DIGITAL RESEARCH®

FlexOS™
Configuration Guide

FlexOS™

Configuration Guide

Foreword

FlexOS^{TM} is a multiuser and multitasking operating system for microcomputers. Multiuser means that more than one person at a time can use the system. Multitasking means that you can run several programs simultaneously, moving from one to another as you need to instead of starting and stopping each program.

Configuring such a system is inherently more complex than configuring a single-user system. Generally, in a multi-user system, one individual (called the **system manager**) is designated to configure and maintian the system. The system manager should be an experienced computer user, but not necessarily a programmer. If you are the sole user of your system, you are responsible for these tasks; you are your own system manager.

What This Guide Contains

The FlexOS Configuration Guide (hereinafter called the Configuration Guide) describes a variety of FlexOS user-level configuration tasks, including:

- creating, managing, and deleting individual user accounts
- creating the System directory for system files accessed by all users
- installing physical devices such as hard disks, printers, and consoles
- formatting and partitioning a hard disk drive
- installing application software

What You Need To Know

This book assumes you are already familiar with personal computers, including the general terminology used to describe hardware and software. You should read and be familiar with the documentation that accompanies your computer before proceeding.

The FlexOS Documentation Set

The <u>Configuration Guide</u> is one of several manuals in the FlexOS documentation set. Other user-oriented documentation includes:

- <u>FlexOS User's Guide</u>: This book describes the FlexOS user interface, including the command line, file specifications, directories and subdirectories, wildcards, logical names, input/output redirection, batch processing, and error handling.

- <u>FlexOS User's Reference Guide</u>: This book is a reference description of each FlexOS command.

- <u>FlexOS Window Manager Guide</u>: This book describes how to use the FlexOS Window Manager provided by Digital Research[R].

- <u>Running DOS Applications under FlexOS</u>: This book describes how to install and run certified DOS application software under FlexOS.

Terms and Conventions

This book uses the terms "diskette," "hard disk," and "disk" in the following manner:

diskette	The $5^{1/4}$-inch or $3^{1/2}$-inch magnetic disks that can be inserted into and removed from your microcomputer. Your system has at least one diskette drive.
hard disk	An internal or external fixed magnetic disk.
disk	The term used when information applies to both diskettes and hard disks.

User Input and FlexOS Output

In this book, user input is in **boldface** type and FlexOS system output, including the system prompt A>, is in regular type. The following example illustrates the convention:

```
A>DIR | FIND "ACCOUNTS PAY"

ACCOUNTS PAY          1429    8-18-86    1:42P
```

In this example, user input is all uppercase letters. However, you can
enter commands in uppercase, lowercase, or a combination of the two.

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THE SYSTEM MANAGER

The FlexOS operating system can support multiple users using a variety of hardware peripheral devices. In such a multiuser environment, it is desirable to designate one individual as a **system manager** who is responsible for configuring and maintaining the system.

The system manager should be a technically competent and experienced computer user, but not necessarily a programmer. If you are the sole user of your system, you are responsible for these tasks; you are your own system manager.

1.1 Primary Responsibilites

The system manager's primary responsibilities are:

- managing user accounts which control an individual user's access to system resources
- managing the System directory which contains the system files accessed by all users
- installing new physical devices such as hard disk drives, printers, and consoles
- formatting, and partitioning a hard disk drive
- installing application software

Other responsibilities may include:

- installing new or maintenance versions of FlexOS system software
- implementing periodic backup procedures

1.2 User-level Configuration Files

The system manager controls the system by editing the two primary user-level configuration files: USER.TAB and CONFIG.BAT.

USER.TAB is an ASCII text file that contains a series of entries called **user accounts**. Each user account is comprised of a set of eight fields of information that describe each individual who uses the system and the level of access they are allowed to system resources.

CONFIG.BAT is an ASCII text file that defines the overall hardware configuration and default system-level definitions that apply to all users. CONFIG.BAT is also called the **boot script** because each time the system is booted, FlexOS configures itself according to the instructions contained in CONFIG.BAT.

The following sections describe how the system manager uses these files to configure and maintain the system.

End of Section 1

MANAGING USER ACCOUNTS

A **user account** is a set of information that FlexOS maintains to describe each individual who uses the computer system and the level of access they are allowed to the system resources. FlexOS maintains all user accounts in an ASCII text file named USER.TAB.

Note: USER.TAB must reside in the **system directory** (see Section 2.4), and only the system manager should have Read and Write access to it.

