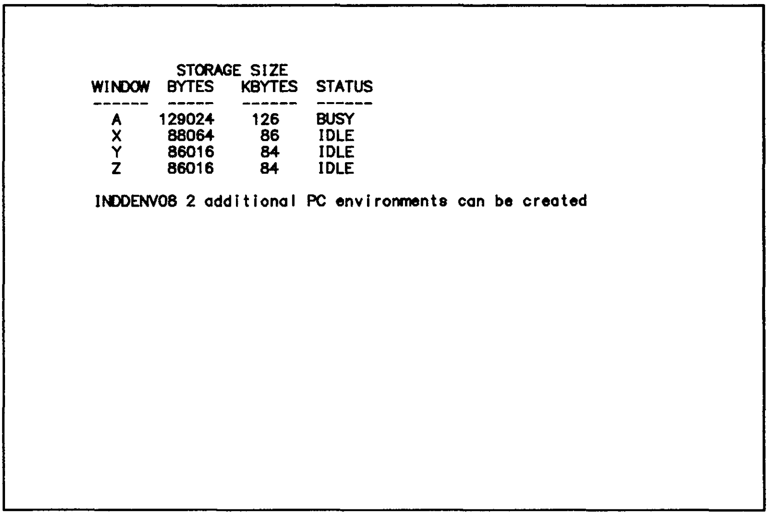


```
Panel 1 of 1                 DEFAULT DIRECTORIES
______________________________________________________________________
Short  Long        Storage          Initial       Default   Highest
Name   Name        (In Kbytes)      Program       Drive     Drive
_      ________    ___K             _________     _         _

Type the required information.

Drive:   Default Directory
A:       _____________________________________________________________
B:       _____________________________________________________________
C:       _____________________________________________________________
D:       _____________________________________________________________
E:       _____________________________________________________________
F:       _____________________________________________________________


When all panels are complete, press PF3 to perform the split.


PF3=Split   PgDn=Next Panel   PgUp=Prev Panel   Home=Home Panel   Esc=Quit
```

7. When you have entered the necessary information, press PF3 to perform the split.

8. You may now enter INDDENV at the DOS prompt to verify the split.

9. You will see a new list that shows the environments you have created from the session you split up. It may look like this:



```
              STORAGE SIZE
WINDOW   BYTES    KBYTES   STATUS
------   -----    ------   ------
  A     129024     126     BUSY
  X      88064      86     IDLE
  Y      86016      84     IDLE
  Z      86016      84     IDLE

INDDENV08 2 additional PC environments can be created
```

This list shows the new windows, X, Y, and Z, which were created by splitting up the memory of session X.

You can use these new windows as you would any other window. The new windows will remain until you turn off your system or until you decide to merge or split them again.

Chapter 11. Using Save/Restore

Introduction

Before powering off, you can save the following and later, when you bring up the system again, restore them.

- Changes to windows and screens
- Autokey recordings
- Notepad data
- All of these together.

You can also save and later display the following:

- Trace data
- Error counters.

In saving and restoring data, you can

- Save the data either in IBM-supplied default files, or files you name
- Create command procedures to save and restore data.

Saving data like this is important to you. For example:

- Let us say that you have recorded your host computer logon procedure with the autokey function. Since this logon procedure is the same every time you use your computer, you can save it, and each time you turn on your work station the recording can be restored for use.
- You will also want to save screen profiles. Suppose you are working with a screen profile and need to stop and continue working with it another time. By saving the screen profile,

you can restore it to the screen the next time you use your system and pick up where you left off. The screen profile you were last using before saving the screen profiles will be active when you next issue a restore to your system. The other screen profiles can also be restored to the system and will appear when those screens are selected.

You must save the updated autokey recordings, screen profiles, and notepads before you power off, or you will lose this information. After you have become familiar with save and restore commands, you may want to learn how to use command procedures to simplify multiple save and restore operations, or to provide automatic restores when your system is initialized.

Rules for Using Save and Restore Commands

While using save and restore commands, you should keep in mind the following:

- You must customize for the Copy utility if you want to save and restore notepad data.
- If you want to restore saved items automatically, you can add the INDRSTR command to your AUTOEXEC.BAT file. See Chapter 6 for more information.
- Save and restore should be run in a PC session customized for at least 64K to avoid the appearance of message "INDSR016: Personal Computer storage insufficient for processing." See the *3270 Workstation Program Problem Determination Guide* for further information.
- Save and restore can be used only while a personal computer window is active and the DOS command prompt, for example, `A>`, is on the screen. Your cursor must be in the personal computer window, and the window will be double-bordered.
- When using the save and restore commands, you can enter them in any combination of uppercase and lowercase characters. If you are not familiar with IBM Personal Computer file naming procedures or notation, refer to this chapter for

a description of the formats and parameters used in the Save and Restore commands and to the *IBM Personal Computer Disk Operating System* manual.

- When issuing save and restore requests, make sure that the correct diskette is in the disk drive specified (or in the default drive if no drive is specified). If any of the DOS device error messages are issued, such as "Diskette is write protected," **do not change diskettes.** If the diskettes are changed, DOS does not guarantee the validity of the diskette directory and the diskette may no longer be readable. For more information, refer to your DOS manual.
- Save your screen profiles before you change your current window configuration. Otherwise you will lose your configuration.

Saving the Changes to Your Windows and Screens

Whenever you make changes to your windows or screens, you must save these changes before you turn off your system. If you don't, they will be lost. You will have to make them over again the next time you turn on your system.

To save the changes to your windows and screens:

1. Make sure that you are not in work station control mode.
2. Press the Jump key (left Alt + Page Up on the Enhanced PC keyboard or Alt + Esc on the AT/XT keyboard) to choose a personal computer window.
3. Make sure that your default drive contains the INDSAVE utility.

4. Type:

   ```
   indsave screen
   ```

```
A>indsave screen
```

Press Enter.

That's all there is to it. Any changes that you made to that screen will be saved.

You can save all of your screens, notepads, and autokey recordings by typing the command INDSAVE.

Restoring the Changes to Your Windows

If you have made changes to your windows and saved them, they are not automatically restored when you turn on your system. You have to restore them yourself.

Here's how to do it:

1. Make sure that you are not in work station control mode.
2. Press the Jump key (left Alt + Page Up on the Enhanced PC keyboard or Alt + Esc on the AT/XT keyboard) to make a personal computer session active.
3. Make sure that your default drive contains the INDRSTR utility.
4. Type:

   ```
   indrstr screen
   ```

```
A>indrstr screen
```

5. Press enter. Your windows as you changed them will appear on the screen.

INDRSTR SCREEN will restore only your windows. INDRSTR will restore your windows, notepads, and autokey recordings.

Saving and Restoring Autokey Recordings

So that you can save and restore autokey recordings, you need to have your system customized with the autokey function, which includes customizing the autokey area size. The autokey recording area will be compressed during the save operation to take up only the diskette storage it needs. The saved autokey data is expanded when restored to fit the current system's autokey area. If it does not fit, a message appears.

To save all autokey recordings:

1. At the DOS prompt, type:

   ```
   INDSAVE AUTOKEY
   ```
2. Press Enter.

To restore all autokey recordings:

1. At the DOS prompt, type:

   ```
   INDRSTR AUTOKEY
   ```
2. Press Enter.

Note: Do not make an autokey recording of an initial program load (IPL) sequence in the personal computer session if you have either one of the following commands in your autoexec.bat file:

```
INDRSTR
```

or:

```
INDRSTR AUTOKEY
```

Otherwise the autokey storage area will be overwritten by the restore command while the recording is playing.

Saving and Restoring Notepads

So that you can save and restore notepads, you need to have your system customized with the copy and notepad functions.

To save all notepads configured in your system:

1. At the DOS prompt, type:

   ```
   INDSAVE NOTEPAD
   ```

2. Press Enter.

To restore all notepads:

1. At the DOS prompt, type:

   ```
   INDRSTR NOTEPAD
   ```

2. Press Enter.

If the saved notepad file was made on a system with the number of notepads different from the current system, an appropriate message explaining this difference appears.

Notes:

1. Saving a notepad saves only the contents of the notepad window: Therefore, when you restore the notepad, the **contents** of the notepad window are restored while the notepad window stays as it is currently defined. For example, if you saved a notepad that has red text on a blue background and later restored the notepad to a notepad window with green text on a black background, the restored notepad will take on the green-on-black color characteristics. To save the original color characteristics of the notepad, save the screen profile that includes that notepad.
2. The first 20 bytes of the notepad data are reserved for use by save and restore commands.

Saving Screen Profiles, Notepads, and Autokey Recordings Together

To save all the autokey recordings, notepad data, and screen profiles of the system at the same time:

1. At the DOS prompt, type:

   ```
   INDSAVE
   ```

2. Press Enter.

To restore all the autokey recordings, notepad data, and screen profiles of the system at the same time:

1. At the DOS prompt, type:

   ```
   INDRSTR
   ```

2. Press Enter.

Note: When you use the save command this way (without any parameter),

- The contents of the notepads are saved.
- Autokey recordings are saved.
- The arrangement of the screen profiles are saved.

When you issue the restore command without any parameters:

- The contents of the notepads are restored.
- Autokey recordings are restored.
- All windows arranged on the screen profiles are restored to the sizes, positions, and colors that existed when the save was done.

The contents of host and PC sessions are never saved or restored.

Saving and Displaying Trace Data and Error Counters

Trace Buffers

If you used the dump data utilities described in the *3270 Workstation Program Problem Determination Guide*, you can save and display the trace.

To save the trace:

1. At the DOS prompt, type:

   ```
   INDSAVE TRACE
   ```

2. Press Enter.

This command creates a file named TRACE.DMP. The trace is in this file.

To display the trace:

1. At the DOS prompt, type:

   ```
   INDDISP TRACE
   ```

2. Press Enter.

Error Counters

If you used the dump data utilities described in the *3270 Workstation Program Problem Determination Guide*, you can save and display the error counter.

To save the error counter:

1. At the DOS prompt, type:

   ```
   INDSAVE COUNTER
   ```

2. Press Enter.

This command creates a file named COUNTER.DMP. The error counter is in this file.

To display the error counter:

1. At the DOS prompt, type:

   ```
   INDDISP COUNTER
   ```
2. Press Enter.

Saving and Restoring Data in Files You Name

There are two types of files you can save and restore data in:

1. IBM-supplied default files
2. Files you name.

IBM-Supplied Default Files

There are four default files in your customized system where data is saved if you do not specify otherwise:

- **INDSAVE.REC**: This file contains the three default filenames listed directly below.
- **INDSAVE.AUT**: This file contains the saved autokey data.
- **INDSAVE.NOT**: This file contains the saved notepads.
- **INDSAVE.SCR**: This file contains the saved screen profiles.

Files You Name

Using an editor of your choice, you may replace the three default filenames in INDSAVE.REC with your own filespecs. The filespec is the complete definition of a file location consisting of drive, path, filename, and extension. The filename is required. The three filespecs in INDSAVE.REC indicate where the saved data will be placed. Each file specification in your replacement for INDSAVE.REC must be separated from the next by a blank space. Note that you must begin each filespec by entering a blank space. Insert a blank space as indicated by the square bullet (■) symbol. For example:

```
■INDSAVE.AUT■INDSAVE.NOT■INDSAVE.SCR■
```

The following filespecs must be in this specified order:

1. Autokey recordings
2. Notepad data
3. Screen profiles.

Below is the format to follow in naming files you created:

```
d:\path filename.ext
```

where:

d:
The personal computer disk drive specifier, for example, **A:**. If not specified, the system will use the default drive.

\path
The optional personal computer DOS directory search order that sets the command search path through directories, for example, \abcd. (Specifying the path to a file is described in your *IBM Personal Computer Disk Operating System* manual.)

filename
A required positional parameter; the personal computer filename.

.ext
The personal computer file extension. It is an optional part of the personal computer filespec. An extension starts with a period, has up to three characters, and follows immediately after the filename. For example:

82PRICES.AUG

where **.AUG** is the extension. An extension of more than three characters is truncated to the first three characters entered.

Refer to the *IBM Personal Computer Disk Operating System* manual for further information on these parameters.

To save items in the file specification of your choice:

1. At the DOS prompt type:

   ```
   A>INDSAVE saved-item [d:][\path]filename[.ext]
   ```

   Where **saved-item** can be:

   SCREEN – to save all screen profiles

   NOTEPAD – to save all notepads

   NOTEPADx – to save a specific notepad, where x is the window short name for that notepad

   AUTOKEY – to save all autokey recordings
2. Press Enter.

To restore items in the file specification of your choice:

1. At the DOS prompt type:

   ```
   A>INDRSTR saved-item [d:][\path]filename[.ext]
   ```

   Where **saved-item** can be:

   SCREEN – to restore all screen profiles

   NOTEPAD – to restore all notepads

   NOTEPADx – to restore a specific notepad, where x is the window short name for that notepad

   AUTOKEY – to restore all autokey recordings
2. Press Enter.

Considerations for Save and Restore

- To save and restore only one notepad, use the NOTEPAD*x* format where *x* is replaced by the short name of the notepad you want to save or restore.
- To save and restore everything, do not specify SCREEN, NOTEPAD, NOTEPAD*x*, or AUTOKEY.
- You need to have your system customized with the copy function so that you can save and restore notepads.
- You need to have your system customized with the autokey function so that you can save and restore autokey recordings.

Creating Command Procedures for Save and Restore

Suppose you want to set up your work station periodically for an application named APPL1, and need to restore:

- Screen profiles from APPL1.SCR
- Autokey recordings from APPL1.REC
- Notepads from APPL1.NOT.

Instead of entering three individual Restore commands and having to remember three user filenames, you can set up a command procedure, such as CNFGAPL1.BAT, that contains the three commands.

This is illustrated below:

CNFGAPL1.BAT file

```
INDRSTR SCREEN APPL1.SCR
INDRSTR RECORD APPL1.REC
INDRSTR NOTEPAD APPL1.NO
```

Then you need only enter a single word to cause the three commands to be executed:

```
A>CNFGAPL1
```

Chapter 12. Printing What's on Your Screen

This chapter explains the three methods of printing what is in your windows when you are working in a host, notepad, or PC session. Specifically, this chapter will describe:

- How to print on the work station printer
- How to print on the printer attached to your control unit
- How to print the contents of a PC window using DOS Print
- What you should know if your printed copy does not exactly match what is on your screen.

Using the Printer Attached to Your Work Station

Using the work station control mode print function allows you to print exactly what is on your display screen. To print the contents of a host, notepad, or PC window, enlarge the window and use this print function. Here's how to do it:

1. If you are not in work station control mode, press the WSCtrl key (Shift + Esc on the Enhanced PC keyboard or Shift + Esc on the AT/XT keyboard).

   This line appears at the bottom of your screen:

   ```
   WSCTRL    _
   ```

2. Make sure the window you want to print is active and enlarged to fill the screen.

   If it is not, press the Jump key (left Alt + Page Up on the Enhanced PC keyboard or Alt + Esc on the AT/XT keyboard) and then press the enlarge key (left Alt + Insert on the Enhanced PC keyboard or Alt + NumLk on the AT/XT keyboard). If you do not enlarge the window, you will print only what is visible in the active window.

3. Press the Print key.

   The line at the bottom of your screen changes to look like this:

   ```
   WSCTRL     PRINT SCR
   ```

4. Wait for the words PRINT SCR to disappear.

5. Press the WSCtrl key (Shift + Esc on the Enhanced PC keyboard or Shift + Esc on the AT/XT keyboard) again to return to using your session.

If you want to stop the printer before the entire screen is printed:

- Press the Alt + Reset (left Alt + right Alt on the Enhanced PC keyboard or Ctrl + F10 on the AT/XT keyboard) keys to quit.

Using the Printer Attached to Your Control Unit

You can print what appears in your host window on a printer attached to your control unit. Even if the window is not full size on your screen, you will get a printed copy of the full size window.

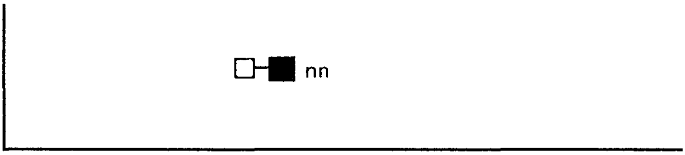
You may not have this type of printer available to you. If you are not sure, ask your supervisor or the person you call for help with using your computer.

If you are not familiar with this type of printer, you can read about it in the *IBM 3270 Information Display System: 3278 Display Station Operator's Guide* before you try to use it.

To print on your control unit's printer:

1. Make sure that the host window you want to print is active.
2. Press the Print key.

   The line at the bottom of your screen should look like this:



□-■ nn

   If it doesn't, press Ctrl + WS Ctrl (Ctrl + Shift + Esc on the Enhanced PC keyboard or Ctrl + Shift + Esc on the AT/XT keyboard). If you still don't see this, there is a problem with the printer. Press Reset, then Quit (left Alt + right Alt on the Enhanced PC keyboard or Ctrl + F10 on the AT/XT keyboard). Refer to the *3278 Display Station Operator's Guide* for instructions on what to do next.

To stop the printer:

- Press the Alt + Reset (left Alt + right Alt on the Enhanced PC keyboard or Alt + F10 on the AT/XT keyboard) keys while you still see the symbol □-■ nn at the bottom of your screen.

Once you see the symbol ■-■ nn, the printer has already started printing. You cannot stop it.

Using the Workstation Program to Print the Contents of a PC Window

While you are working in the PC session, you can print a copy of what is in the window. Even if the window is not full size on your screen, you will get a printed copy of the full size window. You can only use the printer attached to your work station.

1. Make sure the PC window you want to print is active.

   If it is not, press the Jump key (left Alt + Page Up on the Enhanced PC keyboard or Alt + Esc on the AT/XT keyboard) until it is.
2. Press the Shift key and the Print key (Print Screen on the Enhanced PC keyboard and on the AT/XT keyboard).

If you want to stop the printer before the entire screen is printed:

- Press the Alt + Reset (left Alt + right Alt on the Enhanced PC keyboard or Alt + F10 on the AT/XT keyboard) keys to quit.

What If Your Printed Copy Does Not Match What You See on Your Screen?

Some printers can't print everything that you can display on your screen. The things that can cause difficulties are:

- Illustrations, charts, and drawings
- Graphic characters
- Programmed symbols
- Special symbols
- Underscores
- Color
- Highlighting.

What Some Printers Can and Can't Do

Here are some examples:

- IBM 3852 Color Inkjet Printer

  It can print personal computer graphics, underscored text, and highlighting. It prints both foreground and background colors, and thus can print white text on a black background. It cannot print programmed symbols.

- IBM 5201 Quietwriter Printer

  It cannot print in color and cannot print any symbols or characters that are not in its character sets.

- IBM 5216 Wheelprinter and IBM 5218 Printer

  They cannot print in color and cannot print any symbols or characters that are not on their print wheels.

- IBM 5152 Personal Computer Graphics Printer

  It cannot print in color. It can print personal computer graphics, underscored text, and some highlighted text.

- IBM 4201 Proprinter

  It cannot print in color. It can print personal computer graphics, underscored text, and some highlighted text.

- IBM 5182 Personal Computer Color Printer

  It cannot print the background colors of your windows. It may print text in different colors than it appears on your screen, and the shades of the colors may vary slightly. As a default, it prints white text on a black background. This printer cannot print programmed symbols, underscored text, and highlighting.

Printers that can't print everything will still try to print as much as they can. They may:

- Substitute characters they can print for characters they can't print
- Not print some characters at all
- Print blanks for characters they can't print
- Substitute colors they can print for those they can't.

Since there is such a variety in what you can do on your screen, you will have to try printing some of these things on your printer to see what will happen.

When to Suspect Something Is Wrong with Your Printer

Since your printed copies may not match what is on your screen, you may be wondering how to tell if something is wrong with the printer. In most cases, your printer should handle text correctly. If the letters and numbers on your screen are printed correctly, your printer is probably working. If they are incorrect, you should consult the booklet that came with your printer to check what it should be doing.

Chapter 13. Sending Files Between a Personal Computer and a Host

One of the advantages of the IBM 3270 Workstation Program is the utility that allows you to copy files from a diskette or from your fixed disk and send them to one of your hosts or send them the other way. In this chapter we explain how you can move:

- Personal computer files to a VM or TSO host
- VM or TSO files to a personal computer
- Personal computer files created using Personal Services/370 to host sessions.

What You Will Need

To send and receive files, you will the following two items:

1. The IBM 3270 Workstation Program utilities

   You can get the utilities from one of the following:

   - Your fixed disk or your system diskette, if you copied them there. If you are using the default workstation program, they are already there.
   - A separate diskette, if you copied them there.
   - The second IBM 3270 Workstation Program Diskette (2 of 2).

2. The host file transfer programs

   Your technical coordinator can help you verify that the correct host programs are in place. Appendix B contains information about the host programs you will need and how they should be modified.

How to Send or Receive a File

To send or receive a file, follow these steps:

1. Make sure that your host window is enlarged.
2. Make sure that you are logged onto your host.
3. Make sure that the host ready message is the last thing on your host screen.

   Or, if your screen is clear, make sure that no applications are running and that nothing is holding your host session.

   Note: If you receive any messages in your host window from other application programs while you are sending files, the files may not be received. To keep messages from interfering, enter the appropriate host command to temporarily set messages off.

   When you want to receive messages again, enter the appropriate host command to set messages back on.

4. Jump to your PC window.
5. Make sure that your default drive contains the 3270 Workstation Program utilities.

   If the utilities are on a diskette, either your system diskette or a separate diskette, insert it into drive A, and make sure that drive A is the default.

   If the utilities are on your fixed disk, make sure that drive C is the default.

6. Type the appropriate SEND or RECEIVE command after the DOS prompt.

   - To send files to a VM/CMS host, type:

     ```
     C>send a:pcfile.txt e:cmsfile script a1 (ascii crlf)
     ```

     This is just one example of the VM/CMS SEND command. Consult "How to Use the VM/CMS SEND Command" on page 13-5 for more information.

   - To receive files from a VM/CMS host, type:

     ```
     C>receive a:pcfile.txt e:cmsfile script a1 (ascii crlf)
     ```

     This is just one example of the VM/CMS RECEIVE command. Consult "How to Use the VM/CMS RECEIVE Command" on page 13-9 for more information.

   - To send files to a OS/VS2 TSO host, type:

     ```
     C>send a:pcfile.txt g:tsodset.script ascii crlf
     ```

     This is just one example of the OS/VS2 TSO SEND command. Consult "How to Use the OS/VS2 TSO SEND Command" on page 13-12 for more information.

- To receive files from a OS/VS2 TSO host, type:

  ```
  C>receive a:pcfile g:tsodset.script ascii crlf
  ```

  This is just one example of the OS/VS2 TSO RECEIVE command. Consult "How to Use the OS/VS2 TSO RECEIVE Command" on page 13-18 for more information.

7. Press the enter key, and these messages will appear:

   ```
   INDFT001  File transfer command being processed

   INDFT002  Number of bytes of file transferred so far:  ==>    xxxxxx
   ```

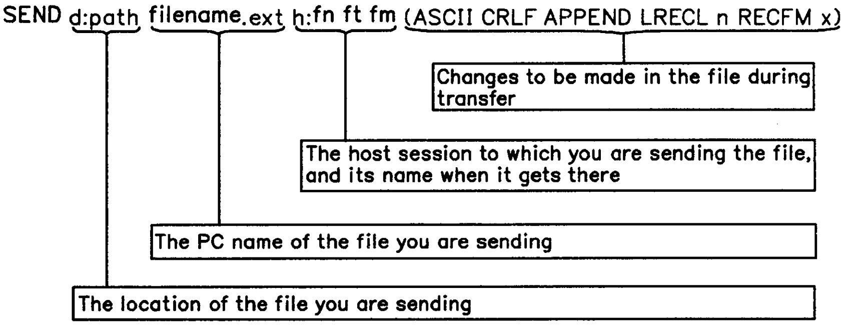
8. Wait until you see this message:

   ```
   INDFT003  File transfer complete
   ```

You can now go to your host session and find the file you sent.

How to Use the VM/CMS SEND Command

There are several parts to the SEND command:


SEND d:path filename.ext h:fn ft fm (ASCII CRLF APPEND LRECL n RECFM x)
Changes to be made in the file during transfer
The host session to which you are sending the file, and its name when it gets there
The PC name of the file you are sending
The location of the file you are sending

The words in capital letters must be entered exactly as shown, including parentheses. The words in lower case represent information you must supply based on what you decide after reading the notes that follow. Any of the words highlighted in color are optional.

In entering the command, you can use either upper or lower case, as you please. Note that there are **no** spaces between the following pairs of names:**d:** and **path**, **filename** and **.ext**, and **h:** and **fn**.

The parts of the Send command are:

SEND	The name of the command. (You always need this name.)
d:	The diskette or fixed disk drive on which the file you want to send is located: **a**, **b**, **c**, or **d**. This part is optional if the file to be sent is on the default drive. If you have only one diskette drive and the system tells you to insert a diskette into drive B, insert it into drive A instead.
path	The subdirectory that the file is in. (Include this part only if the file is in a subdirectory.)

filename.ext	The name of the file you want to send. (Include the extension if the file has one.)
h:	The short name of the window that contains the VM/CMS host to which you want to send the file. (If you have only one host, this part is optional.)
fn ft fm	The name that the file is to have on your CMS disk. (You need the filename and filetype. You may omit the filemode if you want the file placed on your CMS A-disk. You can make up a new name or name a file that is already on your CMS disk. If you use a new name, the file that you send will be added to your CMS disk. If you use the name of a file that is already there, the file that you send will replace, or be added to, the old file. See the APPEND option below.)
ASCII CRLF	ASCII specifies ASCII-to-EBCDIC translation. CRLF is the carriage return and line feed code. (You need these control words for text or source files that you want to look at or edit—SCRIPT files, for example. You do not need them for binary files.)
APPEND	Specifies that the file being sent be added to the end of a CMS file. (Omit this part if you want the file that is sent to replace an existing CMS file.)
LRECL n	The record length that the file you send should have on your CMS disk. (This part is optional. Include a record length only if you want the file you send to have a record length other than 80. Replace the n with the length you want. If you omit this option, the file will have a record length of 80.)

RECFM x	The record format that the file you send should have on your CMS disk: **v** or **f**. (This part is optional. If you want variable- or fixed-length records in the file that you send, replace the x with v for variable or f for fixed. If you omit this option, the file will have variable-length records if you specified CRLF; otherwise it will have fixed-length files.)

Examples

- **Sending a PC file from your default drive and adding it as a new file on your CMS A-disk.**

  ```
  send pcfile.txt e:cmsfile script a1
       (ascii crlf lrecl 132 recfm v)
  ```

  This command sends a file named PCFILE.TXT from your default drive to your VM host in your host window named E. You do not need to name the PC drive if the file you are sending is on the default drive. The command creates a new SCRIPT file named CMSFILE on your A-disk. The records in the file may vary in length up to a maximum of 132 characters.

- **Sending a PC file from your default drive to replace a file on your CMS A-disk.**

  ```
  send pcfile.txt e:cmsfile script a1
       (ascii crlf)
  ```

  This command sends a PC file named PCFILE.TXT from your default drive to your CMS A-disk in your host window named E. You do not need to name the PC drive if the file you are sending is on the default drive. The file replaces a SCRIPT file named CMSFILE. The new CMSFILE will have the same record length and format as the old CMSFILE.

  If you do not have a file called CMSFILE SCRIPT on your A-disk, PCFILE will be added to your A-disk as a new file called CMSFILE SCRIPT. The records in the file may vary in length up to a maximum of 80 characters.

- **Sending a PC file from a drive other than your default to replace a file on your CMS B-disk.**

  ```
  send a:pcfile.txt e:cmsfile script b1
       (ascii crlf)
  ```

  This command sends a PC file named PCFILE.TXT from a diskette in drive A to your CMS B-disk in your host window named E. It replaces a SCRIPT file named CMSFILE.

  If you do not have a file called CMSFILE SCRIPT on your B-disk, PCFILE will be added to your B-disk as a new file called CMSFILE SCRIPT. The records in the file may vary in length up to a maximum of 80 characters.

- **Sending a file from your fixed disk and adding it to the end of a file on your CMS A-disk.**

  ```
  send c:pcfile.txt cmsfile script a1
       (ascii crlf append)
  ```

  This command sends a PC file named PCFILE.TXT from your fixed disk to your only VM host. You do not need to name the host window if you have only one. It adds the file to the end of a SCRIPT file named CMSFILE on your CMS A-disk.

