DAVONG

Davong Multi-OS™

IBM® PC and XT
128K Minimum
IBM® DOS

Software
Installation
Manual

A0384-03-000031

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Preface

This manual contains the instructions you need to install Multi-OS™ support for IBM® DOS. You can choose to install the software with the quick installation (QINSTMOS) program or the full-feature installation (INSTMOS) program.

If you choose the full-feature installation program, you are asked to make decisions about allocating the space on your hard disk drive and naming your master directory (also called the drive name). This installation requires a more experienced person than the quick installation.

After you complete the installation, you can create a hard disk boot volume. This allows you to boot directly from the hard disk without using a floppy diskette. Then you can choose to restore any previously backed up files, or explore the HDMGR program options in the *Multi-OS/Davong MultiLink Utilities Manual*. These options will allow you to manage your hard disk drive's storage space.

Chapter 4 of this book describes the utility programs you can use with IBM DOS. You may recognize some of them if you are familiar with DOS. When you are finished with the software installation, you can choose to remove Chapter 4 from this manual and insert it as Chapter 4 in your *Multi-OS/Davong MultiLink Utilities Manual*.

The appendices contain information about the workings of your hard disk and the way it stores and retrieves information. You will also find error messages, technical information for more advanced users, and troubleshooting tips for your hard disk drive.

How to Use This Manual

The following table shows you the chapters you should read for the task you want to perform. Look carefully. You may fall into more than one category.

	Read:							
	Chapter				**Appendix**			
If you want:	**1**	**2**	**3**	**4**	**A**	**B**	**C**	**D**
To install your first DOS operating system quickly and easily.	✓	✓			✓			
To install your first DOS operating system with more than one volume.	✓	✓			✓			
To add DOS to an existing operating system's disk.	✓		✓					
To format a floppy-size volume as a floppy-equivalent.	✓			✓				
To upgrade to a new DOS or new Multi-OS version.		✓						
To create your own program patches.						✓		
To troubleshoot your hard disk drive.						✓	✓	✓
To use an IBM-compatible computer.						✓		

Chapter

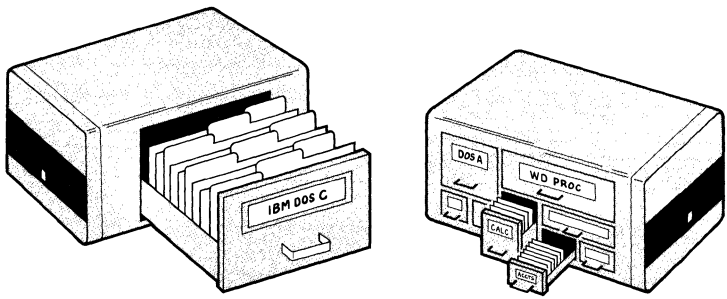
1

Getting Started

Give yourself a pat on the back! You now own the most versatile hard disk management software package available today—Davong's Multi-OS™. Multi-OS is the liaison between your IBM® operating system and your hard disk. With Multi-OS, your computer "sees" your hard disk as one or more *very large* floppy diskettes.

When you receive your hard disk, it is like an empty file cabinet. You can insert one large "file drawer" or several smaller file drawers (Figure 1-1).

Figure 1-1. Dividing Your Hard Disk Space



Single-Volume system

Multiple-Volume system

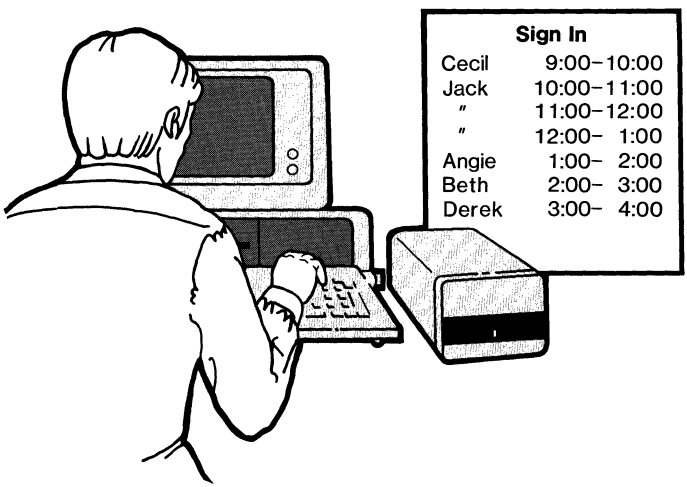
Each file drawer is called a *volume*. Because you are filling these volumes with information, or data, they are called *data volumes*. You can store application programs, data files, batch files, and so forth in data volumes just like floppy diskettes.

In addition to being the liaison to your hardware, Multi-OS also offers a group of powerful utility programs that you can choose to use to manage your volume(s) exactly as you would floppy diskettes. You can copy information from one volume to another, delete information within a volume, or even delete the volume itself.

No matter how few or how many volumes you have on your hard disk, you still have the advantage of a centralized source for your data and "no waiting" for a particular program to be loaded from a floppy diskette. You can access any of your hard disk volumes within milliseconds.

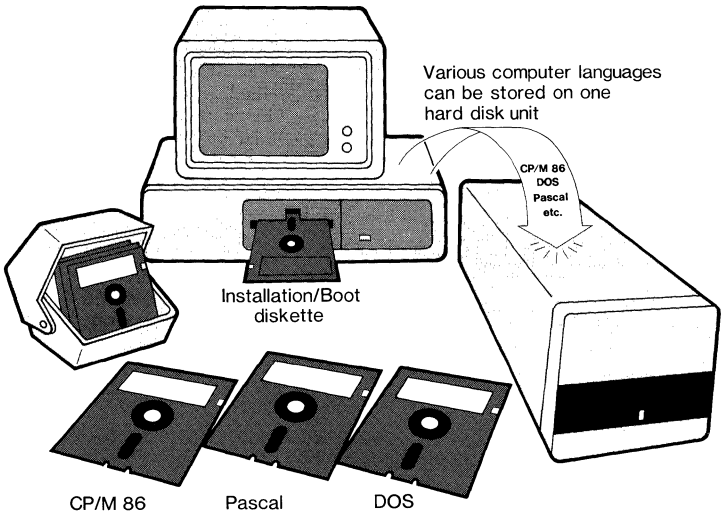
Even if you choose to share your IBM computer with other people in your office, you do not need to worry about your data being mishandled. Each person can use the computer as though he or she is the *only* user. You can add security so that *you* specify who can look into your volumes. You may have some volumes that you do not want anyone to open. Figure 1-2 illustrates a multi-user system where each person has assigned time slots.

Figure 1-2. Sharing Your IBM Computer System



Multi-OS™ can provide support for the IBM Disk Operating System (DOS) as well as the UCSD Pascal™, CP/M-86™, and Concurrent CP/M™ disk operating systems (see Figure 1-3). These disk operating systems and their associated programs can reside on your Davong Hard Disk or IBM® XT simultaneously. If you install all of them, you simply select the one you need to use.

Figure 1- 3. Multi-OS Support



The Multi-OS software provided with this manual allows you to install support for IBM DOS 1.1 or 2.x; you may purchase separate Multi-OS support packages for Pascal and CP/M from your dealer.

To install your new Multi-OS software, you must:

- initialize your hard disk drive(s),
- name your hard disk, and
- create a boot diskette.

Required Equipment

Before you start these tasks, make sure you have the following equipment.

- An IBM PC, IBM XT, or IBM-compatible computer
- A minimum of 128K of computer memory (although some applications can require additional memory)
- At least one hard disk drive attached to your computer using either an IBM XT or Davong disk controller board
- Your IBM DOS systems diskette (1.1, 2.0, etc.)
- Your DSI Multi-OS™ Installation/Boot Disk
- Your DSI Multi-OS™ Quick Installation/Boot Disk
- Your DSI Multi-OS™ Utilities Disk
- Four blank diskettes.

If you have not yet physically attached your hard disk to your computer, refer to the installation documentation that accompanied your Davong product.

If you have the equipment listed above and your hard disk is attached to your computer, you are now ready to boot your system.

Booting Your System

You need to load the contents of the IBM DOS systems diskette into your computer's memory. To do this, make sure the computer and any peripheral equipment, such as your hard disk(s), are turned off. Use the following procedure to boot the system.

1. Insert your IBM DOS systems diskette into the floppy disk drive. If you have more than one floppy drive, insert the diskette into the left floppy drive. Close the disk drive door.

2. Turn on your hard disk drive(s) and any other peripheral equipment.

3. Turn on your IBM computer.

4. The screen displays prompt messages for you to answer. Refer to your IBM DOS manual on "Starting DOS" if you do not know how to answer these questions.

5. When the system is completely booted, you should see a letter prompt followed by a greater than (>) symbol. More than likely, your IBM screen is displaying an A>. You are asked to enter time and date.

6. Remove your IBM DOS systems diskette and set it aside. You will need this diskette later in your installation.

You also need to make backup copies of each of the diskettes provided with this Multi-OS software package. Make one copy of the DSI Multi-OS Utilities Disk and two copies of the DSI Multi-OS Installation/Boot Disk. If you choose to use the Quick Installation, you also need to make a copy of your DSI Multi-OS Quick Installation/Boot Disk. *You must use the Diskcopy command to make the copies.* When you have made your copies, you should have the diskettes shown in Table 1-1.

Table 1-1. Making Working Copies

Diskette To Copy	**Label Copied Diskette**
DSI Multi-OS Utilities Disk	**Multi-OS Utilities Backup (#1)**
DSI Multi- OS Installation/Boot Disk	**Multi-OS Installation/Boot Backup (#2)**
	Multi-OS DOS Master Boot (#3)
DSI Multi-OS Quick Installation Boot	**Multi-OS DOS Master Quick Boot (#4)**

See Appendix A for instructions on backing up diskettes. All diskettes are single-sided with 8 sectors per track. You cannot format your diskette copies as double-sided diskettes.

WARNING:

If you have any files on an existing hard disk that you want to save, you must back them up on either floppy diskettes or tape cartridges before you begin this installation. This installation will destroy the contents of your hard disk. *You must use the IBM Backup utility program to back up IBM XT hard disk files.*

Store the original diskettes in a safe place as well as the DSI Multi-OS Installation/Boot Backup diskette (#2). You will be using the Utilities Backup (#1) and either the Multi-OS Master Boot (#3) or the Multi-OS Master Quick Boot (#4) diskettes.

You are now ready to install your Multi-OS software. Chapter 2 gives you a choice of two installation programs. QINSTMOS allows even an inexperienced person to complete the installation easily and painlessly. INSTMOS, on the other hand, allows a more sophisticated user to take advantage of the many features the software has to offer.

Chapter

2

Installing DOS Under Multi-OS

To use the many capabilities of Multi-OS, you need to have an operating system installed on your hard disk. This chapter covers the procedures by which you can install Multi-OS support for IBM DOS. The chapter explains the different versions of the installation program, so you can turn to the section that describes what you want to do.

Section 1 contains the procedures for a "quick and easy" DOS installation. All you have to know is the size of your master disk drive. The quick installation program will do everything else for you except insert the appropriate diskettes for you. If you have never installed an operating system on a computer before and are unsure as to what to do, turn to Section 1.

Section 2 contains the procedures for installing DOS as the first operating system on your system. Not only do you need to know the size of your hard disk, but you will be asked to make decisions about the percentage of the available hard disk space you want to allocate into volumes. This section shows you how to choose one of the default volume allocations provided by Davong Systems, Inc. If you use this procedure, you will erase everything you currently have on your hard disk.

If you have files on your disk that you want to keep, be sure to back them up to floppy diskettes, a tape cartridge, or to another hard disk drive. Both of these installation programs erase all data from the hard disk drive.

Section 1 Installing DOS The Easy Way

Installing a hard disk operating system for the first time and want an easy way to do it? Then, this is the section you want. The QINSTMOS program only requires that you insert the correct diskettes when you are prompted to do so.

To use this simple installation program, you need to have

- your DOS system diskette,
- your Master Quick Boot Diskette (#4), and
- a minimum of 128K of memory in your IBM computer.

If you followed the instructions in Chapter 1, "Getting Started", you should have a copy of the Davong Multi-OS DOS Quick Installation/Boot Diskette that you have labeled as Master Quick Boot Diskette (#4).

Use the following steps to install your hard disk. Figure 2-2 illustrates these steps.

