
VICTOR 9000

Supplementary Information

Rev. A

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Preface

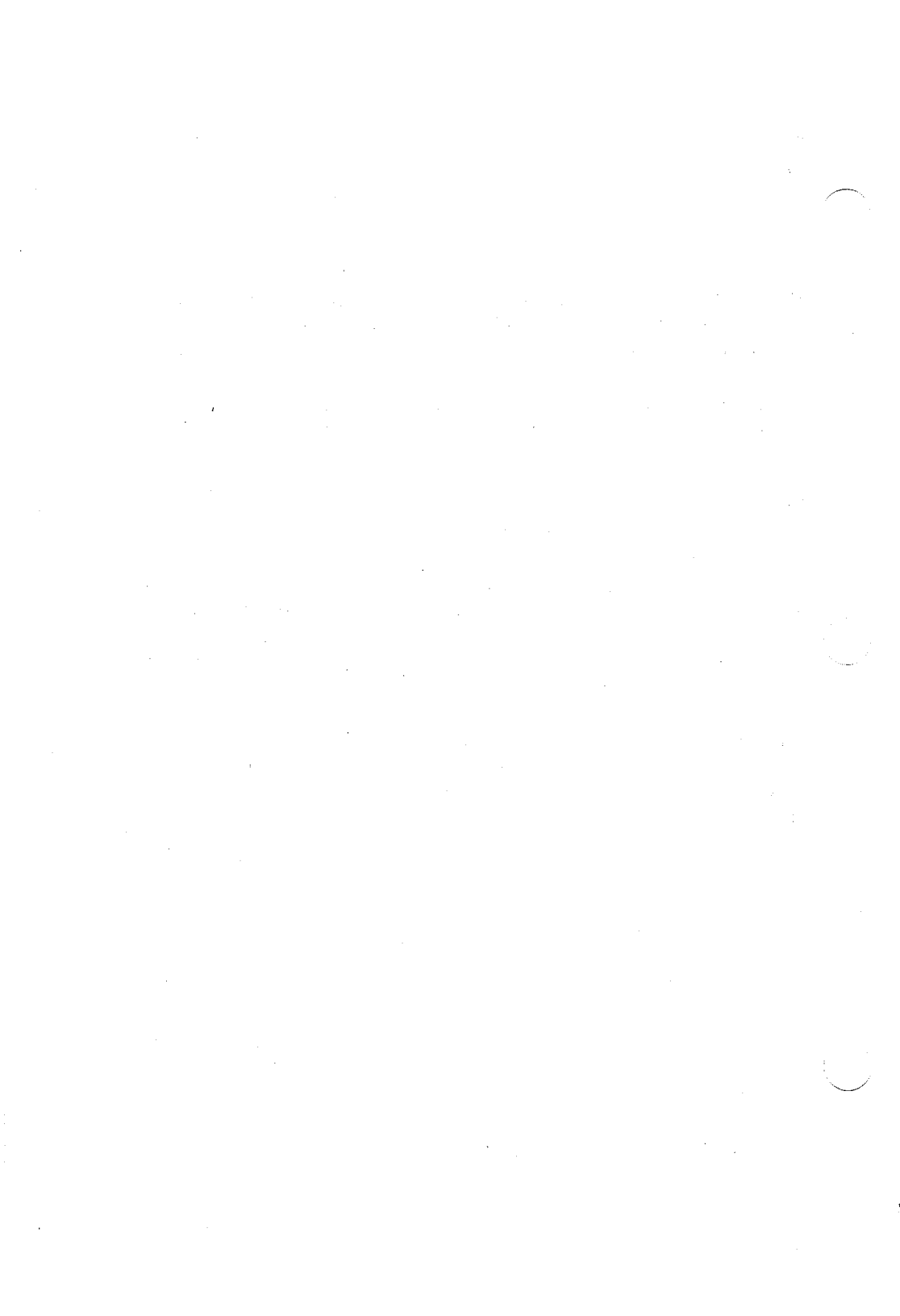
This guide provides supplementary information for the *Operator's Reference Guide II*, the *MS-DOS 3.1 Reference*, and the *VBASICA Interpreter Reference Manual*.

Section 1, "Operator's Reference Guide Changes," describes changes and enhancements to MS-DOS functions documented in the *Operator's Reference Guide II*.

Section 2, "MS-DOS 3.1 Reference Changes," describes changes and enhancements to MS-DOS functions discussed in the *MS-DOS 3.1 Reference*.

Section 3, "New VICTOR MS-DOS Operating System Functions," describes MS-DOS operating system functions that are included in the current implementation but are not described in either the *Operator's Reference Guide II* or the *MS-DOS 3.1 Reference*.

Section 4, "VBASICA Changes," describes changes to VBASICA features documented in the *VBASICA Interpreter Reference Manual*, as well as differences between the current implementation of VBASICA and IBM's BASICA.



Operator's Reference Guide Changes

This section describes changes and enhancements to the *Operator's Reference Guide II*.

1.1 AUTOSET

The AUTOSET hard disk configuration utility described in Chapters 2 and 3 of Section III has been enhanced to support configuration of 30-megabyte (MB) internal hard disk drives. If your system has a 30-MB internal hard disk drive, do not use any earlier version of AUTOSET.

All hard disk configuration files (those with the extension .CFG) whose filenames begin with the number 3 are for use with 30-MB internal hard disks only.

1.2 FORMAT

The description of the FORMAT utility in Chapter 3 of Section II does not apply to this implementation of the MS-DOS operating system. Refer to Chapter 6 of the *MS-DOS 3.1 Reference* for a description of the current FORMAT utility. That description applies to the VICTOR 9000 with the following exceptions.

The /8 and /4 switches are not available on the VICTOR 9000.

The following additional switches are available:

- ▶ The /M (messages) switch tells FORMAT to display the current track and other information while formatting.
- ▶ The /C (clear) switch tells FORMAT to clear the directory and file allocation table (FAT) of the target diskette without formatting the diskette. Use this switch to erase an already formatted diskette. If you use it with an unformatted diskette, a write error occurs.

MS-DOS 3.1 Reference Changes

This section documents changes and enhancements to the *MS-DOS 3.1 Reference*.

2.1 ANSI.EXE

The ANSI-defined standard escape sequences for key reassignment, graphics functions, and cursor movement described in Appendix C are available only when the executable file ANSI.EXE is resident in memory.

To have access to the escape sequences described in Appendix C, you must first either explicitly invoke ANSI.EXE or include ANSI.EXE in a CONFIG.BAT file. The CONFIG.BAT file is described on pages 2-13 and 2-14 of the *MS-DOS 3.1 Reference*. Once loaded, ANSI.EXE remains resident in memory until you reboot or turn off the system.

2.2 FORMAT

The description of the FORMAT utility in Chapter 6 applies to the VICTOR 9000 with the following exceptions.

The /8 and /4 switches are not available on the VICTOR 9000.

The following additional switches are available:

- ▶ The /M (messages) switch tells FORMAT to display the current track and other information while formatting.
- ▶ The /C (clear) switch tells FORMAT to clear the directory and file allocation table (FAT) of the target diskette without formatting the diskette. Use this switch to erase an already formatted diskette. If you use it with an unformatted diskette, a write error occurs.

2.3 MODE, PORTSET, and CLST

The MODE command described in Chapter 6 is not included in this implementation of the operating system. The PORTSET and CLST commands perform many of the same functions as MODE.

2.3.1 PORTSET

PORTSET is an external command that you can use to change the transmission settings for serial output ports A and B. Use PORTSET to adjust serial output to match a serial device such as a printer or modem. Entering PORTSET without parameters lists the current settings of the serial port(s) and displays the on-line help command.

The syntax for entering PORTSET with all its parameters is as follows:

```
PORTSET [port] [baud rate] [parity] [stop bits] [data bits] [/S]
```

port is the name of the serial port to be set; you must use A or B.

baud rate is the speed, in bits per second, at which data is to be transmitted from the port. The baud rate you set for the serial port must match the baud rate of the serial device attached to the port. These are the possible baud rates you can use:

50	300	2400
75	600	3600
110	1200	4800
134.5	1800	9600
150	2000	19200
200		

These baud rates are also listed in the PORTSET help screens.

parity refers to the number of ON bits in each byte of data transmitted. Parity checking is a method of detecting single-bit errors in transmitted data. The possible values for parity are ODD, EVEN, and NONE (you can abbreviate these values as O, E, or N, respectively).

- ▶ If parity is ODD, a parity bit is switched on or off as necessary to ensure that the number of bits turned on in each byte is always odd.
- ▶ If parity is EVEN, the parity bit is turned on or off to ensure that an even number of bits are on.
- ▶ NONE specifies that no parity checking takes place. If you specify 8 data bits, you must specify NONE for parity; a parity bit and an eighth data bit are mutually exclusive.

stop bits specifies the number of bits used to mark the end of each byte of data transmitted. Values for this parameter are 0, 1, 1.5, and 2.

data bits specifies the number of bits in each byte that will carry the data. Values are 5, 6, 7, and 8.

/S suppresses all screen messages that would ordinarily be displayed during execution of a PORTSET command.

When you load MS-DOS, the values for the serial port parameters are taken from the DEVICE commands in the CONFIG.SYS file. These are the default settings in the CONFIG.SYS file on your system diskette:

Baud rate	1200
Parity	NONE
Stop bits	2
Data bits	8

You can separate the parameters of a PORTSET command with spaces, with commas, or with any of the delimiters listed in the first PORTSET help screen. You do not have to enter the parameters in the order shown here; PORTSET can distinguish among parameters regardless of order. Nor do you have to specify all five parameters. If you want to accept the default settings for some parameters and specify others, enter only the parameters you want to specify.

The following PORTSET command sets serial port B to 300 baud, EVEN parity, two stop bits, and six data bits:

```
portset b, 300, even, 2, 6
```

Since the default value for stop bits is 2, the following command has the same effect:

```
portset b, 300, even, 6
```

If you make a typing error when you enter the command, PORTSET displays a message pointing out the first command element that is incorrect and giving the correct command syntax. In the following command, for example, the word EVEN is mistyped as EBEN:

```
portset a, 1200, eben, 1
```

In response, PORTSET displays the following message:

```
a, 1200, eben, 1
```

```
↑
```

```
PORTSET Version X.X
```

```
*** Error: Invalid command line.
```

```
For help type: PORTSET HELP <Return>
```

```
This is the legal command format:
```

```
PORTSET <Port> [Baud rate] [Parity] [Stop bits]  
[Bits per character] [/S]
```

```
Legal values:
```

```
Port = "A" or "B"
```

```
Baud rate = 50, 75, 110, 134.5, 150, 200, 300,  
600, 1200, 1800, 2000, 2400, 3600,  
4800, 9600, 19200.
```

```
Parity = "Even", "Odd", "None".
```

```
Stop bits = 0, 1, 1.5, 2
```

```
Bits per character = 5, 6, 7, 8.
```

PORTSET changes the default settings only for the current operating session. When you turn off or reset your system, the temporary settings are lost. To change the serial port settings permanently, you must change the DEVICE commands in the CONFIG.SYS file.

2.3.2 CLST

To assign printer output to a serial port, use the internal command CLST, in one of the following forms:

```
clst seriala ↵
```

```
clst serialb ↵
```

The first command assigns list device output to serial port A; the second command assigns list device output to serial port B.

Note: Before using CLST to change to a serial port, you must first load the device driver for that port. Do this by using the DEVICE command in your CONFIG.SYS file; then the device drivers are loaded at boot time.

2.4 SELECT, KEYBxx, and MODCON

The SELECT and KEYBxx commands described in Chapter 6 are not part of the current implementation of the operating system. In place of SELECT and KEYBxx, the current implementation of the operating system includes the MODCON command.

MODCON is an external command for modifying the keyboard layout and character set used by the console. You can use MODCON to select a new keyboard file and/or a new character set file. You can also save the current set(s) and restore them later.

The command syntax for MODCON is as follows:

```
MODCON [path]sourcefile name[sourcefile extension]  
[path][savefile name][.savefile extension] ↵
```

path specifies the path from the current directory to the source file. If the source file is in the current directory, you can omit **path**.

sourcefile name specifies the file containing the keyboard layout or character set you want to be made active. If you specify the filename without an extension, the corresponding keyboard (.KB) file and character set (.CHR) file are both activated.

sourcefile extension specifies whether a keyboard file or a character set file is to be made active. To specify a keyboard file only, use the extension .KB. To specify a character set file only, use the extension .CHR. To activate both the keyboard and the character set files, omit **sourcefile extension**.

path specifies the path from the current directory to the save file. If the save file is in the current directory, you can omit **path**.

savefile name specifies the file to which the current keyboard layout or character set is to be saved. If you specify the filename without an extension, the current keyboard layout is saved to that filename with the extension .KB, and the current character set is saved to that filename with the extension .CHR.

savefile extension specifies whether the current keyboard layout or the current character set is to be saved. To specify the current keyboard layout only, enter the extension .KB. To specify the current character set only, enter the extension .CHR. To save both the current keyboard layout and the current character set, omit **savefile extension**.

If you want to save the current keyboard layout or character set to a file without activating a new keyboard layout or character set, you can enter an asterisk (*) in place of the sourcefile specification.

You can also activate a keyboard file and save a character set, or vice versa; the name and extension of the source file are independent of the name and extension of the save file.

Some examples of the MODCON command are shown below.

```
modcon b:\dir3\test.chr\chr\save.chr
```

This command modifies the character set, but does not affect the keyboard layout. The new character set is contained in the file TEST.CHR in the \DIR3 subdirectory on drive B. The current character set is saved to the file SAVE.CHR in the \CHR subdirectory on the current drive.

```
modcon \chr\test.kb
```

This command selects a new keyboard file (TEST.KB in the \CHR subdirectory on the current drive) but does not save the current keyboard layout.

```
modcon germ01 g02save
```

This command activates the keyboard layout specified in the file GERM01.KB and the character set specified in GERM01.CHR. It saves the current keyboard layout to G02SAVE.KB and saves the current character set to G02SAVE.CHR.

```
modcon * brit01.kb
```

This command saves the active keyboard layout to the file BRIT01.KB on the current drive, but leaves it as the active keyboard layout. This command does not have any effect on the character set.

The following batch file uses MODCON to set up a dedicated keyboard layout for a WordStar word processing session. It restores the original keyboard layout when you exit from WordStar.

```
modcon wordamer.kb saved.kb  
ws  
modcon saved.kb  
del saved.kb
```

The first command in this batch file activates the keyboard layout specified by WORDAMER.KB and saves the current keyboard layout to the file SAVED.KB. The second command invokes WordStar. The third command re-activates the original keyboard stored in the file SAVED.KB when you exit from WordStar. The last command deletes SAVED.KB.

To use MODCON, you need keyboard layout and character set files for the keyboard layouts and character sets you want to use.

You can obtain keyboard layout files in either of two ways:

- ▶ Choose a keyboard layout file from those provided on the system selection (SYSGEN) diskette in the *Applications Programmer's Tool Kit*.
- ▶ Modify the current keyboard layout table (or any available keyboard layout table) using the keyboard table editor KEYGEN, included in the *Graphics Tool Kit* and the *Applications Programmer's Tool Kit*.

You can obtain character set files in one of three ways:

- ▶ Choose a character set file from those provided on the system selection (SYSGEN) diskette in the *Applications Programmer's Tool Kit*.
- ▶ Choose a graphics character set provided with CHARGRAF in the *Graphics Tool Kit*.
- ▶ Modify the current character set (or any available character set) using the character font editor EFONT included in the *Graphics Tool Kit* and the *Applications Programmer's Tool Kit*.

2.5 TREE, SEARCH, and LS

The TREE command described in Chapter 6 is not included in this implementation of the operating system. The SEARCH and LS commands provide the same functions as the TREE command, as well as many other capabilities. SEARCH and LS are fully documented in Chapter 6.

New VICTOR MS-DOS Operating System Functions

This section describes additional functions that are included in this implementation of the MS-DOS 3.1 operating system.

3.1 Enhancements of MS-DOS 2.1

With the exception of the SWITCHAR and AVAILDEV configuration commands, which are not supported under MS-DOS 3.1, the VICTOR MS-DOS 3.1 operating system provides all of the functions contained in MS-DOS 2.1, plus a number of enhancements:

- ▶ New interrupt 21 functions and a file sharing program to support file and record locking
- ▶ MS-Networks support
- ▶ UNIX-like utilities: CONCAT, FGREP, HISTORY, LS, MV, SEARCH, TAIL, UNIQ, and WC
- ▶ Support for the 30-megabyte hard disk
- ▶ Enhanced PRINT utility that supports path specifications and can be invoked from within user programs
- ▶ Enhanced COMMAND, DISKCOPY, and FORMAT utilities
- ▶ A large Linker that can link programs of up to 1 megabyte
- ▶ New CONFIG.SYS commands: FCBS and LASTDRIVE
- ▶ Enhanced error-recovery facilities

You can now reset the operating system from the keyboard by simultaneously pressing the ALT and LOCK/CAPS LOCK keys and the decimal (.) key on the numeric keypad.

A reset interrupt has been added at interrupt 69h. If you want to reset the operating system from within an application, you can do so by issuing an interrupt 69h. No parameters are required for this interrupt.

A “hot key” interrupt has been added at interrupt 68h. When the keyboard scan codes are available from the hardware, they are passed in the AX register to interrupt 68h; interrupt 68h is called before any processing of the scan code occurs. An application monitoring this interrupt can do any of three things:

- ▶ Return without changing any of the registers
- ▶ Tell the BIOS to ignore the current key by returning zero in AX
- ▶ Map the current key to another key by returning a different scan code in AX

3

3.2 MS-DOS 3.1 Features Not Documented Elsewhere

This section describes features of MS-DOS 3.1 that are not documented in the *MS-DOS 3.1 Reference* or the *Operator's Reference Guide II*.

3.2.1 CAUX and CLST

In addition to the CTTY command described on page 6-39, VICTOR MS-DOS 3.1 provides two other commands for changing input/output devices: CAUX and CLST. Use CAUX to change the auxiliary input/output device; use CLST to change the list device (printer).

The default device driver for CAUX is AUX. The default device driver for CLST is PRN.

The command syntax and the devicename definition given for CTTY also apply to CAUX and CLST.

3.2.2 HDPARK

HDPARK is a hard disk utility that positions the read/write heads of the hard disk over the innermost cylinder of the drive. Once the read/write heads are moved to this area of the hard disk, data is not damaged in the event that the heads contact the hard disk. Such contact can scratch the hard disk platters and make that area of the disk unusable.

If you have a hard disk drive, you should run HDPARK before you turn your system off. It is also a good practice to run HDPARK and to turn the system off before you move the system or when power to your system is suspect (for example, during storms or brownouts).

CAUTION: Once the heads are parked, you can return to the operating system if you wish. Doing so, however, may unpark the heads.

To invoke HDPARK, enter the command without parameters:

```
hdpark ↵
```

3.2.3 SCRNMX80 and SCRNM84

Two screen print utilities have been added: SCRNMX80 and SCRNM84. These utilities are specific to the Epson MX and FX printers and to the Okidata Micro84 printers, respectively. You can invoke either utility from the command line or from within an AUTOEXEC.BAT or CONFIG.BAT file.

Once loaded, the utility stays resident; whenever you press the Print Screen key, the current screen is sent to the printer in a graphics format specific to the chosen printer.

The Print Screen key is assigned to function key 10. You can change this key assignment by using the /K switch on the command line (or in the batch file) when you invoke the screen dump utility. Enter /K followed by a space and a one- or two-digit hexadecimal number that specifies the assignment of the Print Screen key.

For example, to send the contents of the screen to your MX80 whenever you press ALT-D, enter the following command:

```
scrnmx80 /k 04.↓
```

04 is the ASCII value of ALT-D.

Once you have loaded SCRNMX80 or SCRNM84, you can also initiate a screen dump from within a program by issuing an INT 5.

The screen dump utilities load high in memory; therefore, they do not use memory needed for the graphic screens.

3

3.2.4 CP/M-86 Emulation

The current implementation of the VICTOR MS-DOS 3.1 operating system provides a CP/M-86 emulator that allows you to run programs written for CP/M-86.

RDCPM

Before you can use the CP/M-86 emulator program, you must first transfer your CP/M-86 programs to an MS-DOS formatted diskette. To do so, use the RDCPM command. RDCPM is an external command that can:

- ▶ Display the directory of a CP/M-86 diskette while you are using MS-DOS
- ▶ Transfer files from a CP/M-86 diskette to an MS-DOS diskette in the current directory

To display the directory of a CP/M-86 diskette, use this syntax:

```
[drive]RDCPM DIR[drive][filename.ext].↓
```

The first **drive** parameter specifies the drive that contains the MS-DOS diskette with the RDCPM.EXE file. If the MS-DOS diskette is in the current drive, you can omit **drive**.

The second **drive** parameter specifies the drive that contains the CP/M-86 diskette whose directory you want to display.

You can use **filename.ext** with or without wildcard characters to specify the file(s) you want to be displayed.

The following command displays the directory of the CP/M-86 diskette in drive B:

```
rdcpm dir b:␣
```

The next command displays only those files with the extension .EXE:

```
rdcpm dir b:*.exe␣
```

To transfer files from a CP/M-86 diskette to an MS-DOS diskette, use the following syntax:

```
[drive]RDCPM[drive]filename.ext␣
```

The first **drive** parameter specifies the drive that contains the MS-DOS diskette with the RDCPM.EXE file. If the MS-DOS diskette is in the current drive, you can omit **drive**. If you want to copy the file to a specific subdirectory on the MS-DOS diskette, you must use the CHDIR command to change directories before you enter the RDCPM command.

The second **drive** parameter specifies the drive that contains the CP/M-86 diskette from which you want to copy files.

Use **filename.ext** with or without wildcard characters to specify the file(s) you want to copy.

The following command copies the file TEXT.TXT from the CP/M-86 diskette in drive B to the MS-DOS diskette in the current drive:

```
rdcpm b:text.txt
```

The following command copies all the files from the CP/M-86 diskette in drive B to the MS-DOS diskette in the current drive:

```
rdcpm b:*.*
```

3

Emulator Operation

Once you have transferred the CP/M-86 programs to an MS-DOS diskette that contains the emulator program CPM.EXE, you can run the programs under the CP/M-86 emulator. To do so, type CPM, followed by a space and the CP/M-86 command line, exactly as you would enter it under CP/M-86.

Memory Management

Memory management functions are fully emulated. Functions such as “system reset” and “stay resident,” which are made necessary by or require the CP/M-86 console command processor (CCP), are not supported. The following memory functions are emulated:

- ▶ Get maximum available memory
- ▶ Get maximum memory, absolute
- ▶ Get memory region
- ▶ Get absolute memory region
- ▶ Free memory
- ▶ Free all memory

The emulator supports the following file system interface functions:

- ▶ Open/Make (Function 15)
- ▶ Close (Function 16)
- ▶ Read sequential (Function 20)
- ▶ Write sequential (Function 21)
- ▶ Read random (Function 33)
- ▶ Write random (Function 34)
- ▶ Set random record (Function 36)
- ▶ Write random with zero fill (Function 40)
- ▶ Search first/next—with the exception noted (Functions 17 and 18)
- ▶ Chain to program (Function 47)
- ▶ Delete (Function 19)
- ▶ Rename (Function 23)
- ▶ File size (Function 35)

Byte-Oriented Device Interface

Byte-oriented logical devices are fully supported, including redirection. The following functions are supported:

- ▶ Console input (Function 1)
- ▶ Console output (Function 2)
- ▶ Reader input (Function 3)
- ▶ Punch output (Function 4)
- ▶ List output (Function 5)
- ▶ Direct console I/O (Function 6)
- ▶ Print string (Function 9)
- ▶ Read console buffer (Function 10)
- ▶ Get console status (Function 11)

System Functions

These system functions are supported:

- ▶ System reset—terminates emulation; does not allow program to remain resident (Function 0)
- ▶ Return version number (Function 12)
- ▶ Reset disk system—MS-DOS disk reset (Function 13)
- ▶ Select disk—uses MS-DOS function (Function 14)
- ▶ Return login vector—reflects all drives known to MS-DOS (Function 24)
- ▶ Return current disk—CP/M-86 equivalent (Function 25)
- ▶ Get DMA address—CP/M-86 equivalent (Function 47)
- ▶ Write-protect disk—marks diskettes as write-protected within the emulator (Function 28)
- ▶ Get address—R/O vector; returns address of the emulator R/O vector (Function 29)
- ▶ Reset drive—resets emulator R/O vector (Function 37)
- ▶ Get/Set DMA base—CP/M-86 equivalent (Functions 51 and 52)
- ▶ Get SYSDAT address where the equivalent of SYSDAT information is found within the emulator, with the same offset values as in CP/M-86 (Function 49)

These direct BIOS calls are supported:

- ▶ INIT terminates emulation (BIOS subroutines)
- ▶ WBOOT terminates emulation (BIOS subroutines)
- ▶ CONST, CONIN, CONOUT (BIOS subroutines)
- ▶ LIST, LISTST, PUNCH, READER (BIOS subroutines)
- ▶ HOME, SELDSK (BIOS subroutines)
- ▶ GET/SET IO BYTE (Functions 7 and 8)

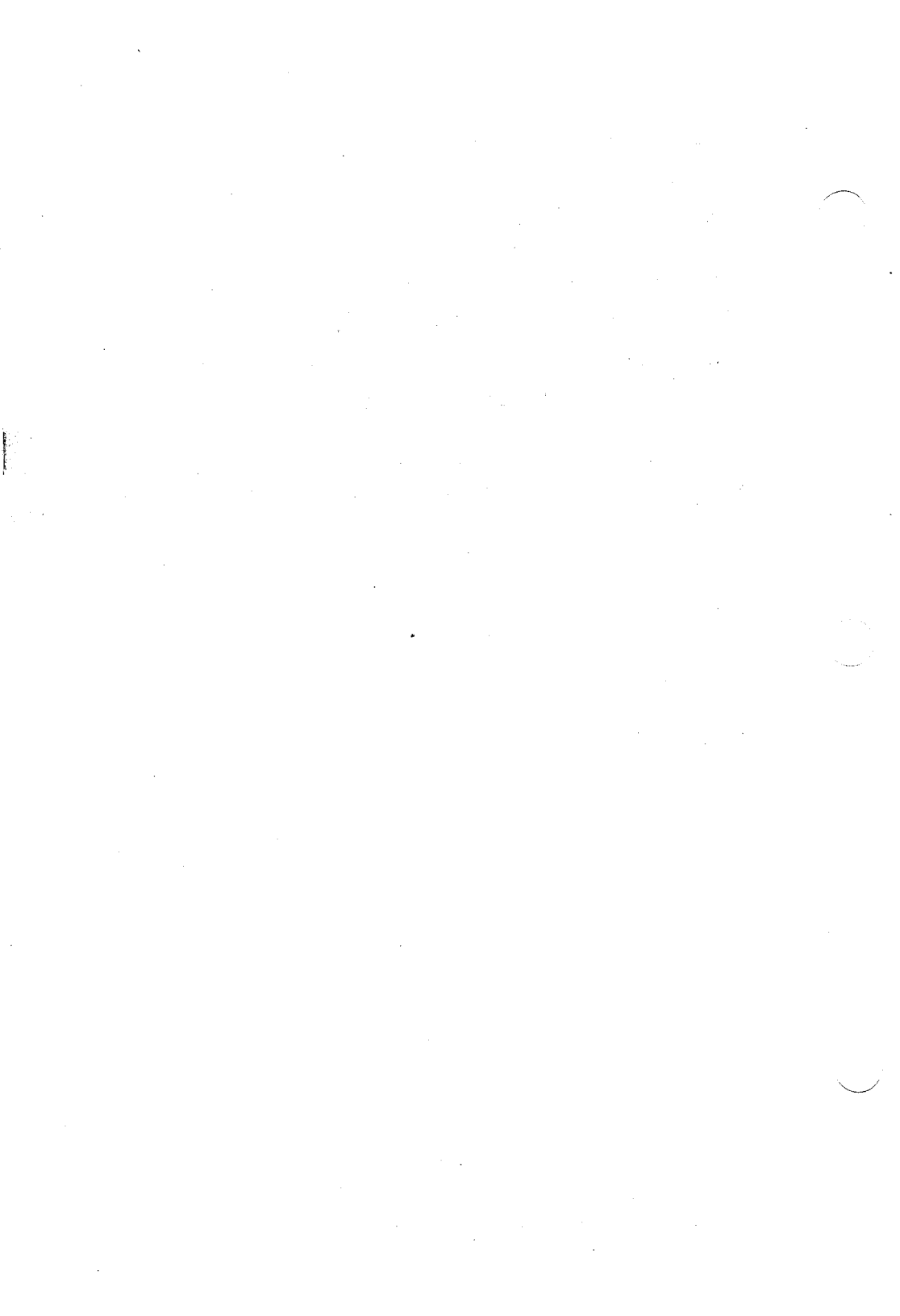
These system functions are **not** supported:

- ▶ Get address—allocate (Function 27)
- ▶ Get/Set user code (Function 32)

These direct BIOS calls are **not** supported:

- ▶ SETTRK, SETSEC, SETDMA (BIOS subroutines)
- ▶ READ, WRITE, SECTRAN (BIOS subroutines)
- ▶ SETDMA, SETDMAB, GETSEGB (BIOS subroutines)

If you attempt to use a system function that is not supported by the CP/M-86 emulator, an error message is displayed and the emulator terminates.



VBASICA Changes

This section documents features of VICTOR's VBASICA that are enhanced relative to IBM's BASICA, lists features that are not supported in this implementation of VBASICA, and discusses some minor compatibility problems and their resolutions.

4.1 Enhanced Features

Features enhanced over BASICA include the LCOPY statement, the VBCONF program, bit map allocation, and additional graphics screens and modes.

4.1.1 LCOPY Statement

FORMAT:

LCOPY

PURPOSE:

Dumps the screen display to a graphics printer.

REMARKS:

With the LCOPY statement VBASICA can output both text and graphics to a dot-matrix printer. VBASICA supports seven printers; you can also define additional printers. Before you can use LCOPY, you must install VBASICA for the printer you are using. Do so by running the VBCONF.BAS program provided on your distribution diskette (VBCONF is described in the next section). After you install VBASICA for a particular printer, you can use the LCOPY statement only with that printer.