By editing the USER.TAB file, the system manager can:

- create a new user account
- delete an old user account
- assign a user an initial password
- assign a user file and directory access levels

2.1 USER.TAB File

Within USER.TAB, each user account consists of eight consecutive fields which have the following format:

username,password,userid,groupid,home,wmanager,shell,access

Note that each field is separated from the others by a comma, and the entire line must be terminated with a carriage return/line feed.

Table 2-1 describes the fields in each USER.TAB entry.

Table 2-1.   USER.TAB Fields

Field	Description
username	This field contains the name the user enters in response to the LOGON prompt (see Section 2.6). Only the first eight characters are significant.
password	This field contains the <u>encrypted</u> form of the user's password entered with the PASSWORD command. The password can be up to eight characters long. Once entered, this field cannot be edited. If you specify eight asterisks (*) in this field, FlexOS accepts a carriage return as input.
userid	This field contains the user's **User ID**, which can be a decimal number 0–255. This field cannot be empty. The system manager's userid should be 0.
groupid	This field contains the user's **Group ID**, which can be a decimal number 0–255. This field cannot be empty. The system manager's groupid should be 0.
home	This field contains the name of the user's **Home** (root) directory. Typically, the Home directory contains the user's AUTOEXEC.BAT file (see Section 2.5).
wmanager	This field contains the name of the user's preferred **Window Manager**. This field cannot be empty.
shell	This field contains the name of the **shell**, which is the program that runs on each window the user creates. The shell displays the system prompt and controls command entry. See COMMAND in the <u>User's Reference Guide</u> for a description of a shell program. This field cannot be empty.

Table 2-1. (Continued)

Field	Description
access	This field contains a value that determines how the user can access the computer. The values are defined as follows: 1 - local access only 2 - remote (over the network) access only 3 - both local and remote access 4-255 - reserved for future use See the FlexNet User's Guide for the complete description of the access field. Always set the access value to 1, unless the computer is attached to a network.

The following is an example user account entry in USER.TAB:

```
Steve,62C54E80,36,5,system:,shell,boot:command.286,1
```

This user logons to FlexOS as "Steve". His User Id is 36 and he is in Group 5. His Home directory is the System: directory, and his default Window Manager is the same as his default shell program, which is COMMAND.286 found in the BOOT: directory. He can only access FlexOS locally. Note that the hexadecimal digits 62C54E80 represent the encrypted form of his password.

2.2 Assigning Passwords

To assign a password in the USER.TAB file, first initialize the password with eight asterisks, then use the PASSWORD command to modify the password field. See PASSWORD in the User's Reference Guide for the explanation of the command syntax.

When you use PASSWORD to enter a user's password, FlexOS encrypts it and places it in the password field of USER.TAB. Once a user's password is encrypted, it cannot be deciphered. Users should be encouraged to keep their passwords secret, and to change them periodically with the PASSWORD command.

2.3 Security

A major function of the USER.TAB file is defining the level of access individual users have to both files and directories. FlexOS uses the information in USER.TAB to control access to files and directories so that data is protected against accidental loss or unauthorized access.

FlexOS manages file and directory security by the interaction of **user classes** and **access priviledges**.

2.3.1 User Classes

The system manager assigns every FlexOS user both a **User** and a **Group** Identification (ID) number. The User ID is a decimal number from 0 to 255, which is unique to the user within any group.

The Group ID is also a decimal number from 0 to 255. Typically, users are assigned to a group based on the type of access they require, and the need to share common types of files. Example groups might include: engineering, technical documentation, accounting and finance, and management.

FlexOS defines three classes of user based on User and Group ID numbers:

