# MS-DOS

## Software Installation Guide

**olivetti**
PERSONAL
COMPUTER

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**Information from
Olivetti Documentation**

## PREFACE

This publication is an installation guide for the MS-DOS operating system. It describes the installation of Microsoft MS-DOS Version 3.30 on an Olivetti Personal Computer.

## SUMMARY

The first chapter of this guide presents the contents of the MS-DOS Software Kit. The other chapters tell the user how to install the MS-DOS operating system onto his computer. Chapter 3 covers installation of national keyboard drivers and fonts. Chapter 4 covers installation of code page switching for suitable devices. Chapter 5 covers installing MS-DOS on floppy disk based systems. Chapter 6 covers installing MS-DOS on hard disk based systems. Chapter 7 tells the user how to configure his operating system for optimal running. There are five appendices which contain other useful information.

## PRE-REQUISITE PUBLICATIONS

Installation and Operations Guide for your Personal Computer.

## RELATED PUBLICATIONS

MS-DOS User Guide
MS-DOS Quick Reference Guide
MS-DOS Messages
MS-DOS Reference Manual
MS GW-BASIC Interpreter under MS-DOS User Guide
MS GW-BASIC under MS-DOS Quick Reference Guide

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# 1. PRESENTING MS-DOS

## PRESENTING MS-DOS - THE OPERATING SYSTEM WITH THE MOST APPLICATIONS

Congratulations on buying the operating system that runs more applications on your Personal Computer than any other competing operating system. This version of MS-DOS supports networking, multiple MS-DOS partitions on your hard disk, virtual disk in main memory, 5 1/4 inch and 3 1/2 inch floppy disk drives, and many other storage devices. Read this manual and the "MS-DOS User Guide" for more details.

Remember, your Olivetti dealer is always available to provide assistance and training.

### THE MS-DOS SOFTWARE KIT

This Software Kit contains the following items:

* MS-DOS Software Installation Guide

* MS-DOS User Guide

* MS-DOS Quick Reference Guide

* MS-DOS Messages

* Software Diskette(s), two 3 1/2 inch diskette and three 5 1/4 inch diskettes.

## WHAT SHOULD YOU READ

Before running MS-DOS read:

* Your computer's Installation and Operations Guide

* Part 1 of the MS-DOS User Guide, if you lack the basic concepts of MS-DOS

* This Software Installation Guide, if your software has not been set up ready for you.

After MS-DOS has been installed refer to the following manuals for the syntax and meaning of the MS-DOS commands:

* Part 2 of the MS-DOS User Guide

* The MS-DOS Quick Reference Guide.

If you see a MS-DOS message that you don't understand or you don't know how to respond- look it up in the "MS-DOS Messages". All the MS-DOS messages are listed there in alphabetical order along with an explanation of their meaning and possible responses. The manual serves as a "trouble-shooting guide" for MS-DOS.


## CONTENTS OF THE MASTER DISKETTE(S)

There are three 5 1/4 inch diskettes: a Startup Diskette, an Operating Diskette  and a Supplemental Diskette,

**and**

there are two 3 1/2 inch diskettes: a Startup/Operating Diskette and a Supplemental Diskette.

The following table shows the contents of the 5 1/4 inch Startup Diskette and a partial contents of the 3 1/2 inch Startup/Operating Diskette. Note that for Version 3.30a the file distribution per disk may vary.

| FILE NAME | DESCRIPTION |
|-----------|-------------|

ANSI.SYS  The American National Standards Institution Standard screen-handling and keyboard extension device driver. The installation of this device driver is described in Appendix C "Installable Device Drivers" in this manual. The ANSI escape sequences themselves are documented in the "MS-DOS Reference Manual" (orderable separately).

COMMAND.COM  When the operating system is booted, this external command must either be in the root directory or in the directory given as the *pathname* parameter in the SHELL declaration (see Appendix B "CONFIG.SYS Commands" for more details). COMMAND.COM is an external command used either for reloading the command processor if it gets overwritten, or for calling a secondary command processor. Reloading is automatic if COMMAND.COM is available to the operating system on a loaded disk. See Chapter 7 "MS-DOS Commands" of the "MS-DOS User Guide" for details.

COUNTRY.SYS  This file contains the country configuration information used getting or setting country dependent features. It is best put into the root directory of the booting drive, if you declare COUNTRY in CONFIG.SYS (see Appendix B "CONFIG.SYS Commands" for details).

DISPLAY.SYS  This display (CON) device driver provides code page switching support comprising: download designation of up to twelve code page images; invocation of one of these code page images; status querying of the

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| FILE NAME | DESCRIPTION |
|-----------|-------------|

active and displayed code page; listing of the possible code pages. The installation of this device driver is described in Appendix C "Installable Device Drivers" and see Chapter 4 "How To Use Code Pages" for an example of it's use.

**DRIVER.SYS**    A generic block device driver. This driver must be used with care. It is recommended that end-users ask their dealers or qualified service personnel for assistance in using this driver for configuring block devices. The installation of this device driver is described in Appendix C "Installable Device Drivers" in this manual.

**FASTOPEN.EXE**    This is a terminate and stay resident utility. It enhances the performance of file access functions on hard disk drives. It enables most recently used files to be opened, found, renamed and referenced in other ways without disk input or output. This is most useful for programs that have a lot of overlays or that use a lot of files that are frequently opened or closed. It is recommended that this utility is installed in your AUTOEXEC.BAT file. See Appendix E "MS-DOS Commands" and Chapter 7 "Configuring And Installing MS-DOS" for an example of the command's use.

**FDISK.COM**    This external command is the Fixed Disk Partition Installation Program. It is completely composed of menus giving you choices from which you have to choose. See Chapter 6 "Hard Disk Systems" for details.

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| FILE NAME | DESCRIPTION |
|---|---|
| FORMAT.COM | An external command which formats a disk or diskette to receive MS-DOS files. See Chapter 7 "MS-DOS Commands" in the "MS-DOS User Guide" for details and Chapter 5 and 6 in this manual for an example of it's use. |
| KEYB.COM | This is a terminate and stay resident utility. It provides support for the Olivetti National Keyboards. It is recommended that this utility is installed in your AUTOEXEC.BAT file. See Chapter 3 "Keyboards and Fonts" for details. |
| KEYBOARD.SYS | This is a data file used by KEYB.COM. If you call KEYB, then KEYBOARD.SYS is best placed in the root directory of the booting disk. |
| MODE.COM | This external command is used for: setting RS-232-C protocols; setting and testing the video monitor modes; setting and redirecting printer modes; code page downloading, invoke and status query on a device by device basis. See Appendix E "MS-DOS Commands" for details. |
| NLSFUNC.EXE | This is a terminate and stay resident utility. If you are using code page switching NLSFUNC should be called in your AUTOEXEC.BAT. It provides extended support for using country dependent features of code pages. See Appendix E "MS-DOS Commands" for details and Chapter 4 "How To Use Code Pages" for an example of it's use. |

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| FILE NAME | DESCRIPTION |
|---|---|

PRINTER.SYS   This printer (PRN or LPT1, LPT2 and LPT3) device driver provides code page switching support comprising: download designation of up to twelve code page images; invocation of one of these code page images; status querying of the active and displayed code page; listing of the possible code pages. The installation of this device driver is described in Appendix C "Installable Device Drivers" and see Chapter 4 "How To Use Code Pages" for an example of it's use.

SELECT.COM   This external command installs MS-DOS on diskettes or hard disk. The target disk is formatted so it must not contain any files that are wanted. See Appendix E "MS-DOS Commands" for details and the Chapters 3, 4, 5 and 6 for examples of it's use.

SYS.COM   This external command is used for upgrading an old version of the MS-DOS hidden system files to this new version. When this command is obeyed, the default drive must be the original drive from which the computer was bootstrapped. See Appendix E "MS-DOS Commands" for details. and Chapters 5 and 6 for examples of it's use.

VDISK.SYS   This device driver, if declared in the CONFIG.SYS file, installs a virtual disk. See Appendix C "Installable Device Drivers" for details.

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| FILE NAME | DESCRIPTION |
|---|---|
| XCOPY.EXE | This external command enables whole disks or subdirectory branches to be copied. As such it provides a replacement for DISKCOPY for dissimilar source and target disks. See Chapter 7 "MS-DOS Commands" in the MS-DOS User Guide". |

The following table shows the contents of the 5 1/4 inch Operating Diskette and partial contents of the 3 1/2 inch Startup/Operating Diskette:

| FILE NAME | DESCRIPTION |
|---|---|
| APPEND.EXE | This is a terminate and stay resident utility. The first time it is called it is an external command, thereafter it is an internal command. If used in it's non-extended fashion it provides a list of paths for data searching. This use can be extended to put the list of data search paths in the environment and/or to treat the directories indicated in the list of paths as part of the current directory for commands like DIR, COMP and command execution. See Chapter 7 "MS-DOS Commands" in the "MS-DOS User Guide" for details. |
| ASSIGN.COM | An external command to re-assign the logical drive assigned to a particular physical disk drive. Normally used when application software refers to the "A:" or "B:" drives, but the software is installed on a hard disk, for example the "C:" drive. Not normally used with diskette drive only configurations. See Chapter 7 "MS-DOS Commands" in the "MS-DOS User Guide" for details. |
| ATTRIB.EXE | An external command to set or reset attributes of a file. See Chapter 7 "MS-DOS Commands" in the "MS-DOS User Guide" for details. |

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| FILE NAME | DESCRIPTION |
|-----------|-------------|
| BACKUP.COM | This external command is for backing up files from hard disk to diskette in a special backup format, "RESTORE" is required to restore them. It is possible to use this command to backup from floppy disk to floppy disk, but this is only likely to be used in special circumstances. See Chapter 7 "MS-DOS Commands" in the "MS-DOS User Guide" for details. |
| CACHER.SYS | This device driver if declared in the CONFIG.SYS file, installs disk caching. Frequently accessed backing store data is stored in a main memory buffer or cache. This means when this data is read by a program it is read from main memory instead of from a backing store. This can improve access time by a factor of between 10% and 25% of the original access time. See the Appendix D "The Disk Cache System" for details. |
| CHKDSK.COM | A very useful external command for checking and correcting errors on both floppy diskettes and on hard disks. See Chapter 7 "MS-DOS Commands" in the "MS-DOS User Guide" for details. |
| COMMAND.COM | See the above table "Startup Diskette" for details. |
| COMP.COM | An external command for comparing files. See Chapter 7 "MS-DOS Commands" in the "MS-DOS User Guide" for details. |

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| FILE NAME | DESCRIPTION |
|-----------|-------------|
| DEBUG.COM | This external command calls the program debugger. As well as for debugging programs it can be used for "patching" files; however if you do this, only patch a copy not the original file. See Chapter 9 "The Debugger" in the "MS-DOS Reference Manual" and also the "MS-DOS Quick Reference" |
| DISKCOMP.COM | An external command for comparing diskettes with the same specifications. It cannot be used for comparing Hard Disks. See Chapter 7 "MS-DOS Commands" in the "MS-DOS User Guide" for details. |
| DISKCOPY.COM | An external command for copying a diskette to another with the same specification. It cannot be used for copying Hard Disks. See Chapter 7 "MS-DOS Commands" in the "MS-DOS User Guide" for details. |
| EDIT.EXE | An external command which calls the "Visual File Editor". See Chapter 6 of the "MS-DOS User Guide" for details. |
| EDLIN.COM | This external command calls the line editor. See Chapter 7 "Line Editor (EDLIN)" in the "MS-DOS Reference Manual" and the "MS-DOS Quick Reference Guide" |
| EXE2BIN.EXE | This external command should only be used by programmers. See Chapter 5 "Commands" in the "MS-DOS Reference Manual" for details. ▶ |

| FILE NAME | DESCRIPTION |
|-----------|-------------|
| FC.EXE | This external command is "File Compare" a highly sophisticated command for comparing either text or binary files. See Chapter 7 "MS-DOS Commands" in the "MS-DOS User Guide", the "MS-DOS Quick Reference Guide" and the "MS-DOS Reference Manual" for details. |
| FIND.EXE | An external command which acts as a filter for finding lines of information in text files. See Chapter 7 "MS-DOS Commands" in the "MS-DOS User Guide" for details. |
| FORMAT.COM | See the above table "Startup Diskette" for details. |
| GRAFTABL.COM | This is a terminate and stay resident utility. It provides support for the extended ASCII characters in graphics modes of the video display controller. If you are using code page switching with the device driver DISPLAY.SYS loaded for the console, you do not need to load GRAFTABL as the code page provides support for the extended ASCII characters instead. See Appendix E "MS-DOS Commands" for details and Chapters 3 and 7 for examples of it's use. |
| GRAPHICS.COM | If you wish to print screens, which contain graphics, on a suitable printer, this external command should be placed in your AUTOEXEC.BAT. See Appendix E "MS-DOS Commands" for details. |

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| FILE NAME | DESCRIPTION |
|---|---|
| HEXDUMP.COM | This external command is for programmers to dump files in hexadecimal. See the "MS-DOS Quick Reference Guide" and the "MS-DOS Reference Manual" for details. |
| JOIN.EXE | This external command joins a disk drive to an empty directory on another drive to produce a single directory structure. See Chapter 7 "MS-DOS Commands" in the "MS-DOS User Guide" for details. |
| LABEL.COM | This external command enables you to modify or delete a disk volume label. See Chapter 7 "MS-DOS Commands" in the "MS-DOS User Guide" for details. |
| MORE.COM | This external command is a filter to enable you to see one page of text output at a time on the Video Monitor. See Chapter 7 "MS-DOS Commands" in the "MS-DOS User Guide" for details. |
| PRINT.COM | This external command queues files for background printing, while other commands are obeyed. See Chapter 7 "MS-DOS Commands" in the "MS-DOS User Guide" for details. |
| RECOVER.COM | This external command recovers an entire disk or a file. Be aware that recovering a whole disk destroys the disk's directory structure: use with care! See Chapter 7 "MS-DOS Commands" in the "MS-DOS User Guide" for details. |

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| FILE NAME | DESCRIPTION |
|---|---|
| RESTORE.COM | This external command is for restoring files from diskette to hard disk, which were backed-up using "BACKUP". See Chapter 7 "MS-DOS Commands" in the "MS-DOS User Guide" for details. |
| SHARE.EXE | This external command is for use in a networking environment. It becomes resident in main Random Access Memory, as such it can be removed only by bootstrapping the Computer. See Appendix E "MS-DOS Commands" for details. |
| SORT.EXE | This external command acts as a filter to sort text files into alpha-numeric order. See Chapter 7 "MS-DOS Commands" in the "MS-DOS User Guide" for details. |
| SUBST.EXE | This external command substitutes a dummy drive specifier for a directory path. See Chapter 7 "MS-DOS Commands" in the "MS-DOS User Guide" for details. |
| TREE.COM | This external command shows the hierarchical directory structure of the specified drive. See Chapter 7 "MS-DOS Commands" in the "MS-DOS User Guide" for details. |
| XCOPY.EXE | See the above table "Startup Diskette" for details. |

The following table shows the contents of the Supplemental Diskette on 5 1/4 inch diskette and 3 1/2 inch diskette:

| FILE NAME | DESCRIPTION |
|---|---|
| COMMAND.COM | When the operating system is booted, this external command must either be in the root directory or in the directory given as the *pathname* parameter in the SHELL declaration (see Appendix B "CONFIG.SYS Commands" for more details). COMMAND.COM is an external command used either for reloading the command processor if it gets overwritten, or for calling a secondary command processor. Reloading is automatic if COMMAND.COM is available to the operating system on a loaded disk. See Chapter 7 "MS-DOS Commands" of the "MS-DOS User Guide" for details. |
| EGA.CPI | The code page character set font files for the EGA and VGA display controllers and compatible display controllers such as the OEC and OVC. If you are using code page switching, it is best to put this file into the root directory of the booting drive. |
| GWBASIC.EXE | This external command calls the MS GW-BASIC Interpreter. See the "MS GW-BASIC User Guide" for details. This manual is orderable separately. |
| LCD.CPI | The code page character set font files for the IBM PC Convertible display controller. |

| FILE NAME | DESCRIPTION |
|---|---|
| REPLACE.EXE | This external command enables files to be replaced or added to the target disk. It is particularly useful for upgrading old versions of operating systems and other software. See Chapter 7 "MS-DOS Commands" in the "MS-DOS User Guide" for details. |
| 4201.CPI | The code page character set font files for the IBM Proprinter Model 4201 and compatible printers. If you are using code page switching, it is best to put this file into the root directory of the booting drive. |
| 5202.CPI | The code page character set font files for the IBM Quietwriter III Model 5202 and compatible printers. If you are using code page switching, it is best to put this file into the root directory of the booting drive. |

## WHAT'S NEW?

### New Features

Many new features have been added to MS-DOS Ver. 3.30:

* New and enhanced commands.

* Improved input/output and hard disk access.

* New national language support.

* Code page switching, enabling different screen and printer fonts.

* Support for up to four serial communication ports, running at up to 19,200 Baud each.

* TIME and DATE set the CMOS clock.

* Improved batch file processing (documented in the "MS-DOS Reference Manual").

* Improved error recovery (see the "MS-DOS Messages" Manual).

### New Commands

These are the new commands: APPEND, CALL (batch file command), CHCP, FASTOPEN, KEYB, NLSFUNC.

### Enhanced Commands

These are the enhanced commands: ATTRIB, BACKUP, DATE, EDIT, FDISK, GRAFTABL, MODE, RESTORE, SELECT, TIME.

# 2. HOW TO INSTALL YOUR SOFTWARE

## INTRODUCTION

This installation guide is divided up into chapters and sections; each of which describes different procedures for different hardware configurations.

### YOU ONLY NEED TO READ ABOUT YOUR HARDWARE CONFIGURATION

Read this chapter, then read the chapters and sections relevant to your hardware configuration. The sections for different hardware configurations are marked as follows:

**Floppy Disk Drives**

Read Chapter 5 "Floppy Disk Systems". Also read the Sections commencing:

**If you have a Single Floppy Disk Drive...**

**If you have Two Floppy Disk Drives...**

**If you have 3 1/2 inch Diskettes...**

**If you have 5 1/4 inch Diskettes...**

**External Diskette Drives**

Read the Chapter "Configuring And Initializing MS-DOS". Also read the Sections commencing:

**If You Have An External Olivetti Floppy Disk Drive...**

**Hard Disk Drives**

Read the Chapter "Hard Disk Systems".

**BEFORE YOU BEGIN**

**DISK TYPES**

Information is stored either on 3 1/2 in. or on 5 1/4 in. floppy disks or, if your system has one, on hard disk. This manual will refer to the former as diskettes and the latter as the hard or fixed disk. The term "disk" will be used to mean either diskette or hard disk.

Drive letters (A,B,C through to Z) are the means by which commands can identify a particular drive.

The drive letter of the first diskette drive in any system is "A:". The drive letter of any second diskette drive is "B:". The drive letter of the first hard disk is "C:". The drive letters "D:" through to "Z:" are used for additional hard disks, disk partitions, virtual disks and dummy drives.

For diskette drives, their capacity governs the type of diskette that can be used in that drive.

Diskettes can have a variety of capacities to hold data; as illustrated in the following table. See your computer's Installation and Operations Guide to check what diskette capacities your diskette drive(s) can read and write.

## 5 1/4 Inch Diskettes

The following table shows the different capacities a 5 1/4 inch diskette may have.

|  | Double Density 40 track (48 t.p.i.) | | High Density 80 track (96 t.p.i.) |
|---|---|---|---|
|  | 8 sector | 9 sector | 15 sector |
| Single Sided | 160 KB | 180 KB | |
| Double Sided | 320 KB | 360 KB | 1.2 MB |

*Fig. 2-1  5 1/4 Inch Diskette Capacities*

## 5 1/4 Inch Diskette Compatibility

Standard formatting in Normal-Capacity drives is 40 tracks 9 sectors per track.  Formatting in High-Capacity drives is 80 tracks, 15 sectors per track.  To format diskettes as 40 tracks, 9 sectors per track in High-Capacity drives use the /4 switch.  However note that Normal-Density diskettes written to in High-Capacity drives cannot be reliably read in Normal-Capacity drives.  To prevent accidental writing to Normal-Density diskettes in a High-Capacity drive, write protect the diskette.

The following figure shows 5 1/4 inch diskette compatibility in different drives:

| | | DRIVE | | |
|---|---|---|---|---|
| | | Normal Capacity | | High Capacity |
| | | Single sided (160/180 KB) | Double sided (320/360 KB) | Double sided (1.2MB) |
| D 48 I tpi S | Single sided | Read/Write | Read/Write | Read |
| K E T | Double sided | | Read/Write | Read/Write |
| T 96 E tpi S | Double sided | | | Read/Write |

*Fig. 2-2  5 1/4 Inch Diskette Type Compatibility in Different Capacity Drives*

## 3 1/2 Inch Diskette Compatibility

These diskettes have 135 tracks per inch (t.p.i.) and can be formatted double sided with 80 tracks. Each track can be formatted with nine or 18 sectors. See the following table which shows the different capacities a 3 1/2 diskette may have:

| High Density 80 track (135 t.p.i.) | | |
|---|---|---|
| | 9 sector | 18 sector |
| Double Sided | 720 KB | 1.44 MB |

*Fig. 2-3  3 1/2 Inch Diskette Capacities*

Obviously you should not place 3 1/2 inch diskettes in a 5 1/4 inch drive, nor can you place 5 1/4 inch diskettes into a 3 1/2 inch drive.

**3 1/2 Inch Diskette Compatibility**

The following figure shows 3 1/2 inch diskette compatibility in different drives:

| | | DRIVE | |
|---|---|---|---|
| | | 720KB | 1.44MB |
| D I S K S | 720KB | Read/Write Format | Read/Write (1) Format (2) |
| | 1.44MB | (3) | Read/Write Format |

*Fig. 2-4  3 1/2 Inch Diskette Type Compatibility In Different Capacity Drives*

(1)     Once written the diskette cannot be reliably read in a 720KB drive.

(2)     See the Format command for the appropriate options.

(3)     Never use a 1.44 MB disk in a 720 KB drive as doing so may render it unusable.

It is possible to format 720KB diskettes in 1.44 MB drives (see the Section "How To Format Your Diskettes" further on in this Chapter). However this formatting is not as reliable as formatting 720 KB diskettes in a 720 KB drive. Therefore you are recommended to format 720 KB diskettes in 720 KB drives wherever possible. To prevent accidental writing to 720KB diskettes in a High-Capacity drive, write protect the diskette.

**If You Have An External Olivetti Floppy Disk Drive...**

This external floppy disk drive will be a 3 1/2 diskette drive for computers with 5 1/4 inch internal diskette drive(s); it will be a 5 1/4 inch diskette drive for computers with a 3 1/2 inch internal drives. The 3 1/2 inch external drive is called a Microbox. The 5 1/4 inch external drive is called a Minibox.

See the Software Manual included in the external drive kit for details of software installation.

**WRITE PROTECT YOUR MASTER DISKETTES**

The following important precaution prevents you from inadvertently destroying files on your master diskettes.

**If you have 3 1/2 inch Diskettes...**

Click the Write Protect Tag to the write protect position as shown in the following figure:
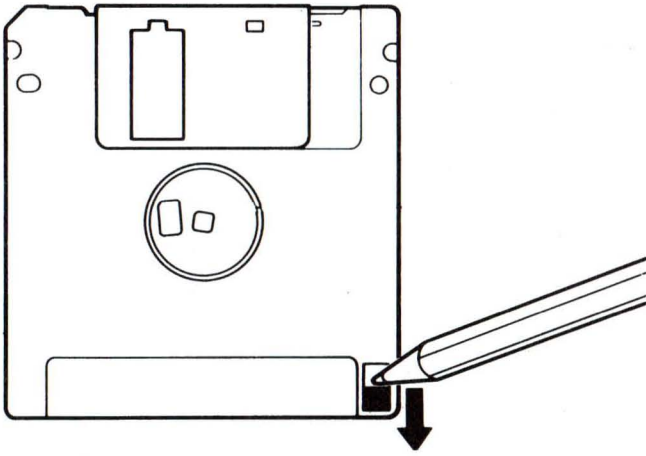
*Fig. 2-5 How To Write Protect Your 3 1/2 inch Diskette*

## If you have 5 1/4 inch Diskettes...

Wrap around a sticky write-protect tab around the write protect notch as shown in the following figure:
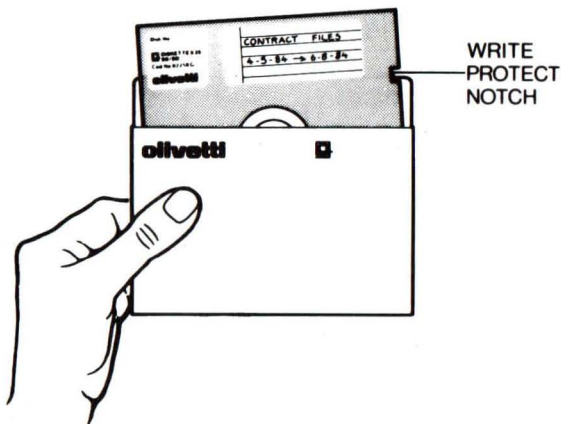
*Fig. 2-6 How To Write Protect Your 5 1/4 inch Diskette*

## TURNING YOUR COMPUTER ON

After connecting the computer together as instructed in your "Installation and Operations Manual", locate the ON/OFF switch and switch it to ON. Diagnostic tests are now performed.

## BOOTSTRAPPING YOUR COMPUTER

Place the master startup or supplemental system diskette into the diskette drive of your Personal Computer called drive "A:". Close the drive door. Press the system reset button. This is known as a "hardware bootstrap".

Or you can perform a "software bootstrap" by pressing the CTRL key down, holding it and then pressing the ALT key and then finally, while still holding the other two keys pressing the DEL key. From now on this is referred to as pressing CTRL ALT DEL simultaneously.

A system reset has the same effect as switching the Personal Computer off and back on again, but makes less demands on its components.

On the completion of the diagnostic tests, MS-DOS system files are loaded into memory. This process is known as "bootstrapping" or "booting up". You will be asked for the date and then the current date will be displayed. If this is correct, press ENTER, otherwise type the correct date. The current time is then displayed. If this is correct, press ENTER, otherwise enter the correct time.

Lastly the following message appears:

```
A>
```

This is the MS-DOS system prompt. It indicates that MS-DOS is ready to accept commands from your keyboard.

If you subsequently prepare a hard disk for booting up MS-DOS, and you do not have a system diskette in drive "A:", your MS-DOS system will boot up from the hard disk, and the system prompt will appear as follows:

```
C>
```

If you have a hard disk, but have not prepared it for booting up MS-DOS, when you reset your computer without a diskette in the "A:" drive a message similar to the following will appear:

```
Rom BASIC not available,
Press reset to re-boot
```

Do as the message says, however you must press the "reset" button on your computer; a keyboard (soft) reset may not work.

