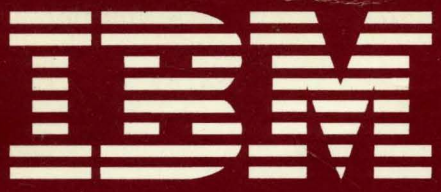

Course 78099

Service Education
Student Self-Study Course

# PC DOS Operation Training
# Version 3.3 and 4.0
# PC and PS/2

To Be Retained By Student

ZR23-6845-01

This publication is primarily intended for use by IBM personnel enrolled in course 78099.

**First Edition (March 1989)**

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A form for readers' comments has been provided at the back of this book. If the form has been removed, address your comments to IBM Corporation, Department 90L/Zip 4339, 951 NW 51st Street, Boca Raton, FL 33432. Please include the form number in your comments. IBM may use or distribute any of the information you supply in any way it believes appropriate without incurring any obligation. You may, continue to use the information you supply.

# Preface

## Getting Started

The course you are about to take is a *hard-copy* FIS course (course code 78099) with lab projects. The lab projects can be completed on any IBM Personal Computer or Personal System/2® except PC*jr*, which is not supported by DOS 4.0. Your education monitor should have already registered you on the FIS system, so you can *sign on* the terminal.

First, sign on the FIS terminal to see if any errata (corrections or additions to the course) is available. If you need assistance to sign on the terminal, refer to Appendix B of this self-study course for procedures. Then, sign off the terminal and begin your study.

When you complete the course, sign on the FIS terminal again and input your final test answers and comments. This enables you to get the course completion certificate. Entering your answers also updates your training history.

## Course Description

This is a self-study course (SSC) intended for customer engineers who have some general knowledge of IBM Personal Computer Disk Operating System (DOS). It is designed to familiarize you with two additional versions of DOS, versions 3.3 and 4.0. Emphasis is placed on version 4.0 because DOS 4.0 presents functions through menus and windows, which substantially increase the ease of use of this operating system. Lab projects, which can be done on most PCs will help you gain practical experience with this IBM package.

The outline of the course is as follows:

- Description of enhancements included in DOS 3.3 followed by a description of the installation steps
- Description of enhancements included in DOS 4.0 followed by a description of the installation steps
- A "tour" of DOS 4.0 through lab projects
- A description of the Support Structure available to assist the customer is included. Warranty Terms and Conditions, under which IBM offers the DOS 4.0 package, are also explained. DOS 4.0 is the first DOS version that has a software support structure and warranty terms and conditions.

## Prerequisite

- *PC DOS/Operations Training (CC 78091).*

## Materials Required

- This self-study course: ZR23-6845
- Three-ring PC binder and two plastic diskette jackets: ZR23-6846
- Supplementary Course Material: ZR23-6847
- Supplementary Course Material media: ZR23-6848.

1. Two 5.25-inch Master diskettes:

   - *DOS 4.0-LAB1 Start/Shell*
   - *DOS 4.0-LAB2 Utilities*

2. Two work diskettes labelled:

   - *Work Diskette/LAB1*
   - *Work Diskette/LAB2*

3. One 3.5-inch diskette labelled *DOS 4.0 LAB1/LAB2 Shell/Utilities*
4. One 3.5-inch work diskette labelled *Work diskette LAB1/LAB2.*

The entire training package can be ordered under the bill of forms, ZBOF-5512.

## Time Required

The estimated time required to complete this course is six hours. This projected time takes into account the review of DOS commands in Appendix D, the completion of all lab projects, and time to investigate other functions on your own.

## Duties and Tasks

You will be able to do the following as you complete this training.

1. Use PC industry terminology to explain or discuss system operations with customers.
   - Understand and use common PC or workstation terms and acronyms.
   - Know some of the more common application programs being used with Personal Computers.
2. Identify error conditions associated with operational type problems.
   - Identify sources of error messages issued by the system.
   - Use all related documents to determine the meaning of error messages.
3. Perform system Problem Determination (PD), using available programs, utilities, commands, and publications.
   - Load, control, and use the Disk Operating System (DOS).
   - Verify correct operation of all supported devices and features with the use of DOS commands.
4. Identify error conditions associated with compatibility problems.
   - Identify the version level of DOS being used.
5. Explain or discuss the DOS 4.0 Support Structure with the customer.
   - Understand components of the structure.
   - Know different customer entry points to the support structure.
6. Communicate or discuss DOS 4.0 warranty terms and conditions with the customer.
   - Be knowledgeable of: what is warranted, central service availability, and warranty length.
   - Inform the customer of other IBM Software warranties.

# Contents

# Session 1. DOS 3.3

## Introduction

The Disk Operating System, version 3.3 (DOS 3.3) was introduced with the IBM Personal System/2. Besides changes that enable DOS to run on a PS/2, other enhancements were made over the DOS 3.2 package. They consist of four new commands, three new features, and ten revised commands.

Following a description of the enhancements is an outline of DOS 3.3 installation steps.

## Objectives

Upon completion of this session, and using all available documentation, you should be able to:

1. Describe the enhancements incorporated into DOS 3.3.
2. Locate and follow the installation steps of DOS 3.3 on a Personal Computer or Personal System/2.

## New Commands and Features

Four new commands and three new features have been incorporated in version 3.3. The four new commands are:

*Fastopen*
*Append*
*NLSFUNC*
*CHCP.*

The three new features are:

*Display.SYS*
*Printer.SYS*
*Keyboard.SYS.*

**Fastopen**, as the name suggests, reduces the required time to search for a file and open it for processing. This is accomplished by keeping the location of directories and recently opened files in memory. When accessing a file, **Fastopen** searches that list first; if the file is in the list, it is found very quickly.

The **Append** command is very similar to the **Path** command (which is reviewed in Appendix D), but has a larger scope. Like **Path**, **Append** identifies sub-directories to be searched when a given file is needed. The difference is that **Append** can search for a file with any extension, including the extensions: BAT, COM, and EXE, while **Path** works only with these three extensions, within or outside the current directory.

**Note:** DOS 3.3 **Append** command cannot be used with the **Append** command from either *IBM PC Network program 1.0* or the *IBM PC LAN program 1.10.*

The **CHCP** and **NLSFUNC** commands offer support for languages other than English. They work with the new features, **Display.SYS, Printer.SYS, and Keyboard.SYS** used by World Trade countries.

## Enhanced Commands

The enhanced DOS commands for version 3.3 are:

| | |
|---|---|
| Attrib | Keyb |
| Backup | Mode |
| Date | Restore |
| Echo | Time |
| Fdisk | Batch Command File |

We will not cover details of the enhancements; only highlights of the more significant changes are presented:

- BACKUP

  The **Backup** command does not require that diskettes be formatted before storing backup files. The enhanced command formats the diskette, backs up files based on a time stamp, and then creates a log file. The overall backup operation is faster. You can appreciate not having to format a series of 360KB diskettes to backup a 20MB disk!

- DATE and TIME

  DOS 3.3 **Date** and **Time** commands update both the system and permanent date and time features, whereas previous versions did not. This enhancement is noticeable only on machines equipped with a battery-powered clock, such as PC-AT or PS/2. On these, date and time are stored in two separate locations, CMOS and a buffer. CMOS contains the permanent date and time, and requires a setup procedure to update both date and time. The buffer stores the system date and time only for the IPL session (from IPL to IPL). When you enter new date and time, DOS 3.3 updates both system and permanent date and time.

- BATCH Commands File

  A batch file sometimes contains other batch files (secondary batch files). DOS 3.3 supports a **Call** function to be used with these secondary batch files. For example, within a batch file you insert: *Call secondary*; DOS gets that file, executes it, and comes back to the main batch file to continue.

## Study Questions

1. _____ keeps a list of recently opened files in memory.

2. _____ allows you to locate a file with any extension, in any directory.

Answers to these questions and all following study questions are in Appendix C.

## Installation

We will not install DOS 3.3 in any of the Lab projects. We are summarizing the tasks you would perform during an actual installation. For a complete description of the steps, refer to a *Disk Operating System Version 3.30 User's Guide*. There is no supplementary course material for Version 3.3 in your package.

Installing DOS 3.3 — or for that matter DOS 4.0, which we will cover in the next session — is typically a user's responsibility. Since, at some time, you may have to assist in installing these packages, or have to perform this task as part of a Special Bid contract, we will go over the major steps of an installation.

DOS version 3.3 can be installed on diskette-based or hard file systems. It is distributed in a four-diskette package. The 5.25-inch diskettes are labelled *Startup*, *Operating*, and *Utilities*. The fourth diskette is a 3.5-inch diskette labelled *Startup/Operating*, which contains the same information as the other three diskettes, but is used with 3.5 inch drives, as on the PS/2 or PC-XT 286.

The *Start-Up* diskette contains DOS programs and commands needed to start the system and the *Install* program. The *Operating* diskette contains files for everyday use, such as FORMAT, DISKCOPY, etc. The *Utilities* diskette contains supplementary programs, such as Debug, Vdisk, etc. Some files are duplicated on the *Startup* and *Operating* diskettes, since they are needed for both installation and everyday use.

## Installation on Diskette-Based Machines

The outline of DOS 3.3 installation on diskette-based systems consists of:

- Getting the *country* and *keyboard* codes.

  These codes select the appropriate character sets for a given language. They are found in the DOS 3.3 Users' Guide.

- Powering-on or soft IPLing (Ctl-Alt-Del) with the *original DOS 3.3 Startup* diskette in drive A.

- Entering the **Select** command with the country and keyboard codes. For example, for the United States, Enter SELECT 001 US.

  **Note:** Select is used to install DOS the first time. It erases everything on the target diskette. The target diskette is your working diskette that will contain DOS 3.3 when the installation is complete.

- Transferring the DOS working files to working diskettes.

## Installation on Hard File

Installing DOS 3.3 on a hard file requires additional considerations, depending on the situation. The steps are different for a first time installation compared to an update.

**New Hard File:** During a first-time installation, you would:

- Load the system from the **DOS Startup** diskette.

- Prepare the hard file using the **Fdisk** command to create a DOS partition.

  That is accomplished by selecting the appropriate prompt from the menus. You have the choice of making a DOS partition of up to 32MB and several extended partitions, however only one will be a DOS partition.

- Use the **Select** command with the country and keyboard codes to install DOS on the hard disk.

**Version Update:** To update to version 3.3, you would execute the following steps:

- Load the system from the **DOS Startup** diskette in drive A.
- Use the **a:Sys c:** command to transfer the DOS 3.3 System files to the hard file.
- Replace existing DOS files on the fixed disk with **Replace a:*.* c:\/s /r**.
- Add the new DOS files to the disk with **Replace a:*.* c:/a**.

**Note:** When updating to version 3.3, **do not** use the **SELECT** command. As stated earlier, **Select** causes formatting of the disk, which erases all data currently stored on it.

## Study Question

3. The _____ command will erase data on the fixed disk, and should therefore not be used for a DOS version update, with existing files on the system.

## Summary

We first covered the changes and additions to DOS 3.3. Among the significant changes are the addition of **Fastopen** and **Append** commands, the improved **Backup** function, and the **Call** feature for batch files.

The second main topic described the content of the DOS 3.3 package and outlined the steps for installing it on either diskette or fixed disk-based systems.