owner   The person with the unique User ID number who creates the file

group   All users with the same Group ID number

world   All users

Figure 2-1 shows a hypothetical hierarchy of classes defined by User and Group ID numbers.

```
---------------------------------------------------------------
|                                                             |
|                         WORLD                               |
|                                                             |
|                                                             |
|        GROUP  1                      GROUP  3               |
|     -------------------      --------------------------     |
|     | User  1  User  2 |     |  User  101     User  201 |   |
|     |                  |     |  User  102     User  202 |   |
|     | User  3  User  4 |     |  User  103     User  203 |   |
|     |                  |     |  User  104     User  204 |   |
|     -------------------      |  User  105     User  205 |   |
|          GROUP  2            |  User  106     User  206 |   |
|     -----------------------  |  User  107     User  207 |   |
|     |     User  14        |  |  User  108     User  208 |   |
|     |     User  24        |  |  User  109     User  209 |   |
|     |     User  37        |  |  User  110     User  210 |   |
|     |     User  50        |  --------------------------     |
|     |     User  78        |                                 |
|     -----------------------                                 |
|                                                             |
|                                                             |
---------------------------------------------------------------
```
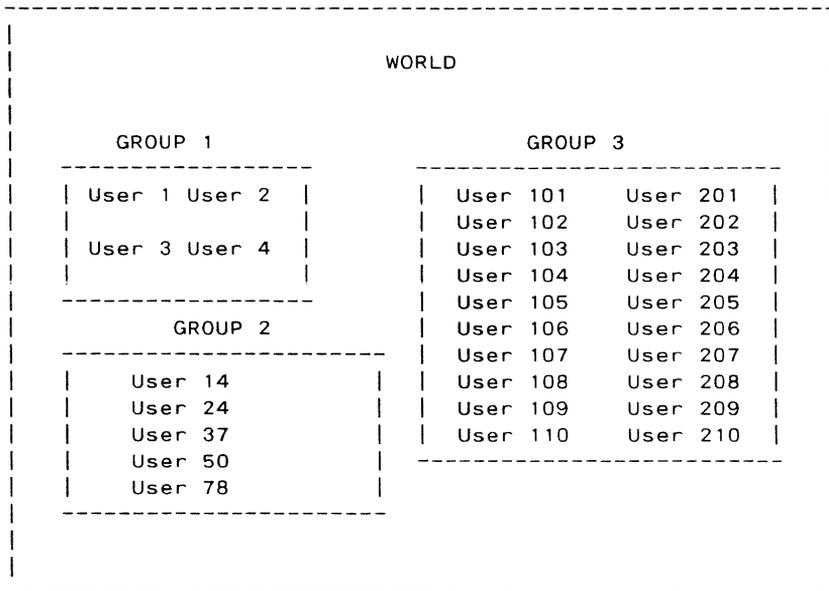
Figure 2-1.   FlexOS User Classes

2.3.2 Access Priviledges

Each class of user can have one or more of the following access privileges:

R(ead)   Read the specified file.

W(rite)   Write to the specified file. To modify the contents of a file, you must have the Write privilege.

E(xecute)   Run the specified file (if the file is a program).

D(elete)   Delete part or all of the specified file. To change the security of a file, you must either have owner access or have the Delete privilege.

2.3.3 Determining File Access

When a user attempts to access a file, FlexOS compares the user's User and Group IDs with the file's ownership information. If the User and Group IDs match the owner information, then the user attempting access is granted the owner privileges of the file. If only the Group ID matches, group privileges are granted. If neither the User or Group IDs match the owner information, world privileges are granted.

2.3.4 Directory Versus File Access Privileges

The User and Group IDs that qualify users for access to individual files also apply to directory access. However, directory access privileges have a slightly different meaning than they do for files. Table 2-2 compares the two meanings.

Table 2-2.   Privilege Definitions for Files and Directories

R(ead)	Read from a file	List files in the directory
W(rite)	Write to a file plus delete/set privileges	Create and delete files in the directory
E(xecute)	Execute a file	Open files in the directory
D(elete/Set	Rename files, change file attributes, or delete files	Change attributes of files in directory

2.4 The System Directory

The **system directory** is a special directory designated for storing files that can be used by all users, typically without access restrictions. When a user enters a command that does not reside in his current default directory, FlexOS automatically searches the system directory for the command. The system directory allows commonly used programs to be stored in a <u>single</u> location, thereby reducing disk storage requirements and file management overhead.

The files in the system directory are called **system files**. The system manager owns the system files and can read, write, execute, or delete any of the files in the system directory. Group and world users can only read and execute files in the system directory.

To make a directory the system directory, you edit the CONFIG.BAT file (see Chapter 3) and use the DEFINE command with the -S option to define a logical name called SYSTEM:.

In the following example, the subdirectory /BIN of hard disk drive 0 (typically drive C:) is defined as the system directory:

```
REM   Define the system directory
REM
DEFINE -S SYSTEM:=HD0:/BIN
REM
```

When you create the system directory, FlexOS gives it the default protection level defined in the CONFIG.BAT file. You can modify the default protection on the system directory with the FSET command

(see the <u>User Reference Guide</u>). Note that when you copy a file into the system directory, it does not automatically receive the default protection level; you must explicitly set it with FSET.