EXAMPLE:

```
10 SCREEN 2           'set hi-res graphics screen
20 KEY OFF            'turn off function key display
30 CLS 2              'clear the screen
40 FOR RADIUS = 20 TO 200 STEP 10
50 CIRCLE (400,200),RADIUS 'draw some graphics
60 NEXT RADIUS
70 LCOPY              'copy the screen to the printer
80 END
```

4.1.2 The VBCONF Program

You can run the VBCONF configuration program either from the operating system level or from VBASICA. To run VBCONF from the operating system level, enter the following command in response to the system prompt:

```
VBASICA VBCONF
```

To run VBCONF from the VBASICA command level, enter this command in response to the "Ok" prompt:

```
RUN "VBCONF"
```

The program displays the following menu choices:

```
ABORT - Abort this program without changing VBASICA.
VICTOR Printer 6010/6020
VICTOR Printer 6015/6025
VICTOR Printer 6070/6075
Tally Printer (160s/180s)
Tally Printer (140)
C. Itoh Printer (8510A, 8510S/1550A, 1550S)
Epson MX-80/MX-100 (with GRAFTRAX)
Epson FX-80/FX-100
Okidata Printer (U84 Only)
No Printer - disable LCOPY
```

Use the cursor arrow keys to move the reverse-video bar up and down the menu. When the choice you want is highlighted, press Return. The V9BASICA.XEC file on the default drive is modified and you return to the operating system. If you choose to ABORT, you return to VBASICA. If you choose "No Printer," LCOPY returns an "Illegal function call" error message if you try to use it.

The VBASICA sign-on message displays the name of the installed printer. Rerun VBCONF any time you change printers.

You can install a printer not listed in the menu by modifying the VBCONF.BAS source code. After reading your printer's manual and the comments in the VBCONF.BAS source code, you should be able to configure VBASICA for most printers that support bit-mapped dot-matrix printing.

VICTOR dot-matrix printers automatically correct the aspect ratio between the printer and the screen so that circles are printed correctly, rather than slightly elongated, as is the case with most printers.

4.1.3 Bit Map Allocation

The graphics functions of VBASICA require a bit map. A bit map is memory that defines the graphics screen; this memory is loaded in the lower 64K of RAM.

The bit map for VBASICA is usually allocated at run time by the VBASICA loader. Many load-and-stay-resident utilities, however, load in low memory, thus preventing the VBASICA loader from allocating the bit map. To overcome this conflict, two utilities—GETSCRN and KILLSCRN—have been provided to allocate and deallocate the memory for the bit map. You can run these utilities at any time.

To avoid conflicts with resident utilities, first run GETSCRN to reserve memory for the bit map, and then load your other utilities. You can then run VBASICA at any time, and it will be able to use the bit map allocated by GETSCRN. If you run GETSCRN before VBASICA, VBASICA knows that memory for the bit map has already been allo-

cated and does not attempt to allocate more memory. You can return the reserved memory to the system by using KILLSCRN.

Communication between GETSCRN and VBASICA is accomplished as follows. GETSCRN allocates the bit map (if it can), stores the segment address of the bit map in the offset of interrupt D9 (location 0:364), and stores a "BM" (4D42) in the segment of interrupt D9 (location 0:366) to indicate a successful allocation. GETSCRN and VBASICA check interrupt D9 with each invocation; if the bit map has already been allocated, they do not allocate another one.

4.1.4 Graphics Screens and Modes

4

VBASICA can create medium- or high-resolution graphics on a color screen or on a standard screen. If your computer has a color card, you can put color and black-and-white images on an attached color screen. VBASICA supports three screen types:

- ▶ The standard VICTOR screen
- ▶ A software-simulated IBM color screen displayed on the standard VICTOR screen
- ▶ The color screen, which requires a color screen and the VICTOR IBM-compatible color card

In addition to three screen types, VBASICA supports three screen resolution modes:

- ▶ Mode 0: text-only mode
- ▶ Mode 1: medium-resolution graphics and text mode
- ▶ Mode 2: high-resolution graphics and text mode

You can set both the screen type and the screen mode from within a VBASICA program by using the SCREEN command. Nine screen/mode combinations are possible, although only eight are implemented.

The possible combinations are shown in Table 1. Each screen number in the table is a two-digit number. The first digit specifies the screen type; the second digit specifies the resolution mode. Use these screen numbers as arguments to the SCREEN command to switch from one type/mode combination to another.

Table 1: Screen Type and Mode Combinations

<u>Screen</u>	<u>Rows</u>	<u>Graphics Columns</u>	<u>Pixels</u>	<u>Comments</u>
Color Screens				
20	25	40/80	No graphics	Full 16 colors, 8 or 4 pages, depending on width
21	25	40	320 × 200	4 colors, medium resolution
22	25	80	640 × 200	2 colors: black and white
Standard Screens				
40	25	40/80	No graphics	Standard text mode
41	(Not available; use screen 61)			
42	25	80	400 × 800	Standard high-resolution screen
IBM Monochrome Screens				
60	25	40/80	No graphics	IBM text mode
61	25	40	320 × 200	4 shades, medium resolution
62	25	40/80	640 × 200	Simulated IBM high-resolution monochrome mode

When the operating system loads VBASICA, it checks to see whether or not a color card is installed and whether or not the bit map is allocated.

If a color card is installed, the VBASICA default screen is screen 20. If no color card is installed, the VBASICA default screen is screen 40.

If the bit map is not allocated, your programs cannot access graphics screens 42, 61, and 62.

After you set a screen type/mode combination using one of the two-digit screen numbers shown in Table 1, you can keep the same screen type but change the resolution mode by issuing a SCREEN command followed by the one-digit mode number (this procedure corresponds to the SCREEN command description in your VBASICA manual).

The following command, for example, switches to the standard screen in text mode:

SCREEN 40

You can then use the following command to switch to the standard screen in high-resolution mode:

SCREEN 2

If you want to run color graphics programs but do not have a color screen, issue the command SCREEN 60 to simulate the IBM color screen on the standard screen.

Color Attributes

You can specify a color attribute with the graphics statements PSET, PRESET, LINE, CIRCLE, PAINT, and DRAW. The range is 0 to 3. These color attribute numbers are distinct from the numbers that refer to actual colors; the latter are used only as parameters in the COLOR statement.

On screen 61, 0 selects black; 1, 2, and 3 select varying shades of white.

In Mode 1 on the color screen (screen 21), 0 selects the background color; 1, 2, and 3 select foreground colors.

In Mode 2 (screen 22 or screen 62), 0 and 2 select black; 1 and 3 select white.

Note: The COLOR statement does not affect any graphics screen except screen 21.

Coordinates

The drawing statements PSET, PRESET, LINE, CIRCLE, GET, PUT, and PAINT require you to specify points on the screen as pairs of x-y coordinates. Specify coordinates in the format (x, y), where x and y are numeric expressions. The ranges of x and y values for each screen type/mode combination are shown in Table 2.

Table 2: Screen Coordinates

<u>Screen Type/Mode</u>	<u>X-Range (Horizontal)</u>	<u>Y-Range (Vertical)</u>
21, 61	0-319	0-199
42 (standard screen)	0-799	0-399
22, 62 (color screen)	0-639	0-199

4

The upper left corner of the screen is always point (0, 0).

When you clear the screen with either the SCREEN statement or the CLS statement, the graphics cursor is set to the middle of the screen. Table 3 gives the midscreen coordinates for each screen type/mode combination.

Table 3: Midscreen Coordinates

<u>Screen</u>	<u>Coordinates</u>
21, 61	(160, 100)
42	(400, 200)
22, 62	(320, 100)

4.2 Features Not Supported in This Version of VBASICA

The following features are not supported:

- ▶ The PAINT statement does not support tiling.
- ▶ The LINE statement does not support the style attribute.
- ▶ The PLAY statement does not support the incrementing and decrementing octaves option.
- ▶ User-defined trappable keys are not supported. Only keys 0 through 11 can be trapped.
- ▶ The MS-DOS PATH command and the use of pathnames in file specifiers are not supported.
- ▶ I/O redirection is not supported.

These statements, commands, and functions are not supported:

CHDIR command
ENVIRON statement
ENVIRON\$ function
ERDEV function
ERDEV\$ function
IOCTL statement
IOCTL\$ function
MKDIR command
ON PLAY statement
ON TIMER statement
PLAY OFF statement
PLAY ON statement

PLAY STOP statement
PLAY (n) function
PMAP function
RANDOMIZE statement
RMDIR command
SHELL statement
TIMER OFF statement
TIMER ON statement
TIMER STOP statement
VIEW statement
VIEW PRINT statement
WINDOW statement

4.3 Compatibility Problems and Resolutions

VBASICA is compatible with IBM BASICA, and programs written to run under IBM BASICA should run under VBASICA. There are, however, three differences between VBASICA and BASICA that you should be aware of.

4.3.1 Screen Compatibility

VBASICA supports three screen types, while BASICA supports one type. If you have a color screen, the difference in the screen types should not affect the operation of the BASICA program because the color screen is IBM compatible. VBASICA defaults to screen 20 (color screen, text mode) if you have a color card installed. Thus, as long as the program switches resolution modes when needed (SCREEN 0, 1, or 2), the program should run normally.

If you do not have a color screen, VBASICA defaults to screen 40 (VICTOR screen, text mode). Screen 40 is not an IBM compatible screen. Therefore, before the BASICA program accesses the screen, the screen mode should be changed to Screen 60 (IBM simulated screen, text mode). The easiest way to do this is to add the statement SCREEN 60 to the BASICA program so that it is the first statement executed. Then, as long as the program switches resolution modes when needed (SCREEN 0, 1, or 2), it should run normally.

4.3.2 Hardware Compatibility

The second area of difference is in the hardware. If a program attempts to access directly an IBM hardware feature that is unavailable on the VICTOR 9000, the program will not run correctly under VBASICA. Known areas of hardware incompatibility are as follows:

- ▶ BLOADs of a binary file from a hard disk to the color card do not work. Only part of the file is loaded. The IBM-compatible color card does not work correctly with the hard disk controller because the controller attempts to write to the color card's memory using Direct Memory Access (DMA).

You can overcome this problem by first reading the contents of the binary file into an array and then using POKE to move the contents of the array into the color card's memory. The color card memory begins at &hB800:0.

BLOADs from diskette to the color card work correctly because they do not use DMA.

- ▶ For some statements that include a boolean (logical true or false) value or variable, the value used for true must be greater than zero but less than 256. For example, in the LOCATE statement

LOCATE LIN%, COL%, CRSR.ATTR%

the variable CRSR.ATTR% is a boolean value. If CRSR.ATTR% is true, the cursor is on; if it is false, the cursor is off. If CRSR.ATTR% is true, it must be in the range

$$1 <= \text{CRSR.ATTR\%} <= 255$$

CRSR.ATTR% cannot be negative. To avoid problems, use + 1 for true and 0 for false.

4.3.3 Function Keys

VBASICA supports a maximum of seven function keys. Therefore, if you have a BASICA program that uses function keys F8 through F10, you will have to rewrite the program to use function keys F1 through F7 only.

WordPerfect (IBM version)

Cursor Program

You can use the Cursor Program to change the appearance of the cursor. Depending on the type of text you are working with, modifying the cursor shape can make it more or less visible on the screen.

The Cursor Program cannot stop the cursor from blinking.

Important: *The Cursor Program file (CURSOR.COM) needs to be installed properly before using the program. If you chose not to install the WordPerfect utility programs when you installed WordPerfect (or have not subsequently installed them), you must do so now to use the Cursor Program. See the Installation Instructions card.*

- 1 Exit WordPerfect and go to DOS.
- 2 Change to the directory where CURSOR.COM is located.

The Installation Program copies this file to the directory where WordPerfect (WP.EXE) is located (usually C:\WP51) if you are using a hard disk, or to the diskette you labeled "Utilities" if you are using a two disk drive system.

- 3 Type cursor and press Enter.

```
WordPerfect Cursor Definition Utility Copyright 1988, WordPerfect Corp.
```

	Second Letter												
	A	B	C	D	E	F	G	H	I	J	K	L	M
F
i
T
a
t
E
F
C
H
L
e
i
J
K
L
N

Use arrow keys to select cursor, then press RETURN
(Press SPACEBAR to see cursor on a line of text)

You may select this cursor from DOS by entering:
A> CURSOR/LM

- 4 Use the arrow keys to move the cursor on the grid until it is the desired size and shape.

Some grid combinations will cause the cursor to disappear. In addition, with some graphics cards, the entire grid cannot be used.

- 5 If you want to see how the cursor looks in text, press the **Space Bar**. Press the **Space Bar** again to return to the grid.

You may want to make a note of the two-letter combination identifying your cursor (displayed at the bottom of the screen). The first letter is the grid row, the second is the grid column.

6 When you are finished, press **Enter** to select the cursor and return to DOS.

Once you know the cursor combination you want, you can select it directly from DOS. To select it,

1 Enter **cursor/nn** at the DOS prompt (where *nn* is the two-letter combination for your cursor).

For example, to use cursor KL, you would enter **cursor/kl** at the DOS prompt.

Notes

Extent of Use

Because the cursor is changed at the DOS level, the new cursor is used both at DOS and in any application run under DOS, including WordPerfect. If you exit DOS, however (for example, if you turn off your machine or run BASIC), the cursor will return to its regular size and shape. To use the new cursor every time you start your computer, enter the **cursor/nn** command in your AUTOEXEC.BAT file (see *DOS and WordPerfect in Reference*).

Some applications may themselves change the shape of the cursor while you are in that program. Upon exiting many of these applications, the cursor is returned to the default size and shape, rather than what it was when you started the application. You may need to run the Cursor Program again to return it to the size and shape you want.

See Also: Cursor Movement; Cursor Speed

Disk Operating System Version 3.30

Reference

Programming Family

The IBM logo, consisting of the letters 'IBM' in a bold, sans-serif font, with each letter formed by eight horizontal bars of varying lengths, creating a striped effect.

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APPEND Command

Purpose:

Locates files outside of the current directory that have extensions other than .COM, .EXE, and .BAT.

Format:

The first time APPEND is loaded:

```
[d:][path]APPEND d:path[;[d:]path . . . ]
```

or

```
[d:][path]APPEND [/X][/E]
```

After APPEND has been loaded:

```
APPEND d:path[;[d:]path . . . ]
```

or

```
APPEND [;]
```

Type:

Internal External

*** ***

Remark:

Specify the parameters:

[d:][path] before APPEND to specify the drive and path that contain the APPEND command.

[d:][path] after APPEND to specify the path to search. Paths cannot be specified the first time the APPEND command is loaded if either /X or /E are also specified.

APPEND

Command

; to separate the APPEND paths or to request the list to be reset to null if the semi-colon is the only parameter.

/X to process SEARCH FIRST, FIND FIRST, and EXEC functions. Commands such as COMP and DIR use the SEARCH FIRST functions to search for files. Commands such as BACKUP, RESTORE, and TREE use the FIND FIRST function to locate files. DOS uses the EXEC function any time a command is entered.

Note: If APPEND has been loaded with /X, before using BACKUP or RESTORE, APPEND must be issued using null (;).

Once the APPEND command is loaded into memory, it then becomes an *internal* command, and a path before APPEND is no longer needed.

/E is used to keep the APPEND paths in the DOS environment, similar to the DOS path command. APPEND searches the environment on each call to find the path. The DOS environment values may be viewed and changed with the APPEND and SET commands.

If the /E is not specified, the path string is held within the APPEND command. The paths are not stored in the environment and can only be viewed or changed by using the APPEND command.

/X and /E can only be specified on the first invocation of the APPEND command.

Technical Note: The environment is limited to the current command processor. If another command processor is loaded, or if the current one is exited, changes to the environment are lost. To ensure that

APPEND Command

all processes are affected by changes to the APPEND path string, do not use /E.

Each time an APPEND command is entered, it takes the place of the preceding APPEND command. The appended directories can be "local" directories on your computer, or "remote" directories on a server computer, or a combination of both.

WARNING!

Some applications read a file from an appended directory and then write the file back out to the disk. The application writes the file in the current directory, **leaving the original copy unchanged.**

You can append as many directories as you can specify in 128 characters. The search sequence for a specified file is:

1. The specified directory, or the current directory if no directory is specified.
2. The directories indicated by the current APPEND command.

If you use the ASSIGN command, the first APPEND command must be entered before the ASSIGN command.

Why Use APPEND?

The APPEND command allows you to store applications only once on your fixed disk. Those applications can be used without changing to the directory that contains them.

For example, correspondence can be sorted into categories, by subject or content. Rather than

APPEND

Command

duplicate the editor, word processor, and spelling aid programs in each letter category or directory, you can install those programs and their associated operating files, in one directory--C:\APPS.

Assume directories have been created for each letter. Before you load any word processing, editing or spelling aid application, use one of the following sets of commands:

```
path c:\apps
append /e
append c:\apps
```

or

```
append /e /x
append c:\apps
```

Now you can use the application that was installed in C:\APPS as if it were in your current directory. Since the files the application needs to operate (that do not have an extension of .COM, .EXE or .BAT) are in C:\APPS the application will find them with the help of APPEND. To edit a file in C:\TEXT you would change to the directory that the file is in and execute your application. When you save the file, the new version will be written to the current directory. For example:

```
c:
cd \text
```

Notes:

1. Erroneous information in the paths, such as invalid drive specifications or imbedded delimiters, will not be detected until DOS actually needs to search the specified paths.
2. If a path is specified that no longer exists, DOS ignores that path and goes on to the next.

APPEND Command

3. PATH finds only executable files, such as .COM, .EXE, and .BAT files. PATH does not find files with other extensions. APPEND finds any extension.
4. A copy of the environment is saved with terminate and stay-resident programs. Loading programs with a resident portion (MODE, PRINT, GRAPHICS) before setting a large path saves usable memory.
5. Terminate and stay-resident programs are loaded above the environment area so growth of the environment is limited to 128 bytes or the current size, whichever is greater (refer to the SHELL= command in Chapter 4 of this book for setting of the environment size.)
6. APPEND /x may cause problems with some applications. If you experience problems using the /x option, you may want to use the APPEND command without it.

WARNING!

Do not use the DOS 3.30 APPEND command with the APPEND command from either the IBM PC Network program 1.00 or the IBM PC LAN program 1.10.

APPEND

Command

APPEND uses the following system functions
(int 21H):

FCB open	-	0FH
FCB file size	-	23H
OPEN	-	3DH

/X specifies the following additional system functions
(int 21H):

FCB search first	-	11H
Find First	-	4EH
Exec program	-	4BH

Note: APPEND cannot process EXEC calls
when TopView is loaded.

See the PATH command in this Chapter, for
additional information.

Batch File Commands

Creating a Batch File with Replaceable Parameters

Within a batch file you can include *dummy* parameters that can be replaced by values supplied when the batch file executes.

For example, if the batch file EXAMPLE.BAT contains these commands:

```
copy %1.mac %2.mac  
type %2.prn  
type %0.bat
```

the replaceable parameters %0, %1, and %2 are replaced sequentially by the parameters you supply when you execute the file. The replaceable parameter %0 is always replaced by the drive specifier, if specified, and the file name of the batch file. In the AUTOEXEC.BAT file, %0 is not set to any value.

Notes:

1. Up to 10 dummy parameters (%0 – %9) can be specified within a batch file. Additional parameters can be specified on a command line (see SHIFT subcommand).
2. If you want to use % as part of a file name *within* a batch file, you must specify it twice. For example, to specify the file ABC%.EXE, you must type ABC%%.EXE in the batch file.

Batch File Commands

Executing a Batch File with Replaceable Parameters

To execute a batch file and pass parameters, type the batch file name followed by the parameters you want sequentially substituted for %1, %2, etc.

For example, you can type:

```
example a:prog1 b:prog2
```

EXAMPLE is substituted for %0, A:PROG1 for %1, and B:PROG2 for %2.

The result is the same as if you typed each of the three commands (in the EXAMPLE.BAT file) with their parameters from the console, as follows:

```
copy a:prog1.mac b:prog2.mac  
type b:prog2.prn  
type example.bat
```


Batch File Commands

Using Environment Variables

DOS environment variables (see the SET command) can be used in batch files in much the same way as replaceable parameters. Each environment variable is preceded with and followed by a %. For example, to refer to the DOS PATH value, enter %PATH%.

The following example assumes that a string defining a valid drive as "destination" exists in the environment (such as destination = c:).

```
echo got here >%destination%file1
```

The result of executing the above BATCH command is the string "got here" in file1 on the drive defined by "destination."

CALL Subcommand

Purpose:

Allows a batch file to be called from within another batch file without ending the first batch file. This allows batch files to be treated as a command in a batch file.

Format:

```
CALL [d:][path]filename
```

Type:

Internal External

Batch File Commands

Remark:

CALL can be used from any line inside of a batch file and is limited only by available memory. A batch file may call itself, but be careful to ensure the batch file eventually terminates.

Examples:

The following batch file calls the files **ACCT.BAT** and **BILL.BAT**, which process monthly accounts and sends out bills.

```
call acct  
call bill
```

Note: The **CALL** command should not be used with piping or redirection.

COMP (Compare Files) Command

Purpose:

Compares the contents of the first set of specified files to the contents of the second set of specified files.

Note: This command compares two sets of files; the DISKCOMP command compares two entire diskettes.

Format:

```
[d:][path]COMP [d:][path][filename[.ext]]  
[d:][path][filename[.ext]]
```

Type:

Internal External

Remark:

Specify the parameters:

[d:][path] before COMP to specify the drive and path that contains the COMP command file.

[d:][path][filename[.ext]] to specify the first set of file names that you want to compare. It is also referred to as the *primary* file.

[d:][path][filename[.ext]] to specify the second set of file names that you want to compare. It is also referred to as the *secondary* file.

COMP (Compare Files) Command

Notes:

1. The files that you compare may be on the same drive or on different drives. They can also be in the same directory or different directories.
2. If no parameters are specified with the COMP command, or if the second parameter is missing, you are prompted for them. If either parameter contains only a drive or a path with no file name, COMP assumes a file name of *.*. You can enter a complete path with either of the two file names.
3. If no file matches the primary file name, COMP will prompt you for both the primary and secondary parameters again.
4. During the comparison, an error message appears for any location that contains mismatching information in the two files. The message indicates the offset into the files of the mismatching bytes, and the contents of the bytes themselves (all in hexadecimal), as follows:

```
Compare error at OFFSET XXXXXXXX  
File 1 = XX  
File 2 = XX
```

In this example, FILE1 is the first file name typed; FILE2 is the second file name typed.

After ten unequal comparisons, COMP concludes that further comparing would be useless; processing ends, and the following message is displayed:

```
10 Mismatches - ending compare
```

COMP (Compare Files) Command

After a successful comparison, COMP displays:

```
Files compare OK
```

After the comparison of the two files ends, comparing will proceed with the next pair of files that match the two file names, until no more files can be found that match the first parameter. Then COMP displays:

```
Compare more files (Y/N)?_
```

You now have the option to compare two more files or to end the comparison. If you want to compare two more files, enter y. You will be prompted for new primary and secondary file names.

If you want to end COMP processing, type n. You will return to the DOS prompt.

5. In all compares, COMP looks at the last byte of the files being compared to assure that it contains a valid end-of-file mark (Ctrl-Z, which is the hexadecimal character 1A). If found, no action is taken by COMP. If the end-of-file mark is *not* found, COMP produces the message:

```
EOF mark not found
```

This is done because some products produce files whose sizes are always recorded in the directory as a multiple of 128 bytes, even though the actual usable data in the file is usually a few bytes less than the directory size. In this case, COMP may produce **compare error** messages when comparing the few bytes beyond the last real data byte in the last block of 128 bytes (COMP always compares the number of bytes reflected in the directory). Thus, the **EOF mark not found** message indicates

COMP (Compare Files) Command

that the compare errors may not have occurred in the usable data portion of the file.

6. A comparison does not take place if the file sizes are different.
7. COMP does not wait for you to insert a diskette containing a file to be compared. Therefore, if a file to be compared is not on the same diskette as the COMP command itself, you should type COMP with no parameters. When COMP prompts for the file names, you can insert the desired diskette and reply with the name of the file to be compared.

Examples:

The following example compares all .ASM files on drive B with the files on drive C with the same file names.

```
comp b:*.asm c:
```

The following example compares all files in the directory A:\LEVEL1 with corresponding files in the directory A:\LEVEL2.

```
comp a:\level1 a:\level2
```

DISKCOMP (Compare Diskettes Only) Command

Purpose:

Compares the contents of the diskette in the first specified drive to the contents of the diskette in the second specified drive.

Notes:

1. This command is used only for comparing diskettes. If a fixed disk drive letter is specified, an error message is displayed.
2. This command compares two *entire diskettes*; the COMP command compares two *files*.

Format:

[d:][path]DISKCOMP [d: [d:]] [/1] [/8]

Type:

Internal External

Remark:

Specify the parameters:

[d:][path] before DISKCOMP to specify the drive and path that contains the DISKCOMP command file.

[d:] to specify the source drive.

[d:] to specify the target drive.

/1 to compare only the first side of the diskettes, even if the diskettes and drives are double-sided.

DISKCOMP (Compare Diskettes Only) Command

/8 to compare only 8 sectors per track, even if the first diskette contains 9/15 sectors per track.

You can specify the same drive or different drives in this command. If you specify the same drive, a one-drive comparison is performed. You are prompted to insert the diskettes at the appropriate time. DISKCOMP waits for you to press any key before it continues.

DISKCOMP compares all tracks on a track-for-track basis and issues a message if the tracks are not equal. The message indicates the track number and the side (0 or 1) where the mismatch was found.

After completing the comparison, DISKCOMP prompts:

```
Compare more diskettes (Y/N)?_
```

If you type **y**, the next comparison is done on the same drives that you originally specified after you receive prompts to insert the proper diskettes.

To end the command, type **n**. If the following message is displayed, insert the DOS diskette in drive **x** and press any key when ready.

```
Insert disk with \COMMAND.COM in drive A  
and strike any key when ready
```

Notes:

1. If you omit both parameters, a one-drive comparison is performed on the default drive.
2. If you omit the second parameter, the default drive is used as the secondary drive.

DISKCOMP (Compare Diskettes Only)

Command

3. On one physical drive compare (the source drive and the target drive are the same physical drive) all prompts are for the source drive letter.
4. DISKCOMP usually does not issue a **Diskettes compare OK** message if you try to compare a backup diskette created by the COPY command with the diskette you copied from. The COPY operation produces a copy that contains the same information, but may place the information at different locations on the target diskette from those locations used on the source diskette. In this case, you should use the COMP command to compare individual files on the diskettes.
5. If a diskette error occurs while DISKCOMP is reading the diskette, a message is produced that indicates where (track and side) the error occurred. Then DISKCOMP continues to compare the rest of the diskette. Because the remainder of the data to be compared cannot be read correctly from the indicated track and side, you can expect to receive a **Compare error** message.
6. DISKCOMP automatically determines the number of sides and sectors per track to be compared, based on the diskette that is to be read first (the first drive parameter entered).

If the first diskette is formatted as single-sided, or if the /1 parameter is used, only the first side is read from both diskettes. If the first diskette contains 9 sectors per track, then DISKCOMP will compare 9 sectors per track unless you used the /8 parameter. If the first diskette contains 15 sectors per track, then DISKCOMP will attempt to compare 15 sectors per track. If the first drive and diskette are double-sided, and /1 is not specified, a two-sided comparison is done. In

DISKCOMP (Compare Diskettes Only)

Command

this case an error message is produced if either the second drive or the diskette is a single-sided diskette.

7. The source and target drives cannot be virtual drives, such as those created by the SUBST command.
8. DISKCOMP does not recognize assigned drives.
9. DISKCOMP should not be used while a JOIN is in effect.
10. DISKCOMP does not work on network drives.

DISKCOMP Compatibility

DISKCOMP can be used only with certain combinations of diskette drives and diskettes. Check the following information to find out which types of diskettes you can compare in your system.

5.25 Inch, Single-Sided, Diskette Drives 160KB/180KB

- Compare a 160KB/180KB, single-sided, double-density diskette with a 160KB/180KB, single-sided, double-density diskette

DISKCOMP (Compare Diskettes Only)

Command

5.25 Inch, Double-Sided Diskette Drives 320KB/360KB

- Compare a 160KB/180KB, single-sided, double-density diskette with a 160KB/180KB, single-sided, double-density diskette
- Compare a 320KB/360KB, double-sided, double-density diskette with a 320KB/360KB, double-sided, double-density diskette

5.25 Inch, High-Capacity Diskette Drives 1.2MB

- Compare a 160KB/180KB, single-sided, double-density diskette with a 160KB/180KB, single-sided, double-density diskette
- Compare a 320KB/360KB, double-sided, double-density diskette with a 320KB/360KB, double-sided, double-density diskette
- Compare a 1.2MB high-capacity, double-density diskette with a 1.2MB, high-capacity, double-density diskette

3.5 Inch, Double-Sided Diskette Drives 720KB

- Compare a 720KB double-sided diskette with a 720KB double-sided diskette

DISKCOMP (Compare Diskettes Only)

Command

3.5 Inch, Double-Sided Diskette Drives 1.44MB

- Compare a 720KB double-sided diskette with a 720KB double-sided diskette
- Compare a 1.44MB double-sided diskette with a 1.44MB double-sided diskette

No other combinations are allowed. If you specify an invalid combination, the following message is displayed:

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

Examples:

The following example compares the diskette in drive A to the diskette in drive B.

```
diskcomp a: b:
```

The following example compares the first diskette in drive A to the second diskette in drive A. Notice that by not specifying the source and target drive, a one-drive comparison is performed. You have to switch diskettes as prompted.

```
A>diskcomp
```

The following example compares the first diskette in drive B to the second diskette in drive A.

```
A>diskcomp b:
```

FASTOPEN

Command

Purpose:

DOS locates files by searching each directory in the path to the file each time the file is accessed. On fixed disks with complex directory structures, this can take a large amount of time. FASTOPEN stores in memory the location of directories and recently opened files. When accessing a file, FASTOPEN searches the memory list first; if the file is in the list, it is found very quickly.