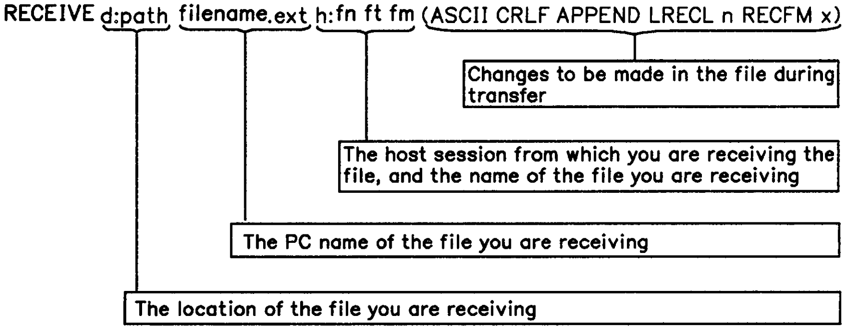
- **Sending a file from a subdirectory on your fixed disk to your CMS A-disk.**

  ```
  send c:\subdir1\pcfile.txt cmsfile script a1
       (ascii crlf)
  ```

  This command sends a file named PCFILE.TXT from a subdirectory named SUBDIR1 on your fixed disk to your VM host. It replaces a SCRIPT file, named CMSFILE, on your CMS A-disk.

How to Use the VM/CMS RECEIVE Command

There are several parts to the RECEIVE command:



```
RECEIVE d:path filename.ext h:fn ft fm (ASCII CRLF APPEND LRECL n RECFM x)
```

Changes to be made in the file during transfer
The host session from which you are receiving the file, and the name of the file you are receiving
The PC name of the file you are receiving
The location of the file you are receiving

The words in capital letters must be entered exactly as shown, including parentheses. The words in lower case represent information you must supply based on what you decide after reading the notes that follow. Any of the words highlighted in color are optional.

In entering the command, you can use either upper or lower case, as you please. Note that there are **no** spaces between the following pairs of names:**d:** and **path**, **filename** and **.ext**, and **h:** and **fn**.

RECEIVE	The name of the command. (You always need this name.)
d:	The diskette or fixed disk drive where you want to receive a copy of the file: **a**, **b**, **c**, or **d**. This part is optional if you want the file to be received onto the default drive.
path	The subdirectory into which you want to put the file. (Include only if you want to put the file into a subdirectory.)

filename.ext	The name you want the file to have on your diskette or fixed disk. (You can make up a new name or name a file you already have. You can include an extension to the filename. If you use a new name, the file that you receive will be added to your diskette or fixed disk. If you use the name of an old file, the file that you receive will replace, or be added to, the old file. See the APPEND option below.)
h:	The short name of the window containing the VM/CMS host session from which you want to get the file. (You do not need this part if you have only one host.)
fn ft fm	The name of the file you want to receive from your CMS disk. (You need the filename. If you omit the filetype and filemode, the transfer program will search until it finds the filename on any of your CMS disks.)
ASCII CRLF	ASCII specifies ASCII-to-EBCDIC translation. CRLF is the carriage return and line feed code. (You need these control words for text or source files that you want to look at or edit—SCRIPT files, for example. You do not need them for binary files.)
APPEND	Specifies that the file being received be added to the end of an old file. (Omit this part if you want the CMS file that is received to replace an existing file.)

Examples

- **Receiving a file from your CMS A-disk at your default drive for a PC session.**

  ```
  receive pcfile.txt e:cmsfile script a1
       (ascii crlf)
  ```

  This command transmits a SCRIPT file named CMSFILE from your CMS A-disk in a host window named E to your PC session. It adds the file to your default drive (diskette or fixed disk) with the name, PCFILE.TXT.

- **Receiving a file from your CMS B-disk and replacing a file on a drive other than your default.**

  ```
  receive a:pcfile.txt e:cmsfile script b1
       (ascii crlf)
  ```

  This command sends a SCRIPT file named CMSFILE from your CMS B-disk in a host window named E to a drive other than the default for your PC session. It replaces a file named PCFILE.TXT on a diskette in drive A.

- **Receiving a file from your CMS A-disk and adding it to the end of a file on your fixed disk.**

  ```
  receive c:pcfile.txt e:cmsfile script a1
       (ascii crlf append)
  ```

  This command sends a SCRIPT file named CMSFILE from your CMS A-disk in a host window named E to your PC session. It adds it to the end of a file named PCFILE.TXT on your fixed disk.

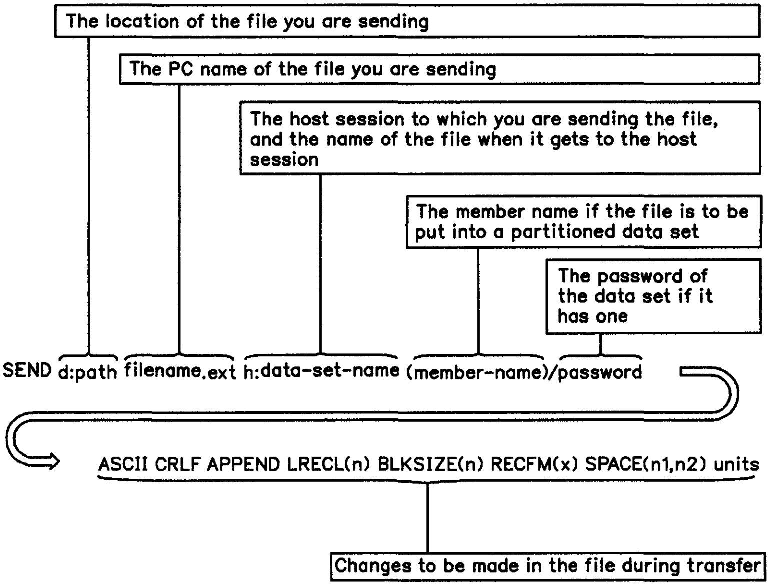
- **Receiving a file from your CMS A-disk and placing it in a subdirectory on your default drive.**

  ```
  receive \subdir1\pcfile.txt e:cmsfile
       script a1 (ascii crlf)
  ```

  This command sends a SCRIPT file named CMSFILE from your CMS A-disk to your default drive. It replaces a file named PCFILE.TXT in a subdirectory named SUBDIR1.

How to Use the OS/VS2 TSO SEND Command

There are several parts to the SEND command:


The location of the file you are sending
The PC name of the file you are sending
The host session to which you are sending the file, and the name of the file when it gets to the host session
The member name if the file is to be put into a partitioned data set
The password of the data set if it has one
SEND d:path filename.ext h:data-set-name (member-name)/password
ASCII CRLF APPEND LRECL(n) BLKSIZE(n) RECFM(x) SPACE(n1,n2) units
Changes to be made in the file during transfer

The words in capital letters must be entered exactly as shown, including parentheses. The words in lower case represent information you must supply based on what you decide after reading the notes that follow. Any of the words highlighted in color are optional.

In entering the command, you can use either upper or lower case, as you please. Note that there are **no** spaces between the following pairs of names:**d:** and **path**, **filename** and **.ext**, and **h:** and **data set name**.

SEND	The name of the command. (You always need this name.)
d:	The diskette or fixed disk drive on which the file you want to send is located: **a**, **b**, **c**, or **d**. This part is optional if the file to be sent is on the default drive. If you have only one

	diskette drive and the system tells you to insert a diskette into drive B, insert it into drive A instead.
path	The subdirectory in which is the file to be sent. (Omit this part, if the file is not in a subdirectory.)
filename.ext	The name of the file to be sent. (Include the extension if it has one.)
h:	The name of the TSO host session you want to send the file to. (Omit this name, if you have only one host. If you have more than one host, this is the short name of the TSO host window you want.)
data set name	The data set name that the file you send is to have on your TSO volume. (The data set name is required. Enclose the data set name along with the member name in single quotes if you are using a fully qualified data set name. You can make up a new name or name a data set that is already on your TSO volume. If you use a new name, the file that you send will be added to your TSO volume. If you use the name of a data set that is already there, the file that you send will replace, or be added to, the old data set. See the APPEND option below.)
(member name)	The member name if the file is to be put into a partitioned data set. **Note:** If someone else is using the partitioned data set, you will not be able to send a file to your TSO host.
/password	The password of the data set if it has one.

ASCII CRLF	ASCII specifies ASCII-to-EBCDIC translation. CRLF is the control word for global carriage return and line feed codes. (These control words are required for text or source data sets that you want to look at or edit—SCRIPT data sets, for example. You do not need them for binary data sets.)
APPEND	Specifies that the file being sent be added to the end of an old TSO data set. (Omit this option if you want the file that is sent to replace an existing TSO data set.)
LRECL(n)	The record length for a new data set on your TSO volume: n = 1 through 132. (This part is optional. If you want to set the record length for a new data set, replace the n with the length you want. If you omit this part, you will get a record length of 80. If you included member name, do not include this option.)
BLKSIZE(n)	The size of the blocks of data in a new data set on your TSO volume. (This part is optional. If you want to set the block size for a new data set, replace the n with the size you want. If you omit this part, the block size will be the same as the record length. If you included member name, do not include this option.)
RECFM(x)	The record format for a new data set on your TSO volume: x = v, f, or u. (This part is optional. If you want variable, fixed, or undefined length records in the data set, replace the x with v, f, or u. If you omit this option, the file will have variable length records if you specified CRLF; otherwise it will have fixed length files. If you included member name, do not include this option.)

SPACE(n1,n2) units

The amount of space to be set aside for a new data set on your TSO volume: n1, n2, units (TRACKS, or CYLINDERS). (This part is optional. If you want to set aside a certain number of blocks, tracks, or cylinders for the new data set, replace the **units** with the type of space you want, AVBLOCKS, TRACKS, or CYLINDERS. Then replace n1 with the amount of space that you want the data set to occupy. Also replace n2 with an amount to be added if the data set needs more space than you asked for with n1. These values are similar to the values on the TSO ALLOCATE command. If you omit this part, you will get space for one block, and the length of the block will be set by the BLKSIZE or LRECL options. If you included member name, do not include this option.)

Examples

- **Sending a file from your default drive to replace a file on your TSO host.**

  ```
  send pcfile.txt g:tsodset.script ascii crlf
  ```

  This command sends a file named PCFILE.TXT from your default drive to your TSO host in a host window named G. It replaces a data set named TSODSET.SCRIPT on your TSO volume.

- **Sending a file from a drive other than the default to your TSO host.**

  ```
  send a:pcfile.txt g:tsodset.script ascii
       crlf
  ```

This command sends a file named PCFILE.TXT from a diskette in drive A to your TSO host in a host window named G. It replaces a data set named TSODSET.SCRIPT on your TSO volume.

- **Sending a file from your default drive to your TSO host and adding it to the end of a TSO data set.**

  ```
  send a:pcfile.txt g:tsodset.script ascii
       crlf append
  ```

  This command sends a file named PCFILE.TXT from a diskette in drive A to your TSO host in a host window named G. It adds it to the end of a data set named TSODSET.SCRIPT on your TSO volume.

- **Sending a file to your TSO host and adding it to the end of a set that has a password.**

  ```
  send a:pcfile.txt g:tsodset.script/brillig3
       ascii crlf append
  ```

  This command sends a file named PCFILE.TXT from a diskette in drive A to your TSO host in a host window named G. It adds it to the end of a data set named TSODSET.SCRIPT on your TSO volume. This data set has a password of BRILLIG3.

- **Sending a file from a subdirectory on your fixed disk to a partitioned data set on your TSO host.**

  ```
  send c:\subdir1\pcfile.txt
       g:tsodset.script(member1) ascii crlf
  ```

  This command sends a file named PCFILE.TXT from a subdirectory named SUBDIR1 on your fixed disk to your TSO host in a host window named G. It replaces a member named MEMBER1 in a partitioned data set named TSODSET.SCRIPT on your TSO volume.

- **Sending a file to a partitioned data set that has a password.**

  ```
  send a:pcfile.txt g:tsodset.script
       (member2)/slithy11 ascii crlf append
  ```

This command sends a file named PCFILE.TXT from a diskette in drive A to your TSO host in a host window named G. It adds it as a member named MEMBER2 to a partitioned data set named TSODSET.SCRIPT on your TSO volume. This data set has a password of SLITHY11.

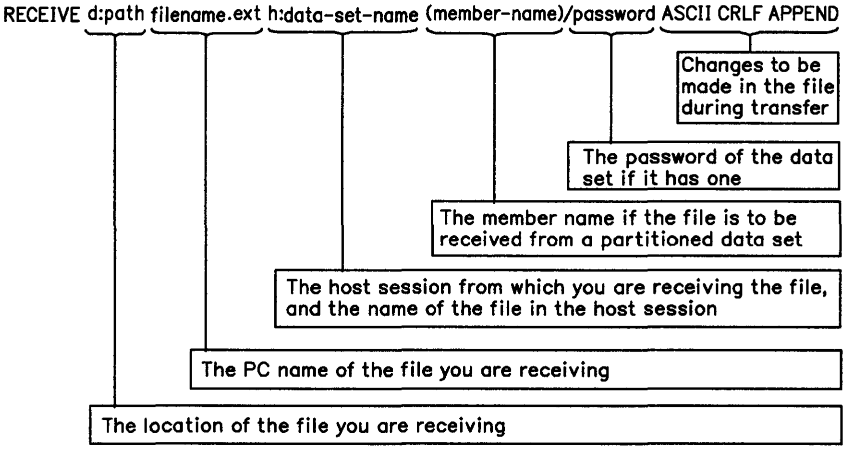
- **Sending a file from your default drive and adding it as a new data set on your TSO volume.**

```
send pcfile.txt g:tsodset.script/vorpal34
     ascii crlf lrecl(132) blksize(132)
     recfm(v) space(20,10) tracks
```

This command sends a file named PCFILE.TXT from your default drive to your TSO host. It adds it as a new data set named TSODSET.SCRIPT on your TSO volume. A password of VORPAL34 is assigned to it. The records in the data set may vary in length up to a maximum of 132 characters. The data blocks are the same length as the records. 20 tracks are set aside for this data set. If more tracks are needed, they will be added in groups of 10.

How to Use the OS/VS2 TSO RECEIVE Command

There are several parts to the RECEIVE command:


RECEIVE d:path filename.ext h:data-set-name (member-name)/password ASCII CRLF APPEND
Changes to be made in the file during transfer
The password of the data set if it has one
The member name if the file is to be received from a partitioned data set
The host session from which you are receiving the file, and the name of the file in the host session
The PC name of the file you are receiving
The location of the file you are receiving

The words in capital letters must be entered exactly as shown, including parentheses. The words in lower case represent information you must supply based on what you decide after reading the notes that follow. Any of the words highlighted in color are optional.

In entering the command, you can use either upper or lower case, as you please. Note that there are **no** spaces between the following pairs of names:**d:** and **path**, **filename** and **.ext**, and **h:** and **data set name** and **(member-name)** and **\password**.

RECEIVE	The name of the command. (You always need this name.)
d:	The diskette or fixed disk drive where you want to receive a copy of the file. This could be either **a**, **b**, **c**, or **d**. This part is optional if you want the file to be received onto the default drive.

path	The subdirectory you want to put the data set in. (This part is optional. Include it only if the data set is to be put into a subdirectory.)
filename.ext	The name you want the file to have on your diskette or fixed disk. (You can make up a new name or name a file that is already on your diskette or fixed disk. If you use a new name, the data set that you receive will be added to your diskette or fixed disk. If you use the name of a file that is already there, the data set that you receive will replace, or be added to, the old file.)
h:	The short name of the TSO window from which you want to get the data set. (If you have only one host, this part is optional. Include it if you have more than one host.)
data set name	The name of the data set you want or the name of the partitioned data set that contains the member you want to send to your PC session. (You must use the qualified name. Enclose the data set name along with the member name in single quotes if you are using a fully qualified data set name.)
(member name)	The name of the member of a partitioned data set that you want to send to your PC session. (This part is optional. Include it only if the data set is a member of a partitioned data set.)
/password	The password of the data set. (Include this part only if the data set has a password.)
ASCII CRLF	ASCII is the control word for ASCII-to-EBCDIC translation. CRLF is the carriage return and line feed code. (You need these control words for text or source files that you want to look at or edit—SCRIPT files, for example. You do not need them for binary files.)

APPEND	The control word that adds the data set to the end of an old file. (Omit this part if you want the TSO data set to replace an existing PC file.)

Examples

- **Receiving a data set from a TSO host to the default drive for your PC session.**

  ```
  receive pcfile.txt g:tsodset.script ascii
       crlf
  ```

  This command sends a data set named TSODSET.SCRIPT from your TSO volume in a host window named G to your PC session. It adds it to the default drive with the name, PCFILE.TXT.

- **Receiving a data set from a TSO host to a drive other than your default drive.**

  ```
  receive a:pcfile.txt g:tsodset.script ascii
       crlf
  ```

  This command sends a data set named TSODSET.SCRIPT from your TSO volume in a host window named G. It replaces a file named PCFILE.TXT on a diskette in drive A.

- **Receiving a data set from a TSO host and adding it to a PC file.**

  ```
  receive a:pcfile.txt g:tsodset.script ascii
       crlf append
  ```

  This command sends a data set named TSODSET.SCRIPT from your TSO volume in a host window named G. It adds the data set to the end of a file named PCFILE.TXT on the diskette in drive A.

- **Receiving a data set from a TSO host and placing it in a subdirectory on your fixed disk.**

  ```
  receive c:\subdir1\pcfile.txt tsodset.script
       ascii crlf
  ```

  This command sends a data set TSODSET.SCRIPT from your TSO volume in a host window named G. It replaces a file named PCFILE.TXT in a subdirectory named SUBDIR1 on your fixed disk.

- **Receiving a data set that has a password from a TSO host to your default drive.**

  ```
  receive a:pcfile.txt g:tsodset.script/brillig3
       ascii crlf append
  ```

  This command sends a data set named TSODSET.SCRIPT from your TSO volume in a host window named G. The data set has the password BRILLIG3. The data set is added to the end of a file named PCFILE.TXT on your A-disk.

- **Receiving a member of a partitioned data set from a TSO host at your PC session.**

  ```
  receive c:\subdir1\pcfile.txt
       g:tsodset.script(member1) ascii crlf
  ```

  This command sends a member named MEMBER1 from a partitioned data set named TSODSET.SCRIPT in a host window named G. The member is placed on your fixed disk in a subdirectory named SUBDIR1. It replaces a file named PCFILE.TXT.

- **Receiving a member of a partitioned data set that has a password to your PC session.**

  ```
  receive a:pcfile.txt
       g:tsodset.script(member2)/slithy11
       ascii crlf append
  ```

  This command sends a member named MEMBER2 from a partitioned data set named TSODSET.SCRIPT in a host window named G. The data set has a password of SLITHY11. The member is added to a file named PCFILE.TXT on the diskette in diskette drive A.

Sending Personal Computer Files to a Host Computer Using Personal Services/370

Personal Services/370 is a menu-driven office systems communication program that runs under the IBM Customer Information Control System (CICS) application program. It allows 3270 series terminals (like the 3270 PC) to exchange documents with IBM products that use the Distributed Office Support (DISOSS) network. These products include the IBM Displaywriter System, the IBM 5520 Administrative System, the IBM 8100 Office Support Facility, the IBM Personal Computer, and the IBM Scanmaster 1.

To use Personal Services/370 file transfer, you use a 3270 Workstation utility program named TRANSFER.

Setting Up the Transfer Program

To set up the TRANSFER program to send documents through Personal Services/370:

1. Jump to the host window where you will be performing your file transfers.
2. If it is not already enlarged, you can enlarge it.
3. If you are not already logged on, log on to your host.
4. Select your file transfer menu.

   If your screen is blank, make sure that no applications are running and that nothing is holding your session.
5. Jump to your PC window.
6. Make sure that your default drive contains the 3270 Workstation Program utilities.

   If the utilities are on a diskette, either your system diskette or a separate diskette, insert it into drive A, and make sure that drive A is the default.

If the utilities are on your fixed disk, make sure that drive C is the default.

For example, if your default drive is A and the utilities are on your fixed disk, type:

```
c:
```

```
A>c:
```

Your default drive will change to C.

```
C>
```

7. Type the TRANSFER command.

   For example:

```
C>transfer b
```

   This command gets you ready to transfer files between your PC session and the host computer window named B. This is the short name of the host computer session you logged on to at the beginning of this procedure.

8. Press the Enter key.

   When TRANSFER has completed its setup with your host window and is waiting for a file transfer to be started from the host computer, you see this message:

```
INDXF001 File transfer waiting for work. Press the End key to quit.
```

9. Jump back to your host computer window.

   Now you are ready to use the host Personal Services/370 application program to transfer files. Refer to your Personal Services/370 documentation for specific information. (See the end of this chapter for a list of related publications.)

What You See When Transfer Is Running

Personal Services/370 displays status and error messages in your PC window. Therefore, you cannot do other work in your PC window until you end the transfer program.

After you start the file transfer from your host computer window, you may want to jump back to your PC window to watch the progress of your file transfer.

When the file transfer begins, you see this message:

```
INDXF002 File transfer started for:
  xxxxxxxx.xxx
```

In the example shown, the “xxxxxxxx.xxx” represents the name of the file you are transferring. You can allow the file transfer to proceed, or if you want to cancel the file transfer, press Ctrl + Break. Note that the file transfer program will time out within 30 seconds if there is no host response. If you do, you will see this message:

```
INDXF036 Current file transfer canceled by user
```

Otherwise, you also see status messages telling you how much information has been transferred:

```
INDXF003 xxxxxxxx Data and xxxxxxxx Profile characters transferred so far
```

In this example, xxxxxxx represents numeric totals.

When the file transfer is complete, you will see this message:

```
INDXF004 File transfer complete.
```

At this point, you can either start another file transfer from your host computer window or press the End key to quit the transfer program. You will see your DOS prompt on the screen indicating your PC session is free again to run other PC applications programs.

When you transfer some documents created at your PC, you will need to provide Personal Services/370 with additional information. Refer to the next section, which explains how you can create you own header information for these documents.

Sending Documents To Your Work Station from Personal Services/370

Personal Services/370 creates a header file for you with the extension **.idp**, meaning “Interchange Document Profile.” This is the header information for the document you sent to the work station.

For example, you might receive a file called **letter.fft**. The transfer program would also send a file called **letter.idp** that you would see in your personal computer file directory. Don’t erase that file, because when you send the file **letter.fft** back through DISOSS, the file **letter.idp** would be sent with it automatically.

Note: IDP files that are created for revisable form text (RFT) or PC documents do not have to be saved. You may erase them if you wish.

This is how you receive and send back a final form text (FFT) document that you receive over DISOSS:

1. Someone sends you a document named **letter**. It is an FFT document and is assigned the file extension **.fft**.
2. You view or print the document on your work station with an editor that knows FFT documents.
3. You send the document back to DISOSS through the Personal Services/370 menu-driven system.
4. Copies of these two files are sent across the network:
   - letter.fft
   - letter.idp

   Note: If you rename the FFT file, remember to rename the IDP file also. Otherwise, you can’t send the FFT file back through DISOSS.

Sending Documents You Create at Your Work Station to Personal Services/370

When you want to send an FFT document that you created at your work station through Personal Services/370, you must create your own IDP file. You do this **before** you type the TRANSFER command to set up your personal computer session for the transfer.

Let's say you created in your personal computer session a file named **graph** that you want to send via Personal Services/370. Follow this procedure:

1. Jump to your PC window.
2. Make sure that your default drive contains the diskette with the INDIDP utility file.
3. Insert the diskette containing the file you want to transfer into another drive.
4. If, for example, your default drive is A and the file to be transferred is on drive b, type:

   ```
   indidp b:graph.fft
   ```

   at the DOS prompt.

   ```
   A>indidp b:graph.fft
   ```

   If the utility and the file to be transferred are both on your fixed disk, type:

   ```
   indidp graph.fft
   ```

   at the DOS prompt.

   ```
   C>indidp graph.fft
   ```

If the utility is on your fixed disk and the file to be transferred is on a subdirectory (in this case, subdir1) on your fixed disk, type:

```
indidp \subdir1\graph.fft
```

at the DOS prompt.

```
C>indidp \subdir1\graph.fft
```

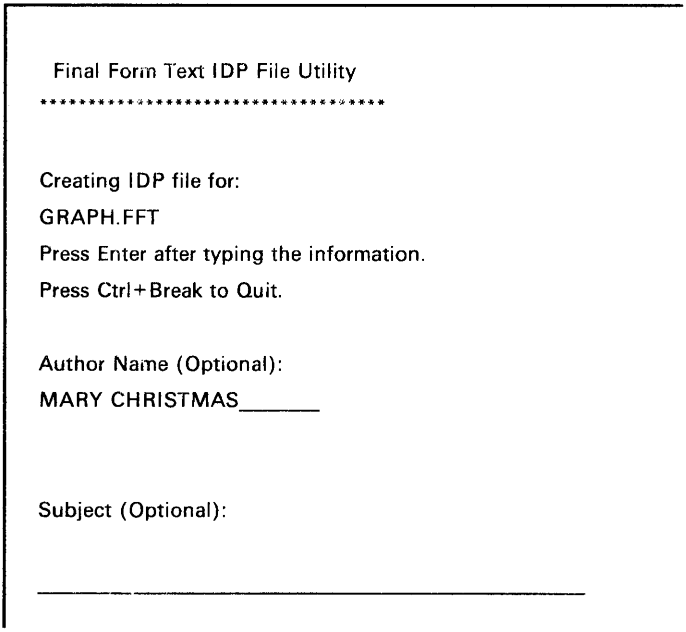
The name of your file will be displayed automatically when the IDP File Utility prompts appear as shown below:

```
 Final Form Text IDP File Utility
**********************************


Creating IDP file for:
GRAPH.FFT
Press Enter after typing the information.
Press Ctrl+Break to Quit.

Author Name (Optional):
```

At this time, you may

- Enter your name and press the Enter key.
- Press the Enter key to proceed without filling in your name.
- Press Ctrl with Break to end the procedure without creating the IDP file.

If you fill in your name and press Enter, a subject prompt will appear, as illustrated below:



```
  Final Form Text IDP File Utility
************************************


Creating IDP file for:
GRAPH.FFT
Press Enter after typing the information.
Press Ctrl+Break to Quit.

Author Name (Optional):
MARY CHRISTMAS_______



Subject (Optional):


_______________________________________
```

At this time you may:

- Enter a subject and press the Enter key.
- Press the Enter key to create the IDP file.
- Press Ctrl with Break to end the procedure without creating an IDP file.

5. Pressing Enter causes the utility to create the IDP file, and you see this message when the procedure is complete:

```
  Final Form Text IDP File Utility
************************************


Creating IDP file for:
GRAPH.FFT
Press Enter after typing the information.
Press Ctrl+Break to Quit.

Author Name (Optional):
MARY CHRISTMAS_______



Subject (Optional):
YEAR END SALES FIGURES________________
INDID001 File creation is complete.
A>
```

If the IDP utility is unable to create the IDP file—for example, if the file **graph.fft** already has an IDP file—you will receive a message. For details about INDIDP file utility messages, refer to *3270 Workstation Program Problem Determination Guide*.

6. Once the IDP file has been created, proceed with the TRANSFER procedure described earlier under "Setting Up the Transfer Program" on page 13-22.

If You Have Problems

If you encounter any problems running the transfer program, you will not lose your original files. When transfer begins, two temporary files (one for your FFT file and one for your IDP file) are created. For example, if a file transfer problem occurred when you were sending a file named **letter.fft**:

1. **letter.fft** would be in your DOS directory as **$temp.doc**, and
2. **letter.idp** would be in your DOS directory as **$temp.idp**.

You could rename the DOS files using the DOS "RENAME" command (refer to your DOS book for details), find the cause of your problem (refer to *3270 Workstation Program Problem Determination Guide*), and transfer the files again.

Whenever this problem or any others occur, messages are displayed on your screen. Refer to the *3270 Workstation Program Problem Determination Guide* for explanations of problems with both the transfer program (message prefix INDXFnnn) and the IDP file utility program (message prefix INDIDPnnn).

Related Publications

For more information about Personal Services/370, refer to the following publications:

Introducing Personal Services/370, GC30-3292

Getting Started with Personal Services/370, SC30-3296

Planning for Personal Services/370, SC30-3293

How to Use Personal Services/370, SC20-3298

Personal Services/370: Mini-Lessons for the New User, SX27-3603

Coordinating Personal Services/370, SC30-3299

Installing Personal Services/370 (MVS), SC30-3294

Installing Personal Services/370 (VSE), SC30-3295

Diagnosing Problems with Personal Services/370, SC30-3300

Personal Services/370: Messages, SC30-3325

Distributed Office Support System/370 General Information, GC30-3085.

Chapter 14. IBM System/370 to IBM Personal Computer Enhanced Connectivity Facilities

The IBM System/370 to IBM Personal Computer Enhanced Connectivity Facilities is a set of programs enabling PC work stations and System/370 host computers to work together more effectively. It provides a uniform structure for sharing resources and exchanging data between personal computers and IBM System/370 computers in MVS/XA, TSO/E, and VM/SP environments. Enhanced Connectivity Facilities create an environment in which the PC can access host resources to expand PC work station capabilities. Your 3270 PC work station can use the Enhanced Connectivity Facilities if you have chosen that option on the customization panels.

To understand how the function works, you should first know about the Enhanced Connectivity Facilities components:

- **Requester**

  A requester is an IBM-supplied or user-written program that interprets requests from PC applications for services or data from a System/370 computer.