1. Insert your IBM DOS system diskette in the left floppy drive. Close the drive door.

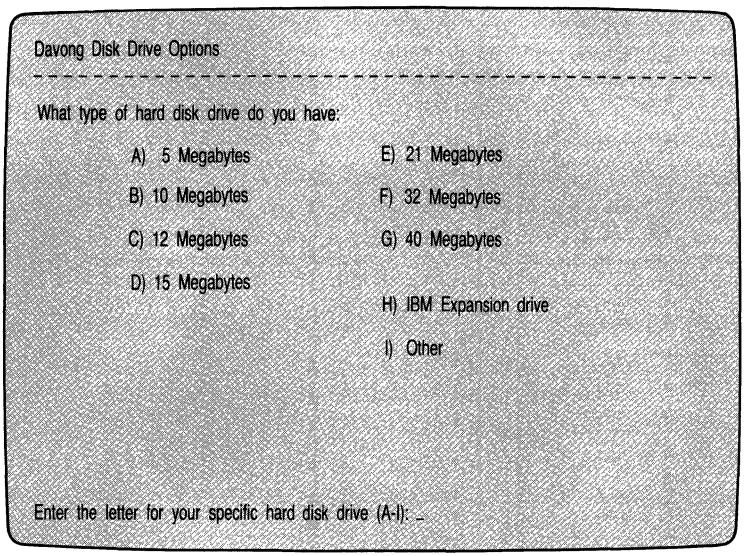
2. If your drive and computer are turned off, turn them on; otherwise, press the <**Ctrl**><**Alt**><**Del**> keys simultaneously.

3. Answer the questions displayed on the screen regarding date, time, etc.

4. Remove your IBM DOS system diskette and insert your Master Quick Boot (#4), when the system prompt appears (usually A>),

5. Type **qinstmos** and press the ◄┘ (Enter) key. The program displays the following screen.

Figure 2-1. Disk Drive Sizes



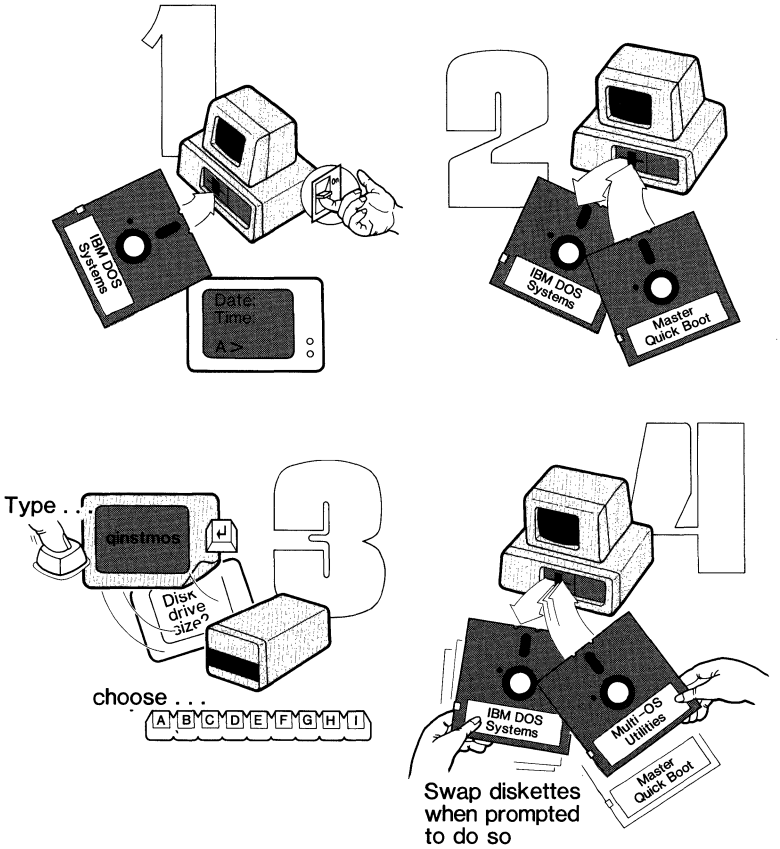
Select the letter that matches your drive size. For instance, to install a 15-megabyte drive, type **D**. If you have a 34-megabyte drive, select F to install it as a 32-megabyte drive. The system will still recognize it as a 34-megabyte drive.

If you have a slave drive that you purchased from IBM, select option H.

If you are using a drive other than a Davong drive or IBM slave, select option I. However, you must be using a Davong or XT disk controller card. Refer to Chapter 3, Section 1 of this book.

The screen will presently prompt you to insert your DOS system diskette and your Multi-OS DOS Installation/Boot Diskette (alternately). When it asks for the latter, insert your Master Quick Boot Diskette (#4).

Figure 2-2. Installing DOS x.x Using the QINSTMOS Program



The QINSTMOS program performs the following tasks for you.

1. Initializes the first attached hard disk it finds on your computer.

2. Verifies the size of your hard disk drive.

3. Assigns the name of ROOT to your hard disk drive.

4. Installs the operating system you used when you turned on your system (either DOS 1.1 or DOS 2.x).

5. Creates one large volume with a default name of IBM DOS C (so that the configuration looks like an IBM XT).

Copying Utility Programs To Your Hard Disk

Having completed the first part of the quick installation, the program prompts you to copy your IBM DOS utility programs to the hard disk volume. Then you are prompted to copy your Davong Multi-OS utility programs to the same volume. These utility programs will replace several of the IBM utilities with utilities that work with your hard disk.

QINSTMOS Volume Configuration

After the QINSTMOS program completes, your system will be configured as:

A: :F1 (floppy drive 1)
B: :F2 (floppy drive 2)
C: IBM DOS C (large hard disk volume) with Read and Write access
D:
E:
F:

In a single-drive system, you do not have two floppy drives. The floppy drive 2 shown as volume B: is a "logical" floppy in a single floppy drive system.

Restoring Backed-up Files

If you previously backed up the files from your hard disk, you can now restore them to volume C:. The RESTORE task writes over the utility programs already on your hard disk. Therefore, you must recopy your Multi-OS utility programs to volume C: using the COPY command.

Repeating the QINSTMOS Program

If you run QINSTMOS a second time, it will only change the boot volume and Master Quick Boot Diskette; it does not reformat the hard disk nor does it erase any existing volumes.

Your installation is now complete. You may want to read Chapter 4 to understand the utility programs you can use with DOS, or read the *Multi-OS/Davong MultiLink Utilities Manual* to understand the options you can use with Multi-OS.

To reboot your system with the hard disk installed, make sure you have your Master Quick Boot Diskette (#4) in the floppy drive and press <**Ctrl**><**Alt**><**Del**>.

Section

2 Installing a First Operating System Under Multi-OS

In this section, you will use the INSTMOS program to install DOS under Multi-OS as your first operating system on either a master or slave drive. If you want two versions of IBM DOS (for instance, 1.1 and 2.0), use these instructions to install the earlier version. The first step in installing Multi-OS into your current system is to initialize your hard disk drive(s). You do not need to read this chapter if you have just installed your hard disk drive with QINSTMOS.

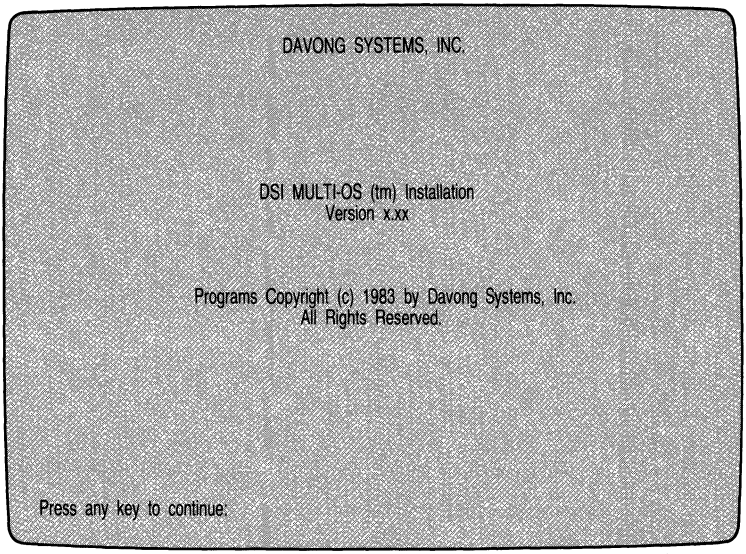
You should see an A> prompt on your screen because you booted from your DOS diskette.

1. Insert your Master Boot Diskette you created in the last chapter in the left floppy drive. Be sure to close the drive door.

2. Type **instmos** and press ◄┘. This command starts the hard disk installation program.

   The screen displays the following information.

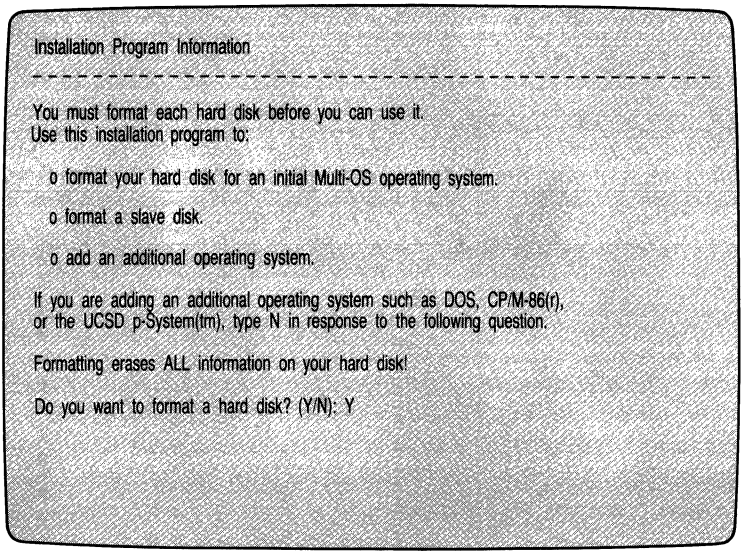
Figure 2-3. Hard Disk Initialization Screen



When you press ◄┘ (or any key to continue), there may be a 60-second delay while the program checks for active disk drives. This screen simply asks you to wait. After it has checked for any active drives, the program clears the Checking for Active Drives screen and displays a screen similar to Figure 2-4.

Be very careful before you answer the prompt message on the following screen. If you answer Y to the prompt message at the bottom of the screen, you may erase the contents of the previously initialized drive. This is the reason it is important for you to have backed up all your data.

Figure 2-4. Installation Information Screen



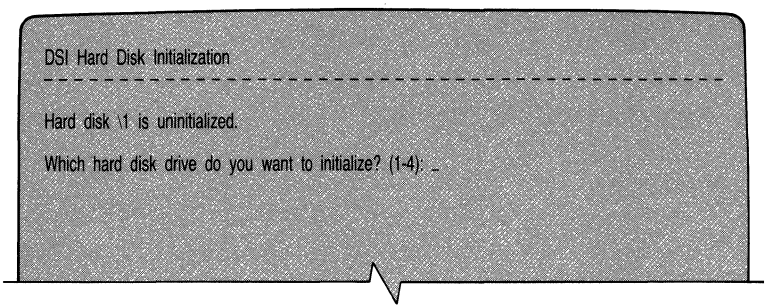
Accept the default Y answer to the above question because you are installing DOS under Multi-OS as the first system on a drive.

WARNING:

If you have any files on your hard disk that you want to save, do *not* format your disk drive.

When you press the ◄┘ key, the screen clears and displays a new screen similar to Figure 2-5.

Figure 2-5. Attached Drive List



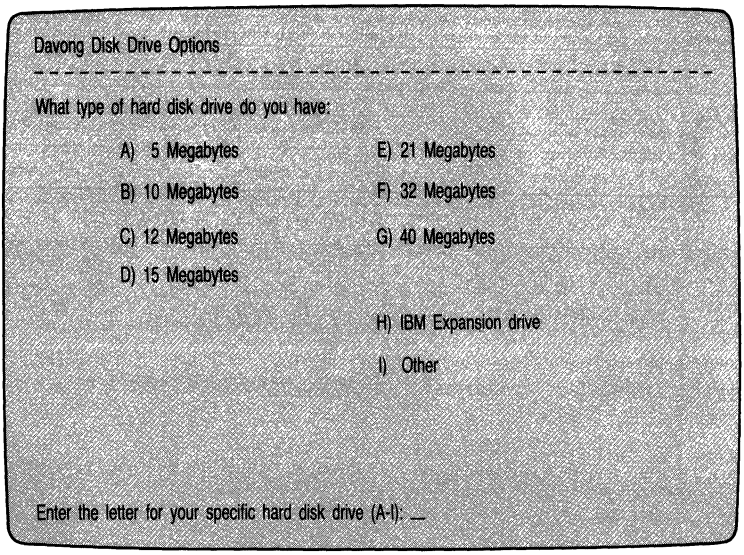
If you have only one drive attached to your computer, the screen will display only the first drive and whether or not it is initialized. If you have multiple drives attached, the screen displays each. You simply select the number for the drive you want to initialize.

Note:
If you are installing Multi-OS on an IBM XT, you will get a slightly different screen than the one shown above. You will only be given a choice of two drives from which to choose; e.g., Which hard disk drive do you want to initialize? (1-2). You will not see Figure 2-6.

Enter the number that matches the drive you have installed and press ◄┘; e.g., **1**.

Figure 2-6 displays a list of drive types. You must select the letter of the drive that matches the drive you have attached to your IBM PC.

Figure 2-6. Disk Drive Types



If you have a slave drive for your XT that you purchased from IBM, select option H.

