DIGITAL RESEARCH™

CP/M®-85 Winchester Supplement

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ZENITH data systems

HEATH

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ESSENTIAL REQUIREMENTS for using:
CP/M-85 (Winchester Utilities)

a. Distribution Media: Two 5.25-inch soft-sectored 48-tpi disks
b. Machine Configuration (minimum): Z-100, 128K memory, one floppy disk drive, one Winchester drive, and CRT
c. Operating System: Not applicable
d. Microcomputer Language: Not applicable

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Introduction

This supplement to the CP/M®-85 manual contains instructions for using the features of your software package that are related to the Winchester disk.

Use this supplement with your CP/M-85 manual. Both will be necessary for efficient use of CP/M-85 in your Zenith Data Systems and/or Heath hardware. Many features of the software are explained in the CP/M-85 manual and not in this supplement.

Section One: Winchester Disk Concepts — explains the important concepts you will need to master before you can use your Winchester disk hardware and software. You should read this section after reading the "Beginning Concepts" text of the CP/M-85 manual.

Section Two: Winchester Disk Procedures — instructs you on preparing your Winchester disk for everyday use. You should read these procedures instead of the "Software Preparation Procedures" in the CP/M-85 manual.

Section Three: Bootup with a Winchester Disk — instructs you on the many bootup options afforded you. You should read this section instead of "Appendix B: Bootup" in the CP/M-85 manual.

Section Four: Winchester Disk Software — explains in detail how several of your system support utilities work. Some of these utilities are totally different from the utilities explained in the "Reference Guide" of the CP/M-85 manual. Others are similar to utilities that are explained in the "Reference Guide" of the CP/M-85 manual. In cases where this supplement and the CP/M-85 manual contain similar text on utilities, rely on the text in this supplement.

NOTE: This supplement presents several examples of prompts and messages that are displayed on your video screen. The version numbers and/or dates presented in these examples might differ slightly from the version numbers and dates displayed on your screen.

User input (the entries you type through the keyboard) will be represented by **boldface type**. In command lines that include keys labeled by more than one character (such as RETURN and CTRL), the key labels will be represented by the key label in ***italic boldfaced type***, as shown in the following example:

PIP E:=A:*.*[RV] ***RETURN***

The term "Z-100" is often presented in this supplement to refer to computers in the Z-100 series. The Z-100 series of computers includes the ZF-110-22, ZF-120-22, H-110-1, H-120-1, ZW-110-32, and ZW-120-32.

Section One

Winchester Disk Concepts

A Winchester Disk (or disks) is a round metal platter coated with a magnetic oxide. This disk is permanently enclosed in a chamber within the cabinet of your Z-100 or H-100 computer.

The Winchester disk's storage capacity is far greater than that of your floppy disks. Because the Winchester Disk has such a great capacity for storing data, it is divided into separate storage areas called "partitions".

The software and data on a partition can be accessed similarly to the software and data stored on a floppy disk in a drive. In fact, for most CP/M operations, a Winchester partition behaves just like a floppy disk. Therefore, when explanations in the CP/M-85 manual refer to a "floppy disk", the same explanation is often applicable to a partition as well.

WINCHESTER DISK ADVANTAGES

Z-100 Winchester hardware and software were designed to provide you with a more convenient, flexible, and secure microcomputer environment.

These products solve three of the most crucial problems involved in any microcomputer application: storage space, organization of data, and protection from media failure.

Convenience

To make your microcomputer work more convenient, Z-100 Winchester disk products help you to store far more data than you can store on a floppy disk. The Z-217 Winchester disk controller card and this version of CP/M-85 enable you to use a Winchester disk with a storage capacity of up to 32 megabytes. (Your Winchester disk might have a different storage capacity.)

Two complimentary utilities provided with your CP/M-85 software (BACKUP and RESTORE) provide you with a convenient method for backing up large quantities of Winchester disk files to floppy disks, and then restoring these files to the Winchester disk when necessary.