## HOW TO TERMINATE YOUR WORKING SESSION

You can bring your working session to an end in any one of two ways:

*   By switching off the computer using the ON/OFF switch on the back panel. Do **not** switch it off when the hard disk or the floppy disk is in use (this is usually indicated by a light).

*   By pressing CTRL ALT DEL keys simultaneously or by pressing the hardware reset button. Do **not** reset when the hard disk or the floppy disk is in use, as you may corrupt your files.


## THE DEFAULT DRIVE

The **A>** (or **C>** ) is the standard MS-DOS prompt from the command processor. It tells you that MS-DOS is ready to accept commands. For systems that do not have a hard disk you will always load MS-DOS from drive "A:".

The **A** (or **C** ) in the MS-DOS prompt indicates the default disk drive. This means that MS-DOS will search only that drive for any commands or other file names that you enter and will perform the specified task on that disk unless you specify a different drive.

For example, if following the **A>** prompt you type:

**DIR**
then press the ENTER key.

Then the DIR command is executed on the default drive. But if you type:

**DIR B:**
then press the ENTER key.

the DIR command is executed on drive "B:", but drive "A:" remains the default drive. To change the default drive to drive "B:" you must type:

**B:**
then press the ENTER key.

and MS-DOS will respond:

B >

Subsequently, MS-DOS will search only the diskette in drive "B:" until you specify a different default drive.

## DRIVE LETTERS FOR SINGLE DRIVE SYSTEMS

If you have a single diskette drive system it is as though you had a system with two diskette drives, except that drive "A:" and drive "B:" represent two diskettes instead of two drives. You enter commands exactly as you would using a dual-drive system and MS-DOS will prompt you when you need to change diskettes.

## PREPARING WORKING COPIES OF YOUR SYSTEM DISKETTES

It is strongly recommended that you prepare working copies of your MS-DOS System Diskette(s). If your working copy becomes damaged, or if the files are accidentally erased, you will still have the files on your master diskette.

The DISKCOPY command copies the contents of one diskette onto another. You can use this command to duplicate the MS-DOS system diskette, or a diskette that contains your own files. DISKCOPY is the fastest way of copying a diskette because it copies the entire diskette in one operation, including MS-DOS system files if they exist. However, note that the DISKCOPY command can only be used where the source and target diskettes have the same capacity.

To make a copy of your MS-DOS master system diskette. First make sure that it is write protected. Then obtain a blank diskette of the same specification as the master diskette, write a label for it copying the label on the master diskette. Make sure the blank diskette is not write protected.

## If you have a Single Floppy Disk Drive...

Insert the operating disk in drive "A:" and type:

**DISKCOPY A: A:**
then press ENTER

DISKCOPY prompts:

```
Insert source diskette in drive A:
Strike any key when ready
```

Insert the master diskette you wish to copy in drive A:. After you have struck any key, DISKCOPY then reads some or all of your source diskette (depending on the main memory capacity of your computer).

DISKCOPY then prompts:

```
Insert destination diskette in drive A:
Strike any key when ready
```

DISKCOPY may prompt you in this way more than once, depending on the main memory storage capacity of your computer.


## CAUTION

You must make sure that you insert the correct source and target diskettes as DISKCOPY does not know the difference. Moreover, you are strongly recommended to write-protect your source diskette to avoid inadvertently overwriting it.


## If you have Two Floppy Disk Drives of the same capacity...

Insert the operating disk in drive "A:", at the "A>" prompt type: "B:", at the "A>" prompt type:

**DISKCOPY A: B:**
then press ENTER

DISKCOPY prompts:

```
Insert source diskette in drive A:
Insert destination diskette in drive B:
Strike any key when ready
```

Insert the master diskette in drive "A:" and the target diskette in drive "B:", then press any key and copying will commence. As the copying commences, a message similar to the following appears on the screen:

```
Copying 2 side(s), 9 sectors per track
```

If your target diskette was not formatted, DISKCOPY will format it as it copies. After MS-DOS has copied the diskette, MS-DOS displays:

```
Copy complete
Copy another disk (Y/N)?
```

Press Y (for Yes) if you wish to copy another diskette with the DISKCOPY command. If you press N (for No), the default drive prompt is displayed.

### If you have Two Floppy Disk Drives, but of different capacities..

Follow the instructions stated under " If you have a Single Floppy Disk Drive...".

### If DISKCOPY fails and outputs...

```
Drive types or diskette types not compatible
```

Then try formatting the target diskette to have the same capacity as the source diskette. See the following Section "How To Format Your Diskettes".

```
Diskette bad or incompatible
```

Then you are either copying from a source drive incompatible with the target drive or you are using a bad diskette. In the latter case, try a new diskette.

## Keep Your Master Diskettes Safe

From now on, only use your working copies of MS-DOS. Put your master diskettes away in a safe place and only use them for producing new working copies.

## Note

If either of the diskettes that you are using has defective tracks, the DISKCOPY command will not work reliably. Use the COPY (or XCOPY) command to back-up your diskettes in these cases. COPY will skip over defective tracks. But note that some of the system files are "hidden" and cannot be copied using the COPY command. Therefore, before copying your system diskette using the COPY command you must format the target diskette using the FORMAT command with the /S option.

## HOW TO FORMAT YOUR DISKETTES

You must format all new diskettes before they can be used by MS-DOS.

A blank diskette must be formatted with the FORMAT command. The FORMAT command changes the format of the diskette to one that MS-DOS can use. If the diskette is not already blank, formatting it will destroy any data that exists on the diskette.

Formatting places the tracks on a diskette and creates an empty directory and file access table for that diskette. The directory and file access table is the means by which MS-DOS indexes the files on the diskette.

If you type:

**FORMAT B:**
then press ENTER

FORMAT issues the following message:

```
Insert new diskette for drive B:
and strike ENTER when ready
```

After you insert the new diskette in drive "B:" and have pressed the ENTER key, formatting begins and the system keeps you informed of the progress of the FORMAT command by responding:

```
Head: x   Cylinder: y
```

Where the head-value can be 0 or 1, and the cylinder-value increases from 1 to the number of cylinders (tracks) formatted. When format has finished you will receive a message such as:

```
362496 bytes total disk space
362496 bytes available on disk
```

```
Format another (Y/N)?
```

Press Y to format another diskette. Press N to terminate the FORMAT program.

If you include **/S** at the end of the command line you will cause the FORMAT command to copy the system files to the target diskette as well as formatting that diskette. That is, it will give you a diskette from which you can boot MS-DOS. In this case, the system will typically respond:

```
362496 bytes total disk space
41984 bytes used by system
320512 bytes available on disk
```

If you include **/V** at the end of the command line you will be given the option to label the diskette. When formatting is complete you will be prompted:

```
Volume label (11 characters. ENTER for none)?
```

You can enter any valid string up to 11 characters followed by ENTER. However, if you do not wish to assign a label to the diskette, simply press ENTER. See the "LABEL command" in chapter 7 of the "MS-DOS User Guide" for details of valid label characters.

For example you could assign the label PROGRAMS to a diskette containing programs. You can use such a label to check that you are using the correct diskette. The label will be displayed if you issue either a DIR command or a VOL command. If at a later stage you wish to give the diskette a new label use the LABEL command. See the "MS-DOS User Guide" for more details.

### If you have a High-Capacity 5 1/4 inch Floppy Disk Drive...

Standard formatting in Normal-Capacity drives is 40 tracks, 9 sectors per track, that is 360 KB. Formatting in High-Capacity drives is 80 tracks, 15 sectors per track, that is 1.2 MB. To format double sided double density diskettes as 40 track, 9 sectors per track in a High-Capacity drive type the following command:

**FORMAT A: /4**
then press ENTER

However note that a Normal-Capacity diskette written to in a High-Capacity drive cannot be reliably read in Normal-Capacity drives. To prevent accidentally writing to Normal-Capacity diskettes in a High-Capacity drive, write protect these diskettes.

### If you have a 1.44 MB 3 1/2 Floppy Disk Drive...

Standard formatting in 720KB drives is 80 tracks, 9 sectors per track, that is 720 KB. Formatting in 1.44 MB drives is 80 tracks, 18 sectors per track, that is 1.44 MB. To format 1 MB unformatted diskettes as 80 tracks, 9 sectors per track in a 1.44 MB drive type the following command:

**FORMAT A: /T:80 /N:9**
then press ENTER

**Warning:** Do **not** format 2 MB unformatted 3 1/2 inch diskettes with the above command as you will permanently damage the diskette.

## CONFIGURING AND INITIALIZING MS-DOS

When MS-DOS is bootstrapped it searches for two special files called CONFIG.SYS and AUTOEXEC.BAT. You will still be able to use MS-DOS if you do not have these files, but they will help you take greater advantage of the facilities of the operating system.

### THE CONFIG.SYS FILE

When you start MS-DOS, it automatically searches in the root directory of the booting disk for a file called CONFIG.SYS. This file contains special commands that let you set up (configure) MS-DOS for use with devices or application programs. See Chapter 7 "Configuring And Initializing MS-DOS" for instructions on how to set up or change CONFIG.SYS. See Appendix B "CONFIG.SYS Commands" for details of the CONFIG.SYS command declarations.

### THE AUTOEXEC.BAT FILE

When you start MS-DOS, the second file it searches for in the root directory of the booting disk for a file called AUTOEXEC.BAT. AUTOEXEC.BAT automatically performs any set of commands you would normally give when you start MS-DOS.

For example, you may want to have MS-DOS display the names of your files each time you load MS-DOS.

If there is an AUTOEXEC.BAT when you start MS-DOS, you are not prompted for date and time.

See Chapter 7 "Configuring And Initializing MS-DOS" for instructions on how to set up or change AUTOEXEC.BAT.

# SETTING UP YOUR DISK FOR NATIONAL SUPPORT

## THE SELECT COMMAND

This command automatically creates a MS-DOS System with an CONFIG.SYS and AUTOEXEC.BAT that correctly initializes the computer for your keyboard and national conventions for date and time. See the Chapter 3 "Keyboards And Fonts" and either Chapter 5 "Floppy Disk Systems" or Chapter 6 "Hard Disk Systems" for details of how to use the SELECT command.

## KEYBOARD AND SCREEN SUPPORT

When you start MS-DOS, input from the keyboard and output to the screen is handled by the BIOS (the Basic Input Output System). Initially this expects the keyboard to have USA characters on it. However your national keyboard may differ from the USA one, and the characters that appear on the screen may also differ. Your operating system disk needs to be set up so that it automatically reconfigures the BIOS to cope with your national requirements. See the "Keyboards and Fonts" Chapter for details of the programs which reconfigure the BIOS.

If you have a USA ASCII keyboard your system will automatically interpret the characters you type at the keyboard correctly. If you have a national version of the keyboard, however, you must install the driver KEYB each time you start up your system and possibly you need to install an extension to the built-in "font table". The KEYB keyboard driver provides the tables that tell the system what code to generate for each key pressed. A font table provides the characters that are displayed on the screen. The command GRAFTABL accesses the font tables for extensions to the ASCII characters.

In addition to national version tables, your system contains tables for the standard USA ASCII keyboards. As soon as you reboot your system, the appropriate USA ASCII driver for your keyboard is reinstalled.

If you wish a specific keyboard driver and font to be loaded automatically immediately after bootstrap you must create an AUTOEXEC.BAT file with the appropriate KEYB and GRAFTABL commands in it.

Of course you have to ensure that KEYB and it's associated files are present on the system diskette you use to boot up your system.

See Chapter 7 "Configuring And Initializing MS-DOS" for more information on AUTOEXEC.BAT files.

Note that your system diskette may already be customized, with the appropriate AUTOEXEC.BAT file and transferred keyboard driver, when you receive it. If you are in doubt, try those keys on the keyboard that differ between USA ASCII and your national version. You will soon see whether you have the correct driver installed.

## Calling The USA ASCII Driver

When a national keyboard driver is installed, it is possible to call the USA ASCII keyboard version by using the three-key combination CTRL ALT F1. When you do this, you can return to the national keyboard version by using another three-key combination, CTRL ALT F2.

Such swapping between national and USA ASCII versions may be necessary in order to use certain application or communication packages.

Key combinations are summarized as follows:

| KEY COMBINATION | ACTION |
| --- | --- |
| CTRL ALT F1 | Calls the USA ASCII keyboard driver |
| CTRL ALT F2 | Calls the national keyboard driver |

## MS-DOS COUNTRY SPECIFIC OPERATIONS SUPPORT

MS-DOS can be configured for different country's requirements for:

* date

* time

* currency symbol

* decimal separator

This is achieved by making the declaration:

COUNTRY =*country-code*

in the CONFIG.SYS file.  (See Appendix B "CONFIG.SYS Commands" for more details.)

## CODE PAGE NATIONAL LANGUAGE SUPPORT

Code page national language support allows different character set fonts to be displayed on suitable display and printer devices.

### Devices Which Support Code Page Switching

Video display controllers, which are EGA or VGA compatible, support code page switching.  The Olivetti OEC is EGA compatible.

Printers which are IBM Proprinter Model 4201 or IBM Quietwriter III Model 5202 compatible, support code page switching.  The Olivetti Advanced Range of Dot Matrix printers are Proprinter compatible (these printers only support the USA ASCII code page 437).  The Olivetti TH760S is Quietwriter III compatible.

If you do not have the above devices you cannot use code page switching.

## Code Page National Character Sets Supported by Code Pages

Although most users will probably only use the character set that matches their keyboard, it is useful to know that MS-DOS can generate other characters which do not necessarily correspond to your keyboard. This information is particularly useful to multilingual translators. This version of MS-DOS supports eight different code pages, two of which support more than one national character set. The existing code pages and the languages they support are:

- United States (English) Code Page

- Multilingual (Latin Language Based) Code Page:

  - Australian

  - Belgian

  - Canadian French

  - Danish

  - Dutch

  - Finnish

  - French

  - German

  - Italian

  - Norwegian

  - Portuguese

  - International Spanish

  - National Spanish

  - Swedish

- – Swiss French

- – Swiss German

- – UK English

- – US English

- • Portuguese Code Page

- • Nordic Code Page:

  - – Danish

  - – Norwegian

- • National Spain Code Page

- • Greek Code Page

- • German Special Font (GS) Code Page

See Chapter 4 "Code Page Switching" for details of installation and usage.

## DISPLAYING THE CHARACTER SET

To display the character corresponding to a given ASCII code (decimal 1 thru 255), type:

**ALT** *number*

Where *number* is the three-digit decimal code for the character. Use the numeric keypad **not** the numbers on the top row of the main body of the keyboard.

Note that some of the characters in the ASCII range 1 thru 32 cannot be reproduced on the screen using this technique.

Appendix A "Code Page Tables" ∅ shows the complete character set of extended ASCII characters.

### If you have a Non USA Keyboard...

You may be having difficulty in typing certain characters, in particular the: : \ | ˜ ' characters. The following table gives the ALT key combinations to ameliorate this difficulty.

| TO GENERATE CHARACTER | PRESS **ALT** AND THE NUMBERS ON THE NUMERIC PAD |
|---|---|
| : | 5 then 8 |
| \ | 9 then 2 |
| \| | 1 then 2 then 4 |
| ˜ | 1 then 2 then 6 |
| ' | 9 then 6 |

# 3. KEYBOARDS AND FONTS

## INTRODUCTION

When you start MS-DOS, input from the keyboard and output to the screen is handled by the BIOS (the Basic Input Output System). Initially this expects you to have a USA keyboard. However your national keyboard may differ from the USA keyboard, and the characters that appear on the screen may also differ.

If you have a non-USA keyboard, your operating system disk needs to be set up so that it automatically reconfigures the BIOS to cope with your national requirements.

If you have a USA ASCII keyboard your system will automatically interpret the characters you type at the keyboard correctly. If you have a National version, however, you must install an appropriate "keyboard driver" each time you start up your system and possibly you need to install an extension to the built-in "font table". A keyboard driver provides the tables that tell the system what code to generate for each key pressed.

## KEYBOARD DRIVERS

When received, your system is configured to recognize the USA ASCII version of the keyboard. If you have a National keyboard you **must** execute the following procedure to define your keyboard to the system.

Refer to the following table to find the KEYB parameter corresponding to your national keyboard version.

| NATIONAL VERSION | KEYB PARAMETER | GRAFTABL PARAMETER |
|---|---|---|
| Belgium* | BE | 850 |
| Denmark | DK | 865 |
| Finland | SU | 437 |
| France | FR | 437 |
| Greece | GK | 210 |
| Germany | GR | 437 |
| Germany Special Font (GS) | GS | 190 |
| Italy | IT | 437 |
| Netherlands | NL | 437 |
| Norway | NO | 865 |
| Portugal | PO | 860 |
| Spain (International) | SP | 437 |
| Spain (National) | S1 | 220 |
| Sweden | SV | 437 |
| Swiss/French | SF | 437 |
| Swiss/German | SG | 437 |
| United Kingdom | UK | 437 |
| United States | US | 437 |

\* For New Industry Standard 102 Key Keyboard only.

Insert the MS-DOS Startup Diskette into drive "A:". At the "A>" prompt, type:

**KEYB** *xx*
then press ENTER

**Where**

*xx* corresponds to the two letters that specify your keyboard type.

**For Example**

KEYB IT

For the detailed use of this command, see Appendix E.

## FONTS

A font table provides the characters that are displayed on the screen in graphics modes. The GRAFTABL command with the parameter listed in the table loads a table of data in memory that defines national characters, that is, the extensions to the ASCII character set, for the colour/graphics adapter.

**For Example**

If you have an Italian keyboard, at the "A>" prompt, type:

**GRAFTABL 437**
then press ENTER

See Appendix E "MS-DOS Commands" for details of this command and see Appendix A for the tables illustrating the font.

## SETTING UP YOUR SYSTEM DISK

To save typing in the above commands to call the keyboard driver and font every time you reset your computer, it is better to have the commands in an AUTOEXEC.BAT file. You must make sure that the National keyboard driver is present on the system diskette you use to boot up your system.

Note also that your system diskette may already be customized, with the appropriate AUTOEXEC.BAT file when you receive it. If you are in doubt, try those keys on the keyboard that differ between USA ASCII and your National version. You will soon see whether you have the correct driver installed.

## THE SELECT COMMAND

This command creates a working copy of the MS-DOS System with an AUTOEXEC.BAT and CONFIG.SYS that correctly initializes the computer for your keyboard and National conventions for time and date. The following table shows the *country-code* and *keyboard-code* you will need as parameters to the SELECT command:

| NATIONAL VERSION | country-code | keyboard-code |
|---|---|---|
| Denmark | 045 | DK |
| Finland | 358 | SU |
| France | 033 | FR |
| Germany | 049 | GR |
| Italy | 039 | IT |
| Netherlands | 031 | NL |
| Norway | 047 | NO |
| Portugal | 351 | PO |
| Spain International | 034 | SP |
| Sweden | 046 | SV |
| Swiss-French | 041 | SF |
| Swiss-German | 041 | SG |
| United Kingdom | 044 | UK |
| United States | 001 | US |

*Tab. 3-1 Country Code and Keyboard Code For The Select Command*

### If you have a Floppy Disk Based System...

The Chapter "Floppy Disk Systems" tells you how to use the SELECT command to install MS-DOS on Floppy Disk.


### If you have a Hard Disk Based System...

The Chapter "Hard Disk Systems" tells you how to use the the SELECT command to install MS-DOS on your hard disk.

## NATIONAL KEYBOARDS

### KEYBOARD LAYOUTS

See the manual that came with your PC for drawings of the layouts of Olivetti Personal Computer Keyboards.

### MULTI-CHARACTER KEYS

On some National keyboards, there are a number of keys marked with more than two symbols.

Depending on the position of the symbol on the key, there is a specific combination of other, special keys that must be pressed and held down before pressing the particular key you want.

There is a total of five possible symbol positions on any key marked with more than two symbols, although not all of them will necessarily be found on all such keys.

Position 1    On a key marked with three or more symbols on the top, this is the symbol on the bottom left-hand corner of the key.

It is selected by pressing the key by itself.

Position 2    Again, for the same type of key, this is the symbol marked on the top left-hand corner of the key.

It is selected by pressing SHIFT + KEY.

Position 3    This is the symbol marked on the bottom right-hand corner of the key.

It is selected by pressing ALT + KEY.

Position 4    This is the symbol marked on the top right-hand corner of the key.

It is selected by pressing ALT + SHIFT + KEY.

Position 5    This is the symbol marked on the front of some keys.

It is selected by pressing ALT + CTRL + KEY simultaneously.

**Note:** If you have a New Industry standard 102 key keyboard, you can press the ALTGR key instead of the ALT CTRL keys.

**Multi-character keys:** Some keys generate up to five characters. The position of these five characters on the key is shown in the following figure:

---
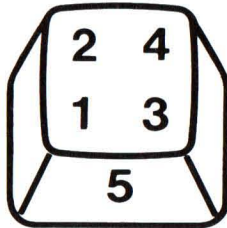


Fig. 3-2 Multi-character Key Top

---

## SWISS-GERMAN/SWISS-FRENCH KEYBOARD

The Swiss Keyboard supports both Swiss-French and Swiss-German requirements. However, to use the keyboard in one mode or the other, the appropriate keyboard driver must be loaded. Please note that although some keys have four symbols marked on them, only one pair of them will be active according to which keyboard driver you have loaded.

Thus, if you have loaded the Swiss-German keyboard driver, the two symbols on the left-hand side of the key will be selected by following the instructions given for symbol positions 1 and 2.

If you have loaded the Swiss-French keyboard, the two symbols on the right-hand side of the key will be selected, but nevertheless you should still follow the instructions given for symbol positions 1 and 2.

The drivers affect the following three keys, as illustrated:
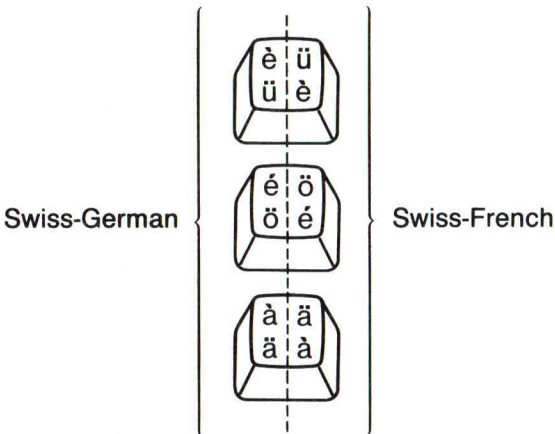


*Fig. 3-3 Swiss Keyboard Variations*

## PORTUGAL KEYBOARD

The characters ü and Ü with diaeresis points are generated by pressing the tilde key followed by the lower case or upper case U as required.

## DEAD SYMBOLS

Some National keyboards support certain symbols that can be used only in conjunction with another key - they cannot be used on their own. Such symbols are called **dead symbols.** The dead symbols are shown below:

            ' ` ^ " ~

These symbols are used to generate lesser-used accented characters not available as separate keyboard characters.

For each keyboard version, there is a set of valid dead symbol combinations.  To generate an accented character, the dead symbol must be pressed first; MS-DOS then checks the next character entered to ensure that a valid combination has been entered. If the combination is invalid the symbol and the character will be displayed on the screen.

The following table shows the possible dead symbol/character combinations for each of the National keyboard versions.

| KEYBOARD | DEAD SYMBOLS SUPPORTED | VALID CHARACTERS |
|---|---|---|
| FRANCE | " ˆ ¨ | ä Ä ë ï ö Ö ü Ü ÿ<br>â ê î ô û |
| GERMANY | ´ ` | á é É í ó ú à è ì ò ù |
| GREECE | ´ ¨ ¨ | ά έ ή ί ό ύ ώ ï ϋ<br>Ά Έ Ή Ί Ό Ύ Ώ |
| PORTUGAL | ´ ` ˆ ˜ ¨ | á é í ó ú Á É Í Ó Ú<br>à è ì ò ù À È Ì Ò Ù<br>â ê ô Â Ê Ô<br>ã õ ñ Ã Õ Ñ ü Ü |
| SPAIN INTERNATIONAL, NORWAY, DENMARK, SWEDEN/FINLAND NORWAY | ´ ` ˆ " ¨ | á é É í ó ú à è ì ò ù<br>â ê î ô û<br>ä ë ï ö ü ÿ Ä Ö Ü |
| SPAIN | ´ ` " ¨ | á é í ó ú Á É Í Ó Ú<br>à è ì ò ù À È Ò<br>ä ë ï ö ü ÿ Ä Ö Ü |
| SWISS-FRENCH SWISS-GERMAN | ´ ` ˆ " ˜ ¨ | á é í ó ú É à è ì ò ù<br>â ê î ô û<br>ä ë ï ö ü ÿ Ä Ö Ü ñ Ñ |

¨ New Industry Standard 102 Key Keyboard only.

## KEYS WITH INVISIBLE CHARACTERS

The National versions of the M24 Keyboard 2 for France, Germany, Italy, Spain International and Switzerland support characters not shown on the keyboard, but which can be generated.

These invisible characters, and the key combinations required to generate them, are listed in the following table:

| COUNTRY | INVISIBLE KEY | KEY COMBINATION | |
|---|---|---|---|
| FRANCE | \| | ALT SHIFT | [> / < \\] |
| | { | ALT SHIFT | [* / $ [] |
| | } | ALT SHIFT | [& / ` ]] |
| | ~ | ALT SHIFT | [+ / =] |
| GERMANY | \| | ALT SHIFT | [> / < \\] |
| | { | ALT SHIFT | [* / + [] |
| | } | ALT SHIFT | [^ / # ]] |
| | ~ | ALT SHIFT | [` / ,] |
| | ' | ALT SHIFT | [Ü @] |
| ITALY | \| | ALT SHIFT | [> / < \\] |
| | { | ALT SHIFT | [& / $ [] |
| | } | ALT SHIFT | [§ / * ]] |
| | ~ | ALT SHiFT | [+ / -] |
| | ' | ALT SHIFT | [= / ì @] |
| SPAIN INTERNATIONAL | \| | ALT SHIFT | [> / < \\] |
| | { | ALT SHIFT | [* / + [] |
| | } | ALT SHIFT | [§ / ~ ]] |
| | ' | ALT | [P] |
| SWISS-FRENCH | ' | ALT SHIFT | [ü / è @] |
| SWISS-GERMAN | ' | ALT SHIFT | [è / ü @] |

# 4. HOW TO USE CODE PAGES

## INTRODUCTION

MS-DOS Ver. 3.30 provides national language support through the use of language-specific code pages. If you live in, or work with, a country other than the United States, you may choose to use the MS-DOS commands that support code page switching.

The implementation of code page switching is designed around MS-DOS 3.30. The previous solution to national language support used by MS-DOS 3.20 used a different system. You therefore should not mix the two systems.