- **Server**

  A server is a program that interfaces with host application programs to reply to PC application program requests for services or data.

  Requester/server pairs act together to provide resource sharing.

- **Server-Requestor Programming Interface (SRPI)**

  The SRPI is a programming interface that provides application programmers a consistent means of issuing requests for services and receiving replies across MVS/XA, TSO/E, and VM/SP host to IBM Personal Computer and IBM 3270 PC environments.

- **Routers**

  Internal routers, provided in both the 3270 PC and System/370 operating systems, are the interfaces between the requesters/servers and the communication facilities.

A flow diagram of the IBM Enhanced Connectivity Facilities is presented in Figure 14-1.

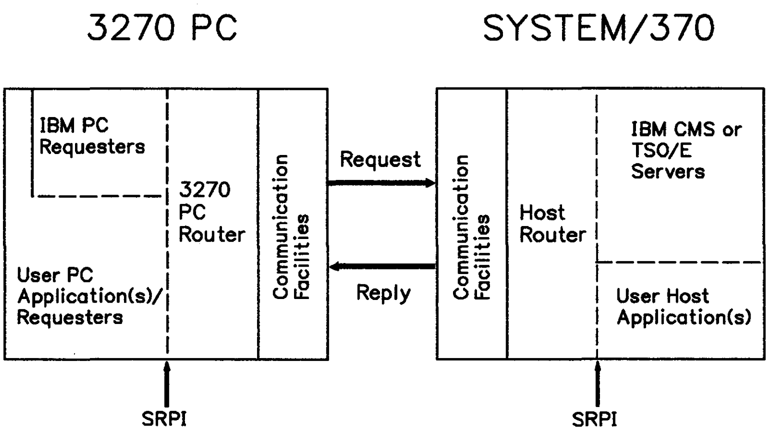

3270 PC
SYSTEM/370
IBM PC Requesters
User PC Application(s)/ Requesters
3270 PC Router
Communication Facilities
Request
Reply
Communication Facilities
Host Router
IBM CMS or TSO/E Servers
User Host Application(s)
SRPI
SRPI

Figure 14-1. Flow Diagram of the IBM System/370 to IBM Personal Computer Enhanced Connectivity Facilities

The IBM 3270 PC Router

The IBM 3270 PC router, in conjunction with the host communication capability of the IBM 3270 Workstation Program, provides an interface for requester programs to obtain services or data from a host computer system.

Consider the situation where you have a central customer address file on your host system and assorted customer data files on your work station. With a PC application program designed to display customer information from both systems, and a host address lookup routine, the following actions can take place:

1. When you initialize the PC application program running on the work station, it retrieves the data stored locally and issues a data request for information from the central customer address file.
2. The data request is interpreted by the requester, which identifies the host address lookup routine as the server.
3. The 3270 PC router sends the request to the host router over the DFT communications link to the host.
4. The host router sends the request to the corresponding server.
5. The host server retrieves the requested information from the host data file and issues a reply to the host router.
6. The host router sends the reply to the 3270 PC router over the DFT link.
7. The 3270 PC router sends the reply to the PC application program.
8. The PC application program resumes execution, displaying customer information retrieved from both the work station and host data bases.

Using the 3270 PC Router

Although you can have multiple PC sessions on your work station, IBM Enhanced Connectivity Facilities servers/requesters can only be supported in one PC session. The PC session supported is the one that first makes a request for host resources. No other PC session will be able to make requests unless the workstation program is re-IPLed. Before you begin a session using servers/requesters, decide which PC session you want supported by these facilities. The other PC sessions are available for other PC functions.

The next section specifies the sequence of events you should follow to use the IBM Enhanced Connectivity Facilities.

Steps in Running IBM Enhanced Connectivity Facilities

To run an Enhanced Connectivity Facilities session between your PC session and your host computer, follow these steps:

1. Start the IBM 3270 Workstation Program.
2. Press the Jump key (left Alt + Page Up on the Enhanced PC keyboard) to get to the host session that supports the Enhanced Connectivity Facilities.
3. Log on to your host.
4. Issue the appropriate host router command. Refer to your host documentation to obtain this information.
5. Press the Jump key (left Alt + Page Up on the Enhanced PC keyboard) to get to the PC session from which you want to issue a request for host resources or data.
6. Start the PC application program that has been customized to issue a request for host services.
7. When you are finished running the PC application, jump back to your host session and terminate the host router. Refer to your host documentation for termination instructions.

Chapter 15. Autokeying: Recording, Playing, and Erasing Automatic Keystrokes

Note: This function cannot be used with the AT or XT keyboard.

If you chose the autokey option during customization, you can use autokey to record a series of keystrokes and play them back into your windows whenever you want. You can also record a series of commands that you use often.

In this chapter, you will learn how to:

- Make a keystroke recording
- Make a keystroke recording with a pause
- Play a keystroke recording
- Play a keystroke recording with a pause to enter text
- Erase a keystroke recording.

Making a Keystroke Recording

To record a series of keystrokes:

1. Press the Jump key (left Alt + Page Up on the Enhanced PC keyboard) to choose a window in which to record.

   (If you want to work along with the description that follows, jump to a notepad window, and follow the rest of these instructions.)

2. Move the cursor to the place you want the recording to begin.
3. If you are not in work station control mode, press the WSCtrl key (Shift + Esc on the Enhanced PC keyboard).

4. Press the Record key, PF16 (Shift + F4 on the Enhanced PC keyboard).

   This message appears:

```
Enter a unique name for the recording about to be made.
WSCTRL    AUTO  REC  NAME _
```

5. Choose a name for this recording.

   Each keystroke recording needs a name so that you can tell the system which recording you want to play. You can use any name not being used for another recording. If you do not remember the names of your keystroke recordings, press the PF1 key (F1 on the Enhanced PC keyboard). You will see a list at the right side of your screen. You can press the PF1 key again to remove the list.

   The name can be from 1 to 8 characters long. It can contain letters and numbers, but no blanks or special characters.

6. Type the name in the information area.

   For this example, type the name JMEMO. The information area will look like this:

```
Press the Enter key when the name is completed.
WSCTRL    AUTO  REC  NAME JMEMO_
```

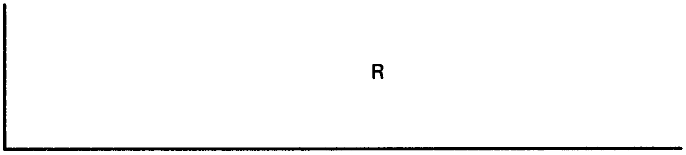
7. If you mistype the name, backspace over it, and type a new name.

   If you stop a recording and start over, press the WSCtrl key (Shift + Esc on the Enhanced PC keyboard), and you are back to where you started.

8. When you are ready to record, press the Enter key.

   If the system refuses to use the name because you accidentally used a duplicate name, simply backspace and type a new name.

   When the system accepts the name you chose, the line at the bottom of the screen disappears. The record symbol appears. It looks like this:



Note: If the record symbol does not appear, press Ctrl + WsCtrl (Ctrl + Shift + Esc on the Enhanced PC keyboard).

Warning: From this point on, every key you press will be recorded except for these:

- WSCtrl
- Enlarge
- AltCr
- ChgScr
- Jump
- Finish
- Enter (in notepad windows)
- PF keys (in notepad windows)

If you decide at this point that you don't want to make this recording, you can end the recording session by pressing the Finish key (Shift + End on the Enhanced PC keyboard).

9. Type what you want to record.

   For example, let's record this short note:

   ```
   Dear Geoff,
   Thank you for your generous contribution.
   Sincerely,
   Jim
   ```

   As in this example, when you type something that has more than one line:

   - Use the cursor keys or the ↵ key to begin the second line.
   - Use the ↵ key to move the cursor to the next input area (field) on the screen if it has them.

10. When you are done typing, press the Finish key (Shift + End on the Enhanced PC keyboard). The record symbol disappears from the bottom of the screen.

You now have a recording called JMEMO. If you want to play this recording, follow the instructions in the section, "Playing a Keystroke Recording" on page 15-10.

Whenever you make keystroke recordings, you should save them before you turn off your system. If you don't, they will be lost. For instructions on how to save your keystroke recordings refer to Chapter 11.

Making a Keystroke Recording with a Pause

You can make a keystroke recording and put a pause in the middle. When you later play the recording, the pause:

- Stops the playback and lets you type something in the middle. For example, you may play back a recorded form letter and insert a new name on each one.
- Stops the playback after it plays a recorded command and lets you type something or wait for the system to respond before it plays the next recorded command.

Note: If you are recording in a host window, any key that signals the host automatically pauses. You do not have to include a pause. These keys include:

- PF keys
- PA keys
- Enter
- Clear

To record a series of keystrokes with a pause:

1. Press the Jump key (left Alt + Page Up on the Enhanced PC keyboard) to choose a window in which you want to make a recording.

   If you want to work along with the description that follows, jump to a PC window, and follow the following of these instructions.

2. Move the cursor to the place you want the recording to begin.

3. If you are not in work station control mode, press the WSCtrl key (Shift + Esc on the Enhanced PC keyboard).

4. Press the Record key, PF16 (Shift + F4 on the Enhanced PC keyboard).

   This message appears:

```
Enter a unique name for the recording about to be made.
WSCTRL    AUTO  REC  NAME _
```

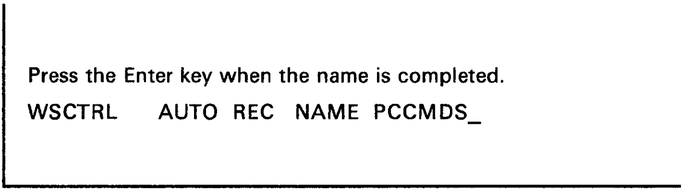
5. Choose a name for this recording.

   Each keystroke recording needs a name so that you can tell the system which recording you want to play. You can use any name not being used by another recording. If you do not remember the names of your keystroke recordings, press the PF1 key. You will see a list at the right side of your screen. You can press the PF1 key again to remove the list.

The name can be from 1 to 8 characters long. It can contain letters and numbers, but no blanks or special characters.

6. Type the name in the information area.

   For this example, type the name PCCMDS. The information area will look like this:



```
Press the Enter key when the name is completed.
WSCTRL    AUTO  REC  NAME  PCCMDS_
```

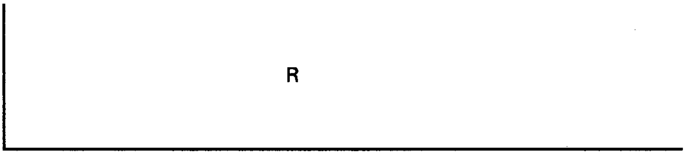
7. If you mistype the name, backspace over it, and type a new name.

   If you decide you do not want to make a recording, press the WSCtrl key (Shift + Esc on the Enhanced PC keyboard), and you are back where you started.

8. When you are ready to record, press the Enter key.

   If the system refuses to use the name because you accidentally used a duplicate name, simply backspace and type a new name.

   When the system accepts the name you chose, the line at the bottom of the screen disappears. The record symbol appears. It looks like this:



```
R
```

Note: If the record symbol does not appear, press Ctrl + WsCtrl (Ctrl + Shift + Esc on the Enhanced PC keyboard).

Warning: From this point on, every key you press will be recorded except for these:

- WSCtrl
- Enlarge
- AltCr
- ChgScr
- Jump
- Finish
- Enter (in notepad windows)
- PF keys (in notepad windows)

9. Type what you want to record.

   For example, let's record a series of DOS commands.

10. Type the DOS CLS (clear screen) command:

```
CLS
```

```
A>cls
```

11. Press the Enter key.
12. Press Pause twice.
13. Wait for the DOS prompt to appear.

```
A>
```

The screen will be blank except for the DOS prompt at the top of screen.

14. Type the DOS VOL (volume) command:

    `VOL`

```
A>vol
```

15. Press the Enter key.
16. Press Pause.
17. Wait for this message and the DOS prompt to appear:

```
Volume in drive A has no label

A>
```

Note: The DOS commands shown above are fast commands and do not need to have a pause between them. In general, most series of DOS commands followed by Enter should be separated by a pause to allow enough time for processing.

18. Type the DOS TIME command:

    `time`

```
A>time
```

19. Press the Enter key.

20. Wait for this message:

```
Current time is  8:17:35.50
Enter new time: _
```

The time shown will be different on your system.

Before you type anything else, we will put a pause here.

21. Press the Alt + Auto keys (Shift + Pause on the Enhanced PC keyboard) to enter a pause.

You may type anything you want, but it will not be recorded. For this example, type a new time but do not press Enter.

22. Press the Alt + Auto keys (Shift + Pause on the Enhanced PC keyboard) again.
23. Press the Enter key and wait for the DOS prompt.

```
A>
```

24. Type the DOS VER (version) command:

```
VER
```

```
A>ver
```

25. Press the Enter key.

26. Wait for this message and the DOS prompt:

```
IBM Personal Computer DOS Version n.nn

A>
```

27. Press the Finish key (Shift + End on the Enhanced PC keyboard).

You now have a recording called PCCMDS. If you want to play this recording, follow the instructions in "Playing a Keystroke Recording with a Pause to Enter Text" on page 15-12.

Whenever you make keystroke recordings, you should save them before you turn off your system. If you don't, they will be lost. For instructions on how to save your keystroke recordings, refer to Chapter 11.

Playing a Keystroke Recording

To play a keystroke recording:

1. Use the Jump key (left Alt + Page Up on the Enhanced PC keyboard) to go to the window in which you want to play the recording.

   If you want to work along with the description that follows, jump to a notepad window, and follow the rest of these instructions. You will need a recording called JMEMO. The section, "Making a Keystroke Recording" on page 15-1, describes how to make this recording.

   You must make room on your screen for the recording, or it will type over whatever is already there.

2. Use the cursor keys to move the cursor to the place you want the playback to begin.

3. If you are not in work station control mode, press the WSCtrl key (Shift + Esc on the Enhanced PC keyboard).
4. Press the Play key, PF4 (F4 on the Enhanced PC keyboard).

   This message appears:

```
Enter the unique name of the recording to play.
WSCTRL    AUTO  PLAY  NAME _
```

5. Type the name of the recording you want to play.

   For this example, type:

   `jmemo`

   As soon as you begin typing the recording name, the system prompts you to press Enter when you are finished.

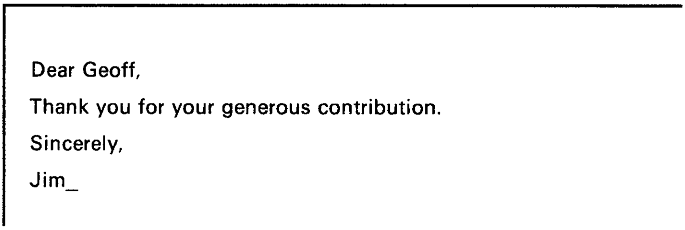
```
Press the Enter key when the name is completed.
WSCTRL    AUTO  PLAY  NAME  JMEMO_
```

   If the system refuses to use the name because you accidentally used a duplicate name, simply backspace and type a new name.

   If you want to stop playing this recording and start over, press the WSCtrl key (Shift + Esc on the Enhanced PC keyboard), and you are back where you started.

6. When you are ready to play the recording, press the Enter key.

   The recording will play on the screen. You will see a “p” at the bottom of the screen while it plays.



```
Dear Geoff,
Thank you for your generous contribution.
Sincerely,
Jim_
```

Playing a Keystroke Recording with a Pause to Enter Text

When you play back a keystroke recording, you may want to:

- Enter text
- Wait for a command to process.

To play a keystroke recording with a pause in it:

1. Use the Jump key (left Alt + Page Up on the Enhanced PC keyboard) to go to the window where you want to place the recording.

   Move the cursor to the place on the screen where you want the recording to be played back. If you want to work along with the example that follows, jump to a PC window, and follow the rest of these instructions. You will need a recording called PCCMDS. The section, "Making a Keystroke Recording with a Pause" on page 15-4, describes how to make this recording.

   Make sure that the DOS prompt is the last thing on your screen.

2. If you are not in work station control mode, press the WSCtrl key (Shift + Esc on the Enhanced PC keyboard).

3. Press the play key, PF4 (F4 on the Enhanced PC keyboard).

   This message appears:

```
Enter the unique name of the recording to play.
WSCTRL    AUTO  PLAY  NAME _
```

4. Type the name of the recording you want to play.

   For this example, type:

   `pccmds`

```
Press the Enter key when the name is completed.
WSCTRL    AUTO  PLAY  NAME  PCCMDS_
```

   If the system refuses to use the name because you accidentally used a duplicate name, simply backspace and type a new name.

   If you want to stop playing this recording and start over, press the WSCtrl key (Shift + Esc on the Enhanced PC keyboard), and you are back where you started.

5. When you are ready, press the Enter key.

   The recording will play on the screen up to the pause. Your screen should look like this:

```
A>vol

Volume in drive A has no label

A>time
Current time is 10:11:05.12
Enter new time: _
```

6. Wait for the pause sign to appear at the bottom of your screen:

```
                    PP
```

   For some hosts, you may have to press Ctrl + WSCtrl to see the OIA. Depending on your task, you may want to type in text or wait for a command to process. Then press Pause to continue. In this example, you enter text.

7. Type a new time, but do not press Enter.

   For example, let's type

   `11:53`

```
Current time is 10:11:05.12
Enter new time: 11:53_
```

8. Press the Alt + Auto keys (Shift + Pause on the Enhanced PC Keyboard).

   The recording finishes playing on the screen. When the recording is done, your screen should look like this:

```
A>vol

Volume in drive A has no label

A>time
Current time is 10:11:05.12
Enter new time: 11:53

A>ver

IBM Personal Computer DOS Version n.nn

A>_
```

Erasing a Keystroke Recording

To erase a keystroke recording:

1. If you are not in work station control mode, press the WSCtrl key (Shift + Esc on the Enhanced PC keyboard).
2. Press the Alt + ErInp keys (left Alt + End on the Enhanced PC keyboard).

   This message appears:

   ```
   Enter the unique name of the recording to be deleted.
   WSCTRL     AUTO  ERASE NAME  _
   ```

3. Type the name of the recording you want to erase.

   For example, if you made the recording named JMEMO and want to erase it, type:

   ```
   jmemo
   ```

   ```
   Press the Enter key when the name is completed.
   WSCTRL     AUTO  ERASE NAME  JMEMO_
   ```

   If the system refuses to use the name because you accidentally used a duplicate name, simply backspace and type a new name.

   If you want to stop playing this recording and start over, press the WSCtrl key (Shift + Esc on the Enhanced PC keyboard), and you are back where you started.

4. When you are ready to erase, press the Enter key.

   The message will appear at the bottom of the screen:

   ```
   Erase complete: Press PF4 (Play), PF16 (Record), or ErInp.
   WSCTRL    AUTO          JMEMO
   ```

   The recording named JMEMO is erased. You can make, play, or erase another recording.

5. When you are done, press the WSCtrl key (Shift + Esc on the Enhanced PC keyboard) to return to where you started.

Chapter 16. Copying Text from Window to Window

Note: This function cannot be used with an AT or XT keyboard.

If you have customized for the copy utility, you can copy a block of text from one place in a window to another place in the same window. You can also copy text from one window into another window. Note that there are some limitations.

In this chapter, you will learn how to:

- Mark what you want to copy
- Mark where you want to place the copy
- Make the copy.

Limitations

You should know about these limitations:

- Before you can copy into a PC window, you must use a Connect for Copy to PC Session service to designate the session as a valid copy target. See Chapter 10 of the *IBM 3270 Workstation Program Programming Guide* for an explanation of Copy Services.
- When you copy from a PC window into a host window, some of the characters in the PC window may appear as blanks when they are copied into the host window. These are ASCII characters that your host can't display.
- When you copy from a host or notepad window into a PC window, some of the characters in the host or notepad window may appear as blanks when they are copied into the PC window. These are characters that your PC can't display.
- If you copy from a host that has a set of programmed symbols to a host that doesn't have any, the programmed symbols will be blanks.

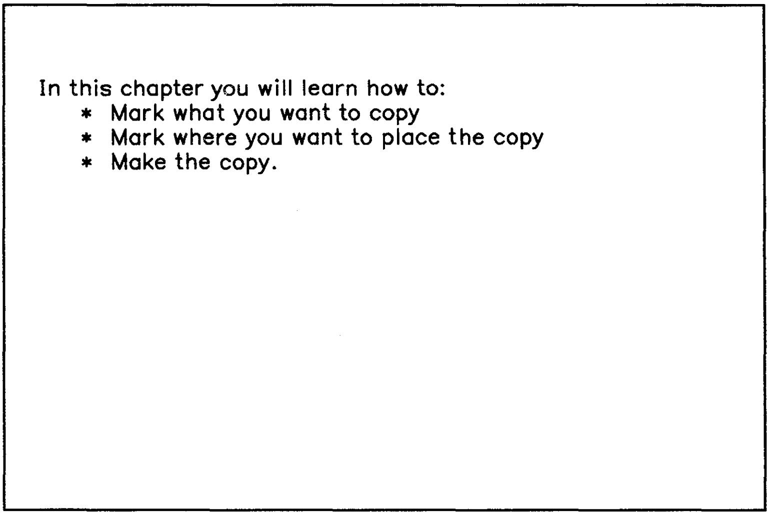
- You cannot copy to or from a PC window that is using graphics.
- You cannot copy into protected areas of a window. For example, you cannot copy into the area where your host session logo is displayed.
- You must make room for the copy, unless you want it placed over what is already there.
- You cannot copy into a window that is input-inhibited.

Marking What You Want to Copy

Let's mark a piece of text to copy:

1. Use the Jump key (left Alt + Page Up on the Enhanced PC keyboard) to jump to a window that has the text you want to copy.

   For example, let's make a copy of this text in one of your windows:

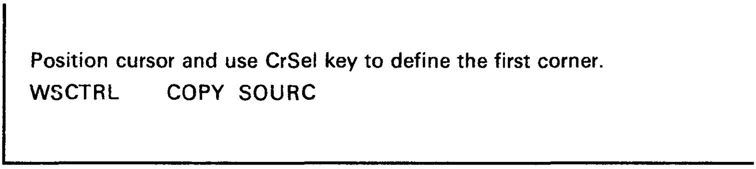


```
In this chapter you will learn how to:
    *  Mark what you want to copy
    *  Mark where you want to place the copy
    *  Make the copy.
```

If you want to try doing this, jump to a notepad window and type these lines. Then, work along with the following instructions.

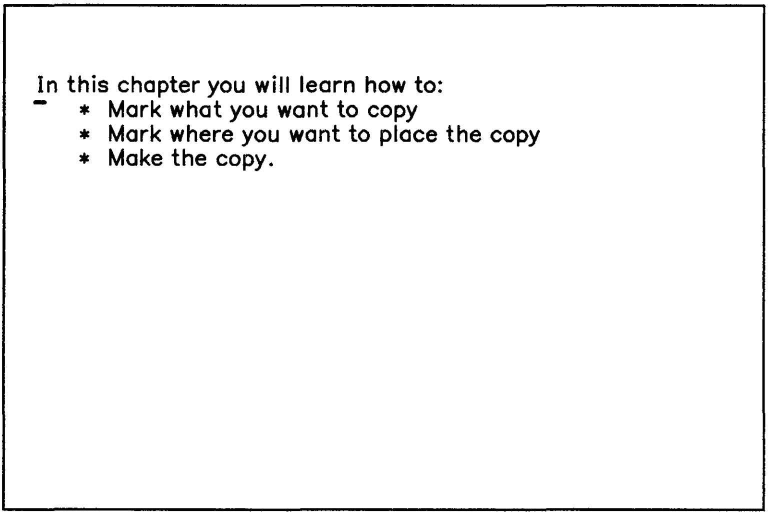
2. Press the WSCtrl key (Shift + Esc on the Enhanced PC keyboard) to get into work station control mode.
3. Press the Source key (PF13) or (Shift + F1 on the Enhanced PC keyboard).

   The line changes to this:



```
Position cursor and use CrSel key to define the first corner.
WSCTRL     COPY  SOURC
```

4. Use the cursor keys to move the cursor to the upper left corner of the text.

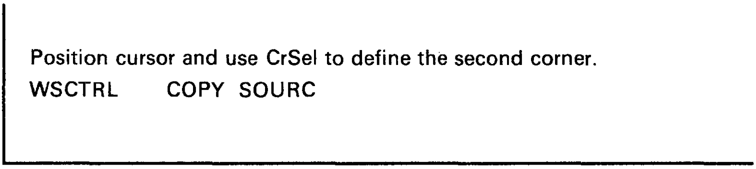


```
In this chapter you will learn how to:
-    * Mark what you want to copy
     * Mark where you want to place the copy
     * Make the copy.
```

If your window is not full-size, some of the text may be hidden by the border of the window. To see it all, move the cursor toward the border and the hidden text will move into view, or press the enlarge key (left Alt + Insert on the Enhanced PC keyboard).

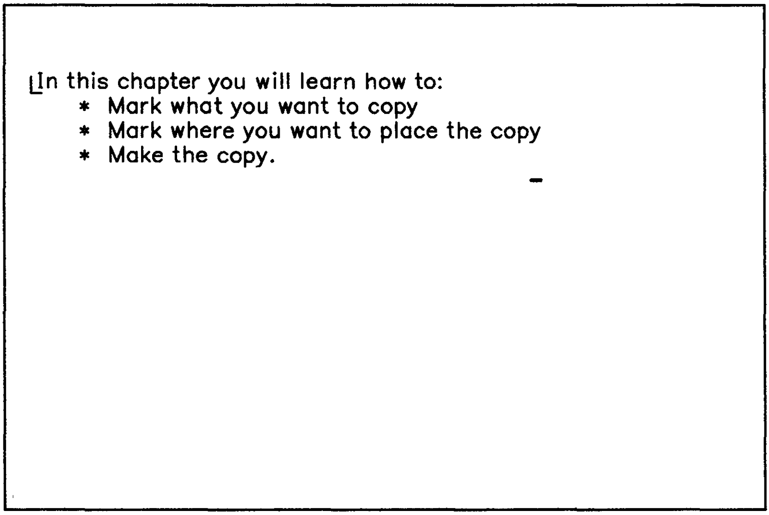
5. Press the Alt and CrSel keys (left Alt + F9 on the Enhanced PC keyboard) to mark the first corner.

   The first corner is marked with a corner symbol, and this message appears:



```
Position cursor and use CrSel to define the second corner.
WSCTRL     COPY  SOURC
```

6. Move the cursor to the lower right corner of the text.

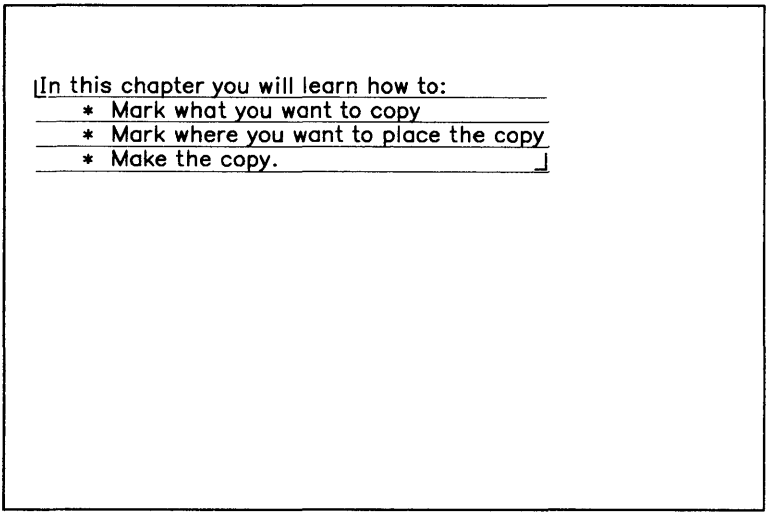


```
⌊In this chapter you will learn how to:
     *  Mark what you want to copy
     *  Mark where you want to place the copy
     *  Make the copy.
                                          _
```

Since you are moving a block of text, make sure you place the cursor so that it is as far over as the longest line.

7. Press the Alt and CrSel keys (left Alt + F9 on the Enhanced PC keyboard) to mark the second corner.

   In a host or notepad window, all the text to be copied is underlined, and the four corners are marked with a corner symbol.



```
In this chapter you will learn how to:
     *  Mark what you want to copy
     *  Mark where you want to place the copy
     *  Make the copy.
```

   Note: If you are using non-3270 PC hardware with the EGA adapter, the source will appear intensified instead, and the corners will be marked.

   In a PC window, only the corners are marked.

   If you missed some text, go back to step 4, and mark new corners.