2.5 AUTOEXEC.BAT File

Each user's Home: directory can contain a special batch file named AUTOEXEC.BAT, which FlexOS automatically executes each time the system is booted, or (if LOGON is enabled) when a user logs on to FlexOS. Typically, AUTOEXEC.BAT contains commands that customize a particular user's environment such as PATH (set the directory search path), ORDER (set the command type search order), PROMPT (define the system command prompt), DEFINE (define logical names and set the default help level), and possibly a CHDIR command to redefine the user's default directory.   See the <u>User's Reference Guide</u> for descriptions of these commands.

2.6 Setting up LOGON Procedure

FlexOS offers a LOGON procedure designed to protect the system from unauthorized access. When LOGON is in effect, each user must enter a username and password to gain access to FlexOS.

When you receive it, FlexOS is configured to run LOGON as the last command of your CONFIG.BAT file.   In this default configuration, LOGON prompts you for the following:

> `Username:`

> `Password:`

To gain initial access to the system, enter a carriage return at each prompt.

The LOGON procedure is activated by defining the logical name PROTECT equal to ON as shown in the following excerpt from the CONFIG.BAT file.

```
REM
REM   Enable system-level LOGON procedure so FlexOS
REM   prompts users for user names and passwords.
REM
DEFINE -S PROTECT=ON
REM
```

The word REM in column 1 of any line makes that line a comment. It is a good practice to document your commands in CONFIG.BAT with comments.

Note: If you do not include the logical name PROTECT in CONFIG.BAT, or if you define PROTECT equal to OFF, all users gain immediate access when FlexOS starts without having to enter a username and password. If PROTECT is set to OFF, security for all users is determined by the SECURITY command (if any) in the CONFIG.BAT file. If there is no SECURITY command in CONFIG.BAT, all security is disabled.

If PROTECT is set to ON but there is no SECURITY command in CONFIG.BAT, then security is disabled except for any files created while security was in effect.

The system manager must decide the appropriate level of security to implement on the system.

End of Section 2

INSTALLING DEVICES

To install a device such as a hard disk, printer, or console, you must perform two tasks:

- Physically attach the device to your system by following the manufacturer's installation instructions and any other documentation that accompanies the device.

- Make FlexOS aware of the device by installing the **device driver**, which contains the software instructions that control the device.

This section covers only the second task, which is accomplished using the device driver commands described below. You can enter these commands on the command line or you can place them in the CONFIG.BAT (see Section 3.6) file so that FlexOS is automatically configured when you boot the system.

3.1 Device Driver Commands

To add a device to your system, you must use one of the commands summarized in Table 3-1.

Table 3-1.   Driver Commands

Command	Use it To
DVRLOAD	Install a device for the first time.
DVRUNIT	Add another unit to an existing device.
DVRLINK	Associate one driver with another.
DVRUNLK	Remove a driver previously installed.

The driver commands have the following return codes:

0   Operation was successful (all driver commands).
1   Incorrect parameter (DVRLOAD, DVRUNIT, DVRLINK).
2   Operation failed (all driver commands).
3   A sub-driver is needed for this operation (DVRLOAD, DVRUNIT, DVRLINK).

Driver command parameters are described in the following descriptions of each command. The term **sub-drivers** refers to drivers that are used by other drivers, as in the case where a printer driver uses a port driver to establish a connection to a port.

3.2 DVRLOAD

Syntax:

   DVRLOAD device_name: driver_name access_level

The DVRLOAD command loads a new driver from a disk. Use DVRLOAD if the type of device you are installing is not installed on your system.

device_name: Logical name of the first unit you are installing. The colon (:) is required following the last character in the device_name.

driver_name   Filespec of the device driver.

access_level   Determines how the device driver may be used. You set the access_level by including one or more options with the DVRLOAD command. Table 3-2 lists the options.

Table 3-2.   Driver Access-Level Options

Option	Purpose
E	Exclusive access denied. Only shared access is allowed, assuming the N option is also set.
L	Lockable. Allows a single user to obtain exclusive control (lock) of a system-wide device.
M	Multiple Partitions. When you create a partition with FDISK, you must use the M option with DVRLOAD and DVRUNIT when loading HD0:, HD1:, etc.
N	Shared access enabled. Two or more processes can access the same device simultaneously.
P	Permanent Driver. Once installed, the driver cannot be removed. The P option is useful for devices that do not need to be changed (for example, a hard disk).
R	Raw Read Access Allowed. Data can be read directly (without interpretation) as it appears on the media. You do not see filenames or the relationships of files within directories.
S	Raw Set Access Allowed. Attributes of the driver itself (like the country code or baud rate of a console) can be changed.
V	Verify Writes. Cause FlexOS to verify all writes to a device. This option can affect performance.
W	Raw Write Access Allowed. Data can be written directly (without interpretation) to the media.