This concludes the study material on the enhancements of DOS version 3.3. The next session describes version 4.0 enhancements and also outlines the steps for installation.

# Session 2. DOS 4.0

## Introduction

DOS version 4.0 is an Operating System intended for fixed disk systems. Besides enhancements over version 3.3, it includes a *Shell Program* that presents the selection of commands through menus, and displays their output with graphics. DOS 4.0 can exploit memory beyond the 640KB boundary when Expanded Memory Specification (EMS) adapters are used. It also supports DASD larger than 32MB.

This session presents version 4.0 enhancements and outlines the installation steps.

## Objectives

Upon completion of this session, and using all available documentation, you should be able to:

1. Describe the enhancements incorporated in DOS 4.0.
2. Locate and follow the installation steps of DOS 4.0 on a Personal Computer or Personal System/2.

## Enhanced Architecture

Two significant enhancements are included in the architecture of DOS 4.0. It is now possible to access memory beyond the 640KB boundary and auxiliary storage (hard disk) beyond 32MB.

**Memory:** Three types of memory can be installed in a system. They are:

- Conventional

  Conventional memory is memory addressed from 0KB through 1,024KB (1MB). This is the basis of all memory used for DOS and the processing of application programs. Previous versions of DOS use conventional memory in the 0KB through 640KB boundary. Memory between 640KB and 1MB is reserved for hardware devices, like keyboard and display buffers, or data "holding" areas.

- Expanded

  Expanded memory is addressed through the XMA2EMS.SYS device driver (program code) and uses special adapter cards, such as the IBM Expanded Memory Adapter (XMA). Two Expanded memory adapters are available: one has an 8MB maximum storage and the other has a 32MB maximum.

  Expanded memory has hardware and software requirements. Expanded memory can be installed only on:

  - IBM Personal Computer XT (except XT286)
  - PC-AT
  - 3270 PC
  - 3270 PC AT
  - IBM Personal System/2 family.

  These systems should also have one of the following features:

1. IBM 2MB Expanded Memory adapter
2. IBM PS/2 80286 Expanded Memory Adapter/A
3. IBM PS/2 80386 Memory Expansion Option
4. PS/2 Model 80 or other 80386-based system with XMAEM device driver loaded.

The software requirements are: the XMA2EMS.SYS driver (program module) and a special software package developed by LOTUS, INTEL, and MICROSOFT[1] (LIM) must be installed.

DOS 4.0 provides Expanded memory support through the XMAEM.SYS, only on 80386-based systems, such as IBM Personal System/2 Model 80.

- Extended

  Extended memory is addressed above 1MB, *extending* conventional memory up to 16MB. The 0 to 16MB range is memory available on 80286 or 80386-based systems.

**Larger DASD:** Up to version 3.3, regardless of the storage capacity of a fixed disk, DOS could access no more than 32MB of that storage. To access larger disks, they had to be partitioned with the disk utility program (**Fdisk**). DOS 4.0 eliminates that restriction. Your DOS partition can be as large as you want, up to the maximum physical limit of the fixed disk.

## Enhanced Error Messages

Error codes and messages are revised and enhanced. *Fail* is an additional response to device errors. You need to *be careful when choosing this response if there is a risk of damage to data.* The other three responses, *Abort, Retry, and Ignore*, should be familiar. A list of error codes is listed in your SCM on page 201 of Appendix D. Take a minute to read that page up to "Extended and Parse Errors." Then, go to page 205 and observe the layout used throughout this appendix to describe errors. The message is displayed in bold characters, the cause of the error condition follows, and a corrective action, if any, is suggested.

## New Commands and Features

DOS 4.0, like DOS 3.3, is downward compatible. Commands and features that are available in version 3.3 are also supported in version 4.0. Some commands and features are further enhanced with a greater selection of parameters. All commands execute their original function as in previous versions.

The commands incorporated in DOS 4.0 are:

*DOSShell*
*Install*
*MEM*
*XMA2EMS.SYS*
*XMAEM.SYS.*

Here is a brief description of the preceding commands:

[1] Lotus is a trademark of Lotus Development Corporation. Intel is a trademark of Intel Corporation. Microsoft is a trademark of Microsoft Corporation.

- DOSShell

  The *shell program* is a program within DOS 4.0 that presents graphically, with menus and windows, the DOS commands and utilities. You can easily exit the *Program shell* to run DOS in the standard mode — that is, displaying the drive letter followed by >. The *Shell* can be re-accessed to continue in the menu-driven mode. DOS 4.0 supports a mouse that can be used for item selection when the *shell* is active. The **DOSShell** command allows you to start or return to the DOS *Shell Program* from the command prompt.

- Install

  **Install** loads commands to start the installation of DOS 4.0.

- MEM

  The **MEM** command displays the amount of memory used and unused, areas of memory that are open and allocated, and the name of all programs currently in memory.

- XMA2EMS.SYS and XMAEM.SYS

  **XMA2EMS.SYS** and **XMAEM.SYS** are program modules to support expanded memory. The Expanded Memory Specification card and the Expanded Memory Adapter/A are the supported adapters. On a PS/2 Model 80, the XMAEM.SYS emulates an 80286 processor to support the Expanded Memory Adapter/A.

## Enhanced Commands

Eighteen DOS commands are further enhanced in version 4.0. They are:

| | | | |
|---|---|---|---|
| APPEND | * DEL | GRAPHICS | SELECT |
| BACKUP | FASTOPEN | KEYB | * TIME |
| BUFFERS | FDISK | * LABEL | * TREE |
| CHKDSK | * FORMAT | * MODE | |
| COUNTRY | GRAFTABL | * REPLACE | |

Since it is likely that you will use some of these commands, we selected the most probable ones and marked them with an asterisk (*) in the preceding list. All the enhancements are not necessarily apparent through message prompts. Some of them are performance enhancements and should not raise any concerns.

The enhanced commands are listed at the beginning of the DOS manual. A description of the change(s) or addition(s) is listed along with each one. The command section of the manual describes each command, accompanied by examples that show its use with different parameters.

- Del

  The **Del** command has a new parameter, **/P**, that displays each file name and a message to verify that you want to delete the file.

- Format

  The **Format** command accepts a new parameter, **/F**. This parameter defines the formatted capacity of a diskette, which can be less than the maximum supported capacity.

- Label

  To change a volume label on disk or diskette, use the **Label** command.

- Mode

  **Mode** does more than change screen format and number of characters per line. Now, it can select keyboard typamatic rates (repeating characters when key is held depressed) and lines per screen. Unlike previous version of DOS, it requires the equal sign (=) as a delimiter between MODE and the value.

- Replace

  The **Replace** command, used to selectively add or copy files, has a new parameter, **/U**. It restricts the replacement to only updated files, where date or time on the source is more recent than date or time on the target.

  **Note:** With that restriction in mind, it is important to enter the correct time and date in the system at power-up.

- Time

  Time of day can be entered on a 12- or 24-hour basis, depending on how it is specified by the country code. In the United States, the system time on Personal Computer or Personal System/2 is in 12-hour, which is followed by either *AM* or *PM*. In addition to this 12-hour cycle, a 24-hour cycle, or military time, is available.

- Tree

  The **Tree** command executes the same functions as earlier DOS versions. In DOS 4.0, graphics are used to represent the relationship between root and sub-directories.

### Study Questions

1. The _____ command in DOS 4.0 graphically displays the relationship between directories and sub-directories.

2. Select the range of extended memory:

   a. 0 to 640KB
   b. 0 to 16MB
   c. 640KB to 1MB
   d. 8MB or 32MB

## Installation

### General Information

The DOS 4.0 package consists of:

- Five 5.25-inch 360KB diskettes
- Two 3.5-inch 1MB diskettes.

  Four blank 5.25-inch diskettes, or one 3.5-inch 2MB, or two 3.5-inch 1MB blank diskettes are needed to contain the installed DOS.

In your SCM, the section called *Getting Started with Disk Operating System* contains a complete description of pre-installation and installation steps for DOS 4.0. As mentioned earlier, installing DOS is usually a user's responsibility. Since

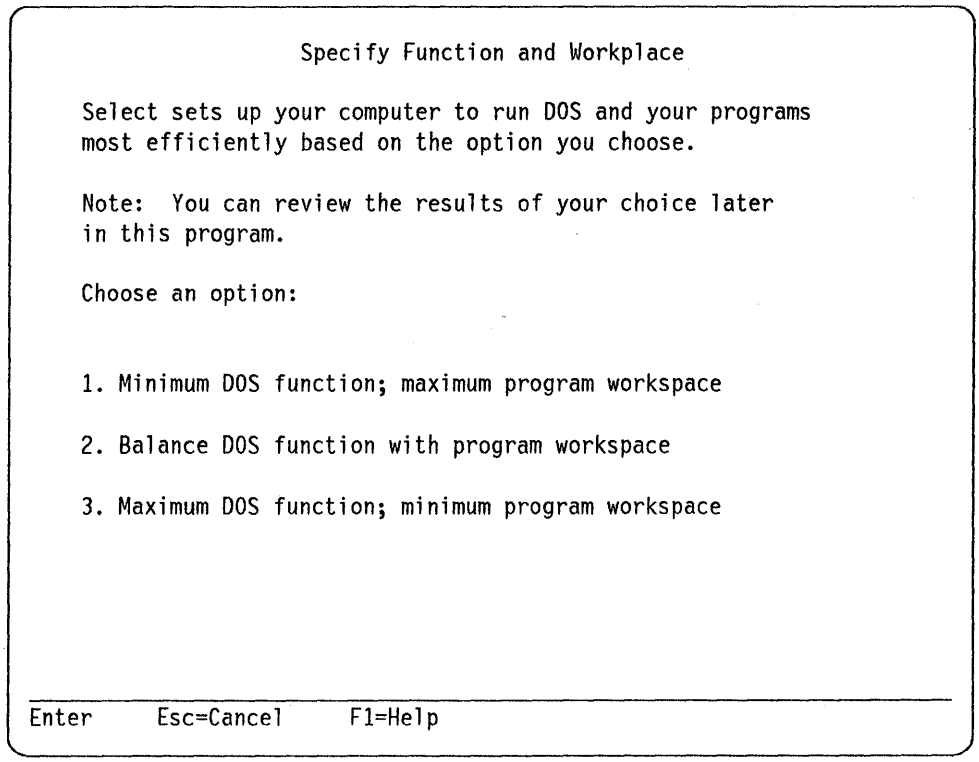
you may have to assist in installing DOS, here are some general considerations and outlines of the installation steps.

DOS 4.0 is easily installed using the **Select** command or the *Install* procedure, whether it is a new installation or a version update. When using the *Install* procedure on a new installation, preparing the disk with the **Fdisk** command is not necessary. Most installation decisions are accompanied by recommended selections; press Enter when the selection is suitable; otherwise change it.

DOS 4.0 can coexist with the IBM Operating System/2 (OS/2) on the PC AT or PS/2. The coexistence does not mean an automatic switching from one operating system to another, but an installation which lets you, at power on, bring the system in either DOS 4.0 or OS/2. The coexistence takes place in the same disk partition; the DOS 4.0 programs are stored in a sub-directory of the OS/2 partition. This coexistence does not exclude the possibility of creating other partitions.