### What Is a Code Page?

A code page is a table that defines the character set you are using. A character set is a country-specific or language-specific group of characters that are translated from the code page table and displayed by your screen or printer. Each code page character set contains 256 characters and is identified by a unique number.

MS-DOS Ver. 3.30 supports seven different code pages:

437     United States code page.

850     Multilingual code page. This code page includes all characters for most languages of European, North American, and South American countries.

860     Portuguese code page.

865     Nordic code page. This code page includes all characters for the Norwegian and Danish languages.

220     National Spain code page.

210     Greek code page.

190     German Special Font (GS) code page. This code page uses
        the USA ASCII character set, with a different font.


## Country and Keyboard Codes

MS-DOS also provides national language support through the use of
two other codes:

country code    Defines the conventions of the country which you
                want to adopt. MS-DOS uses this code to prepare
                and assign default code pages for your system.
                MS-DOS recognizes 19 different country codes.

keyboard code   Defines the type of keyboard you are using. MS-
                DOS recognizes 20 different keyboard codes.


## NATIONAL LANGUAGE SUPPORT CODES

The following table lists each country (or language) supported by MS-
DOS Ver. 3.30. The table also lists the two code pages which may be
prepared for that specific country, and related keyboard codes. If you
do not specify a country code, MS-DOS uses USA as the default
country and uses the code page built into the hardware.

| COUNTRY/LANGUAGE | CODE PAGES | KEYBOARD CODE |
|---|---|---|
| United States | 437,850 | US |
| Greek | 210,850 | GK |
| Netherlands | 437,850 | NL |
| Belgium | 437,850 | BE |
| France | 437,850 | FR |
| Spain International | 437,850 | SP |
| Spain National | 220,850 | S1 |
| Italy | 437,850 | IT |
| Switzerland | 437,850 | SF,SG |
| United Kingdom | 437,850 | UK |
| Denmark | 865,850 | DK |
| Sweden | 437,850 | SV |
| Norway | 865,850 | NO |
| Germany | 437,850 | GR |
| GS (Germany) | 190,850 | GS |
| Portugal | 860,850 | PO |
| Finland | 437,850 | SU |

## COMMANDS THAT SUPPORT NATIONAL LANGUAGES

Several MS-DOS commands - new and old - support code page selection and national languages.

## NEW MS-DOS COMMANDS

### Two New Commands

MS-DOS Ver. 3.30 includes two new commands:

NLSFUNC    Loads the file containing country-specific information.

CHCP    Displays or changes the current code page for the system and all prepared devices.

## ENHANCED MS-DOS COMMANDS

### Three Enhanced Commands

In addition to the new commands, MS-DOS Ver. 3.30 includes enhanced MS-DOS commands that support code page selection. The most significant enhancements include

KEYB      Allows you to select a country-specific keyboard code for the keyboard you are using, and a code page for the character set you prefer. You may also select an alternate keyboard definition file (other than the default KEYBOARD.SYS file) with this command, if another exists.

MODE      Includes several new options:

- Preparing a code page for a device

- Selecting a code page for a device

- Displaying the code pages prepared and selected for a device

- Refreshing code pages that were lost due to hardware error

SELECT      Installs MS-DOS on a disk with selected country-specific information and keyboard code. Note that SELECT does not support country specific information for Spain1, Greece or Germany (GS), nor does it support their respective code pages.

## NEW AND ENHANCED CONFIGURATION COMMANDS

### CONFIG.SYS Commands

Two CONFIG.SYS commands also support country-specific information:

COUNTRY   Identifies the country in which you work or live. This command also defines country-specific conventions to be used, such as date and time formats and sorting sequence for the character set.

DEVICE    Installs device drivers in the system, including two MS-DOS installable device drivers that support code page switching. These device drivers are called:

DISPLAY.SYS   Used to install a standard console screen device with code-page support.

PRINTER.SYS   Used to install a standard parallel or serial printer with code-page support.

### DATE AND TIME FORMATS

### Language-Specific Date and Time Formats

Four other MS-DOS commands - DATE, BACKUP, RESTORE, and TIME - now use country-specific date and time conventions, based on the code pages you choose to use.

The following table lists the date and time formats related to each country (or language group). These formats are determined by the *country code* set in your CONFIG.SYS file.

For each country, the DATE FORMAT column shows how MS-DOS would display January 3, 1989, and the TIME FORMAT column shows how MS-DOS would display 5:35 p.m. (with zero seconds and zero hundredths of seconds).

| COUNTRY/LANGUAGE | COUNTRY CODE | DATE FORMAT | TIME FORMAT |
|---|---|---|---|
| United States | 001 | 1-15-1989 | 17:35:00.00 |
| French/Canadian | 002 | 1989-01-15 | 17:35:00,00 |
| Latin America | 003 | 15/01/1989 | 17:35:00.00 |
| Greece | 030 | 15/01/1989 | 17:35:00,00 |
| Netherlands | 031 | 15-01-1989 | 17:35:00,00 |
| Belgium | 032 | 15/01/1989 | 17:35:00,00 |
| France | 033 | 15/01/1989 | 17:35:00,00 |
| Spain | 034 | 15/01/1989 | 17:35:00,00 |
| Italy | 039 | 15/01/1989 | 17:35:00,00 |
| Switzerland | 041 | 15.01.1989 | 17.35.00.00 |
| United Kingdom | 044 | 15-01-1989 | 17:35:00.00 |
| Denmark | 045 | 15-01-1989 | 17.35.00.00 |
| Sweden | 046 | 1989-01-15 | 17.35.00.00 |
| Norway | 047 | 15/01/1989 | 17.35.00.00 |
| Germany | 049 | 15.01.1989 | 17.35.00.00 |
| Germany (GS) | 190 | 15.01.1989 | 17.35.00.00 |
| Australia | 061 | 15-01-1989 | 17:35:00.00 |
| Portugal | 351 | 15/01/1989 | 17:35:00,00 |
| Finland | 358 | 15.01.1989 | 17.35.00,00 |

**Notes**

Both Swiss-French and Swiss-German use country code 041.

If your required *country code* is not supported, choose one that supports your national conventions.

## HOW TO USE CODE PAGES

### Setting the System Code Page

For the code page feature to operate correctly, it is necessary to carry out a series of things first. Specific commands must be added to your config.sys file and others should be added to your autoexec.bat file. The following is a step by step description of how to prepare your system for code page switching. A sample entry is given for each step. The example assumes that you have an OVC or OEC video controllor board with USA ASCII hardware character generation (equivalent to Code Page 437). It assumes that you have an Olivetti TH 760/S printer. It also assumes that your loadable device drivers are stored under a directory called DRIVERS on drive c:. The example assumes that you wish to set your system up to work in Italian.

**In your config.sys file:**

1. Set the *countrycode* for the county of your choice. A sample entry may be:

    COUNTRY=039,850 c:\drivers\country.sys

    This statement states that the country selected is Italy and that the code page to be used first is 850. (the two legal code pages for Italy being 858 and 437). It also loads the country.sys driver.

2. Type the DEVICE statement that loads the DISPLAY.SYS driver. For a correct definition of this statement you should know which hardware character set is built into your video controllor board. A sample entry may be:

    DEVICE=c:\drivers\display.sys con:=(ega,437,2)

    This statement defines your console device as EGA, your hardware code page as 437 and tells the system to reserve space for two more code pages.

3. If you intend to use a printer you must include a DEVICE

statement for your particular printer. A sample entry may be:

DEVICE=c:\system\printer.sys lpt1:=(5202,437,2)

This states that your printer is connected to the first parallel port, that your printer is IBM Quietwriter III model 5202 compatible and that its built in hardware code page is 437. It also reserves room for two more code pages.

**Note:** There is no limit to the number of times you can use the DEVICE command in your CONFIG.SYS file.

For a description of the COUNTRY and DEVICE commands see Appendix B.

## In your autoexec.bat file:

1. Add the KEYB command. This command loads the national keyboard program to replace the keyboard program resident in ROM BIOS to support the language you have selected for your keyboard. A sample entry may be:

   KEYB it 850 c:\drivers\keyboard.sys

   This tells the system that you have an Italian keyboard and that the code page to be used is 850 (international). It also loads the keyboard driver.

2. Add the NLSFUNC command. A sample entry may be:

   NLSFUNC

   This command needs to be added if you intend to use the CHCP command later.

3. Prepare the Code Page/s for each device you intend using. Naturally if you are using *codepages* you must prepare it for the console screen device. A sample entry may be:

   MODE CON:CP PREP=((850,437)c:\system\EGA.cpi)

If for example you want to prepare code page 850 for the parallel printer connected to LPT1 you would add the following command:

MODE LPT1 CP PREP=((850) c:\system\5202.cpi

The number of code pages prepared for a device with the MODE command must not exceed the maximum number declared in the corresponding DEVICE command in the CONFIG.SYS file.

4.   Use the MODE SELECT command to select the code page you wish to work with first, do this for each device that has a code page prepared.   This is useful if you expect to use the same code page most of the time.

Using this example, you would enter the following:

**MODE CON: CP SEL=850**

**MODE LPT1 CP SEL=850**

When you have done this reboot your system.

**Note:**   For a description of the KEYB, NLSFUNC and MODE commands see Appendix E.

## Changing Character Sets

To switch between code pages you may use two commands: **CHCP** and **MODE** . The COUNTRY command that you defined  in your CONFIG.SYS file associates two code pages with the country of your choice and selects the one specified in the command.  To switch to the other code page associated with your country, use the CHCP command. Using the same example we have used in explaining how to set your system up for code page switching, to switch to the second code page prepared for your system you would enter:

**CHCP 437**

If, on the other hand you wish to switch code page for a single device you would use the MODE CODEPAGE SELECT command.  For example to activate prepared code page 437 for your CON device, you

would type the following command:

**MODE CON CP SEL=437**

**Note:** For code page switching to work you must include the NLSFUNC command in your AUTOEXEC.BAT file. The command may also be entered from the keyboard. If you forget to type the NLSFUNC command, MS-DOS will not allow you to use CHCP to switch code pages or keyboard codes.

## HOW TO LIST CURRENT CODE PAGES

You can list the current prepared and selected code pages for your console screen or a parallel printer by using the MODE command in the following form:

MODE *device* CODEPAGE

### Displaying Current Device Code Pages

For example, to display the current code pages for your console screen device, type the following:

**MODE CON CODEPAGE**

MS-DOS displays a message similar to this one:

```
Active codepage for device CON is 437
hardware codepages:
   Codepage 850
prepared codepages:
   Codepage 437
   Codepage 850
MODE Status Codepage function completed
```

## OEC AUTOSWITCH MODE

See the OEC Installation Guide to see whether you hav set the switches on the display controller to operate in Autoswitch Mode.

### Warning

If your OEC is set to Autoswitch Mode and you wish to use Code Page Switching do **not** declare:

DEVICE=ANSI.SYS

in the CONFIG.SYS of the booting system disk.

Alternatively if you do wish to declare ANSI.SYS and use Code Page Switching, reset the switches on the display controller to a non-Autoswitch, EGA Emulation Mode. To reset the switches see your OEC Installation Guide.

## HOW TO REFRESH LOST CODE PAGES

It is possible for prepared code pages to be lost due to hardware errors or other reasons. For example, if you prepared code pages for your printer, and then turned off the printer, the current code page may be lost. You can use the REFRESH keyword with the MODE command to restore the lost code page.

### Refreshing Lost Code Pages

To illustrate, suppose you had selected code page 850 as the active code page for your console screen (CON), but because of a hardware error, the active code page was lost. You could type the following commands to reinstate the active code pages for your screen:

**MODE CON CODEPAGE PREPARE=((850) EGA.CPI)**
**MODE CON CODEPAGE REFRESH**

## USING THE SELECT COMMAND

### HOW TO FORMAT A DISK WITH COUNTRY-SPECIFIC INFORMATION

MS-DOS Ver.3.30 includes a special command, SELECT, that will:

*   Format a disk

*   Create a CONFIG.SYS file and AUTOEXEC.BAT files with country-specific information

*   Copy the contents of the source disk to the target disk

**Warning:** Do not use the SELECT command with a disk that already contains data files, unless you have backed up the files. Any data on the disk is destroyed when the disk is formatted by either the SELECT command or the FORMAT command.

### Example

To illustrate how the SELECT command works, suppose after configuring your hard disk with FDISK you wanted to format your hard disk "C:". You also want to include the Latin American code page and keyboard code on your hard disk. After placing your MS-DOS master disk in drive "A:", you could type the following:

**SELECT A: C: 003 LA**

After formatting the disk in drive "C:", SELECT creates two files on the target disk - AUTOEXEC.BAT and CONFIG.SYS The contents of the AUTOEXEC.BAT file will look something like this:

```
PATH C:
KEYB LA 437
ECHO OFF
CLS
DATE
TIME
VER
```

The contents of the CONFIG.SYS file will look similar to the following:

```
COUNTRY=003, 437
```

Finally, the SELECT command copies the MS-DOS files to the disk on drive "C:". If AUTOEXEC.BAT and CONFIG.SYS files exist on drive "A:", SELECT does not copy them to drive "C:".

# 5. FLOPPY DISK SYSTEMS

## INTRODUCTION

The kind of diskette you can use depends upon the drive type. It is essential to use the correct type of diskette for the drive and the kind of operation that is going to be performed. See Chapter 2 for details of the kind of diskettes you can use in your floppy disk drives. Also see Chapter 2 for information on how to turn your machine on, insert a system diskette into the "A:" disk drive and boot-strap the operating system. If you have followed these instructions, after the copyright notice has been displayed you should see the MS-DOS prompt:

    A>

### If you have a Single Floppy Disk drive...

Follow the instructions as though you have two disk drives; the source is logical drive "A:" and the target is logical drive "B:". You are advised to write-protect the source diskette. Be careful to insert the correct diskette when prompted.

## TO UPGRADE AN EXISTING SYSTEM DISKETTE TO VERSION 3.30

### USING THE SYS COMMAND TO INSTALL MS-DOS VERSION 3.30 HIDDEN FILES

Place the existing System diskette you wish to upgrade in drive "B:".

Having boot-strapped the computer with the MS-DOS Ver. 3.30 System disk, at the "A>" prompt, type:

**SYS B:**
then press ENTER

If it is possible to copy the hidden system files to the diskette in drive "B:", you will see the following message:

```
System transferred
```

Sometimes, however it is not possible to transfer the new hidden system files to the target diskette. In this case you will see the message:

```
Incompatible system size
```

or

```
No room for system on destination disk
```

If you get either of these two messages, the target disk will not have been corrupted. Instead install MS-DOS Ver. 3.30 on another diskette as instructed in the Section "Formatting A Diskette With An MS-DOS System".

## USING THE REPLACE COMMAND TO UPDATE AN EXISTING FLOPPY DISK

At the A> prompt, with the new MS-DOS Starter Diskette in the "A:" drive, type:

**REPLACE A:*.* B:\ /P /S**
then press ENTER

The REPLACE Command will read the files on the target diskette and will prompt you as to whether to replace them, if a file of the same name exists on the source diskette.

For example:

```
Replace AUTOEXEC.BAT? (Y/N)
```

For AUTOEXEC.BAT, it will probably be advisable to answer N. For COMMAND.COM and other MS.DOS files answer Y. REPLACE will confirm replacement:

```
Replacing B:\COMMAND.COM
```

With the /S switch REPLACE searches sub-directories as well as the root directory for files to replace. Upon completion REPLACE tells you how many files have been replaced. For example:

```
20 File(s) replaced
```

If you wish to use REPLACE with the MS-DOS Ver. 3.30 Operating Diskette or Supplemental Diskette, place the MS-DOS Ver. 3.30 Startup Diskette in the "A:" drive and type the following command:

**REPLACE A:*.* B:\ /P /S /W**
then press ENTER

REPLACE waits for you to insert another source diskette into the "A:" drive and prompts you:

```
Press any key to begin replacing file(s)
```

## TO INSTALL MS-DOS VER. 3.30 ON A NEW SYSTEM DISKETTE

There are two approaches to installing MS-DOS, the first approach is to use "FORMAT", then to copy over the system files and external commands you require and then to create a CONFIG.SYS file and AUTOEXEC.BAT. The second approach is to use SELECT.

### If you have a Non USA Keyboard...

Use the "SELECT" command to install MS-DOS with national keyboard and font support (see the Section "Using The SELECT Command To Install A System Diskette").

### USING THE FORMAT COMMAND TO INITIALIZE A SYSTEM DISKETTE

With the System diskette in the "A:" drive, at the "A>" prompt, type:

**FORMAT B: /S**
then press ENTER

FORMAT prompts you:

```
Insert new diskette for drive B:
and strike ENTER when ready.
```

Press ENTER to start formatting. FORMAT informs you of its progress with the head and cylinder (track) number being formatted. When the formatting is finished, the operating system is transferred. This includes the hidden files and COMMAND.COM. The successful transfer of the system is confirmed with the following message:

```
Format complete
System transferred
```

If either of the first two tracks of the target diskette are faulty, FORMAT will display:

```
Disk unsuitable for system disk
```

However it is possible to use this diskette as a data diskette.


## COPYING SYSTEM FILES AND EXTERNAL COMMANDS

Decide which of the System files and external commands you will need on your target disk. Then use "COPY" to copy them from the source to the target diskette. The following example illustrates using "COPY" for copying the "SYS" files. With the Startup disk in "A:" at the "A>" prompt, type:

**COPY \*.SYS B: /V**
then press ENTER

The /V switch causes a verification of the copying. The system files "ANSI.SYS", "COUNTRY.SYS", "DISPLAY.SYS", "DRIVER.SYS", "KEYBOARD.SYS" "PRINTER.SYS" and "VDISK.SYS" will be copied onto the diskette in "B:".

See Chapter 7 "Configuring And Initializing MS-DOS" for details on setting up an "AUTOEXEC.BAT" and a "CONFIG.SYS".


## USING THE SELECT COMMAND TO INSTALL A SYSTEM DISKETTE

The "SELECT" command automates the preparation of a system diskette, including preparing a AUTOEXEC.BAT and CONFIG.SYS for you. However you will still need to add commands to AUTOEXEC.BAT and CONFIG.SYS, so also see Chapter 7 "Configuring And Initializing MS-DOS".

Before you enter this command you will need to know your: *country-code* and *keyboard-code*. See the Section "The SELECT Command" in Chapter 3, for a table of country-codes and keyboard codes. The *keyboard-code* is a two letter code which becomes a parameter of the KEYB keyboard driver. *keyboard-code* does not exist for Greece and Spain National, therefore for these countries it is not possible to use SELECT.

Bootstrap the computer with the Startup Disk in the "A>" drive.

**If you have a Non USA Keyboard...**

Type the name of the Keyboard Driver which corresponds to your keyboard:

**KEYB** *keyboard-code*
then press ENTER

Now that the keyboard driver is installed the characters embossed on the keyboard correspond to the characters enterered into the computer.

**Warning:** Do **not** use the Keyboard Drivers Diskette which may be provided in your computer's starter kit.

**The SELECT Command**

Make sure the MS-DOS Startup Disk is in the "A:" drive. At the "A>" prompt, type:

**SELECT A: B:** *country-code keyboard-code*
then press ENTER

The computer responds:

```
SELECT is used to install DOS the first
time.   SELECT erases everything on the
specified target and then installs DOS.
Do you want to continue (Y/N)? Y
```

If you wish to proceed press ENTER , otherwise type N then press ENTER. You will be prompted:

```
Insert new diskette for drive B:
and strike ENTER when ready
```

When you strike ENTER the diskette in the "B:" drive will be formatted. After the format has finished you will be asked:

```
Format another (Y/N)?
```

Enter N in reply.

All the files on the Startup Disk will then be copied to the target disk.

You can now use the prepared Startup Disk to bootstrap your computer.  Put the Master Startup Diskette in a safe place.

# 6. HARD DISK SYSTEMS

## INTRODUCTION

If you have new Hard Disk(s) see the Section "How To Set Up Your Hard Disk From Scratch".

If you wish to upgrade an existing version of MS-DOS on hard disk (fixed disk) to MS-DOS Version 3.30 there are several options. Your choice of the correct option(s) depends on:

- What Version of MS-DOS your upgrading from.

- If you have Non-DOS Partitions on your hard disk, such as XENIX.

- If you have multiple MS-DOS partitions.

The options to upgrade to MS-DOS Ver. 3.30 are:

- Use the SYS command to transfer the hidden system files from the MS-DOS Ver. 3.30 Startup Diskette. Then to use the REPLACE command to upgrade the MS-DOS external commands. This option **prevents** you having access to your existing secondary MS-DOS partitions and non-DOS partitions on your hard disk(s).

- Repartition and reformat your hard disk(s). This option **destroys** all existing data on your hard disk.

For upgrading from MS-DOS Ver. 2.11 these options are not mutually exclusive (see the Section "Upgrading From MS-DOS Ver. 2.11 To Ver. 3.30").

**Warning:** After you have installed Ver. 3.30 of MS-DOS on your hard disk, do not use old or non Olivetti versions of MS-DOS (PC-DOS) and access your hard disk.

For upgrading from MS-DOS Ver. 3.10 and Ver. 3.20, see the Section "Upgrading From MS-DOS Ver. 3.xx to Ver. 3.30".

## TO UPGRADE A HARD DISK TO MS-DOS VERSION 3.30

### Backup And Delete All Non-DOS Partitions

If your hard disk(s) contains any partitions that belongs to any other operating system read this paragraph. These operating systems could be, for example XENIX, CP/M or UCSD-P system. Whatever non-DOS operating system you have, use it's facilities to backup all the files from it's partition(s) and then delete those partions. After you have upgraded to MS-DOS Ver. 3.30, you may re-install your Non-DOS operating system. But read the operating system's installation manual to confirm the procedure.

### UPGRADING FROM MS-DOS VER. 2.11 TO VER. 3.30

Follow the following procedure to upgrade. Use the SYS command to transfer the hidden system files from the MS-DOS Ver. 3.30 Startup Diskette to the bootable partition of the hard disk. Then use the REPLACE command to upgrade your hard disk external MS-DOS commands.

Then, after you have upgraded, for hard disks of over 16 Mbytes it is worth reformatting them using MS-DOS Ver. 3.30 FORMAT as this will give you better hard disk performance. However you **must** first backup all the files you want to keep as formatting **destroys** all existing data on your hard disk. If you do decide to reformat your hard disk read the Section "How To Backup Your Hard Disk".

## Using the SYS Command to Install the Hidden System Files

Having bootstrapped the computer with the MS-DOS Ver. 3.30 Startup diskette, at the "A>" prompt, type:

**SYS C:**
then press ENTER

If it is possible to copy the hidden system files to drive "C:", you will see the following message:

```
System transferred
```

Sometimes, however it is not possible to transfer the new hidden system files to the target. In this case you will see the message:

```
Incompatible system size
```

or

```
No room for system on destination disk
```

If you get either of these two messages, the target disk will not have been corrupted. Instead use the "BACKUP" command to backup your hard disk, then re-partition and re-format the disk. See the Sections "How To Backup Your Hard Disk" and "How To Restore Your Hard Disk"

## USING THE REPLACE COMMAND TO UPDATE EXTERNAL COMMANDS

At the "A>" prompt, with the MS-DOS Startup or Supplemental Diskette in the "A:" drive, type:

**REPLACE A:*.* C:\ /S /W**
then press ENTER

The /W option switch causes REPLACE to wait for you to change diskettes - this is necessary to change to the other MS-DOS Ver. 3.30 diskettes, as the REPLACE external command is only on the Startup Diskette.

REPLACE will confirm replacement:

```
Replacing C:\COMMAND.COM
```

With the /S switch REPLACE searches sub-directories as well as the root directory for files to replace. Upon completion REPLACE tells you how many files have been replaced. For example:

```
20 File(s) replaced
```

You can also use REPLACE to add MS-DOS Ver. 3.30 External Commands to your hard disk. For example:

**REPLACE A:*.* C:\ /A /W**
then press ENTER

The /W option switch causes REPLACE to wait for you to change diskettes - this is necessary to change to the other MS-DOS Ver. 3.30 diskettes, as the REPLACE external command is only on the Startup Diskette.

REPLACE will confirm:

```
Adding C:\REPLACE.COM
```

Upon completion REPLACE tells you how many files have been added. For example:

```
20 File(s) added
```

## UPGRADING FROM MS-DOS VER. 3.XX TO VER. 3.30

Follow the following procedure to upgrade.

1.  Bootstrap your computer in the normal fashion from the hard disk using the version installed on the hard disk.

2.  Perform the "de-installation" of all copy protected software that is on the hard disk.

3.  Run CHKDSK on every logical drive of your hard disk(s). If there are problems rerun it with the /F switch set. See CHKDSK in Chapter 7 of the "MS-DOS User Guide" for details of how to use this command.

4.  Backup all the files that you want to keep onto floppy disks. See the Section "How To Backup Your Hard Disk" for details.

5.  Use the FDISK command of the MS-DOS Version installed on your hard disk (MS-DOS Ver. 3.10 or 3.20) to delete all MS-DOS partitions. After having done this there should be no partitions on the hard disk(s). If you still have Non-DOS partitions - see the earlier Section "Backup And Delete All Non-DOS Partitions".

6.  Insert the MS-DOS Ver. 3.30 Starter Diskette into the "A:" drive and bootstrap your computer.

7.  Use the FDISK command from the MS-DOS Ver. 3.30 Startup Diskette to create the MS-DOS partition(s) you require. See later in this chapter for details. After the partition(s) are created the computer will automatically reboot.

8.  Run the FORMAT command from the MS-DOS Ver. 3.30 Startup Diskette to format the MS-DOS partition(s) on the hard disk(s). If the /S switch is specified, this FORMAT command also installs the hidden system files and COMMAND.COM on drive "C:".

9.  Restore all the files, you have previously backed up, to the hard disk(s) from the floppy disks. See the Section "How To Restore Your Hard Disk" for details.

10. Update your MS-DOS external commands using REPLACE. See the earlier Section "Using The REPLACE Command To Update External Commands" for details.

11. Reinstall any copy protected software onto the hard disk.

12. Reinstall any Non-DOS operating systems following the instructions provided with that operating system.

## HOW TO BACKUP YOUR HARD DISK

Before you re-partition and re-format your hard disk, backup the hard disk(s) to diskettes.

## Warning

The procedure explained here will not work with MS-DOS Ver. 2.11.

## Note

Format sufficient backup diskettes before you use the "BACKUP" command.

Insert the MS-DOS Ver. 3.30 Startup Diskette into the "A:" drive.

At the "C>" prompt, type:

**A:BACKUP C:\*.* A: /S**
then press ENTER

The command will prompt:

```
Insert backup diskette 01 in drive A:

WARNING ! Files in the target drive
A:\ root directory will be erased
Strike any key when ready
```

Do as the message instructs. When diskette "01" is full, you will be prompted to insert diskette "02", and so on until all the files on "C:" are backed up. Number and label the diskettes carefully; when the hard disk is restored the diskettes have to be inserted in the same order as they were backed up.