3.3 DVRUNIT

Syntax:

DVRUNIT device_name: device_name: access_level

The DVRUNIT command adds another unit of an existing device to the system. For example, if your system has one hard disk drive and you want to install another, you must use DVRUNIT.

device_name: Logical name of the first device_name (the driver already installed). The colon (:) is required following the last character in the device_name.

device_name: Logical name of the driver's new unit. The colon (:) is required following the last character in the device_name.

access level   See Table 3-2. Generally, you use the same options for DVRUNIT as used with DVRLOAD to install the first device.

3.4 DVRLINK

Syntax:

DVRLINK device_name: sub_driver:

The DVRLINK command lets you to associate one driver with another. For example, you can attach a printer driver to a port driver. This enables the printer to communicate with your computer through a specified port.

device_name: Name of a previously installed device. The colon (:) is required following the last character in the device_name.

sub_driver: Name of the previously installed device you want to associate with device_name. The colon (:) is required following the last character in the device_name.

3.5 DVRUNLK

<u>Syntax:</u>

DVRUNLK device_name:

The DVRUNLK command lets you remove a driver from your system that you have installed with DVRLOAD and/or DVRUNIT.

device_name: Name of a previously installed device.

3.6 Default CONFIG.BAT File

The default CONFIG.BAT file distributed with FlexOS contains commented examples of device driver commands used to install various hardware devices. You should study these examples before attempting to alter the configuration or before adding new devices to the system.

Note: CONFIG.BAT must reside in the BOOT: directory, and only the system manager should have Read and Write access to it.

End of Section 3

PARTITIONING AND FORMATTING A HARD DISK

Preparing a hard disk for use with FlexOS involves two steps:

1. Use the FDISK command to create <u>logical</u> hard disk drives on the <u>physical</u> hard disk. A logical hard disk drive is commonly called a **partition**. FlexOS considers each partition a separate area on the physical drive capable of storing data, and identifies each partition (logical drive) with a unique drive letter.

2. Use the FORMAT command to format each logical drive (partition) you have created thus ensuring a recording format acceptable to FlexOS.

Warning: Using FDISK to delete or alter partitions may cause information on the disk to be lost. Before you use FDISK, you should back up files from the hard disk to diskette(s) so that they can be restored to the hard disk when partitioning is complete.

FlexOS provides utilities to help you backup and restore the files currently on the hard disk. These utilities are BACKUP and RESTORE and they are discussed in detail in the <u>User's Reference Guide</u>.

4.1 Using FDISK

To display the FDISK Options Menu, enter the command:

A>**FDISK**

FDISK displays the FDISK Options Menu shown below.

```
Digital Research Inc. FlexOS
Fixed Disk Setup Program Version 1.4
Copyright (C) DRI 1988


Current fixed disk 1:

FDISK Options

Select ONE of the following:

1.   Create logical partition(s)
2.   Change active partition
3.   Delete logical partition(s)
4.   Display partition information
5.   Select next hard disk drive

Enter Choice ( 1 - 5 )



Press ESC to leave FDISK
```

When you select one of the options, FDISK displays additional menus and screens to help you prepare your disk. When FDISK prompts you to enter a value, it also displays a default value. For example, on the FDISK Options Menu, the default value is 4, "Display partition information."

To select the default value on a particular menu, press Enter . If you do not want to use the default value, type your own value at the cursor and press Enter .

If you change your mind about using a particular value or option, you can use the Esc key to cancel your request provided you have not already started the operation by pressing Enter .

Press Esc once to return to the FDISK Options Menu; press Esc twice to return to the system prompt.

4.2 Creating a Logical Partition

Option 1 creates logical partitions on your hard disk. When you select Option 1, FDISK displays the following sub-menu screen:

```
Create logical partition(s) on physical hard disk 1:

Select ONE of the following:

1. Partition the entire disk into 32 megabyte partitions
2. Create single partition(s) of specified size
```

4.2.1 Option 1

If you choose Option 1, FDISK creates as many 32Mb partitions as will fit on the disk. FDISK prompts you with the message:

```
There is enough room for a total of xx new 32 megabyte partition(s)

Make the partition(s) (Y/N)
```

where xx represents by the appropriate numbers pertaining to your hard disk.