If you are using any drive other than a Davong drive or IBM slave, select option I. Refer to Chapter 3, Section 1 of this book for the parameters you must enter for a custom drive.

For purposes of explaining the utility program options, we will choose option D designating that a 15-megabyte hard disk is attached to the IBM PC.

Naming Your Hard Disk Root Volume

You must have a name for the root volume on your disk so that you can reference it later. This root volume is the "master" disk directory through which all the other disk subdirectories and volumes are referenced. Names for this master directory must follow certain rules.

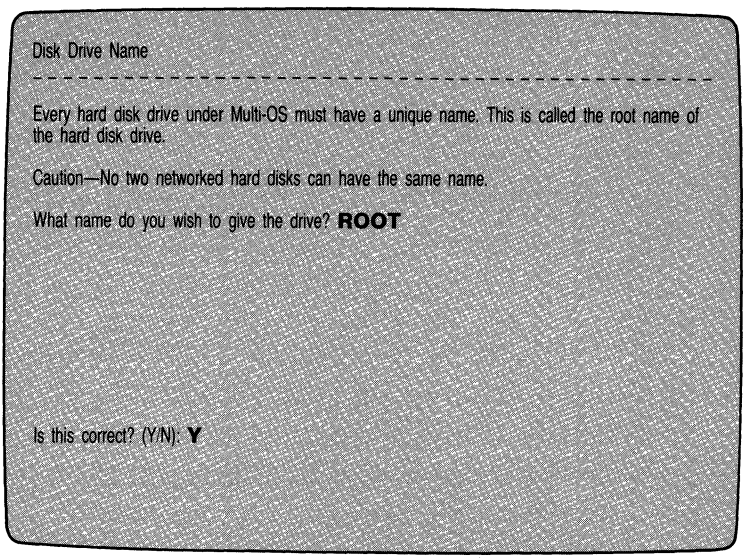
1. This name can be up to 16 characters; for example, DOS1, ROOT, MYDISK, 14CECIL, SAGGITAL CREST.

2. You cannot use characters that don't print on the screen; for instance, keys that you press in conjunction with the <**Ctrl**>.

3. You cannot use commas, hyphens, back slashes, colons, semi-colons, or the equals symbol.

4. You cannot use the characters \1 through \4. (These are used exclusively for drive designations.)

Figure 2-7. Default Responses for Drive Name



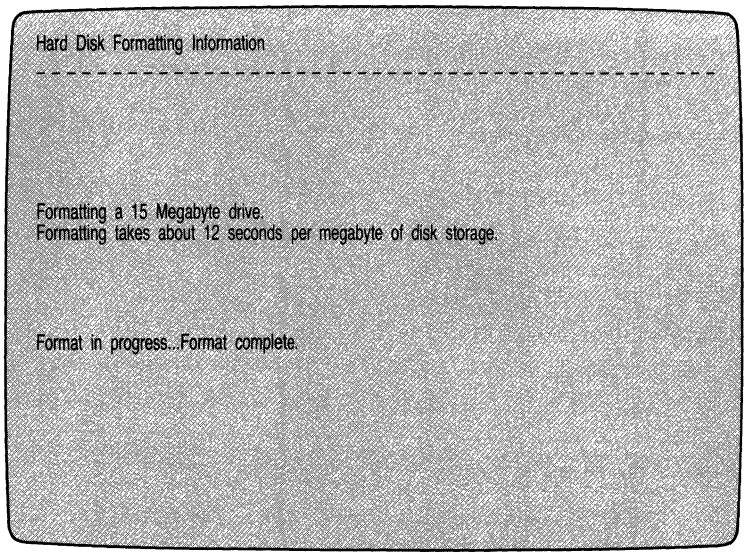
In this example, we have accepted the name of ROOT. Had we already had one drive named ROOT, we would have had to select another. Also, if you are currently using Davong MultiLink™ or are planning to use it, you must assign a unique name to each drive. You cannot have two drives with the same name.

For the rest of this manual, we will use the name \ROOT to refer to the first hard disk drive on the system. For this entry, as with all entries, you will need to press <**Ctrl**><**End**> if you enter a shorter name than the one given as the default.

Formatting Your Hard Disk

This formatting process writes the information to your disk and creates the volumes on the disk. It also erases any files that currently reside on your hard disk.

Figure 2-8. Formatting Your Disk

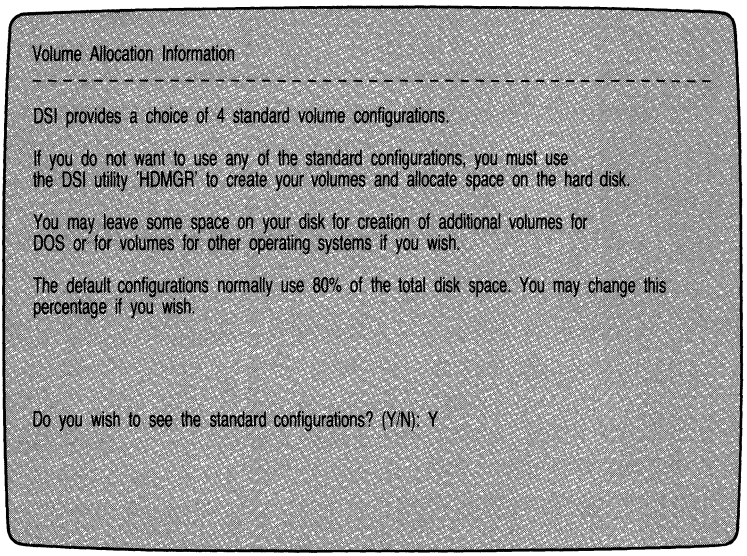


When the formatting begins, you will see a message Format in progress. . . When the formatting is completed, you have a "clean" hard disk on which to store your files.

Allocating Volumes

You can divide the memory space on your hard disk into separate areas. Each area of disk space is called a volume. For additional information about volumes, read Appendix A, Section 3. The first screen, shown in Figure 2-9, is an explanatory screen about the Davong standard volume allocations. Davong provides four standard volume configurations from which you can choose.

Figure 2-9. Information Screen About Volume Allocation



The default answer for the prompt message is Y. Leave the Y answer and press the ◄┘ key, unless you are sure you do not want one of the standard configurations.

You can look at Figure 2-10 to see whether or not you want to select one of the standard configurations. If you do not, type **N** and press ◄┘. Then go to the end of this section and read "Defining Your Own Volume."

Choosing a Standard Allocation

Davong Systems, Inc. provides a choice of four standard volume allocations. You can choose to divide your disk space according to one of these standard configurations, or you can use the DSI utility program, HDMGR, to create your own volumes and sizes of volumes. The HDMGR program is explained in the *Multi-OS/Davong MultiLink Utilities Manual* that you received with your purchase.

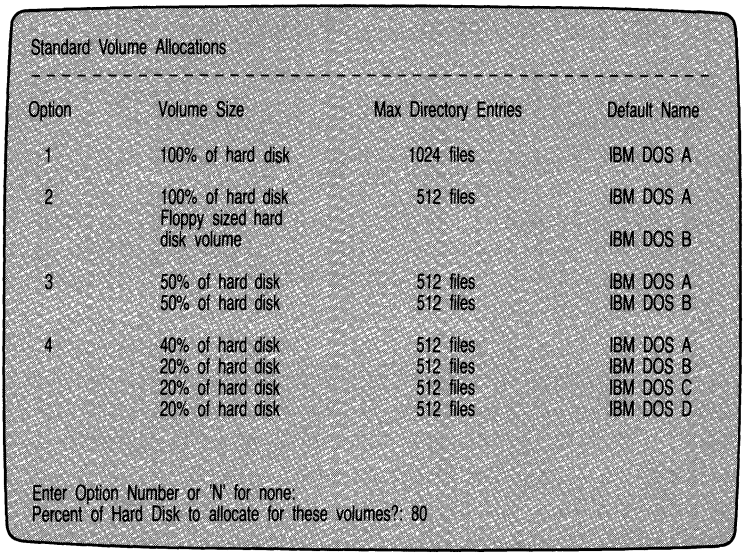
Option 1 creates one large volume on your hard disk as IBM DOS A.

Option 2 creates one large volume and allocates space for a floppy-size volume (360K). The size of the hard disk volume depends on the size of your hard disk. The floppy-size volume is the same size as a DOS 2.x floppy diskette, and after you format it, you can use it just as you would a floppy. (See the FORMAT, DISKCOPY and DISKCOMP commands in Chapter 4. Your operating system must be at least version DOS 2.0 to use the last two programs.)

Option 3 creates two volumes of equal size on your hard disk with the default names of IBM DOS A and IBM DOS B.

Option 4 creates one large volume and three smaller volumes on your hard disk. As you can see, the default names are IBM DOS A through IBM DOS D.

Figure 2-10. Standard Volume Allocations



Standard Volume Allocations

Option	Volume Size	Max Directory Entries	Default Name
1	100% of hard disk	1024 files	IBM DOS A
2	100% of hard disk	512 files	IBM DOS A
	Floppy sized hard disk volume		IBM DOS B
3	50% of hard disk	512 files	IBM DOS A
	50% of hard disk	512 files	IBM DOS B
4	40% of hard disk	512 files	IBM DOS A
	20% of hard disk	512 files	IBM DOS B
	20% of hard disk	512 files	IBM DOS C
	20% of hard disk	512 files	IBM DOS D

Enter Option Number or 'N' for none:
Percent of Hard Disk to allocate for these volumes?: 80

Notice that these standard configurations designate names for the volumes. These are default names. (You can use the Alter command in the HDMGR utility program to change the names of your volumes to whatever you want.)

If you selected one of the four configurations, you have allocated your volumes, each with a set size and name. If you enter **N** for none, you must allocate your volumes using the Create command in the HDMGR program. (See the *Multi-OS/Davong MultiLink Utilities Manual*.)

You know from the previous screen that the normal drive allocation percentage is 80%. This means that you have room to move files from one system volume to another, or even to have other operating systems on your disk. You can increase this percentage up to 100% or decrease it as low as 5% if you wish.

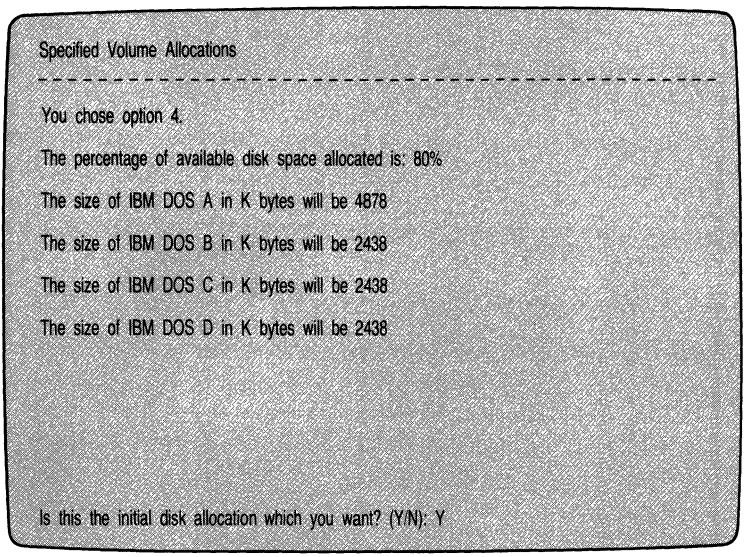
You also have an option to boot automatically from your hard disk drive. If you plan to take advantage of this option, you must leave enough space on your disk for the following volumes:

- 2K for each user hard disk boot volume
- 6K for the TURNKEY volume (most useful for Davong MultiLink users)
- 160K for the BOOT CODE volume
- 4K for the BOOTSECT volume
- 1K for each PATCH volume.

These volumes are explained in Chapter 3 of the *Multi-OS/Davong MultiLink Utilities Manual*.

Now you will see a screen verifying the configuration you chose, the percentage of allocated disk space, and the size of each volume in K bytes. For purposes of this example, we chose the fourth standard volume allocation configuration for the 15-megabyte Davong hard disk drive chosen earlier. Figure 2-11 shows the size of each of the default volumes.

Figure 2-11. Sample of Allocated Volumes



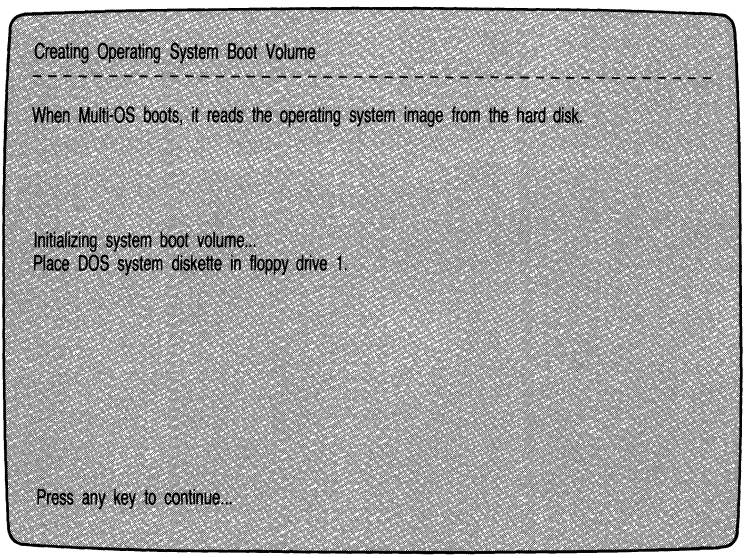
You must now make sure this information is exactly what you want. If it is, press ◄┘ in response to the prompt message default answer at the bottom of the screen. If you type N and press ◄┘ in response to this message, the program returns you to the Volume Allocation Information screen (Figure 2-8). Select the allocation you want.