Flexibility

Because your Z-100 hardware and software can perform so many microcomputer tasks, you have been provided with Winchester utility software to make your Winchester disk a more flexible work tool. The Winchester utility software (provided with your Winchester disk hardware) enables you to separate the programs and data of different applications into different areas of the Winchester disk.

The PART utility is provided for this purpose. It enables you to divide your Winchester disk into as many as 16 separate work areas or partitions.

Integrity

One of the most common fears of computer users is the loss of valuable data due to failure of the storage media. The Winchester utility software offers you three utilities for protecting your data.

One utility (PREP) initializes and tests the entire disk surface. PREP then helps prevent access of any faulty disk media as you work with the Winchester disk.

Another utility (VERIFY) enables you to find any disk media that has become faulty since you began using the disk. VERIFY then helps prevent access of this faulty media.

An additional utility (SHIP) enables you to protect the data on your Winchester disk from damage due to physical shock.

WINCHESTER PARTITIONS VERSUS FLOPPY DISKS

Winchester disk partitions and floppy disks are similar in the following ways:

- Software and data can be accessed on each by entering commands that refer to them by drive names.
- Each can contain an operating system, so that you can boot up using only this partition or disk.
- Different floppy disks and different Winchester partitions can contain different operating systems and still be used in the same disk drive.
- The storage capacities of each can be varied by using special programs (FORMAT for floppy disks and PART for Winchester partitions) before recording data.

Winchester disk partitions and floppy disks are different in the following ways:

- The storage capacity of a Winchester partition is potentially much larger than the storage capacity of a floppy disk.
- Floppy disks can be removed from the floppy disk drive and transported freely. Winchester partitions cannot be removed from the Winchester disk drive, although partitions can be created, eliminated, enlarged, or contracted by special programs (PREP and PART).

- A customized operating system will be able to access all floppy disks immediately upon bootup. A customized system can access a maximum of only one Winchester partition immediately upon bootup. Users with more than one Winchester partition must use a special program (ASSIGN) to "introduce" these partitions to the system before the system will be able to access them.

ACCESSING WINCHESTER PARTITIONS

For most CP/M operations, you can think of a Winchester partition as if it were a floppy disk. However, just as a floppy disk needs to be inserted into a drive, a Winchester partition needs to be assigned to a drive.

You must **insert** a floppy disk into a drive before its data can be accessed. Likewise, you must usually **assign** a partition to a drive before its data can be accessed.

Your Winchester disk drive can contain as many as 16 partitions accessible through CP/M, but only two of these partitions can be assigned to drive names at any one time.

Since your Winchester partitions are permanently sealed in the Winchester disk drive, you can not manually remove a partition or insert a new one. Therefore, you must use the ASSIGN utility to assign partitions to drives. "ASSIGN" in "Section Four: Winchester Disk Software" contains detailed instructions on assigning partitions.

NOTE: The only time when you can access a partition without assigning it is when you boot up to that partition. Booting up to a partition is explained in detail in "Section Three: Bootup with a Winchester Disk".

DEFAULT BOOT PARTITION

You can create as many as 16 bootable CP/M partitions on your Winchester disk and boot up with any of them. However, booting up with a partition requires different circumstances than booting up with a floppy disk.

You must either type special bootup commands or establish one partition as your "default boot partition" using the PART utility.

Each partition on your Winchester disk is identified by a partition name and (optionally) a system name.

Therefore, you can specify which partition you want to boot up with each time you boot up by typing the partition name and (when necessary) the system name at the end of your bootup command. "Section Three: Bootup with a Winchester Disk" contains detailed instructions on booting up to a partition in this manner.

However, some users find it more convenient to establish one partition as the one that will be used for booting up most of the time. Once this partition is established as the default boot partition, the user will not need to enter its partition name and system name in order to boot up with it. "PART" in "Section Four: Winchester Disk Software" contains detailed instructions on establishing a default boot partition.

NOTE: Even when you have selected a default boot partition, you can still boot up to any established partition by entering an explicit bootup command (see Section Three: Bootup with a Winchester Disk).