Format:

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

Type:

Internal External

Remark:

Specify the parameters:

[*d*:][*path*] before FASTOPEN to specify the drive and the path that contain the FASTOPEN command file.

d: to specify the drive to process. Any fixed disk drives may be used. Drives defined by JOIN, SUBST, or ASSIGN may not be used. Network drives may not be used.

nnn to specify the number of directories or file entries to remember for the drive specified as *d*. If the value is not provided, the default is 34. (The minimum is 10 and the maximum is 999.) The sum of all *nnn* cannot be greater than 999. If *nnn* files are

FASTOPEN

Command

accessed on a drive. The least recently accessed file is removed from the list and replaced by the most recently accessed file. The value *nnn* should be bigger than the system's deepest level of subdirectory. For example:

```
c:\dir1\dir2\dir3...\dir10
```

shows that **DIR10** is the deepest level subdirectory and the value for *nnn* should be greater than 10.

The *d:[=nnn]* parameter may be repeated for each disk on your computer.

FASTOPEN can be used only once. All drives must be defined the first time **FASTOPEN** is used.

Normally **FASTOPEN** is placed in the **AUTOEXEC.BAT** file.

```
AUTOEXEC.BAT
fastopen c:=100
.
.
copy c:\dir1\dir2\dir3\myfile1
copy c:\dir1\dir2\dir3\myfile2
```

On the first copy, the directories **DIR1**, **DIR2**, and **DIR3** are located and remembered; **MYFILE1** is also remembered. On the second copy, directories **DIR1**, **DIR2**, and **DIR3** are found in the **FASTOPEN** list and do not need to be found on the disk; **MYFILE2** is now remembered.

FASTOPEN Command

Note: The number *nnn* is not related to the number of files specified in "FILES=" command.

The optimal number of files specified for FASTOPEN varies depending on your usual operations. If you specify the minimum number of 10, you may not fully and efficiently utilize the FASTOPEN command. If you specify the maximum value of 999, you may have overhead to search through the information stored in memory to find the desired file. To store information on each of the *nnn* directories or files, 35 bytes of system memory are required



GRAPHICS (Screen Print) Command

Purpose:

Allows the contents of a graphics display to be printed on an IBM Personal Computer printer when using a color/graphics monitor adapter and screen.

Format:

[*d:*][*path*]GRAPHICS [*printer type*][*/R*][*/B*][*/LCD*]

Type:

Internal External

Remark:

Specify the parameters:

[*d:*][*path*] before GRAPHICS to specify the drive and path that contains the GRAPHICS command file.

[*printer type*] to specify the type of printer you are using. You can choose from the following types:

COLOR1 - IBM Personal Computer Color Printer with black ribbon (prints up to 4 shades of grey)

COLOR4 - IBM Personal Computer Color Printer with RGB (red, green, blue, black) ribbon

COLOR8 - IBM Personal Computer Color Printer with CMY (black, cyan, magenta, yellow) ribbon

GRAPHICS (Screen Print)

Command

COMPACT - IBM Personal Computer Compact Printer

GRAPHICS - IBM Personal Graphics Printer

GRAPHICS - IBM Proprinter

THERMAL - IBM PC Convertible Printer

If you do not specify a printer type, the default is the GRAPHICS printer.

/R to print black (as seen on the monitor) and white (as seen on the monitor) on the printer. If you do not specify **/R**, the default is to print black as white and white as black.

/B to print the background color. This parameter is only for printer types **COLOR4** and **COLOR8**. If you do not specify **/B**, the default is not to print the background color.

[/LCD] to print the image exactly as it appears on the IBM PC Convertible Liquid Crystal Display.

This command increases the resident size of DOS in memory.

Press the Shift - PrtSc keys to print the screen contents on the printer. If the screen is in text mode, the text is printed in less than 30 seconds. If the screen is in the graphics mode, modes 4, 5, 6 only (see Hardware Technical Reference for more information) each time the PrtSc key is pressed, the following happens:

- In the 320x200 color graphics mode with printer types **GRAPHICS** and **COLOR1**, the screen contents are printed in up to four shades of gray.

GRAPHICS (Screen Print) Command

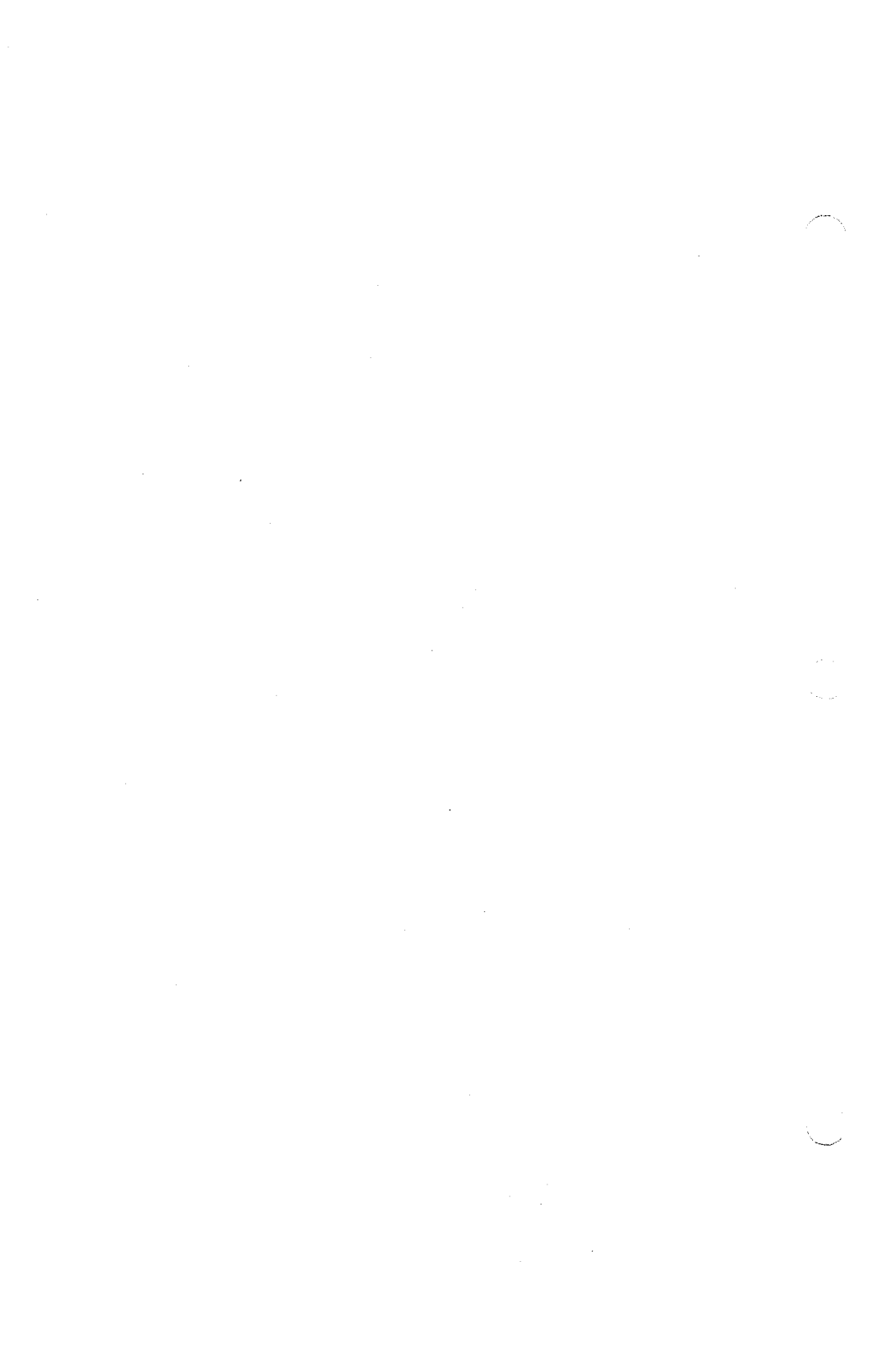
- In the 640x200 color graphics mode, the screen is printed sideways on the paper. The upper right corner of the screen is printed on the upper left corner of the paper.
- Printing may take as long as 3 minutes.
- To invoke the screen print from an assembly language program, use the following coding example:

```
PUSH BP
INT 5
POP BP
```

Examples:

The following example loads graphics support needed to print the screen contents on a COLOR8 printer. The background colors are printed and black prints as black and white as white.

```
A>graphics color8 /b /r
```



SET (Set Environment) Command

Purpose:

This command inserts strings into the command processor's environment. A copy of the entire series of strings in the environment is made available to all commands and applications.

Format:

SET [*name* = [*parameter*]]

Type:

Internal External

Remark:

The entire string (beginning with *name*) is inserted into a block of memory reserved for environment strings. Any lowercase letters in the name are converted to uppercase letters when added to the environment (including foreign language characters); the remainder of the line is inserted as you typed it. If the name already exists in the environment, it is replaced with the new *parameter*.

If the SET command is typed with no *name* specified, then the current set of environment strings is displayed.

If a *name* is specified, but the *parameter* is not specified, then the current occurrence of *name = parameter* is removed from the environment.

A copy of the environment (series of names and parameters) is made available to all DOS commands and applications (see "Program Segment Prefix" in Chapter 7 of the *DOS Technical Reference*).

SET (Set Environment) Command

Notes:

1. DOS automatically adds any PROMPT or PATH commands to the environment when you enter them. You do not need to use the SET command to add either of these two commands to the environment.
2. One of the strings in the environment (placed there by DOS when it starts up) will always be a COMSPEC = parameter. That parameter describes the path that DOS uses to reload the command processor when necessary. You should always include a drive letter in the path used to describe the location of COMMAND.COM.
3. If you have *not* loaded a program that remains resident (such as MODE, PRINT, or GRAPHICS), DOS expands the environment string area to hold additional strings. If you *have* loaded a program that remains resident, DOS is unable to expand the environment area beyond 127 bytes. If the environment area has already expanded beyond 127 bytes when you load a program that is to remain resident, DOS is unable to expand the environment area beyond that point. The message **Out of environment space** appears if you issue a SET command that would cause the combined environment strings to exceed 127 bytes. The SHELL= command of CONFIG.SYS can be used to increase the environment size.
4. A copy of the environment is saved with terminate and stay-resident programs. Invoking programs with a resident portion (MODE, PRINT, GRAPHICS) before a large environment is set saves usable memory.

SET (Set Environment) Command

5. The value of an environment string can be replaced in any DOS command in a batch file by entering %name%. For additional information refer to Batch File Commands, "Using Environment Variables" in this chapter.

Examples:

This example adds the string PGMS=\LEVEL1 to the environment. When an application program receives control, it could search the environment for the name PGMS, and use the supplied parameter as the directory name to use for its files:

```
set pgms=\level1
```

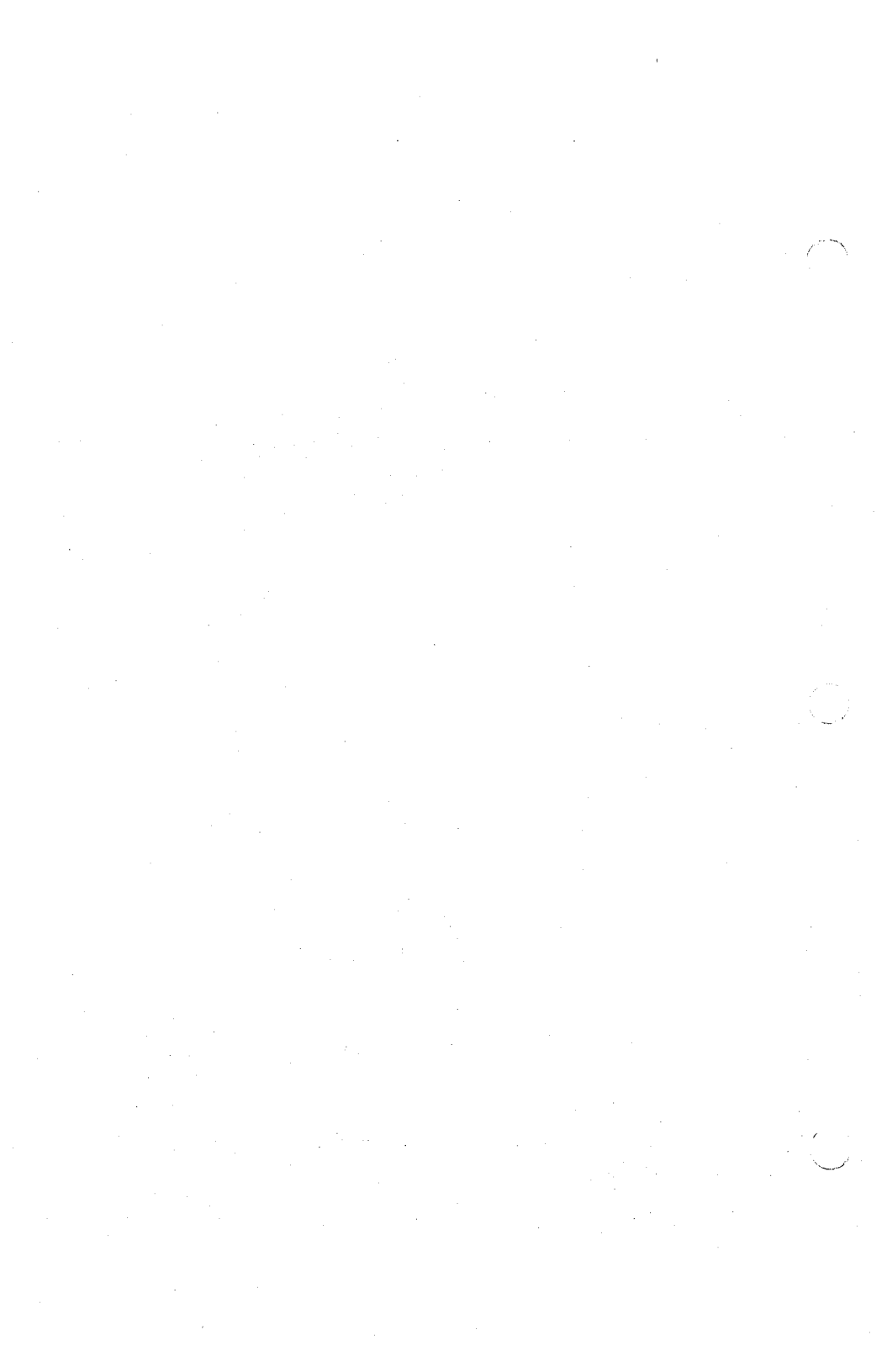
The following example removes PGMS=\LEVEL1 from the environment:

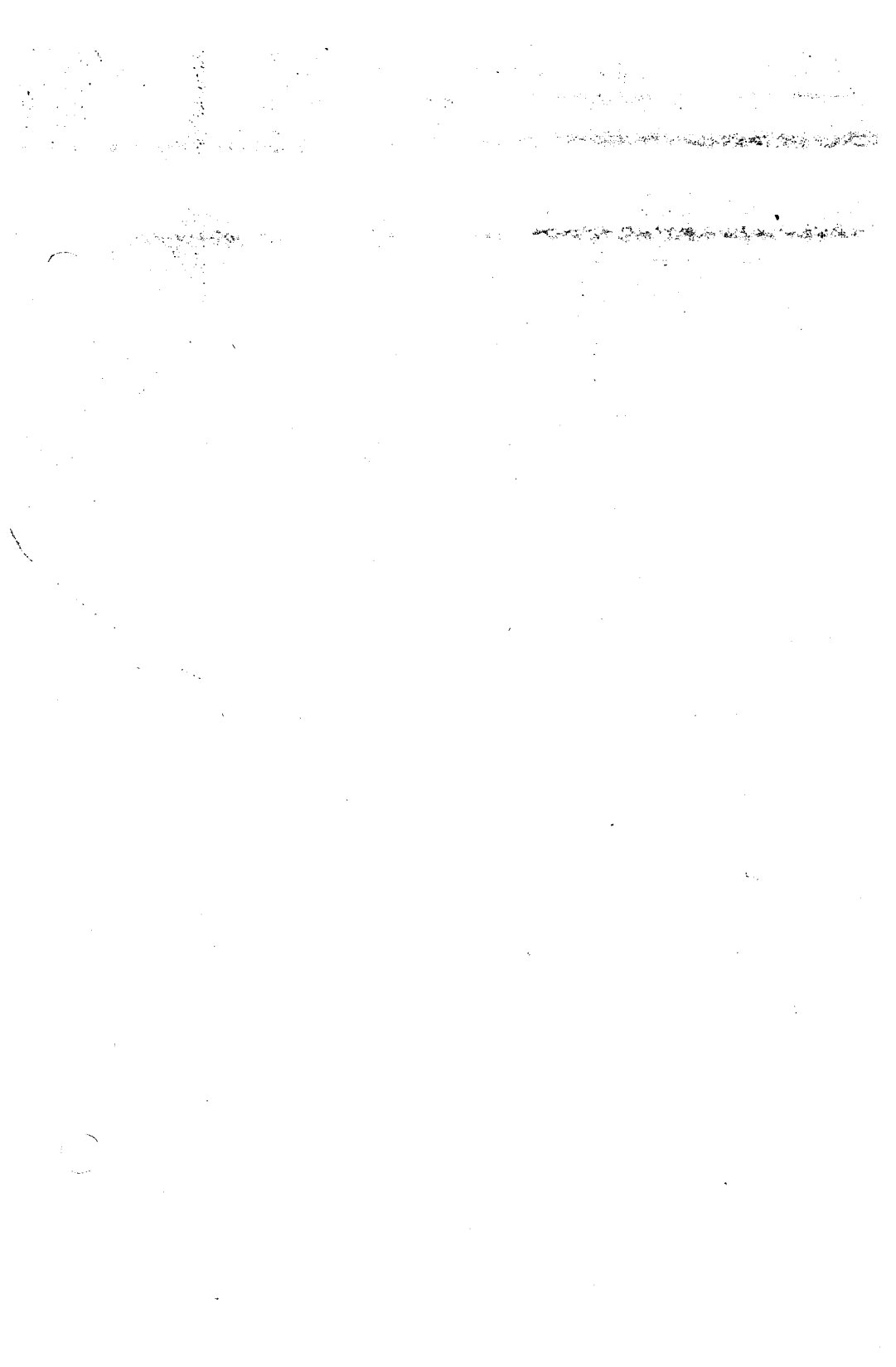
```
set pgms=
```

You can select the strings in the environment. For example, typing:

```
set abc=xyz
```

adds the string ABC=xyz to the other strings already in the environment (note the conversion of abc to uppercase ABC). In this way, it is possible for you to type keywords and parameters that are not meaningful to DOS, but can be found and interpreted by applications designed to examine the environment.





XCOPY

Command

Purpose:

Selectively copy groups of files, which can include lower level subdirectories.

Format:

```
[d:][path]XCOPY [d:][path] filename[.ext]
[d:][path] [filename[.ext]][/A] [/D][ /E] [/M] [/P]
[/S] [/V] [/W]
```

or

```
[d:][path]XCOPY [d:]path [filename[.ext]]
[d:][path] [filename[.ext]][/A] [/D][ /E] [/M] [/P]
[/S] [ /V] [/W]
```

or

```
[d:][path]XCOPY d:[path] [filename[.ext]]
[d:][path] [filename[.ext]][/A] [/D][/E] [/M] [/P]
[/S] [ /V] [/W]
```

Type:

Internal External

Remark:

Specify the parameters:

[d:][path] before XCOPY specifies the drive and path that contains the command file.

[d:] [path][filename[.ext]] specifies the source drive, file, or directory that you want XCOPY to start with. The source can be a drive, a path, a file name, or any combination of the three.

XCOPY Command

[d:][path][filename[.ext]] specifies the target drive, path, and file name. This is the drive and directory */filename* that XCOPY begins copying files to.

/A Copies only those files which have the archive bit of the attribute set to one.* The attribute of the source file is not changed.

/D Copies files whose date is the same or later than the date specified. Depending on the country code you selected using the **SELECT** or **COUNTRY** commands, specify the date format as:

/D:mm-dd-yy

or

/D:dd-mm-yy

or

/D:yy-mm-dd

/E Creates subdirectories on the target even if they end up being empty after all copying is over. If **/E** is not specified, empty subdirectories are not created.

/M Copies files whose archive bit is set. This option turns off the archive bit of the source file. It also allows XCOPY to be used in a backup procedure. When the archive bit of a file's attribute is one, it means that the file has been created or modified since the last XCOPY **/M** or **BACKUP /M**. You can use the **ATTRIB** command found in this section to change the archive bit.

* i.e. Norton EA + White Cune DiskTool report "Archived" (SDIR reports attribute blank)

XCOPY

Command

/P Prompts you before copying each file. You must respond to a (Y/N?) prompt. XCOPY copies on a file-by-file basis instead of a multi-file-copy.

```
d:path\filename.ext (Y/N)?
```

/S Copies files in the source directory and in all directories below the starting source directory; and causes XCOPY to travel the tree. /S does not create an empty subdirectory on the target (unless /E is also specified). If you omit the /S parameter, XCOPY works only within a directory.

/V Causes DOS to verify that the sectors written on the target diskette are recorded properly. This option has been provided so you can verify that critical data has been correctly recorded. This option causes the XCOPY command to run more slowly, due to the additional overhead of verification.

/W Instructs XCOPY to wait for you to insert diskettes, before beginning to search for source files. The following message is displayed:

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

Notes:

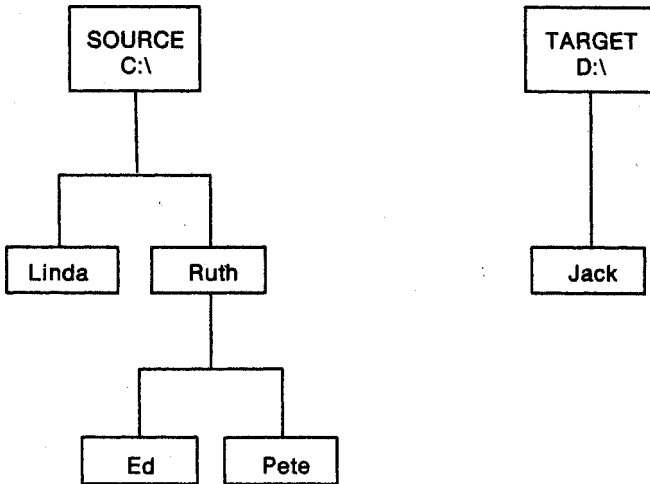
1. If a path is not specified, XCOPY starts from the current directory.
2. The default file name is *.*.
3. If the specified target path does not exist on the target, XCOPY creates the directories before copying files to the target.

XCOPY Command

4. You can specify the target file names just like the COPY command. This allows you to rename files on the target.
5. XCOPY does not support copying from or to the reserved device names, CON, LPT1.
6. The drive path, file name, and file name extension string cannot be longer than 63 characters. XCOPY does not support any path longer than 63 characters (starting from the root directory) at any time while searching or copying.
7. XCOPY cannot copy hidden or deny-read files from the source, and cannot copy to read-only or deny-write files on the target.
8. Do not use the XCOPY command while APPEND is in effect.

Examples:

Suppose you have the following tree structures, "C:\\" as source and drive D with "D:\\" as the target.

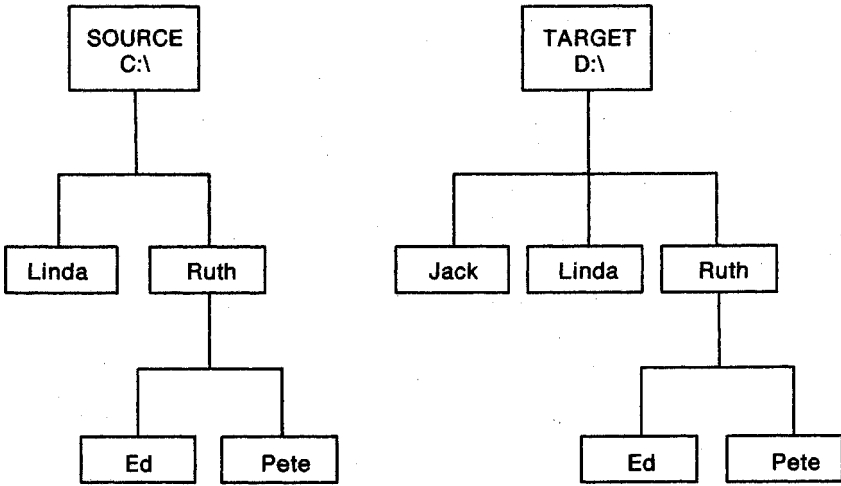


XCOPY Command

Example 1

XCOPY C:\ D:\ /S

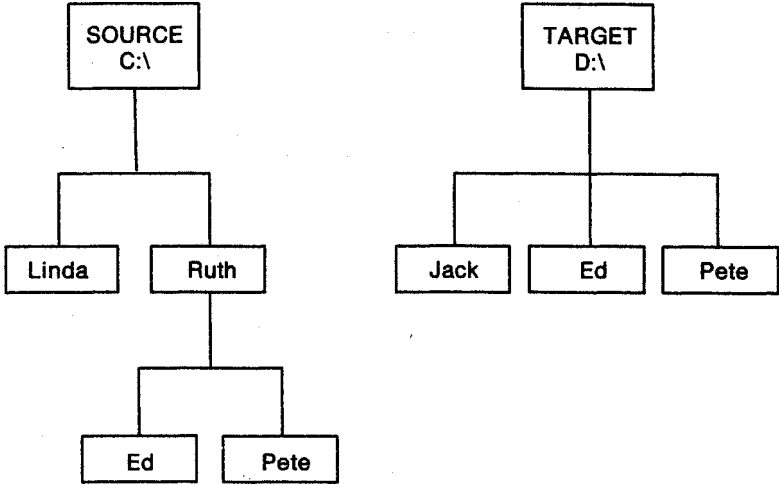
In this example the specified source and target starting directory names are the same. The root directory in the target already exists. The result is:



Example 2

XCOPY C:\Ruth D:_ /S

The result is:



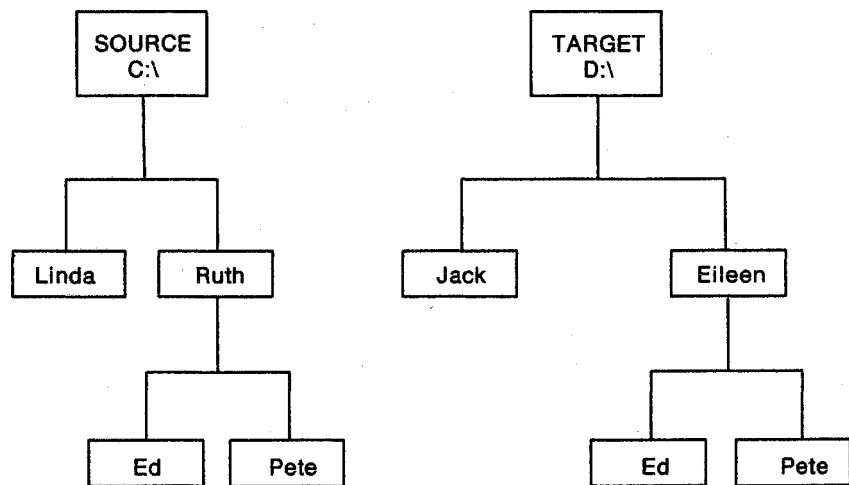
XCOPY

Command

Example 3

```
XCOPY C:\Ruth D:\EILEEN /S
```

The result, a directory called EILEEN, has been created on Drive D. Directories ED and PETE have been transferred with their contents.



```
XCOPY C:\ C:\
or
XCOPY C:\RUTH C:\RUTH
```

XCOPY issues "Access denied" (or "File cannot be copied onto itself").

XCOPY Command

```
XCOPY C:\ C:\RUTH /S
```

Since the starting source directory is one of the members of the parents of the target starting directory, XCOPY issues a message **Cannot perform a cyclic copy.**

Note: Use the /S and /M options when there is a need to use XCOPY to copy several directories or an entire disk to diskettes with insufficient space. This is an exhaustive backup. When the target diskette is full, the system shows **Insufficient disk space.** and finishes. Insert another diskette and execute the same XCOPY command as previously entered. Repeat until no **Insufficient disk space** message appears, and all the files and subdirectories have been copied to the diskettes. Remember that the archive bit of the source file has been modified (turned off). Unlike the BACKUP command, the exhaustive backup scheme lacks the ability to copy a file which is larger than the available size of the target itself.



	AU	Capacity	
		A	B
C: BOOT START UTILS	1	1108	
D: MS DOS UTILITIES	1	4048	
E: WORDPROC COMMUN	2	8096	
F: GRAPHICS GAMES	4	16192	
G. SPSHEET MISCEL	4	16192	
H: DOCUMENT FILES	8	32384	

PARTITION SIZES

Let R = partition size in R kilobytes

$1024 \cdot R$ = partition size in bytes

$1024 \cdot R / 512 = 2R$ = partition size in sectors



	HEAD	CYLINDERS	Horizontal TRACKS
First	0	0-1023	0-1023
Second	1	0-1023	1024-2047
Third	2	0-1023	2048-3071
Fourth	3	0-1023	3072-4095
Fifth	4	0-1023	4096-5119
Sixth	5	0-1023	5120-6143
Seventh	6	0-1023	6144-7167
Eighth	7	0-1023	7168-8191
Ninth	8	0-1023	8192-9215

PHYSICAL
SECTORS
1-17

~~CLUSTERS~~
2-

~~PHYSICAL~~ C = cylinder # NC = 1024
~~SECTORS~~ H = head # NH = 8

$$C = 0 \dots NC - 1$$

$$H = 0 \dots NH - 1$$

~~VT = vertical track~~

HT = horizontal track VT = vertical track

$$HT = H \cdot NC + C$$

$$VT = NH \cdot C + H$$

Disk Explorer pp 15, 35-37

LOGICAL sector numbered consecutively by cylinder; (logical) clusters numbered by beginning with 200; (logical) clusters numbered consecutively (by cylinder) beginning with 2.



Hard Disk Tool Kit II

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IMPORTANT SOFTWARE DISKETTE INFORMATION

For your own protection, do not use this product until you have made a backup copy of your software diskette(s). The backup procedure is described in the user's guide for your computer.

Please read the DISKID file on your new software diskette. DISKID contains important information including:

- ▶ The part number of the diskette assembly.
- ▶ The software library disk number (for internal use only).
- ▶ The date of the DISKID file.
- ▶ A list of files on the diskette, with version number, date, and description for each one.
- ▶ Configuration information (when applicable).
- ▶ Notes giving special instructions for using the product.
- ▶ Information not contained in the current manual, including updates, any known bugs, additions, and deletions.