DOS version 4.0 can be installed on a one-diskette, two-diskette, hard file PC, or PS/2, **excluding PC***jr*. There is a minimum requirement of 256KB memory on all PCs. It is also suggested that a minimum of 384KB be available to install the *Shell Program* in its entirety, leaving enough memory to run programs. If the amount of available memory is between 256KB and and 384KB, it is best to choose a start-up option during installation that loads *Shell* options suited for the memory size.

The memory Start-up options are indirectly chosen. During installation, a screen of information labelled *Specify Function and Workplace* is used to decide how much of the *Shell Program* is installed. When you reach that screen, three options are available. The first option installs the minimum amount of parameters, while the third option installs the *Shell Program* in its entirety. This option screen follows:




The three configuration options result in different CONFIG.SYS files (CONFIG.400) being created during installation:

- MINIMUM DOS function; maximum program workspace:

  BREAK ON (ability to interrupt a program execution)
  FILES = 8
  LASTDRIVE = E
  SHELL = C:\DOS\COMMAND.COM/P

- BALANCED DOS function with program workspace:

  BREAK ON
  BUFFERS = 20
  FILES = 8
  LASTDRIVE = E
  SHELL = C:\DOS\COMMAND.COM/P
  DEVICE = C:DOS\ANSI.SYS
  INSTALL = C:\DOS\FASTOPEN.EXE C: = (50,25)

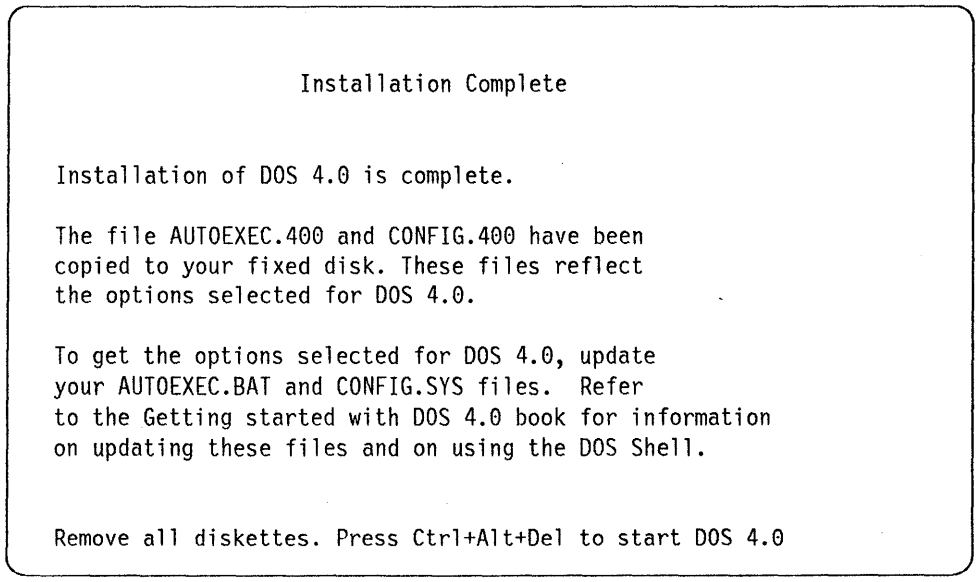
- MAXIMUM DOS function; minimum program workspace:

  BREAK ON
  BUFFERS = 25,8
  FILES = 20,8
  LASTDRIVE = E
  SHELL = C:\DOS\COMMAND.COM/P
  DEVICE = C:DOS\ANSI.SYS /X
  INSTALL = C:\DOS\FASTOPEN.EXE C: = (150,150)

At a glance, you can see the difference. For example, the maximum option allocates storage space for 25 buffers and includes FASTOPEN with a parameter of (150,150). FASTOPEN with such a parameter indicates that a list capable of storing the names of 150 files in 150 contiguous locations will be created. Great! Your system will perform admirably if you have enough memory left to load your applications. Without a doubt, the more overhead, the greater the cost; here it is at the expense of memory. On the other side is the minimum option. It does not allocate buffers nor does it install FASTOPEN. You will run lean, but you will run anyway.

The AUTOEXEC.400 file reflects similar differences depending on the option that is selected.

Regardless of the option selected, the CONFIG.400 and AUTOEXEC.400 need to be renamed CONFIG.SYS and AUTOEXEC.BAT, if these two files do not exist. If they already exist, the information contained in the .400 files must be integrated into them to ensure proper operation when you re-IPL. You are reminded of the renaming of the AUTOEXEC.400 and CONFIG.400 by one of the following two screens when the installation is complete:



The next screen is displayed following an installation where DOS 4.0 coexists with OS/2. You are reminded to copy the system files onto the fixed disk.

```
                    Installation Complete


Installation of DOS 4.0 is complete.

The file AUTOEXEC.400 and CONFIG.400 have been
copied to your fixed disk.  These files reflect
the options selected for DOS 4.0.

To get the options selected for DOS 4.0:
  1. Update your AUTOEXEC.BAT and CONFIG.SYS
     files
  2. Copy DOS 4.0 system files to drive C

Refer to the Getting started with DOS 4.0 book for
information on updating these files and on using the
DOS Shell.
```

## Installation Outline

We will not install DOS 4.0 in any of the Lab projects. We are summarizing the tasks you would perform during an actual installation to give you an idea on how easy it is to install DOS 4.0. For a complete description of the steps, refer to your SCM.

### Installation on Diskette Machines

- Labelling of blank diskettes:
  - 3.5-inch diskettes:

    One diskette is labelled *Startup*, the second is labelled *Shell.*
  - 5.25-inch diskettes

    The four 5.25-inch diskettes are labelled: *Startup, Shell, Working1, and Working.*

    **Note:** *Working1* and *Working* are names assigned to the original DOS diskettes, they should not be confused or associated with the work diskettes used in the lab projects.
- Inserting the DOS 4.0 *Install* diskette in drive A and powering-up the system, or pressing Ctrl + Alt + Del if it is already powered-on
- Following the prompts until installation is complete
- Updating the Config and Autoexec files and re-IPLing the system for use.

### Installation on Fixed Disk

*One Operating System (New Disk or Update):* When installing DOS 4.0 on a fixed disk, the three steps following the labelling of diskettes are identical to those of an installation on diskette-based systems.

Your answer to the drive selection screen, which is shown next, determines whether the installation takes place on the hard file or on a diskette.

```
                          Select Installation Drive


    Choose the drive to install DOS on:

         1. C

         2. B


Enter      Esc=Cancel      F1=Help
```

The second selection on the menu, **B**, directs the installation to a diskette drive and the files generated during the installation will be routed to the B drive. Consequently, if your system has only one diskette drive, you have to alternate diskettes during the installation and the second selection would be an **A**. Since we are summarizing a disk installation, you would choose **1** and continue.

During DOS 4.0 installation, partitioning the disk is done by entering the partition name when you are prompted for it. No additional steps are required. The *Install* program takes over and executes the steps necessary to partition the disk or create a sub-directory, depending on the situation.

*DOS 4.0 Coexistent:* DOS 4.0 coexisting with OS/2 results in a situation that is similar to having DOS 4.0 installed on diskette. You IPL with a system diskette, then use the hard file thereafter.

On the other hand, the installation procedure is similar to a disk installation. After you reach the Installation Complete screen, you would:

- Re-boot the system.
- **Format** your blank *Startup* diskette with the system parameter (**/S**).
- Copy the AUTOEXEC.400 and CONFIG.400 files to your Startup diskette; then update or rename them.

## Study Question

3. Select the correct statement(s). DOS 4.0 supports:

   a. Coexistence of another Operating System on fixed disks
   b. Installation on a single diskette drive system
   c. Use of the Select command for a Version Update
   d. All of the above

## Summary

The first part of this session introduced the enhancements contained in DOS 4.0 compared to DOS 3.3. Besides the revised and added commands, DOS 4.0 introduces a *program shell* and mouse support, which is a standard feature. An additional response to I/O device errors, **Fail**, is introduced with Version 4.0 and should be used carefully when there is a possibility of loosing data.

Also presented within this session were two significant architectural changes: access to DASD capacity beyond 32MB, and extended boundaries for system memory above 640KB.

The second part outlined the DOS installation steps on either a one or two-diskette drive system, and on a hard file. We also discussed DOS installation as an exclusive or coexistent Operating System.

# Session 3. Using the Shell

## Introduction

This session introduces the *DOSShell Program*, identifies the different sections of the default screen, and, using lab projects, walks through the main area of the *Shell Program*. As we are progressing through the *Shell*, we will review the most common DOS commands and show how they are presented in the DOS 4.0 environment with menus and graphics. An in-depth review of these DOS commands is included in Appendix D.

## Objectives

Upon completion of this session, and using all available documentation, you should be able to:

1. Load DOS 4.0 and identify areas of the default screen
2. Exit and re-enter the *Shell Program*
3. Activate, deactivate, and utilize the *Action bar*
4. Use the *DOSShell* program to work with files
5. Update the Program Menu.

## Shell Program Description

The DOS 4.0 *Shell Program* is a program within a program, which enables the presentation of commands and results of their execution, through menus and graphics. The *Shell Program* consists of two main areas. The first one, *Program* is a section that provides the means to group your most commonly used programs, along with the ability to maintain that group (Lab project 7). The second area, *File System*, allows you to work with data files and DOS utilities. Page 40 of *Getting Started...* shows the path to the *File System* functions and how these functions are subdivided.

The *Start Programs* screen groups four default entries that are displayed once the *Shell* is loaded. They are: Command Prompt, Change Color, File System, and DOS Utilities. You can add up to twelve additional entries to that list. For example, *Format* is an addition for the lab activities.

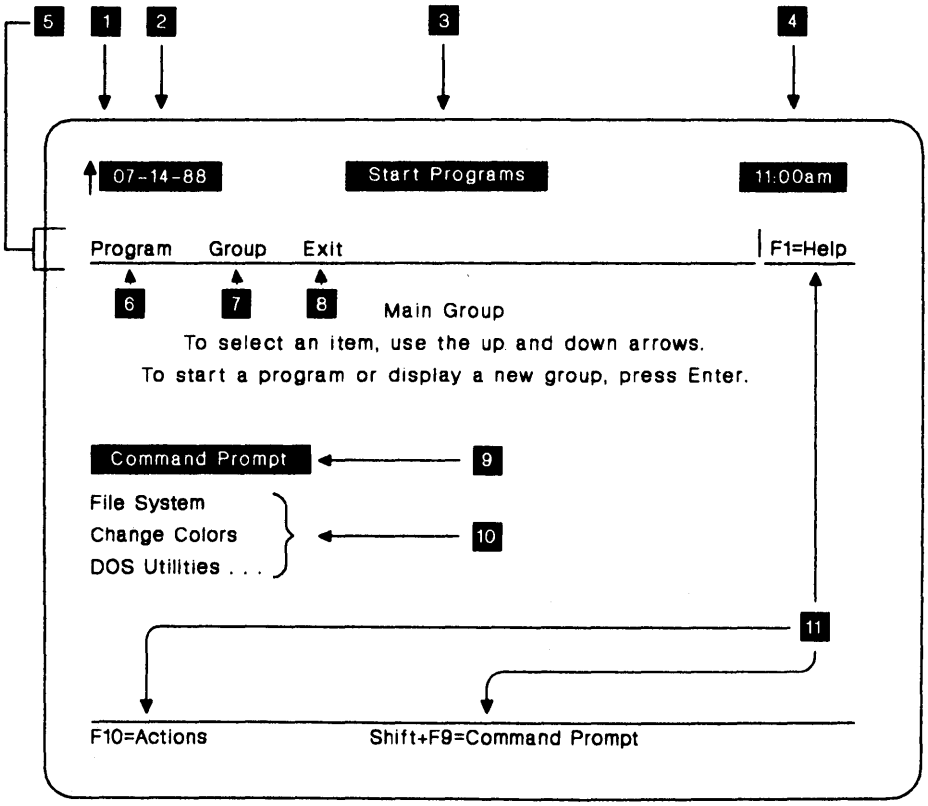
The *File System* is selected from the main menu; its four subgroups are then displayed on the *Action bar* and lower level menus give access to the functions associated with each group.