You have now completed allocating your volumes. Now you need only a hard disk boot volume for your operating system to complete your hard disk installation.

Creating A Boot Volume

You need to have the required operating system files on your hard disk. In fact, when you boot your Multi-OS program, it reads the operating system image from the hard disk. It is faster and more efficient than reading the information from a floppy. You still use your Master Boot Diskette to check your password and access rights.

Figure 2-12. Boot Volume Information Screen



When you see the prompt message Place DOS system diskette in floppy drive 1, remove the Master Boot Diskette from your floppy drive. Now insert the proper IBM DOS diskette into the floppy drive and press the ◄┘ key or any other key. The program will compare your inserted diskette with the operating system under which you booted up and initializes a boot volume.

You are prompted to enter your name. Pick a name up to 16 characters, type it on the screen and press ◄┘. Then, type **N** and press ◄┘ when you see Change boot options?.

Viewing the Mount Table

When the system is completely booted, it will show you the volumes you have mounted for each drive label. In our installation example, we chose one of the standard Davong volume allocations. Therefore the mount table will display as follows:

A: Hard disk volume IBM DOS A
B: Hard disk volume IBM DOS B
C: Hard disk volume IBM DOS C
D: Hard disk volume IBM DOS D
E: Floppy drive 1
F: Floppy drive 2

Copying Your Utility Programs

For convenience, you need to have your utility programs on your hard disk. The screen will prompt you to enter your IBM DOS systems diskette so that it can copy your IBM DOS utility programs. You will then be prompted to insert your Davong Multi-OS Utilities Diskette (#2). This will replace several of the IBM utility programs with those that work with your hard disk.

This completes the installation of Multi-OS DOS version on one hard disk. If you have more than one hard disk, you will have to remove your Master Boot Diskette, insert your DOS diskette and reboot your system. You do this by pressing <**Ctrl**><**Alt**><**Del**> simultaneously. Turn back to the beginning of this section and repeat the INSTMOS procedures for each hard disk you want to install.

You can now use the HDMGR program to create or change your volumes. These program options are described in the *Multi-OS/Davong MultiLink Utilities Manual* that you received with your purchase.

Defining Your Own Volume

If you do not want to select one of the volume allocations provided by Figure 2-8, you type **N** for None on the Standard Volume Configurations screen. In selecting N, you allow the program to go directly to the Creating A Boot Volume screen; you create a boot volume, and reboot with your new options.

If you chose to define your own volumes, you will see a different mount table when you finish the installation program.

```
A: Floppy drive 1
B: Floppy drive 2
C: Not mounted
D: Not mounted
E: Not mounted
F: Not mounted
```

The following instructions guide you through creating one volume. This is a summary of steps. For a full explanation of all the options you have, refer to Chapter 3 of your *Multi-OS/Davong MultiLink Utilities Manual*.

1. Remove your Master Boot Diskette from the left floppy drive.

2. Insert your Multi-OS Utilities Backup Diskette into the left floppy drive.

3. Type **hdmgr** and press ◄┘.

4. Remove the Multi-OS Utilities Backup Diskette from the left floppy drive.

5. Insert your Master Boot Diskette (#3).

6. Select **C** from the HDMGR Options Menu.

7. Enter the volume name of your choice and press ◄┘.

8. Enter a new size for the volume (if desired). Press ◄┘.

9. Enter the maximum number of files to be placed in this volume, or you can leave the default entry. Press <**End**>.

10. Type **Q** to leave HDMGR.

11. Reboot your system and enter your name.

12. Type **Y** when asked to Change Boot Options. Press ◄┘.

13. Select **A** and assign your newly-created hard disk volume to volume A: and assign your floppy drive to volume F:. Press <**End**> to return to the Boot Options Menu.

14. Type **W** to write your changes. Type **:F1** as your boot configuration volume. Press <**End**>.

15. Type **Q** to leave the Boot Options program.

The system writes your changes to your Master Boot Diskette. The screen then displays the mount table and you are prompted to insert diskettes so that you can copy your DOS and Multi-OS utility programs to your hard disk volume.

In the above example, we did not assign any passwords or access rights to the volume. To do so, refer to Chapter 3 of your *Multi-OS/Davong MultiLink Utilities Manual*.

Section 3 Adding DOS as a Second System

You may already have one operating system on your hard disk, but want to add IBM DOS as a second operating system. As an example, you may want to have both DOS 1.1 and DOS 2.x on the hard disk. This means that you must make two boot diskettes.

Because DOS 1.1 has an upward-compatible directory structure with DOS 2.x, you ***must*** install DOS 1.1 before DOS 2.x. Simply boot and install DOS 1.1 as described in Chapter 2. Once DOS 1.1 is up and running under Multi-OS, you are ready to install DOS 2.x.

1. Insert your DOS systems diskette; in this case DOS 2.0.

2. Press <**Ctrl**><**Alt**><**Del**> to reboot your system.

3. Type **diskcopy a:b:** to make a copy of your Multi-OS Installation/Boot Diskette.

4. Remove your DOS systems diskette and insert your Multi-OS Installation Boot Diskette.

5. Label the copy **Master Boot Diskette (#3a).**

6. Insert Master Boot Diskette (#3a) in the left drive, type **instmos** and press the ◄┘ key.

7. The first screen prompts you to press any key to proceed. Press the ◄┘ key.

8. Press **N** and the ◄┘ key when asked whether you want to format the drive.

9. You should now get a screen that asks if you want to make a system boot volume on your hard disk. Press **Y** and ◄┘.

10. When prompted, place the appropriate diskette in the left drive and press the ◄┘ key.

11. When the boot volume creation is finished, the INSTMOS program returns you to the operating system prompt, A>.

You now have an IBM DOS 2.0 system boot volume on your hard disk.

To boot DOS 2.0 in the future, just insert the Master Boot Diskette you just made for DOS 2.0 into the left floppy drive and either power on your IBM PC or press <**Ctrl**><**Alt**><**Del**>.

DOS Utilities and COMMAND.COM

Both DOS 1.1 and 2.*x* can use the 1.1 version of the COMMAND.COM. This file must be present on your A: volume to boot the system.

However, if you use the DOS 1.1 version of COMMAND.COM to run DOS 2.*x*, you will not be able to use some of the DOS 2.*x* features. Also, many of the DOS 2.*x* utilities will not run under DOS 1.1, and many of the DOS 1.1 utilities will not run under 2.*x*.

Our preferred solution to this problem is to have two different A: volumes on your hard disk; one for DOS 1.1, and one for DOS 2.x. Then the DOS 1.1 volume; e.g,. IBM DOS A 1.1, can have all 1.1 utilities and COMMAND.COM, and the DOS 2.*x* volume; e.g., IBM DOS A 2.0, can have all DOS 2.*x* utilities.

To make two different volume A:s on your hard disk, run the HDMGR utility to Create or Alter the volumes, and then use the Boot Options screens to change the names of the volumes used as A: for each of DOS 1.1 and 2.0.

Any volumes to be shared should be created with DOS 1.1. Shared volumes cannot have DOS 2.*x* subdirectories.

Chapter

3

Installing Custom Versions

If you have selected to install a non-Davong Hard Disk System and need to enter the parameters for your own drive, you need to read Section 1 of this chapter. It displays the screen you need to complete.

If you have already installed a first operating system on your hard disk, you may need to know how to upgrade to a later version when it becomes available. Sections 2 and 3 give the steps you need to follow to upgrade both your DOS operating system and Multi-OS support software.

If you used QINSTMOS to install Multi-OS and now want several smaller volumes rather than one large volume, you can use the instructions in Section 4.

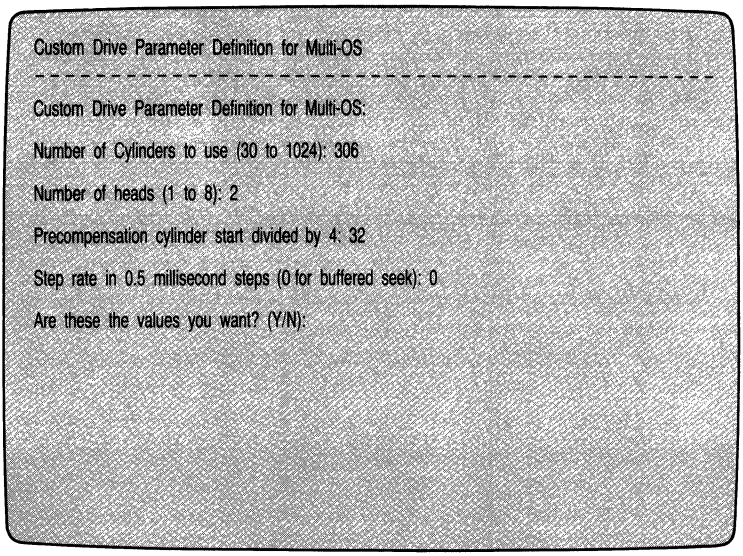
The *Multi-OS/Davong MultiLink Utilities Manual* describes the Boot Options utility program. However, you can use two of these options—Write and Turnkey— to create a hard disk boot volume. This allows you to eliminate using your Master Boot Diskette. See Sections 5 and 6.

The Turnkey command is also useful if you are on the Davong MultiLink network. You can use it to boot your particular configuration automatically, no matter how many people are on the network.

Section 1 Installing a Custom Drive

The program for installing either a standard (i.e., Davong Systems, Inc.) or custom hard disk drive is almost the same. However, you must still use a Davong or IBM XT controller card with your non-standard drive. If you are installing a custom hard disk drive, you must specify the parameters. Otherwise, the installation program will not be able to continue. In Chapter 2, you were asked to select option I if you were installing a custom drive. Choosing that letter displays a screen asking you to specify certain information about your drive. Refer to Figure 3-1 to view the screen and the default answers. If you do not know the required information about your drive, check the manufacturer's sheet that came with it. (These values are all given in decimal.)

Figure 3-1. Custom Drive Specifications and Defaults



If you make a mistake on entering the parameters, type **N** in response to the message Are all parameters correct? and press ◄┘. The program will place the cursor at the top of the list. Press ◄┘ until you reach the mistake and correct it. You can type the correct answer over the existing wrong answer. Press the ◄┘ key until you reach the last question.

When the parameters are correct, type **Y** and press the ◄┘ key.

You have now completed the procedure for defining your hard drives to the system. The next step is to name and format your drive.

You will see a screen asking you to verify the name \ROOT as the name for your drive. If you have only one hard disk, you can simply press ◄┘ to verify the name on the screen.

The program will then begin formatting the drive. This erases any data from the drive and prepares it for accepting volumes.

You can either select one of the standard volume configurations, or you can choose to create your own. If you choose to define your own volumes, press **N** when asked if you want to see the list of standard volume allocations. However, if you do wish to use one of the pre-defined volume allocations, return to Chapter 2, "Allocating Volumes."

Section

2 Upgrading to a Newer Version of DOS

The procedure for installing a newer version is similar to those you used to install your original IBM DOS software. Before you begin, make sure you have made copies of your new software diskettes.

You do *not* need to format your hard disk! If you have IBM DOS already running on your hard disk, the following procedure is all that you need to do to upgrade to the latest version.

1. Insert your newer version of your DOS systems diskette and press <**Ctrl**><**Alt**><**Del**>.

2. Insert your Master Boot Diskette into the left floppy drive.

3. Type **instmos** and press ◄┘ to begin the installation program.

WARNING:

You do ***not*** want to format your hard disk drive!!

---

4. Type **N** when you see the prompt Do you want to format your hard disk?. Press ◄┘.

5. Type **Y** when you see the prompt Do you wish to create a boot volume?. Press ◄┘.

6. Insert your new IBM DOS system diskette into Drive A: when you are prompted. When you have done so, press any key (<**Space Bar**>, ◄┘, etc.). This updates the boot volume for this operating system.

7. When the updated boot volume has been added, the program returns you to the operating system prompt (A>).

8. Insert your Master Boot Diskette and reboot your system using <**Ctrl**><**Alt**><**Del**>. You must enter a name when you are prompted.

9. Type **Y** and press ◄┘ when you are asked if you want to Change Boot Options?.

10. The maximum user space available with a 128K PC is 112K for a single floppy drive system. If you need to change the memory requirements or change the name of your operating system, refer to the *Multi-OS/Davong MultiLink Utilities Manual*, Chapter 3.