To read the DISKID file onscreen, follow these steps:

1. Load the operating system.
2. Remove your system diskette and insert your new software diskette.
3. Enter —

type diskid(cr)

4. The contents of the DISKID file is displayed on the screen. If the file is large (more than 24 lines), the screen display will scroll. Type ALT-S to freeze the screen display; type ALT-S again to continue scrolling.

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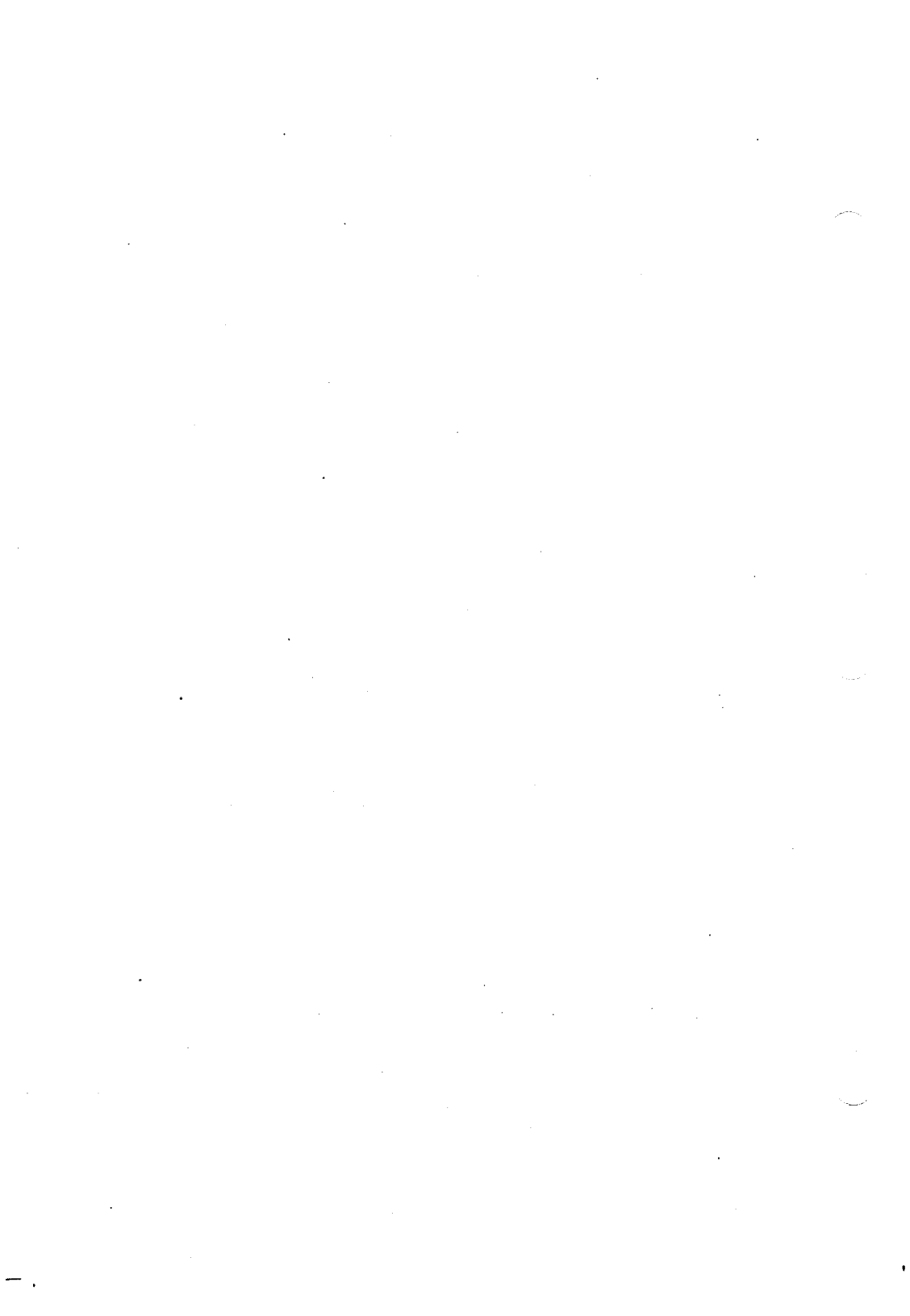
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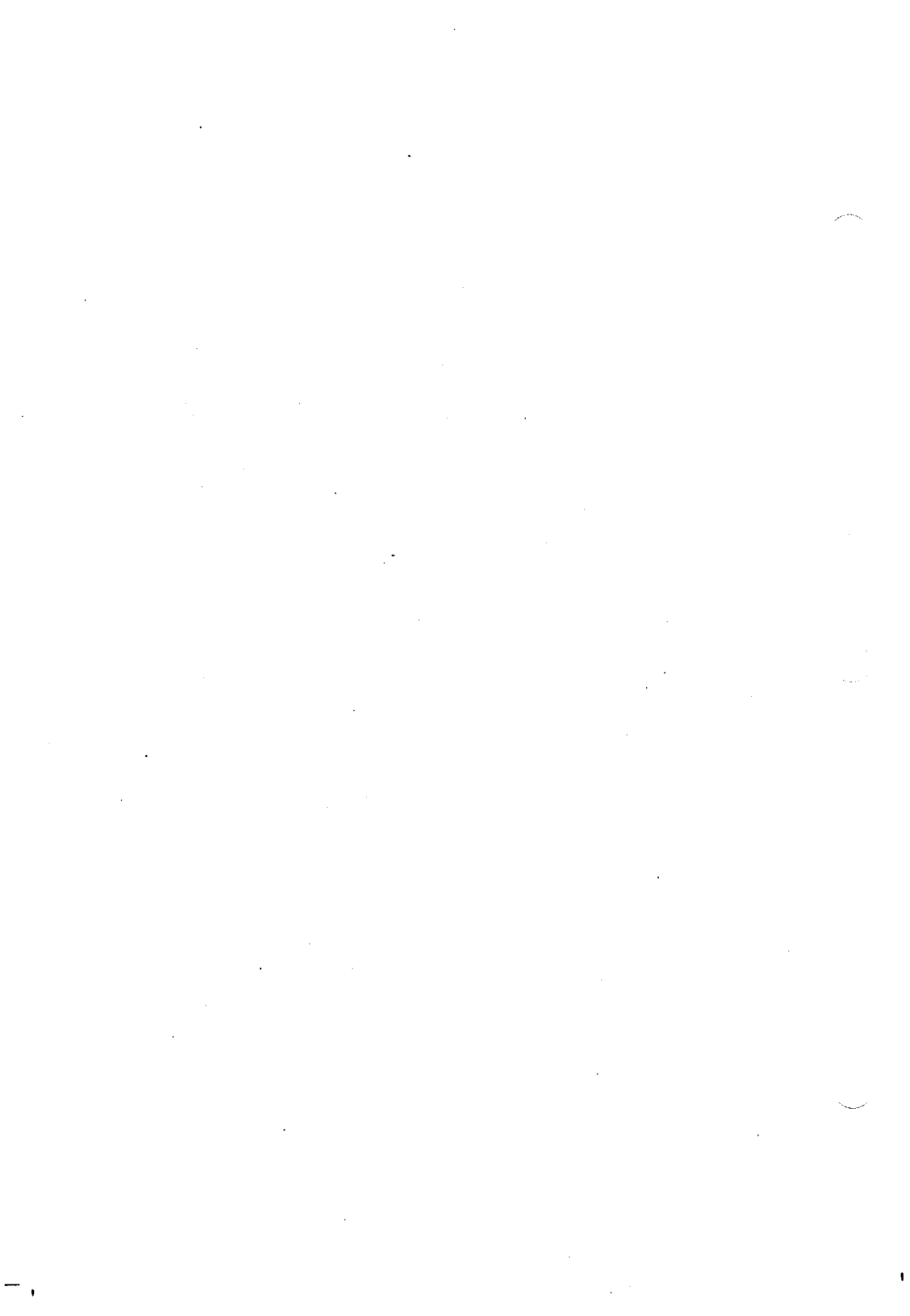


PREFACE

This manual describes how to use these hard disk utilities from the *Hard Disk Tool Kit*:

- ▶ HDSETUP lets you create your own hard disk configuration, review the current configuration, or create a configuration file (used with AUTOSET to configure a hard disk).
- ▶ HDTEST is a hard disk confidence test. Run HDTEST when you first receive the hard disk or any time you suspect hardware errors.
- ▶ HDFIXUP finds, logs, and replaces defective media.
- ▶ HDFORMAT reformats the hard disk. When defects make your hard disk unusable, run HDFORMAT as a last resort before replacing the hard disk. You can also run HDFORMAT on a new hard disk to correct errors that may have occurred during shipment.
- ▶ HDPARK prevents “head crashes” by moving the read/write heads over the innermost cylinder of the drive. You may want to run HDPARK before turning off power to your computer, before moving your hard disk machine, or any time when electrical power is fluctuating or unreliable.
- ▶ HDRESTOR restores the hard disk label from the backup label. Use HDRESTOR if the disk label is damaged or otherwise unusable.

Error messages for these utilities and error codes for the boot ROM are listed in Appendix A.



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1

2

3

4

5

6

A

HDSETUP

HDSETUP.EXE is an MS-DOS utility for setting up or configuring the hard disk. HDSETUP enables you to custom-design your own configuration. In setting up a hard disk with HDSETUP, you can vary volume characteristics such as size and type.

This chapter presents an overview of HDSETUP functions, summarizes HDSETUP operations beginning with the Main menu, and presents step-by-step instructions for each procedure. If you are setting up a new hard disk, you should follow each set of instructions in order as you read this chapter.

HDSETUP OVERVIEW

1.1

You can use HDSETUP to:

- ▶ Set up a new hard disk (divide it into volumes and prepare it for use). Volumes can run under MS-DOS, CP/M-86, UNIX, or OTHER operating systems.
- ▶ Revise volumes on a hard disk that is already set up.
- ▶ Review setup information about existing volumes.
- ▶ Create a .CFG configuration file to use later with AUTOSET, the automatic hard disk configuration utility.

1.1.1 SETTING UP A NEW HARD DISK

There are four major steps in setting up a new hard disk with HDSETUP. Follow them in this order:

1. **Initialize** the hard disk to prepare it for setup.
2. **Configure** the hard disk to divide it into volumes and define volume characteristics.
3. **Assign** drives and designate the boot volume (the volume that boots the system).
4. **Reload** a hard disk operating system to activate the new setup.

You must reload a hard disk operating system, such as the one on the hard disk system diskette. The *Hard Disk Tool Kit* diskette contains a floppy disk operating system. If you reboot a floppy disk OS and try to access the hard disk using any MS-DOS command or utility not specifically designed for the hard disk, you get a "Not ready" or a "Bad Label" error message. However, you can load the HDTK diskette to run any of the hard disk utilities, such as AUTOSET, HDSETUP, and HDFORMAT.

After you set up the hard disk with HDSETUP or AUTOSET, use the SYS utility to copy a hard disk operating system onto the boot volume. (SYS.EXE is described in the *MS-DOS User's Guide* and in the *Hard Disk User's Guide*.) Make sure you copy a hard disk operating system, not a floppy disk operating system. Once a hard disk OS is on the boot volume, the system can boot automatically from the hard disk.

USING HDSETUP WITH A CONFIGURED HARD DISK

1.1.2

Once your hard disk is set up, you can use HDSETUP to:

- ▶ View the current configuration
- ▶ Delete existing volumes
- ▶ Create new volumes
- ▶ Change drive assignments

After you delete or create volumes or change drive assignments, you must reload a hard disk operating system to make the changes effective. Make sure that a hard disk OS diskette (not the HDTK diskette) is in the default drive before you reboot. For most configuration changes, HDSETUP prompts you to reboot by pressing any key. You can also reload by pressing the reset button.

CREATING AN AUTOSET FILE WITH HDSETUP

1.1.3

AUTOSET.EXE uses a .CFG file (rather than user input) to configure a hard disk. You can use any of the .CFG files that accompany AUTOSET, or you can use HDSETUP to create a custom .CFG file of your own. When you create an AUTOSET file, your keystrokes are stored in that .CFG file, and no changes are made to the hard disk until you run AUTOSET with that file. The *Operator's Reference Guide II* describes how to use AUTOSET.

Every .CFG file created with HDSETUP must go through the first three steps in setting up a new hard disk (initialize, configure, and assign). HDSETUP ignores the existing configuration of your hard disk, and creates a new hard disk configuration in the .CFG file. Therefore, when you run HDSETUP to create an AUTOSET file, you cannot view the current hard disk configuration. Instead, you see the new configuration in the AUTOSET file.

Also, if you press F3 (CONFIG) before you press F5 (INIT) you get an error message telling you that the hard disk has not been initialized. This error occurs because the AUTOSET file must go through the steps in order, starting with initialization.

1

1.2 HDSETUP OPERATION

HDSETUP is a menu-driven program. A menu line at the bottom of the screen displays the current set of choices (HDSETUP operations). Each operation is listed with the number of one of the function keys (F1 through F7) located at the top of the keyboard. You perform an HDSETUP operation by pressing the correct function key.

When you load HDSETUP, you start at the Main menu, shown in Figure 1-1. From there you use the top-row function keys to enter other menus where you can perform the HDSETUP functions. The other menus are named for their functions—Configure, Assign, and Init (Initialize). For example, you press F3 (CONFIG) at the Main menu to enter the Configure menu and display the current configuration.

1.2.1 ONSCREEN HELP

HDSETUP has three kinds of help:

- ▶ **PROMPT LINE.** The top line of the screen displays the name of the current menu and gives a one-sentence instruction about what to do next. For example, the prompt line for the Main menu tells you to select the Menu you want to work with:

MAIN MENU Select Menu with Function Keys HDSETUP ver 2.32

- ▶ **MENU LINE.** The bottom line of the screen displays the current value of the seven top-row function keys. For example, the menu line for the Main menu is:

1 CANCEL	2 DONE	3 CONFIG	4 ASSIGN	5 INIT	7 HELP
----------	--------	----------	----------	--------	--------

The menu line always tells you the operation performed by each function key on the current menu.

- ▶ **HELP SCREENS.** Pressing key F7 always displays a HELP screen explaining your options. Different HELP screens are displayed for every step in the HDSETUP program.

Some HDSETUP procedures are complex. If you need assistance, consult the three kinds of onscreen help available to you: prompt line, menu line, and HELP screens.

PERFORMING HDSETUP FUNCTIONS 1.2.2

To perform most HDSETUP functions, you press function keys located at the top of the keyboard. Each menu line tells you the function performed by each key. For example, F7 is always the HELP key, and F1 is always the CANCEL key. F7 displays a HELP screen that tells you what to do next. F1 takes you back to the previous menu or to the beginning of the step you are doing.

On some menus you use the cursor keys to move a highlighted block that indicates where to make your next choice. Then you either type in a value (such as a volume name) or use the function keys to choose the action you want performed (such as CHANGE or DELETE).

1.3 LOADING HDSETUP

The HDSETUP utility is the file HDSETUP.EXE on the *Hard Disk Tool Kit* diskette. To load the HDSETUP program, first load MS-DOS by inserting the HDTK diskette and pressing the reset button if necessary.

Unless you are creating an AUTOSET file, load HDSETUP by typing:

```
hdsetup(cr)
```

To create an AUTOSET file, load HDSETUP by typing:

```
hdsetup filespec(cr)
```

where *filespec* is the name of the configuration file you want to create. HDSETUP assigns a .CFG file extension even if you give another extension.

After you load HDSETUP, the Main menu appears.

1.4 THE MAIN MENU

Figure 1-1 shows the HDSETUP banner and Main menu.

The Main menu function keys do these functions:

- ▶ **F1 - CANCEL:** Cancel any changes made during this HDSETUP session. When you press F1, you are asked "ARE YOU SURE?" Press F2 for "yes" (cancel changes and return to MS-DOS). Press F3 for "no" (return to the Main menu).

Figure 1-1: HDSETUP Main Menu

MAIN MENU Select Menu with Function Keys HDSETUP ver 2.32

HARD DISK SETUP UTILITY ver 2.32

To set up, review, or revise your hard disk
operating environment.

ALT.C TO ABORT

1-CANCEL 2-DONE 3-CONFIG 4-ASSIGN 5-INIT 6- 7-HELP

- ▶ **F2 - DONE:** Log the changes made during this HDSETUP session. F2 either writes the configuration to disk or records the configuration in an AUTOSET file. No HDSETUP functions are performed on disk until you press F2 at the Main menu. Then HDSETUP checks your drive assignments for validity:
 - If drive assignments are valid, you return to MS-DOS, or a screen appears prompting you to reboot the system.
 - If invalid drive assignments are found, an error message appears and you return to the Main menu. Press F4 to go to the Assign menu, where you can correct the invalid assignments.

- ▶ **F3 - CONFIG:** Go to the Configure menu, where you can create or delete volumes or view setup information about existing volumes.
- ▶ **F4 - ASSIGN:** Go to the Assign menu, where you can designate a boot volume and assign drive names to the volumes and drives in your system. You can also view existing drive assignments.
- ▶ **F5 - INIT:** Go to the Initialize menu, where you can initialize the hard disk (the first step in preparing it to accept data).

CAUTION:

Initializing will destroy data already stored on the hard disk (unless you are creating an AUTOSET file). Use F5 only if you are setting up a new hard disk or creating an AUTOSET file.

- ▶ **F7 - HELP:** Display a short description of HDSETUP operation. HELP screens are different for each menu and for each task.
- ▶ **ALT-C - ABORT:** Exit from HDSETUP without making any changes to the hard disk. For example, you should type ALT-C if your keyboard configuration is not compatible with this program (i.e., the function keys do not operate as described). The "soft keyboard" is part of the operating system; you must load a standard version of MS-DOS to use HDSETUP.

To set up your new hard disk configuration, you must press F2 (DONE) at the Main menu when you finish using HDSETUP. No changes are made to your hard disk configuration until you press F2 (DONE).

The Main menu functions are described in more detail in the following sections.

A new hard disk must be initialized before it can be configured and used for data storage. Initialization creates a single large volume the size of the hard disk. Initializing is usually done only once—when you first set up your hard disk. If you have already set up your hard disk and now want to change the configuration or volume assignments, you do not have to reinitialize the disk. Reinitializing a hard disk that contains data destroys the data.

When creating an AUTOSET file, you must start by going through the steps for initializing. The hard disk is not initialized, however, until you run AUTOSET with the configuration file you created with HDSETUP.

Follow these three steps to initialize the hard disk:

1. Press F5 (INIT) at the Main menu.
2. A warning message and a new menu appear (Figure 1-2). HDSETUP warns you that initializing destroys the disk contents.
3. HDSETUP asks you to type the number of the hard disk to be initialized.

The internal hard disk (or any disk with controller 0) is always disk number 0. Most external hard disks (or any disks with controller 1) are disk 2. Some early external models are controller 0 and are therefore disk 0. (The controller number is shown on the strapping for an external hard disk. Controllers 2, 3, and so on are drives 4, 6, and so on.)

The default 0 is shown on the screen. Type the number of your hard disk if it is not 0.

*Folowin's Victor's External hard disks
both are disk 0.*

*Physical setup is as if disk was internal.
Disk number has nothing to do with floppy.*

Figure 1-2: Initialize Menu

INIT.MENU type in Drive No. (Default = 0) HDSETUP ver 2.32

1

THIS OPERATION WILL DESTROY THE DISK CONTENTS

DO YOU STILL WANT TO DO THIS?

CANCEL: DO NOT initialize the Drive & Volume Labels of the Disk Drive
INIT: INITIALIZE the labels of the currently specified Disk Drive

Input a number to specify the Disk Drive if you are initializing
a drive other than the default drive (= 0).

Current Drive to Initialize: 0

1-CANCEL **2-INIT.** **3-EXIT** **4-HELP** **5-QUIT** **6-REBOOT** **7-HELP**

4. Press F2 (INIT) to log the initialization and return to the Main menu. (F1 returns you to the Main menu without logging the initialization.)

After you log the initialization, you can create volumes as described in Chapter 1.6. Changes are made to the hard disk after you finish the HDSETUP process. Therefore, the hard disk will not be initialized until you press F2 at the Main menu.

CONFIGURING (CREATING AND DELETING) VOLUMES

1.6

To configure volumes (or to record a configuration if you are creating an AUTOSET file), first press F3 (CONFIG) at the Main menu. The Configure menu and a volume list appear.

1

Figure 1-3 shows the Configure menu for an unconfigured hard disk. The prompt line at the top reads: Divide Hard Disk into Volumes. Below this is a list of the volumes on the disk. The volume list has these headings:

- ▶ DISK—the disk number (0 for an internal disk, and 2 for an external disk). *Folger Machines A & B: Disk number 0*
- ▶ TYPE—volume type (the operating system used with the volume—MS-DOS, CP/M-86, UNIX, or OTHER.)
- ▶ NAME—volume name. By default, volumes are numbered starting with 1, but you can also create your own volume names 1 to 11 characters long.
- ▶ CAPAC—volume capacity in Kbytes. The minimum is 20 Kbytes. (1 Kbyte is 1024 bytes.)
- ▶ DIR—number of directory entries (files that can be stored in the root directory of the volume).
- ▶ AU—size (in Kbytes) of the allocation unit (AU) for the volume. AUs are described in Chapter 1.6.3.

If you have not yet created volumes, the volume list shows only a single FREE volume the size of the total capacity of the hard disk (see Figure 1-3). For a configured hard disk, the volume list should include all the volumes currently set up:

Figure 1-3: Main Configure Menu

CONFIGURE MENU Divide Hard Disk into Volumes H0SETUP ver 2.32

<u>DISK</u>	<u>TYPE</u>	<u>NAME</u>	<u>CAPAC</u>	<u>DIR</u>	<u>AU</u>
0	FREE		10318		

1

2-DONE **3-ADD** **4-DELETE** **7-HELP**

You are now ready to create a volume (Chapter 1.6.1) or delete an existing volume (Chapter 1.6.2). If you are creating an AUTOSET file, go to Chapter 1.6.1. If you don't want to add or delete volumes, press F2 (DONE) to return to the Main menu.

To create a new volume (or to record volume creation in an AUTOSET file), you must start with a FREE or unconfigured volume. If the Configure menu does not list a FREE volume, you can create one by deleting an existing volume, as described in Chapter 1.6.2. Deleting a volume, however, destroys any files on the volume.

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Follow these twelve steps to create new volumes:

1. At the Configure menu (Figure 1-3), use the down-cursor key to move the cursor to the FREE volume. If you are setting up a new hard disk, the cursor is already at the FREE volume.
2. Press F3 (ADD) to add the FREE volume to the volume list.
3. Default values for the volume characteristics appear (Figure 1-4). The first choice you can make (TYPE) is highlighted (MS-DOS), and the prompt line reads: Space Bar Toggles Type Value.

*Figure 1-4: Configure Menu #2
(Defining a Volume)*

CONFIGURE MENU		Space Bar Toggles Type Value	HOSETUP ver 2.32		
<u>DISK</u>	<u>TYPE</u>	<u>NAME</u>	<u>CAPAC</u>	<u>DIR</u>	<u>AD</u>
0	MSDOS	VOLUME 1	10318	322	32

1-CANCEL **2-CONFIG** **7-HELP**

If you want to accept the default values, skip to step 8. To change the default values, go to step 4.

4. Pressing the Space bar changes the volume type from MS-DOS to UNIX to CP/M to OTHER. (This chapter gives the steps for setting up only MS-DOS on your hard disk. For your reference, however, the next paragraphs and figures describe and illustrate the screen displays for setting up CP/M, UNIX, and OTHER operating systems.)

For CP/M, you can choose only NAME and CAPAC characteristics (see Figure 1-5).

*Figure 1-5: Configure Menu #3
(Selecting CP/M Type)*

CONFIGURE MENU		Space Bar Toggles Type Value			HDSETUP ver 2.32	
DISK	TYPE	NAME	CAPAC	DIR	AU	
0	CP/M	VOLUME 1	10325			

1

1-CANCEL 2-CONFIG ?-HELP

For UNIX, the default NAME is SWAP, a required volume name. Other choices for UNIX volumes are listed at the right of the screen (see Figure 1-6). You must select one of the listed names. When you choose CAPAC, a minimum volume size is shown at the right of the screen (Figure 1-7). Because the last two headings (DIR and AU) are not assignable, they are blank.

*Figure 1-6: Configure Menu #4
(Choosing UNIX Volume Name)*

CONFIGURE MENU Move Cursor to Choose Unix Name H0SETUP ver 2.32

<u>DISK</u>	<u>TYPE</u>	<u>NAME</u>	<u>CAPAC</u>	<u>DIR</u>	<u>AU</u>
0	UNIX	SWAP	10325		

Unix Names

SWAP
HD0
HD1
HD2
HD3
HD4
HD5
BOOT

1-CANCEL **2-CONFIG** **3-...** **4-...** **5-...** **6-...** **7-HELP**

*Figure 1-7: Configure Menu #5
(Choosing UNIX Volume Capacity)*

```
CONFIGURE MENU          Type in Volume Capacity (KBytes)          HDSETUP ver 2.32
-----
DISK  TYPE  NAME  CAPAC  DIR  AU
  0   UNIX  SWAP  10325
```

1

```
Minimum Size Req:
  1000 KB
```

```
1-CANCEL  2-CONFIG  [ ]  [ ]  [ ]  [ ]  7-HELP
```

For any other operating system (OTHER), the prompt line asks you to input a TYPE number. If you have a special operating system, the developers of that OS should give you a number to input for the TYPE value. The number you type is shown in the special OS NUM VAL field at the lower right of the screen, shown in Figure 1-8.

*Figure 1-8: Configure Menu #6
(Inputting Special TYPE Value)*

```

CONFIGURE MENU      Input Numeric OS Type Value (4-9)      HDSETUP ver 2.32
-----
DISK  TYPE  NAME  CAPAC  DIR  AU
  0   OTHER VOLUME 1  10318

```

```

OS NUM VAL
  4

```

```

1-CANCEL  2-CONFIG  .....  .....  .....  .....  7-HELP

```

In all following examples in this manual, all volumes are the default volume type (MS-DOS).

5. Move to the NAME column using the cursor keys. The default volume name appears inside the highlighted window. To accept the default (as shown in Figure 1-4), go to step 6. To change the volume name, type the new name over the old one. (Volume names are for your convenience only.)

- 6. Move to the CAPAC and DIR columns in turn by using the cursor keys. To change the capacity or directory value, type the new value. In Figure 1-9, the capacity for volume 1 is set at 5000 Kbytes, and the directory size is 212 entries.
- 7. To change the AU value, first use the cursor keys to highlight the AU field. A list of possible AU sizes appears on the right of the screen, and the default value (16) is highlighted. (See Chapter 1.6.3 for a description of AUs.)
- 8. Use the up- and down-cursor keys to highlight the AU value you want. Log that value by moving left or right (out of the AU list). In Figure 1-9, the chosen AU size is 8K.

Figure 1-9: Configure Menu #7 with AU Window

CONFIGURE MENU		Select Allocation Unit Size				HDSETUP ver 2.32
DISK	TYPE	NAME	CAPAC	DIR	AU	AU
0	MSDOS	VOLUME 1	5000	212	16	64
						32
						16
						8
						4
						2

1-CANCEL 2-CONFIG 7-HELP

11. To add another volume, repeat steps 1 through 10.
12. When you finish creating volumes, press F2 (DONE) to log your changes and return to the Main menu.

Figure 1-11 shows the Configure menu for a hard disk configured into two volumes of approximately equal size. To change the hard disk from step 9 in the previous procedure to the status shown in Figure 1-11, you must create volume 2 using the default values for all the characteristics. Do this by moving the cursor to the FREE volume at the Configure menu (shown in Figure 1-10) and pressing F3 (ADD). Next, the configuration must be logged with F2 (CONFIG), followed by another F2 (DONE), both at the Configure menu.

1

*Figure 1-11: Main Configure Menu
after Configuring Two Volumes*

CONFIGURE MENU		Space Bar Toggles Type Value			HDSETUP ver 2.32	
DISK	TYPE	NAME	CAPAC	DIR	AU	
0	MSDOS	VOLUME 1	5000	212	8	
0	MSDOS	VOLUME 2	5318	331	16	

1-CANCEL 2-CONFIG 7-HELP

If you are setting up a new hard disk, your next tasks are to designate the boot volume and to assign drives (Chapter 1.7).

1

1.6.2 DELETING A VOLUME

You need to delete a volume if you want to divide one volume into two or more smaller volumes. Deleting a volume also enables you to change its volume characteristics such as the OS type and the volume capacity.

CAUTION:

If you delete a volume that contains data, your data will be inaccessible. Before you delete the volume, back up any files you want to keep.

To delete a volume, first press F2 at the Main menu to get to the main Configure menu (shown in Figures 1-3 and 1-10). Then follow these steps:

1. Press the down-cursor key to highlight the volume you want to delete.
2. Press F4 (DELETE).
3. A new Configure menu appears and you are asked to verify the deletion. The yes/no prompt is shown in Figure 1-12, where VOLUME 2 is to be deleted.

Figure 1-12: Configure Menu #8 (Deleting a Volume)

CONFIGURE MENU		Verification of Volume Deletion			HDSETUP ver 2.32	
DISK	TYPE	NAME	CAPAC	DIR	AU	
0	MSDOS	VOLUME 1	5000	212	8	
0	MSDOS	VOLUME 2	5310	331	16	

1

ARE YOU SURE?

1-CANCEL 2-YES 3-NO 4- 5- 6- 7-HELP

4. Press F2 (YES) to verify the deletion. If you do not want to delete the volume, press F1 (CANCEL) or F3 (NO) to return to the main Configure menu.
5. The main Configure menu appears. The deleted volume is now listed as FREE, as in Figure 1-10.
6. Press F2 (DONE) to log the deletion. The Main menu reappears.

NOTE: If you delete a volume that is assigned to a drive, you must also reassign the drive. Chapter 1.7 tells how to change a drive assignment.

1.6.3 ALLOCATION UNITS

Allocation units (AUs) are the building blocks of disk files. All MS-DOS disk files are stored in AU-size blocks, and the minimum file size is one AU. If the size of a file exceeds the size of an AU by a single byte, an additional AU is needed to store the file.