For example, if you have a 130Mb hard disk, FDISK creates 4 32Mb partitions (4 x 32 = 128), but does not partition the remaining 2Mb.

When FDISK has completed partitioning the disk, it returns to the FDISK Options Menu.

If you select Option 1, be sure the disk has enough free space for at least one partition. Otherwise, FDISK returns the error message:

```
The disk does not contain 32 megabytes of free space
```

4.2.2 Option 2

Option 2 allows you to create a partition of specified size and location. When you select option 2, FDISK displays a screen similar to the following:

```
        Create logical partition(s) on physical hard disk 1:

Partition Status Type Start Cylinder End Cylinder Total Cylinders Megabytes
--------- ------ ---- -------------- ------------ --------------- ---------
    1     ACTIVE DOS       0             306            307          10.2
    2     INACT  DOS      307            311              5           0.2
    3     INACT  DOS      312            411            100           3.3
    4     EXTEND DOS      412            511            100           3.3


Total hard disk space is 614 cylinders

Enter starting cylinder: 512        Size in megabytes:    3.4
Enter cylinder size:     102



Press ESC to return to the Create Menu
```

FDISK displays the following information about each existing partition:

- The Partition column lists the order in which the partitions appear on the hard disk.

- The Status column shows whether the partition is active (ACTIVE), not active (INACT), or extended (EXTEND). The active partition contains (or will contain) the operating system that has control when you boot the system. Extended means the partition is not one of the primary partitions. Only the first three partitions (1 – 3) can be made active (made bootable).

- The Type column shows the partitions to be one of the following:

- FLEX   FlexOS partition greater than 32 megabytes (may not be compatible with other operating systems)
  DOS   FlexOS partition less than 32 megabytes (DOS-compatible media)
  ????   Unknown partition type

- The remaining columns show the partition's starting cylinder and ending cylinder, the total cylinders in the partition, and the partition's size in megabytes. The term **cylinder** simply refers to an area of your hard disk that stores data.

FDISK also displays the default values for the starting cylinder number, cylinder size, and the amount of remaining space available to be partitioned. If you want the next partition to have the default values, press Enter ; otherwise, enter the values you prefer and press Enter .

In either case, FDISK prompts:

```
Make the partition (Y/N)
```

When you enter **Y**, FDISK updates the screen to show that you have one additional partition. The prompts then return with the default values in case you want to create another partition. You can create as many partitions as you have space for. When there is no more space available, FDISK returns to the previous sub-menu screen.

If you enter an invalid partition size, FDISK responds:

```
Invalid input - Press ESC and reenter.
```

If you do not want to create another partition, press Esc to return to the FDISK Options Menu, then press Esc to return to the system prompt.

When you exit FDISK, you receive the message:

```
Changes have been made.  Reboot the system with CTRL-ALT-DEL.
. . . . . . . . . . .
```

Once you reboot the system to incorporate the changes made to the hard disk, you are ready to format the partitions. Skip ahead to section 4.8, "Formating the Partition".

4.3 Changing the Active Partition

Option 2 changes the active partition on your hard disk. When you start your system from a hard disk, the operating system in the active partition has control of your computer. Only one partition can be active at any given time.

Note: If you change the active partition, you must ensure the new partition contains a bootable operating system. Otherwise, the next time you use your system you will not be able to boot from the hard disk.

When you choose Option 2, FDISK displays a screen similar to the
following:

```
        Change current active partition on physical hard disk 1:

Partition Status Type Start Cylinder End Cylinder Total Cylinders Megabytes
--------- ------ ---- -------------- ------------ --------------- ---------
    1      ACTIVE DOS       0             306           307          10.2
    2      INACT  DOS      307            311             5           0.2
    3      INACT  DOS      312            411           100           3.3



Total hard disk space is 614 cylinders

Enter the new active partition:  1


Press ESC to return
```

Enter the number of the partition you want to make active and press
Enter . FDISK activates the specified partition and returns to the
Options Menu.

When you exit FDISK, you receive the message:

```
Changes have been made.  Reboot the system with CTRL-ALT-DEL.
..........
```

4.4 Deleting a Logical Partition

Option 3 deletes the specified partition. If you delete the active
partition, you must make another partition active before you exit
FDISK. Otherwise, the next time you use your system you will not be
able to boot from the hard disk.

Warning: Using Option 3 may cause information to be lost. Be sure
to back up the files in the partition before you continue.