We will not cover all available functions, but the lab projects should enable you to investigate additional areas of your choice. For example, *Change Colors* is an option you could try after completing Lab Project 1. That selection gives four choices of screen colors. To view the choices, use the left or right arrows and press Enter to select.

## DOS 4.0 Main Screen

### Screen Fields

After DOS 4.0 is properly installed, an IPL sequence ends with the following *Start Programs* screen, which we will reference as the *default* screen. For now, we will identify the areas of the screen; during the lab projects we will work with each one of them.



| | | |
|---|---|---|
| 1 | Arrowhead | The arrowhead symbol, in the upper left corner of the screen, is the home position of the mouse. DOS supports a mouse, as mentioned earlier in the course. When present, it can be used instead of the directional arrows or tab keys to move from field to field. |
| 2<br>4 | System date<br>System Time | On a PC, such as the PC-AT or PS/2, a battery-operated circuit keeps the system date and time current, which eliminates the need to updated them at every IPL; on others, the default DOS date and time needs updating and is achieved through a selection from DOS Utilities menu. That section is not included in the Lab diskettes. Other means are made available to update them.<br>**Note:** Since DOS 4.0 can selectively back-up files based on date and time, it is a good practice to keep the date and time current. |
| 3 | Screen Name | There are two main screens: **Start Programs** and **File System**. **Start Programs** is the default screen, and has two sub-areas: **Program** 6 and **Group** 7. We will cover File System in Lab Project 4. |
| 5 | Action Bar | The *Action Bar* is the underlined area under the System Date and the Screen Name. In this illustration, when the *Action bar* is activated, you can select either *Program*, *Group*, or *Exit* |
| 6 | Program | Program indicates that you are in a program execution or organization mode. You can select from entries referenced by 9 or 10 or you can execute 9. |
| 7 | Group | The second field of the *Action bar* enables you to maintain the list of programs displayed on the default screen ( 10 ). |
| 8 | Exit | This deactivates the *Action bar.* |
| 9 | Default Selection | The first selection is already selected for execution. Pressing Enter will start this operation. |
| 10 | Other Choices | Other entries that can be quickly selected. A total of sixteen entries can be displayed. The *File System*, when activated, makes possible the execution of functions associated with file maintenance, such as renaming, copying, viewing, etc. |
| 11 | Defined Function Keys | These function keys are active when no windows are present. Otherwise, the window-defined function keys supersede. To activate the *Action bar* from the default screen, you can press **F10** or move the arrow to the selection and press Enter. |

## Study Question

T F 1. DOS 4.0 *DOSShell* has two main screens, Start Programs and File System, which have a variety of windows.

## General Information

The DOS 4.0 package used with this course is a modified version for education purposes only and should be used solely for that purpose. Many of the DOS commands are not included. Duplication for backup purposes only is authorized. Duplication for any other purpose violates copyright laws.

The package consists of:

- Two master 5.25-inch and one master 3.5-inch diskettes.

  The two 5.25-inch diskettes are labelled DOS 4.0 LAB1-Start/Shell, and DOS 4.0 LAB2-Utilities. The 3.5-inch diskette, labelled DOS 4.0 Shell/Utilities Lab1/Lab2, contains the same information as the other two 5.25-inch diskettes.

- Two 5.25-inch and one 3.5-inch work diskettes.

  The master diskettes are copied onto the work diskettes to ensure that every student starts with identical default screens.

- Supplementary Course Material (SCM) consisting of:
  - *Getting Started with Disk Operating System Version 4.00* manual.

    This manual contains general information on DOS 4.0, such as: installation instructions, description of screens and procedures
  - Appendix A and the first thirteen pages of Appendix D of *Using Disk Operating System Version 4.00.*

    Appendix A contains information and commands for Edlin (DOS line editor) and Appendix D contains samples of messages to abnormal conditions.
  - A description and syntax of DOS commands from *DOS 4.00 Command Reference Manual* that are available on the LAB2 diskette.

    **Note:** The two manuals: *Getting Started...* and *Using DOS...* are included in the DOS 4.0 package and cannot be bought or ordered separately.

The lab diskettes are organized to eliminate the need of a hard file, which will give you more flexibility in finding a training machine on which to do the projects. You can use the lab diskettes on an IBM PC1, PC-XT, PC-AT, or PS/2 without affecting the contents of the hard file.

**5.25-inch/1-Diskette Drive:** If the training machine has one diskette drive, you would IPL with the LAB1 diskette in drive A and work with that diskette until you need to use the Utilities. The DOS external functions are on the LAB2 diskette. Swap LAB1 with LAB2 to load the required utility module.

**5.25-inch/2-Diskette Drives:** If your machine has two diskette drives, place LAB1 in drive A and LAB2 in drive B.

**PS/2:** If you are using a PS/2, you will not have to swap diskettes. All needed programs are grouped on one diskette. You will disregard during the lab projects references to selection of drive **B**.

A small virtual disk of 128KB is allocated in memory to provide you some work space. The letter name for this VDISK is identified at IPL. It will be either C, D, or E, depending on the number of hard files installed in your machine. The default VDISK for the LAB diskette is D, and the default path is: **Path = A:\;B:\;D:** for the 5.25-inch diskettes and **Path = A:\;D:** for 3.5-inch diskettes.

**Note:** It is strongly recommended that you do the lab projects in the order they are listed, because the following projects are built on the topics presented in previous ones. We also suggest that within the first lab project you **do not press the Enter key within a step** until you are directed to do so. In the following projects more general statements are introduced; for example, when a step states "Select **Program**," you will press F10 to activate the *Action bar*, move to the highlighting to the word **Program**, if it is not on it, then press Enter.

Let us begin the lab projects.

# Lab Projects

## Preliminary Steps

**To ensure that the lab project default screens are as described, you need to DISKCOPY the Master Lab Diskette(s) onto the work diskette(s).**

The DISKCOPY operation for a 5.25-inch diskette is described in the following steps, while the DISKCOPY of the 3.5-inch will take place during Lab Project 1.

1. If you are working with a PS/2, go to **Review Needs** on page 3-7.

   For other IBM PC, DISKCOPY the master diskettes now. In case you have forgotten, DISKCOPY is an external command which creates an image of the original diskette. **Do not use** the COPY command.

2. If **"Diskcopying" on a 5.25-inch two diskette drive machine**, perform the following steps. If not, go to the next page.

   IPL your machine with the **Master LAB2-Utilities** diskette in drive A.

   Press Enter twice to default the date and time.

   Key **DISKCOPY a: b:**

   When you are prompted for the *SOURCE* and *TARGET* diskettes, place your work diskette *Work diskette/LAB2* (target) in drive B, keeping the Master Lab2 in drive A

   Press Enter to execute.

   When the first Diskcopy is complete, a question is displayed, inquiring if you want to copy another diskette. Enter a "Y."

   Place the Master *LAB1 Start/Shell* in drive A and your *Work diskette/LAB1* in drive B.

   Press Enter to execute.

   When the question is prompted again, Enter an "N" to terminate.

If you are a skeptic, you can enter **DIR a:/w** and **DIR b:/w** to compare the content of the two diskettes before you remove them.

Place the master diskettes in a safe place.

Proceed to "Review Needs" (page 3-7).

3. If **diskcopying on one 5.25-inch diskette drive machine**:

   IPL your machine with the **Master LAB2-Utilities** diskette in drive A.

   Press Enter twice to default the date and time.

   Key **DISKCOPY a: a:**

   When you are prompted for the *SOURCE,* press Enter.

   The *SOURCE* (Master) diskette will be read, then you will be prompted for the *TARGET.* You will insert your *Work diskette/LAB2* and Enter to continue. Depending on the amount of memory in your machine, you may have to alternate the diskettes more than once to complete the operation.

   When the DISKCOPY of the Master *LAB2 Utilities* is complete, a prompt inquires about other diskette; Enter "Y".

   Place the Master *LAB1 Start/Shell* in drive A when prompted for the SOURCE. Insert the Lab1 work diskette when prompted for the TARGET. Alternate the steps until the operation is completed.

   If you are a skeptic and would like to verify the content of your copies, Enter the command **DIR /w**, then repeat for the *Work diskette/LAB2.*

   Proceed to **Review Needs** (page 3-7).

You should be all set to go now!!

## Review Needs

In Appendix D of your student guide is a review of some DOS commands, with a variety of parameters. These same commands are illustrated during the lab projects with graphics. To help you evaluate your need to review, here are two study questions.

2. What does the command **Dir TAX????.* /W** display when applied to a diskette containing the following six files?

```
TAXGAIN.87     1234   4-15-88  11:30p
TAXLOSS.86    23980   4-15-88  11:30p
TAXINCOM.87    1234   4-15-88  11:30p
TAXPG.EXE     99999   1-01-88   8:30a
TAX.BAT          45   1-09-88   9:02a
TAXTBLE.87    45897   1-01-88   8:52a
```

a. TAXGAIN.87 TAXLOSS.86 TAXPG.EXE TAX.BAT TAXTBLE.87

b. TAXGAIN.87 TAXLOSS.86 TAXINCOM.87 TAXPG.EXE TAX.BAT
TAXTABLE.87

c.
```
TAX.BAT          45   1-09-88   9:02a
TAXPG.EXE     99999   1-01-88   8:30a
TAXLOSS.86    23980   4-15-86  11:30p
TAXGAIN.87     1234   4-15-87  11:30p
TAXTBLE.87    45897   1-01-87   8:52a
```

d.
```
TAXTBLE.87    45897   1-01-87   8:52a
TAXGAIN.87     1234   4-15-87  11:30p
TAXLOSS.86    23980   4-15-86  11:30p
TAXPG.EXE     99999   1-01-88   8:30a
TAX.BAT          45   1-09-88   9:02a
```

3. _____ sets the sequence of directories to be searched.

## Lab Project 1. Entering/Exiting DOS Shell

During this project, you will have the opportunity to load, exit, and re-enter the shell. You will also become familiar with some help screens. In *Getting Started...* (section of SCM) is a "tour" of the shell, which these projects parallel. Use the SCM as a reference during lab activities.