The AU size can be 1K, 2K, 4K, 8K, 16K, 32K, or 64K. The minimum allowable AU size increases with volume size. The smaller AU sizes may not be available if your volume is large.

The operating system uses more memory to store files when the AU size is small. Also, efficient use of disk space depends on the AU size you choose. Larger AUs can waste disk space if most of your files are too small to fill each AU-size block. When copying files to or from diskette, keep in mind that the AU size for floppy diskettes is 4K.

When choosing the AU size, consider the average size of the files on the volume and the amount of disk space left unused by unfilled AUs. If most of your files are small (less than 20 or 30K) you should select a smaller AU size, such as 4K. For large files (over 100K), use a larger AU, such as 16K. If you have only a few files but they are exceptionally large (over 200K), you can probably use an even larger AU.

1.7 DESIGNATING THE BOOT VOLUME AND ASSIGNING DRIVES

After you create volumes on a new hard disk (or in an AUTOSET file), you must designate the boot volume and assign drive names to the volumes.

Designating the **boot volume** means selecting the volume that boots the hard disk (loads the operating system). You must copy a hard disk OS onto this volume using the SYS utility. If your system contains more than one hard disk, the primary boot volume must be on the first disk

controller. The first or only disk is either disk 0 or 2 (see explanation of controller and disk numbers in Chapter 1.5).

Assigning drives means giving each volume a drive name, such as A, B, C, and so on. You assign drives in alphabetical order (A through P).

To begin the assignment procedures, first press F4 (ASSIGN) at the Main menu. The Assign menu and its three lists appear, as shown in Figure 1-13:

- ▶ **VOLUMES**, on the left, lists the volume names. Only MS-DOS volumes appear, and only MS-DOS volumes can be assigned to drives with HDSETUP.
- ▶ **BOOT VOLUME**, at the top right, shows the boot volume name. If no boot volume has been designated, this field is filled with asterisks.
- ▶ **ASSIGNMENTS**, below the boot volume field, shows drive assignments from A to P. If you haven't assigned drives, the assignment list is blank. (You do not have to use all the assignments in the list.)

Figure 1-13 shows the screen for this step. Two volumes are listed, but neither has been designated as the boot volume or assigned to drives.

Figure 1-13: The Main Assign Menu

```
ASSIGN MENU          Keep or Change HD Boot Volume ?      HDSETUP ver 2.32
-----
 1
  VOLUMES
  LEFTFLOPPY
  RIGHTFLOPPY
  0 VOLUME 1
  0 VOLUME 2

  BOOT VOLUME
  *****

  ASSIGNMENTS
  A:
  B:
  C:
  D:
  E:
  F:
  G:
  H:
  I:
  J:
  K:
  L:
  M:
  N:
  O:
  P:

 1-CANCEL  2-KEEP  3-CHANGE  .....  .....  .....  7-HELP
```

SUMMARY OF ASSIGN MENU TASKS

1.7.1

To designate a boot volume and assign drives, you perform three basic procedures, in this order:

- ▶ Decide whether to keep or change the boot volume. If no boot volume has been designated and you want to have an MS-DOS boot volume, you must elect to “change” it.
- ▶ Select the assignment(s) you want to change or delete.
- ▶ Select new volumes or drives for each assignment you want to change.

1

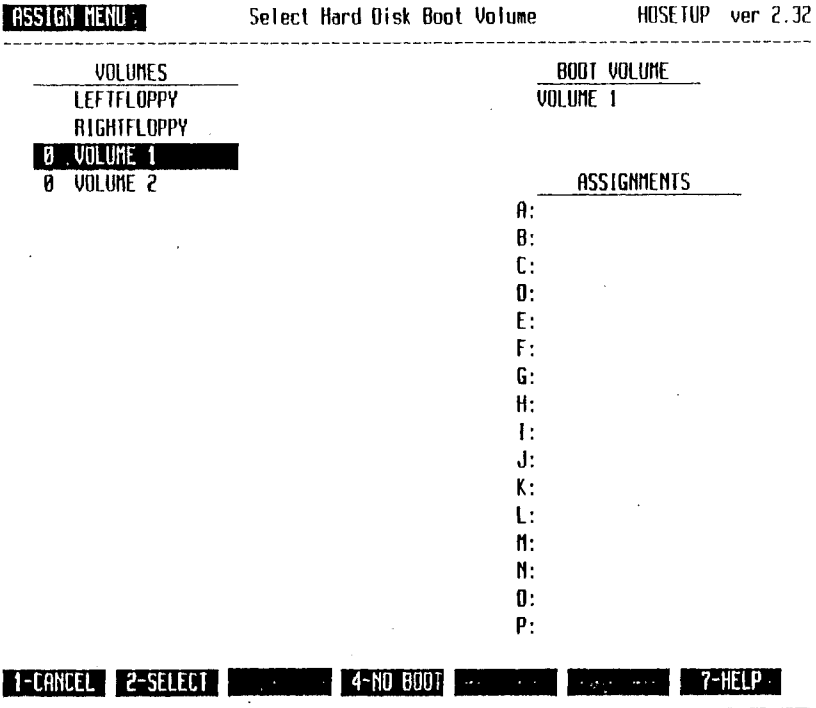
PROCEDURE FOR ASSIGN MENU TASKS

1.7.2

Start at the main Assign menu, shown in Figure 1-13. Follow these thirteen steps to designate the boot volume and assign drives:

1. The prompt line asks: Keep or Change HD Boot Volume? If you want to keep the current boot volume (for a hard disk that is already set up), press F2 (KEEP) and skip to step 5, assigning drives. To assign a new boot volume, press F3 (CHANGE).
2. A new menu line appears, and the name of the first hard disk volume in the volume list is highlighted. For a new hard disk, the same name appears under the boot volume heading at the right of the screen (Figure 1-14).

Figure 1-14: Assign Menu #2 (Selecting a Boot Volume)



- Use the cursor keys to highlight the volume you want to be the boot volume. You can change an existing boot volume to none by pressing F3 (CHANGE) followed by F4 (NO BOOT). If all the volumes do not fit on the screen, keep pressing the down-cursor key to reach volumes not shown.
- Press F2 (SELECT) to log your boot volume choice.
- The prompt line reads: Cursor to Drive Assignment to Modify. The space beside (drive) A: in the assignment list is now highlighted, and a new menu line appears (Figure 1-15).

Figure 1-15: Assign Menu #3 (Assigning Drives)

ASSIGN MENU Cursor to Drive Assignment to Modify HDSETUP ver 2.32

VOLUMES
LEFTFLOPPY
RIGHTFLOPPY
0 VOLUME 1
0 VOLUME 2

BOOT VOLUME
VOLUME 1

1

ASSIGNMENTS
A: **██████████**
B:
C:
D:
E:
F:
G:
H:
I:
J:
K:
L:
M:
N:
O:
P:

1-CANCEL **2-DONE** **3-CHANGE** **4-DELETE** **-----** **-----** **7-HELP**

6. If you haven't assigned drives yet, the assignment list is blank. Press F3 (CHANGE), and go on to step 7.

To keep existing drive assignments (for a hard disk that is already set up), press F2 (DONE) to return to the Main menu.

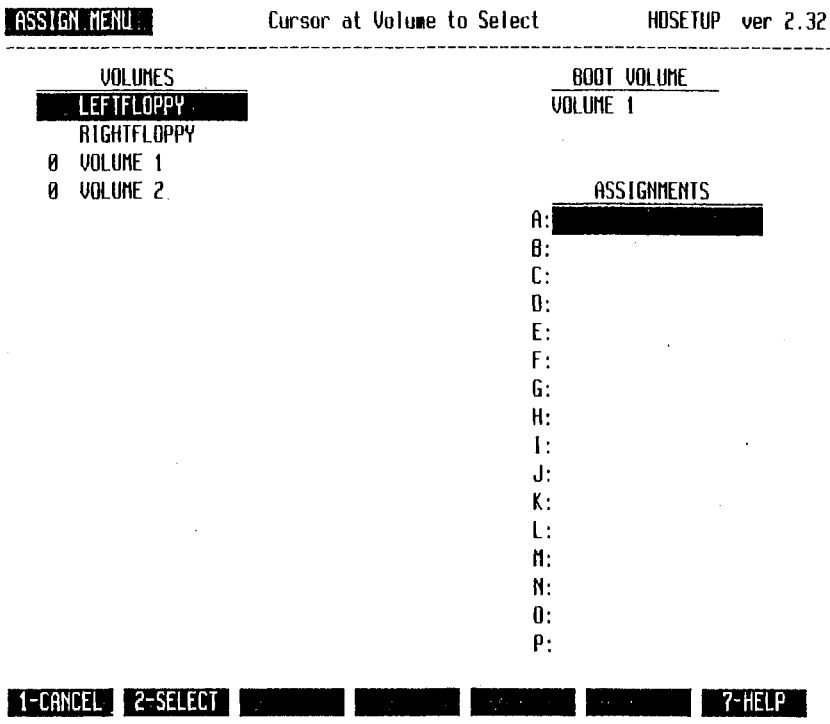
To change an existing drive assignment:

- a. Use the cursor keys to highlight the assignment you want to change.
- b. Press F3 (CHANGE).
- c. The prompt line reads: Cursor at Volume to Select. Use the cursor keys to highlight the volume or drive in the volume list that you want to assign to the highlighted drive name in the assignment list.
- d. Press F2 (SELECT).

To delete the assignment(s) following the highlighted one, press F4 (DELETE). To reassign any of the deleted assignments, move the cursor down to highlight the assignment you want to make, press F3 (CHANGE), and go to step 7.

7. Items on both the volume and assignment lists are highlighted, and a new menu line appears (Figure 1-16). The prompt line reads: Cursor at Volume to Select. In Figure 1-16, no drive assignments have been made.

Figure 1-16: Assign Menu #4 (Selecting a Volume)



- Use the cursor keys to highlight individual names in the volumes list. As each volume or drive name is highlighted, that name appears in the assignment list at the right side of the screen.

Press F2 (SELECT) when the highlighting marks the volume or drive you want for that assignment.

- The previous menu line appears; and only the final entry in the assignment list is highlighted. For this example, volume 1 was selected as the boot volume and assigned to drive A.

10. Move the cursor to the next blank assignment that you want to make, press F3 (CHANGE), and repeat steps 7 to 9.
11. Continue in this way until all the volumes are assigned. Be sure to assign at least one floppy drive also—RIGHTFLOPPY if your computer has an internal hard disk. Figure 1-17 shows a completed assignment list.

Figure 1-17: Assign Menu with Completed Assignment List

```

ASSIGN MENU          Cursor to Drive Assignment to Modify   HDSETUP ver 2.32
-----
          VOLUMES
LEFTFLOPPY
RIGHTFLOPPY
0 VOLUME 1
0 VOLUME 2

          BOOT VOLUME
VOLUME 1

          ASSIGNMENTS
A: 0 VOLUME 1
B:  RIGHTFLOPPY
C: 0 VOLUME 2
D:
E:
F:
G:
H:
I:
J:
K:
L:
M:
N:
O:
P:

1-CANCEL  2-DONE  3-CHANGE  4-DELETE  7-HELP

```

12. Press F2 (DONE) to log your assignments and return to the Main menu.
13. At the Main menu, you must press F2 (DONE) to write your new HDSETUP configuration and assignments to disk (or to an AUTOSSET file).

RELOADING THE OPERATING SYSTEM

1.8

After using HDSETUP to create a new configuration or change drive assignments, you must reload the operating system to activate the new configuration and/or assignments.

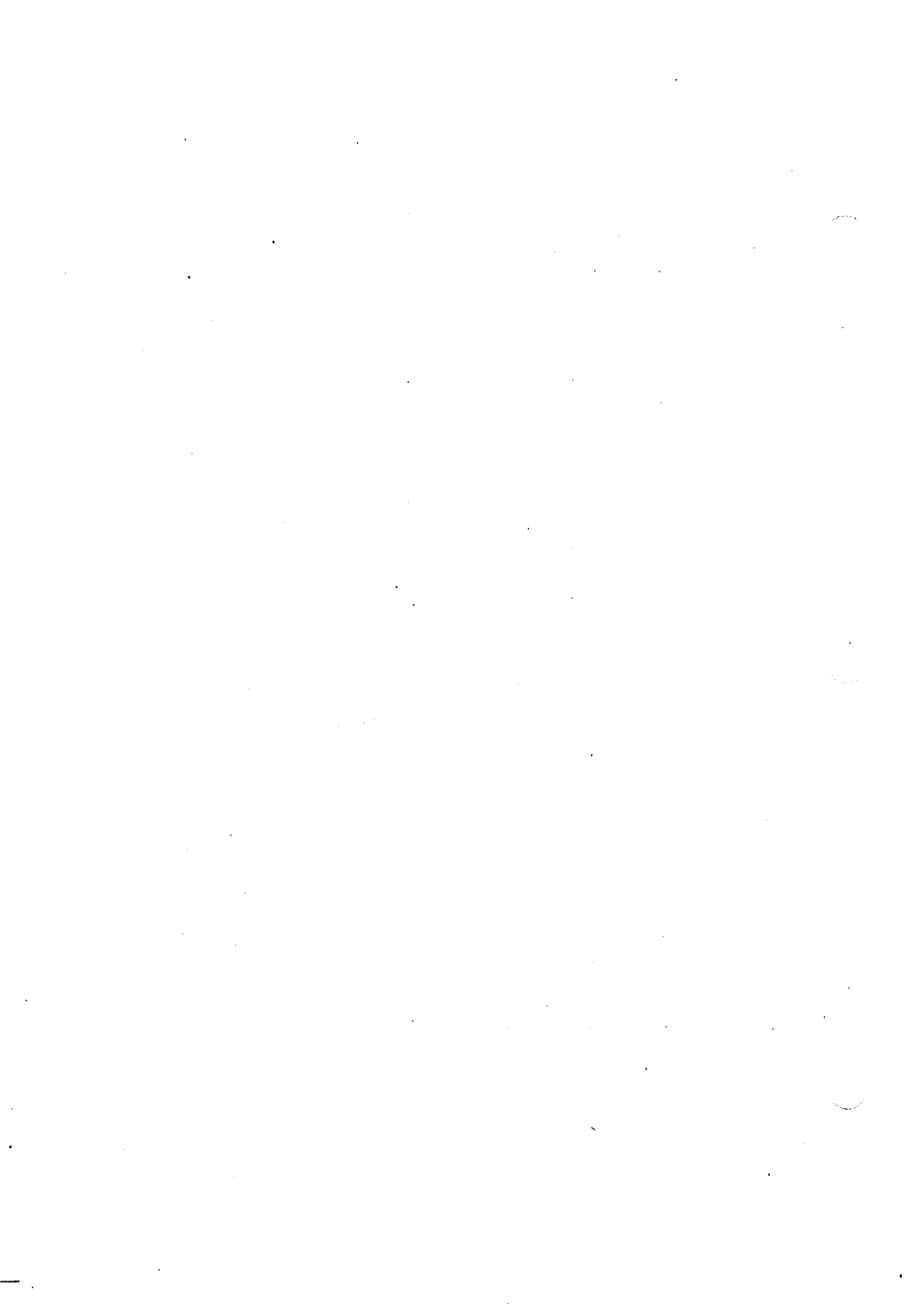
If you initialized the hard disk, HDSETUP displays the message:

Insert a floppy containing a hard disk OS.
Press any key to reboot your system.

Remove the *Hard Disk Tool Kit* diskette if it is in the default drive, and insert a hard disk system diskette. Then press any key (or the reset button) to reload the OS.

Now your newly configured hard disk is ready to use. See Section 1.1.1 "Setting Up a New Hard Disk" for instructions on setting up a boot volume.

If your hard disk was already set up and the boot volume was not changed or deleted during this HDSETUP session, you can simply open the floppy drive door(s) and press any key to reboot from the hard disk.



HDTEST

HDTEST.EXE is a hard disk confidence test. Run HDTEST when you suspect hardware problems (such as damaged tracks) with your hard disk. You can also run HDTEST to check the hard disk when you first receive it. HDTEST does not affect any data stored on the hard disk.

HDTEST OPERATION

2.1

Load HDTEST by typing:

```
hdtest(cr)
```

HDTEST first identifies and reads the drive header label to see whether the drive is a valid drive type. If HDTEST cannot determine the drive type, an error message appears and the program terminates. (HDTEST error messages are given in Appendix A.)

After loading, HDTEST asks for the number of the hard disk controller in your system:

```
HARD DISK CONFIGURATION OPTIONS
Controller=> 0
If this is correct, press SPACE, else press any
other key
```

If your system has one hard disk (internal or external), that disk has controller 0. If your system has more than one hard disk, controller 0

represents the internal hard disk, and controller 1 is the external. If you have both an internal and an external hard disk, you can run HDTEST on only one hard disk at a time. You can, however, choose which disk to test first; run HDTEST with one controller, then run HDTEST with the other.

- ▶ To test an internal hard disk (controller 0), press the Space bar.
- ▶ For an external hard disk (or any controller other than 0), press any key. The screen then displays:

Only values 0 thru 7 are valid for Controller.
Controller (0-7)=>

Type the number for your hard disk controller. Typically, the controller for an external hard disk is 1.

Now HDTEST displays its Test menu of seven options. To select an option, press one of the seven top-row function keys (F1 - F7). To choose the Exit option, press F7 while holding down the Shift key. Six of the eight menu options run hardware tests (F1 through F6). The six tests are:

- ▶ A quick or an extended electronics test.
- ▶ A quick or an extended media test.
- ▶ A quick or an extended electronics/media test.

In most cases, run F3, the quick electronics/media test, first. If more testing is needed, run the extended electronics/media test. The extended tests run continuously until you press the Space bar. Run the extended tests to locate intermittent problems.

After running tests, press F7 (unshifted) to determine if defective tracks were found during testing. If you want to see the results, you must press F7 before terminating HDTEST. If defective tracks are found, run HDFIXUP.

This section lists and describes the menu options for HDTEST.

Quick Electronics Test—F1

This test:

1. Writes data to and from the controller local memory and compares the data for discrepancies. This process is repeated for each of these interface variances in all possible combinations:
 - ▶ Block/byte data transfer (DMA or handshake).
 - ▶ CPU locked in/locked out.
 - ▶ Interrupts polled/not polled.
2. Identifies the inservice diagnostic track (reserved for diagnostic tests run by field service personnel). Repeats the test while writing data to and from the disk diagnostic track. If the diagnostic track cannot be identified, an error message appears (see Appendix A).
3. Runs internal controller diagnostics (a local RAM test and a local checksum process).
4. Runs other diagnostics, including an ECC test.

To get the results from the Quick Electronics Test (and any other tests you run), press F7.

Quick Media Test—F2

Scans one-fifth of the drive surface for defective tracks not already logged in the drive header label. The Quick Media Test makes a single pass of the drive surface. Press F7 to display the results of this test (and any other tests you run).

Quick Electronics and Media Test—F3

Automatically runs the Quick Electronics and Quick Media Tests. For results, press F7.

Extended Electronics Test—F4

Runs the Quick Electronics Test plus an additional controller test. Also repeats the interface variance tests 10 times each. The entire test repeats until you press the Space bar.

Extended Media Test—F5

Does a full scan and then 1000 random reads of the media. The entire test repeats until you press the Space bar.

Extended Electronics and Media Test—F6

Runs the Extended Electronics and Media Tests until you press the Space bar.

Display New Bad Media—F7

Shows the location of any defective media found during HDTEST execution. For each defective media location, F7 shows the numbers of the cylinder, head, sector, track, and logical address. (Most hard disks have four read/write heads. Sectors on a hard disk are 512 bytes each. A track is made up of 17 sectors in a single band on the hard disk. A cylinder is a set of four tracks -- one on each side of the two platters in the hard disk, and with all four tracks in the same relative position on the platters. There are 1224 tracks and 306 cylinders on a hard disk. The logical address is the consecutive sector number.)

Always run F7 before terminating HDTEST. If defective media is found, run HDFIXUP.

Exit—Shifted F7

Moves the hard disk read/write heads to the innermost cylinder and ends the program.

HDFIXUP

HDFIXUP.EXE repairs media on a hard disk that has been set up with HDSETUP or AUTOSET. A hard disk contains a number of spare tracks set aside to replace tracks damaged during use. HDFIXUP searches for damaged tracks, recovers as much data as possible from them, transfers the data to the spare tracks, and reports the repairs.

CAUTION:

HDFIXUP can destroy data recorded on the hard disk. Be sure to back up your hard disk files before running HDFIXUP.

3

HDFIXUP OPERATION

3.1

Load HDFIXUP by typing:

```
hdfixup(cr)
```

HDFIXUP displays the warning prompt:

```
This utility will restore media errors by redirecting
them to spare tracks. You should FIRST BACKUP ALL
IMPORTANT DATA before running this utility as
unrecoverable errors may occur during the repair.
```

```
DO YOU WISH TO CONTINUE? (Y/N)
```

- ▶ To run the HDFIXUP program, type Y.
- ▶ To exit to MS-DOS, type N. At the system prompt, you can back up your hard disk files with COPY, MV, or SEARCH. Then invoke HDFIXUP again.

When HDFIXUP begins operation, the screen tells you to type ALT-S (hold-screen mode) to freeze the screen during repair reports, and control-P (ALT-P) to print the HDFIXUP output to your default printer.

3 HDFIXUP searches the entire hard disk for damaged tracks and inconsistencies in the disk layout. If HDFIXUP doesn't recognize the disk layout or finds nonmedia errors, it reports the problem and terminates without changing the media. Report nonmedia or disk layout problems to your service center.

After searching the hard disk, HDFIXUP compares the number of bad tracks to the number of spare tracks:

- ▶ If no errors are found, HDFIXUP reports an error-free search and terminates.
- ▶ If the hard disk has more spare tracks than bad tracks, HDFIXUP transfers the data to the spare tracks and reports the error type and location of each repair. (See Chapter 3.2.1)
- ▶ If the hard disk has more bad tracks than spare tracks, HDFIXUP gives an error message and terminates. (See Appendix A.) The media is damaged beyond acceptable limits, and should be referred to a service center.

Before updating the disk labels, HDFIXUP shows a yes/no prompt that lets you terminate without making changes to the hard disk. If you continue the program, HDFIXUP writes a new map to the disk label. MS-DOS uses this map at the next system boot.

When media repair is completed, HDFIXUP asks you to press the Space bar to reboot the system. Following a successful HDFIXUP, you do not need to restore your backup files (if you backed up your hard disk) because no data is lost.

HDFIXUP REPORT FORMATS

3.2

REPAIRABLE ERRORS

3.2.1

HDFIXUP shows this message after repairing errors:

```
Data Retrieved from Logical Track XX.
```

HDFIXUP then lists the location of each error recovered or repaired:

```
Error XXXX was fully recovered at Sector:  
Physical XX, Logical XX, Virtual XX in Volume XX.
```

OR:

```
Error XXXX was best repaired at Sector:  
Physical XX, Logical XX, Virtual XX in Volume XX.
```

HDFIXUP then tells you:

```
Data Redirected to Logical Track XX.
```

In an HDFIXUP error report, the sector location is identified with three different numbers: physical, logical, and virtual. The logical number is assigned when the disk is formatted (defective sectors found

during formatting are excluded from the numbering scheme). The virtual number is the sector's logical number minus the logical number of the volume's starting sector. The virtual number is used by the operating system in file operations.

The last number listed in error-location messages is the volume number. This number is also shown in the HDSETUP main Configure menu.

3

3.2.2 NONREPAIRABLE ERRORS

HDFIXUP displays one of these two messages to indicate nonrepairable errors:

```
Contact SERVICE CENTER.  
Cannot repair media=> No changes made.
```

OR:

```
Contact Service Center.  
Drive repair not completed.
```

An error description appears with the preceding message. Appendix A lists the errors identified by HDFIXUP.

HDFORMAT

HDFORMAT.EXE reformats the hard disk and leaves it in the same state it was when it left the factory. Run HDFORMAT on damaged hard disks that cannot be repaired with HDFIXUP. You can also run HDFORMAT on a new hard disk to correct errors that may have occurred during shipment.

CAUTION:

HDFORMAT destroys all data on the hard disk. Before reformatting a hard disk, first try to save your data with HDFIXUP. If that fails, back up your files and then run HDFORMAT. Use HDFORMAT as a last resort to replacing the hard disk.

You can run HDFORMAT only if the hard disk has a valid drive header label. In most cases, if your hard disk has a bad label, the disk will be inaccessible and unbootable, giving hard disk boot ROM error 98. Beyond the drive label, however, HDFORMAT does not test the hard disk media extensively. To verify the media, run HDTEST first.

Load HDFORMAT by typing:

```
hdformat(cr)
```

HDFORMAT first reads the drive header label and identifies the drive as a valid drive type. If the header label is unreadable or if the drive is the wrong type, HDFORMAT displays an error message and terminates.

After loading, HDIFORMAT displays the warning prompt:

```
WARNING!!  ALL DATA ON THE DISK WILL BE DESTROYED

To PROCEED press 'SPACE'.
To STOP  press ANY OTHER KEY?
```

- ▶ To continue with the format, press the Space bar.
- ▶ To return to MS-DOS, press any other key.

During the format, HDIFORMAT:

1. Deletes the inservice diagnostic track from the bad track list. (The inservice diagnostic track is reserved for field service tests, and is placed on the "bad list" so that data will not be written to that track.)
2. Reads the drive header label, formats and checks track 0, and writes the drive label to track 0.
3. Formats the entire disk.
4. Records newly discovered bad-track locations on the drive label.
5. Asks you to identify tracks to be permanently recorded on the defective media list:

```
Do you wish to permanently force any tracks
into the bad list (Y/N)?
```

You should answer Y and give numbers of additional bad tracks only if you know of bad tracks that are not listed in your drive label (step 2).

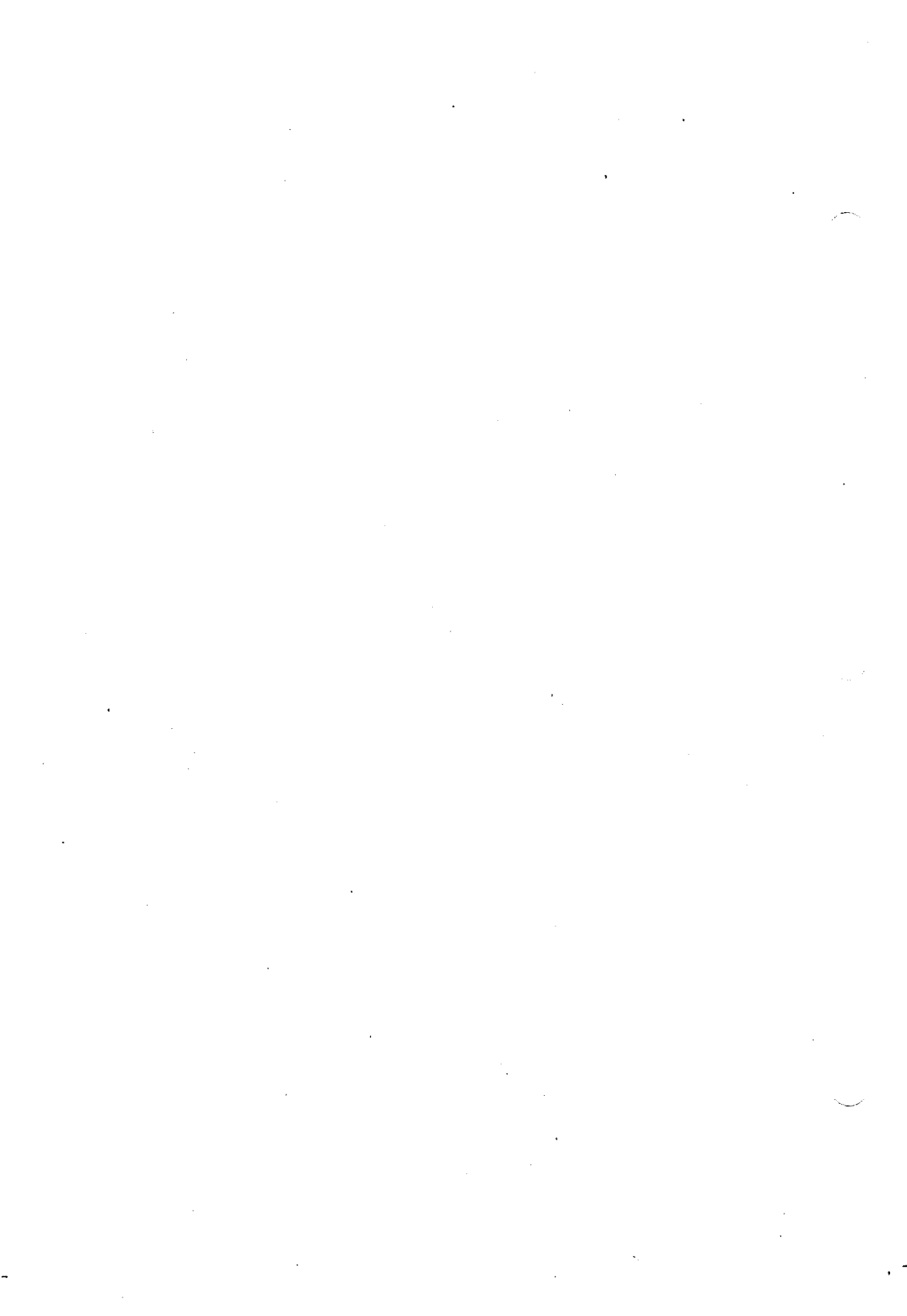
6. Adds a new inservice diagnostic track to the bad track list:

Adding a bad track for inservice diagnostics.

Reserving a “bad track” for diagnostics is done so that the disk will always have inservice diagnostic capabilities; it is not an error condition.

7. Logs the identified tracks in the drive header label and writes the new drive header label to the disk.
8. Displays the number of bad tracks and the percentage of tracks that are bad.
9. Moves the heads to the innermost cylinder and terminates.

If nonmedia errors are found, HDFORMAT terminates.



HDPARK

Hard disks are easily damaged by jarring or sudden power surges. The read/write heads ride close to the disk surface, and "head crashes" can occur, causing loss of data. To prevent head crashes, run HDPARK.EXE before powering off your hard disk, before moving the hard disk unit, or whenever power to the system is suspect (during storms, power outages, and so on).