Your new version of IBM DOS is now on your hard disk, but your IBM computer does not know about this upgrade. It only recognizes the previous version.

11. Select **N** to display the Name and Password screen. Change the operating system to the new version; for example, from IBM DOS 1.1 to IBM DOS 2.1.

You need to have the utility programs for the new IBM DOS package on your hard disk. Use the following instructions to copy your utility programs. Then reboot your system by pressing <**Ctrl**><**Alt**><**Del**>.

1. Copy your new IBM DOS Utilities to your hard disk using the COPY command.

2. Copy your Multi-OS Utilities to your hard disk using the COPY command. This makes sure that you replace the DOS utilities with the corresponding Multi-OS utilities.

> ***Note:***
> Copying these utilities to your hard disk will replace the autoexec.bat file.

Section

3 Upgrading to a Newer Version of Multi-OS

The procedure for installing a newer version is similar to those you used to install your original Multi-OS software. Before you begin, make sure you have made copies of your new software diskettes.

This newest version of Multi-OS requires that users with previously-installed versions of Multi-OS recreate their boot volumes for each operating system supported by Davong Systems. You do *not* need to format your hard disk! If you have Multi-OS already running on your hard disk, the following procedure is all that you need to do to upgrade to the latest version of the Multi-OS software.

1. Make a list the names of your mounted volumes (with passwords, if any).

2. Make copies of the new Installation/Boot and Utilities diskettes using the DISKCOPY command. (If you are not sure of the procedure, read Appendix A of this manual.)

3. Insert the DOS systems diskette and press <**Ctrl**><**Alt**><**Del**>.

4. When you see the operating system prompt, A>, insert your Master Boot Diskette (#3 or #3a) into the left floppy drive (Drive A:).

5. Type **INSTMOS** and press ◄┘ to begin the installation program.

WARNING:
You do ***not*** want to format your hard disk drive!!

---

6. Type **N** when you see the prompt Do you want to format your hard disk?. Press ◄┘.

7. Type **Y** when you see the prompt Do you wish to create a boot volume?. Press ◄┘.

8. The program will prompt you to insert your IBM DOS system diskette into Drive A:. When you have done so, press any key (<**Space Bar**>, ◄┘, etc.). This updates the boot volume for this operating system.

When the updated boot volume has been added, the program returns you to the operating system prompt (A>). Now you need to initialize your Master Boot Diskette.

1. Boot the system with the Master Boot Diskette you were just using. You must enter a name when you are prompted.

2. Type **Y** and press ◄┘ when you are asked if you want to change your Boot Options.

3. Use the Assign option to set the correct volume names that you previously recorded. Use the Name option to set the correct operating system name you want to boot.

4. The maximum user space for a 128K PC is 112K for a single floppy drive. If you need to change the memory requirements or change the name of your operating system, refer to the *Multi-OS/Davong MultiLink Utilities Manual*, Chapter 3.

You need to have the utility programs for the new Multi-OS package on your hard disk. Use the following instructions to copy your utility programs.

1. Copy new Multi-OS Utilities to your hard disk using the COPY command.

2. Reboot your system by pressing <**Ctrl**><**Alt**><**Del**> so that your new "liaison" program can be recognized by both your computer and hard disk drive.

3. Repeat this procedure for each IBM Operating System you have previously installed on your hard disk.

One of the main advantages to the Multi-OS version 1.2x is the ability to boot directly from your hard disk drive. If you want to create a hard disk *boot configuration volume*, see Section 5 of this manual.

Section 4

Reconfiguring Your Installation Allocation

If you installed Multi-OS with QINSTMOS and have now decided that you need to have several small volumes instead of one large one, you can use the following procedure.

1. Boot your system with your Master Quick Boot Diskette (#4).

2. Back up the files on your volume (i.e., IBM DOS C) on floppy diskettes, another drive, or a tape unit.

3. Insert your Master Boot Diskette (#3) in your left floppy drive.

4. Type **a:** and press ◄┘ when you see the C> prompt.

5. Type **c:hdmgr** and press ◄┘ when you see the A> prompt.

6. Use the Delete option in the Hard Disk Manager program to delete IBM DOS C. (See Chapter 2, Section 3 of the *Multi-OS/Davong MultiLink Utilities Manual* for instructions on using the Delete option.)

7. Use the Create option in the HDMGR program to create the volumes you want (i.e., IBM DOS A or SYSTEM FILES, etc.). (See Chapter 2, Section 2 of the *Multi-OS/Davong MultiLink Utilities Manual* for instructions on using the Create option.)

8. Reboot your system by pressing <**Ctrl**><**Alt**><**Del**> simultaneously.

9. Type your name and press ◄┘.

10. Type **Y** and press ◄┘ when asked if you want to Change boot options?

11. Type **A** and mount your newly created volumes. (See Chapter 3, Section 1 of the *Multi-OS/Davong MultiLink Utilities Manual*). Press <**End**> when you have finished.

12. Type **N** to change your operating system and add password protection to the boot process. (See Chapter 3, Section 3 of the *Multi-OS/Davong MultiLink Utilities Manual*).

13. Type **M** to change the size of your user memory, if necessary. (See Chapter 3, Section 2 of the *Multi-OS/Davong MultiLink Utilities Manual.*)

14. Type **W** to save the boot option changes you have made.

15. Type **Q** (for quit) to quit the Boot Options menu and load your system.

16. Insert the appropriate diskettes when prompted.

You will no longer use your Master Quick Boot Diskette. You can store it away in a safe place. From now on, you will use your Master Boot Diskette (#3) to begin a session. This means that you can now use the HDMGR utility program and the Boot Options. See the *Multi-OS/Davong MultiLink Utilities Manual*, Chapter 1, Section 3.

Section 5 Booting From Your Hard Disk

Booting from a floppy diskette—any floppy diskette—takes time. If you have the correct hardware equipment and software, you can choose to boot your system from your hard disk. This takes less time, and you don't have to keep track of your boot floppy disk.

In creating your Master Boot Diskette, you use the Write command in the Boot Options Utility program to write your boot data to your diskette. To be able to boot from a hard disk, you will also use this same command to create a *hard disk boot volume.* This boot volume, when created, allows your computer to get the data it needs to get started directly from the hard disk. You will not need to have a Master Boot Diskette inserted.

If you have the following equipment and are using IBM DOS 2.x, you can change your boot configuration.

You also need an IBM XT or second generation IBM PC mother board (64KB–256KB), then you must have at least one of the following.

1. A Network Multifunction Card (NMC) with a PROM.

2. An External Hard Disk with an External Disk Interface Card with a UDS II PROM.

Creating a Boot Volume

You must first create a "generic" boot volume.

1. Boot your system with your Multi-OS Install/Boot Backup Diskette (#2).

2. Type your name and press ◄┘.

3. Type **Y** and press ◄┘ when asked if you want to Change boot options?

4. Use the Assign command to assign your volumes as follows:

   A: :F1
   B: :F2
   C: IBM DOS C (or whatever volume contains your utility programs)
   D: not mounted
   E: not mounted
   F: not mounted

5. Type **Q** (for quit) to quit the Boot Options menu and load your system.

6. Type **N** when asked to Change Boot Options. Press ◄┘.

Make sure you are on volume C:. Type **c:** and press ◄┘.

For DOS 2.x, use the batch file MKBOOT.BAT on your Multi-OS Utilities diskette to do the following set of steps for you. Use COPY to copy MKBOOT.BAT and BOOT.CMD from your Multi-OS Utilities Diskette (#1) to volume C:. Then type **mkboot** and press ◄┘. Follow the instructions on the screen.

For DOS 1.1, you can use the following steps to create a boot options volume. You are creating a volume on your hard disk that is an exact duplicate of your original Multi-OS Installation Boot diskette.

1. Copy ADDBOOT.COM from your Multi-OS Utilities Diskette to the hard disk volume containing your utilities programs.

2. Change your operating system prompt to volume C:.

3. Type **addboot** and press ◄┘ to initialize the hard disk for a hard disk boot.

4. Type **hdmgr** and press ◄┘.

5. Type **C** to display the Create screen.

6. Create a volume named 1\BOOT\BOOT CODE with a size of 160K. Press <**End**>.

7. Press **Q** to leave the HDMGR program.

8. Insert your Multi-OS Install/Boot Backup diskette (#2) in the left floppy drive.

9. Reboot your system. Press <**Ctrl**><**Alt**><**Del**> simultaneously.

10. Type your user name and press ◄┘.

11. Type **Y** when you are asked Change boot options?.

12. Type **A**. Assign your volume names to the volume labels as follows. Press <**End**> when you are finished.

    A: :F1
    B: :F2
    C: IBM DOS C (or whatever volume contains your utility programs)
    D: \1\BOOT\BOOT CODE
    E: not mounted
    F: not mounted

13. Type **Q** (for quit) to quit the Boot Options menu and boot your system.

14. Type **N** when asked Update boot options? (Y/N).

15. Type **diskcopy/h a: d:/1/8** and press ◄┘.

You have now created a generic boot options volume. You do not need to have **\1\boot\boot code** mounted any more.

Booting From a Hard Disk

You can now boot from the hard disk. But as yet, you have none of your boot options on the hard disk. You must now create a "custom" boot volume with the configuration you want. Use the following instructions.

1. Remove the diskette from the left floppy drive and press <**Ctrl**><**Alt**><**Del**>.

2. Press ◄┘ when you are asked Enter user name (◄┘ for default):.

3. Type **Y** when you are asked "Change boot options?".

4. Type **A**. Assign your volume names to the drive labels you want. Press <**End**> when you are finished.

5. Type **M**. Change your memory size so that you have at least 112K of user memory. Press <**End**>.

6. Type **N**. Use the cursor keys and type the name of your operating system, your name and your password if you assigned one. Press <**End**>.

7. Type **W**. Type your user name on the line labeled Enter user name. Press <**End**>.

You now have our "custom" hard disk boot volume. If you do not want to create hard disk boot volumes for others who might use your computer, you can press **Q** and leave the Boot Options program.

Each time you reboot your system, you are asked to enter your name, password (if any), and whether or not you want to Change boot options?. Press **N**. The system will boot and you can proceed to use your hard disk.

Creating Additional Hard Disk Boot Volumes

If you need to create more custom hard disk boot volumes, you follow essentially the same procedure as you did to create your own custom volume. However, you *must* begin by using the generic hard disk boot volume. Therefore, when you reboot, you again press ◄┘ when asked to enter your name. Then, follow the steps in the last section.

You use the Write command each time you wish to create a new hard disk boot volume. Be sure each custom hard disk boot volume has a unique name and the correct operating system.

If you want to make changes to an existing hard disk boot volume, you do not have to use the Write command. When you leave the Boot Options program, you will be asked if you want to Update boot data? (Y/N):. Press ◄┘ to verify the Y default answer. This automatically updates the boot volume.

If You Can't Boot From Hard Disk

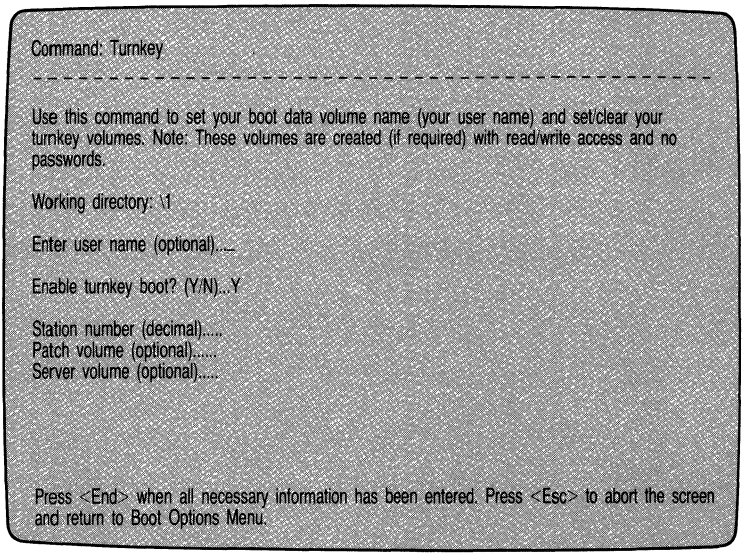
If you have performed this procedure and you cannot boot your system from your hard disk, you may not have the correct hardware inside your machine. You can prepare your disk and add the additional hardware at a later date.

If you ever need to reinstall your generic hard disk boot volume, you must first delete the \1\BOOT\BOOT CODE volume and repeat the steps in this section.

Section 6 Setting a Turnkey

The Boot Options Menu also contains a Turnkey command. This command lets your system bring up your boot volume information automatically. All you have to do it enter your user name and any hardware patch information. Figure 3-2 illustrates the screen you see when you type **T** from the Boot Options Menu.

Figure 3-2. Turnkey Command Screen



Type your user name on the line labeled Enter user name. If you did not use the Patch command, you can press <**End**>. If you did use the Patch command to define custom hardware, type the Patch volume name, then press <**End**>.