WINCHESTER DISK PRECAUTIONS

The Winchester Disk stores so much information within such small surface areas, you should adhere to the following precautions to ensure that the disk and stored data are not damaged.

- Your computer and Winchester drive must not be subjected to any kind of a drop or other physical shock. Should the computer be accidentally dropped, even from only two to three inches, the Winchester drive may fail to operate. If this occurs you should contact your local ZDS representative for service.

- The built-in disk of your Winchester drive cannot be physically removed from the drive. However, information can be removed, stored, and replaced with other data. You will learn how to do this later in this supplement and in the Winchester section of your operating system manuals.

- Do not use or store electric motors, appliances, telephones near the Winchester drive, as these devices contain magnets that could alter the magnetic impressions on the disk.

- Do not expose the Winchester drive to temperatures below 15 degrees Celsius (60 degrees Fahrenheit) or temperatures above 32 degrees Celsius (90 degrees Fahrenheit).

- Do not expose the Winchester disk to smoke or excessively dusty conditions.

NOTE: You should also adhere strictly to any precautions specified in your hardware documentation.

Section Two

Winchester Disk Procedures

Before you begin using your Winchester disk for everyday microcomputer tasks, you should perform one or both of the following two procedures in sequence:

- Winchester Utility Procedure — Necessary only for users with a damaged copy of the Winchester Utility Disk and/or users who wish to repartition their Winchester disk or change the default boot partition.

- Software Transfer Procedure — Necessary for all users.

These procedures can help you to make backup copies of your Winchester Utility Disk and CP/M Distribution Disks, to divide your Winchester disk into partitions, and to transfer customized CP/M software to one or more partitions.

The instructions within each procedure will inform you when it is possible for some users to skip an activity.

WINCHESTER UTILITY PROCEDURE

This procedure can help you to back up the Winchester Utility Disk (using the DSKCOPY utility), and to repartition your Winchester disk (using the PART utility).

None of these activities are essential to all users because all users are shipped two copies of the Winchester Utility Disk, and because Winchester disks supplied by Zenith Data Systems or Heath contain a CP/M partition when they are shipped. Therefore some users can skip activities within this procedure or proceed directly to the Software Transfer Procedure.

Procedure Synopsis

If either copy of your Winchester Utility Disk is damaged, then you should perform the following activities in sequence:

Z-DOS Bootup
DSKCOPY

If you wish to change the arrangement of partitions on your Winchester disk or the default boot partition, then you should perform the following activities in sequence:

Z-DOS Bootup
PART

If your Winchester Utility Disk is damaged **and** you wish to change partitions or the default boot partition, then you should perform the following activities in sequence:

Z-DOS Bootup
DSKCOPY
PART

NOTE: This procedure will require you to use the Z-DOS Operating System (rather than the CP/M-85 Operating System). The differences between the Z-DOS and CP/M-85 systems will have no noticeable effect on the operation of the PART utility.

Z-DOS Bootup

This bootup activity helps you to load the Z-DOS Operating System into the computer from a floppy disk (the Winchester Utility Disk), so that it can control Z-DOS utilities.

1. Insert the Winchester Utility Disk into the 5.25-inch floppy disk drive slot of the Z-100, and close the drive latch.

2. Reset the system by entering ***CTRL-RESET*** (if you have not already done so).

3. If the light on the 5.25-inch floppy disk drive glows after you reset the system, then skip ahead to step 5.

   If the light on the Winchester disk drive glows after you reset the system, then wait several seconds until the pointing finger prompt is displayed on the screen. Then proceed to step 4.

   If no drive light glows after you reset the system, then the pointing finger prompt should be displayed on the screen. Then proceed to step 4.