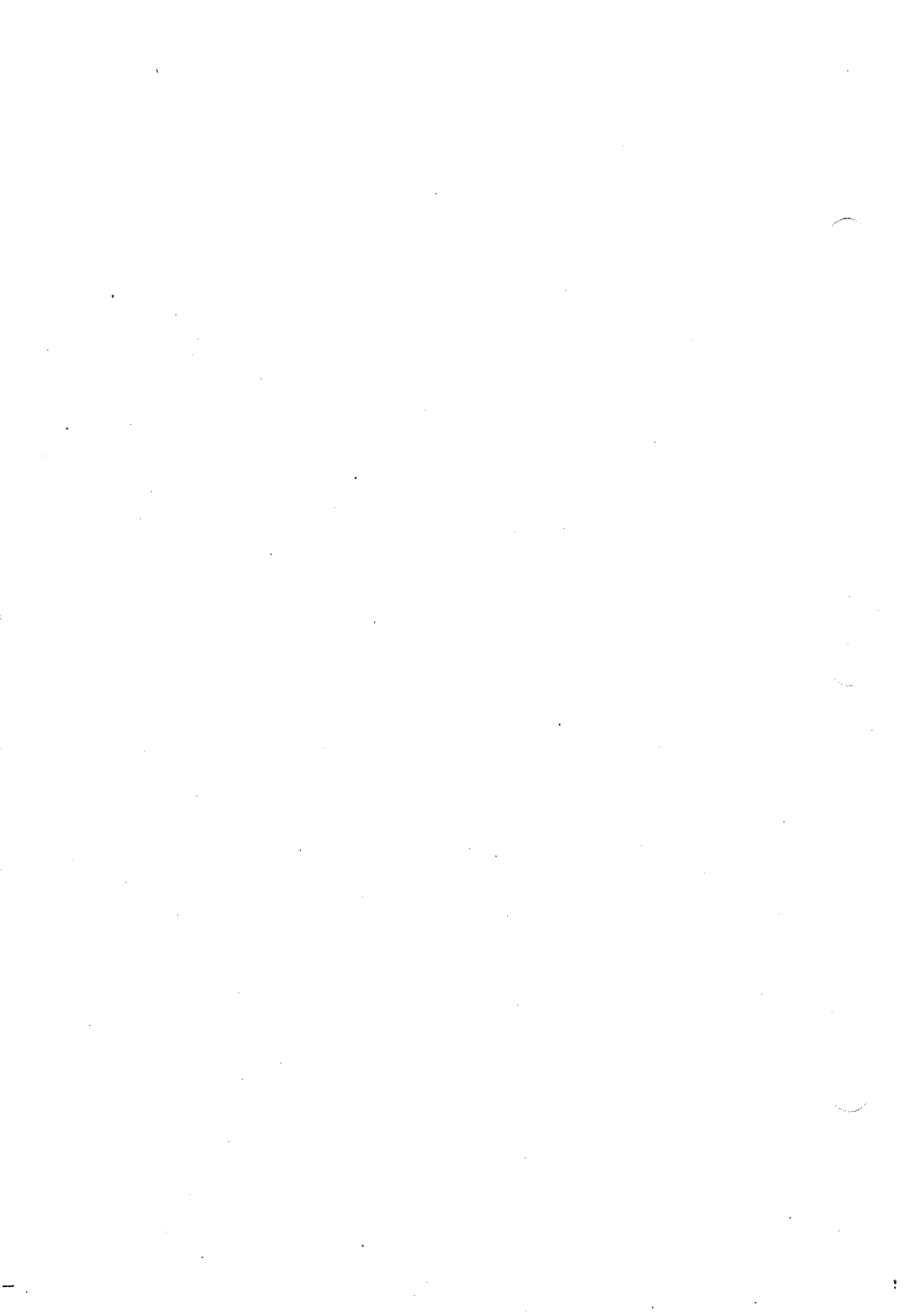
HDPARK.EXE positions the read/write heads over the innermost cylinder of the hard disk. A **cylinder** is a set of tracks, each having the same position on a different surface of the hard disk. Most hard disks have four surfaces or two "platters." Therefore cylinders usually contain four tracks.

The operating system allocates tracks starting from the outermost cylinder of the drive. This cylinder (at track 0, sector 0) contains the drive label, a segment of code necessary for booting from the hard disk. The innermost cylinder, on the other hand, does not usually contain data. In fact, the inservice diagnostic track is often the last (innermost) track.

Load HDPARK by typing:

```
hdpark(cr)
```

HDPARK first identifies the drive type by reading the drive label. If no label is found, the drive is assumed to be a Tandon 502. HDPARK then calculates the highest cylinder, issues a seek, and returns to the system prompt.



HDRESTOR

HDRESTOR.EXE restores the disk label on a hard disk. The **disk label** for a hard disk is an encoded data field on track 0 that identifies the disk and its contents for the operating system.

If the disk label on your hard disk is erased or damaged, the hard disk unit may be inaccessible or unbootable. At bootup, the system may display hard disk boot error 98 (bad disk label). If all other aspects of the drive are operable, you can use HDRESTOR to restore the label.

HDRESTOR finds the system backup label (kept on the highest usable drive sector) and writes that label to track 0, sector 0 (the location of the disk label). Running HDRESTOR should not affect data on any track other than track/sector 0.

Load HDRESTOR by typing:

```
hdrestor(cr)
```

HDRESTOR first attempts to read the drive label on track 0. If HDRESTOR finds a valid label on track 0, it displays:

```
LABEL FOUND ON TRACK 0.  
DO YOU WANT TO CONTINUE?? (Y/N)
```

HDRESTOR is not as particular about the label as the operating system is, so bad labels may appear good to HDRESTOR. If you type Y to continue or if HDRESTOR finds no valid label, HDRESTOR tries to find the backup label on the highest usable system sector.

Because hard disks can have different drive types, bad tracks, and diagnostic tracks, the highest sector is not known. HDRESTOR searches

backwards through the highest 100 sectors to find the label. During the search, a dot is displayed on the screen for every sector. When the label is found, it is written to track 0. If no backup label is found, the program exits with an error message (see Appendix A).

HARD DISK ERROR MESSAGES

This appendix lists both hard disk boot ROM errors and error messages displayed by each of the utilities in the *Hard Disk Tool Kit*.

HARD DISK BOOT ROM ERRORS

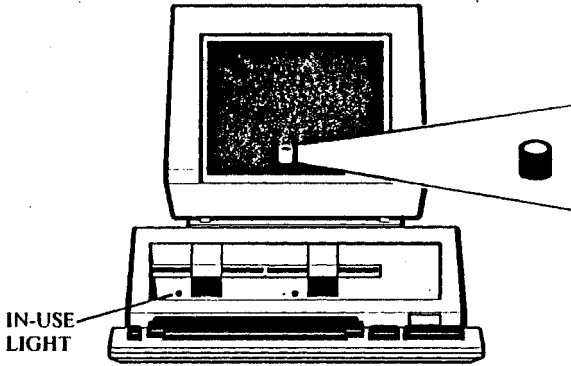
A.1

At bootup or reset, your computer's boot ROM first attempts to load the operating system from the floppy drive(s), then from the Network (if any), and finally from the hard disk. When the boot ROM tries the hard disk, the hard disk symbol or icon appears at the bottom of the screen, as shown in Figure A-1. If an error occurs during bootup from the hard disk, an X is displayed next to the hard disk symbol, along with one of the error codes listed in Table A-1.

If you get an error when booting the hard disk, make sure the designated boot volume contains a hard disk operating system. You may have to run HDSETUP (or AUTOSET) to assign a boot volume, and run SYS to copy a hard disk OS to the boot volume.

The *Hard Disk Tool Kit* diskette contains an operating system for a floppy diskette machine, but a hard disk operating system is included on the hard disk system diskette. In some error conditions you may be unable to boot the hard disk because MS-DOS retrieves drive assignments from the hard disk. In such an error situation, boot your HDTK diskette. Using a floppy-drive OS, you can run the hard disk utilities without requiring drive assignments from the hard disk.

Figure A-1: Hard Disk Boot ROM Symbol



A

Table A-1: Hard Disk Boot ROM Error Codes

<u>ERROR CODE</u>	<u>MEANING</u>
01	No index detected from disk drive.
02	No seek-complete signal from disk drive.
03	Write fault from disk drive.
04	Drive not ready after it was selected.
06	Track 00 not found.
10	ID field read error.
11	Uncorrectable data error.

ERROR CODE	MEANING
12	Address mark not found.
14	Target sector not found.
15	Seek error (incorrect cylinder and/or track).
18	Correctable data error.
19	Bad-track flag detected.
1A	Format error.
20	Invalid command.
21	Illegal disk address.
30	RAM diagnostic failure.
31	Program memory checksum error.
32	ECC diagnostic failure.
3D	Internal error; invalid command.
3F	Time out on disk operation.
40	Internal error; bad operation.
41	Hard disk I/O error; bad region information in label.
4F	Internal error; invalid block count.
98	Bad hard disk label.
99	Label indicates no operating system on disk.

NOTE: Early boot ROMs add 80 hex to the error code (01 - 4F). For example, error 10 displays as 90, and error 4F as CF.

HDSETUP ERROR MESSAGES

A.2

100 - Specified disk does not exist.

The disk you specified is not present on your system. Try specifying a disk number that is smaller than the one you entered.

101 - Cannot delete primary boot volume.

You tried to delete the boot volume. If you want to delete this volume, go to the HDSETUP Assign menu and redesignate a boot volume.

102 - Disk reading error.

Run HDTEST to check for errors. If HDTEST reports a media error, run HDFIXUP.

103 - Memory error.

HDSETUP ran out of memory while executing. You must add memory to accommodate your current volume configurations.

104 - Error writing FATS and directory.

Run HDTEST to check for errors. If HDTEST reports a media error, run HDFIXUP. If the problem persists, run HDFORMAT.

105 - Error writing new volume label with assignments.

Run HDTEST to check for errors. If HDTEST reports a media error, run HDFIXUP. If the problem persists, run HDFORMAT.

106 - Error writing new volume label.

Run HDTEST to check for errors. If HDTEST reports a media error, run HDFIXUP. If the problem persists, run HDFORMAT.

107 - Error writing volume label with new assignments.

Run HDTEST to check for errors. If HDTEST reports a media error, run HDFIXUP. If the problem persists, run HDFORMAT.

108 - Error writing newly freed volume label.

Run HDTEST to check for errors. If HDTEST reports a media error, run HDFIXUP. If the problem persists, run HDFORMAT.

109 - Error writing valid drive label.

Run HDTEST to check for errors. If HDTEST reports a media error, run HDFIXUP. If the problem persists, run HDFORMAT.

110 - Error writing drive label backup.

The hard disk is in the same state it was in before you ran HDSETUP. Run HDFORMAT if you just ran HDFIXUP and then tried to reinitialize the hard disk. HDFORMAT will set the mapping correctly.

111 - No configured volumes on disk 0.

You must create volumes on disk 0 before you can make drive assignments.

112 - Controller error. Unable to reset hard disk.

Indicates a hardware error. Make sure the power is on for all disk drives. If the power is on, run HDTEST.

113 - No hard disk drives exist.

No hard disk drives are connected to your system.

114 - No primary boot volume exists.

Go to the Assign menu and designate a boot volume.

115 - The primary boot volume is invalid.

The boot volume is no longer valid. Go to the Assign menu and redesignate the boot volume.

116 - No assignments exist on the current primary boot volume.

Go to the Assign menu and assign drives for the volumes on your hard disk.

117 - One of the current drive assignments is invalid.

Go to the Assign menu to view your drive assignments. Reassign valid volumes to drives that are marked with a line of asterisks (*).

118 - The selected volume is not free. Please choose another volume to add.

You cannot add a non-free volume. Move the cursor to a free volume and try again.

119 - The selected volume is a free volume. You cannot delete it. Choose another.

Move the cursor to the non-free volume you want to delete and try again.

120 - Disk is not initialized. You cannot configure until disk is initialized.

You must initialize disk 0 before you can create volumes.

121 - The requested capacity is too large for current space availability.

You requested a capacity larger than the space available. The default capacity displayed is the current maximum.

122 - The entered number of directory entries was too large. It has been adjusted.

You requested a larger number of directory entries than is possible for the given capacity and AU size. The number has been adjusted to reflect the largest number of directory entries possible.

A

123 - That name has already been used. Choose another.

You cannot give the same name to two volumes. Type another name.

124 - The same volume cannot be assigned twice.

Assign a different volume to the current drive letter.

125 - You must assign a floppy drive.

Go to the Assign menu and assign a floppy drive. If you have only one floppy drive, be sure to assign RIGHTFLOPPY.

126 - You must assign the primary boot volume.

Go to the Assign menu and assign the boot volume to a drive letter.

127 - The chosen capacity is too small. The minimum size is 20Kbytes.

Type another capacity that is equal to or greater than 20 Kbytes.

128 - You cannot make assignments without first choosing a boot volume.

The boot volume is invalid. Designate a valid boot volume.

130 - Bad filename. Cannot create file.

Can occur while creating an AUTOSET file. The program terminates; the hard disk is not affected. Try again using a legal file name.

131 - Error while writing data file.

Indicates a write error that can occur while creating an AUTOSET file. The program terminates; the hard disk is not affected.

132 - Cannot close data file.

Can occur while creating an AUTOSET file. The program terminates; the hard disk is not affected.

133 - Cannot create file with two hard disks present.

You cannot create a file for use with AUTOSET when more than one disk is present. Disconnect all but the first drive and try again.

A

134 - Invalid drive label type. Unable to continue.

The drive header label is bad. If your hard disk is already set up, try running HDRESTOR. For any hard disk, run HDTEST, followed by HDFORMAT if necessary.

HDTEST ERROR MESSAGES

A.3

**ERROR = > CANNOT FIND DIAGNOSTIC TRACK
MUST RUN HDFORMAT IN ORDER TO RUN DIAGNOSTICS**

You must reformat the disk with HDFORMAT.

**ERROR = > UNABLE TO CONFIRM DRIVE LABEL.
CALL SERVICE CENTER.**

Contact your service center. Report the exact error message you received.

**ERROR = > DETECTED DEFECTIVE ELECTRONICS.
CALL SERVICE CENTER.**

Contact your service center. Report the exact error message you received.

DETECTED THE FOLLOWING DEFECTIVE MEDIA:

Try running HDFIXUP. If HDFIXUP cannot repair the defective media, run HDFORMAT.

**ERROR = > EXCESSIVE DEFECTIVE MEDIA.
CALL SERVICE CENTER.**

Contact your service center. Report the exact error message you received.

A

A.4 HDFIXUP ERROR MESSAGES

A.4.1 ERROR MESSAGES FOR REPAIRABLE ERRORS

HDFIXUP reports the location of each error after repair. In the error-location messages, the sector is identified with three different numbers: physical, logical, and virtual. The logical number is assigned after the disk has been formatted (defective sectors found during formatting are excluded from the numbering scheme). The virtual number is the sector's logical number minus the logical number of the volume's starting sector. The virtual number is used by the operating system in file operations.

The volume number is also given in error-location messages. This number is shown in the HDSETUP Configure menu.

HDFIXUP shows this message after repairing errors:

A

```
Data Retrieved from Logical Track XX.
```

HDFIXUP then lists the location of each error recovered or repaired:

```
Error XXXX was fully recovered at Sector:  
Physical XX, Logical XX, Virtual XX in Volume XX.
```

OR:

```
Error XXXX was best repaired at Sector:  
Physical XX, Logical XX, Virtual XX in Volume XX.
```

HDFIXUP then tells you:

Data Redirected to Logical Track XX.

ERROR MESSAGES FOR NONREPAIRABLE ERRORS A.4.2

HDFIXUP displays one of two basic messages to indicate nonrepairable errors:

Contact SERVICE CENTER.
Cannot repair media No changes made.

OR:

Contact Service Center.
Drive repair not completed.

A

The following error descriptions can occur with the preceding messages. Be sure to report all error messages exactly when you contact your service center:

- ▶ Drive is not responding. Error xx
- ▶ Error is not media related.
- ▶ Read Error xx at Sector:
Physical xx, Logical xx, Virtual xx in Volume xx.
- ▶ Write Error xx at Sector:
Physical xx, Logical xx, Virtual xx in Volume xx.

- ▶ Verify after Write Error at Sector:
Physical *xx*, Logical *xx*, Virtual *xx* in Volume *xx*.
- ▶ Bad Backup Drive Label:
- ▶ Bad Master Drive Label: Uninitialized or unknown Revision.
- ▶ Bad Master Drive Label: Null Working Media List.
- ▶ Bad Master Drive Label: Regions are not on track boundaries.
- ▶ Master Drive Label and Backup Drive Label do not match.
- ▶ Error while building New Label, System Error *x*.
- ▶ Error while building New Label, expanded beyond maximum size.
- ▶ Unrecoverable Error occurred while updating Backup Drive Label.
- ▶ Unrecoverable Error occurred while updating Master Drive Label.
- ▶ There are *xx* bad tracks and only *xx* spares available.

A.5 HDFORMAT ERROR MESSAGES

A ERROR = > UNABLE TO CONFIRM DRIVE LABEL.
CALL SERVICE CENTER.

Contact your service center. Report the exact error message you received.

ERROR = > DETECTED DEFECTIVE ELECTRONICS.
CALL SERVICE CENTER.

Contact your service center. Report the exact error message you received.

DETECTED THE FOLLOWING DEFECTIVE MEDIA:

Try running HDFIXUP. If HDFIXUP cannot repair the defective media, run HDFORMAT.

ERROR = > EXCESSIVE DEFECTIVE MEDIA.
CALL SERVICE CENTER.

Contact your service center. Report the exact message you received.

HDPARK ERROR MESSAGES

A.6

ERROR = > UNABLE TO CONFIRM DRIVE LABEL. CALL SERVICE CENTER.

The drive label is invalid. Report the exact error message.

ERROR = > DETECTED DEFECTIVE ELECTRONICS CALL SERVICE CENTER.

Contact your service center. Report the exact error message.

HDRESTOR ERROR MESSAGES

A.7

VALID DRIVE LABEL FOUND. DO YOU WANT TO CONTINUE. ?? (Y/N)

A drive label was found on track/sector 0 which appears to be valid. Are you sure the label is bad? If you still want to restore the backup label, answer Y. If you do not want to restore the backup label, answer N.

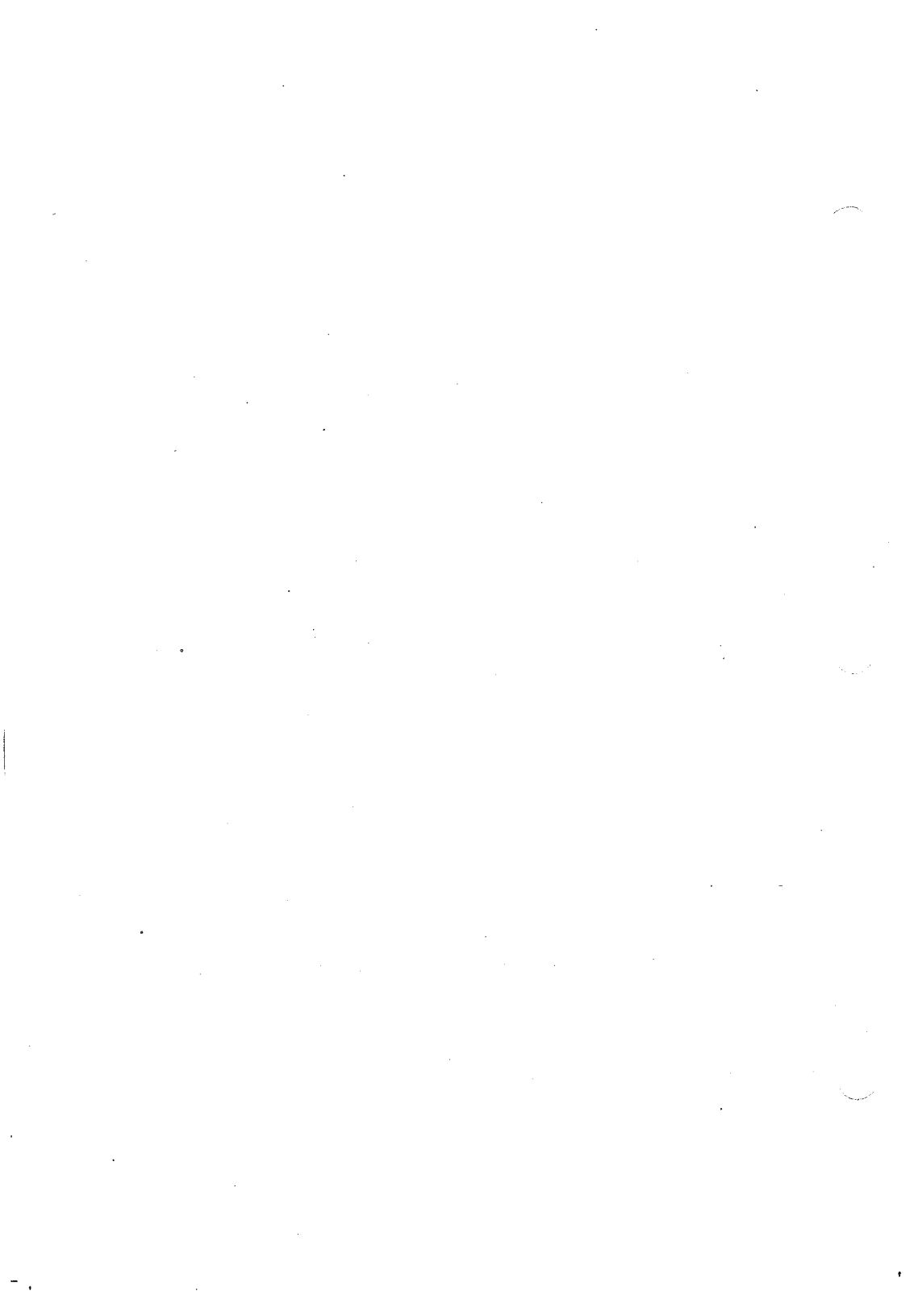
COULD NOT FIND BACKUP DRIVE LABEL

HDRESTOR could not find the backup drive label. The disk will probably have to be reformatted.

ERROR = > DETECTED DEFECTIVE ELECTRONICS. CALL SERVICE CENTER.

Contact your service center. Report the exact error message.

A



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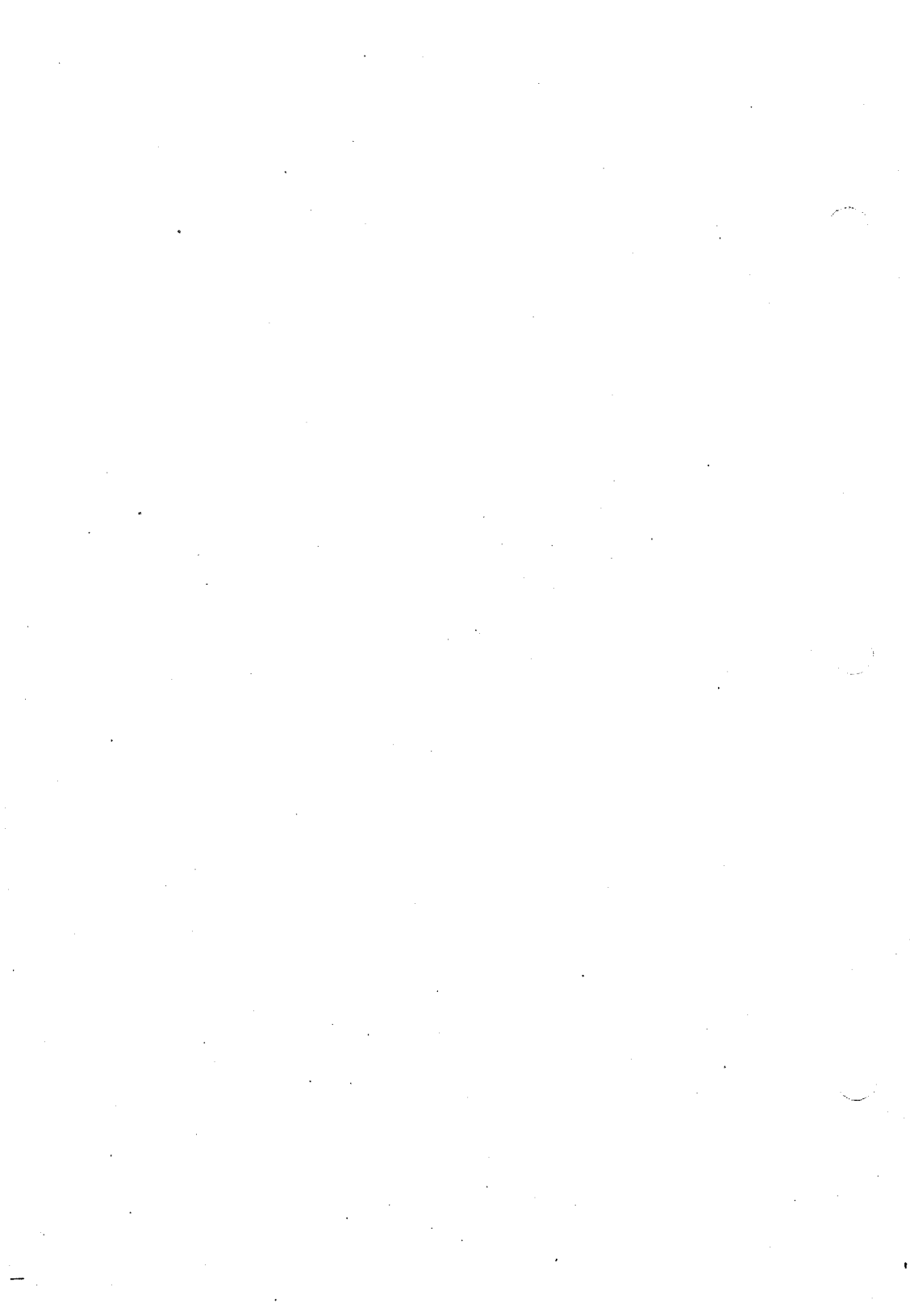
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Hard Disk Utility Manual

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PREFACE TO THE HARD DISK UTILITY MANUAL

This manual describes how to use the hard disk operator utilities AUTOSET, VDIR, and ARCHIVE. Before you use these utilities, read the Operator Reference Guide to familiarize yourself with basic operation of the hard disk.

The hard disk operator utilities allow you to:

- o Prepare the hard disk for use according to a preset configuration.
- o View drive assignment information.
- o Back up and restore hard disk files.

The last chapter in this guide describes the error messages that are displayed by the utilities.



1. THE AUTOSET UTILITY

The AUTOSET utility lets you prepare the hard disk for use quickly and easily. AUTOSET divides the hard disk into volumes according to a preset configuration that you choose.

AUTOSET has five standard volume configurations for you to choose from. You can also use a nonstandard configuration that has been recorded in a file created with HDSETUP. The Hard Disk Maintenance Manual describes how to create a customized configuration file with HDSETUP.

1.1 AN OVERVIEW OF AUTOSET

Each of the standard configurations provided with AUTOSET has a specific use. For example, one divides the hard disk into two volumes, a configuration appropriate for use with a single application that creates large files. Each standard configuration is recorded in a configuration file. These files tell AUTOSET how many volumes to create, how large each volume should be, and which drive letters to assign to each volumes.

After you load AUTOSET, the utility describes the standard configurations and tells you the file name for each configuration. AUTOSET then asks you to choose a configuration by typing its file name. After you type the file name, AUTOSET prepares the hard disk according to the configuration you've chosen.

If you already know the name of the configuration you want, you can type the name when you load AUTOSET (see Section 1.2). AUTOSET then prepares the hard disk without displaying information about the available configurations.

1.2 HOW TO USE AUTOSET

Follow these steps to use AUTOSET:

- 1) Load AUTOSET by typing:

```
autoset(cr)
```

- 2) If you know the name of the configuration you want, you can also load AUTOSET by typing:

```
autoset filename(cr)
```

where "filename" is the name of the configuration. (You don't need to type the configuration file extension). You can type the name of an AUTOSET configuration file or the name of a configuration file created with HDSETUP.

- 3) When loaded, AUTOSET displays its sign-on message:

AUTOMATIC SETUP UTILITY v1.0

- 4) Next, AUTOSET initializes the hard disk. Initialization prepares the hard disk for setup, but also destroys data. If your hard disk has previously been set up with AUTOSET (or HDSETUP), AUTOSET warns you with the message:

**Your hard disk is already initialized.
All of the current data will be destroyed if this
program continues.
Do you want to back up your data? (y/n)**

- a) If you want to back up the data, type "y". If not, type "n" to continue the program. AUTOSET checks again by asking:

**Are you sure you want to reinitialize the disk?
(y/n)**

- b) Type "y" to continue the program (any other character ends the program).

- 5) If you typed a file name when loading AUTOSET, the utility sets up the hard disk according to your chosen configuration.
- 6) If you did not type a file name, AUTOSET displays information about the standard configurations:
- a) One screen of information is displayed about each configuration. At the bottom of each screen, AUTOSET tells you:
- Hit any key to continue.**
- b) Press any key to view the next screen.
- c) When you have viewed information about each configuration, AUTOSET lists the names of the configuration files and asks you to pick one:
- Please enter the file name of your choice.**
- d) If you know which configuration you want, type its file name. If you are still not sure, type an ALT-C to end AUTOSET and return to MS-DOS.

- 7) When AUTOSET is finished setting up the hard disk, it tells you:

Press any key to reboot your system.

- 8) Press any key to reload the DOS (from your system diskette). You can then use the new configuration.

After you use AUTOSET, use SYSCOPY to transfer a copy of the DOS onto the hard disk. You can then load the DOS directly from the hard disk. SYSCOPY is described in the Operator Reference Guide.

1.3 THE STANDARD AUTOSET CONFIGURATIONS

This section describes the standard configurations available with AUTOSET. Each configuration is listed by its file name. Specifications for that configuration appear at the beginning of the description. These specifications also appear in the information AUTOSET shows about each configuration.

The specifications for each configuration show:

- o The number of volumes created.
- o The capacity of each volume in Kbytes (1K = 1024 bytes).
- o The number of files you can store under each volume's directory.
- o The allocation unit (AU) size. (This information is used by programmers.)
- o The amount of DOS memory used by each volume. The total amount of DOS memory required for the configuration is also shown at the bottom of the specification information.