8. When you are ready, go to the next section and choose where you want to place the copy.

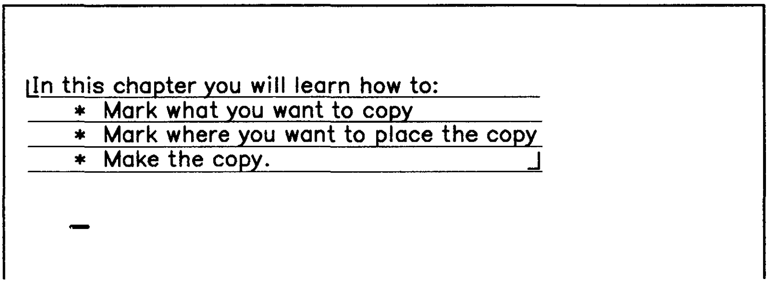
   If you decide that you don't want to make the copy, press the Finish key (Shift + End on the Enhanced PC keyboard), and you are back to where you started.

Marking Where You Want to Place the Copy

You can place a copy of the text that you marked in the same window or in another window.

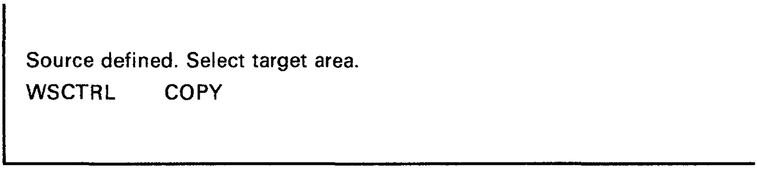
1. If you want to copy into another window, press the Jump key to select the window in which you want to put the copy.

   For this example, we will make the copy in the same window as the text we just marked as the source:



```
In this chapter you will learn how to:
     *  Mark what you want to copy
     *  Mark where you want to place the copy
     *  Make the copy.
```

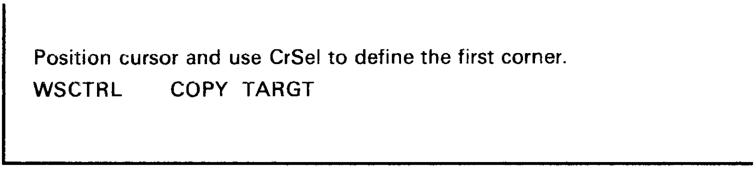
   This line and message appear at the bottom of your screen:



```
Source defined. Select target area.
WSCTRL     COPY
```

2. Press the Target key (PF14) or (Shift + F2 on the Enhanced PC keyboard).

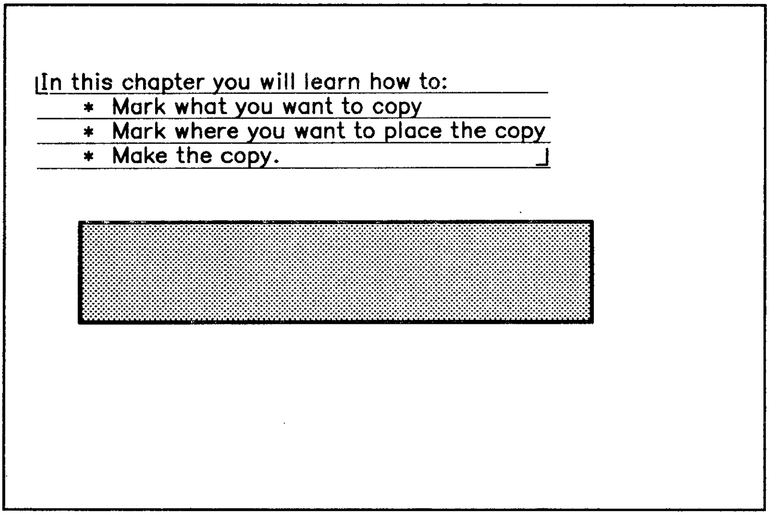
   This message appears:



```
Position cursor and use CrSel to define the first corner.
WSCTRL     COPY  TARGT
```

3. Use the cursor keys to move the cursor to the spot where you want the upper left corner of the copy to be placed.

   For example, let's place the copy *two lines down and four spaces to the right* of the original. The cursor would be here:



```
In this chapter you will learn how to:
     *  Mark what you want to copy
     *  Mark where you want to place the copy
     *  Make the copy.
```

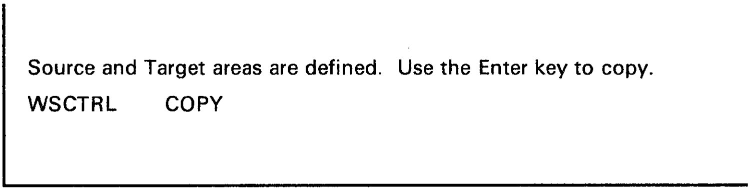
4. Press the Alt and CrSel keys (left Alt + F9 on the Enhanced PC keyboard) to mark the upper left corner of the copy.

   In a host or notepad window, the copy will occupy the space shown in reverse video with the corners marked.

   Note: If you are using non-3270 PC hardware with the EGA adapter, the target colors will be reversed and the four corners marked.

   In a PC window, only corner marks show the space for the copy.

   This message appears:



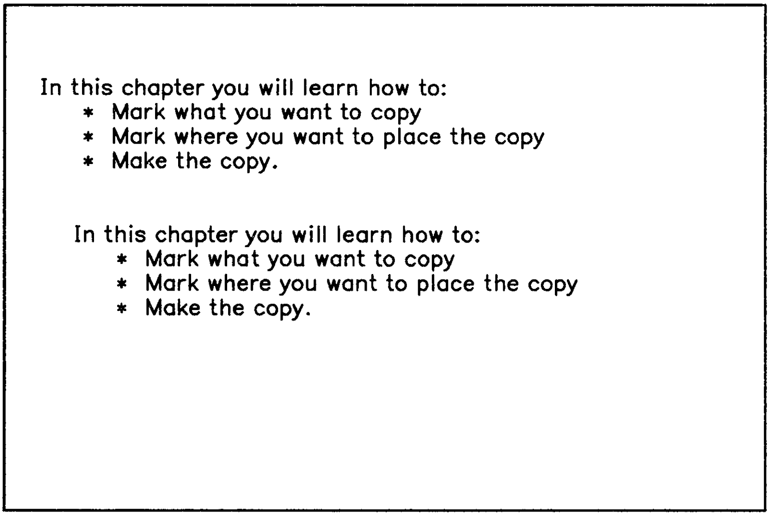
```
Source and Target areas are defined.  Use the Enter key to copy.
WSCTRL     COPY
```

5. If you want to correct or change the position of the copy, go back to step 2, and choose a new place for the copy.

Making the Copy

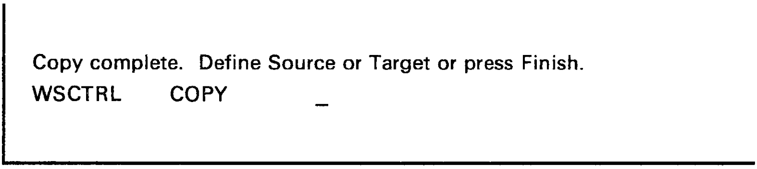
1. When you are satisfied with the position of the copy, press the Enter key.

   A copy of the marked text is placed at the cursor.



```
In this chapter you will learn how to:
    *  Mark what you want to copy
    *  Mark where you want to place the copy
    *  Make the copy.


    In this chapter you will learn how to:
        *  Mark what you want to copy
        *  Mark where you want to place the copy
        *  Make the copy.
```

And this message appears at the bottom of your screen:



```
Copy complete.  Define Source or Target or press Finish.
WSCTRL      COPY          _
```

You can make another copy using the same source if you want. Just press the Target key (PF14) or (Shift + F2 on the Enhanced PC keyboard) again to mark a new target for the next copy. Note that the Home key will return your cursor to the row 1, column 1 position. If you want to mark a new source, press the Source key (PF13) or (Shift + F1 on the Enhanced PC keyboard) again.

2. If you are done, press the Finish key (Shift + End on the Enhanced PC keyboard). The source markings go away.

3. When you are ready, press the WSCtrl key (Shift + Esc on the Enhanced PC keyboard) to get out of work station control mode.

Part 4. Appendixes

Appendix A. Preparing the Controllers for Customization A-1
Introduction A-1
Preparing the 3174 and 3274 Control Units A-3
  3174 and 3274 Requirements A-5
  3174 and 3274 Customization Sequence Numbers A-6
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Appendix A. Preparing the Controllers for Customization

Introduction

When you customize the IBM 3270 Workstation Program, you assign to it one of two host interactive modes: **distributed function terminal (DFT) mode** or **control unit terminal (CUT) mode**. The DFT mode runs from one to four host sessions; the CUT mode runs only one host session.

Note: When you customize a controller for your PC work stations, the PC work station that you are using must be in CUT mode during the customization process.

In DFT mode:

- Your PC work station attaches to certain models of the 3274 with configuration support D and any model of the 3174.
- Attachment to the 3174 and 3274 requires one port and from one to four logical addresses. The 3274 port must be type A.
- Category B terminals cannot be attached to a 3174 or 3274 that is customized to support a PC work station operating in DFT mode.
- Your PC work station attaches to a 4361 Workstation Adapter (WSA).

In CUT mode your PC work station attaches to:

- Any model of the 3174 or 3274, by means of a type A terminal adapter
- A 3276 Control Unit Display Station
- A 4361 Workstation Adapter (WSA).

Use of your PC work station depends on the configuration of the controller or processor it attaches to. Therefore, total customization must be a joint effort between the controller customization planner, the service coordinator, and the person responsible for customizing the IBM 3270 Workstation Program. Both the customization planner and the service coordinator must:

- Understand the hardware configuration of the controller to which the PC work station is to be attached and the relationship of the controller to the PC work station
- Be able to identify the hardware configuration of the PC work station and the associated software configuration that is desired
- Provide this information, before the workstation program is customized, to the person who will be doing the customization.

This chapter should be used in conjunction with the following books:

- *IBM 3270 Information Display System: 3174 Subsystem Control Unit Site Planning*, GA23-0213.
- *IBM 3270 Information Display System: 3174 Subsystem Control Unit Customizing Guide*, GA23-0213
- *IBM 3270 Information Display System: 3274 Control Unit Planning, Setup, and Customizing Guide*, GA27-2827
- *IBM 3270 Information Display System: 3274 Control Unit Customizing Guide; Configuration Support D*, GA23-0065
- *IBM 3270 Information Display System: 3276 Control Unit Display Station; Operator's Guide*, GA18-2040
- *IBM 3270 Information Display System: 3276 Control Unit Display Station; Planning and Setup Guide*, GA18-2041
- *IBM 3270 Information Display System: 3276 Control Unit Display Station; Description and User's Guide*, GA18-2081

- *IBM 3270 Information Display System: 3276 Control Unit Display Station; Maintenance Concepts Manual,* SY18-2018
- *IBM 4361 Processor Operating Procedures,* GA33-1570
- *IBM 4361 Processor Work Station Adapter Reference Manual,* GA33-1578.

Preparing the 3174 and 3274 Control Units

Figure A-1 illustrates how your PC work station attaches to the 3174 and 3274 Control Units. It shows 3278 Display Stations and PC work stations with multiple host sessions from both the host view and the controller view.

Host View

Host Terminal Control Table

					Control Unit Port
Physically Attached Devices	LU1	LU	LOCADDR=2,	DLOGMOD=T3278M2	0
	LU2[1]	LU	LOCADDR=3,	DLOGMOD=T3278M2	1
	LU3[2]	LU	LOCADDR=4,	DLOGMOD=T3278M4	2
	LU4[1]	LU	LOCADDR=5,	DLOGMOD=T3278M2	3
	LU5	LU	LOCADDR=6,	DLOGMOD=T3278M2	4
	LU6[1]	LU	LOCADDR=7,	DLOGMOD=T3278M3	5
PC Workstation Secondary Terminal Address	LU7	LU	LOCADDR=8,	DLOGMOD=T3278M2	
	LU8	LU	LOCADDR=9,	DLOGMOD=T3278M2	
	LU9	LU	LOCADDR=10,	DLOGMOD=T3278M2	
	LU10	LU	LOCADDR=11,	DLOGMOD=T3278M4	
	LU11	LU	LOCADDR=12,	DLOGMOD=T3278M2	
	LU12	LU	LOCADDR=13,	DLOGMOD=T3278M2	
	LU13	LU	LOCADDR=14,	DLOGMOD=T3278M2	
	LU14	LU	LOCADDR=15,	DLOGMOD=T3278M4	
	LU15	LU	LOCADDR=16,	DLOGMOD=T3278M2	
	LU16	LU	LOCADDR=17,	DLOGMOD=T3278M5	

[1] Four Host Sessions
[2] Two Host Sessions

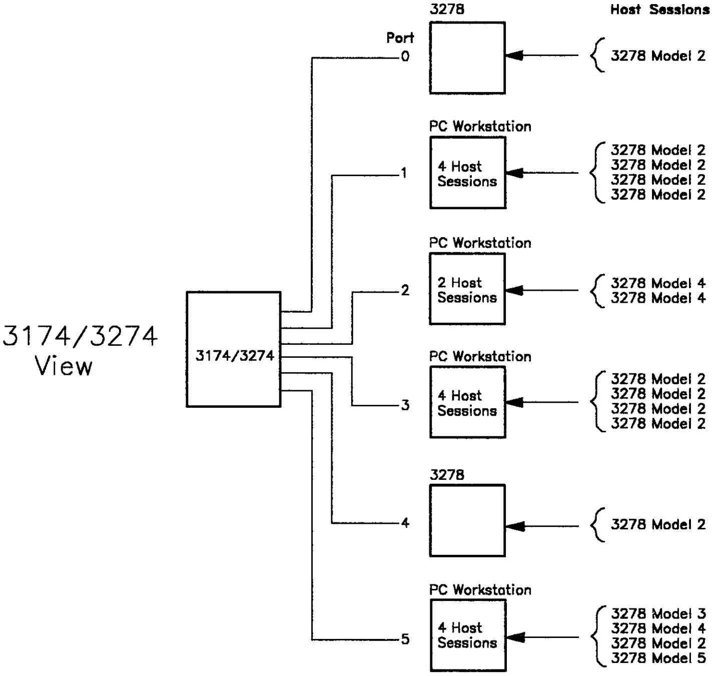

3174/3274 View
3174/3274
Port
0
1
2
3
4
5
3278
PC Workstation
4 Host Sessions
2 Host Sessions
Host Sessions
3278 Model 2
3278 Model 4
3278 Model 3
3278 Model 5

Figure A-1. PC Work station Attachment to a 3174 or 3274 Control Unit

3174 and 3274 Requirements

Each model of the 3174 requires 1 megabyte of storage.

Each 3274 Control Unit has one of four possible software configuration support levels: A, B, C, or D. The following chart lists the 3274 Control Unit model designations and the corresponding storage requirements and software configuration support levels. Select the model designation that pertains to your control unit. Note that the CUT mode is supported on all 3274 configuration support levels.

3274 Model Designation	Storage Required (bytes)[1]	3274 Configuration Support Level Required for CUT	3274 Configuration Support Level Required for DFT
1B	64K	A	
1A, 1C, 1D	64K	A, B	
1A, 1C, 1D	128K	A, B, C	
21B	64K	A	
21A, 21C, 21D	64K	A, B	
31A, 31C, 31D	128K	A, B, C	
31A, 31C, 31D	192K	D	D[2]
51C	64K	A, B	
51C	128K	A, B, C	
51C, 61C	192K	D	D[2]
61C	256K	D	D[2]

[1] K equals 1024.
[2] Configuration support D must be at Release Level 64.1 or higher.

The 3274 configuration release level is indicated on the 3274 feature and system diskette label. The 2-digit validation number, which also appears on the diskette label, should match the number printed on the cover of these manuals:

- *IBM 3270 Information Display System: 3274 Control Unit Planning, Setup, and Customizing Guide*, GA27-2827 (listing configuration support levels A, B, and C).
- *IBM 3270 Information Display System: 3274 Control Unit Customizing Guide*, GA23-0065 (listing configuration support level D).

3174 and 3274 Customization Sequence Numbers

The following list summarizes the controller customization sequence numbers (CSN) that are affected by the IBM 3270 Workstation Program in DFT mode. No customization sequence numbers are affected if the 3270 Workstation Program is set in CUT mode.

- **112 Number of Category A Terminals (3274 Only)**

  CSN 112 asks you to indicate how many Category A terminals there are on the 3274 Control Unit that your PC work stations will attach to. The number you indicate must be from 08 to 32 in increments of 8.

  For a list of all Category A terminals, see *IBM 3270 Information Display System: 3274 Control Unit Planning, Setup, and Customizing Guide*, GA27-2827, and *IBM 3270 Information Display System: 3274 Control Unit Customizing Guide; Configuration Support D*, GA23-0065.
- **116 Individual Port Assignment (3174 and 3274 Configuartion Support D)**

  CSN 116 allows you to indicate how you would like addresses assigned when you specify the number of logical terminals per port in CSN 117. The answer to CSN 116 must be “1” or “2”. The answer “1” indicates that the control unit will automatically assign addresses. The answer "2", applicable to Release 64 or higher, indicates that you will assign individual addresses.

- **117 Port Assignment Specification Table (3174 and 3274 Configuration Support D)**

  CSN 117 will appear when you select "1" for number 116. For Releases 61 through 63 of configuration support D, a table will appear on your screen that allows you to set individual port assignments. For Release 64 of configuration support D, a table will appear on your screen that allows you to set individual port and address assignments. See *IBM 3270 Information Display Station: 3174 Subsystem Control Unit Customizing Guide*, GA23-0213, or Appendix B of *IBM 3270 Information Display System: 3274 Control Unit Customizing Guide; Configuration Support D*, GA23-0065, with validation number 34 or higher, for additional information.

- **118 Port Address Table (3174 and 3274 Configuration Support D)**

  CSN 118 is an informational screen, allowing you to see what assignments you set in number 117. It gives you the option to go back and make changes to that table.

- **125 Miscellaneous Feature Options (3174 and 3274 Configuration Support D)**

  CSN 125 refers to any additional features you may have; for example, the dual-function Clear key function. This refers to the item on the worksheet that asks whether the 3274 Control Unit supports the VM Clear function. If you have configuration support D and you want this function, bit 0 for customization sequence number 125 must be "1".

  CSN 125 also refers to the unsupported control code translate function. This refers to the item on the worksheet that asks what action is to be taken on invalid control codes. If you have configuration support D and want this function, bit 1 for customization sequence number 125 must be "1".

- **170 Distributed Function Terminals (3274 Only)**

  Your response to CSN 170 reflects the inclusion of PC work stations in the 3274 configuration. The answer to CSN 170 will be "1" if you are supporting display stations that require a load diskette in addition to PC work stations. It will be "2" if you will support only PC work stations.

Preparing the 3276 Control Unit Display Station

The PC work station attaches to the 3276 Control Unit Display Station in a manner similar to that of the 3174 and 3274 Control Units. Figure A-2 illustrates this concept by indicating 3278 Display Stations and PC work stations from both the host view and the 3276 Control Unit Display Station view.

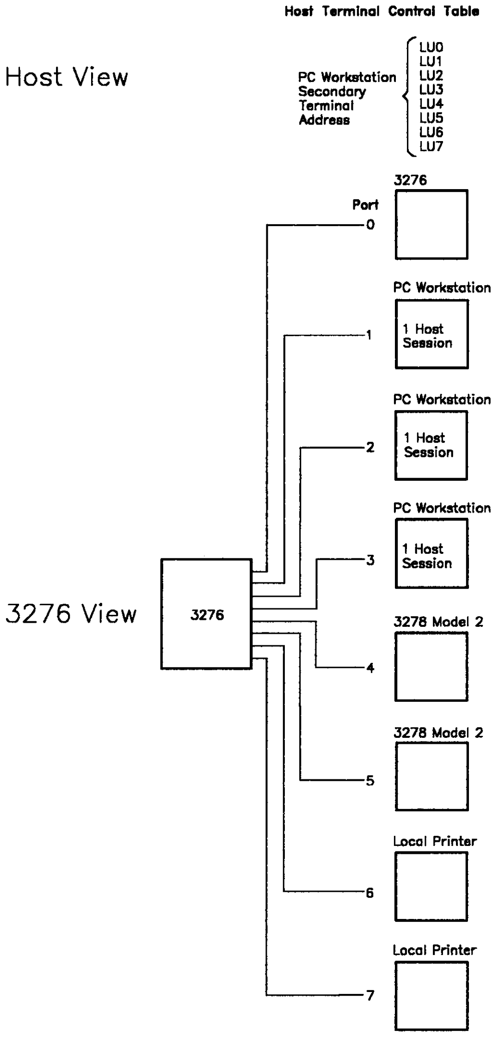

Host Terminal Control Table
Host View
PC Workstation Secondary Terminal Address
LU0
LU1
LU2
LU3
LU4
LU5
LU6
LU7
3276
Port
0
1
2
3
4
5
6
7
PC Workstation
1 Host Session
PC Workstation
1 Host Session
PC Workstation
1 Host Session
3278 Model 2
3278 Model 2
Local Printer
Local Printer
3276 View
3276

Figure A-2. PC Work station Attachment to a 3276 Control Unit Display Station

A PC work station attaches to the 3276 by means of a coaxial cable to one of the ports (locations 1 through 7) at the bottom rear of the unit. When you IPL the 3276, the connected work station paths are marked active.

The 3276 operates in CUT mode only and does not support EDS. The 3276 does not operate in transparent mode, but does operate on a communication line with other terminals that might operate in transparent mode.

The customization process necessary for attaching a 3276 involves switch settings on the operator panel drawer of the controller. This operator panel drawer is illustrated in Figure A-3.

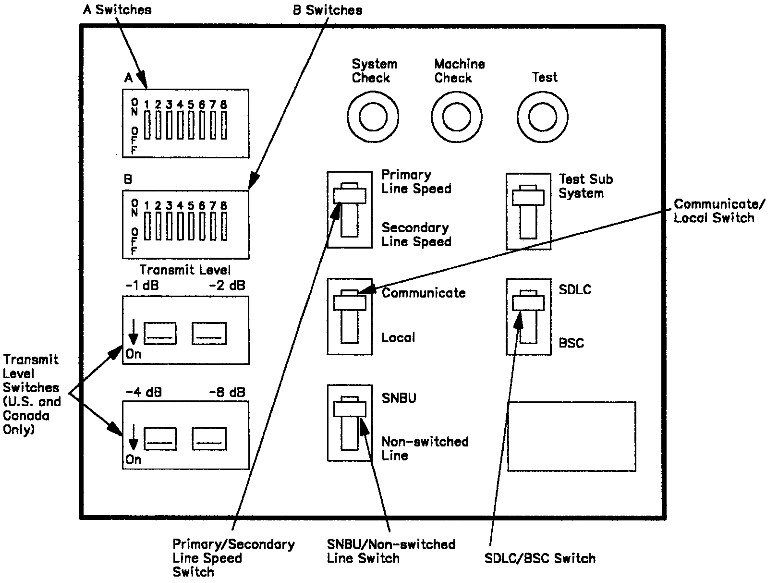

A Switches
B Switches
A
ON
1 2 3 4 5 6 7 8
OFF
B
ON
1 2 3 4 5 6 7 8
OFF
Transmit Level
-1 dB
-2 dB
On
-4 dB
-8 dB
On
Transmit Level Switches (U.S. and Canada Only)
System Check
Machine Check
Test
Primary Line Speed
Secondary Line Speed
Test Sub System
Communicate/ Local Switch
Communicate
Local
SDLC
BSC
SNBU
Non-switched Line
Primary/Secondary Line Speed Switch
SNBU/Non-switched Line Switch
SDLC/BSC Switch

Figure A-3. 3276 Operator Panel Drawer

Customizing for Synchronous Data Link Control (SDLC)

The following list summarizes the operator panel switch settings necessary in order to attach your PC work station with SDLC:

- **SDLC/BSC Switch**

  Set this switch in the upper position to select SDLC line control.

- **SDLC Address Switches**

  These eight switches (A1 through A8) should be set to correspond to the SDLC control unit address of the 3276. Refer to *IBM 3270 Information Display System: 3276 Control Unit Display Station Planning and Setup Guide*, GA18-2041, for the SDLC address switch settings for your control unit address.

- **Primary Line Speed/Secondary Line Speed Switch**

  Set this switch to the upper position to select the primary communication line speed.

- **SNBU/Switched Line Switch**

  This switch is installed if the 3276:

  - Has an integrated modem with the switched network backup (SNBU) feature and is attached to a nonswitched line, or
  - Has an external modem and is connected to a nonswitched line.

  Set this switch to the lower position to select the nonswitched line.

- **Transmit Level Switches**

  These four switches are installed only in 3276s used in the U.S. and Canada that have an integrated modem attaching to a switched network. Set the switches to match the 3276

Transmit Level to the data coupler (type CDT, CBS, or FCC-certified equivalent) that is attached to the termination of the communication line.

Customizing for Binary Synchronous Communication (BSC)

The following list summarizes the operator panel switch settings necessary in order to attach your PC work station with BSC:

- **SDLC/BSC Switch**

  Set this switch in the lower position to select BSC line control.

- **BSC Address Switches**

  These five switches (B1 through B5) should be set to correspond to the BSC control unit address of the 3276. Refer to *IBM 3270 Information Display System: 3276 Control Unit Display Station Planning and Setup Guide*, GA18-2041, for the BSC address switch settings for your control unit address.

- **Full Duplex (FDX)/Half Duplex (HDX) Switch (B6)**

  Set this switch to the lower position (HDX) for noncontinuous carrier operation when:

  - BSC or SDLC protocol is being used in 2-wire operation
  - SDLC protocol is being used in 4-wire, leased-line, multipoint operation.

- **Non-Return to Zero (NRZ)/Non-Return to Zero Inverted (NRZI) Switch (B8)**

  The NRZ/NRZI switch should be set to define whether your modem uses NRZ (upper position) or NRZI (lower position) encoding when the 3276 is using SDLC protocol. No setting is necessary if the 3276 uses only BSC protocol.

- **Primary Line Speed/Secondary Line Speed Switch**

  Set this switch to the upper position to select the primary communication line speed.

- **SNBU/Switched Line Switch**

  This switch is installed if the 3276 has:

  - An integrated modem with the Switched Network Backup (SNBU) feature and is attached to a nonswitched line, or
  - An external modem and is connected to a nonswitched line.

  Set this switch to the lower position to select the nonswitched line.

- **Transmit Level Switches**

  These four switches are installed only in 3276s used in the U.S. and Canada that have an integrated modem that attaches to a switched network. Set the switches to match the 3276 Transmit Level to the data coupler (type CDT, CBS, or FCC-certified equivalent) that is attached to the termination of the communication line.

Preparing the 4361 Work Station Adapter (WSA)

The WSA is a self-configuring device that needs no preparation for PC work station attachment. It recognizes the PC work station and automatically assigns an address to it as soon as the machine is powered-on. For multiple host sessions, you can assign up to three additional addresses on the WSA address assignment menu.

Appendix B. Host Requirements for File Transfer

File transfer allows you to send and receive files between a personal computer session and a host virtual machine/conversational monitor system (VM/CMS), multiple virtual system/time sharing option (MVS/TSO) system, or multiple virtual system/customer information control system (MVS/CICS).

To use file transfer, the IBM host-supported file transfer program (5664-281 for VM/CMS, 5665-311 for MVS/TSO, or 5798-DHQ for MVS/CICS) must be installed at the host site. You must also have ACF/VTAM, Release 2.1 or above, or ACF/TCAM, Release 2.4 or above, to transfer files.

Because file transfer uses 3270 Extended Data Stream (EDS), changes may have to be made to the ACF/VTAM network definitions. The BIND image must have the query bit on. In the ACF/VTAM MODETAB macro for the PC work station session that will be used for file transfers, specify:

- MODEENT PSERVIC=0280 (for a PC work station attached to a controller running in SNA (SDLC) mode)
- MODEENT PSERVIC=0080 (for a PC work station attached to a controller running in non-SNA (BSC) mode)
  - If the PC work station is attached to a local (non-SNA) controller, code FEATUR2=EDATS in the ACF/VTAM LOCAL macro.
  - If the PC work station is attached to a remote (BSC) controller, code FEATURE2=EDATS in the NCP TERMINAL macro.

Appendix C. Storage Estimates for Customization

Each option that you may want to use on the PC with the IBM 3270 Workstation Program requires some storage to run. The following chart can help you **estimate** the amount of storage required for your PC configuration. The options that can be selected during customization, and the amount of storage required for each option, are listed below. Any remaining storage will be allocated to your large PC session.