1. Insert your 5.25-inch Lab1 work diskette in drive A (Lab2 work diskette in drive B if present) or your 3.5-inch master diskette (for Lab Project 1 only).
2. **IPL** your system. Follow the displayed instructions that is: make a note of the VDISK identifier, update time and date if needed. The IPL sequence should terminate with the *Start Programs* screen. The first IPL screen displays the VDISK identifier, often referred to as disk name.

```
ENTER YOUR VDISK NAME HERE:_________
```

```
IBM DOS Version 4.00, VDISK virtual disk D:
   Buffer size:       120KB
   Sector size:       128
   Directory entries: 32

    ******************************************************
    *   IMPORTANT: Make a note of the VDISK identifier   *
    *   that is displayed on the first line of the screen. *
    *   It precedes the colon (:).  That letter will not  *
    *   change as long as you are working with the same PC *
    *   or PS/2; it is used during the LAB activities.   *
    ******************************************************

Press any key to continue . . .
```

You should be looking at the *Start Programs* screen, the first screen of the *DOSShell.*

Press **F1**

F1 provides help for the function you invoked. You can even obtain "Help on Help." A rectangular section, called a window or overlay, contains the description.

3. Press **F1** again to receive "Help on Help."

Make sure when reading Help screens that you use the PgDn and PgUp keys for a complete description (you may have to deactivate the "NUM LOCK" key on systems such as the PC-AT). Notice the arrow in the upper right corner of the window; when pointing down, it indicates there is more information. When the arrow is pointing up, you are looking at the last screen. Within Help you can use the up or down directional arrows, and PgUp or PgDn, to scroll through Help screens. When both up and down arrows are displayed, you are somewhere in the body of the description.

Within the window are the active function keys. The other function keys at the bottom of the screen are temporarily unavailable. To convince yourself, press

**F10**. No action occurs except for a beep that indicate you are attempting an improper operation.

4. Press **F11** (Alt + F1) to display the Help Index.
5. Select **Introduction** by using the up or down arrows to **highlight** the word, and press Enter.

   Whenever you are asked to select an option during these projects, this means move the **highlighting** to that option.
6. Read the Introduction.
7. Press **Esc** once to return to the *Start Programs* screen.

   You should be looking at the default screen as on page 38 of *Getting Started....* From time to time we will reference that screen to help us stay together.
8. Select **Command Prompt**. Press Enter with *Command Prompt* highlighted.

   Now, you have exited the *DOS Shell.* (Do not confuse "exiting" with "quitting" the Shell. Selecting and entering *Command prompt* exits the Shell, which gives the opportunity of returning to it by keying EXIT at the DOS prompt. If you press F3 to quit, the *Shell* session is terminated. Do not press F3 now.)
9. If your VDISK identifier is **D** and you have a PS/2 go to step (10).

   If you have a PS/2 and the VDISK is not **D**, update the **Path** as follows:

   ```
   Key Path=A:\;?:\ and press Enter
   (where ? is your VDISK drive name).
   ```

   Go to step 10.

   For all other IBM PCs, update the **Path** as follows:

   ```
   Key Path=A:\;B:\;?:\ and press Enter.
   (where ? is your VDISK drive name).
   ```

   **Note:**

   **PATH sets the environment for the session duration only. If you power Off or re-IPL your machine, you must re-enter the Path command.**

   Go to step 11.
10. **"Diskcopying" the 3.5-inch diskette**
    a. Key **Diskcopy a: a:** and press Enter.
    b. When prompted for the *SOURCE* diskette, press Enter.
    c. When prompted for the *TARGET*, insert your *Work diskette LAB1/LAB2* and press Enter.
    d. When prompted for making additional copies, key "N" and press Enter.
    e. Put away the master diskette in a safe place. Continue your lab projects with the copy, *Work diskette LAB1/LAB2.*
11. Key **Exit** to return to the *Shell Program.*
12. Press **F3** to quit.

F3 is displayed when the Exit option is highlighted and you press Enter. Although not always displayed, F3 can always be used to exit the *DOSShell.* This key is active throughout the *Shell,* although it is not always displayed.

13. At the DOS prompt, key *DOSShell* (commands are not case sensitive; you can key any command in upper, lower, or mixed case; it executes the same). Press Enter to reload the *Shell.*

This concludes Lab Project 1. You have seen the default screen, and used **F1** for additional information and **F11** to reach the Help Index. Then you exited and re-entered the *Shell.* Finally, you used **F3** to quit.

## Lab Project 2. Activate/Deactivate Action Bar

This project shows how to:

- Activate and deactivate the *Action bar*
- Use *Letter* commands when several options are available
- Interpret the asterisk (*) when it is shown as a letter substitute in a list of options.

**IPL** the machine, unless you are continuing from the previous project. Make sure you are displaying the *Start Programs* screen.

Go to Lab Project 1, if you need help.

1. Press **F10** three times while observing the *Action bar.*

   F10 activates and deactivates the *Action bar.* It works like a toggle switch. When the *bar* is activated, the word *Program* is highlighted (unless you are returning from a previous selection).

2. With the *Action bar* activated, Use the right arrow (→) to move to **Exit** and press Enter.

   A window displays two choices: *Exit* and *Resume Start Programs.* Either the *F3* or the Enter key will cause you to quit the *Shell.*

3. Select **Resume Start Programs** and press Enter.

   The window goes away, but **Exit** is still highlighted.

4. Press **Esc** to deactivate *Exit.*

5. Activate the *Action bar.*

6. Key the letter **P** to display the *Program* options (Page 45 of *Getting Started...* )

   From the five options displayed in the window, two of them, *Start and Add* are spelled out completely. The other three options have a missing character, which is replaced by an asterisk. The asterisk indicates that this function is not available at this time. The unavailable options can also be presented in *silhouetted* (shaded) words.

   Within each function displayed on the *Action bar* or in a window, there is a character-command. This character can be used when the *Action bar* is activated or when it is displayed within the window. A character-command in a window, supersede character-commands or function keys outside that window. That is, as long as the window is displayed, only the functions within that window can be executed.

Depending on your machine configuration, the character-command may be shown in either intensified mode, in a different color, or underlined. Keying that character produces results identical to highlighting an option and pressing Enter.

7. Press **Esc** twice to deactivate the window and *Program.*
8. **Move** the highlighting bar to the entry *Format.*
9. Press **F10** to activate *Program.*
10. Press **P** to display the options again.

    All the asterisks are replaced by character-commands. Format was added for this lab project. The other four options are default entries and cannot be deleted or changed.

11. Press **Esc** to exit *Program* options.
12. Key **X** to select *Exit.*
13. Press **F3** to quit.

In summary, we used F10 to activate and deactivate the *Action bar.* While the *Action bar* was activated, you selected an available option by either **highlighting** and pressing Enter, or by keying a single letter.

Key in **DOSShell** and press Enter to re-activate the *Shell* for the next project.

## Lab Project 3. Reordering Entries

This project steps through reordering entries of the *Start Programs* screen. We will illustrate this operation by placing the *File System* as the first selection on the menu. To reorder an entry on the *Start Programs* menu:

1. Highlight **File System**.
2. Activate the *bar* and key **G**.
3. Select **Reorder** (key an **R**, or highlight **Reorder** and press Enter). A prompt on the screen tells how to complete the reorder.
4. Highlight the new position, ***Command Prompt***.
5. Press Enter to execute.

   That is it, folks. Now, *File System* is first. After an IPL, when you press Enter, you are directly in the *File System* environment.

## Lab Project 4. File System

During this project we will browse through the file system. You will also have an opportunity to practice some DOS commands we reviewed earlier and observe the difference in the way results are presented.

You should be at the *Start Programs* screen.

1. Press Enter to start the ***File System.***

   *File System* should be the first entry, since we reordered the entries in the previous project.

2. Refer to page 54 of *Getting Started...* (section of your SCM).

The screen on your machine should be similar to the one shown in the SCM. Reference 4 points at the drive identifier field, which indicates the drives DOS has detected on the system. On yours, the default drive (highlighted) is **A**, since we IPLed from diskette. The last letter should match the drive name of your virtual disk.

The path shown on your Root Directory 5 is **A:** . The path sets the search pattern for executable files with BAT, COM and EXE extensions.

In the Filename Area, the default parameter for the directory command is: ***.*** As you change the search argument, it is automatically updated as we will illustrate in the next few steps.

3. Tab to the drive identifier section and select **B** and press Enter.

   If your machine has only one drive, insert the LAB2 diskette in drive **A** and press Enter. (You may have to press Enter twice to cause the diskette to be "read.")

4. Highlight **Options** on the *Action bar* and press Enter.

5. Key **D**

6. Within the window, using the **Tab** key followed by the up and down cursor, highlight **Extension** and press Enter.

   Here, we are! The file names are listed in alphabetical order by file extensions.

   You can use the question mark (?) or the asterisk (*) to limit the search as described in the Appendix D. Try other combinations of your own, if you wish; for example, key **S*.*** which will list all files beginning with an *S* (3 files on LAB2.), or key **S*.E*** to list all files whose name starts with an *S* and an extension starting with an *E*.

   Restore the parameter *.* to display a complete listing of the diskette before you continue.

7. Tab to the **Directory Tree** section 2 .

8. Use the down arrow on the numeric key pad to highlight the **SUBPRJT1** sub-directory.

9. Press Enter to **mark** it.

   Two changes take place: both the path and the file list are updated.

   The Directory Tree for LAB2 shows the Root directory and two sub-directories: Project1 and Project2. Each of these two sub-directories has its own sub-directory, Subprjt1 and Subprjt2.

   The Directory Tree area of the screen displays with graphics the relationship between root and sub-directories. Previous DOS versions did not use graphics to show the Tree. In Appendix D is an illustration of earlier displays.

10. **Tab** to the File List. Press the space bar to **mark** the file.
11. Activate the *Action bar* (F10); **File** is highlighted.
12. Press Enter to display the functions (similar screen on page 70 of *Getting Started...)*.
13. Key a **V** to view the content of the file. You should see this:

```
                        File View
  To view a file's content press PgUp or PgDn.
  Viewing file: A:\PROJECT1\SUBPRJT1\FILEP1S1.TXT

      ======= Top of file (included in the file) =======

    Hi!  This is the file you are expected to see.


 DOS starts displaying the content of the file right below the frame
in which the file name and the associated path are displayed.

 This file is in the sub-directory SUBPRJT1, which is a sub-directory
of the PROJECT1 sub-directory.  It occupies...
⋮
      ======= Bottom of file (included in the file) =======
```

14. Press **F9**.

    F9 acts as a toggle switch to display the file in either ASCII or Hexadecimal. Depending on the file it might be easier to read it in the Hex format; for example, a compiled program.

15. Press **Esc** to exit the View function.
16. **Mark** the file again (highlight, and press the space bar).
17. Activate the *Action bar*. Select **Options** and Enter. Select **Show Information** and Enter.

    You should be displaying a window with four sections of data: File, Selected, Directory, and Disk. Three of these sections File, Directory, and Disk describe the file, the directory it is in; and the disk on which it is stored. The fourth section, *Selected*, indicates the number of files that are marked along with that

file and the amount of space they occupy. This information can be useful when copying or deleting a group of files.

18. Press **Esc** to cancel.
19. Key **X** twice to return to the *Start Programs.*

A summary of the steps you have just completed might be welcome at this point. You selected the File System by pressing the Enter key at the main menu. This displayed the drives installed on the system, showed which drive was the current default drive, showed the directory tree of the drive and files in the Root directory. File were listed according to the default parameter *.* of the **DIR** command.