The drive letter assignments are shown to the right. AUTOSET assigns a drive letter to each volume and floppy disk drive. The drive letter is used in the drive designation for files on the volume or floppy drive. The floppy disk drive assignments are labeled "floppy."

The volume used to load the DOS is labeled "boot." After using AUTOSET, transfer the DOS onto the boot volume with SYSCOPY.

1.3.1 5AND5.CFG CONFIGURATION

Specifications				A: 5m (boot)
Capac	Dir	Au	Mem Req	B: Floppy
5000K	352	4k	2048b	C: 5+m
5000+k	352	4k	2048b	

Total Memory Requirements with double-sided floppy-5k = 5120b

This configuration is appropriate if you use two applications only. You can assign one volume to each application. The configuration handles large or small files easily and efficiently.

This configuration is not appropriate if you use many applications.

1.3.2 2AND3.CFG CONFIGURATION

Specifications				A: 2m (boot)
Capac	Dir	Au	Mem Req	B: Floppy
2000K	256	4k	1024b	C: 8+m
3000+k	512	4k	3584b	

Total Memory Requirements with double-sided floppy-4.5k=4608b

This configuration is appropriate if you use a single program that creates large files - such as an accounting spread sheet application. You can use the smaller volume for the application and the larger volume for data storage.

Don't use this configuration if you use many applications. The large data volume does not let you group many small files logically.

1.3.3 1AND3X3.CFG CONFIGURATION

Specifications				A: 1m (boot)
Capac	Dir	Au	Mem Req	B: Floppy
1000K	192	2K	1024b	C: 3m
3000K	352	4K	1536b	D: 3m
3000K	352	4K	1536b	E: 3+m
3000+k	352	4K	1536b	

Total Memory Requirements with double-sided floppy - 6.5K = 6656b

This configuration is appropriate if you use up to three applications. It is well suited for storing small files and can handle a moderate number of large files. Very small files (less than 2K bytes) should be stored on the drive A volume (the boot volume) because of the small AU size on volume A.

A disadvantage of this configuration is that it uses a large amount of DOS memory. Memory sensitive applications may have problems.

1.3.4 5X2.CFG CONFIGURATION

Specifications				A:	2m (boot)
Capac	Dir	Au	Mem Req	B:	Floppy
2000K	256	2K	1536b	C:	2m
2000K	256	2K	1536b	D:	2m
2000K	256	2K	1536b	E:	2m
2000K	256	4K	1024b	F:	2+m
2000+K	256	4K	1024b		

Total Memory Requirements with double-sided floppy - 7.5K = 7680b

This is a good general purpose configuration. Small files are efficiently stored on the first three volumes because of the volumes' small AU size. Larger files should be stored on the two remaining volumes. This configuration is your best choice if you use a word processor to create memo-size files.

A disadvantage of this configuration is that it uses a large amount of DOS memory. However, this should not be a problem if you work primarily with small files.

1.3.5 2AND8X1.CFG CONFIGURATION

Specifications				A:	2m (boot)
Capac	Dir	Au	Mem Req	B:	Floppy
2000K	256	4K	1024b	C:	1m
1000K	240	2K	1024b	D:	1m
1000K	240	2K	1024b	E:	1m
1000K	240	2K	1024b	F:	1m
1000K	240	2K	1024b	G:	1m
1000K	240	2K	1024b	H:	1m
1000K	240	2K	1024b	I:	1m
1000K	240	2K	1024b	J:	1+m
1000+K	240	2K	1024b		

Total Memory Requirements with double-sided floppy - 10K = 10240b

This configuration is designed for the programmer. It lets you store a variety of files on different volumes. This promotes good file organization.

2. THE VDIR UTILITY

The VDIR utility displays information about the drive assignments on your computer. VDIR lists information about each volume or floppy disk drive assigned to a drive letter.

Before you use VDIR, check that your floppy disk drive(s) contain MS-DOS diskette(s). If you use an external hard disk, check that its power is on. Otherwise, VDIR cannot list drive information for the drive letters assigned to the floppy drives or the external hard disk. Instead, VDIR displays an MS-DOS error message and the message NO DISK (see the second example below).

VDIR lists the drive information under headings:

- o VOLUME NAME lists the volume name. If a floppy disk drive is assigned to the drive letter and the drive contains an MS-DOS diskette, it lists the name FLOPPY.
- o VOLUME TYPE lists the DOS used with the volume or the diskette in the floppy disk drive. (Currently, MS-DOS is the only DOS listed.)
- o VOLUME CAPACITY lists the capacity of the volume or diskette in the floppy disk drive. The capacity is listed in K bytes (1K equals 1024 bytes).
- o VOLUME DIRECTORY ENTRIES lists the number of files you can store under the volume or diskette directory.
- o VOLUME ALLOCATION UNIT lists the size of the allocation unit for the volume or diskette.

The following example shows using VDIR for a computer with an internal hard disk containing two volumes. In the example, what you would type is underlined.

```
A><u>vdir</u>(cr)
```

```
VOLUME DIRECTORY UTILITY V1.0
```

	VOLUME NAME	TYPE	CAPACITY	DIRECTORY SIZE	AU
A:	VOLUME 1	MS-DOS	2000K	256	4K
B:	FLOPPY	MS-DOS	612K	128	2K
C:	VOLUME 2	MS-DOS	8327K	512	4K

```
A>
```

The following example shows using VDIR for the same computer when the floppy disk drive is empty:

A>>vdir(cr)

VOLUME DIRECTORY UTILITY V1.0

Drive= 1, Track= 0, Sector= 0, Error= FA

	VOLUME NAME	TYPE	CAPACITY	DIRECTORY SIZE	AU
A:	VOLUME 1	MS-DOS	2000K	256	4K
B:	NO DISK				
C:	VOLUME 2	MS-DOS	8327K	512	4K

A>

3. THE ARCHIVE UTILITY

The ARCHIVE utility saves hard disk files by recording them on diskette. ARCHIVE also restores the saved files by copying them from diskette back to the hard disk.

You can save and restore files singly or in groups. Saved files are written to one or more diskettes, depending on the number and size of the files. Large files can be recorded across several diskettes. Restored files are read from diskette to a designated hard disk volume.

3.1 AN OVERVIEW OF ARCHIVE

The two basic ARCHIVE commands are ARCHIVE and RESTORE. With either command, screen prompts take you through each step of the process.

The ARCHIVE command writes the files you specify on diskette(s). These diskettes are called the **Archive Diskette Library**. Each diskette contains an **Archive Directory** that records which files are contained on which diskette or diskettes.

The RESTORE command writes files in the Archive Diskette Library back to a hard disk volume. During a RESTORE, you are prompted to insert specific diskettes from the Archive Diskette Library.

File groups are saved or restored in wild-card groups or by argument file. An argument file contains a list of files to be archived; the files are listed one per line. Up to 415 files can be archived in a run.

You can quit the utility at any point by typing Q(cr). If you quit during the middle of an ARCHIVE or RESTORE command (after having completed at least one diskette), you can restart at the place you left off by re-entering the command line.

3.2 SPECIAL NOTATION USED IN THIS CHAPTER

The following sections describe the ARCHIVE commands. Each command description gives you the command format, which tells you how to type the command. The command formats use the following special notation:

- o Uppercase words are to be typed exactly as shown. You

can actually type these words in upper- or lowercase, but you must type the exact characters shown.

- o Lowercase words indicate command parameters that you supply. For example, "filespec" means that you type a file specifier at that point in the command.
- o Square brackets ([]) enclose optional parameters. You do not need to type optional parameters with the command. If you do type these parameters with the command, however, do not type the brackets.

3.3 THE ARCHIVE COMMAND

3.3.1 COMMAND FORMAT

The ARCHIVE command format is:

```
ARCHIVE [&]filespec [SINCE date] [UNDER archivename]  
FROM volume TO diskette drive [DOUBLE](cr)
```

Where:

- & - Indicates that filespec is an argument file specifier.
- filespec - A file specifier - with or without wild-cards - that identifies the files to be archived. If filespec is an argument file specifier, it must contain the drive designation, file name, and file extension; it cannot include wild-cards.
- date - Only files modified since this date are to be archived. Type the date as mm-dd-yy, dd-mm-yy, mm/dd/yy, or dd/mm/yy. (The date is displayed as mm/dd/yy.) The default date is 1-1-80.
- archivename - The name assigned to the archive library. The default is the current date plus the extension .ARC - for example, 1/20/83.ARC.
- volume - The letter name (A - P) of the hard disk volume from which the files are to be archived.
- diskette drive - The letter name (A - P) of the floppy disk drive to be used.
- double - Specifies that double-sided diskettes are to be used. The default is for single-sided diskettes.

3.3.2 ARGUMENT FILES

An argument file contains a list of the files you want to archive. Create an argument file by listing the files to be archived, one per line. An argument file can contain up to 415 entries. Each entry must give the file's drive designation, file name, and file extension.

The file specifier for an argument file must contain a drive designation, file name, and file extension.

3.3.3 COMMAND LINE EXAMPLES

The following command line archives all files modified since 9-1-82 from hard disk volume K. The archive library is named SEPT.ARC, and the archived files are written to double-sided diskette(s) in floppy drive B:

```
archive *.* since 9-1-82 under sept.arc from k to b double(cr)
```

The next command line uses default values. The & tells you K:FILE.LST is an argument file. The files listed in K:FILE.LST are to be written from volume K to single-sided diskette(s) in floppy drive A. The archive library name is (by default) the current date with the .ARC extension. All files modified since 1-1-80 (the default date) are archived:

```
archive &k:file.lst from k to a(cr)
```

3.3.4 COMMAND EXAMPLE

The following example shows how to use ARCHIVE. In the example, what you type is underlined.

Example:

```
C>archive *.* since 10-01-82 under oct.arc from c to d(cr)
```

```
Archive  
Version 1.0
```

```
Archiving files modified since 10-01-82 under oct.arc on  
single sided diskettes.
```

```
Insert a newly formatted diskette in drive d. Press return  
when ready. (Q to quit program)<cr>
```

```
Writing:
```

```
Diskette 1 of 15.
```

```
Writing to diskette 1 complete.
```

Now

- 1) Remove diskette 1.
- 2) Label it:
 oct.arc
 Diskette 1 of 15
 10/05/82

3) AFFIX A WRITE PROTECT TAG TO THE DISKETTE

You will need 14 additional newly formatted diskettes to archive the rest of the files.

Do you need to format diskettes? (y/n)y

C>

In the preceding example, ARCHIVE:

- 1) Created the Archive Directory (a list of the files to be archived) and allocated files to the diskettes in the Archive Diskette Library.
- 2) Transferred the file(s) allocated to diskette 1 onto the first diskette inserted.
- 3) Written 2 utility files to diskette 1: ARC.DAT and ARC.ALF. ARC.DAT contains the Archive Directory. ARC.ALF contains housekeeping information required by ARCHIVE and RESTORE. These utility files are written to each archive diskette after the diskette is processed.

Diskette 1 - which has been fully processed - can be used to restart the interrupted archive after more diskettes have been formatted.

3.4 THE RESTORE COMMAND

With the RESTORE command, the specified files are recorded from diskette(s) in the specified floppy disk drive onto the specified hard disk volume. The RESTORE command format is:

RESTORE [&]filespec FROM diskettedrive TO volume(cr)

The command parameters are the same as for ARCHIVE.

Any diskette from the Archive Diskette Library can be used to start a RESTORE. The Restore Directory (a list of the files to be restored) is constructed from the files on the inserted diskette. A copy of the Restore Directory is saved in a temporary file (ARC.\$\$\$) on the target restore volume.

You must restore files on a volume sufficient to hold the restored files and ARC.\$\$\$\$. (ARC.\$\$\$ requires 1 to 2 allocation units.)

The following example shows how to use RESTORE. In the example, what you type is underlined.

Example:

F>Restore *.* from b to f(cr)

Restore
Version 1.0

Restoring from b to f.

Insert a diskette from the archive library into drive b.
Press return when ready. (Q to quit program) (cr)

Archive Library oct.arc
This diskette is number 7 of 15.
This library contains files of volume c
archived on 10/05/82.

Insert diskette 1 in drive b.
Press return when ready. (Q to quit program) (cr)

Archive Library oct.arc
This diskette is number 1 of 15.

Restoring:

filename1
filename2

Restoration of diskette 1 complete.

Insert diskette 2 in drive b.
Press return when ready. (Q to quit program) (cr)

Archive Library oct.arc
This diskette is number 2 of 15.

[and so on....]

Restoring complete.

F>

3.5 RESTARTING AN INTERRUPTED ARCHIVE OR RESTORE COMMAND

You can restart an interrupted ARCHIVE or RESTORE run with the following commands:

ARCHIVE TO diskette drive(cr)

Or:

RESTORE [FROM diskette drive] TO volume(cr)

You must complete at least one diskette with the original command to restart an interrupted ARCHIVE or RESTORE. If you use a floppy drive other than the original floppy drive, make sure it can handle the capacities of the original command.

When you restart an ARCHIVE or RESTORE command, check that you insert the correct diskette. If you insert the wrong diskette, type a Q to exit the program and retype the restart command line.

The following example shows how to restart an interrupted ARCHIVE command:

Example:

C>Archive to d(cr)

Archive
Version 1.0

Continuing to d.

Insert the last completed Archive diskette into drive d.
Press return when ready. (Q to quit program) (cr)

Archive Library oct.arc
This diskette is number 1 of 15.
This library contains files of volume c
archived on 10/05/82.

Insert a newly formatted diskette into drive d.
Press return when ready. (Q to quit program) (cr)

Writing:

Diskette 2 of 15.

Writing to diskette 2 complete.

[...and so on]

Archiving complete.

C>_

The following example shows how to restart a RESTORE command. In the example, RESTORE is interrupted after the second diskette has been processed:

Example:

K>Restore *.* from n to k(cr)

Restore
Version 1.0

Restoring from n to k.

Insert a diskette from the archive library into drive n.
Press return when ready. (Q to quit program)(cr)

Archive Library total.arc
This diskette is number 7 of 15.
This library contains files of volume c
archived on 9/11/82.

Insert diskette 1 in drive n.
Press return when ready. (Q to quit program)g

K>Restore to k(cr)

Restore
Version 1.0

Continuing from n to k.

Insert a diskette from the Archive Library oct.arc into drive n.
Press return when ready. (Q to quit program)(cr)

Archive Library oct.arc
This diskette is number 2 of 10.

Insert diskette 1 in drive n.
Press return when ready. (Q to quit program)(cr)

Archive Library oct.arc
This diskette is number 1 of 10.
[and so on....]

Restoring complete.

K>

4. OPERATOR UTILITIES ERROR MESSAGES

4.1 AUTOSET ERROR MESSAGES

Following are the errors you may see while using the AUTOSET utility. The error messages occur before configuration takes place. If these errors do occur, the hard disk is left in the original state.

- o The AUTOSET.HLP file was not found.

The AUTOSET help file could not be found on the default drive. (The help file contains the information about the standard configurations that is displayed when you load AUTOSET.) The utility terminates.

- o Unable to close the AUTOSET.HLP file.

The help file could not be closed. The utility terminates.

4.2 HARDWARE ERROR MESSAGES

The following error messages may be caused by hardware. Try reloading the operating system.

- o Cannot open the specified file name.
- o Error reading input file.
- o Cannot close input file.

4.3 HARD DISK ERROR MESSAGES

Hard disk errors can also occur. If a hard disk error occurs, you are notified by an error message. If the error persists, try resetting the system by slowly turning the power off and on. If this does not help, contact your dealer to have the hardware and media checked.

Following are the messages you may encounter while using the hard disk:

- o Disk reading error.
- o Memory error.
- o Error writing FATS and directory.

- o Error writing new volume label with assignments.
- o Error writing new volume label.
- o Error writing volume label with new assignments.
- o Error writing newly freed volume label.
- o Error writing valid drive label.
- o Error writing drive label backup.
- o Controller error. Unable to reset hard disk.

4.4 ARCHIVE ERROR MESSAGES

Following are the error messages you may encounter while using the ARCHIVE utility.

- o **Open <filename>, cannot be closed.**
Check that current diskette is correct. Press Return when ready (Q for emergency exit).
- o **Hard disk full; <filename> cannot be written.**
Start over using a hard disk volume with more space. Program terminates.
- o **Volume <X> not available.**
Program terminates.
- o **Volume <X> is available but is empty.**
Program terminates.
- o **<X> is not an available floppy drive.**
Program terminates.
- o **Improper response.**
Prompt is repeated.
- o **Improper syntax for an archive name. Archive names have the same form as file names.**
Program terminates.
- o **Improper syntax for a file name.**
Program terminates.

- o **Improper date syntax. The correct syntax is month/day/year. (mm/dd/yr where yr is the short year form, e.g. "82", not "1982")**
Program terminates.
- o **Temporary restore file not found, must redo from start.**
Program terminates.
- o **Inserted diskette is not newly formatted.**
Prompt repeats.
- o **Diskette is not a completed archive diskette.**
Prompt repeats.
- o **Inserted diskette is not [diskette <N>] of Archive Library <XXXXXX>.**
Prompt repeats.
- o **Inserted diskette is not an archive diskette.**
Program terminates.
- o **Diskette archived under incompatible Archive version <X>. You must restore under version <X> or higher.**
Program terminates.
- o **<filename> already exists on volume <X>.
Restore anyway? (y/n)**
- o **Drive <X> is not a double sided drive as required by your Archive Disk Library. Redo with a double sided floppy drive.**
Program terminates.
- o **Diskette full. Can not write filename.**
Reformat this diskette using FORMAT. Also check that you are using double-sided diskettes if you specified double in your command line.
- o **System error: Segment wrap around on system read. Program exit is necessary. Suggested recovery : split your current Archive Library into two sections and archive each section separately.**
Program terminates.

- o **Incomplete command line. Expected to find <key word>.**
Program terminates.
- o **Archive Library mis-match!! The archive Library last being restored to volume <X> does not match the Archive Library of the inserted diskette.**
- o **Error: File list does not exist on requested volume.**

Hard Disk Maintenance Manual

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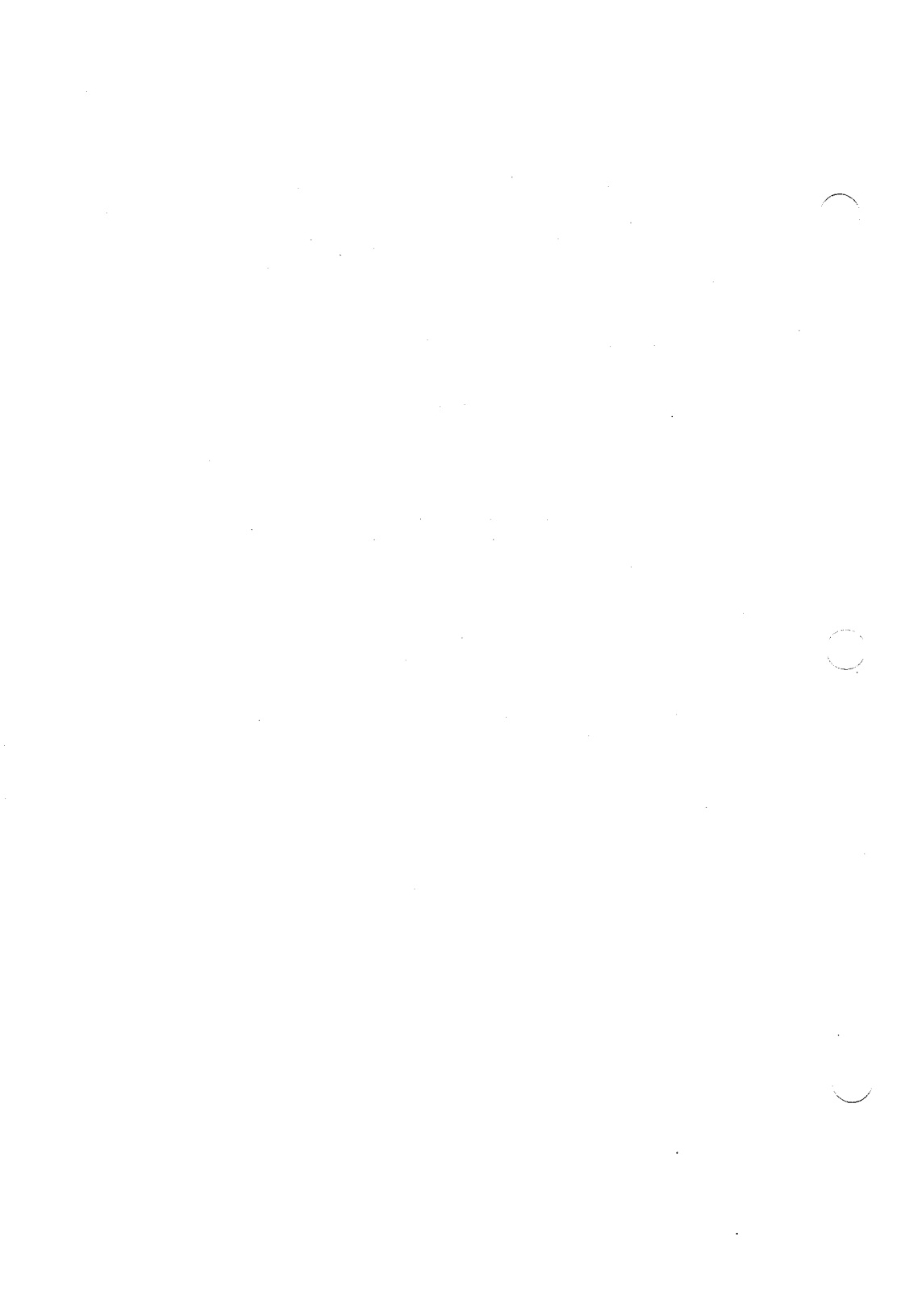
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PREFACE TO THE HARD DISK MAINTENANCE MANUAL

This manual describes how to use the hard disk maintenance utilities provided with the Hard Disk Tool Kit. These utilities can alter the contents of the hard disk and should be used with care. The maintenance utilities are briefly described below:

- o HDSETUP allows you to specify a hard disk configuration, view existing configuration information, or create a file for use with AUTOSET. AUTOSET is the end-user utility for setting up a new hard disk. AUTOSET is described in the Hard Disk Utility Manual.
- o HDFIXUP allows you to identify, log, and replace defective media.
- o HDTEST is a hard disk confidence test. Run HDTEST when you first receive the hard disk or when you suspect hardware errors.
- o HDFORMAT reformats the hard disk. Run HDFORMAT as a last resort before replacing the hard disk. You can also run HDFORMAT on a newly installed hard disk to correct errors that may have occurred during shipment.

Error messages for each utility are listed in the chapter that describes the utility. The error messages are repeated in Chapter 5, which lists the error messages for all four utilities.



1. HDSETUP

Use HDSETUP to:

- o Set up a new hard disk (divide it into volumes and prepare it for use).
- o Create new volumes or delete existing volumes on a hard disk that has already been set up.
- o View configuration information about existing hard disk volumes.
- o Create a file to be used with AUTOSET, the end-user utility for setting up a new hard disk. **When you use HDSETUP to create a file for use with AUTOSET, HDSETUP does not affect existing hard disk volumes.** AUTOSET is described in the Hard Disk Utility Manual.

When you use HDSETUP to create an AUTOSET file, HDSETUP operates exactly as when you use it to set up the hard disk, except that:

- o Your keystrokes are stored in a file and do not affect the hard disk.
- o Data already stored on the hard disk is not affected.
- o The hard disk always appears to be uninitialized (whether or not it actually is uninitialized). This is because AUTOSET automatically initializes the hard disk.

1.1 HDSETUP OVERVIEW

There are four main steps to setting up a new hard disk:

- 1) You **initialize** the hard disk to prepare it for setup.
- 2) You **configure** it to divide it into volumes and define volume characteristics.
- 3) You **assign** drive letters to the volumes. MS-DOS uses 16 drive letters: A through P. You must assign them in alphabetical order.
- 4) You **reload** the DOS to activate the new setup.

HDSETUP is menu driven. You choose to initialize the hard disk, configure volumes, or assign drives from the Main

menu. The Main menu is displayed after HDSETUP is loaded.

Once the hard disk is set up, you can work from the Main menu to view volume configuration information, delete existing volumes, create new volumes, or change drive assignments. You do not need to reinitialize the hard disk.

When you add volumes or change drive assignments, **you must reload the DOS to make the changes effective.** You can do this by pressing the reset button. When you delete volumes or create volumes on a newly initialized hard disk, HDSETUP reloads the system automatically.

After you have set up a new hard disk, use SYSCOPY to store a DOS on the **primary boot volume.** You assign the primary boot volume when you assign drives. MS-DOS stores your drive assignments on the primary boot volume. After you store the DOS on the primary boot volume, you can load the DOS directly from the hard disk.

If you have more than one hard disk, the primary boot volume is on the first disk in the data line. The first (or only) disk is disk 0.

1.2 HDSETUP OPERATION

HDSETUP uses the top row of function keys labeled 1 through 7. You choose menu options by pressing the appropriate function key. In this section, the function keys are called F1 through F7. During each step, HDSETUP displays a function key map at the bottom of the screen. The map tells you what each function key does for that step. F6 always acts as a "help" key, and F5 always acts as a "cancel" key. F5 takes you back to the beginning of the step you were working on.

Load HDSETUP by typing:

```
hdsetup(cr)
```

To create a file for use with AUTOSET, load HDSETUP by typing:

```
hdsetup filespec(cr)
```

where filespec is the name of the file to be used with AUTOSET. AUTOSET assumes the file extension .CFG. If you give another extension, AUTOSET discards it and assigns the .CFG extension.

After you load HDSETUP, the Main menu appears. The Main menu is described in the following section.

1.3 THE MAIN MENU

Table 1-1 describes the Main menu function keys.

Table 1-1: HDSETUP Main Menu Function Keys

<u>KEY NAME</u>	<u>KEY FUNCTION</u>
F1 - ASSIGN	Assign drive letters or view current drive assignments.
F2 - CONFIG	Create or delete volumes or view existing volume configuration information.
F4 - INIT	Initialize the hard disk (prepare it to accept data). CAUTION: Initialization destroys data already stored on the hard disk. Use F4 only if: <ul style="list-style-type: none">o You have just unpacked the hard disk and connected it to your system.o You have backed up your hard disk files.o You are using HDSETUP to create a file for use with AUTOSSET.
F5 - CANCEL	Cancel changes made during current HDSETUP session. You are asked to verify cancellation. Press F1 for "yes" (cancel changes and return to MS-DOS) or F2 for "no" (return to the main menu).
F6 - HELP	Display short description of HDSETUP operation.
F7 - DONE	Complete the changes you have made. HDSETUP checks your drive assignments for validity: <ul style="list-style-type: none">o If drive assignments are valid, you are returned to MS-DOS.o If invalid drive assignments are found, you are returned to the main menu. Press F1 (assign) to correct the invalid assignments.
ALT-C - EXIT	Exit from HDSETUP. Use ALT-C if your keyboard configuration is not standard (i.e., the function keys do not operate as described). The keyboard configuration is part of the DOS. You must load a standard version of the operating system to use HDSETUP.

The functions you perform from the Main menu are described in more detail in the following sections.

When you finish using HDSETUP, press F7 in the main menu to log your changes. Then press the reset button to activate the system configuration you have just created. If you delete volumes or initialize your disk, HDSETUP reloads the system automatically.

1.4 HOW TO INITIALIZE THE HARD DISK

You must initialize a new hard disk to prepare it to accept data. You cannot create volumes on a new hard disk until you have initialized it.

Initialization creates one large volume. The capacity of this volume is the total capacity of the hard disk. You can reinitialize a hard disk that contains volumes and data, but the data is lost.

Follow these steps to initialize the hard disk:

- 1) Press F4 in the main menu.
- 2) The following message appears:

THIS OPERATION WILL DESTROY THE DISK CONTENTS.

Also, a new function-key map and an are-you-sure window appear, allowing you to cancel initialization. You have four choices:

- o F1 - YES: continue initialization.
- o F2 - NO: return to main menu.
- o F5 - CANCEL: return to main menu.
- o F6 - HELP: describe function keys.

- 2) Press F1 for "yes."
- 3) A new function key map appears, and HDSETUP asks you to type the number of the hard disk to be initialized. The number 0 is automatically shown in the disk number window:
 - o Do not type a number if your hard disk is number 0 (for example, if you have only one hard disk).
 - o Type the number of your hard disk if it is not 0.

- 4) You now have three function key choices:
 - o F5 - CANCEL: return to main menu.
 - o F6 - HELP: describe function keys.
 - o F7 - INIT: log initialization, return to main menu.
- 5) Press F7 to log the initialization. You are now ready to configure the hard disk volumes, as described in the following section.

Remember that changes are not stored on disk until you press F7 while in the main menu.

1.5 HOW TO CONFIGURE HARD DISK VOLUMES

Press F2 in the main menu to create or delete hard disk volumes and to assign volume characteristics.

When you press F2, a volume list appears on the left side of the screen. If you have not yet created volumes, only one "free" volume is listed.

The volume list describes these volume characteristics:

- o Disk number.
- o Volume name.
- o Volume type (the DOS available for use with the volume).
- o Volume capacity (in Kbytes; minimum capacity is 20 Kbytes).
- o Directory entries (the number of files that can be stored on the volume).
- o Size of the allocation unit (AU) for the volume. AUs are described in Section 1.5.3.

When you create a new volume, you first add it to the volume list and then define its characteristics, as described in the following section.

1.5.1 HOW TO CREATE A NEW VOLUME

To create a new volume:

- 1) Move the cursor to the volume listed as "FREE." If you are setting up a new hard disk, the cursor already marks the free volume. Use the up-arrow and down-arrow keys to move the cursor.

- 2) The function key map for this step lists four choices:
 - o F1 - ADD: adds the "free" volume to the volume list. If the cursor is not on a free volume, HDSETUP shows an error message.
 - o F2 - DELETE: use this key to delete a volume (Section 1.5.2). If the cursor is on a free volume, HDSETUP shows an error message.
 - o F6 - HELP: describe function keys.
 - o F7 - DONE: log changes and return to main menu.
- 3) Press F1 to add the volume to the volume list:
 - o A new function key map appears
 - o HDSETUP displays default values for the volume characteristics.
 - o A memory requirements window appears on the right. The window shows the amount of memory (in bytes) required by the DOS for the volume as listed.
- 4) Change the default values you do not wish to keep. If you do not want to change the default values, go to step 5.
 - a) The cursor is initially over the volume name. Type a new name to change the name. (The name is for your convenience only.)
 - a) To change the capacity or directory value, move the cursor to the capacity or directory field and type the new value.
 - b) To change the AU value, move the cursor to the AU field:
 - o A list of possible AU sizes appears, and the cursor moves to the list.
 - o Move the cursor up or down to the value you choose (see Section 1.5.3). With each AU value, HDSETUP automatically adjusts the value shown for memory requirements.
 - o Log the AU value you choose by moving the cursor left or right (out of the AU window).