Type **Q** to leave the Boot Options utility program.

When you reboot, this turnkey volume automatically locates your boot data and patch data. Your computer will respond as though you had a Master Boot Diskette in the floppy drive, but will not take as long to load.

Chapter

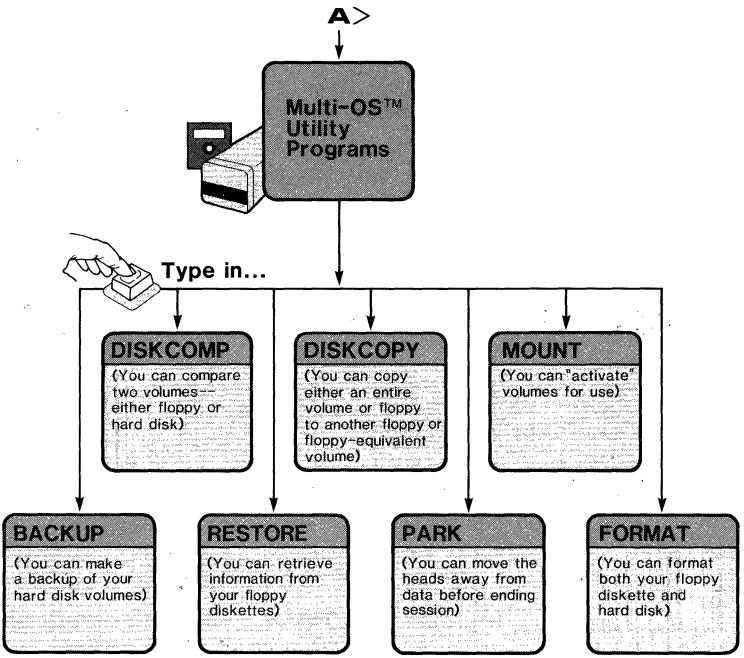
4

Using the Multi-OS Utility Programs With DOS

DSI provides a diskette with Multi-OS utility programs so you can manage the volumes and files on your hard disk(s). You can only use these utility programs if you are using the IBM DOS operating system with Multi-OS software support. This chapter describes only seven utilities—the HDMGR and Boot Options utility programs are described in the *Multi-OS/Davong MultiLink Utilities Manual.*

You can use each section in this chapter as you need them. For instance, if you want to restore your backed up files to your hard disk, read Section 5. If you want to end your session, you should first use the PARK utility to move the heads away from the storage area of your hard disk (Section 4). Figure 4-1 illustrates the main utility programs.

Figure 4-1. Multi-OS Utility Programs



With the programs on the DSI/Multi-OS Utilities Diskette, you have the following capabilities.

- BACKUP lets you make backup copies of your files onto floppy diskettes. We strongly recommend you use this option frequently. While the hard disk is quite reliable, you can lose data through power outages and surges. For DOS 2.x users, you may wish to use the IBM-supplied programs.

- DISKCOMP lets you compare the contents of two volumes.

- DISKCOPY lets you copy the contents of a floppy diskette to either your hard disk or to another floppy diskette.

- FORMAT replaces the standard IBM DOS Format utility. This option lets you format both hard disk volumes and floppy diskettes.

- MOUNT lets you activate or deactivate volumes for your use and displays the currently mounted volumes. You can only use this utility program if your operating system is version 2.0 or later.

- PARK lets you move the heads of your hard disk to a cylinder that contains no valuable data.

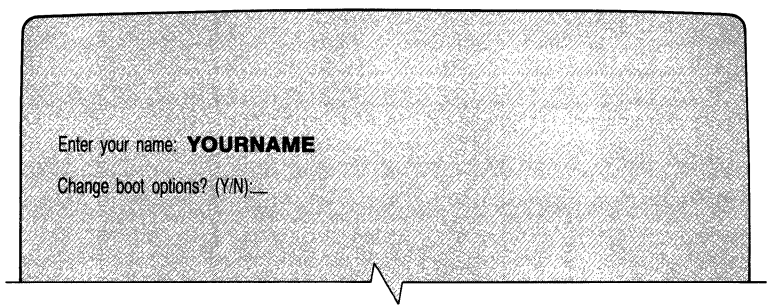
- RESTORE lets you return files from your backed up floppy diskettes to your hard disk(s).

Booting Up Under Multi-OS

If you have installed your software with QINSTMOS and are currently using the Master Quick Boot Diskette, you do not have access to the Boot Options. This section applies only to those who are booting from their Master Boot Diskettes (#4) or their hard disk drives.

When you first boot up your system under Multi-OS, you are asked to enter your name. If this is the first time you have booted your system after installing your hard disk, the display looks like Figure 4-2.

Figure 4-2. First Screen After Booting Multi-OS



After you have entered your name, you can choose to change the default options on your boot diskette. If you need to assign your volumes, change your computer's memory size, or add your name or a password to your Boot Diskette, you need to answer **Y** to the second prompt message on the screen. Then, turn to Chapter 3 of the *Multi-OS/Davong MultiLink Utilities Manual* that came with this package.

Once you have entered the information on this screen, you can restore any files to your hard disk (if any), activate volumes to use during this session, or use the HDMGR utility program options described in the *Multi-OS/Davong MultiLink Utilities Manual*.

The succeeding sections describe each of the utility programs used exclusively with the IBM DOS operating system.

Section 1

Using the BACKUP Command

This command saves your hard disk files on floppy diskettes. You may back up either specified files or just files that have changed since you did your last backup. As an example, you could back up specified files on a volume to a floppy diskette.

> ***Note:***
> This BACKUP program was written for DOS 1.1 that has no BACKUP or RESTORE utility program of its own. If you are using DOS 2.x, you should use the IBM-supplied BACKUP and RESTORE programs. All other utility programs in this chapter support DOS 2.x hierarchical directories.

If you are not currently running Multi-OS, insert your Master Boot Diskette (#3) and reboot your system. This procedure will format the diskette if you request a total backup.

Computer displays	**You type (with comments)**
A>	**backup a:files*.*** ◄┘
	Enter the command followed by the volume and files to be backed up. This example will backup all the files in volume a: that started with FILES.
Insert Floppy 1	
	If the diskette is not blank, you are asked if you want to format it and how you want to format it; single-sided or double-sided.
Press any key to continue	◄┘
	Press ◄┘ or any other key to begin the backup process.

If the program fills the diskette, it will prompt you to insert a second diskette. Label the diskette with its contents and the diskette number; e.g., Floppy 1. Repeat this procedure until you have backed up your hard disk files to floppies. The last diskette is the Master Index. Be sure you label it as such. When the Backup operation is complete, the A> prompt appears on the screen.

You have options that you can use with the Backup command. The following table defines these options.

Table 4-2. Backup Command Options

Option	Explanation
–	This option preceding filename(s) means to back up all files on the specified volume except the filename(s) following it. For example, **backup a:- *.com** would back up all files to floppy diskette *except* those ending with .com.
*	This *wild card* (*) is used to substitute for a string of characters. For example, you may have six files ending with .com, and you don't want to back them up individually. You would type **backup a:*.com** to back up only those six files.
?	This wild card (?) is used to substitute for any single character in that position. For example, you might have files named FILE1, FILE2, FILE3, FILE4, etc. that you want to back up. You would type **backup a:file?** to back up only those files.
/I	This option lets you back up only files that you have worked on since the last backup. This option takes a lot less time since less data needs to be copied.
/D	This option is similar to /I, but it compares the date and file length of the files to be backed up with the files of the same name already on floppy diskettes. If either is different, the file will be backed up. If the date and the file length are unchanged, Backup does not re-save the file to floppy.
[ ]	You would use this option to backup files that have alternating characters. For example, **backup a:x[01][ab]** would backup files x0a, x1a, x0b, and x1b.

You must be sure you label each of your backup diskettes with the date of the backup and the numeric order in which it appeared in the backup. It is also helpful to note what backup command was used.

Section 2

Using the FORMAT Command

When you format a volume or diskette, you are simply preparing it so that it can receive and store information. If you used one of the default volume allocations that created space for a floppy-sized volume, you can use this command to create a floppy-equivalent volume under DOS 2.x. This command erases any existing data and sets up file allocation tables and directory entries.

When you type **format/H** followed by a volume letter and colon, the screen prompts you to confirm that you really do want to format the volume. If you have existing files you want to save, do *not* continue with the volume formatting until you have backed up these files onto floppy diskettes, another hard disk volume, or a tape cartridge. For instance, to format the volume currently mounted as e:, you would type **format/H e:** and press the key.

In addition, the format command has several options you can use with it. The following table gives an explanation of each option.

Table 4-3. Format Command Options

Option	Explanation
/S	When this option is specified, a copy of the operating system files, COMMAND.COM, IBMBIO.COM, and IBMDOS.COM, are copied from the current default volume (if they exist on the default volume) to the new volume or diskette.
/B	Selecting this option causes FORMAT to create an 8 sector-per-track diskette with space allocated for two system modules. You can create DOS 1.1 type volumes using this option.
/H	This option is required when you want to format a hard disk volume.
/V	If you select this option, it will prompt you for a volume name to be written to the disk DOS 2.*x* only
/1	Use this option when formatting a floppy-sized volume. This option signifies the diskette is single-sided.
/2	Use this option when formatting a floppy-sized volume. This option signifies the diskette is double-sided (default).
/8	Use this option when formatting a floppy-sized volume. This option lets you specify 8 sectors per track on the floppy diskette. Otherwise, FORMAT uses 9 sectors per track.
/9	Use this option when formatting a floppy-sized volume. This option lets you specify 9 sectors per track on the floppy diskette (default).

To format a hard disk volume mounted on drive b: as a single-sided, 8 sectors per track and floppy-sized, you would type

```
C>format/H b:/1/8
```

When this command is executed, the system displays a message verifying that the format operation is complete.

Now the volume on drive b: is formatted as a *floppy-equivalent* volume and can be used as a floppy diskette.

Section

3 Using the MOUNT Command

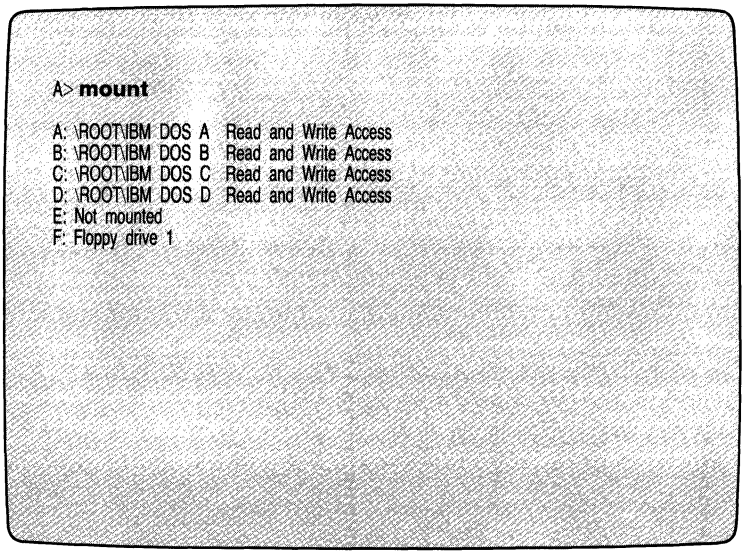
Mounting a hard disk volume has the same function as inserting a floppy diskette into a drive and closing the drive door. You know it's there if you want to use it. If a volume is not mounted, you cannot use it—just like you can't use a floppy diskette if it is not in the floppy drive. DOS does not know how to access it.

You can use this MOUNT command to list the volume or volumes you currently have mounted. When you have a DOS prompt; e.g., A>, type

mount ←┘

The screen will display a list of volumes. These are the volumes you mounted using ASSIGN and/or MOUNT. Figure 4-3 shows a sample mounted volumes list. Notice that this list is the same as the one that would display if you were using the M option in HDMGR.

Figure 4-3. Example Of A Mounted Volumes List



If you are using IBM DOS 1.1, you can display the mounted volumes as shown above, but cannot use the MOUNT command to make any changes. You can only use this command to make changes if you are using IBM DOS version 2.x.

Mounting A Volume

Suppose you want to mount a volume called COMPANY INFO located on the disk named ROOT as volume C.

Type **mount c:\root\company info:im ok** and press the ◀┘ key.

This command mounts a volume called COMPANY INFO on the disk named \ROOT as volume C. Because the volume is password-protected, the password must follow the volume name.

WARNING:
Be careful about remounting volume A:. You might not be able to get to your utility programs.

If you want to mount a floppy disk drive as volume A: so you can run a copy-protected program, you would type **mount a: :f1** and press ◄┘.

You can only mount created volumes. If you try to mount a volume that is not a previously created data volume, you will get an error message.