Minimum System with One Host Session	Storage (bytes)
For 3270 PC System Units Choose one terminal type:	
CUT	197,500
DFT Protocol: SNA	252,600
DFT Protocol: non-SNA	242,600
For non-3270 PC System Units Choose one terminal type:	
CUT	198,800
DFT Protocol: SNA	253,900
DFT Protocol: non-SNA	243,900
For the Workstation Program options selected:	
Copy	11,300
Multi-DOS	34,500
Print	5,150
Autokey	5,600
Autokey Area	*
Connectivity Facilities (3270 PC Router)	19,900

Minimum System with One Host Session	Storage (bytes)
For each DFT host, choose one:	
24x80 screen	3,968
24x80 screen with EAB	5,888
32x80 screen	4,624
32x80 screen with EAB	7,184
43x80 screen	5,526
43x80 screen with EAB	8,966
27x132 screen	5,618
27x132 screen with EAB	9,182
For the first notepad	9,300
For the second notepad	4,100
For the first PC session	21,500
For each additional PC session	**
For each system extension:	
Required memory	*
If it uses DOS	4,000
For DOS 3.2	46,000

Note: Don't use multiple copies of DOS. You must use the same level of DOS on all diskettes and/or fixed disks that you use on your system. Re-IPLing a PC session with a different version of DOS will cause the system to fail.

* Fill in the amount of storage you need.
** Add the size allocated for the PC environment.

Note: Some configurations of the workstation program will not fit on a single customized diskette. Therefore, you may need two system diskettes or a fixed disk to customize your workstation program.

The storage sizes given are reasonably accurate, but are subject to change and should be used only as a guideline. If you require exact storage sizes, run the customization program.

Appendix D. Representations of Symbols in the Retrieve Table and Keyboard Definition Utility Panels

Some symbols for keyboard functions are represented differently in the retrieve table and the keyboard definition utility Panels 3.1 through 3.3. The charts that follow relate these representations to help you retrieve symbols that you originally deleted using the keyboard definition utility.

The first column of the chart lists in alphabetic order each function where there are differences. The second column shows the function's symbol as represented on Panels 3.1 through 3.3, and the third column shows its corresponding symbol as represented on the retrieve table panel.

PC Session, 3270 PC Keyboard

Function	Symbol on Panel 3	Symbol on Table Panel
Alternate (left)	AltL	Alt L
Alternate (right)	AltR	Alt R
Backspace	←	BkSpc
Back Tab	⇤	BkTab
Cursor Down	↓	Cr Dn
Cursor Left	←	Cr L
Cursor Right	→	Cr R
Cursor Up	↑	Cr Up
New Line	↵	NewLn
Page Down	PgDn	Pg Dn
Page Up	PgUp	Pg Up
Left Shift	LShft	ShiftL
Right Shift	RShft	ShiftR
Tab	⇥	Tab

Host Session, 3270 PC Keyboard

Function	Symbol on Panel 3	Symbol on Table Panel
Alternate (Left)	AltL	Alt L
Alternate (Right)	AltR	Alt R
Backspace	←	BkSpc
Back Tab	⇤	BkTab
Cursor Down	↓	Cr Dn
Cursor Left	←	Cr L
Cursor Right	→	Cr R
Cursor Up	↑	Cr Up
Fast Cursor Left	↞	FCr L
Fast Cursor Right	↠	FCr R
New Line	↵	NewLn
Shift Left	LShft	ShiftL
Shift Right	RShft	ShiftR
Tab	⇥	Tab
Reverse Video	RVid	ReVid
Underscore	UnSc	UndSc

PC Session, Enhanced PC Keyboard

Function	Symbol on Panel 3	Symbol on Table Panel
Left Alternate	AltL	Alt L
Right Alternate	AltR	Alt R
Backspace	←	BkSpc
Back Tab	⇤	BkTab
Cursor Down	↓	Cr Dn
Cursor Left	←	Cr L
Cursor Right	→	Cr R
Cursor Up	↑	Cr Up
New Line	↵	NewLn
Page Down	PgDn	Pg Dn
Page Up	PgUp	Pg Up
Pause (Autokey)	Pause	Pause A
Left Shift	LShft	ShiftL
Right Shift	RShft	ShiftR
Tab	⇥	Tab

Host Session, Enhanced PC Keyboard

Function	Symbol on Panel 3	Symbol on Table Panel
Backspace	←	BkSpc
Back Tab	⇤	BkTab
Cursor Down	↓	Cr Dn
Cursor Left	←	Cr L
Cursor Right	→	Cr R
Cursor Up	↑	Cr Up
Erase End of Field	EEOF	ErEOF
Fast Cursor Left	↞	FCr L
Fast Cursor Right	↠	FCr R
New Line	↵	NewLn
Left Shift	LShft	ShiftL
Right Shift	RShft	ShiftR
Tab	⇥	Tab
Reverse Video	RVid	ReVid
Underscore	UnSc	UndSc

Appendix E. Keyboard Layout Worksheets

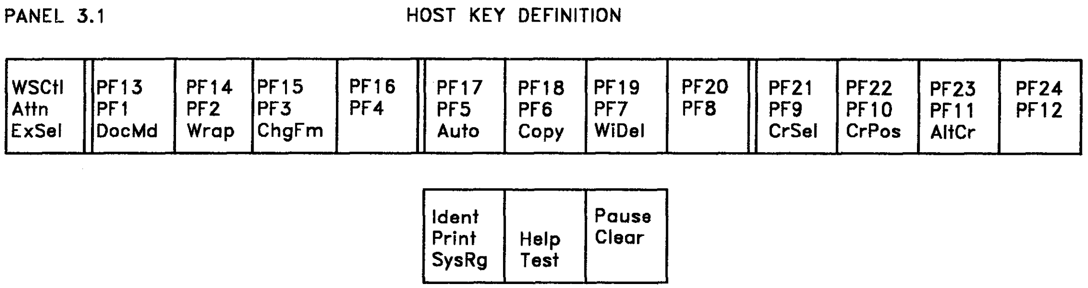
This appendix is to be used with the keyboard definition utility to help you plan your new keyboard arrangement. The appendix contains worksheets that match the keyboard diagrams displayed on Panels 3.1 through 3.3 of the utility. The keyboard diagrams are:

> 3270 PC - Host Session (host and notepad functions, including WSCtrl)
>
> 3270 PC - PC Session (PC functions only)
>
> Enhanced PC - Host Session (host and notepad functions, including WSCtrl)
>
> Enhanced PC - PC Session (PC functions only)

In the space provided, enter the layout, either current or default, that you chose on Panel 1. The IBM-supplied default layout is printed on the worksheets. As you plan, you can cross out the functions you wish to change and write in the new functions. It may be helpful to use different colors to indicate the source and target keys for each change operation.

Enhanced PC Keyboard, Host Session

Layout:

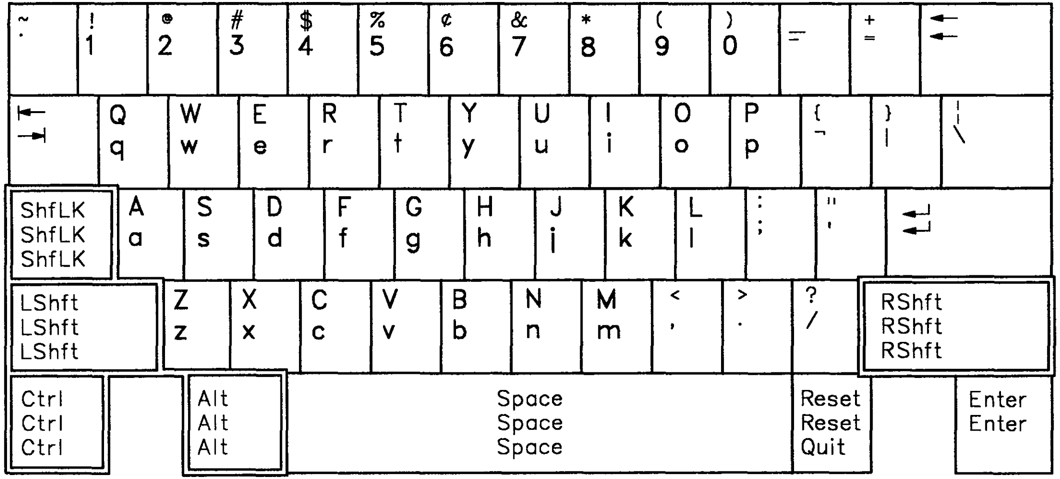


PANEL 3.1 HOST KEY DEFINITION

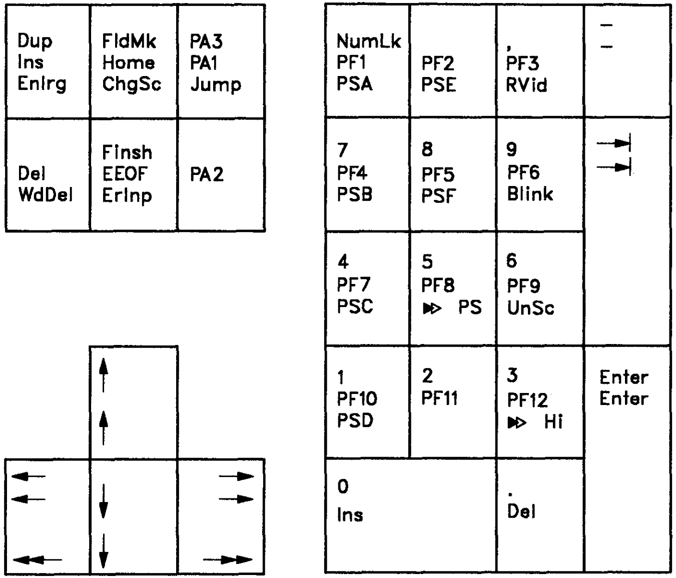
WSCtl	PF13	PF14	PF15	PF16	PF17	PF18	PF19	PF20	PF21	PF22	PF23	PF24
Attn	PF1	PF2	PF3	PF4	PF5	PF6	PF7	PF8	PF9	PF10	PF11	PF12
ExSel	DocMd	Wrap	ChgFm		Auto	Copy	WiDel		CrSel	CrPos	AltCr	

Ident		Pause
Print	Help	Clear
SysRg	Test	

PANEL 3.2 HOST KEY DEFINITION


~ `
! 1
@ 2
# 3
$ 4
% 5
¢ 6
& 7
* 8
(9
) 0
_ -
+ =
Q q
W w
E e
R r
T t
Y y
U u
I i
O o
P p
{ ¬
} |
| \
ShfLK ShfLK ShfLK
A a
S s
D d
F f
G g
H h
J j
K k
L l
: ;
" '
LShft LShft LShft
Z z
X x
C c
V v
B b
N n
M m
< ,
> .
? /
RShft RShft RShft
Ctrl Ctrl Ctrl
Alt Alt Alt
Space Space Space
Reset Reset Quit
Enter Enter

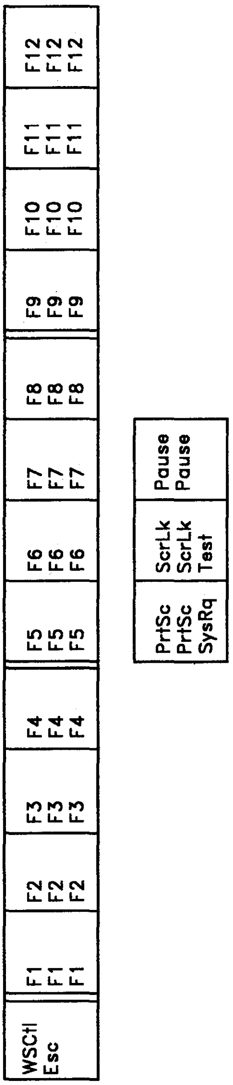
PANEL 3.3 HOST KEY DEFINITION


Dup
Ins
Enlrg
FldMk
Home
ChgSc
PA3
PA1
Jump
Del
WdDel
Finsh
EEOF
ErInp
PA2
NumLk
PF1
PSA
PF2
PSE
,
PF3
RVid
–
–
7
PF4
PSB
8
PF5
PSF
9
PF6
Blink
4
PF7
PSC
5
PF8
PS
6
PF9
UnSc
1
PF10
PSD
2
PF11
3
PF12
Hi
Enter
Enter
0
Ins
.
Del

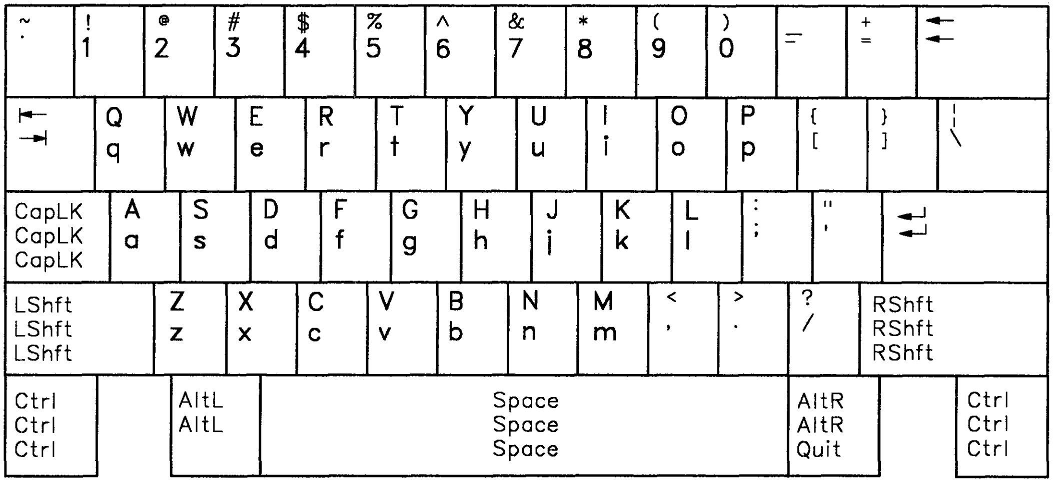
Enhanced PC Keyboard, PC Session

Layout:____________________

PANEL 3.1 PC KEY DEFINITION

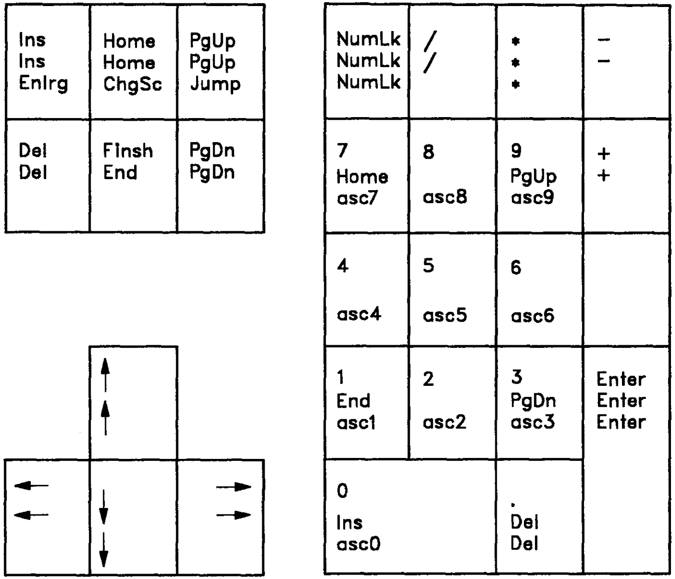

WSCtl Esc
F1 F1 F1
F2 F2 F2
F3 F3 F3
F4 F4 F4
F5 F5 F5
F6 F6 F6
F7 F7 F7
F8 F8 F8
F9 F9 F9
F10 F10 F10
F11 F11 F11
F12 F12 F12
PrtSc PrtSc SysRq
ScrLk ScrLk Test
Pause Pause

PANEL 3.2 PC KEY DEFINITION


~ `
! 1
@ 2
# 3
$ 4
% 5
^ 6
& 7
* 8
(9
) 0
_ -
+ =
Q q
W w
E e
R r
T t
Y y
U u
I i
O o
P p
{ [
}]
| \
CapLK CapLK CapLK
A a
S s
D d
F f
G g
H h
J j
K k
L l
: ;
" '
LShft LShft LShft
Z z
X x
C c
V v
B b
N n
M m
< ,
> .
? /
RShft RShft RShft
Ctrl Ctrl Ctrl
AltL AltL
Space Space Space
AltR AltR Quit
Ctrl Ctrl Ctrl

PANEL 3.3

PC KEY DEFINITION


Ins Ins Enlrg
Home Home ChgSc
PgUp PgUp Jump
Del Del
Finsh End
PgDn PgDn
NumLk NumLk NumLk
/ /
* * *
− −
7 Home asc7
8 asc8
9 PgUp asc9
+ +
4 asc4
5 asc5
6 asc6
1 End asc1
2 asc2
3 PgDn asc3
Enter Enter Enter
0 Ins asc0
. Del Del
↑ ↑
← ←
↓ ↓
→ →

3270 PC Keyboard, Host Session

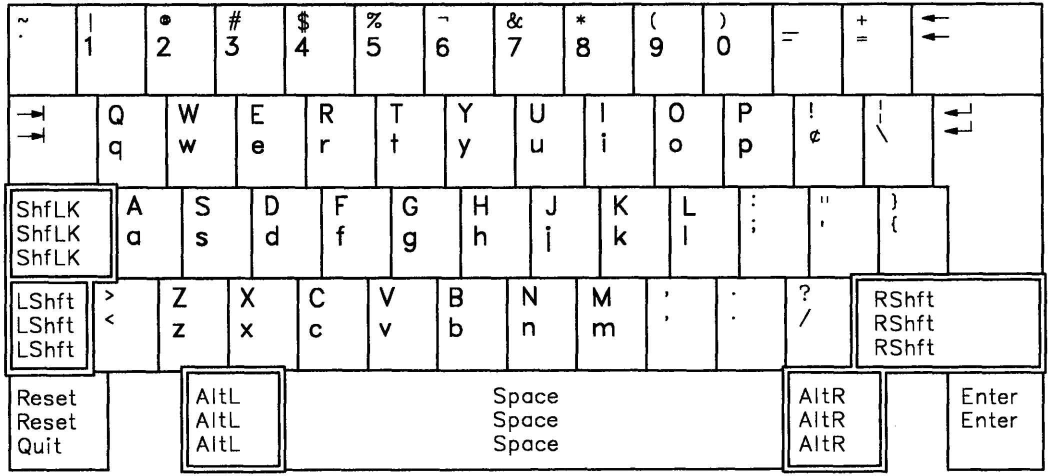
Layout:

PANEL 3.1 HOST KEY DEFINITION

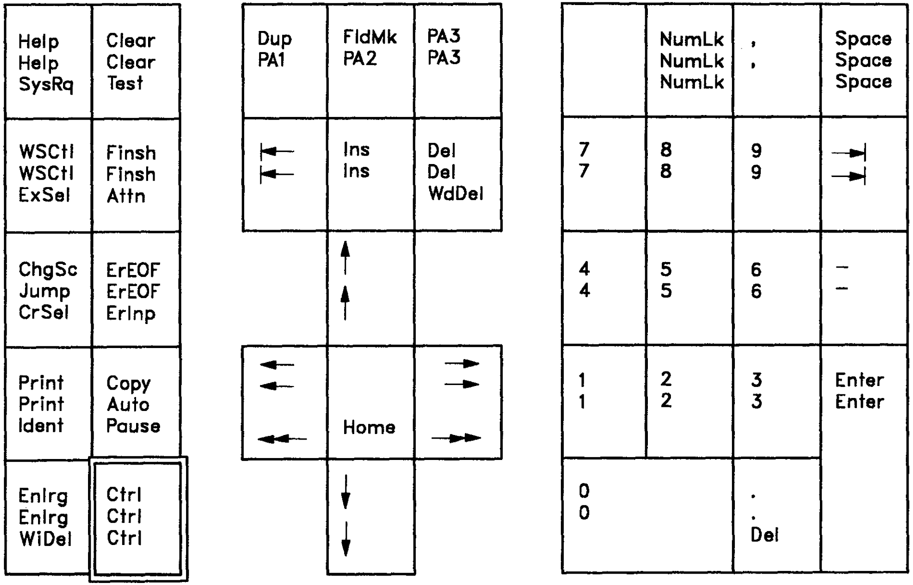
PF13 PF13 Red	PF14 PF14 Pink	PF15 PF15 Green	PF16 PF16 Yellow	PF17 PF17 Blue	PF18 PF18 Turq	PF19 PF19 White	PF20 PF20 Black	PF21 PF21 ▶▷ Co	PF22 PF22	PF23 PF23 AltCr	PF24 PF24
PF1 PF1 PSA	PF2 PF2 PSB	PF3 PF3 PSC	PF4 PF4 PSD	PF5 PF5 PSE	PF6 PF6 PSF	PF7 PF7 ▶▷ PS	PF8 PF8	PF9 PF9 RVid	PF10 PF10 Blink	PF11 PF11 UnSc	PF12 PF12 ▶▷ Hi

PANEL 3.2

HOST KEY DEFINITION


~ `
| 1
@ 2
# 3
$ 4
% 5
¬ 6
& 7
* 8
(9
) 0
_ -
+ =
←
←
→|
→|
Q q
W w
E e
R r
T t
Y y
U u
I i
O o
P p
! ¢
| \
↵
↵
ShfLK
ShfLK
ShfLK
A a
S s
D d
F f
G g
H h
J j
K k
L l
: ;
" '
} {
LShft
LShft
LShft
> <
Z z
X x
C c
V v
B b
N n
M m
, ,
. .
? /
RShft
RShft
RShft
Reset
Reset
Quit
AltL
AltL
AltL
Space
Space
Space
AltR
AltR
AltR
Enter
Enter

PANEL 3.3 HOST KEY DEFINITION


Help Help SysRq
Clear Clear Test
Dup PA1
FldMk PA2
PA3 PA3
NumLk NumLk NumLk
, ,
Space Space Space
WSCtl WSCtl ExSel
Finsh Finsh Attn
|← |←
Ins Ins
Del Del WdDel
7 7
8 8
9 9
→| →|
ChgSc Jump CrSel
ErEOF ErEOF ErInp
↑ ↑
4 4
5 5
6 6
– –
Print Print Ident
Copy Auto Pause
← ← ←←
Home
→ → →→
1 1
2 2
3 3
Enter Enter
Enlrg Enlrg WiDel
Ctrl Ctrl Ctrl
↓ ↓
0 0
. . Del

SWAP COPY DELETE RETRIEVE FULL SINGLE

PF1=Help PF2=Select PgDn=Next PgUp=Prev End=Exit

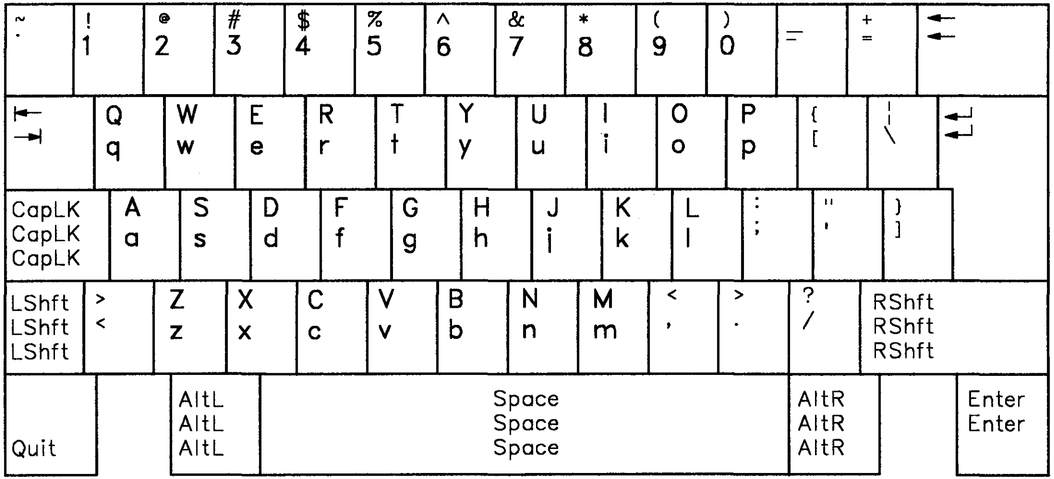
3270 PC Keyboard, PC Session

Layout:____________________

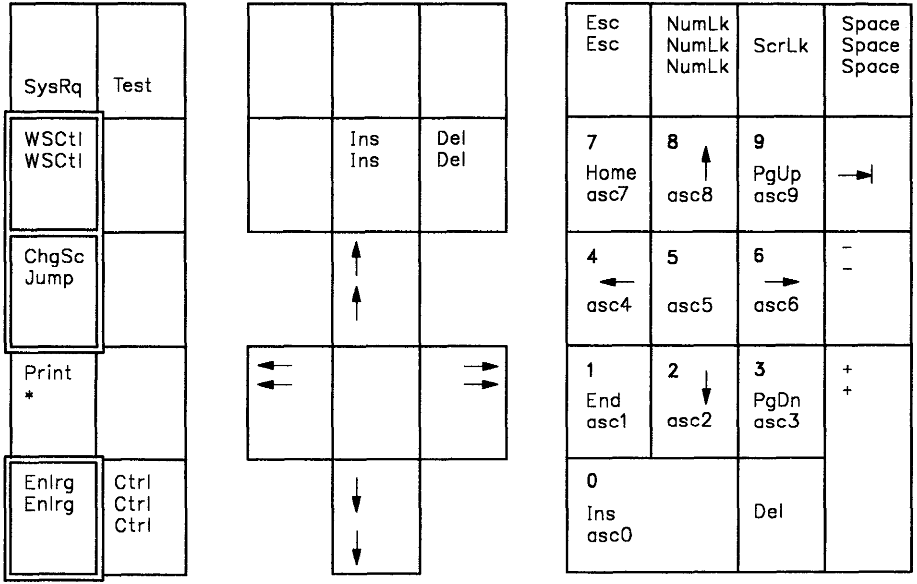
PANEL 3.1 PC KEY DEFINITION

F1 F1 F1	F2 F2 F2	F3 F3 F3	F4 F4 F4	F5 F5 F5	F6 F6 F6	F7 F7 F7	F8 F8 F8	F9 F9 F9	F10 F10 F10		

PANEL 3.2 PC KEY DEFINITION


~ `
! 1
@ 2
# 3
$ 4
% 5
^ 6
& 7
* 8
(9
) 0
_ -
+ =
Q q
W w
E e
R r
T t
Y y
U u
I i
O o
P p
{ [
| \
CapLK CapLK CapLK
A a
S s
D d
F f
G g
H h
J j
K k
L l
: ;
" '
}]
LShft LShft LShft
> <
Z z
X x
C c
V v
B b
N n
M m
< ,
> .
? /
RShft RShft RShft
Quit
AltL AltL AltL
Space Space Space
AltR AltR AltR
Enter Enter

PANEL 3.3 PC KEY DEFINITION


SysRq
Test
WSCtl WSCtl
ChgSc Jump
Print *
Enlrg Enlrg
Ctrl Ctrl Ctrl
Ins Ins
Del Del
Esc Esc
NumLk NumLk NumLk
ScrLk
Space Space Space
7 Home asc7
8 asc8
9 PgUp asc9
4 asc4
5 asc5
6 asc6
− −
1 End asc1
2 asc2
3 PgDn asc3
+ +
0 Ins asc0
Del

Appendix F. Programmed Symbols

This appendix is for anyone who wants to use Programmed Symbol (PS) features on the IBM 3270 Personal Computer. To use the PS feature, you must have programmed symbol host support and the Programmed Symbol adapter card installed in the system unit. Note that the Programmed Symbol adapter card is only supported on 3270 PC hardware. In addition, your PC work station must be customized for programmed symbols for one host.

A programmed symbol is a special character or graphic component that is loaded by a host application program into a symbol set in the IBM 3270 Personal Computer. The IBM 3270 Personal Computer has enough storage for six symbol sets with the patterns for 192 symbols in each. The symbol set indicators are:

- PSA
- PSB
- PSC
- PSD
- PSE
- PSF

Press Alt + PF1 through PF6 to select one of these sets. The operator information area displays the symbol set indicator you are using. (Refer to *IBM 3270 Information Display System 3278 Display Station Operator's Guide* for additional information.)

To define a symbol, the host application program turns on only those bits in a location that relate to the active dots needed to display the symbol.

Some examples of programmed symbol use are:

- Characters from foreign alphabets
- Mathematical signs and symbols
- Scientific signs and symbols
- Special type fonts, for example, italics
- Sets of graphic elements used to build bar graphs, bar charts, and other graphic representations of data.

The characters you see on your display screen are made up of a pattern of active dots. Each character position on the screen is addressed by the display as a matrix of dots, as shown below. The 3270 PC has a character size with the width of 9 and a height of 14. The 3278 and 3279 display stations have the same character size.

```
* * * * * * * * *
* * * * * * * * *
* * * * * * * * *
* * * * * * * * *
* * * * * * * * *
* * * * * * * * *
* * * * * * * * *
* * * * * * * * *
* * * * * * * * *
* * * * * * * * *
* * * * * * * * *
* * * * * * * * *
* * * * * * * * *
* * * * * * * * *


Width = 9
Height = 14
```

The active dots form the character seen on the display screen. The number of dots in the matrix and the size of the matrix vary between display stations. Characters of the base character set are defined within the display station as a pattern of active dots in this matrix, as shown below.

```
     Base Character
          Set

- - - - - - - - -
- - - - - - - - -
- - - - - - - - -
- - - - - - - - -
- - * * * * - - -
- - - - - - * - -
- - * * * * * - -
- * - - - - * - -
- - * * * * * - -
- - - - - - - * -
- - - - - - - - -
- - - - - - - - -
- - - - - - - - -
- - - - - - - - -
       "a"
```

Before You Begin

Before you can use the Programmed Symbol feature:

1. Make sure your work station has the Programmed Symbol adapter card installed in the system unit.
2. The customized system diskette you are using must have one host session customized for programmed symbols.
3. Log on to a host session that has applications that send programmed symbols to the display, such as graphic applications, and start the application.