We used the Tab key to move from section to section of the menu. We used the directional arrows to move within a section, the Enter key to mark a change of drive or directory, and the space bar to mark a file before performing a function on it. Finally, we looked at *Options* and displayed file information including size, directory, and the medium or device on which it is stored.

## Lab Project 5. Creating/Editing Files

**Creating:** Now that you are getting accustomed to the *File System*, let us use it to create a file. We will use Edlin as an editor to create a file and then we will store the created file on the virtual disk.

Edlin is an easy-to-use program that has a limited number of commands. The third section of your SCM consists of a description of the editor. If you'd like to take a few minutes to look at that section now, go ahead.

1. Load the *DOSShell.*
2. Select drive **B** or insert LAB2 in drive **A**.
3. Go to the file name area of the ***File System***
4. Highlight **Edlin** and press Enter.
5. Key your **VDISK identifier** on the option line, followed by a colon, a file name and an extension (e.g. e:Testfile.tst), and press Enter.

   The screen is cleared and on the first screen line is displayed: *New file*, with an asterisk directly below the *N*.

   What happened? When you pressed Enter, DOS searched for the Edlin Editor, loaded it, created a new file and became ready to act on that file. Our next step will put us in Input mode.

6. Next to the asterisk, key in the digit one followed by the letter *i* (**1i**), and Enter.

   You are now displaying **1:***. Key in your name and press Enter. **2:*** is now displayed on the last line. Every time you press Enter, a new line number is generated. Enter three or four lines of data, then press Ctrl+Break to terminate Input mode. You now have an asterisk in the first position of the following line.

7. Enter an "L" (key the letter "L," press Enter) to list what you have keyed in.

   If you do not like what you keyed, you will have an opportunity to change it in a short while.

8. Enter an "E" to end Edlin.

DOS writes the file you just created onto the VDISK.

9. Now that you have created a file, use the *File System* to view this file. Do this now.

   If you are not successful, we will help you. Remember, you have written the file on the VDISK; do not shut the machine off or re-IPL. If you do, there will be nothing to look at.

10. If you were successful in viewing the file, you have our congratulations. Skip the following paragraph and go to editing.

    To view the file, select the virtual drive in the Drive Identifier section of the *File System* (page 54 in *Getting Started ...* 4 ) and press Enter. You then go to the *Filename Area* and mark the file by pressing the space bar. Activate *File* on the *Action bar* to list the functions. Finally, you key a **V** to view the file. If you still need more help, refer to Lab Project 4.

    **Editing:** Editing a file, making change to the file, requires steps similar to creating a file. That is, you:

    a. Activate the *File System*, and **Tab** to the File name area.

    b. Select the editor (Edlin).

    c. Enter the file description on the option line (within the window). That is: the drive where the file is stored, the file name and extension, if any, that you want to change.

       We will use the file you just created to practice editing.

    d. Execute the above steps to get to the end of your Input file.

       The first Edlin prompt in Edit mode is different from the prompt displayed when you are creating a file. The Edit prompt is *End of Input file*, and an asterisk is placed in the first position of the next line.

11. Enter an "L" to list the file.

12. Enter the line number you want to change.

    This displays the data for that line. Right below, the number of the same line is again displayed to receive the new data.

13. Change the line of data and Enter.

14. Enter an "L" again to list the altered file.

15. Enter "E" to end Edlin.

16. Press Enter to go back to the *Shell.*

This concludes the project on **creating** and **editing** a file.

## Lab Project 6. Copying Files/Creating Directories

This Lab project copies a file from a root directory into a third-level directory on the VDISK disk.

All disk or diskette drives have a root directory identified by a back slash (\). Any additional directory created on that drive is considered a sub-directory. When creating a sub-directory, it becomes a sub-directory of the current one, unless you specify the path that the new sub-directory should have.

Before copying a file, let us ensure that we have both a file to copy and a sub-directory to copy the file to.

1. First, let us get the directory. We do not yet have a third-level directory within which to put the file. Let us create a third-level directory (ref. page 64 of *Getting Started....*)
2. Activate *File System*, select the VDISK drive and press Enter to read and display its content (empty or the Testfile.txt from lab project 5).
3. Activate the *File* option and Enter "e" to create a directory.
4. Key in **Level1** and Enter.

   A new directory is added to the root directory on your VDISK. You should see *Level1* displayed beneath the root directory.
5. Move to the *Directory Tree* area, highlight the *Level1* directory, and press Enter to mark it.
6. Activate the *File* option again and create another directory called **Level2.**
7. Step down to the *Level2* directory.

   We stated at the beginning of this project that we were going to copy our file to a third-level directory. You recall that sub-directories appear after the root directory, which is level 0.

   Let us select a file to copy to the Level2 directory. We will use a file name *Shell.MEU* on LAB1. Let's go to it.
8. Select drive **A**. (Tab to the drive identifier area, move to **A**, press Enter, and tab to the *File Name* area).
9. Mark the *Shell.MEU* file.
10. Activate the *File* option on the *Action bar*
11. Key in "c" to display the window where you will enter the destination of the copy.
12. Enter **?:\level1\Level2** (where ? = Letter for VDISK, (C, D, or E)).
13. Go to the *Level2* directory and verify that the file is there.

    Now we are going to delete that copy of the *Shell.MEU* from the VDISK (or anywhere else you might have mistakenly copied it to), leaving the original file on the **A** drive.
14. Mark the file (*Shell.MEU*) that you copied to your VDISK.
15. Activate the *File* option on the *Action bar.*
16. Key in a "**D.**"

A window displays the name of the selected file.

17. Press Enter.

    A window displays a message to verify the choice.

18. Select option 2 to delete the file.

19. Activate *File* one more time.

    Notice that there is no available option to remove a directory. When a sub-directory is empty, then the sub-directory itself can be deleted. We will do this now.

20. Enter a "d" to delete the sub-directory.

    Again, you have an opportunity to change your mind. By now, you have probably gotten the idea. Highlight **2** to delete that sub-directory.

This concludes lab project 6.

## Lab Project 7. Menu Maintenance

In this lab project we will add an entry to the *Start Programs* menu. We will create an entry identifier or descriptor for our editor to place on the default screen. We will call it "Create/Edit a file," and this descriptor will call Edlin. We will include in the command a few of the Program Startup options (page 90-92 of *Getting Started...*) to enhance the entry.

1. Display the *Start Programs* screen.
2. Activate the **Program** selection on *Action bar.*
3. Key an **A** to select the Add function.

   The window (ref. page 85) displays four entry lines: two are required, the other two are optional. Edlin, the DOS editor, is on the LAB2 diskette. Let us use it for the *Start Programs* addition. You will need to press F4 between commands to insert the two bars (‖). These bars are command separators and allow you to distinguish the sections of combined commands. Fill in the window fields. When you have completed, it should like the following screen with the exception that the entire command is not displayed.

4. Here is the complete statement you must enter for the *Commands* line:

   **Edlin [%1 /I"Enter name of file to create or edit." /P"Filename: " /D"?:" /C"%1"] ‖type %1‖Pause** (Space between parameters are not required, but you must include the brackets after Edlin and before the first parallel bars.)

```
Required

  Title . . . . [Create/Edit a file      >
  Commands  . . [Edlin [%1/I"Enter file   >


Optional

  Help Text . . [This file will be stored on the VDISK.
  Password  . . [LETMEIN ]
```

**Notes:**

a. **Remember to substitute your VDISK identifier for the question mark (?).**

b. **Press F4 for parallel bars (||).**

c. **Should you change the password, make a note of it. You will need it later.**

Let us take a look at the command you just entered. If it appeared complex, a quick inspection will convince you of the opposite. Five parameters were entered in brackets to customize the command Edlin. These parameters are: %n, I, P, D, and C (page 90-92 of *Getting Started...* ).

- **%n** causes DOS to request for the file name you want to work with.
- **/I** displays the instruction that follows it. That statement is between the double quotes.
- **/P** prompts the word Filename, which is in quotes next to it.
- **/D** displays in the Filename window the default drive where that file is expected to be found or saved.
- **/C** saves the file name that is entered for additional processing.
- The other two commands, separated by the parallel bars, are used to display the content of the file that was just created or edited, and to pause before returning to the main screen.

5. Press F2 to save your entries and update the menu.
6. Highlight the new entry and press Enter

   You should display a window as follows:

```
                Program Parameters

        Enter name of file to create or edit.

         Filename: [?:              >

  ------------------------------------------------------

        <—┘ = Enter   Esc = Cancel   F1 = Help
```

7. Key a name for that file, and press Enter.

   You should be on the familiar grounds of Edlin. Enter an **I** to start Input mode, and a few words to test the next command in the string (Type). After exiting Edlin, whatever you keyed is displayed, followed by the prompt *Press any key to continue.* OK! Press any key to return to the main menu. Now, we are going to delete an entry from the default screen.

8. Highlight *Format*; **do not** press Enter.
9. Activate *Program.*
10. Select *delete.*
11. Take option **1** to delete *Format* from the menu.

Adding entries to the *Program Group* or *DOS Utilities* options requires steps similar to those we just completed and will not be repeated.

This concludes Lab Project 7 and the lab activities for the course. Should you like to review or practice other options, now is an opportune time!

## Study Questions

T F 4. When the *Action bar* is activated, keying **X** twice exits the DOS *Shell Program*

T F 5. Each time you press F10, the *Action bar* is activated.

6. Give the sequence of steps to view a Text File:

   ___ Key in a **V** to view the file
   ___ Activate the *File System*
   ___ Select *File* and Enter to display functions

T F 7. You can reorder the four basic entries of the main menu, but they cannot be deleted.

## Summary

Now you should be familiar with stepping through the *Shell Program.* In conclusion, the steps that we took during these lab projects were the use of F10 as a toggle switch to activate or deactivate the *Action bar*, and pressing the Enter key to list the functions for that option. From the list of functions, we used a "letter command" or moved the highlight bar to a function and pressed Enter to execute it. You use the Tab key to move from section to section and the cursor arrows to move within a section. Pressing the Enter key in the *Drive Identifier* or *Directory Tree* sections marks the drive or the directory. Within the *Filename Area*, you use the *space bar* to mark a file.

# Session 4. Warranty/Support Structure

## Introduction

This session covers the warranty terms and conditions for DOS 4.0 and the structure available to the customer.

## Objectives

Upon completion of this session, you should be able to:

1. Understand and discuss the IBM Warranty terms and conditions for DOS 4.0.
2. Assist your customer with support structure information to resolve DOS 4.0 problems and/or defects.

## Warranty Terms and Conditions

IBM provides a 90-day limited warranty on the DOS 4.0 Media (diskette) and Program (code).

**Media:** IBM warrants the media to be free from defects in material and workmanship under normal use during the Warranty Period. If notified during the warranty that the media contains such defects, IBM will replace the media. If IBM is unable to deliver replacement media, the customer may terminate the license, and obtain a refund upon return of all copies of the program.

**Program:** The Warranty Period for the program is for three months from the date of its delivery to the original user shown by a receipt from the point of sale.

IBM warrants that this program, if unaltered, will conform to its Program Specifications during the Warranty Period when such program is properly used on a machine for which it was designed. If notified during the warranty period that the program contains defects, IBM will:

1. Attempt to make the program operate as warranted, by:
   a. Providing a correction, if prior to the Service Expiration Date.
   b. Providing any existing corrections, if after Service Expiration Date.
2. Replace the program with a functionally equivalent program, as determined by IBM. In the event that IBM does not provide a remedy, the customer may terminate the license, and money will be refunded upon return of all copies of the program.