Dismounting a Volume

You can dismount a volume when you are through using it for a session. If you are sharing your computer with other people, this is another safety precaution. To dismount volume C:, type

mount c: ◄┘

Since you always need a volume A:, the system will not let you dismount it. If you try to do so, you will get an error message. You must always have a volume mounted on volume A:, even if it is a floppy drive.

Section 4 Using the PARK Command

Use PARK to move the heads of your hard disk system away from the data area. When your disk is running, the heads *fly* at a few microns clearance above the surface of the media on a cushion of air. When your disk is turned off, the heads actually rest on the media. Parking the heads places the heads beyond the usable area of your hard disk. This might save your disk from undue wear. All Winchester-technology disk drives do not automatically park the heads to prevent wear of disk surfaces when you power down.

An actual power down without the heads parked will cause no damage. However, you should park your heads if you plan to leave your machine off overnight and especially if you plan to transport your disk.

To park the heads, type **park** and press ◄┘.

This causes the system to search the drive tables to find the highest cylinder for parking the heads, and park the heads of every drive attached to the IBM PC or XT.

Note:
If you have a $P option (print pathname) in the prompt command under DOS 2.x, you will not be able to use the PARK function. If you request this option, DOS must read the current directory in order to retrieve and print the current pathname; therefore, PARK is negated.

You can use the Park command even if you are not running Multi-OS on an installed drive. However, in this case you must designate the cylinder number over which you want the heads parked followed by the drive number. The cylinder number is usually the highest cylinder number on your disk. If your drive has 603 cylinders, then you would type **park 603 1.** If you do not know the highest cylinder number on your hard disk, refer to the appropriate *Davong Owner's Manual*.

Section 5

Using the RESTORE Command

This command restores files from backed up floppy diskettes to a designated hard disk drive. You can use this command to restore the files from the floppy diskettes that you backed up before you began the Multi-OS installation.

Note:
This RESTORE program was written for DOS 1.1 that has no BACKUP or RESTORE utility programs. If you are using DOS 2.x, you should use the IBM-supplied BACKUP and RESTORE programs. All other utility programs in this chapter support DOS 2.x hierarchical directories.

If you are not currently running Multi-OS, insert your Master Boot Diskette and reboot your system.

Computer displays	**You type (with comments)**
A>	**copy f:restore a: ↵**
	Use the Copy command to copy the Restore program from your floppy drive F: to your hard disk, in this case, volume A:.
A>	**restore a:*.* ↵**
	Enter the command followed by the volume and files to be restored. In this case, it is all the files in volume a:.
Insert the Master Index to be restored into source drive and press any key to continue...	↵
	Press ↵ or any other key to begin the restore.

When the program has finished reading the files from the Master Index, it will prompt you to enter each succeeding diskette by number. Repeat this procedure until you have restored all your files to your hard disk. When the RESTORE operation is complete, the A> prompt appears on the screen.

Remember to copy the Multi-OS Utilities to volume A: after restoring all files on A:.

You have options that you can use with the RESTORE command. The following table defines these options.

Table 4-5. RESTORE Command Options

Option	Explanation
–	This option preceding volume name means to restore all files on the specified volume except the filename following it. For example, **restore a:- *.com** would restore all the files from the floppy diskette *except* those ending with .com. You can only enter one exception after the volume letter. You could not type restore -a:.
*	This *wild card* (*) is used to substitute for a string of characters. For example, you may have six files ending with .com, and you don't want to restore them individually. You would type **restore a:*.com** to restore only those six files.
?	This wild card (?) is used to substitute for a single character. For example, you might have files named FILE1, FILE2, FILE3, FILE4, etc. that you want to restore. You would type **restore a:file?** to restore only those files.
/I	This option lets you restore only files that you have worked on since the last restore. This option takes a lot less time since less data needs to be restored from the diskette.
/D	This option is similar to /I, but it compares the date and file length of the files to be restored with the files of the same name already on the hard disk. If either is different, the file will be restored. If the date and the file length are unchanged, the program does not restore the file to the hard disk.
[ ]	You would use this option to restore files that have alternating characters. For example, **restore a:x[01] [ab]** would restore files x0a, x1a, x0b, and x1b.
INSTEAD OF	This option allows you to restore files to a different volume than the one from which it was backed up. For example, to restore *.com files that you backed up from volume b: to volume a:, you would type **restore A:*.com Instead of B:**.

Section 6

Using the DISKCOPY Command

You can copy the contents of a floppy diskette onto a hard disk volume of equal or greater size using the DISKCOPY command. You can also use this same command to copy the contents of a *floppy-equivalent* hard disk volume onto a floppy diskette. You can also use this command to copy from one hard disk volume to another (similar to the HDMGR Transfer command).

To make a hard disk volume a floppy-equivalent, use the DISKCOPY command to copy the contents of a floppy diskette onto it, or use FORMAT with floppy-size options.

The floppy-equivalent options that you can use with this DISKCOPY command are:

Command option	Function
/1	to copy a volume as a one-sided diskette
/2	to copy a volume as a double-sided diskette
/8	to specify 8 sectors per track
/9	to specify 9 sectors per track
/H	to copy to a hard disk volume.

Thereafter, it will be a floppy-equivalent volume. You can treat it as you would any other floppy diskette except that you can't remove a hard disk volume from the computer. You can only mount and dismount it. See Chapter 3, Section 3.

If you use DISKCOPY to copy a hard disk volume to a floppy diskette, the floppy diskette will be automatically formatted (if necessary).

To convert a floppy-equivalent hard disk volume back to a normal hard disk drive, use FORMAT with no floppy-size options.

For instance, suppose you have your floppy drive mounted as volume F: and a 360 Kbyte volume mounted as volume E:. Use the following command to copy the contents of the floppy to the hard disk volume.

Computer displays	**You type (with comments)**
A>	**diskcopy f: e:/H**
	Notice that you enter the drive letter from which you want to copy files (source drive) followed by the drive letter to which you want the files copied (destination drive).
Copy another? (Y/N)	**N**
	Type N if you do not want to copy the same diskette to another floppy-sized volume or vice-versa.

The files you have on the floppy will all be copied to the hard disk volume mounted on drive E:.

You can also use this command to copy files from a floppy-equivalent volume to a floppy diskette, or to copy files from one floppy diskette to another. Just make sure you type the source drive letter before you type the destination drive letter.

To ensure that the files and system tracks are identical on the floppy-equivalent volume and the floppy diskette, you can use the Diskcomp command. This command is described in the next section.

Section 7

Using the DISKCOMP Command

You can compare the entire contents of a floppy diskette and a floppy-equivalent volume, or two hard disk volumes using this disk compare command. You would normally use this command after you have used the DISKCOPY command to verify that the contents are the same on both. This command compares all tracks on a track-for-track basis and displays a message if the tracks are not equal.

The floppy-size options that you can use with this DISKCOMP command are:

Command option	Function
/1	to compare a volume as a one-sided diskette
/2	to compare a volume as a double-sided diskette
/8	to specify 8 sectors per track
/9	to specify 9 sectors per track (default)

If you do not enter any of the above options, the program automatically determines the size from the source volume. (This is also true for DISKCOPY.) To compare the contents of the hard disk volume (E:) to the floppy diskette (F:), use the following format.

Computer displays	**You type (with comments)**
A>	**diskcomp f: e:** ◄┘
Compare more disks? (Y/N)	**N**◄┘
	Type N if you do not want to compare another diskette to another floppy-sized volume.

Appendix

A

Supplemental Information

This appendix provides reference information. If you have a lot of expertise with hard disks, you probably do not need to read it. However, if you have a burning desire to understand what goes on inside your "black box," or need to refresh your memory on making copies of your diskettes, read on.

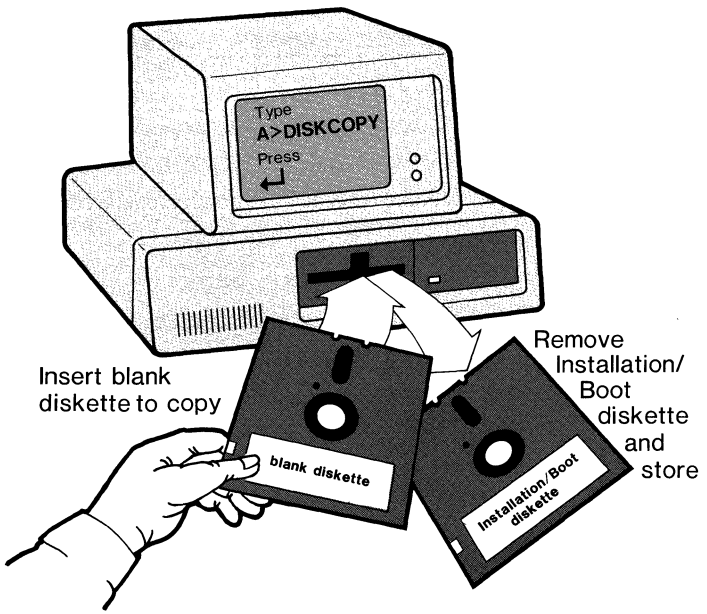
Section 1 provides the information you need to make working copies and backup copies of the diskettes that are included with this Multi-OS package.

Section 2 of this appendix briefly describes hard disk drive technology. Understanding how your hard disk drive stores and retrieves data can help you learn to manage the storage space on your drive most efficiently.

Section 1 Making Copies of Diskettes

Use the following instructions to make working copies and backup copies of your diskettes. If you have only one physical floppy drive, you must *swap diskettes.* Figure A-1 shows an example of swapping diskettes.

Figure A-1. Swapping Diskettes



These instructions assume that you have a single floppy disk drive. If you have two floppy disk drives, you can designate the right floppy drive as your target drive. The messages are those displayed for DOS 2.0.

Make two copies of your Multi-OS Installation/Boot diskette: one to keep as a backup, and one that you can use as your Master Boot Diskette from which you can create distribution copies for others who use your system.

Boot up your system if you have not done so.

Computer displays	**You type (with comments)**
	Insert your DOS x.x diskette and press <**Ctrl**><**Alt**><**Del**> to boot your system.
A>	**diskcopy a: b:/1**
	Enter the command and press the ↵ key. Do ***not*** use the Copy command. Your diskette will not work if you do.
Insert source diskette in drive A:	
	Insert the diskette you want to copy into Drive A and close the door.
Strike any key when ready	↵
	Press the ↵ key.
Copying [8 or 9] sectors per track 1 side(s).	
	Information message.
Insert target diskette in drive A:	
	Remove the diskette from Drive A. Insert a blank diskette into Drive A and close the door.
Strike any key when ready	↵
	Press the ↵ key. You may have to switch diskettes more than once before the copy task is completed.
Copy complete. Copy another? (Y/N)	**Y**

You are going to make another copy of the Multi-OS Installation/Boot Diskette. Remove the newly created diskette from Drive A and label it **Multi-OS Installation/Boot Backup Copy.**

Now repeat the steps in the above table until you have 2 copies of your Multi-OS Installation/Boot Diskette, 1 copy of your Multi-OS Quick Installation diskette, and 1 copy of your Multi-OS Utilities Diskette. The following chart shows you what to label each diskette copy.

Table A-2. Making Backup Copies

Diskette To copy	**Label copied diskette**
Multi-OS Utilities Diskette	**Multi-OS Utilities Backup (#1)**
Multi-OS Installation/Boot Diskette	**Multi-OS Installation/Boot Backup (#2)**
	Multi-OS DOS Master Boot (#3)
Multi-OS Quick Boot	**Multi-OS DOS Master Quick Boot (#4)**

Store your original Multi-OS diskettes and your Backup diskettes in a safe place.

You use the Master Boot Diskette each time you begin a session unless you choose to boot from your hard disk. It will contain your name, password, and access rights information. You can use the above procedure to make more copies of this diskette after you have finished the installation.

Section 2

How a Hard Disk Drive Works

As the name implies, a hard disk drive stores information on a rigid, circular metallic plate. The plate is connected to a motor that spins the plate rapidly. The plate, or disk, is covered with a recording substance that can be magnetized, just like the surface of tape used to record music.

In those characteristics, a hard disk is similar to a floppy disk. They are both flat, round disks, are covered with a metal-oxide recording media, and are spun rapidly when used. Both have read/write heads that can alternately cause (write) and interpret (read) magnetic changes in the metal-oxide recording media. The similarities end there, however.

The most meaningful differences are the makeup of the disks and the environments in which they operate. The hard disk is, of course, rigid; the floppy is pliable. A floppy drive is an unsealed, open device, in which the drive's read/write head rests on the floppy disk during the data-transfer process. A hard disk rests in a permanently sealed, contamination-free case, and the read/write heads float above, rather than on, the recording surface.