Note that you can use your IBM 3270 Personal Computer while working with Programmed Symbol applications. For example, you can size your windows, move them, hide them, and corner them.

Symbol Sets

Programmed symbol sets are either **single-plane** or **triple-plane**. Single-plane symbol sets have no inherent color characteristic and are available for monochrome, plasma panel, and color displays. The advantage of a triple-plane symbol set is that it allows more than one color to be used in a single character position. For example, a red character position overlaying a green character position would appear yellow on the display screen. Triple-plane symbol sets are, therefore, not available on monochrome displays. Regardless of the type of display you have, however, the same adapter card is installed in the system unit of the IBM 3270 Personal Computer.

Note: If you have a color display and are using the Programmed Symbol feature triple-plane symbols, the cursor will always appear white for either the default "bar" or the alternate cursor (block). If you have a monochrome display and are using programmed symbols, the cursor will appear in reverse video for either the default or alternate cursor.

In certain applications, you may need to display in more than one color within a single character position. A typical example of a symbol that requires a triple-plane symbol set occurs where the application program displays a graph with lines in different colors.

Primary Colors

As stated above, some of the symbol sets available in the programmed symbols features are triple-plane symbol sets. Such sets contain three times the normal amount of storage for each defined character, arranged in three planes each representing one of the three primary colors: red, blue, and green. By defining only a portion of the total symbol in each color plane, you can obtain a whole symbol in more than one color.

Take, for example, the instance where two horizontal lines, one blue and one yellow, are cut by a red vertical line. The active dots at the character position may appear as follows:

```
Red Plane      Blue Plane     Green Plane

- - r - -      - - - - -      - - - - -
- - r - -      - - - - -      - - - - -
- - r - -      b b - b b      - - - - -
- - r - -      - - - - -      - - - - -
- - r - -      - - - - -      - - - - -
- - r - -      - - - - -      - - - - -
- - r - -      - - - - -      - - - - -
r r r r r      - - - - -      g g - g g
- - r - -      - - - - -      - - - - -
- - r - -      - - - - -      - - - - -


             What You See

               - - r - -
               - - r - -
               b b r b b
               - - r - -
               - - r - -
               - - r - -
               - - r - -
               y y r y y
               - - r - -
               - - r - -
```

Legend
r = active red bit
b = active blue bit
y = active yellow bit
g = active green bit
- = blank

Note: The symbol extends to the edges of the character position, thus allowing the lines to continue without interruption into the adjacent character positions.

Secondary Colors

Secondary colors are obtained by mixing red, blue, and green. The secondary colors are pink, yellow, turquoise, and white. If a bit is active in more than one plane, the active primary colors combine to produce secondary colors, as shown below:

Primary Colors			Secondary Colors
Red	Blue	Green	What you See
No	No	No	No display
No	No	Yes	Green
No	Yes	No	Blue
No	Yes	Yes	Turquoise
Yes	No	No	Red
Yes	No	Yes	Yellow
Yes	Yes	No	Pink
Yes	Yes	Yes	White

Character Attributes and Triple-Plane Symbols

Character attributes, such as reverse video, underscoring, and blinking, will have no effect when you are using triple-plane symbols. Your data will appear as it has been loaded into the triple-plane symbol font.

Related Publications

For additional information on programmed symbols, refer to:

- *IBM 3270 Information Display System, 3274 Control Unit Description and Programmer's Guide.*
- *IBM 3270 Information Display System 3278 Display Station and Programmer's Guide.*
- *IBM 3270 Information Display System: Color and Programmed Symbols.*

Appendix G. Installing XMA and VDISK Device Drivers

Introduction

The IBM 3270 Workstation Program diskettes contain two device drivers for use in system units containing an IBM Expanded Memory Adapter (XMA):

- The XMA Device Driver, which provides an interface to expanded memory for most[1] PC applications that use the Lotus/Intel/Microsoft[2] Expanded Memory Specification.
- The XMA VDISK Device Driver, which provides a PC DOS-like virtual disk for use with the IBM XMA card.

---

[1] The IBM XMA Device Driver does not support PC applications that use functions 10 and 11. These functions are described as reserved functions in Version 3.2 of the Lotus/Intel/Microsoft Expanded Memory Specification. For further information, see "Differences from the Expanded Memory Specification" on page G-21.

[2] Lotus is a registered trademark of Lotus Development Corporation. Intel is a registered trademark of Intel Corporation. Microsoft is a registered trademark of Microsoft Corporation.

What is Expanded Memory?

Expanded memory is a paging scheme used to access more than 640 Kb of memory while staying within the conventional memory addressing range (0-1024 Kb). Two types of expanded memory are available with the IBM 3270 Workstation Program as follows:

- 3270 PC Expanded Memory - This type of expanded memory is used by the IBM 3270 Workstation Program. It allows you to have multiple PC sessions that together total more than 640 Kb. 3270 PC Expanded Memory is built into the workstation program, and if you have the XMA card, you have only to customize for it to use it.
- XMA Expanded Memory - This form of expanded memory allows programs that were written to the Lotus/Intel/Microsoft Expanded Memory Specification to have access to the expanded memory on the IBM XMA card. XMA Expanded Memory is not built into the workstation program, but you can use it by installing the XMA Device Driver mentioned above.

Both types of expanded memory can be used concurrently. However, the more memory that you reserve for XMA Expanded Memory, the less memory you have for 3270 PC Expanded Memory.

How Does Expanded Memory Work?

Expanded memory works by switching pages of memory into and out of a page frame as needed. The page frame is located inside reserved conventional memory (see Figure G-1 on page G-3).

Expanded memory differs from "extended" memory because it stays within the address space for conventional memory. Extended memory uses addresses above the conventional memory space.

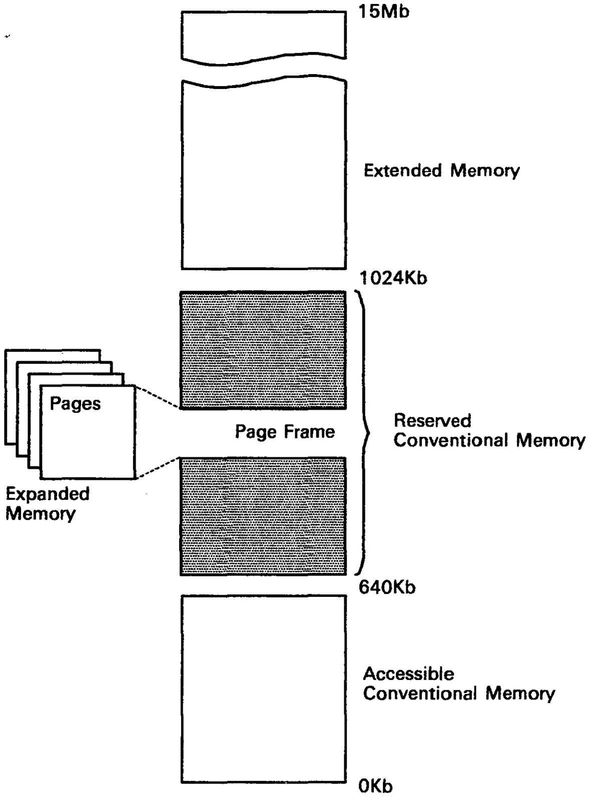

15Mb
Extended Memory
1024Kb
Pages
Page Frame
Reserved
Conventional Memory
Expanded
Memory
640Kb
Accessible
Conventional Memory
0Kb

Figure G-1. Expanded Memory

When would I want to use the XMA Device Driver?

Check the documentation that came with your PC applications and see if they use the Lotus/Intel/Microsoft Expanded Memory Specification. If so, installing IBM's XMA device driver will most likely allow your PC applications access to expanded memory on the IBM XMA card.

What is VDISK?

VDISK stands for "virtual disk." It is a volatile disk drive set up inside the memory of your PC. Its main advantage over conventional disk drives is speed.

How does VDISK work?

VDISK uses electronic, rather than mechanical means to store and access data. It speeds up the operation of programs that require frequent disk access. This particular VDISK driver was written using the Lotus/Intel/Microsoft Expanded Memory Specification and calls on the XMA driver mentioned above to access memory on the IBM XMA card.

When would I want to use VDISK?

One way you can tell if you'll benefit using VDISK is to watch your "In-Use" lights on the front of your PC while loading or using a application. If they light up frequently or stay lit for long periods of time, you might speed things up using VDISK.

How to Install XMA and VDISK

If you've decided you want to use XMA or VDISK, follow the steps below.

Step 1. Copy the Device Drivers

For you to run the device drivers, they must be on the diskette or fixed disk that you IPL with. The two files you need to copy are on workstation program diskette 3 of 3, and are named:

- XMA2EMS.SYS, which is the filename of the XMA Device Driver
- XMA2VDK.SYS, which is the filename of the XMA VDISK Device Driver.

If You Have a Fixed Disk: Use the DOS COPY command, and copy the device drivers from workstation program diskette 3 of 3 to your fixed disk.

If You Do Not Have a Fixed Disk

1. Format a blank diskette using FORMAT A:/S.

2. Label the diskette “System Diskette 1”.

3. Copy the device drivers from the workstation program diskette to the system diskette you just created:

   - If you haven’t customized the workstation program, you will use this diskette as your first system diskette during customization; for now go to “Step 2. Edit Your CONFIG.SYS File.”

   - If you’ve already customized, chances are your existing system diskette is already too full to copy the device drivers onto it. That is why you were instructed to create a new “system diskette 1.” Later after you finish with this appendix, you will have to recustomize to get your workstation program files onto the new system diskette. When you bring up customization, be sure that you enter “A” under “Preset Options”. In that way, you can pick up the options from your old system diskette. For now, go to “Step 2. Edit Your CONFIG.SYS File.”

Step 2. Edit Your CONFIG.SYS File

Using any standard DOS ASCII editor (for example, Personal Editor or Edlin) edit a file named CONFIG.SYS[3] file on your system diskette or fixed disk.

---

[3] If you have customized, you already have a CONFIG.SYS with the line “FILES=40” in it.

For each driver, you must add a statement as described below.

The Statement for XMA

The general syntax for the XMA statement is:

```
DEVICE=XMA2EMS.SYS [/S=xxxx] [/P=yyy]
```

Brackets indicate that the parameter is optional.

Where:

xxxx	Is the segment starting address for the page frame. the default value is D000 hex. You shouldn't have to change this address unless there is a conflict with something else. If a conflict occurs, see "How to Assign a New Page Frame Address" on page G-12.
yyy	Designates the number of pages[4] reserved for use by the workstation program. This value must be greater than zero. The XMA device driver gets installed before the workstation program when you IPL the PC. If you don't specify a value for "/P", the XMA driver will take all the XMA memory and leave nothing for the workstation program. If this happens, some of your PC sessions could fail to initialize or your last-defined PC session could be smaller than expected.

---

[4] There are 16Kb in each page of memory. Thus, a 1-megabyte XMA card has 1024Kb/16Kb or 64 pages of memory; 24 pages (384Kb) of which is *always* used to fill conventional memory from 256Kb-640Kb.

XMA Example 1: If you have a 1-megabyte XMA Card, want XMA, but do not want VDISK, add the following line to your CONFIG.SYS:

```
DEVICE=XMA2EMS.SYS /P=20
```

Out of 64 pages (1024 Kb) total:

Memory in Pages	Memory in Kb	Where the Memory Goes
24	384	Allocated to fill in conventional memory from 256Kb to 640Kb
20	320	Reserved by the "/P" parameter for the IBM 3270 Workstation Program
20	384	Left over for XMA use

XMA Example 2: If you have a 2-megabyte XMA Card, want XMA, but do not want VDISK, add the following line to your CONFIG.SYS:

```
DEVICE=XMA2EMS.SYS /P=64
```

Out of 128 pages (2048 Kb) total:

Memory in Pages	Memory in Kb	Where the Memory Goes
24	384	Allocated to fill in conventional memory from 256Kb to 640Kb
64	1024	Reserved by the "/P" parameter for the IBM 3270 Workstation Program
40	640	Left over for XMA use

The Statement for VDISK

The general syntax for the VDISK statement is:

```
DEVICE=XMA2VDK.SYS zzz
```

Where:

zzz	Is the size (in kilobytes) of the PC virtual disk you want created out of XMA memory.

The VDISK device driver gets its storage from XMA, so that you must include both the XMA and VDISK statements in your CONFIG.SYS file.

For each page given to VDISK, you decrease the amount of memory available for XMA applications.

The memory allocated for VDISK cannot exceed the amount of memory available for XMA.

VDISK Example 1: If you have a 1-megabyte XMA Card, and want to use VDISK, add the following two lines to your CONFIG.SYS:

```
DEVICE=XMA2EMS.SYS /P=20
DEVICE=XMA2VDK.SYS 180
```

Out of 64 pages (1024 Kb) total:

Memory in Pages	Memory in Kb	Where the Memory Goes
24	384	Allocated to fill in conventional memory from 256Kb to 640Kb
20	320	Reserved by the "/P" parameter for the IBM 3270 Workstation Program
20	320	Used for XMA. VDISK memory is taken from this
	180	Used for a virtual disk
	140	Remains for other XMA applications

VDISK Example 2: If you have a 2-megabyte XMA Card, and want VDISK, add the following two lines to your CONFIG.SYS:

Note: Since the VDISK device driver uses XMA, the XMA driver must also be installed.

```
DEVICE=XMA2EMS.SYS /P=40
DEVICE=XMA2VDK.SYS 360
```

Out of 128 pages (2048 Kb) total:

Memory in Pages	Memory in Kb	Where the Memory Goes
24	384	Allocated to fill in conventional memory from 256Kb to 640Kb
40	640	Reserved by the "/P" parameter for use by the IBM 3270 Workstation Program
64	1024	Used for XMA. VDISK memory is taken from this
	360	Used for a virtual disk
	664	Remains for other XMA applications

Step 3. Review the Following Customization Considerations

If You Already Have a Customized Workstation Program: Chances are, you'll still be able to load the workstation program with the XMA drivers, but without recustomizing. However, you should know that:

- Your last PC session will be decreased in size by the amount of memory used for XMA.
- If the workstation program does fail to load, you may have to:
  - Recustomize and choose fewer or smaller PC sessions
  - Reserve more workstation program memory in your CONFIG.SYS file
  - Do both.

If You Don't Have a Customized Workstation Program: When you do a customization, you will notice that the panels display a running total of the amount of memory *allocated* and the amount of *free* memory.

Since customization has no way of knowing that you plan to use part of XMA memory for the XMA and VDISK drivers, the amount of free memory it displays will not be accurate.

To obtain a more accurate figure of free memory, take the number that customization displays and subtract the amount that you allocated for XMA.

For example, suppose you followed "VDISK Example 2" on page G-9. There would be 64 pages (or 1024 Kb) of memory for XMA. To get an accurate count of free memory, subtract 1024 K from the amount of free memory shown.

If the customization panel displays the following:

```
 567 K Allocated
1737 K Free
```

567K is the amount of memory that the workstation program will require with all its options so far.

1737K is the amount of memory that customization thinks is available to assign to PC sessions.

To calculate the actual amount of free memory:

```
1737K - 1024K = 713K
```

Be sure you use the calculated amount rather than the amount customization displays when allocating memory to your PC sessions.

Step 4. Load the Device Drivers

After you have the device drivers on your system diskette along with the CONFIG.SYS file, you are ready to begin.

1 Make sure your system unit is turned off.

2 If you installed the device drivers onto a diskette, insert the diskette into drive A.

3 Switch the system unit on to load the drivers.

The following screen will appear if your device drivers are loaded properly:

```
XMA2EMS: Expanded Memory Manager                         Version 1.0
(C) Copyright IBM Corporation 1986                   All rights reserved


XMA001  Performing XMA diagnostics:   XXXX Kb OK
XMA002  Diagnostics completed

XMA003  Page Frame starts at....................................   D000:0
XMA004  Pages mapped to conventional memory......   XX
XMA005  Pages reserved for IBM 3270 Workstation Program.. XX
XMA006  Pages available for expanded memory.........   XXX

IBM EXPANDED MEMORY ADAPTER XMA VDISK Version 1.0
(C)Copyright IBM Corporation 1986

VDK001  Virtual Disk using Drive %:
```

Note: If you have problems loading the device drivers see "What To Do If There Are Problems" on page G-19.

If you have an AUTOEXEC.BAT that loads the workstation program automatically, this panel will disappear from your screen after the device drivers load. This is normal[5].

How to Use the XMA Device Driver

To use XMA, simply run any application written to the Expanded Memory Specification.

The XMA device driver acts as a go-between for your application and the XMA card. By moving four 16Kb pages into and out of the 64Kb page frame in which your software application is running, the XMA allows the software access to the expanded memory.

Important: Use XMA in only one PC session at a time. The XMA device driver must only be used in one PC session at a time. Before you can start another application that uses Expanded Memory in another PC session, you must exit the first one. If you don't, when you jump back to your first session, the data in that session could be corrupted with data from the second PC application.

How to Assign a New Page Frame Address

If a starting address conflict occurs between the XMA page frame and other devices you have in your system, you may be able to reassign the XMA page frame starting address. By including the **/S** command in your CONFIG.SYS file, you can change the starting address of your page frame.

---

[5] If you don't want the workstation program to load immediately after you install the device drivers, you can temporarily rename the AUTOEXEC.BAT file to something else. This is especially helpful if you are experimenting with how much memory you want to allocate to XMA or the workstation program.

The XMA driver uses a 64Kb page frame containing four 16Kb pages. Therefore, to choose a valid starting address you will use the tables to find an address that has four empty, adjacent spaces above it (like X'D000'.)

To use the /S command:

1 Using the appropriate table below, pick a starting address for the page frame. Remember, there must be four contiguous empty blocks for the address to work.

- If you have a 3270 PC or 3270 Personal Computer AT, use Figure G-2 on page G-14.
- If you have a Personal Computer XT or AT, use Figure G-3 on page G-15.

Note: You may have other devices installed that are not listed in the figures.

Starting Decimal	Address Hex	3270 PC	3270 Personal Computer AT
1008	FC00	BIOS/BASIC	BIOS/BASIC
992K	F800	BIOS/BASIC	BIOS/BASIC
976K	F400	BIOS/BASIC	BIOS/BASIC
960K	F000	BIOS/BASIC	BIOS/BASIC
944K	EC00		System board ROM
928K	E800		System board ROM
912K	E400		System board ROM
896K	E000		System board ROM
880K	DC00		
864K	D800		
848K	D400		
832K	D000		
816K	CC00	See Note	See Note
800K	C800	Fixed disk control	
784K	C400		
768K	C000		
752K	BC00	3270 PC Display	3270 PC Display
736K	B800	3270 PC Display	3270 PC Display
720K	B400		
704K	B000	3270 PC Display	3270 PC Display
688K	AC00	Programmed symbols	Programmed symbols
672K	A800		
656K	A400		
640K	A000	3270 PC Color Display	3270 PC Color Display
Note: The 3270 PC System Adapter uses X'CE00' to X'D000'.			

Figure G-2. 3270 PC and 3270 Personal Computer AT Map of Reserved Conventional Memory

Starting Decimal	Address Hex	Personal Computer XT	Personal Computer AT
1008	FC00	BIOS/BASIC	BIOS/BASIC
992K	F800	BIOS/BASIC	BIOS/BASIC
976K	F400	BIOS/BASIC	BIOS/BASIC
960K	F000	BIOS/BASIC	BIOS/BASIC
944K	EC00		System board ROM
928K	E800		System board ROM
912K	E400		System board ROM
896K	E000		System board ROM
880K	DC00		
864K	D800		
848K	D400		
832K	D000		
816K	CC00	See Note	See Note
800K	C800	Fixed disk control	
784K	C400		
768K	C000		
752K	BC00	EGA	EGA
736K	B800	Color/graphics or EGA	Color/graphics or EGA
720K	B400	EGA	EGA
704K	B000	Monochrome or EGA	Monochrome or EGA
688K	AC00	EGA	EGA
672K	A800	EGA	EGA
656K	A400	EGA	EGA
640K	A000	EGA	EGA
Note: The IBM 3278/79 Emulation Adapter uses X'CE00' to X'D000'.			

Figure G-3. Personal Computer XT and AT Map of Reserved Conventional Memory

2 Use an editor to bring up your CONFIG.SYS file.

3 Type, at the end of the XMA driver installation statement:

```
/S=xxxx
```

where xxxx is the first hexadecimal address of the 64K page frame.

If, for example, you did not have a conflict with the starting address A000, a line of your CONFIG.SYS file might look like this:

```
DEVICE=XMA2EMS.SYS /S=A000
```

4 Save the CONFIG.SYS with the changes you made.

5 Reload the device drivers by pressing ALT + CTRL + DEL.

If the table does not show a potential conflict, but the message

```
ESM00X  Adapter error:
        Expanded Memory Manager not installed
```

appears, or the device drivers do not install when you restart your system unit, repeat the process until you have a starting address that works.

How to Use VDISK

Once it is installed, you use most of the same commands with a VDISK that you would use on a regular diskette or fixed disk drive. COPY, DISKCOPY, and CHKDSK all work the same.

If you have applications that take a long time to load, you can have them copied onto your VDISK by your AUTOEXEC.BAT file when you start your PC. Then when you call the application, it will load from the virtual disk, rather than having to go to the slower diskette drive. The VDISK and its contents will stay there until you power off or re-IPL your PC.

You can determine the drive letter of your VDISK in two ways:

1 If you are using DOS Version 3.1 or 3.2, look at the last line of the VDISK initialization message. The statement

```
Virtual Disk using Drive %:
```

tells you the letter of your VDISK drive (represented by %).

This line is not displayed if you are using any earlier version of DOS.

2 If you are not using DOS 3.1 or higher, determine your drive letter this way:

- If you have one or two diskette drives and no hard file, your VDISK drive will be drive C.
- If you have one hard file, your VDISK will be drive D.
- If you have two hard files, your VDISK will be drive E.

Remember, VDISK is **temporary.** Any files on your VDISK are lost when you turn your system unit off or press CTRL + ALT + DEL to re-IPL. Although you can use it like any other disk, you must store any files you want to save on another diskette or disk.

You can make sure you've copied all files from VDISK by doing a "directory" of your VDISK.

Use the DOS COPY command to save your files.

Changing the Size of Your VDISK

The statement in the CONFIG.SYS file that installs VDISK also determines its size. To increase or decrease the amount of memory on your VDISK, use an editor to change zzz on the line

```
DEVICE=XMA2VDK.SYS zzz
```

in your CONFIG.SYS file. You cannot have a VDISK larger than the number of pages you have available for expanded memory.

To find out how large a VDISK you can have:

1 With the XMA device driver installed, restart your PC.

2 Look at the message

```
XMA006 Pages available for expanded memory
 xxx
```

3 Multiply the number represented here as xxx by 16.

The result is the number of kilobytes your memory manager can manage. This is the largest number you can assign to VDISK.

Creating Multiple VDISKs

You can have multiple VDISKs, each with different drive letters, if you repeat the VDISK installation command in your CONFIG.SYS file. Use an editor to insert the line

```
DEVICE=XMA2VDK.SYS xxx
```

into your CONFIG.SYS file once for each VDISK you want.

Remember, however, that you cannot request more storage for all your VDISKs combined than you have for your XMA. Refer to "Changing the Size of Your VDISK" on page G-18 to determine the total amount of storage you can have for your VDISKs.

What To Do If There Are Problems

Listed below are sample problems you might encounter along with possible explanations and solutions. They are not intended to take the place of problem determination. If these solutions do not solve your problem after installing the device drivers, see the *IBM 3270 Workstation Program Problem Determination Guide and Reference* for more information.

Sample Problem 1:

- The workstation program failed to load.

  or

- The workstation program loaded, you received a COMPONENT ERROR, and some of the PC sessions failed to initialize.

  or

- The workstation program loaded, but your last PC session is not the size specified during customization.

Explanation

The XMA device driver loads before the workstation program and takes memory that would normally be available for the workstation program. It may be possible that you haven't reserved enough memory for the workstation program to load at all or load as expected.

Solution

- Edit your CONFIG.SYS file and reserve more memory for the workstation program using the "/P" parameter.
- Recustomize your workstation program so that it doesn't require as much memory.

Sample Problem 2:

Data was corrupted while using multiple PC applications.

Explanation

The XMA driver can only be used in one PC session at a time. If you load a second XMA application before leaving the first application, data in the first session could be corrupted.

Solution

Examine the documentation that came with the PC programs you are using. If you have more than on XMA application, be sure that you exit one application before starting another in a second PC session.

Sample Problem 3:

One of the following messages appears:

XMA100	Adapter error: Expanded Memory Manager has NOT been installed
XMA200	Cannot find adapter: Expanded Memory Manager has NOT been installed
XMA300	Parameter syntax or value error: Expanded Memory Manager has NOT been installed
VDK100	Expanded Memory Manager not installed: VDISK has NOT been installed
VDK200	Expanded Memory Manager driver error: VDISK has NOT been installed
VDK300	Not enough storage: VDISK has NOT been installed

Solution

See "Messages" on page G-22 for an explanation and possible solution to your particular message.

All Other Problems: See the *IBM 3270 Workstation Program Problem Determination Guide and Reference.*

Differences from the Expanded Memory Specification

The IBM XMA device driver that works with the IBM XMA card differs from the Lotus/Intel/Microsoft Expanded Memory Specification on the following three functions.

Function 2: Get Page Frame Address

According to the Expanded Memory Specification, the memory manager determines the segment of the page frame at initialization time. That is, the memory manager looks for an unused 64Kb block of memory in the 640Kb to 1024Kb address range. The manager chooses for the page frame any address that satisfies this requirement.

In the IBM implementation of the XMA, however, the segment address of the page frame is passed to the manager as an argument in the command line. Thus the following command in a CONFIG.SYS file:

```
(d:)(\path)XMA2EMS.SYS /S=nnnn
```

instructs the memory manager to place the page frame at hexadecimal segment nnnn.

If no segment is specified, the page frame will default to segment X'D000'.

Function 10: Get Page Mapping Register I/O Port Array

This function is not supported by the IBM XMA Device Driver.

Function 11: Get Logical to Physical Page Translation Array

This function is not supported by the IBM XMA Device Driver.

Messages

XMA Device Driver Messages

XMA001 Performing XMA Diagnostics: xxxx Kb OK

Explanation: Your work station is checking the XMA card to determine how much memory is available. The number xxxx represents the amount of memory checked.

User Response: None.

XMA002 Diagnostics completed

Explanation: XMA diagnostic testing is complete.

User Response: None.

XMA003 Page frame starts at................. xxxx:0

Explanation: The hexadecimal address at which your XMA driver was installed in memory is xxxx.

User Response: None.

XMA004 Pages mapped to conventional memory.. xx

Explanation: The XMA driver allocated xx pages of XMA memory to bring your conventional memory up to 640Kb.

User Response: None.

XMA006 Pages available for expanded memory.. xxx

Explanation: You have xxx pages of expanded memory left to use. The XMA driver is installed.

User Response: None.

XMA100 Adapter error:
Expanded Memory Manager has NOT been installed

Explanation: An XMA hardware error was detected.

User Response: Run the XMA card diagnostic.

XMA200 Cannot find adapter:
Expanded Memory Manager has NOT been installed

Explanation: The XMA driver was unable to locate the XMA card.

User Response: Make sure your XMA card is installed correctly.

XMA300 Parameter syntax or value error:
Expanded Memory Manager has NOT been installed

Explanation: Either the /S or /P command parameter did not have the proper format or the proper value.

User Response: Refer to "The Statement for XMA" on page G-6 to make sure your page frame starting address is assigned correctly.

VDISK Messages

VDK001 Virtual Disk using Drive %:

Explanation: Your VDISK is assigned a drive letter as represented by the variable %. This message only appears if you are using DOS Version 3.1 or higher.

User Response: None.

VDK100 Expanded Memory Manager not installed:
VDISK has NOT been installed

Explanation: Your VDISK was not installed.

User Response: Check your system diskette to ensure that the XMA2VDK.SYS is on the system diskette. Also check your CONFIG.SYS file to ensure that the memory manager is installed before the VDISK.

VDK200 Expanded Memory Manager driver error:
VDISK has NOT been installed

Explanation: Your VDISK was not installed because a call to the XMA driver returned an unexpected error.

User Response: Run the XMA card diagnostic.

VDK300 Not enough storage:
VDISK has NOT been installed

Explanation: Your VDISK was not installed because the amount of VDISK storage you requested was greater than the amount of free storage available from the XMA interface.