## Service and Support

Since customers may request your assistance on DOS 4.0 questions and problems, here is a description of the "Customers" Support Structure.

Customer support is available until August, 31 1989, through a "Registered Service Coordinator." To determine who the "Registered Service Coordinator" is, ask the customer to find where the DOS 4.0 was purchased. Generally, when DOS 4.0 packages are purchased from IBM, customers assign their own "Registered Service Coordinator." When the customer cannot determine who the "Registered Service Coordinator" is, a phone call to the local IBM Marketing Representative or System

Engineer may be necessary. However, if the DOS 4.0 package was purchased from an IBM Authorized Dealer, the dealer serves as a "Registered Service Coordinator."

The "Registered Service Coordinator" will be designated at the time the program license is acquired, and may be a dealer or a customer representative, depending on the type of contract and where the program license is acquired. The Service Coordinator is the first level of customer assistance; the customer contacts the Service Coordinator for any problem requiring IBM assistance.

The "Registered Service Coordinator" is responsible for assisting the customer with:

- Determining if a problem is caused by hardware, software, or improper use of the Operating System
- Reporting defects through the IBM Support Structure, when a DOS 4.0 defect is suspected
- Applying preventive and corrective service
- Helping the user install the corrections
- Working with IBM support functions to define and/or resolve a problem.

Upon request from a registered Service Coordinator, IBM responds to a defect in the unaltered portion of a supported release of the licensed program by issuing corrective service information such as:

- Correction documentation
- Corrected executable code
- Notice of availability of corrected code
- Restriction or bypass as determined by IBM.

  This support is applicable only if a problem occurs in the operating environment in which the product was intended to be used.

Preventive service may be provided through updates to a program. If an update is made available by IBM, information will be made available to the registered Service Coordinators, and instructions for distribution and/or ordering of copies will be distributed to each customer's Service Coordinator.

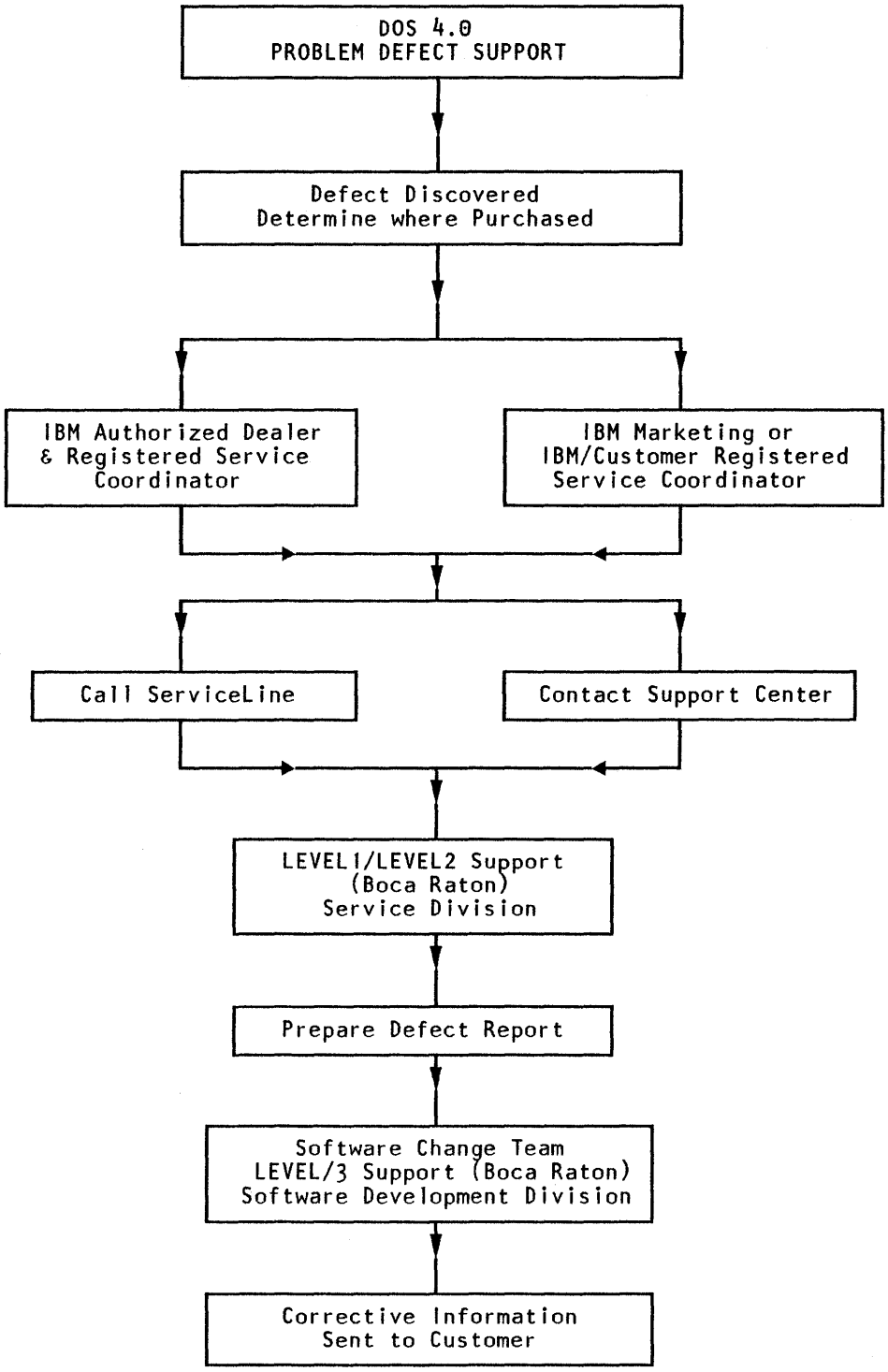
When "Registered Service Coordinators" need assistance, they can access either the **ServiceLine** or the **IBM Support Center**.

*ServiceLine:* The *ServiceLine* is an on-line electronic data-base and problem reporting facility that "Registered Service Coordinator" access through a Modem. The need for the Modem might limit the number of "Registered Service Coordinators" able to use this service.

*IBM Support Center:* "Registered Service Coordinators" may call the IBM Support Center to obtain assistance in problem diagnosis and resolution. When a DOS 4.0 defect is determined, the support center follows through with corrective service for the customer. The support center generally operates in a call-back mode, returning the "Registered Service Coordinator" call by the end of the next business day. The Software Support Center has a structure that is similar to the Hardware Support Center. It also has three levels, which are located in Boca Raton, Florida. LEVEL1 and LEVEL2 are part of the Service Division, and LEVEL3 is part of

Software Development Division. The next page shows a flow diagram of the "Registered Service Coordinator" — IBM Support Center interaction.

## Coordinator — Support Center



## Study Questions

T F 1. Program Service is provided to registered Service Coordinators only.

T F 2. Program Services will be available until August 31, 1989.

## Course End

This concludes the study material for this course. Appendix A contains a Student Course Evaluation form to enter your evaluation of this course.

The FIS system provides a COMMENT function to enable you to forward to the author comments and suggestions.

You are encouraged to use these means to send your comments. They are appreciated and help us provide you a better course.

Take the final quiz, which is in Appendix E.

Return the library materials to your coordinator.

To enter your answers in the FIS system, you will have to re-IPL the Learning System machine without any diskette in drive A.

# Appendix A. Student Course Evaluation

Appendix A. Student Course Evaluation

Please rate the following items as accurately as you can. The results of this evaluation will be used to improve the training of those who take the course after you.

Use the following scale to rate the items below:

a = Very Good  b = Good  c = Average  d = Poor  e = Very Poor

___ How the course met its objectives.

___ The quality of course content.

___ The quality of course delivery.

___ Your overall satisfaction with the course.

___ Availability of course materials.

___ Scheduling of time to complete the course.

___ Freedom from interruptions by local personnel.

Enter your answers in *boxes 1 through 7 of Area 1* on the FIS Data Collection Sheet located at the back of this SSC. If the sheet is missing from your SSC, contact your education coordinator.

# Appendix B. FIS Terminal Procedures

To sign-on the FIS system, refer to the Learning System Wall Chart at your location, and follow the instructions for *Using the Learning System* following the path for a 7XXXX course.

# Appendix C. Answers to Study Questions

Session 1

1. Fastopen

2. Append

3. SELECT

Session 2

1. Tree

2. b

3. d

Session 3

1. t

2. a
(Explanation: The parameter /W of the Dir command displays the files five abreast. All files with a name of seven character or less (TAX = 3 + ????) were selected.)

3. Path or Append
Lab projects study questions.

4. t

5. f

6. 3, 1, 2

7. t

Session 4

1. t

2. t

# Appendix D. DOS Review

## Directory

The directory command, **Dir**, is probably the most commonly used DOS command. You enter it any time you want to know the content of a disk or diskette. It displays on successive lines: file name and extension (if any), size, date and time of creation. Let us apply it to a hypothetical diskette for now. You enter **Dir** and observe the following list of files:

```
TAXGAIN.87     1234   4-15-87  11:30p
TAXLOSS.86    23980   4-15-86  11:30p
TAXINCOM.87    1234   4-15-87  11:30p
TAXPG.EXE     99999   1-01-88   8:30a
TAX.BAT          45   1-09-88   9:02a
TAXTBLE.87    45897   1-01-87   8:52a
```

There are parameters such as: /W, /P, *, ? which enable you to modify the search of files or to limit the scope of the search.

The **Dir /W** command displays file names in rows of five columns; applied to the same hypothetical diskette, this command produces the following result:

```
TAXGAIN.87   TAXLOSS.86     TAXINCOM.87     TAXPG.EXE      TAX.BAT
TAXTBLE.87
```

The *asterisk* (*) is the default parameter of the directory command, but it can be used to assist in more limited searches.

When you enter **Dir**, DOS interprets it as **Dir *.***. The *asterisk* is a substitute for any character or word in the file name or extension field. However, characters on the right of the *asterisk* are ignored. By selectively using the *asterisk*, you can search for files with a specific extension or name. For example, **Dir Tax*.87** will display all the Tax files with an 87 extension as shown in the following illustration. That is,

all files with *Tax* as the first three letters of the file name and *87* as the file extension will be displayed.

```
TAXGAIN.87     1234   4-15-87  11:30p
TAXINCOM.87    1234   4-15-87  10:30p
TAXTBLE.87    45897   1-01-87   8:52a
```

Entering **Dir Tax.*** displays the only file with the name *Tax*:

```
TAX.BAT          45   1-09-88   9:02a
```

Parameters can be combined for added flexibility. For example, when you enter **Dir *.exe /w /p**, all the files with an **exe** extension are displayed five abreast, with a pause when the screen is full. The parameter **/P** causes the listing on the screen to pause, rather than scrolling off the top. If there were more than one screen of files, you would press any key to display the next screen, and would repeat the process until you reached the end of the list. Such a combination of parameters is useful when you have many files. Here, it would take over one hundred files with an **exe** extension to fill the first screen (5 files per line x 24 lines).