When you choose Option 3, FDISK displays a screen similar to the
following:

```
                Delete a partition on physical hard disk 1:

Partition Status Type Start Cylinder End Cylinder Total Cylinders Megabytes
--------- ------ ---- -------------- ------------ --------------- ---------
        1    ACTIVE DOS         0          306            307        10.2
        2    INACT  DOS       307          311              5         0.2
        3    INACT  DOS       312          411            100         3.3
        4    EXTEND DOS       412          511            100         3.3


Total hard disk space is 614 cylinders

Partition number to delete:

WARNING:   CURRENT DISK INFORMATION MAY BE LOST!

Press ESC to return
```

If you have one or more FlexOS partition on your hard disk, FDISK prompts you for the number of the partition you wish to delete. To prevent accidental deletion, FDISK does not prompt you with a default number. You must enter a specific partition.

When you enter the number of the partition to delete, FDISK prompts:

```
Delete the partition (Y/N)
```

If you have backed up all the files in your FlexOS partition and you are ready to continue, type **Y** and press Enter . If you decide to cancel the operation, you can press either Enter to obtain the default **N**, or Esc to return to the FDISK Options Menu.

If you enter **Y**, FDISK deletes the partition, then updates the partition information on your screen. If you have other partitions on your hard disk, the Delete prompt reappears on your screen in case you want to delete other partitions. The menu stays on your screen until there are no more partitions to delete, or you press Esc to return to the FDISK Options Menu.

When you exit FDISK, you receive the message:

```
Changes have been made.   Reboot the system with CTRL-ALT-DEL.
. . . . . . . . . .
```

4.5 Displaying Partition Data

Option 4 displays information about the partitions on the hard disk. If you select Option 4, FDISK displays a screen similar to the following:

```
       Display current partitions on physical hard disk 1:

Partition Status Type Start Cylinder End Cylinder Total Cylinders Megabytes
--------- ------ ---- -------------- ------------ --------------- ---------
    1      ACTIVE DOS       0             306           307          10.2
    2      INACT  DOS      307            311             5           0.2
    3      INACT  DOS      312            411           100           3.3
    4      EXTEND DOS      412            511           100           3.3



Total hard disk space is 614 cylinders



Press ESC to return
```

If there are more than four partitions on the disk, FDISK prompts:

```
Display more partition information (Y/N)
```

FDISK provides one line of information for each assigned partition. The last line on the screen displays the total amount of space on the hard disk.

Press Esc to return to the FDISK Options Menu.

4.6 Selecting the Next Hard Disk Drive

If you have more than one hard disk, Option 5 makes your next hard disk drive the current physical hard disk[1]. For example, if your current drive is physical hard disk **1**, Option 5 makes physical hard disk **2** your current drive. You can then prepare the second hard disk using the appropriate FDISK options.

---

[1]FDISK cannot access hard disk 2 unless the first partition on disk 2 is loaded with the DVRUNIT command.

When you select the next hard disk drive, the FDISK Options Menu is automatically updated. The information line "Current fixed disk" displays the hard disk drive you selected. You can then use the FDISK options to work with the current hard disk.

4.7 Editing CONFIG.BAT

Whenever you create one or more FlexOS partitions on your hard disk, you must create a driver unit for each partition by editing the portion of the CONFIG.BAT file that installs your hard disk driver. For example, it may look something like this:

```
REM   The DVRLOAD command below installs a hard disk driver HD.DRV.
REM   HD0: is defined as the device name for the driver.
REM   The driver is installed with the following options:
REM
REM     L - Lockable (the device can be locked by a single user)
REM     N - Shared Access (two or more users can share the device)
REM     R - Raw Read Access allowed
REM     W - Raw Write Access allowed
REM     S - Raw Set Access allowed
REM     M - Multiple partitions allowed (more units can be added)
REM
DVRLOAD HD0: FD0:/DRIVERS/HD.DRV LNRWSM
REM
REM   The DEFINE command below assigns the logical name C: to HD0:.
REM
DEFINE -S C:=HD0:
REM
```

When you find this section of CONFIG.BAT, use the DVRUNIT command to assign a driver unit to the next partition of the drive already installed. You can also give each partition a drive letter with the DEFINE command. Each FlexOS partition must have its own driver unit. The drive letter is optional, but recommended for ease of use.