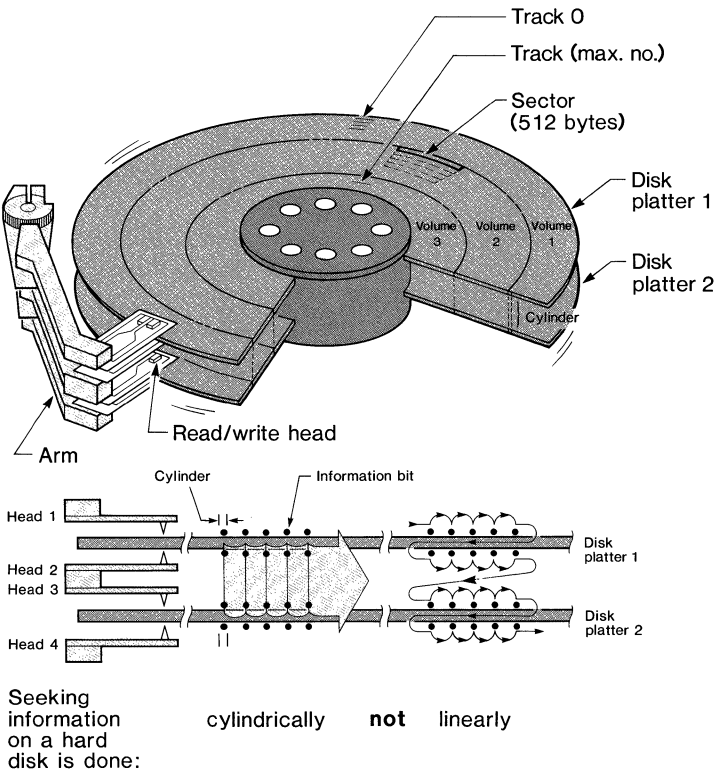
The read/write heads are attached to an arm which in turn is connected to a motor. When power is applied to the hard disk, the platters are rotated rapidly and the heads are positioned several microns above the platter.

Because the heads do not touch the disk surface, hard disks can be spun at much greater speeds—3600 revolutions per minute vs. about 360—than floppy disks. This ensures faster read/write performance—data can be accessed sooner—and substantially greater storage capability—more data can be imprinted on a smaller area—than with floppies.

Each hard disk platter provides two recording surfaces. As the electronically controlled read/write heads skim over the recording surface, they create a magnetic field. This field allows the heads to imprint electronically information on the platter (recording media).

The recording surfaces of the hard disk platters (each hard disk usually has two or more platters) are divided into tracks and cylinders. (See Figure A-2.)

Figure A-2. Hard Disk Mechanics



A track can be likened to a single groove on a record album, with one major exception. A hard disk track does not spiral in from the outside like a record groove. It is a 0.001-inch wide ring with a constant radius on the media surface. Thus, if it were possible to place a phonograph stylus on a hard disk track, the stylus would remain where it was placed. It would not move toward the center of the disk, as it does on a phonograph. The number of tracks on a drive depends on the megabyte capacity of the drive; tracks are numbered, beginning at 0 and running to the maximum your drive allows.

A cylinder is a vertical set of tracks on a multi-platter drive (see Figure A-2). The width of a cylinder is one track. During the read/write process, the drive reads an entire cylinder—i.e., a set of tracks above or below each other—before moving to another track. This provides fast data access because the read/write heads spend little time moving from one track to another.

During the formatting process, tracks are broken into small, easily managed blocks called sectors. Each sector holds 512 bytes (characters) of data.

The storage space on a hard disk drive is further managed by creating contiguous blocks of sectors called volumes. Volume structure is discussed in the next section.

Appendix

B

Technical Notes

This appendix describes some very detailed technical information about Multi-OS and IBM DOS. You will only need this information if you are multi-tasking, using programmed I/O, or are using an IBM-compatible computer.

Multi-Tasking Under DOS

If you are writing applications under DOS that will stay in memory and use interrupts or timer ticks to run while other programs are running, you are *multi-tasking*.

DOS 2.0 provides a system call to determine whether your memory resident driver can issue DOS system calls. To use this mechanism, issue system call 34(hex); the result is that ES:BX will point to a *critical interval flag*. Before your driver can issue DOS calls, it must check this flag. If the flag is non-zero, no DOS calls can be issued; if the flag is zero, DOS interrupt 21(hex) calls can be made.

Non-Standard Disk Settings

If you are using non-standard disk switch settings, you can patch Multi-OS to respond to the actual settings. You can also patch Multi-OS to use programmed I/O instead of DMA I/O. (DMA stands for Direct Memory Access.) Programmed I/O runs slower than DMA, but it frees the DMA channel for use by other devices.

Using Programmed I/O

To install Multi-OS with programmed I/O, use the following steps.

1. Boot standard IBM DOS 1.1 or 2.0, and run the DEBUG program. (For DOS 2.0, DEBUG is on the supplemental diskette.)

2. Place your copy of the Multi-OS Boot/Install Diskette in the left drive. Enter the following (your entry is in **boldface**).

```
-L100 0 8 1 ←┘
-E103 ←┘
    CS:103 00 FF ←┘
-W100 0 8 1 ←┘
-Q ←┘
```

You can now boot/install Multi-OS, and it will run in programmed I/O mode instead of DMA.

Other Disk Options

All other disk options can be patched in the same way that programmed I/O is selected. Entry locations are shown in the following table.

Table B-1. Entry Locations

Location	Use
100-1	Controller I/O base address. (Low then high bytes.) Normally 0320 (hex). 100=20, 101=03
102	Disk interrupt bit. Normally 20 (hex) for interrupt 5. Can be set to 08 for interrupt 3, but you need to change switch settings. See Installation Manual.
103	Programmed I/O mode. Normally 00 (hex) for DMA; set to FF (hex) to force programmed I/O.
104-5	Disk timeout count in 55 millisecond intervals. (Low then high bytes.) Normally 0300 (hex). 104=00, 105=03
106	DMA channel mask. Normally 3 for Channel 3; may be 1 for channel 1.
107	DMA bank select. Normally 82 (hex) for channel 3; may be 83 (hex) for channel 1.
108	DMA Read command. Normally 47 (hex) for channel 3; may be 45 (hex) for channel 1.
109	DMA Write command. Normally 4B (hex) for channel 3; may be 49 (hex) for channel 1.
10A	DMA memory address register. Normally 6 for channel 3; may be 02 (hex) for channel 1.
111-2	Base I/O address of the DMA controller. This is normally 0.
113-4	Base address of hardware interrupt vectors. This is normally 20 (hex).
115-6	Base I/O address of interrupt controller. This is normally 20 (hex).
117	End of interrupt command to interrupt controller; normally set to 20 (hex). Non-specific EDI.
118	Interrupt number of the timer. Normally 0.
119	Interrupt controller mask for the timer interrupt.

Using Multi-OS With IBM-Compatible Computers

Most IBM-compatible computers can operate with the Davong hard disk systems. However, you must use the IBM DOS version of the operating system rather than your computer's DOS. The following machines and procedures are known to work with Multi-OS and the Davong Hard Disk Systems.

Compaq Computer: This is a true IBM-compatible computer. Using either IBM DOS 1.1 or DOS 2.0, you can install and run Multi-OS exactly as though you are using an IBM PC or XT. However, you will still need to use the Compaq-provided BASIC interpreter rather than the IBM version.

Eagle Computer: The Eagle computer can be run under Multi-OS if you use Program I/O rather than DMA operation. You need to patch your Multi-OS (and MultiLink) boot diskette(s) using the procedure in this appendix (address 103h goes to ffh). You will need to run the BASIC interpreter provided with the Eagle rather than the IBM version.

Columbia Computer: The Columbia has modified the interrupt bus so that interrupt 5 (IRQ 5) does not work. To run Multi-OS on this computer, you need to change the interrupt vector being used. The recommended interrupt is IRQ 3. To change to this vector, you need to patch the Multi-OS diskette as described in this appendix except that you will modify address 102h. If you replace the 20h at this location with 08h, you will set the software to use interrupt 3. (Patch 10h for interrupt 4, normally used by serial cards, or 04h for interrupt 2, used by Davong MultiLink.)

You must also modify the Davong hardware to match the interrupt you choose. On external drives, this is easy. You only need to change a switch setting on the UDS interface board.

Table B-2. Hardware Modifications

		Switches			
Interrupt	**Address 102**	**5**	**6**	**7**	**8**
5	20h	Off	Off	Off	On
4	10h	Off	Off	On	Off
3	08h	Off	On	Off	Off
2	04h	On	Off	Off	Off

Leave switches 1 through 4 unchanged. These select the DMA channel and will only work in their factory settings.

Patch location 102h of sector 8 of the Multi-OS diskette to the interrupt 3 value of 08h. Use the same procedure as for patching for program I/O except use E102 rather than E103.

Patch location 103h for DMA operation initially. Place a 0 at location 103h.

Run the installation again.

On internal drives, you will need to make a cut and a jump on the Davong controller board. For instructions on the cut and jump, call your dealer for details.

Appendix

C

Troubleshooting With HDTEST

If your hard disk system does not come up after installation, you can evaluate it by running a quick test of your drive. You have a program called HDTEST on your DSI Installation/Boot Diskette (#2). This program tests your drive's ability to read and write. It was removed from the Master Boot Diskette. Therefore, you will have to use the backup copy you made of the DSI Installation/Boot Diskette to run this program.

1. Boot up your system using your IBM DOS x.x diskette.

2. Remove the IBM DOS diskette from your floppy drive and insert your Multi-OS Installation/Boot Backup Diskette.

3. Type **hdtest** and press ◄┘.

HDTEST tests the first 10 cylinders for the first two heads of your hard disk. This is enough to verify that your controller is working properly and that the most critical sectors of your hard disk are usable.

HDTEST will run using DMA data transfer. The test will continue running until you press <**Ctrl**><**Break**>.

You have four HDTEST options available to you: /P to test the disk using Programmed I/O, /A to alternate between DMA and Programmed I/O, /R to produce a record of your test results on your floppy diskette, and /W to read and write tests on your hard disk.

WARNING:

If you choose the /W option, you will *erase* the existing contents of your hard disk. Your disk will be empty of ALL information.

To run HDTEST using Programmed I/O, type **hdtest /p** and press the ◄┘ key. Press <**Ctrl**><**Break**> simultaneously to stop the test.

To alternate between the two tests, type **hdtest /a** and press the ◄┘ key. Press <**Ctrl**><**Break**> simultaneously to stop the test.

HDTEST keeps a record of all passes in a file called CARD1 if you choose the /R option. This record is useful if you wish to run the test overnight. To display the CARD1 file, type **type card1** and press ◄┘.

Remember, you do not need a password to run this program. Therefore, do *not* keep it on your Master Boot Diskette or any copies of the diskette you make for distribution.

When you have finished running the test, store your Multi-OS Installation/Boot Diskette in a safe place.

Appendix

D

Error Messages

This appendix contains the error messages you might encounter during installation. Each message is followed by an explanation and a way of recovering from the error.

BOTH COPIES OF DIRECTORY ARE BAD
When the system tried to boot, it read the first master directory and found it bad. It then read the second one and found that it was not readable either. This rates as a serious problem. You may have to reinitialize the system and restore your disk from your floppies.

CONSISTENCY CHECK—"text"
If this error occurs, make a note of the exact text and the conditions that lead to the error, and call Davong Customer Support. If you have a Davong Internal Disk Drive, the screen will display this message if you turn off your power supply before you turn off your computer. If you see the error in this context, it is not serious at all.

DISK I/O ERROR
You need to check all your connections and your disk controller board. Retry the operation you were doing. If you get the same error, you might check to make sure your disk is turned on.

DRIVE NOT FOUND
The drive name you entered in the pathname is not one that the Multi-OS recognizes. Check to see if you spelled the drive name correctly.

DRIVE NOT READY
The disk drive you specified is not ready. If you specified a floppy disk, this error may mean that you do not have a diskette inserted into the drive. If you specified a hard disk, it may mean that you didn't allow enough time for the drive to warm up before you turned on the computer. It could also mean that either your disk controller card or your drive has a problem.

FLAW TABLE FULL
During mapping, the program found too many flawed areas on the disk.

NOT A SYSTEM DATA VOLUME
You cannot mount the operating system volume.

NOT ENOUGH MEMORY
You need to adjust the boot floppy parameters. Use M from the Boot Options Menu to decrease your user memory space to give Multi-OS more memory.

READ/WRITE NOT ALLOWED ON DIRECTORIES
You cannot mount a directory volume for write access.

SYNTAX ERROR IN VOLUME PATHNAME
Check to see if you have entered the correct delimiters, or if the first parameter in the command is a null pathname. You also might have entered more than 16 characters for a volume name or password, or used illegal characters. Remember that you cannot use <**Ctrl**> characters, commas, hyphens, back slashes, colons, semi-colons, or an equals symbol.

UNABLE TO WRITE SPACE MAP COPY 1
UNABLE TO WRITE SPACE MAP COPY 2
The program attempted to read both space maps and could not read either one. This is also classified as a serious problem. You will have to re-install and re-format the entire disk. Then you must restore the backed up floppies you made. The other possibility is that there is a hardware problem.

UNIT NOT FOUND

You cannot create a new volume because the drive name you specified cannot be located.

VOLUME NOT FOUND

The program could not find the volume name that you specified. Check your spelling.

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