## HOW TO RESTORE YOUR HARD DISK

Before you restore your hard disk, follow the instructions in the Section "How To Set Up Your Hard Disk From Scratch".

### If you had backed up the root directory of MS-DOS Ver. 3.10...

Before you restore the root directory of the hard disk carry out the following procedure. At the MS-DOS prompt, type:

1. **C:**
   Then press ENTER

2. **CD \**

3. **COPY CON IO.SYS**
   Then press ENTER

4. **This is a dummy file!**

5. Press F6

6. Press ENTER

   The computer will respond:

   ```
   1 File(s) copied
   ```

7. **COPY IO.SYS MSDOS.SYS**
   Then press ENTER

You have now created two dummy files called IO.SYS and MSDOS.SYS. These have the same name as the hidden system files used by MS-DOS Ver. Ver. 3.10.

**For files backed up from MS-DOS Ver. 3.10 and 3.20...**

Insert the MS-DOS Ver. 3.30 Starter Diskette into the "A:" drive.

At the "C>" prompt, type:

**A:RESTORE A: C:*.* /S/P**
then press ENTER

The command will prompt you:

```
Insert backup diskette 01 in drive A:
Strike any key when ready
```

Do as the command instructs.  Be careful to insert the diskettes in the same order as that in which they were backed up.

As the /P switch is specified, you will be prompted before the command restores a file which was changed after it was backed up:

```
filename
Warning! The file  above was  changed after it
was backed up.
Replace the file (Y/N)?
```

Answer N , if *filename* is IO.SYS, MSDOS.SYS, COMMAND.COM or any of the other files supplied on your MS-DOS Ver. 3.30 Startup or Operating or Supplementary Diskettes.


**If you had backed up the root directory of MS-DOS Ver. 3.10...**

When you have finished restoring files to the hard disk, the dummy IO.SYS and MSDOS.SYS can be deleted.

## HOW TO SET UP YOUR HARD DISK FROM SCRATCH

If your Olivetti Personal Computer has a hard disk (fixed disk) there are several steps you will need to take before you can use it with MS-DOS. The MS-DOS command that you will use to set up your hard (fixed disk(s)) is called the "Fixed Disk Setup Program". It uses a series of video display menus and prompts that guide you through the operations step by step.

## HOW TO USE FDISK TO PARTITION YOUR HARD DISK

### Introduction

Hard disks can be divided into one to four separate sections, called partitions. Partitions separate your hard disk into individual areas, and each partition may contain a different operating system.

To prepare your hard disk for the MS-DOS operating system, you must create a partition for MS-DOS, called a DOS partition. You can create a DOS partition on your hard disk by using a menu-driven utility called FDISK. You must use FDISK if you want to do one of the following:

- Create a primary MS-DOS partition

- Create an extended DOS partition

- Change the active partition

- Delete a DOS partition

- Display partition information

- Review or modify the configuration of another hard disk on your computer.

**Warning:** Reconfiguring your disk with FDISK destroys all existing files. Be sure to have a backup of all files on your disk before you create an MS-DOS partition with FDISK.

## CHECKING FOR A CONFIGURED AND FORMATTED DISK

### Has FDISK been run already?

Many computer stores configure hard disk computers for MS-DOS, so you may not need to use FDISK. They may also format your hard disk to start MS-DOS when you turn the power on. To find out whether this has been done, do the following:

1. First, try to to start MS-DOS from your hard disk.

   • If it starts, your hard disk is both configured and formatted, and the MS-DOS system files are on the disk.

   • If MS-DOS does not start, your disk is not formatted to start MS-DOS, but may have been configured.

2. If MS-DOS did not start, check to see if the disk has been configured with FDISK. Place the MS-DOS Startup Diskette in drive "A:" and press CTRL ALT DEL to start MS-DOS. Then run FDISK and select the "Display Partition Information" to see if any MS-DOS partitions exist.

   • If any do exist, your disk has been configured.

   • If no partitions exist, follow the instructions in this chapter to configure your disk.

3. After your hard disk is configured, be sure to format your disk with the MS-DOS FORMAT /S command before you copy files onto the disk. Otherwise, your files will be unreadable.

## HOW TO START FDISK

### Starting FDISK

The FDISK utility is easy to use because it uses menus to lead you through each procedure. To start FDISK, follow these steps:

1. Place the MS-DOS disk in drive "A:".

2. Turn on your computer to start MS-DOS

3. Type the following command:

   **FDISK**
   then press ENTER

### FDISK Main Menu

In response, FDISK displays its main menu on your screen. This menu lists five choices. If your computer has only one hard disk, Choice 5 will not appear on your screen.

```
FDISK Options

Current Fixed Disk Drive: 1

Choose one of the following:

    1. Create DOS Partition
    2. Change Active Partition
    3. Delete DOS Partition
    4. Display Partition Information
    5. Select Next Fixed Disk Drive

Enter choice:    [1]

Press ESC to return to DOS
```

*Fig. 6-1 FDISK Options*

The following sections describe each of these options, and show the menus and other information they display. To exit to MS-DOS from the main menu, just press the ESC key. You can also use the ESC key to return to the main menu from any of the FDISK menus.

Most of the FDISK menus displays a default value. To choose the default value, press the ENTER key. To choose another value, just type the value you want, and press the ENTER key.

## HOW TO CREATE A DOS PARTITION

If you choose the first option on the main menu, and if your hard disk is not yet completely partitioned, FDISK displays a screen like the following. If no extended partitions exist, the third option is not displayed:

```
Create DOS Partition

Current Fixed Disk Drive: 1

        1. Create Primary DOS Partition
        2. Create Extended DOS Partition
        3. Create Logical DOS Drive(s)  in
           the  Extended  DOS Partition

Enter choice:    [1]

Press ESC to return to FDISK Options
```
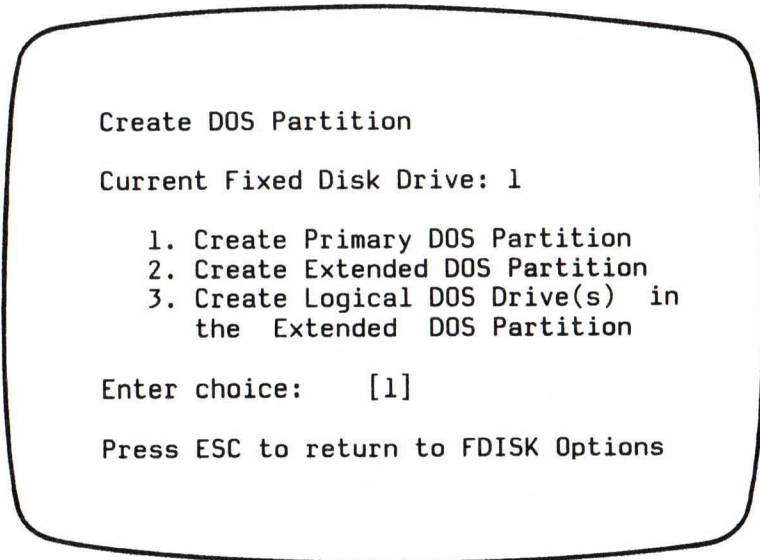
*Fig. 6-2 FDISK Menu: Choice 1*

## Selection 1: Create Primary DOS Partition

You must create a primary MS-DOS partition first before you can create any extended MS-DOS partitions on your disk. In most cases, you will need only one MS-DOS partition for your entire disk.

### Creating a Primary MS-DOS Partition

To create a primary MS-DOS partition, press the ENTER key to accept the default selection (1). The following menu appears next:

```
The Create Primary DOS Partition menu appears next:

Create Primary DOS Partition

Current Fixed Disk Drive: 1

Do you wish to use the maximum size
for a DOS partition and make the DOS
partition active (Y/N).........?  [Y]

Press ESC to return to FDISK Options
```
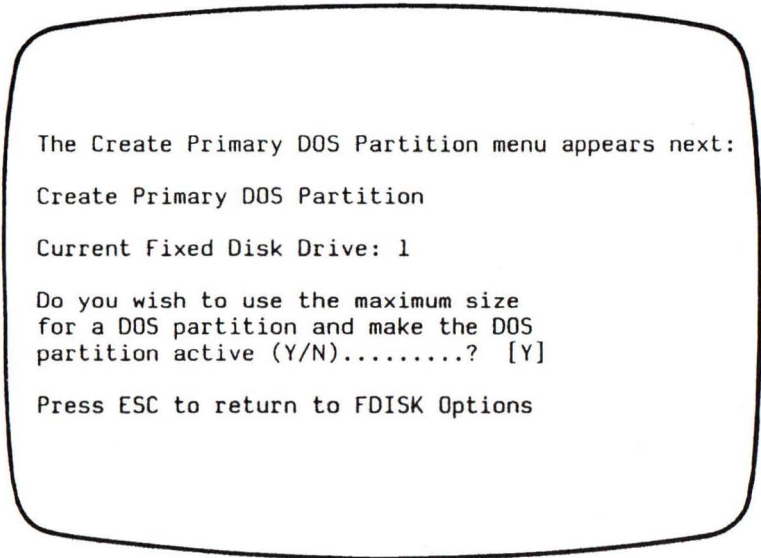
*Fig. 6-3 Create Primary DOS Partition Menu*

## Creating a Single MS-DOS Partition

If you use your entire hard disk for MS-DOS, you will use the FDISK program only once to create the primary MS-DOS partition. If you want to use the entire hard disk (up to 32 megabytes) for MS-DOS, press the ENTER key to accept the default selection ( Y ).

FDISK then displays the following message:

```
System will now restart

Insert DOS diskette in drive A:
Press any key when ready . . .
```

Put your MS-DOS disk in drive "A:" and press any key to restart MS-DOS.

Now read the Section later in this Chapter entitled "Formatting Your Hard Disk".

## Creating More than One MS-DOS Partition

You may choose to create a primary MS-DOS partition smaller than the maximum size. To do this, type N (for No) in response to the question on the first Create Primary DOS Partition menu. FDISK displays a second Create Primary DOS Partition menu like the following. From this menu, you can specify the size of the primary MS-DOS partition:

```
Create Primary DOS Partition

Current Fixed Disk Drive: 1

Partition  Status  Type  Start  End  Size

Total disk space is 732 cylinders.
Maximum space available for partition
is 732 cylinders.

Enter partition size........... [ 732]

Press ESC to return to Fdisk Options
```

*Fig. 6-4 Second Create Primary DOS Partition Menu*

The space available on your hard disk is measured in cylinders, also
called tracks. This menu shows the total number of cylinders available
for a hard disk partition, and prompts you to enter the size of your new
partition. The default size for the partition is the maximum available
space on the hard disk. Press the ENTER key if you want the default
size; otherwise, type the size (in cylinders) that you want for the
partition, and press the ENTER key. Any part of the disk that you do not
use for the primary MS-DOS partition may be used for an extended
MS-DOS partition.

**Selection 2: Create Extended DOS Partition**

You can use FDISK to create an extended partition if your disk is larger than 32-megabytes (the maximum partition size), or if you want to designate one or more logical drives for the disk.

To select Create Extended DOS Partition, type 2, then press the ENTER key. In response, FDISK displays a menu like this one:

```
Create Extended DOS Partition

Current Fixed Disk Drive: 1

Partition  Status   Type  Start  End   Size
  C:  1       A     PRI DOS   0    599   600

Total disk space is 1263 cylinders.
Maximum space available for partition
is 663 cylinders.

Enter partition size........... [ 663]

Press ESC to return to FDISK Options
```

*Fig. 6-5 Create An Extended DOS Partition Menu*

This menu shows the total number of cylinders available for an extended partition. The default for the partition size is the maximum available space on the hard disk. Press the ENTER key if you want the default; otherwise, type the size (in cylinders) that you want for the partition, and press the ENTER key.

**Note:** If FDISK finds any defective tracks at the start of the partition, it adjusts the partition boundaries to avoid those bad tracks.

**Selection 3: Create Logical Drive In The Extended DOS Partition**

When you have created an extended partition, you must specify one or more drive letters to define that area of the disk. FDISK automatically displays this menu after you create an extended partition. FDISK displays a menu similar to the following if you choose option 3 from the Create DOS Partition menu:

```
Create Logical DOS Drive(s)

Drv   Start   End   Size
D:     650   1049   400

Total partition space is 1000 cylinders.
Maximum space available for logical
drive is 600 cylinders.

Enter logical drive size........... [ 600]

Press ESC to return to FDISK Options
```

*Fig. 6-6 Create Logical DOS Drive(s) Menu*

You may designate the entire partition as one logical drive, or divide it into two or more logical drives. For example, if you want to segregate a particular application and its data files to their own drive, you may want to create a second logical drive on the partition. Because you cannot

use an MS-DOS extended partition without a drive letter, FDISK continues to prompt you for logical disk drive information until the whole partition has been assigned to a logical drive.

When the entire partition is assigned to logical drives, FDISK displays this message:

```
All available space in the Extended DOS
partition is assigned to logical drives.
```

Press ESC to enter to the main FDISK menu. From there, you can restart MS-DOS, or select another option.

## HOW TO CHANGE THE ACTIVE PARTITION

If you choose the second option on the main menu, FDISK displays a screen showing the status of each partition on your hard disk. The active partition, indicated by a status of A, contains the operating system and files you access when you turn on or reset your computer. If you have created a partition on your disk with another operating system, this menu allows you to make that partition the active partition. Only one partition is active at a time; the others are not active.

### Changing the active partition

For example, if you have both XENIX and DOS partitions on your disk, the Change Active Partition menu might look like this:

```
Change Active Partition

Current Fixed Disk Drive: 1

Partition  Status    Type   Start  End   Size
  C:  1              non DOS    0    1     1
      2              non DOS    2  401   400
      3        A     PRI DOS  402  731   330

Total disk space is 732 cylinders.

Enter the number of the partition you
want to make active..................:[ 1]

Press ESC to return to FDISK Options
```
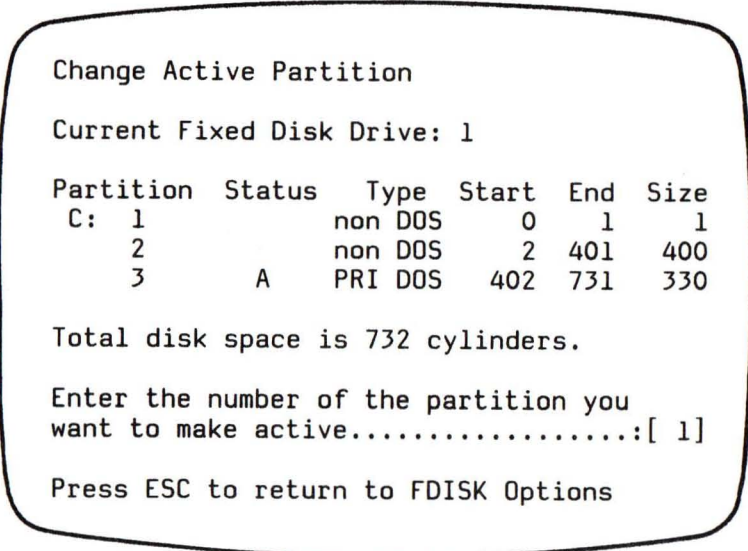
*Fig. 6-7 Change Active Partition Menu*

Type the number of the partition that you want to activate, and press the ENTER key. The default setting is the active partition number.

If your hard disk contains only MS-DOS partitions, FDISK displays the following message instead of prompting you for the partition that you want to activate:

```
The only bootable partition on Drive 1
is already marked active.

Press ESC
to return to FDISK Options.
```

## HOW TO DELETE A DOS PARTITION

If you choose the third option on the main menu, FDISK displays the following menu, which asks you to identify whether the partition you want to delete is a primary or extended DOS partition:

```
Delete DOS Partition

Current Fixed Disk Drive: 1

     1. Delete Primary DOS Partition
     2. Delete Extended DOS Partition
     3. Delete Logical DOS Drive(s) in
        the Extended DOS Partition

Enter choice:    [ ]

Press ESC to return to FDISK Options
```
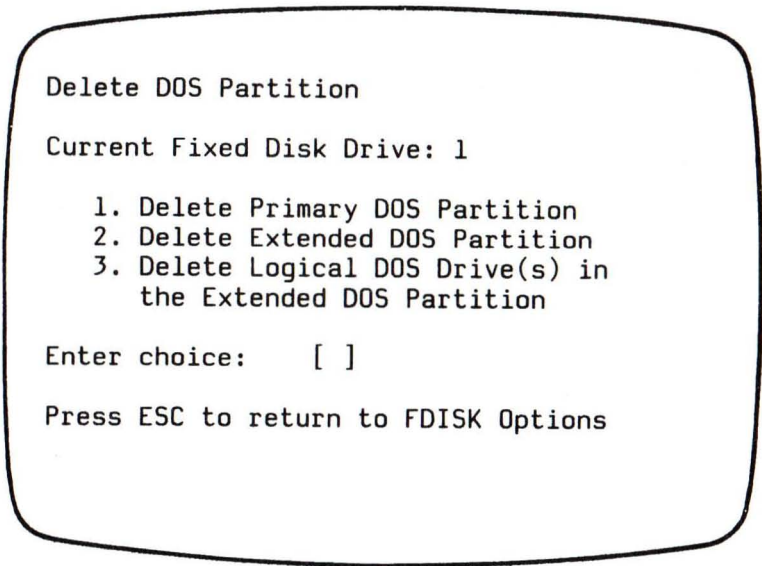
*Fig. 6-8 Delete DOS Partition Menu*

### Deleting a DOS partition

Type the number of the selection you want and press the ENTER key. The next menu, whether for a primary or extended DOS partition, shows the status of that partition. When you delete a DOS partition, FDISK deletes the partition boundaries and any data that existed in that

partition. Once you delete the partition, you **cannot** recover the data that was on it.

**Note:** You cannot use FDISK to delete a non-DOS partition. Instead, to continue using MS-DOS after you have deleted the DOS partition, you must put a MS-DOS program disk into drive "A:". To start a different operating system in another partition of your hard disk, you must change the active partition to that number before you delete the DOS partition.

## Selection 1: Delete Primary DOS Partition

The Delete Primary DOS Partition menu will look similar to this:

```
Delete Primary DOS Partition

Current Fixed Disk Drive: 1

Partition  Status  Type  Start  End  Size
  C:  1       A    PRI DOS    0   399  400
      2            EXT DOS  400   731  332

Total disk space is 732 cylinders.

Warning!  Data in the Primary DOS
partition will be lost.  Do you wish
to continue.......................?  [N]

Press ESC to return to FDISK Options
```
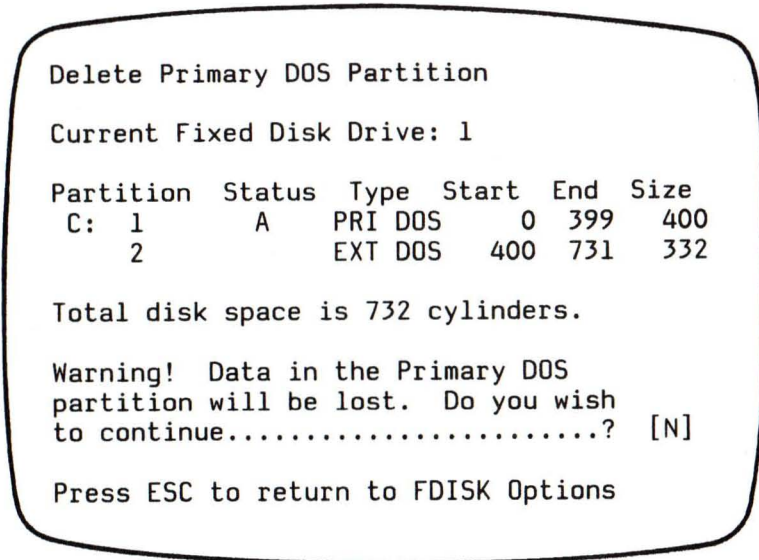
*Fig. 6-9 Delete Primary DOS Partition Menu*

If you do not want to delete the primary DOS partition, press the ENTER key to accept the default value ( N ).

To delete the primary DOS partition,

1. Type Y

2. Press the ENTER key.

## Selection 2: Delete Extended DOS Partition

If you choose to delete an extended partition, you must first delete the logical drives associated with that partition.

Selection 3: Delete Logical Drive in the Extended DOS Partition To delete a logical drive, type 3 to select the option Delete Logical DOS Drive(s) in the Extended DOS Partition from the Delete DOS Partition menu. Then press the ENTER key. FDISK displays a menu like the following:

```
Delete Logical DOS Drive(s)

Drv    Start    End    Size
D:       400    999     600
E:      1000   1399     400

Total partition space is 1000 cylinders.

Warning!  Data in the logical DOS drive
will be lost.  What drive do you wish
to delete........................? [ ]

Press ESC to return to FDISK Options
```

*Fig. 6-10 Delete Logical DOS Drive(s)*

Type the letter of the drive you want to delete, and press ENTER. FDISK displays this message:

```
Are you sure......................? [N]
```

If this logical drive contains valuable data you have not backed up, press ENTER. This stops FDISK from deleting the logical drive.

**Note:** Be sure to back up all files you will need from the logical drive before you delete the drive. When FDISK deletes a logical drive or partition, the data is destroyed. If you are sure you want to delete the drive, type Y (for Yes).

## HOW TO DISPLAY PARTITION DATA

If you choose the fourth option on the main menu, FDISK displays a menu that contains information about each of the partitions on your hard disk. For example, the Display Partition Information menu might look like this:

```
Display Partition Information

Current Fixed Disk Drive: 1

Partition  Status   Type  Start  End  Size
  C:  1      A     PRI DOS    0   399  400
      2            EXT DOS  400   731  332

Total disk space is 732 cylinders.

The Extended DOS partition contains
logical DOS drives.  Do you want to
display logical drive information?     [Y]

Press ESC to return to FDISK Options
```

*Fig. 6-11 Display Partition Information*

This information screen identifies the partitions on your disk. It shows each partition's number, status, and type, its starting and ending cylinder numbers, and its size in cylinders.

If you have an extended partition, FDISK asks if you want to see information about that partition's logical drives. Type Y and press ENTER to display a screen like the following:

```
Display Logical DOS Drive(s)

Drv    Start    End   Size
D:       400    999    600
E:      1000   1399    400




Press ESC to return to FDISK Options
```
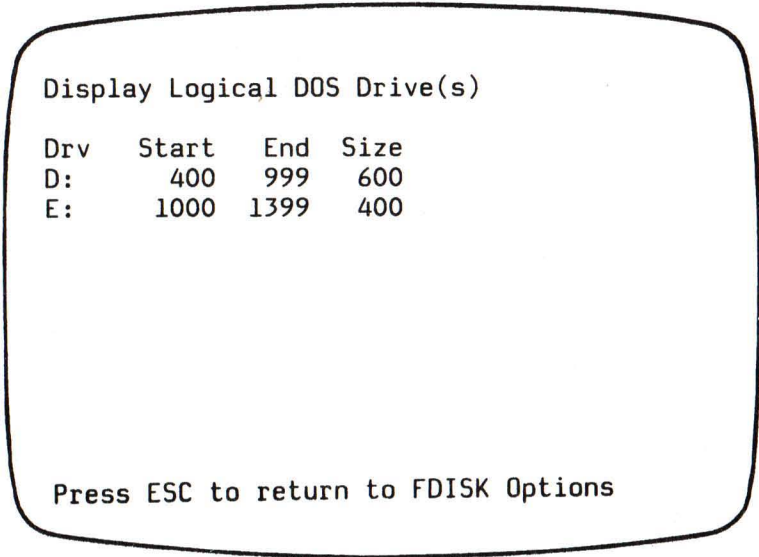
*Fig. 6-12 Display Logical DOS Drive(s)*

Press the ESC key to return to the main menu.

### HOW TO SELECT THE NEXT FIXED DISK DRIVE

Option 5 only appears on the main FDISK menu if you have more than one hard disk attached to your computer. If you choose this option, FDISK changes the current disk drive to the next fixed disk drive.

### Example

If the current disk drive is drive 1, and if you choose option 5 on the main menu, FDISK changes the current fixed disk drive to drive 2. You could then choose any of the FDISK options (1 - 4) to prepare the

second fixed disk for MS-DOS. Or, you could select option 5 once again to select the next fixed disk drive. For example, if there is not a third fixed disk, FDISK changes the current fixed disk drive from 2 back to 1.

After you have selected the next drive, FDISK displays the main menu again. Note that near the top of the screen, there is a line that looks something like this:

```
Current fixed disk drive:   2
```

The activity you select will be performed on the disk shown in this line.


**Example**

This example illustrates four MS-DOS partitions on Physical Fixed Disk 1 and four MS-DOS partitions on Physical Disk 2. The active partition is "C:". The other MS-DOS partitions of Fixed Disk 1 are "E:", "F:", and "G:". The MS-DOS partitions of Fixed Disk 2 are "D", "H:", "I:" and "J:".

It is recommended that you give each logical drive a volume label such as:

```
DRIVE  LABEL          COMMENT

C:     D(1)  P(P)     Physical Drive 1, Primary Partition
D:     D(2)  P(P)     Physical Drive 2, Primary Partition
E:     D(1)  P(E1)    Physical Drive 1, Extended Partition - 1st
F:     D(1)  P(E2)    Physical Drive 1, Extended Partition - 2nd
G:     D(1)  P(E3)    Physical Drive 1, Extended Partition - 3rd
H:     D(2)  P(E1)    Physical Drive 2, Extended Partition - 1st
I:     D(2)  P(E2)    Physical Drive 2, Extended Partition - 2nd
J:     D(2)  P(E3)    Physical Drive 2, Extended Partition - 3rd
```

These suggested volume labels are for the example illustrated, similar labeling schemes would apply to other configurations.

## FORMATTING YOUR HARD DISK

### If you have a Non USA Keyboard...

You are recommended to use the SELECT command to format and install the operating system on your "C:" drive. Read the Section later in this Chapter called "Using SELECT" To Install MS-DOS On Your Hard Disk".

### If you have a USA Keyboard

You can either use the SELECT command or use the FORMAT command to format the "C:" drive and install the MS-DOS operating system.

### If you have Multiple MS-DOS Partitions or Two Hard Disks

Use the FORMAT command to format drives other than "C:" without an operating system. (For more information about the FORMAT command, see Chapter 7, "MS-DOS Commands" in the "MS-DOS User Guide".)

### FORMATTING THE C: DRIVE

1.  You now need to format the hard disk so that MS-DOS can use it. Make sure that you have your system disk in drive "A:" and "A>" is your MS-DOS prompt. Type:

    **FORMAT C:/S/V**
    then press ENTER

    This not only formats the hard disk but also copies the hidden files to it.