The following example illustrates how to use the DVRUNIT and DEFINE commands to install a second partition.

```
REM   The DVRLOAD command below installs a hard disk driver HD.DRV.
REM   HD0: is defined as the device name for the driver.
REM   The driver is installed with the following options:
REM      .
REM      L - Lockable (the device can be locked by a single user)
REM      N - Shared Access (two or more users can share the device)
REM      R - Raw Read Access allowed
REM      W - Raw Write Access allowed
REM      S - Raw Set Access allowed
REM      M - Multiple partitions allowed (more units can be added)
REM
DVRLOAD HD0: FD0:/DRIVERS/HD.DRV LNRWSM
REM
REM   The DEFINE command below assigns the logical name C: to the
REM   device HD0:.
REM
DEFINE -S C:=HD0:
REM
REM   The DVRUNIT command below connects a 2nd unit to the driver
REM   installed above.  HD1: is assigned as the device name of the
REM   2nd drive.
REM
DVRUNIT HD0: HD1: LNRWSM
REM
REM   The DEFINE command below assigns the logical name D: to the
REM   device HD1: so the partition is identified by D:.
REM
DEFINE -S D:=HD2:
REM
```

Before exiting FDISK, be sure to restart FlexOS (press [Ctrl] [Alt] [Del]) to incorporate your partition changes.

4.8   Formatting The Partition

Whenever you create a partition, the next step in preparing the hard disk is formatting the partition. The way you format your partition depends on how you want to use it. You have two choices:

1. You can format your partition so that you can store both data files and a copy of FlexOS in your partition. When you format your partition this way, you have the option of booting FlexOS from the hard disk rather than from a diskette. This alternative is described under "Formatting With System Tracks," below.

2. You can format your partition so that it only stores data files. When you format your partition this way, you must boot FlexOS from a diskette. This alternative is described under "Formatting Without System Tracks," below.

The first alternative is more flexible. If you choose the second alternative and change your mind later, it requires more time and effort to back up your files and reformat the partition.

4.8.1 Formatting With System Tracks

To reserve space for FlexOS on your partition, enter the following command:

    A>**FORMAT C:-S-V**

This command formats your partition, reserves space for the FlexOS system tracks and prompts you for a volume label. In this example, the hard disk drive letter is C.

Be sure to respond to all FlexOS prompts.

After formatting the partition, copy all the FlexOS system files onto the hard disk.

4.8.2 Formatting Without System Tracks

If you prefer to start FlexOS from diskette, you can format your partition without system tracks. To do this, enter the command shown below:

    A>**FORMAT C:-V**

After your partition is formatted you are prompted for a volume label, but no space is reserved for system tracks. In this example, the hard disk drive letter is C.

Your hard disk is now ready for use.

4.9 FDISK Command-line Options

Command-line options provide the ability to use FDISK in a batch file. These options allow FDISK to bypass the menu system, and create, delete, activate, and display partition information from the command-line.

Table 4-1 lists the FDISK command-line options.

Table 4-1.   FDISK Command-line Options

Option	Purpose
-C	Display the "Create Logical Partition" menu.
-C -E	Partition the entire disk into 32 megabyte partitions.
-C -Sn -Nn	Create a partition. Sn specifies the starting cylinder number, Nn specifies the number of cylinders (n is a decimal number).
-A	Display the "Active Partition Table".
-A -Nn	Activate the partition specified by Nn (n = 1-3).
-D	Display the "Delete Partition Table".
-D -Nn	Delete the partition specified by Nn (n = 1-3).
-I	Display the "Partition Information Table".

Examples:

The following command creates as many 32Mb partitions as will fit on the disk.

```
FDISK HD0: -c -e
```

The following command creates a partition of 307 cylinders starting at cylinder 0.

```
FDISK HD0: -c -s0 -n306
```

The following command makes partition 2 the active partition.

```
FDISK HD0: -a -n2
```

The following command displays the current partition table information.

    FDISK -i

If you enter the command:

    FDISK -?

FDISK displays a help screen.

If you enter the command:

    FDISK

FDISK displays the FDISK main menu.

End of Section 4

INSTALLING APPLICATION SOFTWARE

In general, you install an application on FlexOS by copying the application into the system directory, and then using FSET to give the file the system (SYS) attribute. You must use FSET because files do not automatically receive the system attribute when they are copied into the system directory. See the User's Reference Guide for more information about the FSET command.

The following example adds the word processing application WPROC.EXE to the system directory. In this example, the system directory is the root directory of the hard disk, drive C.

```
A>COPY WPROC.EXE SYSTEM:

A>FSET SYSTEM:WPROC.EXE -S=ON

A>_
```

For guidelines on installing and running specific applications software, see Running DOS Applications.

End of Section 5

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