User Response: Reduce the amount of storage you request by changing the number zzz in the line

```
DEVICE=XMA2VDK.SYS zzz
```

of your CONFIG.SYS file.

Appendix H. IBM 3270 Workstation Program Keyboard Summary

The tables in this appendix explain how to perform a broad range of functions using the keyboards available with the 3270 Workstation Program. The functions are organized in alphabetical order. In the second column for each function is a brief description of the task and a code explaining which session(s) the function is active in.

- "H" stands for host session
- "N" stands for notepad session
- "P" stands for PC session
- "W" stands for work station control mode
- "all" stands for all sessions and work station control mode.

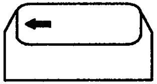
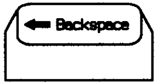
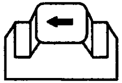
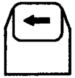
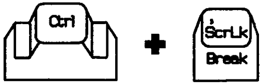
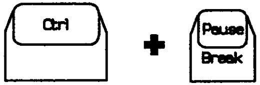
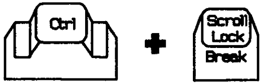
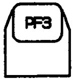
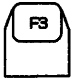
After the explanation of the function, the keystrokes required to perform the function with are presented.

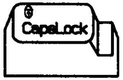
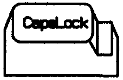
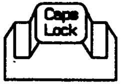
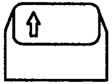
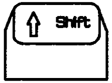
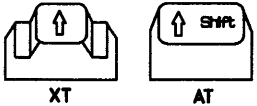
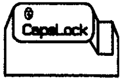
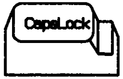
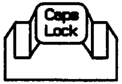
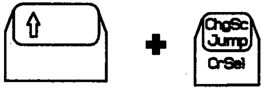
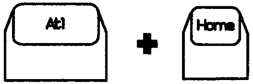
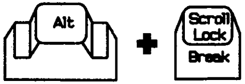
- The third column displays the keystrokes required to perform the functions with the 3270 PC keyboard.
- The fourth column presents the keystrokes for the Enhanced PC keyboard.
- The last column shows the keystrokes for the XT and AT keyboards.

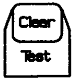
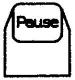
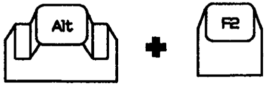
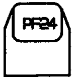
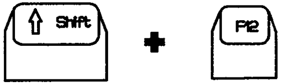
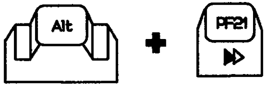
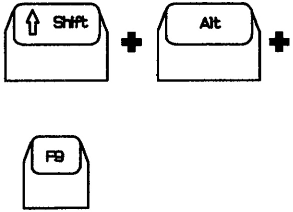
  Note: Some keys on the XT and AT keyboards differ in shape. An example of this is the shift key. The differences are noted when the key is explained in the table. If the key is used in combination with other keys for different tasks, the XT key only is shown in the table.

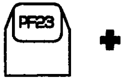
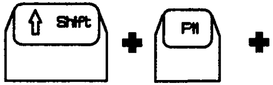
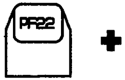
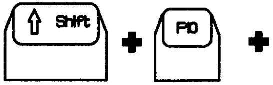
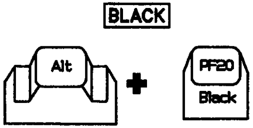
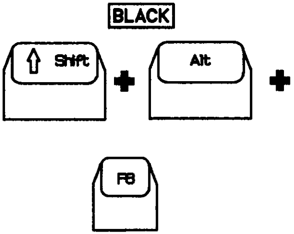
Function	Description	Keystrokes		
		3270 PC Keyboard	Enhanced PC Keyboard	XT and AT Keyboards
Alternate Cursor	Enlarge the cursor and make it blink	Alt + PF23 AltCr Except PC session	Alt + F11 Except PC session	Function not supported
Alternate Function	Use the alternate case position on a key (all)	Alt + Any key with an alternate function	Alt + Any key with an alternate function	Alt + Any key with an alternate function
Attention	Signal a host application program (H)	Alt + Finish Attn	Esc	Alt + F1
Autokey, Activate	Activate the autokey function (W)	Copy Auto Pause	Alt + F5	Function not supported

Function	Description	Keystrokes		
		3270 PC Keyboard	Enhanced PC Keyboard	XT and AT Keyboards
Autokey, Erase	Erase an autokey recording (W)	Alt ✚ Erase EOF ErInp	Alt ✚ End	Function not supported
Autokey, List	Display a list of autokey recordings (W)	When autokey is active PF1	When autokey is active F1	Function not supported
Autokey, Play	Play an autokey recording (W)	PF4 PSD	F4	Function not supported
Autokey, Record	Make an autokey recording (W)	PF16 Yellw	⇧ Shift ✚ F4	Function not supported

Function	Description	Keystrokes		
		3270 PC Keyboard	Enhanced PC Keyboard	XT and AT Keyboards
Backspace	1. Move cursor to the left and erase (N,P) 2. Move cursor to the left (H)			 XT  AT
Base Colors (see Color, Base)				
Black (see under Color, Selection)				
Blinking Text (see Highlighted Text, Blinking)				
Blue (see under Color, Selection)				
Break	Stop an application program (P)	 Ctrl ScrLk Break	 Ctrl Pause Break	 Ctrl Scroll Lock Break
Browse a Window	Browse the contents of a reduced window (W)			Function not supported

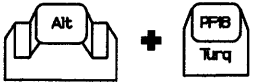
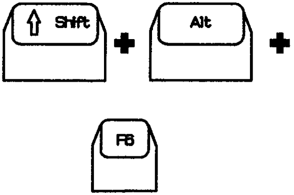
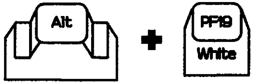
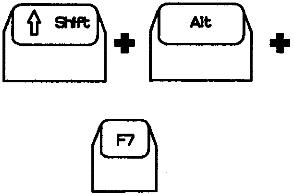
Function	Description	Keystrokes		
		3270 PC Keyboard	Enhanced PC Keyboard	XT and AT Keyboards
Caps Lock	Lock the shift key (all)			
Caps Lock, Release	1. Release shift lock (H,N,W)			
	2. Release shift lock (P)			
Change Background Color (see Color, Background)				
Change Color of Border and Text (see Color, Foreground)				
Change Color of Screen (see Color, Screen)				
Change Screen	Move to the next screen profile in numerical order (all)	 ⇧ + ChgSc Jump CrSel		 Alt + Scroll Lock Break

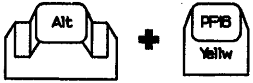
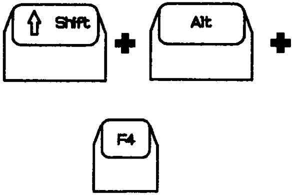
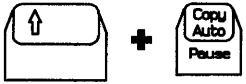
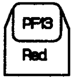
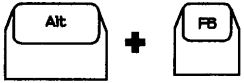
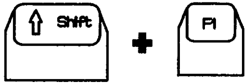
Function	Description	Keystrokes		
		3270 PC Keyboard	Enhanced PC Keyboard	XT and AT Keyboards
Change Screen Color (see Color, Screen)				
Clear	1. Clear the host window (H) 2. Erase the notepad window (N)		 Note: Pressing this key in a PC session suspends the PC application	
Color, Background	Change the background color of a window (W)			Function not supported
Color, Base	1. Stop typing notepad text in multiple colors and resume using base colors (N) 2. Use the base colors for typing text in a host or notepad window (W)			Function not supported

Function	Description	Keystrokes		
		3270 PC Keyboard	Enhanced PC Keyboard	XT and AT Keyboards
Color, Foreground	Change the color of the border and text in a window (W)	 Color selection keys	 Color selection keys	Function not supported
Color, Screen	Change the color of a screen (W)	 Color selection keys	 Color selection keys	Function not supported
Color, Selection	1. Type text in black in a host or notepad (H, N) 2. Select black for the foreground, background, or screen (W)	 BLACK Alt + PF20 Black	 BLACK Shift + Alt + F8	Function not supported

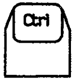
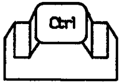
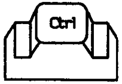
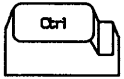
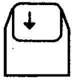
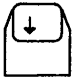
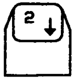
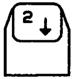
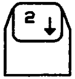
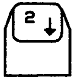
Function	Description	Keystrokes		
		3270 PC Keyboard	Enhanced PC Keyboard	XT and AT Keyboards
Color, Selection Continued	1. Type text in blue in a host or notepad (H, N) 2. Select blue for the foreground, background, or screen (W)	BLUE Alt ✚ PF17 Blue	BLUE ⇧ Shift ✚ Alt ✚ F5	Function not supported
Color, Selection Continued	1. Type text in green in a host or notepad (H, N) 2. Select green for the foreground, background, or screen (W)	GREEN Alt ✚ PF15 Green	GREEN ⇧ Shift ✚ Alt ✚ F3	Function not supported

Function	Description	Keystrokes		
		3270 PC Keyboard	Enhanced PC Keyboard	XT and AT Keyboards
Color, Selection Continued	1. Type text in pink in a host or notepad (H, N) 2. Select pink for the foreground, background, or screen (W)	PINK Alt + PF14 Pink	PINK ⇧ Shift + Alt + F2	Function not supported
Color, Selection Continued	1. Type text in red in a host or notepad (H, N) 2. Select red for the foreground, background, or screen (W)	RED Alt + PF13 Red	RED ⇧ Shift + Alt + F1	Function not supported

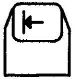
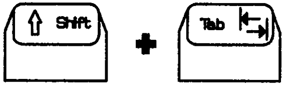
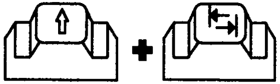
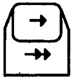
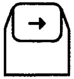
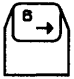
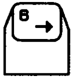
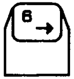
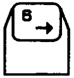
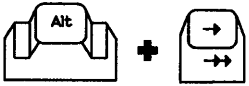
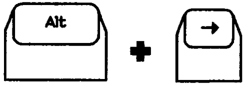
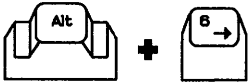
Function	Description	Keystrokes		
		3270 PC Keyboard	Enhanced PC Keyboard	XT and AT Keyboards
Color, Selection Continued	1. Type text in turquoise in host or notepad (H, N) 2. Select turquoise for the foreground, background, or screen (W)	TURQUOISE  Alt + PF18 Turq	TURQUOISE  Shift + Alt + F6	Function not supported
Color, Selection Continued	1. Type text in white in a host or notepad (H, N) 2. Select white for the foreground, background, or screen (W)	WHITE  Alt + PF19 White	WHITE  Shift + Alt + F7	Function not supported

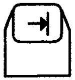
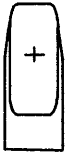
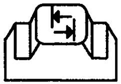
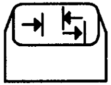
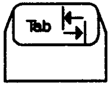
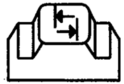
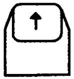
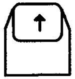
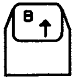
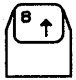
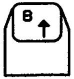
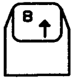
Function	Description	Keystrokes		
		3270 PC Keyboard	Enhanced PC Keyboard	XT and AT Keyboards
Color, Selection Continued	1. Type text in yellow in a host or notepad (H, N) 2. Select yellow for the foreground, background, or screen (W)	YELLOW  Alt PF8 Yellw	YELLOW  Shift Alt F4	Function not supported
Copy, Activate	Activate the copy function (W)	 Copy Auto Pause Or  Source	 Or  Source	Function not supported

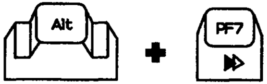
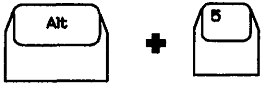
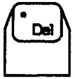
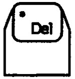
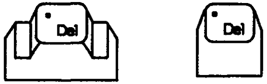
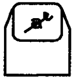
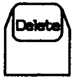
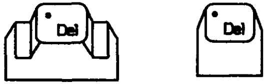
Function	Description	Keystrokes		
		3270 PC Keyboard	Enhanced PC Keyboard	XT and AT Keyboards
Copy, Source	Begin defining a block of text to be copied (W)	PF13 Red	⇧ Shift + F1	Function not supported
Copy, Cursor Select	1. Define the corners of a block of text to be copied (W)	After Pressing Source Alt + ChgSc Jump CrSel	After Pressing Source Alt + F8	Function not supported
	2. Define the corners of the target where a block of text is to be copied (W)	After Pressing Target Alt + ChgSc Jump CrSel	After Pressing Target Alt + F8	Function not supported
Copy, Target	Define the target to which a block of text is to be copied (W)	PF14 Pink	⇧ Shift + F2	Function not supported

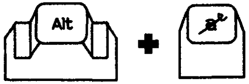
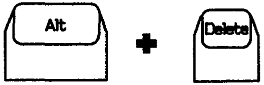
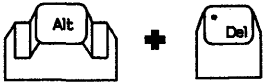
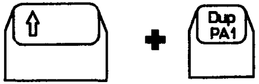
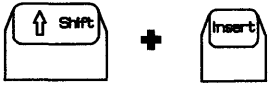
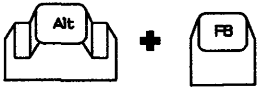
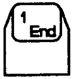
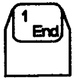
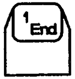
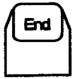
Function	Description	Keystrokes		
		3270 PC Keyboard	Enhanced PC Keyboard	XT and AT Keyboards
Control	Activate the DOS control key (P)			 XT  AT
Corner a window (see Window, Corner)				
Cursor Movement, Down Cursor	1. Move the cursor down (H, N, P)			
	2. Move the cursor down (P)			

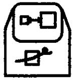
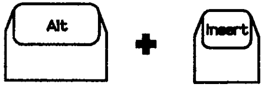
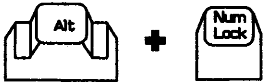
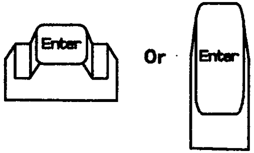
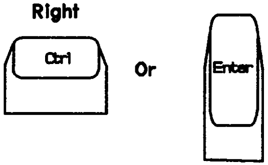
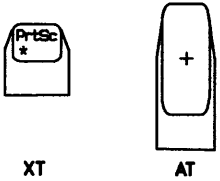
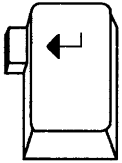
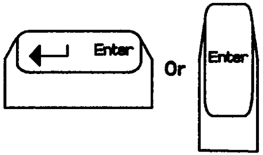
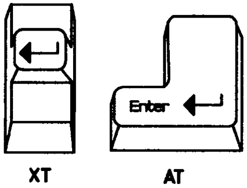
Function	Description	Keystrokes		
		3270 PC Keyboard	Enhanced PC Keyboard	XT and AT Keyboards
Cursor Movement, Home	1. Move the cursor to the upper left corner (H, N)	↖	Home	7 Home
	2. Signal a PC application to move the cursor to the home position (P)	7 Home	Home	7 Home
Cursor Movement, Left Cursor	1. Move the cursor to the left (H, N, P)	← ↞	←	4 ←
	2. Move the cursor to the left (P)	4 ←	4 ←	4 ←
	3. Move the cursor to the left quickly (H, N)	Alt + ← ↞	Alt + ←	Alt + 4 ←

Function	Description	Keystrokes		
		3270 PC Keyboard	Enhanced PC Keyboard	XT and AT Keyboards
Cursor Movement, Left Tab	Move the cursor to the last typing area (H)			
Cursor Movement, Right Cursor	1. Move the cursor to the right (H, N, P)			
	2. Move the cursor to the right (P)			
	3. Move the cursor to the right quickly (H, N)			

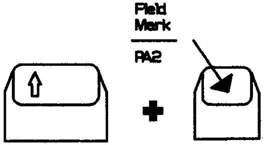
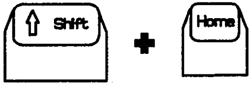
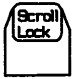
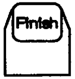
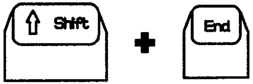
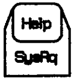
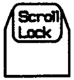
		Keystrokes		
Function	Description	3270 PC Keyboard	Enhanced PC Keyboard	XT and AT Keyboards
Cursor Movement, Right Tab	1. Move the cursor to the next typing area (H) 2. Tab the cursor six spaces at a time to align numbers in a column (P)			
Cursor Movement, Tab	Move the cursor to the next typing area on the screen (H, P, W)			
Cursor Movement, Up Cursor	1. Move the cursor up (H, N, P)			
	2. Move the cursor up (P)			

Function	Description	Keystrokes		
		3270 PC Keyboard	Enhanced PC Keyboard	XT and AT Keyboards
Cursor Select (see Copy, Cursor Select)				
Default Symbols	Stop using programmed symbol set and return to default symbols (H)			Function not supported
Delete	Erase the character at the cursor (text to the right moves left to close up) (P)			 XT AT
Delete a Letter	Erase the character at the cursor (text to the right moves left to close up) (all)			 XT AT
Delete a Window (see Window, Delete)				

Function	Description	Keystrokes		
		3270 PC Keyboard	Enhanced PC Keyboard	XT and AT Keyboards
Delete a Word (Doc Mode)	Remove the word at the cursor. Text to right moves left to close up (H)			
Duplicate (Doc Mode)	Duplicate the line previously entered (H)		 ⇧ Shift ✚ Insert	
End	1. Signal a PC application program (P)			
	2. Move the cursor to the end of the field (P)		 Note: Pressing this key in a Host, Notepad, or WSCtrl mode erases to the end of the line or input field.	

Function	Description	Keystrokes		
		3270 PC Keyboard	Enhanced PC Keyboard	XT and AT Keyboards
Enlarge	Enlarge the active window to fill the entire screen or reduce it again (all)			 Alt Num Lock
Enter	1. Enter what you have typed on the screen (H)	 Enter Or Enter	 Right Ctrl Or Enter	
	2. Enter what you have typed on the screen (P)		 Enter Or Enter	

Function	Description	Keystrokes		
		3270 PC Keyboard	Enhanced PC Keyboard	XT and AT Keyboards
Erase End of Field	Erase everything from the cursor to the end of an input field (H, N)	Erase EOF ErInp	End	Alt + F6
Erase Input	Erase all the input fields (H)	Alt + Erase EOF ErInp	Alt + End	Alt + 9 PgUp
Escape	Signal a PC application program (P)	Esc	Esc	Esc
Extension Select	Select host extensions for X.25 Network Communications, 3270 Entry Assist, system response times, and printer matrixes (H)	Alt + WS Ctrl ExSel	Alt + Esc	Alt + F4

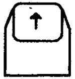
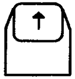
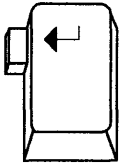
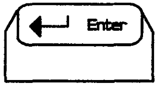
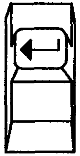
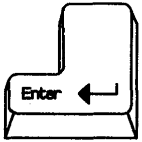
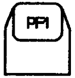
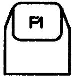
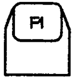
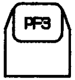
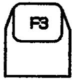
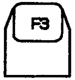
Function	Description	Keystrokes		
		3270 PC Keyboard	Enhanced PC Keyboard	XT and AT Keyboards
F1 to F24 (see Program Function Keys)				
Field Mark	Signal a host application program (H)	 ⇧ Field Mark PA2		 Scroll Lock
Finish	Return you to the previous level of work station control (W)			Function not supported
Green (See under Color, Selection)				
Help	Display help panels on your screen (W)		 Scroll Lock	Function not supported

Function	Description	Keystrokes		
		3270 PC Keyboard	Enhanced PC Keyboard	XT and AT Keyboards
Hide a Window (see Window, Hide)				
Highlighted Text, Blinking	Type blinking text in host or notepad window (H, N)	Alt + PF10	Alt + 9 PgUp	Alt + 1 End
Highlighted Text, Off	Stop typing highlighted text (H, N)	Alt + PF12	Alt + 3 PgDn	Alt + 3 PgDn
Highlighted Text, Reverse Video	Type text in reverse video in host or notepad window (H, N)	Alt + PF9	Alt + *	Alt + -
Highlighted Text, Underlined	Type underlined text in host or notepad window (H, N)	Alt + PF11	Alt + 6 →	Alt + 2 ↓

Function	Description	Keystrokes		
		3270 PC Keyboard	Enhanced PC Keyboard	XT and AT Keyboards
Home	Signal a PC application program (P)	7 Home	7 Home Or Home	7 Home
Identify Printer	Signal the host that the next two numbers you type identify a printer (H)	Alt + Print * Ident	⇧ Shift + Print Scren	5
Insert	1. Insert text at the cursor (text to the right of the cursor moves right to make room) (H, N, P)	‸a	Insert	0 Ins XT 0 Ins AT
	2. Insert a character at the cursor (text to the right of the cursor moves right to make room) (P)	0 Ins	0 Ins	0 Ins XT 0 Ins AT

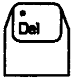
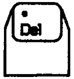
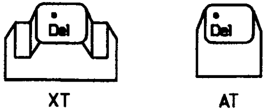
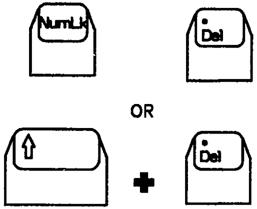
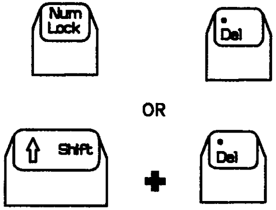
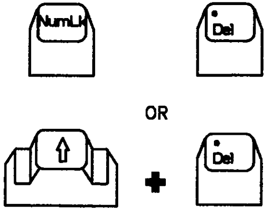
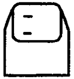
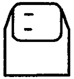
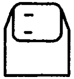
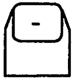
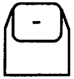
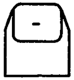
Function	Description	Keystrokes		
		3270 PC Keyboard	Enhanced PC Keyboard	XT and AT Keyboards
IPL	Initial Program Load to start or restart the workstation program (all)	Ctrl + Alt + Del	Ctrl + Alt + Del	Ctrl + Alt + Del
Jump	Move to the next window in alphabetical order (all)	Jump	Left Alt + Page Up	Alt + Esc
Letters, Lowercase	Type the lowercase letters a to z (all)	A to Z	A to Z	A to Z
Letters, Uppercase	Type the uppercase letters A to Z (all)	⇧ + A to Z	⇧ Shift + A to Z	⇧ + A to Z

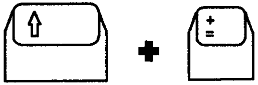
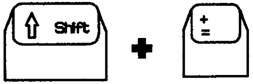
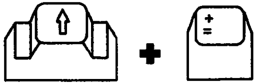
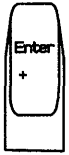
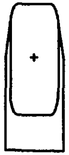
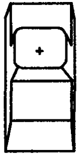
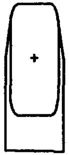
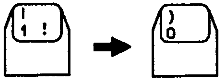
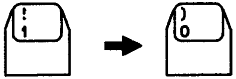
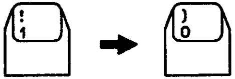
Function	Description	Keystrokes		
		3270 PC Keyboard	Enhanced PC Keyboard	XT and AT Keyboards
List, Autokey Recordings	Display a list of your autokey recordings (W)	Auto then Alt + PF1	Alt + F5 then Alt + F1	Function not supported
List, Windows and Screen Profiles	Display a list of your windows and screen profiles (W)	Alt + PF1	Alt + F1	Alt + F1
Move a Window (see Window, Move)				
Move to Next Help Panel	Move to the next help panel while help is displayed on your screen (W)	↓	↓	Function not supported

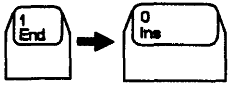
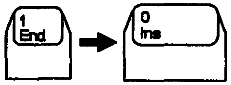
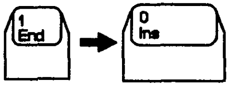
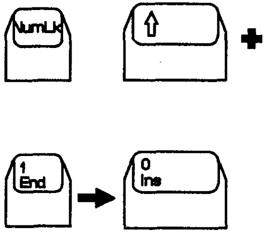
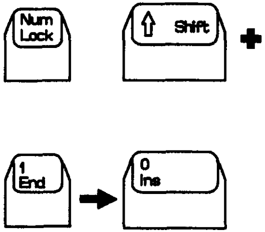
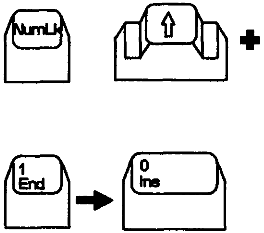
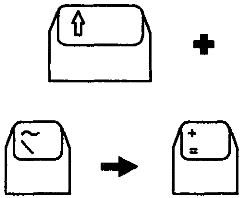
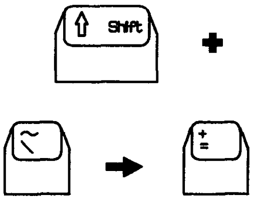
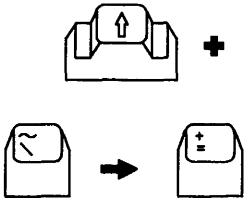
Function	Description	Keystrokes		
		3270 PC Keyboard	Enhanced PC Keyboard	XT and AT Keyboards
Move to the Previous Help Panel	Move to the previous help panel while help is on display (W)			Function not supported
New Line	1. Enter what you have typed on the screen (P) 2. Move the cursor to the beginning of the next line (H, N)			 XT  AT
Notepad, Delete a Line	Delete a line in a notepad screen (N)			
Notepad, Duplicate a Line	Duplicate a line in a notepad screen (N)			

Function	Description	Keystrokes		
		3270 PC Keyboard	Enhanced PC Keyboard	XT and AT Keyboards
Notepad, Insert a Line	Insert a line in a notepad screen (N)	PF2	F2	F2
Notepad, Copy Mark Source Block	Mark the beginning and end of a block of text to be copied in a notepad screen (N)	PF7	F7	F7
Notepad, Copy Insert	Insert a marked block of text between two blocks of text in a notepad screen (N)	PF5	F5	F5
Notepad, Copy Move	Move a marked block of text in a notepad screen (N)	PF6	F6	F6

Function	Description	Keystrokes		
		3270 PC Keyboard	Enhanced PC Keyboard	XT and AT Keyboards
Notepad, Copy Overlay	Overlay a marked block of text in a notepad screen (N)	PF4	F4	F4
Numbers and Symbols, Asterisk (*)	1. Type an asterisk (*) (all)	⇧ + * 8	⇧ Shift + * 8	⇧ + * 8
	2. Type an asterisk (*) in your PC window (P)	Print * Ident	* Also in shift state and NumLock	PrtSc *
Numbers and Symbols, Comma (,)	1. Type a comma (,) (all)	, < ,	< ,	< ,
	2. Type a comma (,) in a string of numbers (H, N)	, ScrLk	*	

Function	Description	Keystrokes		
		3270 PC Keyboard	Enhanced PC Keyboard	XT and AT Keyboards
Numbers and Symbols, Decimal Point (.)	1. Type a decimal point (.) (H, N)			 Del Del XT AT
	2. Type a decimal point (.) (P)	 NumLk Del OR ⇧ + Del	 Num Lock Del OR ⇧ Shift + Del	 NumLk Del OR ⇧ + Del
Numbers and Symbols, Minus Sign (–)	1. Type a minus sign (–) (all)			
	2. Type a minus sign (–) (H, N, P)			

Function	Description	Keystrokes 3270 PC Keyboard	 Enhanced PC Keyboard	 XT and AT Keyboards
Numbers and Symbols, Plus Sign (+)	1. Type a plus sign (+) (all)			
	2. Type a plus sign (+) (P)			 XT  AT
Numbers and Symbols, 1 – 0 On Typewriter Keypad	Type 1 – 0 from the typewriter keypad (all)			

Function	Description	Keystrokes		
		3270 PC Keyboard	Enhanced PC Keyboard	XT and AT Keyboards
Numbers and Symbols, 1 – 0 on numeric keypad	1. Type a number (H, N)			
	2. Type a number (H, N, P)	 NumLk ⇧ 1 End 0 Ins	 Num Lock ⇧ Shift 1 End 0 Ins	 NumLk ⇧ 1 End 0 Ins
Numbers and Symbols, Uppercase Symbols	Type uppercase symbols from typewriter keypad (all)			

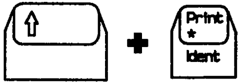
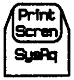
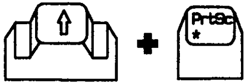
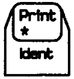
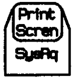
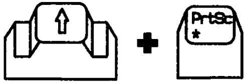
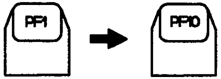
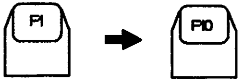
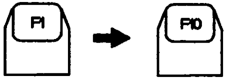
Function	Description	Keystrokes		
		3270 PC Keyboard	Enhanced PC Keyboard	XT and AT Keyboards
Numbers and Symbols, Programmed Symbols Set A	Use programmed symbols set A (H)	Alt + PF1 PSA	Alt + Num Lock	Function not supported
Numbers and Symbols, Programmed Symbols Set B	Use programmed symbols set B (H)	Alt + PF2 PSB	Alt + 7 Home	Function not supported
Numbers and Symbols, Programmed Symbols Set C	Use programmed symbols set C (H)	Alt + PF3 PSC	Alt + 4 ←	Function not supported
Numbers and Symbols, Programmed Symbols Set D	Use programmed symbols set D (H)	Alt + PF4 PSD	Alt + 1 End	Function not supported