The question mark (?) is also used as a default modifier. It affects only the column where it is inserted. For example, **Dir Tax??.*** generates a search for files with a three to five character name field whose first three characters are *Tax*. An illustration of the result of that search follows:

```
TAXPG.EXE    99999   1-01-88   8:30a
TAX.BAT         45   1-09-88   9:02a
```

### Pipe and Filters

The *Pipe* and *Filters* functions, although not related to the **Dir** command, are easily illustrated with it, so we will present them at this point.

A DOS **Pipe** function, represented by the split vertical bar symbol (¦), allows you to chain commands and automatically redirect output to the standard Input and Output devices. Standard Input and Output devices are the keyboard and the display. (If you need more information on how to redirect Input and Output, consult any DOS manual at version 2.0 or higher.) The command is piped through one of the three DOS **filters**: *Sort, Find, and More*. In essence, you are forcing the command to go through a filter that modifies the output format. The following example illustrates the command structure for the directory command piped through the **Sort** filter.

```
Dir ¦ SORT
```

The result is that the list of files is sorted before it is displayed on the screen.

You can pipe more than one filter. Add the **More** filter to the above command to stop the rolling of the screen and display the word *—More—* in the lower right corner of the screen, if there are more files to be displayed. Then, you press any key to continue.

```
Dir ¦ SORT ¦ More
```

You can enter a filter with additional parameters such as: /+n. N is a number added to the first position of the file name field to be sorted. For instance, adding /+9 as a parameter, starts the sort in position 9 of the file name and results in a listing of the directory files sorted by extensions (since 8 characters are the maximum number of positions for a file name field). That combination of parameters is illustrated in the following screen. The /R parameter is included to sort in descending order.

```
Dir ¦ SORT /R/+9 ¦ MORE
```

Although parameters can be added to a filter, none can be added to the command. If parameters are added to the command, the command parameters will be executed and the pipe continuity is destroyed.

## Path

You probably noticed the word *Path* in the last example; it is the result of a previous execution of the **Path** command. It is often included in the *Autoexec* or other batch files to establish the directories search pattern for the retrieval of executable files; that is, files with a **BAT, COM, or EXE** extension. It is a very useful command to assist in improving Personal Computer efficiency. The greater the number of directories, the more useful it becomes to set the path command. It eliminates the need to key the path when these files must be accessed.

The **Path** command sets the search pattern for an executable file. In a multiple directory environment, either on disk or diskette, when a program is invoked, it must be in the current directory to be found. **Path** ties directories to extend the search pattern. The **Path** command is effective only on executable files. That means only files with one of the following three extensions: BAT, EXE, or COM will be found. To locate files with any other extension, Enter the directory name within which they are stored, when they are not in the current directory. Similarly, when creating a file which will be stored in a different directory, the directory name will precede the file name.

The **Path** command is entered with or without parameters. When entered without parameters, it returns a message indicating the current path of the default drive. For example, if the default drive is *b*, the returned message is likely to be:

```
Path=b
```

No other information is displayed because the path is not defined, which is often the case with diskettes.

For a hard disk, the returned message from the **Path** command could be:

```
Path=c:\;\EDITOR;\d:\BACKUP;\COMPILER
```

This path shows the four directories that would be searched when a command is entered from any one of these directories. For example, if you want to use Edlin (DOS line editor) to edit a file in a directory called Workarea, you would enter:

```
Edlin \workarea\myfile.xxx
```

Because of the **Path** command previously entered, there is no need to re-define the path for Edlin, since we are assuming it to be in the Root directory. DOS will go to the Root directory, load Edlin, and then go to the Workarea directory, and search for myfile.xxx.

When **Path** is entered with parameters, it modifies the environment for the duration of the DOS session (until machine is re-IPLed).

## Prompt

The **Prompt** command becomes very significant in a multi-directory environment. The traditional DOS prompt displays the drive name followed by the *greater* than symbol ( A> ). When you have more than one directory and you are changing from one to another, there is no visual reference of the directory you are using. The prompt command can be useful in overcoming this situation. Again, you can make the change for only the session, or it can be made permanent by adding it to the Autoexec file. The command that displays the drive name and its current directory is: **Prompt = [$P]** There is a long list of parameters and options you can use with the **Prompt** command. We will not discuss them in this course, but for more information on the prompt options and the commands we reviewed, refer to a DOS manual.

## Set

The **Set** command, like the Path command, is used to modify the DOS environment. You can use it to change the number of characters per line on your printer from 80 to 132, or to change the display mode from 80 to 40 characters per line. It is used to modify parameters in the system environment.

Like the path command, the **Set** command without parameters displays the current set of modifications if any. When entered with parameters, it modifies the system

environment for the duration of the session. Here is the displayed information for **Set** after a system was IPLed with the LAB1 diskette:

```
COMSPEC=A:\COMMAND.COM
PATH=A:\;B:\;D:\
PROMPT=$p$g  $d  $
```

## Tree

The **Tree** command has many similarities with the directory command. It is more commonly used with hard files to list directories and sub-directories, and their relationships. When a drive is not specified, the default drive is selected.

To list the *files* in a sub-directory, use the **Tree** command with the **/F** parameter. As diskettes with larger densities become more common, the use of sub-directories on diskettes will most likely increase. You will have the opportunity to practice this command later; meanwhile, here is an example of the **Tree /F** command applied to a hard file:

```
Path: \EDITOR\SAMPLE\BACKUP\COMPILER

Sub-directories: SYS
                 : L
                 : MAX

Files:
          file1.xxx
          file2.yyy
          file3.zzz
```

## Editors

There are three types of editors:

- Character editor
- Line editor
- Screen editor.

DOS offers two of them; the character editor, which is internal, and the line editor, *Edlin*, which is external. External means it is a stand-alone program on the DOS

diskette, rather than being memory resident. It can be copied to another disk or diskette.

# Appendix E. Final Quiz

1. Select the command that is improperly defined:

   a. The *Tree* command lists all directories and their related sub-directory(ies), if there are any
   b. The *Path* command assigns the routing of all files on a hard disk
   c. The *Set* command modifies the environment for the duration of the session.

2. DOS version 3.3 is enhanced with:

   a. New features and commands
   b. Revised commands
   c. Code suitable for the PS/2
   d. All of the above.

3. DOS 4.0 *program shell* supports:

   a. A mouse
   b. Windows
   c. Traditional DOS prompt format: *d*> (*d*=drive).
   d. Utilities
   e. All of the above.

T F 4. It is possible to customize the installation of the *Program Shell.*

5. DOS version 4.0 cannot be installed on:

   a. Personal System/2
   b. Personal Computer XT with 256 Kbytes of memory
   c. Personal Computer AT with 512 Kbytes of memory
   d. PC*jr.*

6. When the DOS 4.0 *Shell* is loaded, it displays the following items, except:

   a. A screen title
   b. An *Action bar*
   c. A menu title
   d. A default menu
   e. A menu level.

7. To properly exit the shell:

   a. Activate EXIT on the *Action bar* and press ENTER, or key an **X**
   b. Press Ctl + Break keys
   c. Press F3
   d. Press F1.

T F 8. Command key F10 moves highlighting between the Action bar and the menu areas.

T F 9. Some Update functions cannot use F1 for help.

T F 10. All invalid selections from a menu produce an error message.

11. (Select the best answer.) When assistance is required to resolve DOS 4.0 problems, contact:

    a. Local designated hardware support CE
    b. IBM marketing representative
    c. Nearest Hardware Support Center
    d. Registered Service Coordinator for the account.

# Appendix F. Data Collection Sheets

STUDENT NAME _____ STUDENT SERIAL _____ COURSE NUMBER _____

**AREA 1** – STUDENT OPINION RESPONSES: ☐ 0 ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐ 8 ☐ 9 ☐ 10 ☐ 11 ☐ 12 ☐ 13 ☐ 14 ☐ 15

**AREA 2** – ANSWERS TO COURSE QUIZ *(MAXIMUM 20 CHARACTERS EACH)*:

| | | |
|---|---|---|
| 1. _____ | 2. _____ | 3. _____ |
| 4. _____ | 5. _____ | 6. _____ |
| 7. _____ | 8. _____ | 9. _____ |
| 10. _____ | 11. _____ | 12. _____ |
| 13. _____ | 14. _____ | 15. _____ |
| 16. _____ | 17. _____ | 18. _____ |
| 19. _____ | 20. _____ | 21. _____ |
| 22. _____ | 23. _____ | 24. _____ |
| 25. _____ | 26. _____ | 27. _____ |
| 28. _____ | 29. _____ | 30. _____ |

**AREA 3** – TOTAL STUDY TIME FOR THIS COURSE TO DATE: ☐☐ . ☐ *(FORMAT = HH.T)*

**AREA 4** – COMMENTS TO COURSE AUTHOR *(USE OTHER SIDE OF THIS FORM)*

IBM®

# FIS DATA COLLECTION SHEE

ZR31-1007-(

**AREA 4** — COMMENTS TO COURSE AUTHOR *(USE ADDITIONAL PAPER AS REQUIRED):*

STUDENT NAME _____ STUDENT SERIAL _____ COURSE NUMBER _____

**AREA 1** – STUDENT OPINION RESPONSES: ☐ 0 ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐ 8 ☐ 9 ☐ 10 ☐ 11 ☐ 12 ☐ 13 ☐ 14 ☐ 15

**AREA 2** – ANSWERS TO COURSE QUIZ *(MAXIMUM 20 CHARACTERS EACH):*

| | | |
|---|---|---|
| 1. _____ | 2. _____ | 3. _____ |
| 4. _____ | 5. _____ | 6. _____ |
| 7. _____ | 8. _____ | 9. _____ |
| 10. _____ | 11. _____ | 12. _____ |
| 13. _____ | 14. _____ | 15. _____ |
| 16. _____ | 17. _____ | 18. _____ |
| 19. _____ | 20. _____ | 21. _____ |
| 22. _____ | 23. _____ | 24. _____ |
| 25. _____ | 26. _____ | 27. _____ |
| 28. _____ | 29. _____ | 30. _____ |

**AREA 3** – TOTAL STUDY TIME FOR THIS COURSE TO DATE: ☐☐ . ☐ *(FORMAT = HH.T)*

**AREA 4** – COMMENTS TO COURSE AUTHOR *(USE OTHER SIDE OF THIS FORM)*

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# FIS DATA COLLECTION SHEET

ZR31-1007-02

**AREA 4** – COMMENTS TO COURSE AUTHOR *(USE ADDITIONAL PAPER AS REQUIRED):*

STUDENT NAME _____ STUDENT SERIAL _____ COURSE NUMBER _____

**AREA 1** – STUDENT OPINION RESPONSES: ☐ 0 ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐ 8 ☐ 9 ☐ 10 ☐ 11 ☐ 12 ☐ 13 ☐ 14 ☐ 15

**AREA 2** – ANSWERS TO COURSE QUIZ *(MAXIMUM 20 CHARACTERS EACH)*:

| | | |
|---|---|---|
| 1. _____ | 2. _____ | 3. _____ |
| 4. _____ | 5. _____ | 6. _____ |
| 7. _____ | 8. _____ | 9. _____ |
| 10. _____ | 11. _____ | 12. _____ |
| 13. _____ | 14. _____ | 15. _____ |
| 16. _____ | 17. _____ | 18. _____ |
| 19. _____ | 20. _____ | 21. _____ |
| 22. _____ | 23. _____ | 24. _____ |
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