    If you do not want to boot MS-DOS from hard disk it is sufficient to

type:

**FORMAT C:/V**
then press ENTER

If you have an existing formatted disk as a precautionary measure you will be prompted:

```
Enter current Volume Label for drive C:
```

Type in your current label.

You will then be prompted:

```
WARNING, ALL DATA ON NON-REMOVABLE DISK
DRIVE C: WILL BE LOST!
Proceed with Format (Y/N)?
```

2. Type Y then press ENTER

```
Formatting
```

appears. The FORMAT program displays the cylinder and head number it is formatting. After several minutes you will see the message:

```
Format complete
```

and if you entered /S in the command line the following message will also appear:

```
System transferred
```

This indicates that a copy of MS-DOS has been made on the hard disk. You will now be able to boot from the hard disk.

3. The following message then appears:

```
Volume label (11 characters, ENTER for none) ?
```

It is recommended that you give your hard disk a Volume label, for example type:

**HARD DISK**
then press ENTER

You will get a message similar to the following:

```
10592256 bytes total disk space
   61440 bytes used by system
10530816 bytes available on disk
```

## FORMATTING HARD DISKS DRIVES OTHER THAN C:

To format the other logical drives, at the A> prompt. Type:

**FORMAT** *drive* /V
then press ENTER

Where *drive* can be the other logical drives you have partitioned.

It is recommended that you give each logical drive a volume label, such as:

```
DRIVE LABEL      COMMENT

C:     D(1) P(P)  Physical Drive 1, Primary Partition
D:     D(1) P(E1) Physical Drive 1, Extended Partition - 1st
E:     D(1) P(E2) Physical Drive 1, Extended Partition - 2nd
F:     D(1) P(E3) Physical Drive 1, Extended Partition - 3rd
```

## TRANSFERRING THE OPERATING SYSTEM TO HARD DISK

If you have copied MS-DOS to the hard disk you will probably require the MS-DOS external commands to be copied there as well. With your MS-DOS system diskette in drive "A:", at the "A>" prompt, type:

**COPY *.* C:/V**
then press ENTER

This will copy all the non-hidden files from the system diskette to the hard disk, verifying the correctness of the copied files.

## USING SELECT TO INSTALL MS-DOS ON YOUR HARD DISK

Bootstrap the computer with the Startup Diskette in the A> drive. At the "A>" prompt, type:

**SELECT A: C:\ SYSTEM** *country-code keyboard-code*
then press ENTER

The computer responds:

```
SELECT is used to install DOS the first
time.   SELECT erases everything on the
specified target and then installs DOS.
Do you wish to continue (Y/N)? Y
```

If you wish to proceed press ENTER , otherwise type N , then press ENTER. SELECT will now use the FORMAT command to format the "C:" drive of the hard disk. If you have an existing formatted disk as a precautionary measure you will be prompted:

```
Enter current Volume Label for drive C:
```

Type in your current label.

You will then be prompted:

```
WARNING, ALL DATA ON NON-REMOVABLE DISK
DRIVE C: WILL BE LOST!
Proceed with Format (Y/N)?
```

Enter Y in reply. The "C:" drive of your hard disk will then be formatted.


**If you have 5 1/4 inch Diskettes...**

Insert the MS-DOS Operating Diskette and then the Supplementary Diskette into the "A:" drive. At the "A>" prompt, type:

**COPY *.* C:\SYSTEM /V**
then press ENTER

The computer will then copy all the files on the diskette to the "C:" drive. Repeat this process for the Supplementary Diskette.

**If you have 3 1/2 inch Diskettes...**

Insert the MS-DOS the Supplementary Diskette into the "A:" drive. At the "A>" prompt, type:

    **COPY *.* C:\SYSTEM /V**
    then press ENTER

The computer will then copy all the files on the diskette to the "C:" drive.

## BOOTSTRAPPING YOUR COMPUTER

If you have set up the "C:" drive as active and have installed the MS-DOS operating System, test your installation by bootstrapping your hard disk. Remove any diskette that is in the "A" drive. Press the following keys simultaneously: CTRL ALT DEL The computer should bootstrap with the Microsoft/Olivetti Copyright Notice, and then output a "C>" prompt.

If this does not work, start again at the beginning to repartition and format your hard disk. If again the computer bootstrap does not work, contact your Olivetti Dealer for advice.

# 7. CONFIGURING AND INITIALIZING MS-DOS

## INTRODUCTION

This Chapter contains example CONFIG.SYS and AUTOEXEC.BAT files. Look for the Section heading suitable for your particular hardware configuration. Remember these are only example files, tailor them to your own hardware and application requirements.

## THE CONFIGURATION OF MS-DOS USING CONFIG.SYS

Whenever MS-DOS is initialized, it searches the root directory of the "A:" (or "C:" drive, for a hard disk), for a file named CONFIG.SYS. If this file exists, it is read and the configuring commands within it are executed. If CONFIG.SYS is not found the default settings for each command is used. In many cases these defaults do not provide optimum performance. So by providing the correct parameter settings, the performance of your application program and/or MS-DOS can be improved. However the trade-off is in many cases increased use of main memory, leaving less room for application programs. For more information about individual CONFIG.SYS commands see Appendix B.

Use the "Video File Editor (EDIT)", to create and/or edit the "CONFIG.SYS" file. Remember it must be in the root directory of the boot drive. Insert the correct configuring commands for your hardware configuration. The "Video File Editor (EDIT)" is documented in Chapter 6 of the "MS-DOS User Guide".

After creating or changing "CONFIG.SYS", you must re-bootstrap the computer to effect the new commands.

## FLOPPY DISK CONFIG.SYS

### If you have 5 1/4 inch Floppy Disk Drive(s)...

```
BUFFERS=15
FILES=20
```

### If you have two 720 KB 3 1/2 inch Floppy Disk Drives A: and B: ...

```
BUFFERS=15
DRIVPARM=/D:0 /F:2
DRIVPARM=/D:1 /F:2
FILES=20
```

### If you have a 720 KB 3 1/2 inch Floppy Disk Drive A:...

```
BUFFERS=15
DRIVPARM=/D:0 /F:2
FILES=20
```

### you

```
BUFFERS=15
DRIVPARM=/D:1 /F:2
FILES=20
```

## HARD DISK CONFIG.SYS

### If you have 720 KB 3 1/2 inch floppy disk drive(s) and hard disk(s)...

See above for the relevant "DRIVPARM" setting, but use the "BUFFERS" and "FILES" settings recommended below.

**If you have a 10 MB Hard Disk...**

BUFFERS=20
FILES=20

**If you have a 20 MB Hard Disk...**

BUFFERS=25
FILES=20

**If you have a 40 or more than 40 MB Hard Disk...**

BUFFERS=40
FILES=20

## THE INITIALIZATION OF MS-DOS USING AN AUTOEXEC.BAT FILE

The AUTOEXEC.BAT is a special batch file which, if present in the root directory of the "A:" (or "C:" drive, for a hard disk), is automatically executed at system initialization. It is very useful to have a fixed sequence of commands executed every time the system is initialized. The difference between the "CONFIG.SYS" and the "AUTOEXEC.BAT" file is that the special declaration commands in the "CONFIG.SYS" can only be obeyed at system initialization, whereas the "AUTOEXEC.BAT" contains normal MS-DOS commands, which could be obeyed at any time during an MS-DOS session. The "CONFIG.SYS" is obeyed before the "AUTOEXEC.BAT".

Use the "Video File Editor (EDIT)", to create and/or edit the "AUTOEXEC.BAT" file. Remember it must be in the root directory of the boot drive. Insert the correct configuring commands for your hardware configuration. The "Video File Editor (EDIT)" is documented in Chapter 6 of the "MS-DOS User Guide".

The following MS-DOS commands are particularly relevant for inclusion in the "AUTOEXEC.BAT" file:

- ASSIGN

- DATE

- FASTOPEN

- GRAFTABL

- GRAPHICS

- JOIN

- KEYB *xx*

- MODE

- NLSFUNC

- PATH

- PROMPT

- SHARE

- SUBST

- TIME

See Chapter 7 of the "MS-DOS User Guide" and Appendix E of this manual for details of the above MS-DOS commands.

**If you have a Floppy Disk based system...**

```
ECHO OFF
GRAFTABL
PATH=A:\;B:\
PROMPT=$P$G
CLS
```

**If you have a Hard Disk based system...**

```
ECHO OFF
GRAFTABL
PATH=C:\;A:\;B:\
FASTOPEN C:15
PROMPT=$P$G
CLS
```

## USING THE AUTOEXEC.BAT TO LOAD APPLICATIONS

Usually the application documentation gives full details and examples of using batch files to initialize and call an application. However many "pop-up programs", which load and stay resident, are sensitive to the order in which they are initially called. Make sure that all resident MS-DOS external commands such as "GRAPHICS", "GRAFTABL" and "MODE" are called before calling the "pop-up program".

# A. CODE PAGE TABLES

| DEC: | HEX | CHARACTER | DEC: | HEX | CHARACTER | DEC: | HEX | CHARACTER | DEC: | HEX | CHARACTER |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 000 | 00 | BLANK (NULL) (NUL) | 016 | 10 | ► (DLE) | 032 | 20 | (SPACE) (SP) | 048 | 30 | 0 |
| 001 | 01 | ☺ (SOH) | 017 | 11 | ◄ (DC1) | 033 | 21 | ! | 049 | 31 | 1 |
| 002 | 02 | ☻ (STX) | 018 | 12 | ↕ (DC2) | 034 | 22 | " | 050 | 32 | 2 |
| 003 | 03 | ♥ (ETX) | 019 | 13 | ‼ (DC3) | 035 | 23 | # | 051 | 33 | 3 |
| 004 | 04 | ♦ (EOT) | 020 | 14 | ¶ (DC4) | 036 | 24 | $ | 052 | 34 | 4 |
| 005 | 05 | ♣ (ENQ) | 021 | 15 | § (NAK) | 037 | 25 | % | 053 | 35 | 5 |
| 006 | 06 | ♠ (ACK) | 022 | 16 | ▬ (SYN) | 038 | 26 | & | 054 | 36 | 6 |
| 007 | 07 | • (BEL) | 023 | 17 | ↨ (ETB) | 039 | 27 | ' | 055 | 37 | 7 |
| 008 | 08 | ◘ (BS) | 024 | 18 | ↑ (CAN) | 040 | 28 | ( | 056 | 38 | 8 |
| 009 | 09 | ○ (HT) | 025 | 19 | ↓ (EM) | 041 | 29 | ) | 057 | 39 | 9 |
| 010 | 0A | ◙ (LF) | 026 | 1A | → (SUB) | 042 | 2A | * | 058 | 3A | : |
| 011 | 0B | ♂ (VT) | 027 | 1B | ← (ESC) | 043 | 2B | + | 059 | 3B | ; |
| 012 | 0C | ♀ (FF) | 028 | 1C | ∟ (FS) | 044 | 2C | , | 060 | 3C | < |
| 013 | 0D | ♪ (CR) | 029 | 1D | ↔ (GS) | 045 | 2D | — | 061 | 3D | = |
| 014 | 0E | ♫ (SO) | 030 | 1E | ▲ (RS) | 046 | 2E | . | 062 | 3E | > |
| 015 | 0F | ☼ (SI) | 031 | 1F | ▼ (US) | 047 | 2F | / | 063 | 3F | ? | ►

*Tab. A-1  Code Page 437 (United States)*

| DEC: | HEX | CHARACTER | DEC: | HEX | CHARACTER | DEC: | HEX | CHARACTER | DEC: | HEX | CHARACTER |
|------|-----|-----------|------|-----|-----------|------|-----|-----------|------|-----|-----------|
| 064 | 40 | @ | 080 | 50 | P | 096 | 60 | ` | 112 | 70 | p |
| 065 | 41 | A | 081 | 51 | Q | 097 | 61 | a | 113 | 71 | q |
| 066 | 42 | B | 082 | 52 | R | 098 | 62 | b | 114 | 72 | r |
| 067 | 43 | C | 083 | 53 | S | 099 | 63 | c | 115 | 73 | s |
| 068 | 44 | D | 084 | 54 | T | 100 | 64 | d | 116 | 74 | t |
| 069 | 45 | E | 085 | 55 | U | 101 | 65 | e | 117 | 75 | u |
| 070 | 46 | F | 086 | 56 | V | 102 | 66 | f | 118 | 76 | v |
| 071 | 47 | G | 087 | 57 | W | 103 | 67 | g | 119 | 77 | w |
| 072 | 48 | H | 088 | 58 | X | 104 | 68 | h | 120 | 78 | x |
| 073 | 49 | I | 089 | 59 | Y | 105 | 69 | i | 121 | 79 | y |
| 074 | 4A | J | 090 | 5A | Z | 106 | 6A | j | 122 | 7A | z |
| 075 | 4B | K | 091 | 5B | [ | 107 | 6B | k | 123 | 7B | { |
| 076 | 4C | L | 092 | 5C | \ | 108 | 6C | l | 124 | 7C | ¦ |
| 077 | 4D | M | 093 | 5D | ] | 109 | 6D | m | 125 | 7D | } |
| 078 | 4E | N | 094 | 5E | ^ | 110 | 6E | n | 126 | 7E | ~ |
| 079 | 4F | O | 095 | 5F | — | 111 | 6F | o | 127 | 7F | △ (DEL) |

*Tab. A-1  Code Page 437 (United States) (cont.)*

| DEC | HEX | CHARACTER | DEC | HEX | CHARACTER | DEC | HEX | CHARACTER | DEC | HEX | CHARACTER |
|-----|-----|-----------|-----|-----|-----------|-----|-----|-----------|-----|-----|-----------|
| 128 | 80 | Ç | 144 | 90 | É | 160 | A0 | á | 176 | B0 | |
| 129 | 81 | ü | 145 | 91 | æ | 161 | A1 | í | 177 | B1 | |
| 130 | 82 | é | 146 | 92 | Æ | 162 | A2 | ó | 178 | B2 | |
| 131 | 83 | â | 147 | 93 | ô | 163 | A3 | ú | 179 | B3 | \| |
| 132 | 84 | ä | 148 | 94 | ö | 164 | A4 | ñ | 180 | B4 | ┤ |
| 133 | 85 | à | 149 | 95 | ò | 165 | A5 | Ñ | 181 | B5 | ╡ |
| 134 | 86 | å | 150 | 96 | û | 166 | A6 | a̲ | 182 | B6 | ╢ |
| 135 | 87 | ç | 151 | 97 | ù | 167 | A7 | o̲ | 183 | B7 | ╖ |
| 136 | 88 | ê | 152 | 98 | ÿ | 168 | A8 | ¿ | 184 | B8 | ╕ |
| 137 | 89 | ë | 153 | 99 | Ö | 169 | A9 | ⌐ | 185 | B9 | ╣ |
| 138 | 8A | è | 154 | 9A | Ü | 170 | AA | ¬ | 186 | BA | ║ |
| 139 | 8B | ï | 155 | 9B | ¢ | 171 | AB | 1/2 | 187 | BB | ╗ |
| 140 | 8C | î | 156 | 9C | £ | 172 | AC | 1/4 | 188 | BC | ╝ |
| 141 | 8D | ì | 157 | 9D | ¥ | 173 | AD | ¡ | 189 | BD | ╜ |
| 142 | 8E | Ä | 158 | 9E | Pt | 174 | AE | « | 190 | BE | ╛ |
| 143 | 8F | Å | 159 | 9F | f | 175 | AF | » | 191 | BF | ┐ |

▶

*Tab. A-1  Code Page 437 (United States) (cont.)*

| DEC | HEX | CHARACTER | DEC | HEX | CHARACTER | DEC | HEX | CHARACTER | DEC | HEX | CHARACTER |
|-----|-----|-----------|-----|-----|-----------|-----|-----|-----------|-----|-----|-----------|
| 192 | C0 | L | 208 | D0 | ⊥⊥ | 224 | E0 | α | 240 | F0 | ≡ |
| 193 | C1 | ⊥ | 209 | D1 | ╤ | 225 | E1 | β | 241 | F1 | ± |
| 194 | C2 | ⊤ | 210 | D2 | ╥ | 226 | E2 | Γ | 242 | F2 | ≥ |
| 195 | C3 | ├ | 211 | D3 | ╙ | 227 | E3 | π | 243 | F3 | ≤ |
| 196 | C4 | ─ | 212 | D4 | ╘ | 228 | E4 | Σ | 244 | F4 | ⌠ |
| 197 | C5 | ┼ | 213 | D5 | ╒ | 229 | E5 | σ | 245 | F5 | ⌡ |
| 198 | C6 | ╞ | 214 | D6 | ╓ | 230 | E6 | μ | 246 | F6 | ÷ |
| 199 | C7 | ╟ | 215 | D7 | ╫ | 231 | E7 | τ | 247 | F7 | ≈ |
| 200 | C8 | ╚ | 216 | D8 | ╪ | 232 | E8 | φ | 248 | F8 | ° |
| 201 | C9 | ╔ | 217 | D9 | ┘ | 233 | E9 | Θ | 249 | F9 | • |
| 202 | CA | ╩ | 218 | DA | ┌ | 234 | EA | Ω | 250 | FA | · |
| 203 | CB | ╦ | 219 | DB | ■ | 235 | EB | δ | 251 | FB | √ |
| 204 | CC | ╠ | 220 | DC | ▬ | 236 | EC | ∞ | 252 | FC | n |
| 205 | CD | ═ | 221 | DD | ▌ | 237 | ED | Ø | 253 | FD | 2 |
| 206 | CE | ╬ | 222 | DE | ▐ | 238 | EE | ∈ | 254 | FE | ■ |
| 207 | CF | ⊥ | 223 | DF | ▀ | 239 | EF | ∩ | 255 | FF | (SPACE) (SP) |

*Tab. A-1  Code Page 437 (United States) (cont.)*

| DEC: | HEX | CHARACTER | DEC: | HEX | CHARACTER | DEC: | HEX | CHARACTER | DEC: | HEX | CHARACTER |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 000 | 00 | BLANK (NULL) (NUL) | 016 | 10 | ► (DLE) | 032 | 20 | (SPACE) (SP) | 048 | 30 | 0 |
| 001 | 01 | ☺ (SOH) | 017 | 11 | ◄ (DC1) | 033 | 21 | ! | 049 | 31 | 1 |
| 002 | 02 | ☻ (STX) | 018 | 12 | ↕ (DC2) | 034 | 22 | " | 050 | 32 | 2 |
| 003 | 03 | ♥ (ETX) | 019 | 13 | ‼ (DC3) | 035 | 23 | # | 051 | 33 | 3 |
| 004 | 04 | ♦ (EOT) | 020 | 14 | ¶ (DC4) | 036 | 24 | $ | 052 | 34 | 4 |
| 005 | 05 | ♣ (ENQ) | 021 | 15 | § (NAK) | 037 | 25 | % | 053 | 35 | 5 |
| 006 | 06 | ♠ (ACK) | 022 | 16 | ▬ (SYN) | 038 | 26 | & | 054 | 36 | 6 |
| 007 | 07 | • (BEL) | 023 | 17 | ↨ (ETB) | 039 | 27 | ' | 055 | 37 | 7 |
| 008 | 08 | ▪ (BS) | 024 | 18 | ↑ (CAN) | 040 | 28 | ( | 056 | 38 | 8 |
| 009 | 09 | ○ (HT) | 025 | 19 | ↓ (EM) | 041 | 29 | ) | 057 | 39 | 9 |
| 010 | 0A | ◙ (LF) | 026 | 1A | → (SUB) | 042 | 2A | * | 058 | 3A | : |
| 011 | 0B | ♂ (VT) | 027 | 1B | ← (ESC) | 043 | 2B | + | 059 | 3B | ; |
| 012 | 0C | ♀ (FF) | 028 | 1C | ∟ (FS) | 044 | 2C | , | 060 | 3C | < |
| 013 | 0D | ♪ (CR) | 029 | 1D | ↔ (GS) | 045 | 2D | — | 061 | 3D | = |
| 014 | 0E | ♫ (SO) | 030 | 1E | ▲ (RS) | 046 | 2E | . | 062 | 3E | > |
| 015 | 0F | ☼ (SI) | 031 | 1F | ▼ (US) | 047 | 2F | / | 063 | 3F | ? |

*Tab. A-2 Code Page 850 (Multilingual)*

| DEC: | HEX | CHARACTER | DEC: | HEX | CHARACTER | DEC: | HEX | CHARACTER | DEC: | HEX | CHARACTER |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 064 | 40 | @ | 080 | 50 | P | 096 | 60 | ` | 112 | 70 | p |
| 065 | 41 | A | 081 | 51 | Q | 097 | 61 | a | 113 | 71 | q |
| 066 | 42 | B | 082 | 52 | R | 098 | 62 | b | 114 | 72 | r |
| 067 | 43 | C | 083 | 53 | S | 099 | 63 | c | 115 | 73 | s |
| 068 | 44 | D | 084 | 54 | T | 100 | 64 | d | 116 | 74 | t |
| 069 | 45 | E | 085 | 55 | U | 101 | 65 | e | 117 | 75 | u |
| 070 | 46 | F | 086 | 56 | V | 102 | 66 | f | 118 | 76 | v |
| 071 | 47 | G | 087 | 57 | W | 103 | 67 | g | 119 | 77 | w |
| 072 | 48 | H | 088 | 58 | X | 104 | 68 | h | 120 | 78 | x |
| 073 | 49 | I | 089 | 59 | Y | 105 | 69 | i | 121 | 79 | y |
| 074 | 4A | J | 090 | 5A | Z | 106 | 6A | j | 122 | 7A | z |
| 075 | 4B | K | 091 | 5B | [ | 107 | 6B | k | 123 | 7B | { |
| 076 | 4C | L | 092 | 5C | \ | 108 | 6C | l | 124 | 7C | ¦ |
| 077 | 4D | M | 093 | 5D | ] | 109 | 6D | m | 125 | 7D | } |
| 078 | 4E | N | 094 | 5E | ^ | 110 | 6E | n | 126 | 7E | ~ |
| 079 | 4F | O | 095 | 5F | — | 111 | 6F | o | 127 | 7F | △ (DEL) |

*Tab. A-2  Code Page 850 (Multilingual) (cont.)*

| DEC | HEX | CHARACTER | DEC | HEX | CHARACTER | DEC | HEX | CHARACTER | DEC | HEX | CHARACTER |
|-----|-----|-----------|-----|-----|-----------|-----|-----|-----------|-----|-----|-----------|
| 128 | 80 | Ç | 144 | 90 | É | 160 | A0 | á | 176 | B0 | |
| 129 | 81 | ü | 145 | 91 | æ | 161 | A1 | í | 177 | B1 | |
| 130 | 82 | é | 146 | 92 | Æ | 162 | A2 | ó | 178 | B2 | |
| 131 | 83 | â | 147 | 93 | ô | 163 | A3 | ú | 179 | B3 | │ |
| 132 | 84 | ä | 148 | 94 | ö | 164 | A4 | ñ | 180 | B4 | ┤ |
| 133 | 85 | à | 149 | 95 | ò | 165 | A5 | Ñ | 181 | B5 | Á |
| 134 | 86 | å | 150 | 96 | û | 166 | A6 | a̲ | 182 | B6 | Â |
| 135 | 87 | ç | 151 | 97 | ù | 167 | A7 | o̲ | 183 | B7 | À |
| 136 | 88 | ê | 152 | 98 | ÿ | 168 | A8 | ¿ | 184 | B8 | © |
| 137 | 89 | ë | 153 | 99 | Ö | 169 | A9 | ® | 185 | B9 | ╣ |
| 138 | 8A | è | 154 | 9A | Ü | 170 | AA | ¬ | 186 | BA | ║ |
| 139 | 8B | ï | 155 | 9B | ø | 171 | AB | 1/2 | 187 | BB | ╗ |
| 140 | 8C | î | 156 | 9C | £ | 172 | AC | 1/4 | 188 | BC | ╝ |
| 141 | 8D | ì | 157 | 9D | Ø | 173 | AD | ¡ | 189 | BD | ¢ |
| 142 | 8E | Ä | 158 | 9E | × | 174 | AE | « | 190 | BE | ¥ |
| 143 | 8F | Å | 159 | 9F | ƒ | 175 | AF | » | 191 | BF | ┐ |

▶

*Tab. A-2  Code Page 850 (Multilingual) (cont.)*

| DEC | HEX | CHARACTER | DEC | HEX | CHARACTER | DEC | HEX | CHARACTER | DEC | HEX | CHARACTER |
|-----|-----|-----------|-----|-----|-----------|-----|-----|-----------|-----|-----|-----------|
| 192 | C0 | ∟ | 208 | D0 | ð | 224 | E0 | Ó | 240 | F0 | ─ |
| 193 | C1 | ⊥ | 209 | D1 | Ð | 225 | E1 | β | 241 | F1 | ± |
| 194 | C2 | ⊤ | 210 | D2 | Ê | 226 | E2 | Ô | 242 | F2 | = |
| 195 | C3 | ├ | 211 | D3 | Ë | 227 | E3 | Ò | 243 | F3 | 3/4 |
| 196 | C4 | ─ | 212 | D4 | È | 228 | E4 | õ | 244 | F4 | ¶ |
| 197 | C5 | ┼ | 213 | D5 | ı | 229 | E5 | Õ | 245 | F5 | § |
| 198 | C6 | ã | 214 | D6 | Í | 230 | E6 | µ | 246 | F6 | ÷ |
| 199 | C7 | Ã | 215 | D7 | Î | 231 | E7 | þ | 247 | F7 | ⌣ |
| 200 | C8 | ╚ | 216 | D8 | Ï | 232 | E8 | Þ | 248 | F8 | ° |
| 201 | C9 | ╗ | 217 | D9 | ┘ | 233 | E9 | Ú | 249 | F9 | ·· |
| 202 | CA | ╩ | 218 | DA | ┌ | 234 | EA | Û | 250 | FA | · |
| 203 | CB | ╦ | 219 | DB | ■ | 235 | EB | Ù | 251 | FB | 1 |
| 204 | CC | ╠ | 220 | DC | ▬ | 236 | EC | ý | 252 | FC | 3 |
| 205 | CD | ═ | 221 | DD | ¦ | 237 | ED | Ý | 253 | FD | 2 |
| 206 | CE | ╬ | 222 | DE | Ì | 238 | EE | ¯ | 254 | FE | ■ |
| 207 | CF | ¤ | 223 | DF | ▀ | 239 | EF | ´ | 255 | FF | (SPACE) (SP) |

Tab. A-2 Code Page 850 (Multilingual) (cont.)