- 5) At this point you have three function key choices:
 - o F5 - CANCEL: change volume to FREE, return to previous menu (add a volume).
 - o F6 - HELP: describes function keys.
 - o F7 - CONFIG: log volume characteristics as shown, return to previous menu (add a volume).
- 6) Press F7 when you are satisfied with the values shown for the volume characteristics.
- 7) The previous function key map appears. You have three choices:
 - o Move the cursor to the "free" volume and press F1 to add another volume.
 - o Press F2 to delete a volume (see Section 1.5.2).
 - o Press F7 to log your changes and return to the main menu.

When you have finished creating volumes, you are ready to designate the boot volume and assign drives (Section 1.6). Remember that changes are not recorded on disk until you press F7 while in the main menu.

1.5.2 HOW TO DELETE A VOLUME

To delete a volume:

- 1) Move the cursor to the volume you wish to delete.
- 2) The function key map for this step lists four choices:
 - o F1 - ADD: adds the "free" volume to the volume list. If the cursor is not on a free volume, HDSETUP shows an error message.
 - o F2 - DELETE: deletes the volume marked by the cursor. If the cursor is on a free volume, HDSETUP shows an error message.
 - o F6 - HELP: describe function keys.
 - o F7 - DONE: log changes and return to main menu.
- 3) Press F2 to delete the volume.

- 4) A new function key map appears, and you are asked to verify the deletion:
 - o Press F1 to verify the deletion. The volume list reappears; the deleted volume is listed as "free".
 - o Press F2 or F5 to return to the volume list without deleting the volume.
- 5) Press F7 to log the deletion when the previous function key map (add a volume) appears.

Remember that changes are not recorded on disk until you press F7 while in the **main menu**.

1.5.3 ALLOCATION UNITS

AUs are the building blocks of disk files. The files you store on the hard disk are broken up and stored in AU size blocks. The minimum file size is the size of one AU. If the size of a file is one byte larger than one AU, two AUs are used to store the file.

Except for large volumes, the AU size can be 1k, 2k, 4k, 8k, 16k, 32k, or 64k. You may not be able to select a 1k AU if your volume is large. The minimum allowable AU size increases with volume size.

The amount of memory space used by the DOS to store your work depends on your selection of an optimum size for an AU. Efficient use of disk space also depends on the size you choose for the AU.

When choosing the AU size, consider:

- o The size of the volume and the amount of memory required by the DOS.
- o The average size of the files on the volume and the amount of disk space left unused.

1.6 HOW TO DESIGNATE THE PRIMARY BOOT VOLUME AND ASSIGN DRIVES

To designate the boot volume and assign drive letters:

- 1) Press F1 in the main menu. Press F1 only after you have configured the volumes. You are returned to the main menu if no volumes exist.

- 2) A new function key map and three screen windows appear:
 - o The volume window, on the left, shows a list of volumes available for assignment.
 - o The boot volume window, at the top right, shows the existing primary boot volume. If there is no existing primary boot volume, asterisks are shown in place of the boot volume name.
 - o The assignment window is below the boot volume window. This window shows the existing drive assignments.
- 3) Choose to keep or change the existing boot volume. If you are setting up a new hard disk, you must designate (change) the boot volume. You have four function key choices:
 - o F1 - KEEP: keep existing boot volume. Cursor moves to assignment window and new function key map appears.
 - o F2 - CHANGE: prepare to change existing boot volume. Cursor moves to volume list and new function key map appears.
 - o F5 - CANCEL: return to main menu.
 - o F6 - HELP: describe function keys.
- 4) Press F1 to keep the existing boot volume and move on to assigning drives. The cursor moves to the assignment window, and a new function key map appears.
- 5) Press F2 to change the boot volume. A new function key map appears and the cursor moves to the volume list:
 - a) Move the cursor to the volume you wish to be the new boot volume. All the volumes may not fit in the volume window. Access more volumes by pressing the down-arrow key when the cursor is at the last volume displayed.
 - b) You now have three function key choices:
 - o F5 - CANCEL: cursor returns to boot volume window and previous function key map appears.
 - o F6 - HELP: describe function keys.
 - o F7 - SELECT: log your boot volume choice. Cursor moves to assignment window and new function key map appears.
 - c) Press F7 to log your boot volume choice and move on to assigning drives. The cursor moves to the

assignment window, and a new function key map appears.

- 6) Choose to keep or change drive assignments. If you are setting up a new hard disk, you must assign (change) drives. You have five function key choices:
 - o F2 - CHANGE: prepare to change (or add) the drive assignment marked by cursor. Cursor moves to volume list and new function key map appears.
 - o F3 - DELETE: delete all assignments following the one marked by the cursor. Cursor does not move.
 - o F5 - CANCEL: cancel drive assignment changes; cursor returns to boot volume window.
 - o F6 - HELP: describe function keys.
 - o F7 - DONE: log drive assignment choices; return to main menu.
- 7) Press F7 to keep the existing drive assignments.
- 8) To assign drives to newly configured volumes (the assignment list is blank):
 - a) Press F2. The cursor moves to the volume list, and a new function key map appears:
 - o F5 - CANCEL: cursor returns to assignment list.
 - o F6 - HELP: describe function keys.
 - o F7 - SELECT: the volume marked by the cursor is assigned to the drive highlighted in the assignment list.
 - b) Move the cursor to mark the the volume for drive A and press F7.
 - c) Move the cursor to drive B. Repeat step a for drive B.
 - d) Continue to assign drives in the same way for the remaining volumes. Be sure to:
 - o Assign the primary boot volume and at least one floppy drive.
 - o Assign RIGHTFLOPPY if you have only one floppy drive.
 - e) Press F7 to log your assignments and return to the main menu.

- 9) To change already existing drive assignments:
- a) Move the cursor to the first drive you wish to change.
 - b) Press F3 to clear the remaining drive assignments.
 - c) Assign the drives in order as described above.

After you have finished assigning drives, press F7 in the Main menu to record your changes on disk.

1.7 HDSETUP ERROR MESSAGES

HDSETUP error messages are listed below in alphabetical order:

o **Bad filename. Cannot create file.**

You may encounter this error message while creating a file for use with AUTOSET. The program terminates; the hard disk is not affected. Try again using a legal file name.

o **Cannot close data file.**

You may encounter this error message while creating a file for use with AUTOSET. The program terminates; the hard disk is not affected.

o **Cannot create file with two hard disks present.**

You cannot create a file for use with AUTOSET when more than one disk is present. This is because AUTOSET operates on only one disk. Disconnect all but the first drive and try again.

o **Cannot delete primary boot volume.**

You tried to delete the primary boot volume. If you want to delete this volume, first get to the Assign menu and redesignate the boot volume.

o **Controller error. Unable to reset hard disk.**

This indicates a hardware error. Check that the power is on for all disk drives. If the power is on, run HDTEST.

o **Disk 0 is not initialized. You cannot configure until disk 0 is initialized.**

You must initialize disk 0 before you can create volumes.

o **Disk reading error.**

Run HDTEST to check for errors. If HDTEST reports a media error, run HDFIXUP.

o **Error while writing data file.**

You may encounter this error message while creating a file for use with AUTOSET. An error occurred during a write. The program terminates; the hard disk is not affected.

o **Error writing FATS and directory.**

Run HDTEST to check for errors. If HDTEST reports a media error, run HDFIXUP. If the problem still persists, run HDFORMAT.

o **Error writing drive label backup.**

The hard disk is in the same state it was in before you ran HDSETUP. Run HDFORMAT if you just ran HDFIXUP and then tried to reinitialize the hard disk. HDFORMAT will set the mapping correctly.

o **Error writing new volume label with assignments.**

Run HDTEST to check for errors. If HDTEST reports a media error, run HDFIXUP. If the problem still persists, run HDFORMAT.

o **Error writing new volume label.**

Run HDTEST to check for errors. If HDTEST reports a media error, run HDFIXUP. If the problem still persists, run HDFORMAT.

o **Error writing newly freed volume label.**

Run HDTEST to check for errors. If HDTEST reports a media error, run HDFIXUP. If the problem still persists, run HDFORMAT.

o **Error writing valid drive label.**

Run HDTEST to check for errors. If HDTEST reports a media error, run HDFIXUP. If the problem still persists, run HDFORMAT.

o **Error writing volume label with new assignments.**

Run HDTEST to check for errors. If HDTEST reports a media error, run HDFIXUP. If the problem still persists, run HDFORMAT.

- o **Invalid syntax in command line.**

Retype the command line for loading the utility correctly.

- o **Memory error.**

The utility ran out of memory while executing. You must add memory to accommodate your current volume configurations.

- o **No configured volumes on disk 0.**

You must create volumes on disk 0 before you can make drive assignments.

- o **No assignments exist on the current primary boot volume.**

Get to the Assign menu and assign drives for the volumes on your hard disk.

- o **No hard disk drives exist.**

No hard disk drives are connected to your system.

- o **No primary boot volume exists.**

Get to the Assign menu and designate a primary boot volume.

- o **One of the current drive assignments is invalid.**

Get to the Assign menu to view your drive assignments. Reassign valid volumes to drives that are marked with a line of asterisks (*).

- o **Specified disk does not exist.**

The disk you specified is not present on your system. Try specifying a disk number that is less than the one you just entered.

- o **That name has already been used. Choose another.**

You cannot name two volumes with the same name. Type another name.

- o **The chosen capacity is too small. The minimum size is 20Kbytes.**

Type another capacity that is equal to or greater than 20 Kbytes.

- o **The entered number of directory entries was too large. It has been adjusted.**

You requested a larger number of directory entries than is possible for the given capacity and AU size. The number has been adjusted to reflect the largest number of directory entries possible.

- o **The primary boot volume is invalid.**

The primary boot volume is no longer valid. Get to the Assign menu and redesignate the primary boot volume.

- o **The requested capacity is too large for current space availability.**

You requested a capacity that is larger than the space available on the disk. The default capacity displayed is the maximum you can request.

- o **The same volume cannot be assigned twice.**

Choose a different volume to assign to the current drive letter.

- o **The selected volume is a free volume. You cannot delete it.**

Move the cursor to the non-free volume you wish to delete and try again.

- o **The selected volume is not free. Please choose another volume.**

You cannot add a non-free volume. Move the cursor to a free volume and try again.

- o **You cannot make assignments without first choosing a boot volume.**

The primary boot volume is invalid. Designate a valid primary boot volume.

- o **You must assign a floppy drive.**

Get to the Assign menu and assign a floppy drive. If you have only one floppy drive, be sure to assign RIGHTFLOPPY.

- o **You must assign the primary boot volume.**

Get to the Assign menu and assign the primary boot volume to a drive letter.

2. HDFIXUP

HDFIXUP repairs media on a formatted and configured hard disk (a hard disk that has been set up with HDSETUP).

The hard disk contains a number of spare tracks set aside to replace tracks that are damaged during use. HDFIXUP searches for damaged tracks, recovers as much data as possible from them, transfers the data to the spare tracks, and reports the repairs.

HDFIXUP may wipe out data already recorded on the hard disk. **Be sure to back up your hard disk files before running HDFIXUP.**

2.1 HDFIXUP OPERATION

Load HDFIXUP by typing:

```
hdfixup(cr)
```

When loaded, HDFIXUP displays its sign-on message and warning prompt:

This utility will restore media errors by redirecting them to spare tracks. You should FIRST BACKUP ALL IMPORTANT DATA before running this utility as unrecoverable errors may occur during the repair.

DO YOU WISH TO CONTINUE? (Y/N)

Type "y" to run the program or "n" to exit to the DOS.

The first screen display also tells you to use ALT-S (hold screen mode) to freeze the screen during repair reports and ALT-P (control P) to print output to the screen.

HDFIXUP searches the entire hard disk for damaged media and inconsistencies in the disk layout. If non-media errors are found or if the disk layout is not recognized, HDFIXUP reports the problem and terminates without altering the media. Non-media or disk layout problems should be reported to your service center.

After searching the hard disk, HDFIXUP compares the number of bad tracks to the number of spare tracks:

- o If no errors are found, HDFIXUP reports an error-free search and terminates.

- o If there are more spare tracks than bad tracks, HDFIXUP transfers the data to the spare tracks and reports the error type and location of each repair.
- o If there are more bad tracks than spare tracks, HDFIXUP reports the problem and terminates. The media has been damaged beyond acceptable limits, and should be referred to a service center.

Before updating the disk labels, HDFIXUP displays a yes/no prompt giving you a last chance to exit the program without making changes to the hard disk. If you type "y" to continue the program, HDFIXUP writes a new map to the disk label, which the DOS uses at the next system boot.

When completed, HDFIXUP requests that you press the Space bar to reboot the system.

2.2 HDFIXUP ERROR MESSAGES

2.2.1 ERROR MESSAGES FOR REPAIRABLE ERRORS

After repairing errors, HDFIXUP displays the following message:

Data Retrieved from Logical Track XX.

It then lists the error location for each error that was recovered or repaired:

**Error XXXX was fully recovered at Sector:
Physical XX, Logical XX, Virtual XX in Volume XX.**

OR:

**Error XXXX was best repaired at Sector:
Physical XX, Logical XX, Virtual XX in Volume XX.**

It then tells you:

Data Redirected to Logical Track XX.

In the error location messages, the sector is identified with three different numbers: physical, logical, and virtual. The logical number is the number given to the sector after the disk has been formatted (defective sectors found during formatting are excluded from the numbering scheme). The virtual number is the logical number minus the starting sector number of the virtual volume. **The virtual number is the number used by the DOS in file operations.** The volume number is the number shown in the HDSETUP Configuration menu.

2.2.2 ERROR MESSAGES FOR NONREPAIRABLE ERRORS

HDFIXUP displays one of two basic messages to indicate nonrepairable errors:

Contact SERVICE CENTER.

Cannot repair media - No changes made.

OR:

Contact Service Center.

Drive repair not completed.

The following messages may be displayed with the preceding messages. Be sure to report all error messages exactly when you contact your service center:

- o Drive is not responding. Error XX
- o Error is not media related.
- o Read Error XX at Sector:
Physical XX, Logical XX, Virtual XX in Volume XX.
- o Write Error XX at Sector:
Physical XX, Logical XX, Virtual XX in Volume XX.
- o Verify after Write Error at Sector:
Physical XX, Logical XX, Virtual XX in Volume XX.
- o Bad Backup Drive Label:
- o Bad Master Drive Label: Uninitialized or unknown Revision.
- o Bad Master Drive Label: Null Working Media List.
- o Bad Master Drive Label: Regions are not on track boundaries.
- o Master Drive Label and Backup Drive Label do not match.
- o Error while building New Label, System Error X.
- o Error while building New Label, expanded beyond maximum size.
- o Unrecoverable Error occurred while updating Backup Drive Label.
- o Unrecoverable Error occurred while updating Master Drive Label.
- o There are XX bad tracks and only XX spares available.

3. HDTEST

HDTEST is an end user confidence test for the hard disk. Run HDTEST when you suspect hardware problems with the hard disk. You can also run HDTEST to check the hard disk when you first receive it. HDTEST does not affect data already stored on the hard disk.

3.1 HDTEST OPERATION

Load HDTEST by typing:

hdtest(cr)

During initialization, HDTEST identifies and reads the drive header label to check that the drive is a valid drive type. If HDTEST cannot determine the drive type, an error message appears and the program terminates.

After initialization, the HDTEST main menu is displayed. The menu provides eight options. You press one of the top seven function keys (labeled 1 through 7) to choose an option. To choose the eighth option (the exit option), you press function key 7 while holding down the Shift key.

Six of the eight menu options run hardware tests (function keys 1 through 6). The six test options are for:

- o A quick or extended electronics test.
- o A quick or extended media test.
- o A quick or extended electronics/media combination test.

In general, you should run the quick electronics/media combination test first. If more testing is required, run the extended electronics/media test. The extended tests run continuously until you press the Space bar. Run the extended tests to catch intermittent problems.

Function key 7 (unshifted) shows information about defective tracks found during testing. Always run function key 7 before terminating HDTEST. Then run HDFIXUP if defective tracks are found.

The following section describes the HDTEST menu options in greater detail.

3.2 HDTEST MENU OPTIONS

Descriptions of the HDTEST options follow. The function keys for the first 7 options are identified as f1, f2, etc. The function key for the eighth option is shown as F7, indicating you must hold down the Shift key while pressing function key 7.

f1 - Quick Electronics Test

This test:

- 1) Writes data to and from the controller local memory and compares the data for discrepancies. This process is repeated using the following interface variances in all possible combinations (each process is done one time):
 - o Block/byte data transfer (DMA or handshake).
 - o CPU locked in/locked out.
 - o Interrupts polled/not polled.
- 2) Identifies the inservice diagnostic track and repeats the test while writing data to and from the disk diagnostic track. If the diagnostic track cannot be identified, an error message appears.
- 3) Runs internal controller diagnostics. The diagnostics run are a local RAM test and a local checksum process.
- 4) Runs other diagnostics, including an ECC test.

f2 - Quick Media Test

This test reads one fifth of the drive media surface for defective tracks not already logged in the drive header label. The test makes a single pass of the drive surface.

Press f7 to display information about defective tracks found during testing.

f3 - Quick Electronics and Media Test

This test automatically executes f1 and f2.

f4 - Extended Electronics Test

This test runs the f1 test plus an additional controller test. Also, the interface variance tests are repeated 10 times each. The test repeats the entire test until you

press the Space bar.

f5 - Extended Media Test

This test executes a full scan of the drive media and then does 1000 random reads over the surface. The test repeats entire test until you press the Space bar.

f6 - Extended Electronics and Media Test

This test executes f4 and f5 until you press the Space bar.

f7 - Defective Media Display

This option displays information about the defective media found during HDTEST execution. The defective-media information shows the numbers for the cylinder, head, sector, track, and logical address. Always run f7 before terminating HDTEST. If defective media is found, run HDFIXUP.

F7 - Exit

This option places heads on innermost cylinder and terminates program.

3.3 HDTEST ERROR MESSAGES

HDTEST error messages follow:

- o **ERROR=> CANNOT FIND DIAGNOSTIC TRACK
MUST RUN HDFORMAT IN ORDER TO RUN DIAGNOSTICS**

You must reformat the disk with HDFORMAT.

- o **ERROR=> UNABLE TO CONFIRM DRIVE LABEL.
CALL SERVICE CENTER.**

Contact your service center. Be sure to report the exact error message you received.

- o **ERROR=> DETECTED DEFECTIVE ELECTRONICS.
CALL SERVICE CENTER.**

Contact your service center. Be sure to report the exact error message you received.

- o **DETECTED THE FOLLOWING DEFECTIVE MEDIA:**

Try running HDFIXUP. If HDFIXUP cannot repair the defective media, run HDFORMAT.

- **ERROR=> EXCESSIVE DEFECTIVE MEDIA.
CALL SERVICE CENTER.**

Contact your service center. Be sure to report the exact error message you received.

4. HDFORMAT

HDFORMAT reformats the hard disk. A reformatted hard disk is in the same state as when it left the factory. Run HDFORMAT on a newly installed hard disk before using it to correct errors that may have occurred during shipment.

HDFORMAT destroys all data written to the hard disk. Run HDFORMAT on a hard disk containing data only if you cannot access the hard disk or large portions of the hard disk. HDFORMAT is a last resort before replacing the hard disk.

You can run HDFORMAT only on hard disk drives that have a valid drive label header.

4.1 HDFORMAT OPERATION

Load HDFORMAT by typing:

hdformat(cr)

During initialization, HDFORMAT reads the drive header and identifies the drive as a valid drive type. If the drive header cannot be read or if the drive is the wrong type, an error message is displayed, and the program terminates. Otherwise, the program initializes the controller, and the code is set to format the drive. Before formatting begins, you are prompted to OK the format.

During the format, HDFORMAT:

- 1) Deletes the inservice diagnostic track from the bad track list. When the format is done, a new inservice diagnostic track (probably the same physical track) is added to the bad track list.
- 2) Reads the drive label, formats and checks track 0, and writes the drive label to track 0.
- 3) Formats the entire disk.
- 4) Records newly discovered defective track locations on the drive label.
- 5) Prompts you to identify tracks to be permanently recorded on the defective media list.
- 6) Logs the identified tracks in the drive header and writes the new drive header to the disk.

- 7) Displays the number of bad tracks and the percentage of the total number of tracks that are bad.
- 8) Positions the heads to the innermost cylinder and terminates.

If non-media errors are found, HDIFORMAT terminates.

4.2 HDIFORMAT ERROR MESSAGES

The HDIFORMAT error messages follow:

- o **ERROR=> UNABLE TO CONFIRM DRIVE LABEL.
CALL SERVICE CENTER.**

Contact your service center. Be sure to report the exact error message you received.

- o **ERROR=> DETECTED DEFECTIVE ELECTRONICS.
CALL SERVICE CENTER.**

Contact your service center. Be sure to report the exact error message you received.

- o **DETECTED THE FOLLOWING DEFECTIVE MEDIA:**

Try running HDFIXUP. If HDFIXUP cannot repair the defective media, run HDIFORMAT.

- o **ERROR=> EXCESSIVE DEFECTIVE MEDIA.
CALL SERVICE CENTER.**

Contact your service center. Be sure to report the exact error message you received.

5. MAINTENANCE UTILITIES ERROR MESSAGES

5.1 HDSETUP ERROR MESSAGES

HDSETUP error messages are listed below in alphabetical order:

- o **Bad filename. Cannot create file.**

You may encounter this error message while creating a file for use with AUTOSET. The program terminates; the hard disk is not affected. Try again using a legal file name.

- o **Cannot close data file.**

You may encounter this error message while creating a file for use with AUTOSET. The program terminates; the hard disk is not affected.

- o **Cannot create file with two hard disks present.**

You cannot create a file for use with AUTOSET when more than one disk is present. This is because AUTOSET operates on only one disk. Disconnect all but the first drive and try again.

- o **Cannot delete primary boot volume.**

You tried to delete the primary boot volume. If you want to delete this volume, first get to the Assign menu and redesignate the boot volume.

- o **Controller error. Unable to reset hard disk.**

This indicates a hardware error. Check that the power is on for all disk drives. If the power is on, run HDTEST.

- o **Disk 0 is not initialized. You cannot configure until disk 0 is initialized.**

You must initialize disk 0 before you can create volumes.

- o **Disk reading error.**

Run HDTEST to check for errors. If HDTEST reports a media error, run HDFIXUP.

o **Error while writing data file.**

You may encounter this error message while creating a file for use with AUTOSET. An error occurred during a write. The program terminates; the hard disk is not affected.

o **Error writing FATS and directory.**

Run HDTEST to check for errors. If HDTEST reports a media error, run HDFIXUP. If the problem still persists, run HDFORMAT.

o **Error writing drive label backup.**

The hard disk is in the same state it was in before you ran HDSETUP. Run HDFORMAT if you just ran HDFIXUP and then tried to reinitialize the hard disk. HDFORMAT will set the mapping correctly.

o **Error writing new volume label with assignments.**

Run HDTEST to check for errors. If HDTEST reports a media error, run HDFIXUP. If the problem still persists, run HDFORMAT.

o **Error writing new volume label.**

Run HDTEST to check for errors. If HDTEST reports a media error, run HDFIXUP. If the problem still persists, run HDFORMAT.

o **Error writing newly freed volume label.**

Run HDTEST to check for errors. If HDTEST reports a media error, run HDFIXUP. If the problem still persists, run HDFORMAT.

o **Error writing valid drive label.**

Run HDTEST to check for errors. If HDTEST reports a media error, run HDFIXUP. If the problem still persists, run HDFORMAT.

o **Error writing volume label with new assignments.**

Run HDTEST to check for errors. If HDTEST reports a media error, run HDFIXUP. If the problem still persists, run HDFORMAT.

o **Invalid syntax in command line.**

Retype the command line for loading the utility correctly.

o **Memory error.**

The utility ran out of memory while executing. You must add memory to accommodate your current volume configurations.

o **No configured volumes on disk 0.**

You must create volumes on disk 0 before you can make drive assignments.

o **No assignments exist on the current primary boot volume.**

Get to the Assign menu and assign drives for the volumes on your hard disk.

o **No hard disk drives exist.**

No hard disk drives are connected to your system.

o **No primary boot volume exists.**

Get to the Assign menu and designate a primary boot volume.

o **One of the current drive assignments is invalid.**

Get to the Assign menu to view your drive assignments. Reassign valid volumes to drives that are marked with a line of asterisks (*).

o **Specified disk does not exist.**

The disk you specified is not present on your system. Try specifying a disk number that is less than the one you just entered.

o **That name has already been used. Choose another.**

You cannot name two volumes with the same name. Type another name.

o **The chosen capacity is too small. The minimum size is 20Kbytes.**

Type another capacity that is equal to or greater than 20 Kbytes.

o **The entered number of directory entries was too large. It has been adjusted.**

You requested a larger number of directory entries than is possible for the given capacity and AU size. The number has been adjusted to reflect the largest number of directory entries possible.

- o **The primary boot volume is invalid.**

The primary boot volume is no longer valid. Get to the Assign menu and redesignate the primary boot volume.

- o **The requested capacity is too large for current space availability.**

You requested a capacity that is larger than the space available on the disk. The default capacity displayed is the maximum you can request.

- o **The same volume cannot be assigned twice.**

Choose a different volume to assign to the current drive letter.

- o **The selected volume is a free volume. You cannot delete it.**

Move the cursor to the non-free volume you wish to delete and try again.

- o **The selected volume is not free. Please choose another volume.**

You cannot add a non-free volume. Move the cursor to a free volume and try again.

- o **You cannot make assignments without first choosing a boot volume.**

The primary boot volume is invalid. Designate a valid primary boot volume.

- o **You must assign a floppy drive.**

Get to the Assign menu and assign a floppy drive. If you have only one floppy drive, be sure to assign RIGHTFLOPPY.

- o **You must assign the primary boot volume.**

Get to the Assign menu and assign the primary boot volume to a drive letter.

5.2 HDFIXUP ERROR MESSAGES

5.2.1 ERROR MESSAGES FOR REPAIRABLE ERRORS

After repairing errors, HDFIXUP displays the following message:

Data Retrieved from Logical Track XX.

It then lists the error location for each error that was recovered or repaired:

Error XXXX was fully recovered at Sector:
Physical XX, Logical XX, Virtual XX in Volume XX.

OR:

Error XXXX was best repaired at Sector:
Physical XX, Logical XX, Virtual XX in Volume XX.

It then tells you:

Data Redirected to Logical Track XX.

In the error location messages, the sector is identified with three different numbers: physical, logical, and virtual. The logical number is the number given to the sector after the disk has been formatted (defective sectors found during formatting are excluded from the numbering scheme). The virtual number is the logical number minus the starting sector number of the virtual volume. **The virtual number is the number used by the DOS in file operations.** The volume number is the number shown in the HDSETUP Configuration menu.

5.2.2 ERROR MESSAGES FOR NONREPAIRABLE ERRORS

HDFIXUP displays one of two basic messages to indicate nonrepairable errors:

Contact SERVICE CENTER.
Cannot repair media - No changes made.

OR:

Contact Service Center.
Drive repair not completed.

The following messages may be displayed with the preceding messages. Be sure to report all error messages exactly when you contact your service center:

- o Drive is not responding. Error XX
- o Error is not media related.
- o Read Error XX at Sector:
Physical XX, Logical XX, Virtual XX in Volume XX.
- o Write Error XX at Sector:
Physical XX, Logical XX, Virtual XX in Volume XX.

- o Verify after Write Error at Sector:
Physical XX, Logical XX, Virtual XX in Volume XX.
- o Bad Backup Drive Label:
- o Bad Master Drive Label: Initialized or unknown Revision.
- o Bad Master Drive Label: Null Working Media List.
- o Bad Master Drive Label: Regions are not on track boundaries.
- o Master Drive Label and Backup Drive Label do not match.
- o Error while building New Label, System Error X.
- o Error while building New Label, expanded beyond maximum size.
- o Unrecoverable Error occurred while updating Backup Drive Label.
- o Unrecoverable Error occurred while updating Master Drive Label.
- o There are XX bad tracks and only XX spares available.

5.3 HDTEST ERROR MESSAGES

The HDTEST error messages follow:

- o ERROR=> CANNOT FIND DIAGNOSTIC TRACK
MUST RUN HDFORMAT IN ORDER TO RUN DIAGNOSTICS

You must reformat the disk with HDFORMAT.
- o ERROR=> UNABLE TO CONFIRM DRIVE LABEL.
CALL SERVICE CENTER.

Contact your service center. Be sure to report the exact error message you received.
- o ERROR=> DETECTED DEFECTIVE ELECTRONICS.
CALL SERVICE CENTER.

Contact your service center. Be sure to report the exact error message you received.
- o DETECTED THE FOLLOWING DEFECTIVE MEDIA:

Try running HDFIXUP. If HDFIXUP cannot repair the defective media, run HDFORMAT.

- o **ERROR=> EXCESSIVE DEVECTIVE MEDIA.
CALL SERVICE CENTER.**

Contact your service center. Be sure to report the exact error message you received.

5.4 HDFORMAT ERROR MESSAGES

The HDFORMAT error messages follow:

- o **ERROR=> UNABLE TO CONFIRM DRIVE LABEL.
CALL SERVICE CENTER.**

Contact your service center. Be sure to report the exact error message you received.

- o **ERROR=> DETECTED DEFECTIVE ELECTRONICS.
CALL SERVICE CENTER.**

Contact your service center. Be sure to report the exact error message you received.

- o **DETECTED THE FOLLOWING DEFECTIVE MEDIA:**

Try running HDFIXUP. If HDFIXUP cannot repair the defective media, run HDFORMAT.

- o **ERROR=> EXCESSIVE DEFECTIVE MEDIA.
CALL SERVICE CENTER.**

Contact your service center. Be sure to report the exact error message you received.