4. At the pointing hand prompt, press the **B** key, the ***F1*** key, and a ***RETURN***.

5. Wait for the display of a series of messages in the following form:

```
Z-DOS/MS-DOS BIOS Release 1.00, version 1.10

Z-DOS/MS-DOS release 1.00, version 1.25
(c) Copyright 1982 Zenith Data Systems

Z-DOS/MS-DOS release 1.00, version 1.20S
Current date is Mon  1-31-83
Enter new date:
```

6. At the "Enter new date" prompt, type the current date in the following form:

```
Current date is Mon 1-31-83
Enter new date {mm}-{dd}-{yy}  RETURN
```

Where {**mm**} is a number in the range 1-12, representing a month;
where {**dd**} is a number in the range 1-28, 1-29, 1-30, or 1-31 (depending on the month and year) representing a day; and
where {**yy**} is a number in the range 80-99 or 1980-2099 representing a year.

Then Z-DOS will display a message in the following form:

```
Current time is 8:35:12.50
Enter new time:
```

7. At the "Enter new time" prompt, type the current time in the following form:

```
Current time is 8:35:12.50
Enter new time {hh}:{mm}:{ss}  RETURN
```

Where {**hh**} is a number in the range 1-24 representing the hours;
where {**mm**} is a number in the range 0-59 representing the minutes. This entry is optional. If omitted, 00 is assumed; and
where {**ss**} is a number in the range 0-59 representing the seconds. This entry is optional. If omitted, 00 is assumed.

The A: system prompt will now appear on your screen, to show that Z-DOS is in control and ready to accept commands.

If either copy of your Winchester Utility Disk is damaged, then you should proceed to the DSKCOPY activity.

If you wish to change the arrangement of partitions on your Winchester disk or the default boot partition and you have two usable copies of the Winchester Utility Disk, then you should proced to the PART activity.

DSKCOPY

The DSKCOPY activity will help you to copy all of the software from your Winchester Utility Disk to a backup disk.

NOTE: We recommend that you use this activity only if a copy of the Winchester Utility Disk has become unusable.

1. Type the command **DSKCOPY/V *RETURN*** at the A: system prompt. This entry invokes DSKCOPY, which will display a message and prompt in the following form:

```
            DSKCOPY version 1.01
Copyright(C) 1982 Zenith Data Systems

Source drive name? (A-F)  _:
```

2. Type **A**. Then DSKCOPY will display the following prompt:

```
Destination drive name? (A-F)  _:
```

3. Type **B**. Then DSKCOPY will display the following prompt:

```
Place source diskette in A: and destination diskette in B:
Hit RETURN when ready.
```

4. Leave the Winchester Utility Disk in the drive, and press ***RETURN***. Then DSKCOPY will display the following prompt:

```
Formatting destination... Place disk B in drive A:.
Hit any key when ready.
```

5. Remove the Winchester Utility Disk from the drive.

6. Label a blank, 5.25-inch, double-sided, double density, 48-tpi, floppy disk with the words "Winchester Utility Backup Disk".

7. Insert the Winchester Utility Backup Disk in the 5.25-inch floppy disk drive slot, close the drive latch, and press a gray key. (Do not press any of the brown keys in the top row.) The floppy disk drive light will glow for several seconds. Then DSKCOPY will display the following prompt:

```
Copying... Place disk A in drive A:.
Hit any key when ready.
```

8. Remove the Winchester Utility Backup Disk from the drive, insert the Winchester Utility Disk, and press a gray key. DSKCOPY will continue to display prompts in the following form:

```
Place disk X in drive A:.
Hit any key when ready.
```

9. When a prompt in this form reads "Place disk B", insert the Winchester Utility Backup Disk and carefully press a key.

   When a prompt in this form reads "Place disk A", insert the Winchester Utility Disk and carefully press a key.

10. Continue switching the two disks as DSKCOPY displays a prompt in the following form:

```
Verifying... Place disk A in drive A:.
Hit any key when ready.
```

11. Continue switching the two disks until DSKCOPY displays the following prompt:

```
Copy another? (Y/N) <N>
```

12. Type **N** and press ***RETURN***. The system prompt should be displayed again, as shown:

```
A:
```

13. Store your Winchester Utility Disk away in a safe place, and leave your Winchester Utility Backup Disk in the 5.25-inch floppy disk drive for the remainder of this procedure.