| DEC | HEX | CHARACTER | DEC | HEX | CHARACTER | DEC | HEX | CHARACTER | DEC | HEX | CHARACTER |
|-----|-----|-----------|-----|-----|-----------|-----|-----|-----------|-----|-----|-----------|
| 000 | 00 | BLANK (NULL) (NULL) | 016 | 10 | ► (DLE) | 032 | 20 | BLANK (SPACE) | 048 | 30 | 0 |
| 001 | 01 | ☺ (SOH) | 017 | 11 | ◄ (DC1) | 033 | 21 | ! | 049 | 31 | 1 |
| 002 | 02 | ☻ (STX) | 018 | 12 | ↕ (DC2) | 034 | 22 | " | 050 | 32 | 2 |
| 003 | 03 | ♥ (ETX) | 019 | 13 | ‼ (DC3) | 035 | 23 | # | 051 | 33 | 3 |
| 004 | 04 | ♦ (EOT) | 020 | 14 | ¶ (DC4) | 036 | 24 | $ | 052 | 34 | 4 |
| 005 | 05 | ♣ (ENQ) | 021 | 15 | § (NAC) | 037 | 25 | % | 053 | 35 | 5 |
| 006 | 06 | ♠ (ACK) | 022 | 16 | ▬ (SYN) | 038 | 26 | & | 054 | 36 | 6 |
| 007 | 07 | ● (BEL) | 023 | 17 | ↨ (ETB) | 039 | 27 | ' | 055 | 37 | 7 |
| 008 | 08 | ◘ (BS) | 024 | 18 | ↑ (CAN) | 040 | 28 | ( | 056 | 38 | 8 |
| 009 | 09 | ○ (HT) | 025 | 19 | ↓ (EM) | 041 | 29 | ) | 057 | 39 | 9 |
| 010 | 0A | ◙ (LF) | 026 | 1A | → (SUB) | 042 | 2A | * | 058 | 3A | : |
| 011 | 0B | ♂ (VT) | 027 | 1B | ← (ESC) | 043 | 2B | + | 059 | 3B | ; |
| 012 | 0C | ♀ (FF) | 028 | 1C | ∟ (FS) | 044 | 2C | , | 060 | 3C | < |
| 013 | 0D | ♪ (CR) | 029 | 1D | ↔ (GS) | 045 | 2D | — | 061 | 3D | = |
| 014 | 0E | ♫ (SO) | 030 | 1E | ▲ (RS) | 046 | 2E | . | 062 | 3E | > |
| 015 | 0F | ☼ (SI) | 031 | 1F | ▼ (US) | 047 | 2F | / | 063 | 3F | ? |

*Tab. A-3  Code Page 860 (Portugal)*

| DEC: | HEX | CHARACTER | DEC: | HEX | CHARACTER | DEC: | HEX | CHARACTER | DEC: | HEX | CHARACTER |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 064 | 40 | @ | 080 | 50 | P | 096 | 60 | ` | 112 | 70 | p |
| 065 | 41 | A | 081 | 51 | Q | 097 | 61 | a | 113 | 71 | q |
| 066 | 42 | B | 082 | 52 | R | 098 | 62 | b | 114 | 72 | r |
| 067 | 43 | C | 083 | 53 | S | 099 | 63 | c | 115 | 73 | s |
| 068 | 44 | D | 084 | 54 | T | 100 | 64 | d | 116 | 74 | t |
| 069 | 45 | E | 085 | 55 | U | 101 | 65 | e | 117 | 75 | u |
| 070 | 46 | F | 086 | 56 | V | 102 | 66 | f | 118 | 76 | v |
| 071 | 47 | G | 087 | 57 | W | 103 | 67 | g | 119 | 77 | w |
| 072 | 48 | H | 088 | 58 | X | 104 | 68 | h | 120 | 78 | x |
| 073 | 49 | I | 089 | 59 | Y | 105 | 69 | i | 121 | 79 | y |
| 074 | 4A | J | 090 | 5A | Z | 106 | 6A | j | 122 | 7A | z |
| 075 | 4B | K | 091 | 5B | [ | 107 | 6B | k | 123 | 7B | { |
| 076 | 4C | L | 092 | 5C | \ | 108 | 6C | l | 124 | 7C | ¦ |
| 077 | 4D | M | 093 | 5D | ] | 109 | 6D | m | 125 | 7D | } |
| 078 | 4E | N | 094 | 5E | ^ | 110 | 6E | n | 126 | 7E | ~ |
| 079 | 4F | O | 095 | 5F | — | 111 | 6F | o | 127 | 7F | △(DEL) ▶ |

*Tab. A-3  Code Page 860 (Portugal) (cont.)*

| DEC | HEX | CHARACTER | DEC | HEX | CHARACTER | DEC | HEX | CHARACTER | DEC | HEX | CHARACTER |
|-----|-----|-----------|-----|-----|-----------|-----|-----|-----------|-----|-----|-----------|
| 128 | 80 | Ç | 144 | 90 | É | 160 | A0 | á | 176 | B0 | |
| 129 | 81 | ü | 145 | 91 | Á | 161 | A1 | í | 177 | B1 | |
| 130 | 82 | é | 146 | 92 | È | 162 | A2 | ó | 178 | B2 | |
| 131 | 83 | â | 147 | 93 | ô | 163 | A3 | ú | 179 | B3 | \| |
| 132 | 84 | ã | 148 | 94 | õ | 164 | A4 | ñ | 180 | B4 | ┤ |
| 133 | 85 | à | 149 | 95 | ò | 165 | A5 | Ñ | 181 | B5 | ╡ |
| 134 | 86 | Á | 150 | 96 | Ú | 166 | A6 | a̲ | 182 | B6 | ╢ |
| 135 | 87 | ç | 151 | 97 | ù | 167 | A7 | o̲ | 183 | B7 | ╖ |
| 136 | 88 | ê | 152 | 98 | ì | 168 | A8 | ¿ | 184 | B8 | ╕ |
| 137 | 89 | Ê | 153 | 99 | Õ | 169 | A9 | Ò | 185 | B9 | ╣ |
| 138 | 8A | è | 154 | 9A | Ü | 170 | AA | ¬ | 186 | BA | ║ |
| 139 | 8B | í | 155 | 9B | ¢ | 171 | AB | 1/2 | 187 | BB | ╗ |
| 140 | 8C | Ô | 156 | 9C | £ | 172 | AC | 1/4 | 188 | BC | ╝ |
| 141 | 8D | ì | 157 | 9D | Ù | 173 | AD | ¡ | 189 | BD | ╜ |
| 142 | 8E | Ã | 158 | 9E | Pt | 174 | AE | « | 190 | BE | ╛ |
| 143 | 8F | Â | 159 | 9F | Ó | 175 | AF | » | 191 | BF | ┐ |

*Tab. A-3  Code Page 860 (Portugal) (cont.)*

| DEC | HEX | CHARACTER | DEC | HEX | CHARACTER | DEC | HEX | CHARACTER | DEC | HEX | CHARACTER |
|-----|-----|-----------|-----|-----|-----------|-----|-----|-----------|-----|-----|-----------|
| 192 | C0 | └ | 208 | D0 | ╨ | 224 | E0 | ∝ | 240 | F0 | ≡ |
| 193 | C1 | ┴ | 209 | D1 | ╤ | 225 | E1 | β | 241 | F1 | ± |
| 194 | C2 | ┬ | 210 | D2 | ╥ | 226 | E2 | Γ | 242 | F2 | ≥ |
| 195 | C3 | ├ | 211 | D3 | ╙ | 227 | E3 | π | 243 | F3 | ≤ |
| 196 | C4 | ─ | 212 | D4 | ╘ | 228 | E4 | Σ | 244 | F4 | ⌠ |
| 197 | C5 | ┼ | 213 | D5 | ╒ | 229 | E5 | σ | 245 | F5 | ⌡ |
| 198 | C6 | ╞ | 214 | D6 | ╓ | 230 | E6 | μ | 246 | F6 | ÷ |
| 199 | C7 | ╟ | 215 | D7 | ╫ | 231 | E7 | τ | 247 | F7 | ≈ |
| 200 | C8 | ╚ | 216 | D8 | ╪ | 232 | E8 | Φ | 248 | F8 | ° |
| 201 | C9 | ╔ | 217 | D9 | ┘ | 233 | E9 | ⊖ | 249 | F9 | • |
| 202 | CA | ╩ | 218 | DA | ┌ | 234 | EA | Ω | 250 | FA | · |
| 203 | CB | ╦ | 219 | DB | █ | 235 | EB | δ | 251 | FB | √ |
| 204 | CC | ╠ | 220 | DC | ▄ | 236 | EC | ∞ | 252 | FC | ⁿ |
| 205 | CD | ═ | 221 | DD | ▌ | 237 | ED | ∅ | 253 | FD | ² |
| 206 | CE | ╬ | 222 | DE | ▐ | 238 | EE | ∈ | 254 | FE | ■ |
| 207 | CF | ╧ | 223 | DF | ▀ | 239 | EF | ∩ | 255 | FF | (SPACE) (SP) |

Tab. A-3  Code Page 860 (Portugal) (cont.)

| DEC: | HEX | CHARACTER | DEC: | HEX | CHARACTER | DEC: | HEX | CHARACTER | DEC: | HEX | CHARACTER |
|------|-----|-----------|------|-----|-----------|------|-----|-----------|------|-----|-----------|
| 000 | 00 | BLANK (NULL) (NUL) | 016 | 10 | ► (DLE) | 032 | 20 | (SPACE) (SP) | 048 | 30 | 0 |
| 001 | 01 | ☺ (SOH) | 017 | 11 | ◄ (DC1) | 033 | 21 | ! | 049 | 31 | 1 |
| 002 | 02 | ☻ (STX) | 018 | 12 | ↕ (DC2) | 034 | 22 | " | 050 | 32 | 2 |
| 003 | 03 | ♥ (ETX) | 019 | 13 | ‼ (DC3) | 035 | 23 | # | 051 | 33 | 3 |
| 004 | 04 | ♦ (EOT) | 020 | 14 | ¶ (DC4) | 036 | 24 | $ | 052 | 34 | 4 |
| 005 | 05 | ♣ (ENQ) | 021 | 15 | § (NAK) | 037 | 25 | % | 053 | 35 | 5 |
| 006 | 06 | ♠ (ACK) | 022 | 16 | ▬ (SYN) | 038 | 26 | & | 054 | 36 | 6 |
| 007 | 07 | • (BEL) | 023 | 17 | ↨ (ETB) | 039 | 27 | ' | 055 | 37 | 7 |
| 008 | 08 | ▫ (BS) | 024 | 18 | ↑ (CAN) | 040 | 28 | ( | 056 | 38 | 8 |
| 009 | 09 | ○ (HT) | 025 | 19 | ↓ (EM) | 041 | 29 | ) | 057 | 39 | 9 |
| 010 | 0A | ◙ (LF) | 026 | 1A | → (SUB) | 042 | 2A | * | 058 | 3A | : |
| 011 | 0B | ♂ (VT) | 027 | 1B | ← (ESC) | 043 | 2B | + | 059 | 3B | ; |
| 012 | 0C | ♀ (FF) | 028 | 1C | ∟ (FS) | 044 | 2C | , | 060 | 3C | < |
| 013 | 0D | ♪ (CR) | 029 | 1D | ↔ (GS) | 045 | 2D | — | 061 | 3D | = |
| 014 | 0E | ♫ (SO) | 030 | 1E | ▲ (RS) | 046 | 2E | . | 062 | 3E | > |
| 015 | 0F | ☼ (SI) | 031 | 1F | ▼ (US) | 047 | 2F | / | 063 | 3F | ? |

*Tab. A-4  Code Page 865 (Norway)*

| DEC: | HEX | CHARACTER | DEC: | HEX | CHARACTER | DEC: | HEX | CHARACTER | DEC: | HEX | CHARACTER |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 064 | 40 | @ | 080 | 50 | P | 096 | 60 | ` | 112 | 70 | p |
| 065 | 41 | A | 081 | 51 | Q | 097 | 61 | a | 113 | 71 | q |
| 066 | 42 | B | 082 | 52 | R | 098 | 62 | b | 114 | 72 | r |
| 067 | 43 | C | 083 | 53 | S | 099 | 63 | c | 115 | 73 | s |
| 068 | 44 | D | 084 | 54 | T | 100 | 64 | d | 116 | 74 | t |
| 069 | 45 | E | 085 | 55 | U | 101 | 65 | e | 117 | 75 | u |
| 070 | 46 | F | 086 | 56 | V | 102 | 66 | f | 118 | 76 | v |
| 071 | 47 | G | 087 | 57 | W | 103 | 67 | g | 119 | 77 | w |
| 072 | 48 | H | 088 | 58 | X | 104 | 68 | h | 120 | 78 | x |
| 073 | 49 | I | 089 | 59 | Y | 105 | 69 | i | 121 | 79 | y |
| 074 | 4A | J | 090 | 5A | Z | 106 | 6A | j | 122 | 7A | z |
| 075 | 4B | K | 091 | 5B | [ | 107 | 6B | k | 123 | 7B | { |
| 076 | 4C | L | 092 | 5C | \ | 108 | 6C | l | 124 | 7C | ¦ |
| 077 | 4D | M | 093 | 5D | ] | 109 | 6D | m | 125 | 7D | } |
| 078 | 4E | N | 094 | 5E | ^ | 110 | 6E | n | 126 | 7E | ~ |
| 079 | 4F | O | 095 | 5F | — | 111 | 6F | o | 127 | 7F | △ (DEL) |

*Tab. A-4  Code Page 865 (Norway) (cont.)*

**MS-DOS SOFTWARE INSTALLATION GUIDE**

| DEC | HEX | CHARACTER | DEC | HEX | CHARACTER | DEC | HEX | CHARACTER | DEC | HEX | CHARACTER |
|-----|-----|-----------|-----|-----|-----------|-----|-----|-----------|-----|-----|-----------|
| 128 | 80 | Ç | 144 | 90 | É | 160 | A0 | á | 176 | B0 |  |
| 129 | 81 | ü | 145 | 91 | æ | 161 | A1 | í | 177 | B1 |  |
| 130 | 82 | é | 146 | 92 | Æ | 162 | A2 | ó | 178 | B2 |  |
| 131 | 83 | â | 147 | 93 | ô | 163 | A3 | ú | 179 | B3 | │ |
| 132 | 84 | ä | 148 | 94 | ö | 164 | A4 | ñ | 180 | B4 | ┤ |
| 133 | 85 | à | 149 | 95 | ò | 165 | A5 | Ñ | 181 | B5 | ╡ |
| 134 | 86 | å | 150 | 96 | û | 166 | A6 | a | 182 | B6 | ╢ |
| 135 | 87 | ç | 151 | 97 | ù | 167 | A7 | o | 183 | B7 | ╖ |
| 136 | 88 | ê | 152 | 98 | ÿ | 168 | A8 | ¿ | 184 | B8 | ╕ |
| 137 | 89 | ë | 153 | 99 | Ö | 169 | A9 | ⌐ | 185 | B9 | ╣ |
| 138 | 8A | è | 154 | 9A | Ü | 170 | AA | ¬ | 186 | BA | ║ |
| 139 | 8B | ï | 155 | 9B | Á | 171 | AB | 1/2 | 187 | BB | ╗ |
| 140 | 8C | î | 156 | 9C | £ | 172 | AC | 1/4 | 188 | BC | ╝ |
| 141 | 8D | ì | 157 | 9D | À | 173 | AD | ¡ | 189 | BD | ╜ |
| 142 | 8E | Ä | 158 | 9E | Pt | 174 | AE | « | 190 | BE | ╛ |
| 143 | 8F | Å | 159 | 9F | ƒ | 175 | AF | ¤ | 191 | BF | ┐ |

*Tab. A-4  Code Page 865 (Norway) (cont.)*

| DEC | HEX | CHARACTER | DEC | HEX | CHARACTER | DEC | HEX | CHARACTER | DEC | HEX | CHARACTER |
|-----|-----|-----------|-----|-----|-----------|-----|-----|-----------|-----|-----|-----------|
| 192 | C0 | ∟ | 208 | D0 | ╨ | 224 | E0 | α | 240 | F0 | ≡ |
| 193 | C1 | ┴ | 209 | D1 | ╤ | 225 | E1 | β | 241 | F1 | ± |
| 194 | C2 | ┬ | 210 | D2 | ╥ | 226 | E2 | Γ | 242 | F2 | ≥ |
| 195 | C3 | ├ | 211 | D3 | ╙ | 227 | E3 | π | 243 | F3 | ≤ |
| 196 | C4 | ─ | 212 | D4 | ╘ | 228 | E4 | Σ | 244 | F4 | ⌠ |
| 197 | C5 | ┼ | 213 | D5 | ╒ | 229 | E5 | σ | 245 | F5 | ⌡ |
| 198 | C6 | ╞ | 214 | D6 | ╓ | 230 | E6 | μ | 246 | F6 | ÷ |
| 199 | C7 | ╟ | 215 | D7 | ╫ | 231 | E7 | τ | 247 | F7 | ≈ |
| 200 | C8 | ╚ | 216 | D8 | ╪ | 232 | E8 | Φ | 248 | F8 | ° |
| 201 | C9 | ╔ | 217 | D9 | ┘ | 233 | E9 | Θ | 249 | F9 | • |
| 202 | CA | ╩ | 218 | DA | ┌ | 234 | EA | Ω | 250 | FA | · |
| 203 | CB | ╦ | 219 | DB | █ | 235 | EB | δ | 251 | FB | √ |
| 204 | CC | ╠ | 220 | DC | ▄ | 236 | EC | ∞ | 252 | FC | n |
| 205 | CD | ═ | 221 | DD | ▌ | 237 | ED | ∅ | 253 | FD | 2 |
| 206 | CE | ╬ | 222 | DE | ▐ | 238 | EE | ∈ | 254 | FE | ■ |
| 207 | CF | ╧ | 223 | DF | ▀ | 239 | EF | ∩ | 255 | FF | (SPACE) (SP) |

*Tab. A-4  Code Page 865 (Norway) (cont.)*

**MS-DOS SOFTWARE INSTALLATION GUIDE**

| DEC | HEX | CHARACTER | DEC | HEX | CHARACTER | DEC | HEX | CHARACTER | DEC | HEX | CHARACTER |
|-----|-----|-----------|-----|-----|-----------|-----|-----|-----------|-----|-----|-----------|
| 000 | 00 | BLANK (NULL) (NULL) | 016 | 10 | ► (DLE) | 032 | 20 | BLANK (SPACE) | 048 | 30 | 0 |
| 001 | 01 | ☺ (SOH) | 017 | 11 | ◄ (DC1) | 033 | 21 | ! | 049 | 31 | 1 |
| 002 | 02 | ☻ (STX) | 018 | 12 | ↕ (DC2) | 034 | 22 | " | 050 | 32 | 2 |
| 003 | 03 | ♥ (ETX) | 019 | 13 | ‼ (DC3) | 035 | 23 | # | 051 | 33 | 3 |
| 004 | 04 | ◆ (EOT) | 020 | 14 | ¶ (DC4) | 036 | 24 | $ | 052 | 34 | 4 |
| 005 | 05 | ♣ (ENQ) | 021 | 15 | § (NAC) | 037 | 25 | % | 053 | 35 | 5 |
| 006 | 06 | ♠ (ACK) | 022 | 16 | ▬ (SYN) | 038 | 26 | & | 054 | 36 | 6 |
| 007 | 07 | • (BEL) | 023 | 17 | ↨ (ETB) | 039 | 27 | ' | 055 | 37 | 7 |
| 008 | 08 | ▣ (BS) | 024 | 18 | ↑ (CAN) | 040 | 28 | ( | 056 | 38 | 8 |
| 009 | 09 | ○ (HT) | 025 | 19 | ↓ (EM) | 041 | 29 | ) | 057 | 39 | 9 |
| 010 | 0A | ◉ (LF) | 026 | 1A | → (SUB) | 042 | 2A | * | 058 | 3A | : |
| 011 | 0B | ♂ (VT) | 027 | 1B | ← (ESC) | 043 | 2B | + | 059 | 3B | ; |
| 012 | 0C | ♀ (FF) | 028 | 1C | ∟ (FS) | 044 | 2C | , | 060 | 3C | < |
| 013 | 0D | ♪ (CR) | 029 | 1D | ↔ (GS) | 045 | 2D | — | 061 | 3D | = |
| 014 | 0E | ♫ (SO) | 030 | 1E | ▲ (RS) | 046 | 2E | . | 062 | 3E | > |
| 015 | 0F | ☼ (SI) | 031 | 1F | ▼ (US) | 047 | 2F | / | 063 | 3F | ? |

*Fig. A-5 Code Page 220 (National Spain)*

| DEC: | HEX | CHARACTER | DEC: | HEX | CHARACTER | DEC: | HEX | CHARACTER | DEC: | HEX | CHARACTER |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 064 | 40 | @ | 080 | 50 | P | 096 | 60 | ` | 112 | 70 | p |
| 065 | 41 | A | 081 | 51 | Q | 097 | 61 | a | 113 | 71 | q |
| 066 | 42 | B | 082 | 52 | R | 098 | 62 | b | 114 | 72 | r |
| 067 | 43 | C | 083 | 53 | S | 099 | 63 | c | 115 | 73 | s |
| 068 | 44 | D | 084 | 54 | T | 100 | 64 | d | 116 | 74 | t |
| 069 | 45 | E | 085 | 55 | U | 101 | 65 | e | 117 | 75 | u |
| 070 | 46 | F | 086 | 56 | V | 102 | 66 | f | 118 | 76 | v |
| 071 | 47 | G | 087 | 57 | W | 103 | 67 | g | 119 | 77 | w |
| 072 | 48 | H | 088 | 58 | X | 104 | 68 | h | 120 | 78 | x |
| 073 | 49 | I | 089 | 59 | Y | 105 | 69 | i | 121 | 79 | y |
| 074 | 4A | J | 090 | 5A | Z | 106 | 6A | j | 122 | 7A | z |
| 075 | 4B | K | 091 | 5B | [ | 107 | 6B | k | 123 | 7B | { |
| 076 | 4C | L | 092 | 5C | \ | 108 | 6C | l | 124 | 7C | ¦ |
| 077 | 4D | M | 093 | 5D | ] | 109 | 6D | m | 125 | 7D | } |
| 078 | 4E | N | 094 | 5E | ^ | 110 | 6E | n | 126 | 7E | ~ |
| 079 | 4F | O | 095 | 5F | — | 111 | 6F | o | 127 | 7F | △(DEL) |

*Fig. A-5 Code Page 220 (National Spain) (cont.)*

| DEC | HEX | CHARACTER | DEC | HEX | CHARACTER | DEC | HEX | CHARACTER | DEC | HEX | CHARACTER |
|-----|-----|-----------|-----|-----|-----------|-----|-----|-----------|-----|-----|-----------|
| 128 | 80 | Ç | 144 | 90 | É | 160 | A0 | á | 176 | B0 | ░ |
| 129 | 81 | ü | 145 | 91 | í | 161 | A1 | í | 177 | B1 | ▒ |
| 130 | 82 | é | 146 | 92 | Ó | 162 | A2 | ó | 178 | B2 | ▓ |
| 131 | 83 | â | 147 | 93 | ô | 163 | A3 | ú | 179 | B3 | │ |
| 132 | 84 | ä | 148 | 94 | ö | 164 | A4 | ñ | 180 | B4 | ┤ |
| 133 | 85 | à | 149 | 95 | ò | 165 | A5 | Ñ | 181 | B5 | ╡ |
| 134 | 86 | À | 150 | 96 | û | 166 | A6 | a̲ | 182 | B6 | ╢ |
| 135 | 87 | ç | 151 | 97 | ù | 167 | A7 | o̲ | 183 | B7 | ╖ |
| 136 | 88 | ê | 152 | 98 | Á | 168 | A8 | ¿ | 184 | B8 | ╕ |
| 137 | 89 | ë | 153 | 99 | Ö | 169 | A9 | I· | 185 | B9 | ╣ |
| 138 | 8A | è | 154 | 9A | Ü | 170 | AA | Ŀ | 186 | BA | ║ |
| 139 | 8B | ï | 155 | 9B | Ò | 171 | AB | 1/2 | 187 | BB | ╗ |
| 140 | 8C | î | 156 | 9C | £ | 172 | AC | 1/4 | 188 | BC | ╝ |
| 141 | 8D | ì | 157 | 9D | Ú | 173 | AD | ¡ | 189 | BD | ╜ |
| 142 | 8E | Ä | 158 | 9E | Pt | 174 | AE | « | 190 | BE | ╛ |
| 143 | 8F | È | 159 | 9F | ï | 175 | AF | » | 191 | BF | ┐ |

*Fig. A-5 Code Page 220 (National Spain) (cont.)*

| DEC | HEX | CHARACTER | DEC | HEX | CHARACTER | DEC | HEX | CHARACTER | DEC | HEX | CHARACTER |
|-----|-----|-----------|-----|-----|-----------|-----|-----|-----------|-----|-----|-----------|
| 192 | C0 | L | 208 | D0 | ⊥ | 224 | E0 | ∝ | 240 | F0 | ≡ |
| 193 | C1 | ⊥ | 209 | D1 | ⊤ | 225 | E1 | β | 241 | F1 | ± |
| 194 | C2 | ⊤ | 210 | D2 | ⊤ | 226 | E2 | Γ | 242 | F2 | ≥ |
| 195 | C3 | ├ | 211 | D3 | ╚ | 227 | E3 | π | 243 | F3 | ≤ |
| 196 | C4 | — | 212 | D4 | ╘ | 228 | E4 | Σ | 244 | F4 | ⌠ |
| 197 | C5 | + | 213 | D5 | ╒ | 229 | E5 | σ | 245 | F5 | ⌡ |
| 198 | C6 | ╞ | 214 | D6 | ╓ | 230 | E6 | μ | 246 | F6 | ÷ |
| 199 | C7 | ╟ | 215 | D7 | ╫ | 231 | E7 | τ | 247 | F7 | ≈ |
| 200 | C8 | ╚ | 216 | D8 | ╪ | 232 | E8 | Φ | 248 | F8 | ° |
| 201 | C9 | ╔ | 217 | D9 | ┘ | 233 | E9 | Θ | 249 | F9 | • |
| 202 | CA | ╩ | 218 | DA | ┌ | 234 | EA | Ω | 250 | FA | · |
| 203 | CB | ╦ | 219 | DB | █ | 235 | EB | δ | 251 | FB | √ |
| 204 | CC | ╠ | 220 | DC | ▄ | 236 | EC | ∞ | 252 | FC | n |
| 205 | CD | = | 221 | DD | ▌ | 237 | ED | ∅ | 253 | FD | ² |
| 206 | CE | ╬ | 222 | DE | ▐ | 238 | EE | ∈ | 254 | FE | ■ |
| 207 | CF | ⊥ | 223 | DF | ▀ | 239 | EF | ∩ | 255 | FF | (SPACE) (SP) |