Function	Description	Keystrokes		
		3270 PC Keyboard	Enhanced PC Keyboard	XT and AT Keyboards
Numbers and Symbols, Programmed Symbols Set E	Use programmed symbols set E (H)	Alt + PF5 PSE	Alt + /	Function not supported
Numbers and Symbols, Programmed Symbols Set F	Use programmed symbols set F (H)	Alt + PF6 PSF	Alt + 8 ↑	Function not supported
Numbers and Symbols, Programmed Symbols Default Symbols	Stop using programmed symbols and return to using default symbols (H)	Alt + PF7 ▶▷	Alt + 5	Function not supported

Function	Description	Keystrokes		
		3270 PC Keyboard	Enhanced PC Keyboard	XT and AT Keyboards
Number Lock	1. Toggle the numeric keypad on and off (P)	NumLk	Num Lock	NumLk
	2. Toggle the numeric keypad on and off (H, N, P)	⇧ + NumLk	⇧ Shift + Num Lock	⇧ + NumLk
PA1	Signal a host program (H)	Dup PA1	Page Up	9 PgUp
PA2	Signal a host program (H)	Field Mark / PA2	Page Down	-

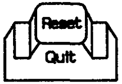
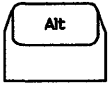
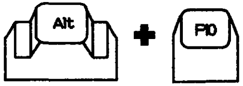
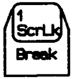
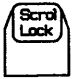
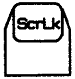
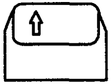
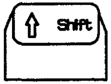
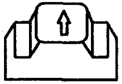
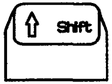
Function	Description	Keystrokes		
		3270 PC Keyboard	Enhanced PC Keyboard	XT and AT Keyboards
PA3	Signal a host program (H)	PA3	⇧ Shift + Page Up	3 PgDn
Page Down	1. Signal a PC application program to go another panel (P) 2. Go to the next help panel (W)	3 PgDn	3 PgDn OR Page Down	3 PgDn No Help panel support for XT or AT keyboards
Page Up	1. Signal a PC application program to go to another panel (P) 2. Go to the previous help panel (W)	9 PgUp	9 PgUp OR Page Up	9 PgUp No Help panel support for XT or AT keyboards

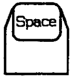
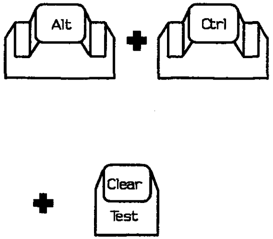
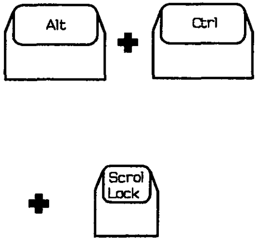
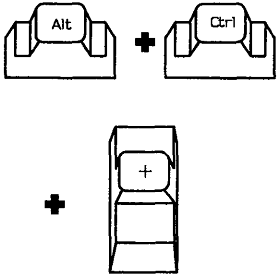
Function	Description	Keystrokes		
		3270 PC Keyboard	Enhanced PC Keyboard	XT and AT Keyboards
Pause	1. Interrupt a keystroke recording to insert data and restart it again (W)	Alt + Copy Auto Pause	⇧ Shift + Pause	Function not supported
	2. Suspend a PC session (P)	Ctrl + NumLk	Pause	Ctrl + NumLk
Pink (see under Color, Selection)				
Play Autokey Recording (see Autokey, Play)				
Print, Control Unit Attached Printer	Print what appears on your host screen on the printer attached to your control unit (H)	Print * Ident	Print Screen SysRq	⇧ + PrtSc *

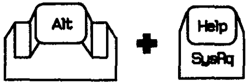
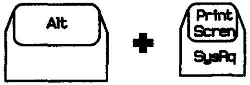
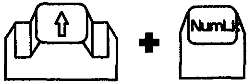
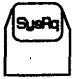
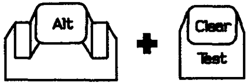
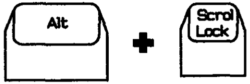
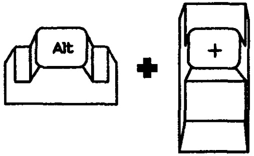
Function	Description	Keystrokes		
		3270 PC Keyboard	Enhanced PC Keyboard	XT and AT Keyboards
Print, PC Work Station Printer	Print what appears in a PC session window on your work station–attached printer (P)	 ⇧ + Print * Ident	 Print Scren SysRq	
Print, Work Station Control	Print the screen contents on your work station–attached printer (W)	 Print * Ident	 Print Scren SysRq	
Program Function Keys, PF1 – PF10	1. Signal a PC application program (P) 2. Signal a host application program (H)			

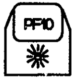
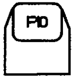
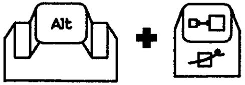
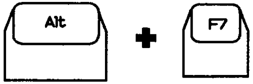
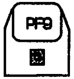
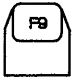
Function	Description	Keystrokes		
		3270 PC Keyboard	Enhanced PC Keyboard	XT and AT Keyboards
Program Function Keys, PF11 – PF20	Signal a host application program (H)	PF11 → PF20	⇧ Shift + F11 → F20	⇧ + F11 → F20
Program Function Keys, PF21 – PF24	Signal a host application program (H)	PF21 → PF24	⇧ Shift + F9 → F12	Function not supported
Quit	1. Stop the printer before the entire screen has printed (H, P, W) 2. Cancel last request (W)	Alt + Reset Quit	Left Alt + Right Alt	⇧ + ScrLk
Record Autokey (see Autokey, Record)				

Function	Description	Keystrokes		
		3270 PC Keyboard	Enhanced PC Keyboard	XT and AT Keyboards
Red (see under Color, Selection)				
Re-IPL Host	Re-IPL all host sessions. Useful when you want to switch coaxial cables without losing PC sessions. (H)	Ctrl + Clear Test	Ctrl + Pause	Alt + Ctrl + F2
Repeat DOS Characters	Repeat entered characters in DOS (P)	6 →	6 →	6 →
Response Time Monitor (RTM)	Allows last transaction time to be displayed (H)	Alt + WS Ctrl ExSel Then PF19 White	Alt + Esc Then ⇧ Shift + F9	Alt + F4 Then ⇧ + F9

Function	Description	Keystrokes		
		3270 PC Keyboard	Enhanced PC Keyboard	XT and AT Keyboards
Reset	1. Unlock the ketboard after a Do Not Enter X appears (H, N) 2. Turn off insert mode (H)		Right 	
Return to Previous Help Panel (see Move to Previous Help Panel)				
Reverse Video Text (see Highlighted Text, Reverse Video)				
Scroll Lock	Signal a PC application program (P)	 ScrLk Break	 Scroll Lock	
Setup Windows (see Windows, Setup)				
Shift	Type uppercase letters, symbols, and commands (all)			 XT  AT

Function	Description	Keystrokes		
		3270 PC Keyboard	Enhanced PC Keyboard	XT and AT Keyboards
Size Windows (see Windows, Size)				
Source (see Copy, Source)				
Space, in Numbers	Type a blank space in a string of numbers (all)		Space bar	Space bar
Space, in Text	Type a blank space in text (all)	Space bar	Space bar	Space bar
System Dump	Gives you an opportunity to obtain a system dump (all). Refer to the *3270 Workstation Program Problem Determination and Reference* for more information.			

Function	Description	Keystrokes		
		3270 PC Keyboard	Enhanced PC Keyboard	XT and AT Keyboards
System Request	Signal the host (H)	 Alt + Help SysRq	 Alt + Print Screen SysRq	 XT  AT
Target (see Copy, Target)				
Test	Put your work station in test mode (may log you off) (H)	 Alt + Clear Test	 Alt + Scroll Lock	

Function	Description	Keystrokes		
		3270 PC Keyboard	Enhanced PC Keyboard	XT and AT Keyboards
Turquoise (see under Color, Selection)				
Underlined Text (see Highlighted Text, Underlined)				
White (see under Color, Selection)				
Window, Corner	Move a window to a corner of the screen (W)			Function not supported
Window, Delete	Delete a window from a screen profile (W)			Function not supported
Window, Hide	Hide a window in a screen profile (W)			Function not supported

Function	Description	Keystrokes		
		3270 PC Keyboard	Enhanced PC Keyboard	XT and AT Keyboards
Window, Move	Move a window using the PC cursor keys (W)	PF11 a	F11	Function not supported
Window, Setup	Start setup mode to move and size windows (W)	PF2 PSB	F2	Function not supported
Window, Size	Change the size of a window with the PC cursor keys (W)	PF12 ▶▷	F12	Function not supported
Work Station Control	Toggle into and out of work station control mode (all)	WS Ctrl ExSel	⇧ Shift + Esc	⇧ + Esc
Yellow (see under Color, Selection)				

Glossary

A

active window. The window outlined with a double border and containing the cursor, indicating the session to which your keyboard is logically "attached." (See *selected window*.)

adapter card. A supplementary hardware component added to the system unit of your work station that expands basic function.

add window. The work station function that allows you to place a window within a screen profile.

all points addressable graphics. A personal computer programming capability enabled by the addition of a graphics adapter card that allows you to draw complex pictures and provides more versatility than special line and block characters usually available.

Alt key Functions. Keyboard functions printed on the front of the keys that are selected when the Alternate (Alt) key is pressed in conjunction with the desired key.

American National Standard Code for Information Interchange (ASCII). One of the two standard codes used for exchanging information among data processing systems and associated equipment; the standard code used by the IBM Personal Computer and other microcomputers. (Contrast with *EBCDIC*.)

APA. All points addressable (See *all points addressable graphics*).

API. Application program interface (See the publication *IBM 3270 Workstation Program Programming Guide*).

application. The use to which a data processing system is put; a program that is written by or for a user for performing a particular task, for example, a payroll application program.

application mode. The mode of operation in which your work is logically "attached" to one of the following: a host computer session, the personal computer session, or a notepad session. (Compare with *work station control mode*.)

application window area. The topmost portion of your screen; the area that contains your windows. It is composed of ten screen profiles, numbered 0 through 9.

ASCII. American National Standard Code for Information Interchange. (See *American National Standard Code for Information Interchange*.)

auto-windowing. A characteristic of application mode in which the cursor scrolls the information within the presentation space behind the active window. The function is automatic; when the cursor reaches the edge of a window, the information behind the window moves automatically so that the cursor is always visible. (Contrast with *browse*.)

autokeying. A function that starts the continuous printout of recorded text; a workstation program capability that lets you record frequently used groups of keystrokes and plays them back at designated locations on the screen.

B

back up (verb). When dealing with diskettes, to duplicate data from a fixed disk drive or diskette to another diskette to ensure availability of data in the event of loss of or damage to the original; do not confuse this term with the DOS fixed disk command (see *IBM Personal Computer Disk Operating System* manual).

background color. The color of the window "writing surface." (Contrast with *foreground color*.)

base color. The four colors white, red, blue, and green assigned according to protection and intensity attributes of the 3270 field attribute byte.

BASIC. Beginner's All-Purpose Symbolic Instruction Code. (See *Beginner's All-Purpose Instruction Code*.)

Beginner's All-Purpose Symbolic Instruction Code (BASIC). A high-level, widely used computer programming language.

break. A personal computer function that halts whatever action is in progress, such as stopping a program in the middle of execution.

browse. The work station function that allows you to move the data contained in the presentation space vertically and horizontally within an application window.

C

change. A work station function, available both inside and outside work station control mode, that allows you to cycle through defined screen profiles in numeric order with the ChgSc key or to call up a specific screen profile by its numerical name by pressing the WS Ctrl key plus the number of the desired screen profile. (Compare with *jump*.)

color. One of the Level 3 functions (a subset of SetUp) allowing you to set and change the colors (both foreground and background) of individual sessions to one of eight colors; to set some host sessions to the base four-color 3270 data stream defaults; and to set screen background color when you are using a color display.

combination keys. Keys that must be used in conjunction with another key or keys to produce a desired function; these include the personal computer keys Control, Shift, and Alternate, and the host computer keys Shift and Alternate.

control functions. Keyboard functions in personal computer mode requiring the use of the Control (Ctrl) key in conjunction with another key.

control unit-attached printer. The centralized printer attached indirectly to your work station by means of an IBM control unit, a printer that serves a number of uses.

control unit terminal (CUT). An operational mode that allows one logical terminal session. (Contrast with *distributed function terminal (DFT)*.)

copy. The work station function that allows you to mark source lines in one text mode window and move them to a target location in within the same window or from one window to another on the same screen profile or a different screen profile. You can copy from any window into any window except a personal computer.

corner. The work station function that allows you to move a window clockwise to each of the four corners of the screen.

cursor. The movable spot of light, on a display screen, that indicates where the next character will be entered, replaced, or deleted.

cursor movement keys. The arrow keys that move the cursor up, down, left, and right. There are two sets of cursor movement keys. The black cursor movement keys in the cursor key area of the keyboard are used to execute host computer functions, work station functions, and personal computer functions. The blue cursor movement keys in the numeric keypad are for personal computer applications only. Within the Browse function, the cursor movement keys scroll the data within the window; within the Size function, they move the window borders; within the Copy function, they move the cursor to mark source and target blocks. When you use a personal computer application program with your IBM 3270 Personal Computer and without the workstation program software, you must use the blue cursor movement keys.

customization. The process by which your workstation program diskette is tailored to your 3274 controller host computer configuration; accomplished through a set of interactive prompt screens.

customize. With IBM 3270 Workstation Program diskettes, to tailor your workstation program diskette to reflect the 3274 workstationler host computer configuration to which the work station is attached and to your needs or those of your organization.

customized system diskette. A workstation program diskette on which the customization procedure has been performed. (See *customization.*)

CUT. Control unit terminal. (See *control unit terminal (CUT).*)

D

data. All information entered into or used by a computer.

default. A value that is assumed when none has been specified.

defined screen. A screen profile containing one or more windows.

delete window. The work station function that allows you to remove a designated window from a screen profile.

DFT. Distributed Function Terminal. (See *distributed function terminal (DFT)*.)

Disk Operating System (DOS). A program that interacts with the system unit and the disk/diskette drive to control the flow of data. The DOS programs control the way your personal computer session uses other personal computer programs. DOS tells your personal computer session how to use the information you supply to the programs and how to return information that the programs supply to you.

diskette. A personal computer storage device consisting of a flexible magnetic disk inside a protective plastic jacket.

diskette drive. A device that uses diskettes for mass storage and retrieval of data.

display. An output unit for the visual display of data.

display environment. The command INDDENV which allows a user to display a list of all current PC environments showing their size and status.

distributed function terminal (DFT). An operational mode that allows multiple concurrent logical terminal sessions.

DOS. Disk Operating System. (See *Disk Operating System*.)

E

EBCDIC. Extended binary-coded decimal interchange code. (See *Extended Binary-Coded Decimal Interchange Code.*)

EGA. Exhanced graphics adapter card.

Enhanced Connectivity Facilities. A set of programs that provides a uniform structure for sharing resources and exchanging data between personal computers and IBM System/370 computers in MVS/XA, TSO/E, and VM/SP environments.

Enlarge. A toggle key that allows you to increase the dimensions of your windows to full-screen size; initiated by the *Enlarge* key, which is valid in both work station control mode and application mode. *Enlarge* does not affect character size but instead enlarges the screen area.

environment. Machine and system resources, such as memory and system control blocks, are internally grouped to form an environment. These resources are accessed on user and program requests.

erase. In autokey mode, to remove from autokey storage a recording you no longer need.

Expanded Memory Specification[1]. A convention for expanding personal computer internal memory beyond 640 kilobytes. Expanded memory works by switching pages of memory into and out of a page frame located inside reserved conventional memory.[1]

Extended Binary-Coded Decimal Interchange Code (EBCDIC). A coded character set consisting of 8-bit coded characters.

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[1] The Expanded Memory Specification was developed by Lotus, Intel, and Microsoft. Lotus is a registered trademark of Lotus Development Corporation. Intel is a registered trademark of Intel Corporation. Microsoft is a registered trademark of Microsoft Corporation.

extended color. The seven colors red, blue, green, white, yellow, pink and turquoise applied to both whole fields and individual characters within fields independently of any other attributes of the data.

F

file. A collection of data. This data can be programs, word processing files, or computational information. Files are stored either in the host computer or on personal computer diskettes. Files are also called *data sets.*

file transfer. The work station function that allows you to send and receive files between a personal computer session and a host computer session when the file transfer code is accessible through your host computer session.

file transfer program. A host computer program that allows you to use the file transfer function.

finish. The key that ends your activity at one work station level and moves you up one level; for example, *Finish* in the Size function (Level 3) would return you to SetUp (Level 2).

fixed disk. A type of work station storage used for mass storage and retrieval of data. This storage device is housed in the system unit.

foreground color. The color of characters within a window. (Contrast with *background color.*)

G

graphic. A symbol produced by a process such as handwriting, printing, or drawing.

H

hardware. The physical equipment used in data processing, as opposed to programs, procedures, and associated documentation. (Contrast with *software.*)

Help. An aspect of work station control mode that overlays the right side of your current screen with information about the status of your work station control functions and keys. Help is a toggle key. Once it is toggled on, Help information changes as you move among the work station levels.

HELPER. The IBM 3270 Workstation Program Online Tutorial, consisting of an interactive self-teaching diskette and a booklet.

hide. The work station function that allows you to remove a window temporarily from the screen profile in which it appears: it does not delete the window or affect its presence on other screen profiles; it merely "hides" it. (Compare with *delete window.*)

home. The initial cursor position, located in the upper left corner of the presentation space.

host computer. A central computer that provides services such as computation, data base access, and special programs or programming languages to a number of users.

I

INDIDP. One of the 3270 Workstation Program utilities that allows you to create an IDP file for Final Form Text files that you created using Personal Services 370.

initial program load (IPL). The first process in operating your work station, which causes the operating system to commence operation.

IPL. Initial program load. (See *initial program load.*)

J

jump. The work station function, available both inside and outside work station control mode, that allows you to move from window to window on a screen profile; initiated with the Jump key or by pressing the WS Ctrl key and the letter name of the window.

L

LED. Light emitting diode.

left control keys. The keyboard area to the left of the main keyboard, (the Typewriter Key area) containing many of your work station control keys.

list. The function initiated by pressing PF1 that overlays the right side of your screen with an ordered set of items. Two kinds of listing are possible: List Window and List Autokey. List Window, initiated anywhere in work station control mode, displays the window assignments and screen profiles. List Autokey, initiated from the autokey function, displays the names of autokey recordings, recording lengths, and remaining autokey storage.

load (verb). To read a copy of a computer program or data from a diskette into work station storage.

logging on. The procedure by which you are linked to a multiple-user host computer system; the procedure requires a user identification (*userid*) and a password.

M

menu. A list of available operations. You select which operation you want from the list.

menu number. The number associated with a unit of information to call that unit to the screen.

merge. The command INDMERGE which allows a user to merge memory from one or more contiguous environments into a single environment.

message. An ordered series of characters displayed near the bottom of the screen to convey important information about the status of the work station from the machine to the user.

message line/user prompt area. The line on your screen just above the operator information area on which messages and prompts from your work station are displayed.

move. The work station function that allows you to move a window either horizontally or vertically on the screen.

Multi-DOS. A feature of the IBM 3270 Workstation Program that allows multiple concurrent personal computer sessions.

N

NMI. Non-Maskable Interrupt. (See *Non-Maskable Interrupt.*)

Non-Maskable Interrupt. A button on the keyboard adapter at the back of the system unit that allows you to start a dump process when the keyboard does not respond to any input.

normal path. In the HELPER tutorial, looking at every panel and working the associated exercises; initiated by pressing any MENU NUMBER from the main menu. (Contrast with *quick path.*)

notepad. The application mode session that contains notes you make to yourself at your work station; its keyboard is similar to the host keyboard; its contents disappear at the end of a session unless stored with the Save utility.

numeric keypad. The rightmost area of your keyboard. In application mode, when your personal computer session is active, the numeric keypad is also a cursor key movement area; NumLk toggles between cursor keys and numeric pad. In application mode, when a host computer session or a notepad session is active, this area is a numeric keypad.

O

ODSP. Outbound data stream preprocessing (See *Outbound Data Stream Preprocessing*).

OIA. Operator information area. (See *operator information area.*)

operator information area (OIA). The bottommost line of your screen where you receive information about the status of your work station and your host, notepad, and personal computer sessions.

Outbound Data Stream Preprocessing. Allows you to preprocess a 3270 outbound data stream with a user-written system extension to reduce the amount of data traffic flowing through a network.

overlay verb. To place one set of information temporarily over another.

P

panel. A screen full of information; the smallest unit within the HELPER tutorial.

Panel ID. Two-letter codes located in the lower right corner of each HELPER panel. Panel IDs are necessary for using the GOTO function of the tutorial (PF3).

Pause. In the autokey function, a toggle key that places a pause within a recording or that causes the playback of a recording to resume after a recorded pause.

personal computer graphics printer. The desktop printer attached directly to your IBM Personal Computer. (Contrast with *3274-attached printer.*)

Play. In the autokey function, the key that initiates the playback sequence of an autokey recording whose name is entered in the OIA.

power on. To switch on the system unit and/or monitor of your work station in order to begin a session.

presentation space. A concept that represents the area that contains the data that goes to your display screen during an IBM 3270 host session, an IBM Personal Computer session, or a notepad session.

program function key. A key that passes a signal to a program. The program function keys are located in the topmost area of your keyboard. This area contains host computer PF keys and personal computer function F keys. The IBM 3270 Personal Computer PF keys and the IBM Personal Computer F keys are two names for the same key. Many of the work station control functions are located here; their names are printed on a template that fits over this keyboard area.

Program Information File (PIF). PIF or program information files are system information files needed for any PC application you want to run. A PIF contains the name of the file that starts your program and some operating characteristics of your program.

Programmed Symbol set. One of six sets of characters named PSA-PSF enabled by the addition of a programmed symbols adapter card and appropriate host computer capability.

Programmed Symbols adapter. An adapter card that enables a user to define and extend the characters, symbols, and signs that can be displayed or printed in text to meet the special needs of the user's host applications. Examples include characters from foreign alphabets; mathematical signs and symbols; scientific signs and symbols; special type fonts such as italics; and a set of graphic elements that can be used to build graphs, bar charts, and other graphic representations of data.

prompt. A request for information that guides the user by describing required input or giving necessary operational information.

Q

quick path. In the HELPER tutorial, the main menu option that allows long-time IBM 3270 display users to see a highly condensed version of HELPER. The function is toggled on with the Q key from the main menu. (Contrast with *normal path*.)

Quit. The work station control mode functions reached by pressing Alt Reset, which halts or eliminates whatever work station function is executing.

R

Receive command. One of the two commands involved in file transfer. When you receive a file, a copy of the file goes from the host session to the personal computer session. (Contrast with *Send command.*)

record. Within the autokey function, the work station function from which sequences of keystrokes are entered for playback at a designated location.

Resolution. A measure of the ability to distinguish closely adjacent optical images.

Restore command. The work station command that allows you to load autokey recordings, notepad information, and/or screen profiles from personal computer diskette or fixed disk storage to work station temporary storage. (Contrast with *Save command.*)

right control keys. The keyboard area to the immediate right of the main keyboard area (the typewriter key area) containing the black cursor movement keys used by the host, notepad, work station, and personal computer functions.

Rule. A horizontal line you can display on the 3295 Plasma Monitor in either a host or notepad session.

S

Save command. The work station function that allows you to move autokey recordings, notepad information, and/or screen profiles from work station temporary storage to personal computer diskette or fixed diskette storage. (Contrast with *Restore command.*)

screen. The display surface.

screen background color. The color of the display screen in the application window area not covered by windows.

screen profiles. Sets of window configurations; there are ten of these in your work station, numbered 0 through 9. The number of windows on Screen Profile 0 is set at customization. The remaining nine screen profiles are flexible in terms of number and placement of windows. You move through them (1) sequentially by pressing shift + ChgSc, or (2) individually by pressing the WS Ctrl key and a screen profile number (0 through 9).

selected window. In work station control mode, the double-bordered window that will be affected by work station functions. (Contrast with *active window.*)

Send command. One of the two commands involved in file transfer. When you send a file, a copy of the file goes from your personal computer session to a host session. (Contrast with *Receive command.*)

session. A connection between your work station and a host computer, a personal computer, or a notepad.

Setup. The work station control function from which aspects of screen layout may be changed (for example, sizing and moving windows).

Shift. The set of key functions printed on the keyface at the top of the key; initiated by pressing the desired key + Shift.

short name. A letter name (A through Z) of a window displayed in the upper left corner of a window border; within the autokey function, a short name is a unique name of one or more characters for your recording that is shorter than the complete recording name.

single-place symbol set. A Programmed Symbol set that has no inherent color characteristic. Single-plane symbol sets are, however, available for both monochrome and color displays. (Contrast with *triple-plane symbol set.*)

size. The work station function that allows you to change the bottom and right boundaries of a window, either to enlarge or to diminish its size.

software. Programs, procedures, rules, and any associated documentation pertaining to the operation of a computer system. (Contrast with *hardware.*)

Source. The work station function within Copy in which the lines are marked with Cursor Select as those to be copied into another window. (Contrast with *Target.*)

SPIF. The INDSPIF utility allows the user to create, update or delete Program Information Files or System Information Files.

split. The INDSPLIT command allows the user to divide the memory currently allocated to one environment to one or more new environments.

system extension. A system extension is a service routine that runs with the workstation program and may be accessed from programs or tasks in any environment.

System Information File (SIF). A file containing information about a system extension's system resource requirements. An SIF tells the workstation program how much storage it will need to support the data structures it uses for your system extension.

system reset. Within the personal computer session, the function that produces a result similar to that of a *power on.* It is accomplished by pressing and holding these three keys in succession: the Alt key, the Ctrl key, and the Del key.

system unit. The part of your IBM Personal Computer that interprets between the display and the keyboard. It accomplishes the workstation program and personal computer processing and controlling operations for the work station.

T

target. The work station function within Copy in which the upper left-hand corner of a location is marked with Cursor Select, indicating the place where marked source lines are to be moved. (Contrast with *Source*.)

template. A guide that fits around a section of the keyboard and identifies keys valid during a specified application.

toggle key. A key that turns a function *on* the first time you press it and *off* the next time you press it. Toggle keys on your work station include the work station control key, SetUp (PF2), Browse (PF3), and the pause key in work station control mode; and the CapLk and NumLk keys in the personal computer session.

triple-plane symbol set. A Programmed Symbol set that allows more than one color to be used in a single character position. Triple-plane symbol sets contain three times the normal amount of storage for each defined character, arranged in three planes, representing the three primary colors, red, blue, and green. By defining only a portion of the total symbol in each color plane, the user can obtain a whole symbol in more than one color. (Contrast with *single-plane symbol set.*)

typematic. Key functions that will repeat when the key is held down.

typewriter key area. The large central area of the keyboard containing the familiar typewriter keys; also called the "qwerty" keys.

U

Un-Enlarge. A toggle key that allows you to return enlarged windows to their pre-enlarged size.

Un-Hide. The work station control function that allows you to return a hidden window to the screen in the same size and position in which it was hidden.

V

valid key. A key that is recognized by the session type (host, personal computer, or notepad) or mode (WS Ctrl) to which your keyboard is logically "attached."

VDISK. Virtual disk. (See *virtual disk*.)

virtual disk. A volatile disk drive set up inside the memory of your PC that uses electronic, rather than mechanical, means to store and access data, thereby speeding up the operation of programs that require frequent disk access.

W

window. The "opening" on the screen through which you view your application data sets. A window can be the same size as your full IBM Personal Computer screen or as small as one character. Your work station allows you to have up to 40 windows distributed over your 10 screen profiles.

workstation program function. The set of functions in the IBM 3270 Personal Computer allowing you to create windows, change their size and position, and hide and enlarge them; use autokeying and copying; save and restore autokey recordings, notepad contents, and screen profiles; and transfer files between hose computer and personal computer sessions.

work station control mode. The master control mode of the IBM 3270 Personal Computer from which the workstation program functions are initiated; accessed and quit by the WS Ctrl key, which is a toggle. (Compare with *application mode*.)

X

XGA. Expanded graphics adapter card.

XMA card. The expanded memory adapter (XMA) card is a hardware option card which uses bank switched memory to add 1.2M of storage to your system.

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