*Fig. A-5 Code Page 220 (National Spain) (cont.)*

| DEC | HEX | CHARACTER | DEC | HEX | CHARACTER | DEC | HEX | CHARACTER | DEC | HEX | CHARACTER |
|-----|-----|-----------|-----|-----|-----------|-----|-----|-----------|-----|-----|-----------|
| 000 | 00 | BLANK (NULL) (NULL) | 016 | 10 | ► (DLE) | 032 | 20 | BLANK (SPACE) | 048 | 30 | 0 |
| 001 | 01 | ☺ (SOH) | 017 | 11 | ◄ (DC1) | 033 | 21 | ! | 049 | 31 | 1 |
| 002 | 02 | ☻ (STX) | 018 | 12 | ↕ (DC2) | 034 | 22 | " | 050 | 32 | 2 |
| 003 | 03 | ♥ (ETX) | 019 | 13 | ‼ (DC3) | 035 | 23 | # | 051 | 33 | 3 |
| 004 | 04 | ♦ (EOT) | 020 | 14 | ¶ (DC4) | 036 | 24 | $ | 052 | 34 | 4 |
| 005 | 05 | ♣ (ENQ) | 021 | 15 | § (NAC) | 037 | 25 | % | 053 | 35 | 5 |
| 006 | 06 | ♠ (ACK) | 022 | 16 | ▬ (SYN) | 038 | 26 | & | 054 | 36 | 6 |
| 007 | 07 | • (BEL) | 023 | 17 | ↨ (ETB) | 039 | 27 | ' | 055 | 37 | 7 |
| 008 | 08 | ▣ (BS) | 024 | 18 | ↑ (CAN) | 040 | 28 | ( | 056 | 38 | 8 |
| 009 | 09 | ○ (HT) | 025 | 19 | ↓ (EM) | 041 | 29 | ) | 057 | 39 | 9 |
| 010 | 0A | ◎ (LF) | 026 | 1A | → (SUB) | 042 | 2A | * | 058 | 3A | : |
| 011 | 0B | ♂ (VT) | 027 | 1B | ← (ESC) | 043 | 2B | + | 059 | 3B | ; |
| 012 | 0C | ♀ (FF) | 028 | 1C | ∟ (FS) | 044 | 2C | , | 060 | 3C | < |
| 013 | 0D | ♪ (CR) | 029 | 1D | ↔ (GS) | 045 | 2D | — | 061 | 3D | = |
| 014 | 0E | ♫ (SO) | 030 | 1E | ▲ (RS) | 046 | 2E | . | 062 | 3E | > |
| 015 | 0F | ☼ (SI) | 031 | 1F | ▼ (US) | 047 | 2F | / | 063 | 3F | ? |

*Fig. A-6 Code Page 210 (Greece)*

| DEC: | HEX | CHARACTER | DEC: | HEX | CHARACTER | DEC: | HEX | CHARACTER | DEC: | HEX | CHARACTER |
|------|-----|-----------|------|-----|-----------|------|-----|-----------|------|-----|-----------|
| 064 | 40 | @ | 080 | 50 | P | 096 | 60 | ' | 112 | 70 | p |
| 065 | 41 | A | 081 | 51 | Q | 097 | 61 | a | 113 | 71 | q |
| 066 | 42 | B | 082 | 52 | R | 098 | 62 | b | 114 | 72 | r |
| 067 | 43 | C | 083 | 53 | S | 099 | 63 | c | 115 | 73 | s |
| 068 | 44 | D | 084 | 54 | T | 100 | 64 | d | 116 | 74 | t |
| 069 | 45 | E | 085 | 55 | U | 101 | 65 | e | 117 | 75 | u |
| 070 | 46 | F | 086 | 56 | V | 102 | 66 | f | 118 | 76 | v |
| 071 | 47 | G | 087 | 57 | W | 103 | 67 | g | 119 | 77 | w |
| 072 | 48 | H | 088 | 58 | X | 104 | 68 | h | 120 | 78 | x |
| 073 | 49 | I | 089 | 59 | Y | 105 | 69 | i | 121 | 79 | y |
| 074 | 4A | J | 090 | 5A | Z | 106 | 6A | j | 122 | 7A | z |
| 075 | 4B | K | 091 | 5B | [ | 107 | 6B | k | 123 | 7B | { |
| 076 | 4C | L | 092 | 5C | \ | 108 | 6C | l | 124 | 7C | ¦ |
| 077 | 4D | M | 093 | 5D | ] | 109 | 6D | m | 125 | 7D | } |
| 078 | 4E | N | 094 | 5E | ^ | 110 | 6E | n | 126 | 7E | ~ |
| 079 | 4F | O | 095 | 5F | — | 111 | 6F | o | 127 | 7F | △ (DEL) ▶ |

*Fig. A-6 Code Page 210 (Greece) (cont.)*

| DEC | HEX | CHARACTER | DEC | HEX | CHARACTER | DEC | HEX | CHARACTER | DEC | HEX | CHARACTER |
|-----|-----|-----------|-----|-----|-----------|-----|-----|-----------|-----|-----|-----------|
| 128 | 80 | $A$ | 144 | 90 | $P$ | 160 | A0 | $\iota$ | 176 | B0 | |
| 129 | 81 | $B$ | 145 | 91 | $\Sigma$ | 161 | A1 | $k$ | 177 | B1 | |
| 130 | 82 | $\Gamma$ | 146 | 92 | $T$ | 162 | A2 | $\lambda$ | 178 | B2 | |
| 131 | 83 | $\Delta$ | 147 | 93 | $Y$ | 163 | A3 | $\mu$ | 179 | B3 | │ |
| 132 | 84 | $E$ | 148 | 94 | $\Phi$ | 164 | A4 | $\nu$ | 180 | B4 | ┤ |
| 133 | 85 | $Z$ | 149 | 95 | $X$ | 165 | A5 | $\xi$ | 181 | B5 | ╡ |
| 134 | 86 | $H$ | 150 | 96 | $\Psi$ | 166 | A6 | $o$ | 182 | B6 | ╢ |
| 135 | 87 | $\Theta$ | 151 | 97 | $\Omega$ | 167 | A7 | $\pi$ | 183 | B7 | ╖ |
| 136 | 88 | $I$ | 152 | 98 | $\alpha$ | 168 | A8 | $\rho$ | 184 | B8 | ╕ |
| 137 | 89 | $K$ | 153 | 99 | $\beta$ | 169 | A9 | $\sigma$ | 185 | B9 | ╣ |
| 138 | 8A | $\Lambda$ | 154 | 9A | $\gamma$ | 170 | AA | $\varsigma$ | 186 | BA | ║ |
| 139 | 8B | $M$ | 155 | 9B | $\delta$ | 171 | AB | $\tau$ | 187 | BB | ╗ |
| 140 | 8C | $N$ | 156 | 9C | $\varepsilon$ | 172 | AC | $\upsilon$ | 188 | BC | ╝ |
| 141 | 8D | $\Xi$ | 157 | 9D | $\zeta$ | 173 | AD | $\varphi$ | 189 | BD | ╜ |
| 142 | 8E | $O$ | 158 | 9E | $\eta$ | 174 | AE | $\chi$ | 190 | BE | ╛ |
| 143 | 8F | $\Pi$ | 159 | 9F | $\theta$ | 175 | AF | $\psi$ | 191 | BF | ┐ |

*Fig. A-6 Code Page 210 (Greece) (cont.)*

| DEC | HEX | CHARACTER | DEC | HEX | CHARACTER | DEC | HEX | CHARACTER | DEC | HEX | CHARACTER |
|-----|-----|-----------|-----|-----|-----------|-----|-----|-----------|-----|-----|-----------|
| 192 | C0 | L | 208 | D0 | ⊥ | 224 | E0 | ω | 240 | F0 | Ω |
| 193 | C1 | ⊥ | 209 | D1 | ╤ | 225 | E1 | ά | 241 | F1 | ± |
| 194 | C2 | ⊤ | 210 | D2 | ╥ | 226 | E2 | έ | 242 | F2 | ≥ |
| 195 | C3 | ├ | 211 | D3 | ╙ | 227 | E3 | ή | 243 | F3 | ≤ |
| 196 | C4 | — | 212 | D4 | ╘ | 228 | E4 | ϊ | 244 | F4 | ⌠ |
| 197 | C5 | + | 213 | D5 | ╒ | 229 | E5 | ί | 245 | F5 | ⌡ |
| 198 | C6 | ╞ | 214 | D6 | ╓ | 230 | E6 | ό | 246 | F6 | ÷ |
| 199 | C7 | ╟ | 215 | D7 | ╫ | 231 | E7 | ύ | 247 | F7 | ≈ |
| 200 | C8 | ╚ | 216 | D8 | ╪ | 232 | E8 | ϋ | 248 | F8 | ° |
| 201 | C9 | ╔ | 217 | D9 | ┘ | 233 | E9 | ώ | 249 | F9 | £ |
| 202 | CA | ╩ | 218 | DA | ┌ | 234 | EA | Ά | 250 | FA | • |
| 203 | CB | ╦ | 219 | DB | ■ | 235 | EB | Έ | 251 | FB | √ |
| 204 | CC | ╠ | 220 | DC | ▬ | 236 | EC | Ή | 252 | FC | n |
| 205 | CD | = | 221 | DD | ▌ | 237 | ED | Ί | 253 | FD | 2 |
| 206 | CE | ╬ | 222 | DE | ▐ | 238 | EE | Ό | 254 | FE | ■ |
| 207 | CF | ⊥ | 223 | DF | ▬ | 239 | EF | Ύ | 255 | FF | (SPACE) (SP) |

*Fig. A-6 Code Page 210 (Greece) (cont.)*

# CODE PAGE TABLES

| DEC | HEX | CHARACTER | DEC | HEX | CHARACTER | DEC | HEX | CHARACTER | DEC | HEX | CHARACTER |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 000 | 00 | BLANK (NULL) | 016 | 10 | ► (DLE) | 032 | 20 | BLANK (SPACE) | 048 | 30 | 0 |
| 001 | 01 | ☺ (SOH) | 017 | 11 | ◄ (DC1) | 033 | 21 | ! | 049 | 31 | 1 |
| 002 | 02 | ☻ (STX) | 018 | 12 | ↕ (DC2) | 034 | 22 | " | 050 | 32 | 2 |
| 003 | 03 | ♥ (ETX) | 019 | 13 | ‼ (DC3) | 035 | 23 | # | 051 | 33 | 3 |
| 004 | 04 | ♦ (EOT) | 020 | 14 | ¶ (DC4) | 036 | 24 | $ | 052 | 34 | 4 |
| 005 | 05 | ♣ (ENQ) | 021 | 15 | § (NAC) | 037 | 25 | % | 053 | 35 | 5 |
| 006 | 06 | ♠ (ACK) | 022 | 16 | ▬ (SYN) | 038 | 26 | & | 054 | 36 | 6 |
| 007 | 07 | • (BEL) | 023 | 17 | ↨ (ETB) | 039 | 27 | ' | 055 | 37 | 7 |
| 008 | 08 | ◘ (BS) | 024 | 18 | ↑ (CAN) | 040 | 28 | ( | 056 | 38 | 8 |
| 009 | 09 | ○ (HT) | 025 | 19 | ↓ (EM) | 041 | 29 | ) | 057 | 39 | 9 |
| 010 | 0A | ◎ (LF) | 026 | 1A | → (SUB) | 042 | 2A | * | 058 | 3A | : |
| 011 | 0B | ♂ (VT) | 027 | 1B | ← (ESC) | 043 | 2B | + | 059 | 3B | ; |
| 012 | 0C | ♀ (FF) | 028 | 1C | └ (FS) | 044 | 2C | , | 060 | 3C | < |
| 013 | 0D | ♪ (CR) | 029 | 1D | ↔ (GS) | 045 | 2D | — | 061 | 3D | = |
| 014 | 0E | ♫ (SO) | 030 | 1E | ▲ (RS) | 046 | 2E | . | 062 | 3E | > |
| 015 | 0F | ☼ (SI) | 031 | 1F | ▼ (US) | 047 | 2F | / | 063 | 3F | ? |

*Fig. A-7 Code Page 190 (Germany GS)*

| DEC: | HEX | CHARACTER | DEC: | HEX | CHARACTER | DEC: | HEX | CHARACTER | DEC: | HEX | CHARACTER |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 064 | 40 | @ | 080 | 50 | P | 096 | 60 | ' | 112 | 70 | p |
| 065 | 41 | A | 081 | 51 | Q | 097 | 61 | a | 113 | 71 | q |
| 066 | 42 | B | 082 | 52 | R | 098 | 62 | b | 114 | 72 | r |
| 067 | 43 | C | 083 | 53 | S | 099 | 63 | c | 115 | 73 | s |
| 068 | 44 | D | 084 | 54 | T | 100 | 64 | d | 116 | 74 | t |
| 069 | 45 | E | 085 | 55 | U | 101 | 65 | e | 117 | 75 | u |
| 070 | 46 | F | 086 | 56 | V | 102 | 66 | f | 118 | 76 | v |
| 071 | 47 | G | 087 | 57 | W | 103 | 67 | g | 119 | 77 | w |
| 072 | 48 | H | 088 | 58 | X | 104 | 68 | h | 120 | 78 | x |
| 073 | 49 | I | 089 | 59 | Y | 105 | 69 | i | 121 | 79 | y |
| 074 | 4A | J | 090 | 5A | Z | 106 | 6A | j | 122 | 7A | z |
| 075 | 4B | K | 091 | 5B | [ | 107 | 6B | k | 123 | 7B | { |
| 076 | 4C | L | 092 | 5C | \ | 108 | 6C | l | 124 | 7C | ¦ |
| 077 | 4D | M | 093 | 5D | ] | 109 | 6D | m | 125 | 7D | } |
| 078 | 4E | N | 094 | 5E | ^ | 110 | 6E | n | 126 | 7E | ~ |
| 079 | 4F | O | 095 | 5F | — | 111 | 6F | o | 127 | 7F | △(DEL) |

*Fig. A-7 Code Page 190 (Germany GS) (cont.)*

| DEC | HEX | CHARACTER | DEC | HEX | CHARACTER | DEC | HEX | CHARACTER | DEC | HEX | CHARACTER |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 128 | 80 | Ç | 144 | 90 | É | 160 | A0 | á | 176 | B0 | ▓ |
| 129 | 81 | ü | 145 | 91 | æ | 161 | A1 | í | 177 | B1 | ▓ |
| 130 | 82 | é | 146 | 92 | Æ | 162 | A2 | ó | 178 | B2 | ▓ |
| 131 | 83 | â | 147 | 93 | ô | 163 | A3 | ú | 179 | B3 | │ |
| 132 | 84 | ä | 148 | 94 | Ö | 164 | A4 | ñ | 180 | B4 | ┤ |
| 133 | 85 | à | 149 | 95 | ò | 165 | A5 | Ñ | 181 | B5 | ╡ |
| 134 | 86 | å | 150 | 96 | û | 166 | A6 | a | 182 | B6 | ╢ |
| 135 | 87 | ç | 151 | 97 | ù | 167 | A7 | o | 183 | B7 | ╖ |
| 136 | 88 | ê | 152 | 98 | ÿ | 168 | A8 | ¿ | 184 | B8 | ╕ |
| 137 | 89 | ë | 153 | 99 | Ö | 169 | A9 | ⌐ | 185 | B9 | ╣ |
| 138 | 8A | è | 154 | 9A | Ü | 170 | AA | ¬ | 186 | BA | ║ |
| 139 | 8B | ï | 155 | 9B | ¢ | 171 | AB | 1/2 | 187 | BB | ╗ |
| 140 | 8C | î | 156 | 9C | £ | 172 | AC | 1/4 | 188 | BC | ╝ |
| 141 | 8D | ì | 157 | 9D | ¥ | 173 | AD | ¡ | 189 | BD | ╜ |
| 142 | 8E | Ä | 158 | 9E | Pt | 174 | AE | « | 190 | BE | ╛ |
| 143 | 8F | Å | 159 | 9F | f | 175 | AF | » | 191 | BF | ┐ |

*Fig. A-7 Code Page 190 (Germany GS) (cont.)*

| DEC | HEX | CHARACTER | DEC | HEX | CHARACTER | DEC | HEX | CHARACTER | DEC | HEX | CHARACTER |
|-----|-----|-----------|-----|-----|-----------|-----|-----|-----------|-----|-----|-----------|
| 192 | C0 | L | 208 | D0 | ⊥ | 224 | E0 | α | 240 | F0 | ≡ |
| 193 | C1 | ⊥ | 209 | D1 | ╤ | 225 | E1 | β | 241 | F1 | ± |
| 194 | C2 | ⊤ | 210 | D2 | ╥ | 226 | E2 | Γ | 242 | F2 | ≥ |
| 195 | C3 | ├ | 211 | D3 | ╙ | 227 | E3 | π | 243 | F3 | ≤ |
| 196 | C4 | — | 212 | D4 | ╘ | 228 | E4 | Σ | 244 | F4 | ⌠ |
| 197 | C5 | + | 213 | D5 | ╒ | 229 | E5 | σ | 245 | F5 | ⌡ |
| 198 | C6 | ╞ | 214 | D6 | ╓ | 230 | E6 | μ | 246 | F6 | ÷ |
| 199 | C7 | ╟ | 215 | D7 | ╫ | 231 | E7 | τ | 247 | F7 | ≈ |
| 200 | C8 | ╚ | 216 | D8 | ╪ | 232 | E8 | Φ | 248 | F8 | ° |
| 201 | C9 | ╔ | 217 | D9 | ┘ | 233 | E9 | Θ | 249 | F9 | • |
| 202 | CA | ╩ | 218 | DA | ┌ | 234 | EA | Ω | 250 | FA | · |
| 203 | CB | ╦ | 219 | DB | ■ | 235 | EB | δ | 251 | FB | √ |
| 204 | CC | ╠ | 220 | DC | ▬ | 236 | EC | ∞ | 252 | FC | n |
| 205 | CD | = | 221 | DD | ▌ | 237 | ED | ∅ | 253 | FD | ² |
| 206 | CE | ╬ | 222 | DE | ▐ | 238 | EE | ∈ | 254 | FE | ■ |
| 207 | CF | ⊥ | 223 | DF | ▀ | 239 | EF | ∩ | 255 | FF | (SPACE) (SP) |

*Fig. A-7 Code Page 190 (Germany GS) (cont.)*

**MS-DOS SOFTWARE INSTALLATION GUIDE**

# B. CONFIG.SYS COMMANDS

## INTRODUCTION

Whenever MS-DOS is initialized, it searches the root directory for a file named CONFIG.SYS. If this file exists, it is read and the configuring commands within it are executed. If CONFIG.SYS is not found the default setting for each command is used.

You can create or modify the CONFIG.SYS file using the Video File Editor (EDIT) and include in it any of the commands described in this appendix.

Also if the particular command within CONFIG.SYS is not found its default setting is used.

## BREAK

Purpose   Sets or resets the CTRL C or CTRL BREAK break facility.

Syntax    **BREAK= ON | OFF**

Comments  The action of the BREAK command is exactly the same as described in Chapter 7 "MS-DOS Commands" in the "MS-DOS User Guide". However, it can only occur once in the CONFIG.SYS file. The state set by including this command in the CONFIG.SYS file can later be reversed by entering a BREAK command with the opposite argument at the keyboard.

The default is OFF.

## BUFFERS

Purpose    Sets the number of buffers to be allocated.

Syntax     **BUFFERS**=*number*

Where      *number* is a decimal number in the range 2 to 255 that
           defines the number of buffers to be allocated. The default
           value is 15.

Comments   The optimum number of buffers depends on factors such
           as:

- the kind of disk drives attached to the computer

- whether external devices such as spooling tape are
  attached

- the type of applications most commonly used

- the amount of main memory

- whether the computer is acting as a network server

If your applications perform a lot of random accesses you
will probably benefit by using a larger number of buffers.
However, beyond a certain number it may take MS-DOS
longer to scan the buffers than it would to access a value
from disk. For most data base applications between 10
and 20 buffers is a reasonable number.

Memory size affects the optimum number of buffers
because each additional buffer requires 512 bytes of
memory.

The optimum number of buffers can only be determined by
trial then timing the result.

## COUNTRY

Purpose     Sets the country to allow MS-DOS to use the correct national time, date, currency,decimal separators and case conversion.

Syntax      **COUNTRY**=*xxx*[,[*yyy*][,*pathname*]]

Where       *xxx* is the country code (default is 001 for USA). *yyy* is the code page for that country (default is code page 437 - United States). *pathname* is the path to the file containing country information (default is COUNTRY.SYS ).

Comments    For a list of valid country codes and code pages see Chapter 4 "How To Use Code Pages".

## DEVICE

Purpose     Installs a device driver.

Syntax      **DEVICE**=*pathname* **[***argument***]**

Where       *pathname* is the path to the device driver system file. *argument* accepts any parameters and/or switches used by the declared device driver.

Comments    The standard installable device drivers provided with MS-DOS are ANSI.SYS, DISPLAY.SYS, DRIVER.SYS, PRINTER.SYS and VDISK.SYS. For information on these device drivers see Appendix C "Installable Device Drivers".

            Also provided is CACHER.SYS, see Appendix D "The Disk Cache System" for details.

            Alternatively, you may enter the file name of any device driver written for your system.

Warning    The device drivers COUNTRY.SYS and KEYBOARD.SYS are loaded automatically when required. Do **not** try to load either of these with the DEVICE command. If you do, it will "hang" your system (that is, MS-DOS will not start).

## DRIVPARM

Purpose    Enables you to override the default settings for predefined block devices.

Syntax    **DRIVPARM=** /D:*drive-no* [/C] [/F:*form-factor*] [/H:*head*] [/N /S:*sectors*] [/T:*tracks*]

### Where

| SWITCH | PARAMETER | MEANING |
|--------|-----------|---------|
| /D | drive-no | Specifies the logical drive number between 0 and 255. So 0=A: 1=B: 2=C: etc. |
| /C | | Disk change support is required. |
| /F | form-factor | Specifies the media format and kind to be supported. Where: <br><br> 0  320/360 KB |

▶

| SWITCH | PARAMETER | MEANING |
|--------|-----------|---------|
| | | 1   1.2 MB<br>2   720 KB (default)<br>3   8 inch single density<br>4   8 inch double density<br>5   Hard Disk<br>6   Tape Drive<br>7   1.44 MB (3 1/2 inch diskette) |
| /H | heads | Specifies the number of heads on the disk drive. Its value can range from 1 to 99. The default is 2 heads. |
| /N | | Specifies a non-removable block device such as a hard disk. |
| /S | sectors | Specifies the number of sectors per track. Its value can range from 1 to 99. The default is 9 sectors per track. |
| /T | tracks | Specifies the number of tracks per side. Its value can range from 1 through 999. The default is 80 tracks per side. |

**Note**

DRIVPARM can be repeated on several lines of the CONFIG.SYS file with different parameters.

## Example

You might have a computer with an internal tape drive unit on drive "D:" that is configured at boot time to write 20 tracks of 40 sectors per track. If you want to reconfigure this tape drive to write 10 tracks of 99 sectors each, you can put the following line in your CONFIG.SYS file:

DRIVPARM=/D:3 /F:6 /H:1 /S:99 /T:10

This overrides the default device driver settings, and supports a tape drive as drive "D:" (in this case the logical and physical drive numbers are identical). This tape drive has 1 head, and supports a tape format of 10 tracks and 99 sectors per track. (This assumes that the device driver for the tape device supports this configuration of tracks and sectors). You might want to use this method to create a tape that you can read on another computer that can only read this alternate format.

## FCBS

| | |
|---|---|
| Function | Defines the number of FILES opened with File Control Blocks that can be open at any one time. |
| Syntax | **FCBS**= *maxopen,number* |
| Where | *maxopen* is a number from 1 to 255 which represents the maximum number of files that can be opened with File Control Blocks. The default value is 4. |
| | *number* is a number from 0 to 255 that specifies the files that MS-DOS cannot close automatically if the application tries to open more than maxopen. The first files opened are the protected files. The default value of number is 0. |
| Note | You are advised not to use this command unless the application specifies or you are having trouble while file-sharing on a server. If sharing is not loaded this command is not applicable. |

## FILES

Purpose    Defines the number of file handles that can be open at any one time.

Syntax    **FILES**=*number*

Where    *number* is a decimal number in the range 1 to 255 defining the number of files that a program can have open. The default is 8.

Comments    Each additional file above the default value of 8 requires an extra 48 bytes of memory. These 8 file handles include the 5 predefined file handles for: the console, standard input, standard output, auxiliary output and printer output.

The maximum number of file handles all Concurrently running programs can have open is 20 (default maximum) or 65,534 (extended). See the MS-DOS Ver. 3.30 "System Programmer Guide" for more details.

## LASTDRIVE

Purpose    Sets the maximum number of drives that you may access.

Syntax    **LASTDRIVE**=*drive-letter*

Where    *drive-letter* is any letter from A through Z, defining the last valid drive that MS-DOS will accept.

Comments  The default is:

LASTDRIVE=E

Remarks  You cannot set LASTDRIVE less than the number of drives on your computer.

## SHELL

Purpose  Loads a top-level command processor, which can be COMMAND.COM or an alternative command processor.

Syntax  **SHELL**=*pathname path* **[/E:***nnnnn***]** **/P**

Where  *pathname* is the drive, path and file name containing the top-level command processor to be loaded.

*path* is the drive and path of the directory containing the top-level command processor. This sets the environment variable COMSPEC to point to the command processor for reloading purposes.

| SWITCH | MEANING |
|---|---|
| /E:*nnnnn* | This switch specifies the environment size, where *nnnnn* is the size in bytes. The size may range between 160 and 32768 bytes. The default value is 160 bytes. |

▶

| SWITCH | MEANING |
|--------|---------|
| /P | This switch must be specified. This is to indicate that the command processor is to be used for system startup. If omitted AUTOEXEC.BAT will not be executed and an EXIT causes a system crash. |

Example SHELL=C:\BIN\COMMAND.COM C:\BI/E:16384 /P

This command causes the top level command processor to be loaded from the \BIN directory of the C: drive. The second parameter indicates that the transitory part of the command processor is to be reloaded from the \BIN directory of the C: drive. The /E switch sets the environment size to be 16384 bytes. The /P switch must be specified to indicate this is the top level command processor.

## STACKS

Purpose    In this version of MS-DOS the default is for hardware interrupts to use a separate stack. This command declaration sets the number and size of stack frames available for hardware interrupt stacking.

Syntax    **STACKS**=*frames,size*

Where    *frames* specifies the number of stack frames can range from 0 through 64. The default value is 9.

*size* specifies the size in bytes of each stack frame. This number can range from 0 through 512. The default is 128.

When    STACKS=0,0

MS-DOS will not use a separate stack, but will use the "User Stack".

Comments    When a hardware interrupt occurs, MS-DOS allocates a stack frame from the available frames. When the BIOS has processed the interrupt, MS-DOS frees the stack frame. If too many hardware interrupts are queued for the available stack resources, the system crashes and outputs the following message:

```
Internal stack overflow, System halted.
```

If this situation should occur on your personal computer, increase the number of stack frames. The default stack size of 128, is sufficient except in exceptional circumstances. The pool of stack frames is within the memory allocated at the initialization of MS-DOS, increasing the STACKS parameters reduces available memory by the corresponding number of bytes.

# C. INSTALLABLE DEVICE DRIVERS

## INTRODUCTION

Device Drivers are programs that extend the MS-DOS operating system to either recognize additional devices or to use existing devices in a new way. Examples of devices are a modem, a printer, a mouse and an external disk drive. Some device drivers are already installed in MS-DOS. Other device drivers come with MS-DOS for you to install if you need them.

These device drivers are declared to MS-DOS by placing the command:

DEVICE=*pathname* [*argument*]

### Where

*pathname* is the path to the device driver system file.

*argument* accepts any parameters and/or switches used by the declared device driver.

The DEVICE command can be used a number of times in CONFIG.SYS to make different device declarations.

See "DEVICE" in Appendix B "CONFIG.SYS Commands" for more details.

### Warning

The device drivers COUNTRY.SYS and KEYBOARD.SYS are loaded automatically when required. Do **not** try to load either of these with the DEVICE command. If you do, it will "hang" your system (that is, MS-DOS will not start).

## ANSI.SYS

Purpose     An ANSI escape sequence is a series of characters begin-
            ning with the character **ESC** (decimal 27, hex 1B) that can
            be generated to define functions to MS-DOS. Specifically
            these can affect cursor movement, erase specific areas of
            the screen and set the graphics mode, by issuing these
            sequences through standard MS-DOS input/output. The
            interpretation of these escape sequences requires the
            declaration of ANSI.SYS in the CONFIG.SYS

            ANSI.SYS is a file included on your MS-DOS Startup
            Diskette.

Syntax      **DEVICE=[*drive*:][*path*]ANSI.SYS**

Remarks     The ANSI escape sequences themselves are documented
            in the "MS-DOS Reference Manual"

## DISPLAY.SYS

Purpose     DISPLAY.SYS is an installable device driver that supports
            code    page    switching    for    the    console    device.
            DISPLAY.SYS is a file included on your MS-DOS Startup
            Diskette.

Syntax      **DEVICE=[*drive*:][*path*]DISPLAY.SYS**
            **CON[:]=[*type*[,*hwcp*][,*n*,*m*]]**

## Parameters

| PARAMETER | VALUE |
| --- | --- |
| *type* | The display adapter in use. Valid values include MONO, CGA, EGA. |
| *hwcp* | The code page supported by the hardware. The following values are allowed:<br><br>437 (United States)<br>860 (Portugal)<br>865 (Norway)<br>210 (Greece)<br>190 (Germany GS)<br>220 (Spain1)<br>862 (Israel) |
| *n* | The number of additional code pages that can be supported. This number is dependent on the hardware. MONO and CGA do not support other fonts, so n must be 0. EGA can be 2. |
| *m* | The number of sub-fonts that are supported for each code page. |

## DRIVER.SYS

Purpose     DRIVER.SYS is a device driver, which when installed either: enables a new block device to be installed; or enables existing block devices to be referred to as a new logical block device with different characteristics. DRIVER.SYS is a file included on your MS-DOS Startup Diskette.

Syntax  **DEVICE=[**drive:**][**path**]DRIVER.SYS   /D:**drive-no   **[/C]**
        **[/F:**form-factor**] [/H:**heads**][/N /S:**sectors**][/T:**tracks**]**

Where

| SWITCH | PARAMETER | MEANING |
|--------|-----------|---------|
| /D | drive-no | Specifies the physical drive number between 0 and 255. Floppy disk drives start at 0, hard disks start at 128. |
| /C | | Disk change support is required. See SHARE in Chapter 5 for more details. |
| /F | form-factor | Specifies the media format and kind to supported. Where:<br><br>0  320/360 KB<br>1  1.2 MB<br>2  720 KB (default)<br>3  8 inch single density<br>4  8 inch double density<br>5  Hard Disk<br>6  Tape Drive<br>7  1.44 MB |
| /H | heads | Specifies the number of heads on the disk drive. Its value can range from 1 to 99. The default is 2 heads. |
| /N | | Specifies a non-removable block device such as a hard disk. |

▶

| SWITCH | PARAMETER | MEANING |
|--------|-----------|---------|
| /S | sectors | Specifies the number of sectors per track. Its value can range from 1 to 99 default is nine sectors per track. |
| /T | tracks | Specifies the number of tracks per side. Its value can range from 1 through 999. The default is 80 tracks per side. |

Note    DEVICE=DRIVER.SYS can be repeated on several lines of the CONFIG.SYS file with different parameters.

## PRINTER.SYS

Purpose    PRINTER.SYS is an installable device driver that supports code page switching for parallel ports LPT1, LPT2, and LPT3. (The port name PRN may be substituted for LPT1 to refer to the first parallel port.) PRINTER.SYS is a file included on your MS-DOS Startup Diskette.

Syntax     **DEVICE=**[*drive*:][*path*]**PRINTER.SYS**
           **LPT**x=[*type*[,*hwcp*[,...]][,*n*]]

## Parameters

| PARAMETER | VALUE |
|---|---|
| *type* | The type of printer in use. The following values are allowed are:<br><br>4201 (for IBM Proprinter Model 4201 compatibles)<br>5202 (for the Olivetti TH760S and other Quietwriter III compatibles) |
| *hwcp* | The code page supported by the hardware. The following values are allowed:<br><br>437 (United States)<br>850 (Multilingual)<br>860 (Portugal)<br>863 (French-Canadian)<br>865 (Nordic) |
| *n* | The number of additional code pages that can be supported. This number is dependent on the hardware. |

## VDISK.SYS

Purpose    A virtual disk is part of Random Access Memory which emulates a backing store Disk. The VDISK.SYS is a device driver, which when installed, enables a virtual disk drive with the next available drive letter. For example if you have a two physical drive machine, with drives A: and B:, when VDISK.SYS is installed, you will have an extra drive C:. The only difference between virtual disk and real disk is that when you turn your machine off, the information on

virtual disk will be lost. So remember to COPY all files you want to keep from virtual disk to a real disk, before you turn your machine off. VDISK.SYS is a file included on your MS-DOS Startup Diskette.

Syntax    **DEVICE**=[*drive:*][*path*]**VDISK.SYS**[*disk-size*] [*sector-size*] [*entries*] [/**E**[:*max*]]

Where

| SYNTAX ELEMENT | MEANING |
| --- | --- |
| *disk-size* | A decimal value declaring the virtual disk size in Kilo Bytes. The value be from 1 through to the maximum free Random Access Memory on your computer. The default is 64 Kilo Bytes. |
| *sector-size* | A decimal value declaring the sector size in bytes. The value may be 128, 256 or 512. The default is 128 bytes. |
| *entries* | A decimal number declaring the maximum number of directory entries required for files. One entry is used for a volume label. Three entries are used for each sub-directory. The value may be from 2 through 512. The default is 64 entries. |
| /E | This switch specifies that the VDISK driver uses "extended memory". MS-DOS can only directly address 640 KB. Random Access Memory installed over 640 KB is |

▶

| SYNTAX ELEMENT | MEANING |
|---|---|
| | "extended memory". This option is only available on Intel 80286/80386 based Personal Computers, do not use this switch for other Personal Computers. |
| :max | This is a parameter of the /E switch, specifying the maximum number of sectors (of sector-size) that are transferred to/from extended memory. The possible values are a decimal number in the range 1 through 8. The default value is 8. |

Example    This example assumes that VDISK.SYS is in the root directory of the booting drive. For example place the following declaration in CONFIG.SYS:

DEVICE= VDISK.SYS 128 512 32

Rebootstrap your computer and a message similar to the following will be displayed:

```
VDISK Version 3.30 virtual disk D:
Directory entries adjusted
Buffer size: 128 KB
Sector size: 512
Directory entries: 32
```

Remarks    The following situations cause VDISK to fail to install.

- less than 64 KB free memory.

- using the /E switch with no or sufficient extended memory.

In these cases the following message is output on the screen:

```
VDISK not installed - insufficient memory
```

Remarks  You can install more than one virtual disk by placing several **DEVICE = VDISK.SYS** commands in your CONFIG.SYS. Each virtual disk takes the next available drive letter. If the next available drive letter is F:, for use by the virtual disk, place the command:

  LASTDRIVE=F

before your DEVICE command in CONFIG.SYS. Refer to Appendix B for more details.

Warning  Using VDISK in extended memory with networking installed, may lead to problems of lost interrupts and corruption of the virtual disk. If you have such problems, try setting the *max* parameter of the /E switch to 1. If this does not cure the problems, then you cannot place the declaration "DEVICE=VDISK.SYS /E" in the CONFIG.SYS, when you are going to load networking.

# D. THE DISK CACHE SYSTEM

## INTRODUCTION

This disk cache system stores frequently accessed backing store data in a main memory buffer (or cache). This means that when this data is read by a program, it is read from main memory instead of from backing store. This can improve the access time by a factor of between 10% and 25% of the original access time. This performance varies depending upon the disk access profile of the application and upon the the efficiency of the particular hard disk controller. However the variation among the efficiencies of the different disk controllers is within 3%.

This software driver provides a cache for data being read not for data being written. When data is written the disk is updated. However if the data sector is being cached, the cache is also updated. This means that data read from cache is always consistent with the data on the disk.

## CACHER.SYS

Purpose   CACHER.SYS is a device driver which must be declared in the CONFIG.SYS file of the MS-DOS System Disk used for bootstrapping the computer.

Syntax    **DEVICE=[*d*:][*path*CACHER.SYS[*kilobytes*][/E][/Rn]**

Where     *kilobytes* is a decimal value declaring the amount of memory available, in KB (Kilo Bytes) to cache disk sectors. If your hard disk uses 512 Byte disk sectors, then 50 KB will hold 100 disk sectors, as 1024 Bytes equals 1 KB. If you do not specify the /E switch (see below), you can declare a value from 50 KB through 256 KB in memory

with an address of below 640 KB. If you specify the /E switch (see below), you can declare from 50 KB through 15360 KB. The default in both cases is is 50 KB.

/E is an option switch specifying that the CACHER driver uses "extended memory". MS-DOS can only directly address 640 KB. Random Access Memory installed over 640 KB is "extended memory". This option is only available on Intel 80286/80386 based Personal Computers, do not use this switch for other Personal Computers.

/R$n$ is the minimum number of sectors that are transferred to cache memory. The possible value is a decimal number: 2 or 4 or 8. The default is 4 sectors.

Comments  Refer to Appendix B "CONFIG.SYS Commands" for more details of CONFIG.SYS.

The CACHER.SYS becomes resident as a device drive with the name $$$CACHE, taking up 12 KB of main memory. In addition the declared cache memory is taken up in normal or extended memory. (Programmers, please do not use the name $$$CACHE or access this device driver.)

You are recommended to set:

    BUFFERS=10

in your CONFIG.SYS. A higher value is not needed, because CACHER provides additional buffering, for reading the Hard Disk.

## Examples

For example on a machine without extended memory place the following declaration in the CONFIG.SYS file:

DEVICE=CACHER.SYS

With this declaration CACHER.SYS should be placed in the root of the "C:" drive.

This example uses the default settings to set up a disk cache of 50 KB in normal memory, transferring 4 sectors at a time.

Or for example on a machine with extended memory place the following declarations in the CONFIG.SYS file:

DEVICE=CACHER.SYS 1000 /E /R8

This example sets up a disk cache of 1000 KB (with room to hold 2000 512 KB sectors) in extended memory, transferring 8 sectors at a time.

Rebootstrap your computer and a message similar to the following will be displayed:

```
Resident part of CACHER 1.00 installed
```

## Error Message

The following situations cause CACHER to fail to install.

- less than 62 KB free memory for the default settings or less than sufficient memory for the cache size chosen

- using the /E switch with no or insufficient extended memory.

In these cases the following message is output on the screen:

```
Not enough memory for specified size
CACHER not installed
```

**Remarks**

CACHER will not work efficiently unless the files being read are contiguous on disk, that is the file are not fragmented. Use the command:

**CHKDSK \*.\***

to find out whether the files in the current directory are contiguous or not. If they are not contiguous, optimize the disk layout, using the BACKUP and RESTORE commands or some other program which makes files contiguous on hard disk.

**Warning**

In a networking environment CACHER may cause lost interrupts, when it has been declared with the /E switch, that is when the cache is in extended memory.

If such problems occur, redeclare CACHER without the /E switch, that is with the cache in normal memory.

# E. MS-DOS COMMANDS

## CHCP

**Purpose**   Displays or changes the current code page globally for all suitable devices.

**Category**   Internal

**Syntax**   **CHCP [nnn]**

**Where**   *nnn* is the code page to start.

**Comments**   The CHCP command selects one of the prepared system code pages as the current code page. An error message is displayed if the code page specified has not been prepared for the system. In this case call CHCP again with a prepared code page as a parameter.

If you type the CHCP command without a code page, CHCP displays the active code page and the prepared code pages for the system.

## FASTOPEN

**Purpose**   Decreases the amount of time needed to open frequently used files and directories.

**Category**   External, Non-network

Syntax      [*d*:][*path*]**FASTOPEN** *drive*:[*=nnn*] [*drive*:[*=nnn*]...]

Where       Upto and including four separate *drive* parameters can be
            specified. *nnn* is the number of files per *drive* specified.
            *nnn* ranges from 10 thru 999. The default is 10 files.

Comments    FASTOPEN tracks the location of files and directories on a
            disk for fast access. Access to files in a complex directory
            structure can be time consuming. If you run applications
            that use several files (such as a data base application), the
            time to open and close files noticeably degrades your
            computer's performance.

            Every time a file or directory is opened, FASTOPEN
            records its name and location. Then, if a file or directory
            recorded by FASTOPEN is reopened, the access time is
            greatly reduced.

Notes       You can invoke the FASTOPEN command only once. If
            you want to change the FASTOPEN settings, restart MS-
            DOS. FASTOPEN needs approximately 40 bytes of
            memory for each file or directory location it tracks.


## GRAFTABL


Purpose     Enables an extended character set to be displayed when
            using display adapters in graphics mode.

Category    External

Syntax      [*d*:][*path*]**GRAFTABL** [*xxx*]

            or

            [*d*:][*path*]**GRAFTABL {/STATUS|?}**

Where       *xxx* is a code page identification number. Code page table
            437 (United States) is the default if you call GRAFTABL

without a parameter.

If you type the GRAFTABL command followed by the /STATUS switch, it displays the active character set.

If you type the GRAFTABL command followed by a "?", it displays the active character set followed by a list of GRAFTABL command line parameters supported, which includes the permissible code pages (*xxx*).

Examples    If you type:

**GRAFTABL**
Then press ENTER

GRAFTABL responds:

```
No version of Graphic Character Set
Table is already loaded.

USA version of Graphic Character Set
Table has just been loaded.
```

If you then type:

**GRAFTABL 865**
Then press ENTER

GRAFTABL responds:

```
USA version of Graphic Character Set
Table is already loaded.

Nordic version of Graphic Character
Set Table has just been loaded.
```

**Note:** If you have set your system to operate with code page switching, this command should not be used.

# GRAPHICS

**Purpose**    Enables graphics currently displayed on the screen to be printed, on a compatible printer, along with any text when the SHIFT PRTSC keys are pressed.

**Category**    External

**Syntax**    [*d*:][*path*]**GRAPHICS** [*printer-type*] **[/B][/R][/D{/U|/H}]**

**Where**    The *printer-type* parameter can be:

| printer-type | DESCRIPTION |
|---|---|
| graphics | Olivetti PR-15B or PR-17B or Industry Standard Graphics Printer or Epson MX/FX 80 |
| color1 | Industry Standard Color Printer with black ribbon |
| color4 | Industry Standard Color Printer with RGB (Red, Green, Blue and Black) ribbon - 4 colors. |
| color8 | Industry Standard Color Printer with CMY (Cyan, Magenta, Yellow and black) ribbon - 8 colors. |
| jx80 | Epson JX-80 (color printer) using the Epson character set. |
| dm | Olivetti PR-12B (DM285) or PR-14B (DM295) Color Printer. The character set must be IBM International 2. |

Remarks    If no *printer-type* parameter is given then graphics is assumed.

The GRAPHICS command can only be used with printers that have graphics capabilities.

Switches    Switch options have the following effect:

| SWITCHES | MEANING |
| --- | --- |
| /B | Causes the background color to be printed, otherwise the background is suppressed. |
| /R | Causes black on the screen to be printed black and white on the screen to be printed white. Without the switch the default is to print black as white and white as black. |
| /D | For a machine with an Enhanced Graphics Color Board (EGC) but no DEB INT 10 filter installed. |
| /U | 400 scanlines (Olivetti High Resolution). This switch cannot be used unless preceded by /D. |
| /H | 200 scanlines (Industry Standard Compatible). This switch cannot be used unless preceded by /D. |

## Characteristics

This command must be entered to install graphics support necessary to print the screen in graphics modes. SHIFT PRTSC then invokes the printing function. Re-enter the GRAPHICS command with new

parameters to reset the existing parameters; graphics support is not reinstalled, only the parameters are changed.

Text modes are printed in the upright position. Graphics Modes are rotated counter-clockwise 90 degrees on the printout page, so the Visual Display Units upper right corner appears on the paper's upper left corner.

The GRAPHICS command can only be used with printers that have graphics capabilities.

For details of printing with an Enhanced Graphics Color Board, see the "EGC Board User Guide".

**Warning**

Do not turn the printer off while printing as this may cause unpredictable effects, and force you to reboot the operating system.

## KEYB

| | |
|---|---|
| Purpose | Loads a keyboard driver. |
| Category | External. |
| Syntax | **[*d*:][*path*]KEYB [*xx*[,[*yyy*],[*pathname*]]]** |
| Where | *xx* is a two-letter country code.<br>*yyy* is the code page which defines the character set.<br>*pathname* is the path to and the filename of the keyboard definition file. This file is called KEYBOARD.SYS. If this parameter is not specified KEYB will look for KEYBOARD.SYS in the root directory of your current drive. |
| Comments | See Chapter 4 "How To Use Code Pages" for the list of Keyboard codes and Code pages. |

If you type KEYB without options, MS-DOS displays a message like the following to show the current keyboard code and its related code page, and the current code paged used by your console screen device (CON):

```
Current keyboard code: FR code page: 437
Current CON code page: 437
```

## MODE

**Purpose** Sets operation modes for devices.

**Category** External

**Syntax** Parallel printer mode:
[*d:*][*path*]**MODE LPT***n*[:] [*chars*][,[*lines*][,P]]

Asynchronous communications mode:

[*d:*][*path*]**MODE COM***m*[:]*baud*[,*parity*[,*databits*[,*stopbits*[,p]]]]

Redirecting parallel printer output:
[*d:*][*path*]**MODE LPT***n*[:]=**COM***m*[:]

Display modes:
[*d:*][*path*]**MODE** *display*
or
[*d:*][*path*]**MODE** [*display*],*shift*[,T]

Device code page modes:
[*d:*][*path*]**MODE** *device* **CODEPAGE PREPARE** =[[*yyy*]*pathname*]

and

[*d:*][*path*]**MODE** *device* **CODEPAGE SELECT**=*yyy*

[*d:*][*path*]**MODE** *device* **CODEPAGE REFRESH**

## [*d*:][*path*]**MODE** *device* **CODEPAGE [/STATUS]**

Comments   The MODE command prepares MS-DOS for communica-
tion with devices such as parallel and serial printers,
modems, and console screens. It also prepares parallel
printers and console screen devices for code page switch-
ing. And, you can use the MODE command to redirect
output.

### Parallel Printer Modes

For parallel printer modes, you can use PRN and LPT1
interchangeably.

The default settings are LPT1, 80 characters per line, and 6 lines per
inch. You can break out of a time-out loop by pressing CTRL BREAK.

You can use the following parameters with the MODE LPT command to
set parameters for a parallel printer:

| PARAMETER | PURPOSE |
|---|---|
| *n* | Specifies the printer number: 1, 2, or 3. |
| *chars* | Specifies characters per line: 80 or 132. |
| *lines* | Specifies vertical spacing, lines per inch: 6 or 8. |
| *P* | Specifies that mode tries continuously to send output to the printer is a time-out error occurs.<br>This option causes part of the mode program to remain resident in memory. |

## Asynchronous (Serial) Communication Modes

The default settings are even parity, 7 databits and 1 stopbit.

You can use the following parameters with the MODE COM command to set parameters for serial ports:

| PARAMETER | PURPOSE |
|-----------|---------|
| m | Specifies the asynchronous communications (COM) port number: 1, 2, 3, or 4. |
| baud | Specifies the first two digits of the transmission rate: 110, 150, 300, 600, 1200, 2400, 4800, 9600 or 19,200. |
| parity | Specifies the parity: N (none), 0 (add), or E (even). The default value is E. |
| databits | Specifies the number of data bits: 7 or 8. The default value is 7. |
| stopbits | Specifies the number of stop bits: 1 or 2. If baud is 110, the default value is 2; otherwise, the default value is 1. |
| P | Specifies that mode is using the COM port for a serial printer and continuously retrying if time-out errors occur. This option causes part of the MODE program to remain resident in memory. |

## Display Modes

You can use the following parameters with the MODE command to set parameters for a display:

| PARAMETER | PURPOSE |
|---|---|
| *display* | Specifies one of the following values: 40, 80, BW40, BW80, CO40, CO80, or MONO. |
| | 40 and 80 indicate the number of characters per line. |
| | BW and CO refer to a color graphics monitor adapter with color disabled (BW) or enabled (CO). MONO specifies a monochrome display adapter with a constant display width of 80 characters per line. |
| *shift* | Specifies whether to shift the display to the left or to the right. Valid values are L (for left) or R (for right). |
| *T* | Tells MS-DOS to display a test pattern in order to align the display on the screen. |

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## Device Code Page Modes

You can use the MODE command to set or display code pages for parallel printers or your console screen device. You can use the following parameters with MODE to set or display code pages:

| PARAMETERS | PURPOSE |
|---|---|
| device | Specifies the device to support code page switching. Valid dev- ice names are CON, LPT1, LPT2, and LPT3. |
| yyy | Specifies a code page. Valid code pages are 437, 850, 860, 863, and 865. |
| filename | Identifies the name of the Code Page Information (.CPI) file MS- DOS should use to prepare a code page for the device specified. |

## Note

If you are using the Olivetti TH 760/S printer you must specify 5202.cpi as the code page information file. Also, before attempting to use code page switching, the printer must be set to Quietwriter 3 emulation mode. (see your printer documentation for instructions on how to do this)

There are four keywords that you can use with the mode device codepage command. Each causes the mode command to perform a different function. The following table explains each keyword:

```
KEYWORD    FUNCTION
```

```
PREPARE    Tells MS-DOS to prepare code pages for a given
           device. You must prepare a code page for a
           device before you can use it with that device.

SELECT     Specifies which code page you want to use with a
           device. You must prepare a code page before you
           can select it.

REFRESH    If the prepared code pages for a device are lost
           due to hardware or other error, this keyword
           reinstates the prepared code pages.

/STATUS    Displays the current code pages prepared and/or
           selected for a device. Note that the following
           commands both produce the same results:

                MODE CON CODEPAGE
                MODE CON CODEPAGE /STATUS

           Typing /STATUS is optional.
```

For more information about using the MODE command to set or display code pages, see Chapter 4 "How to Use Code Pages".

**Notes**

You can use the following abbreviations with the MODE command for code page modes:

Type    In place of

CP      CODEPAGE
/STA    /STATUS
PREP    PREPARE
SEL     SELECT
REF     REFRESH

## NLSFUNC

| | |
|---|---|
| Purpose | Loads country-specific information. |
| Category | External |
| Syntax | [*d*:][*path*]**NLSFUNC** [*pathname*] |
| Where | *pathname* specifies the file containing country-specific information. |
| Comments | The NLSFUNC command supports the use of extended country-specific information and code page switching. It must be loaded prior to using the CHCP command. |

The default value of *pathname* is defined by the COUNTRY command in your CONFIG.SYS file. If no country command exists in your CONFIG.SYS file, MS-DOS looks for the COUNTRY.SYS file in your root directory for country-specific information.

## RECOVER

| | |
|---|---|
| Purpose | Recovers a file or disk containing bad sectors. |
| Category | External, Non-network. |
| Syntax | [*d*:][*path*]**RECOVER** *pathname* |

or

[*d*:][*path*]**RECOVER** [*drive*:]

| | |
|---|---|
| Comments | If the CHKDSK command shows that a sector on your disk is bad, you can use the RECOVER command to recover |

the entire disk or just the file containing the bad sector.

The RECOVER command causes MS-DOS to read the file sector by sector and to skip the bad sectors. When MS-DOS finds a bad sector, it no longer allocates your data to that sector.

Notes       The RECOVER command does not work on a network from a remote work station. RECOVER doesn't work on drives used in the SUBST or JOIN commands.

# SELECT

Purpose     This command lets you install MS-DOS on a new disk along with country specific information (such as date and time formats, and collating sequence) for a selected country.

Category    External, Non-network

Syntax      [*d*:][*path*]**SELECT**[[*source-drive*:][*target-drive*:][*path*]] [*country-code*][*keyboard-code*]

Comments    See the Section "The SELECT Command" in Chapter 3 "Keyboards And Fonts" for the table of the country-codes and keyboard-codes.

The SELECT command does the following:

*   Formats the target disk.

*   Creates both the CONFIG.SYS and AUTOEXEC.BAT files on the new disk.

*   Copies the contents of the source disk, track by track, to the source disk.

# SHARE

**Purpose**   Installs file sharing and locking.

**Category**   External

**Syntax**   [*d*:][*path*]**SHARE [/F:***space*][/L:*locks*]

## Option Switches

| SWITCH | PURPOSE |
|--------|---------|
| /F:*space* | Allocates file space (in bytes) for the MS-DOS storage area used to record file sharing information. The default value for the /F switch is 2048. Note that each open file requires enough space for the length of the full filename plus 11 bytes, since an average pathname is 20 bytes in length. |
| /L:*locks* | Allocates the number of locks you want to allow. The default value for the /L switch is 20. |

# SYS

**Purpose**   Transfers the MS-DOS system files from the disk in the default drive to the disk in the specified drive.

**Category**   External, Non-network

Syntax    **[***d*:**][***path***]SYS** *drive*:

Comments  Bootstrap off the system  disk which contains the
SYS.COM file. With this disk as the default drive, enter the
SYS command with the target drive as the parameter.

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