14. Type **DIR *RETURN*** at the system prompt. The following prompt will appear on the screen:

```
Place disk A in drive A:
Hit RETURN when ready.
```

15. Press ***RETURN*** at the Place disk A prompt. (Leave your Winchester Utility Backup Disk in the drive.) Directory characteristics of the Winchester utility files will be displayed.

If you wish to change the partition arrangement or the default boot partition, proceed to the PART activity.

If you do not wish to change the partition arrangement or the default boot partition, proceed to the "Software Transfer Procedure".

PART

The PART activity helps you to change the quantity, size, and names of Winchester disk partitions. It also enables you to specify which partition should be accessed when you boot up.

A partition is much like a floppy disk in most operations, because you can access a partition's data and/or software by entering commands that refer to the drive name that has been designated for that particular partition.

CAUTION: Performance of this procedure can irrevocably destroy any software or data that now resides on your Winchester disk. Therefore, you should **not** perform this procedure unless you are certain that you have floppy disk copies of any valuable software or data that might reside on the Winchester disk. This procedure is **not** absolutely necessary for use of Winchester disks supplied by Zenith Data Systems or Heath. ZDS and Heath Winchester disks already contain a CP/M partition when they are shipped to you. This CP/M partition occupies one half of the total Winchester disk space, while a Z-DOS partition occupies the other half.

NOTE: These steps provide you with the minimum information necessary to use the PART utility. If you obtain an error message or desire more detailed information about PART, refer to "PART" in "Section Four: Winchester Disk Software".

1. Type the command **PART *RETURN*** at the A: system prompt. This entry invokes PART. PART first displays an identification message, an explanation of the program's function, a caution, and the following prompt:

```
Proceed (Y/N)?
```

2. Read the initial PART display, paying particular attention to the caution.

   If you wish to proceed with PART, press **Y**. PART will display a table showing the (default) status of several features related to partitions. The cursor will appear at the bottom of the display, at the end of the following menu and prompt:

```
        B - Modify default boot partition
        P - Partition maintenance
        E - Exit
Choose desired option. <B, P or E>_
```

   At this display, you have the choice of changing the arrangement of your Winchester disk partitions, changing the setting of the default boot partition, or exiting from PART. Proceed to step 3.

   If you do not wish to proceed past the initial display with PART, press **N**. The system prompt will appear. Now back up your Winchester disk, or do whatever is necessary to get ready to use PART.

3. If you wish to change the arrangement of partitions on your Winchester disk, then type **P** at this prompt and proceed to step 4. The cursor will move to the partition name of the first partition, at the top of the table.

   If you wish to change the setting of the default boot partition, then type **B** at this prompt and skip ahead to step 7. The cursor will move to the current default boot partition, near the bottom of the table.

4. If you wish to change or add a partition name at the cursor position, type a string of **1-16 ASCII characters** (excluding the semicolon or non-printing characters such as the space or the tab). You can use the BACK SPACE key to edit this entry. Then press ***RETURN***. The name you typed will be displayed and the cursor will move to the system name of the same partition. Proceed to step 5.

If you do not wish to change the partition name of this partition, press ***RETURN*** only. The cursor will move to the system name of the same partition. Proceed to step 4. (If no partition existed in the partition name position when you pressed RETURN, the cursor will move down to the default boot partition. Under these circumstances, you should skip ahead to step 7.)

If you wish to remove all features (partition name, system name, percentage, and kilobytes) of a partition from the table, press the **space bar** once. The cursor will remain in the same position, as the features of the next partition in the table move up to the cursor position. Then repeat step 4. (If no partition was featured below the cursor when you pressed the space bar, the cursor will move down to the default boot partition. Under these circumstances, you should skip ahead to step 7.)

5. If you wish to change the system name at the cursor position, type a string of **1-10 ASCII characters** (excluding the semicolon or non-printing characters such as the space or the tab). You can use the BACK SPACE key to edit this entry. Then press ***RETURN***. We recommend that you use the system name "CP/M" for your CP/M-85 partitions. To create a Z-DOS partition, you must use the system name, "Z-DOS". The system name you type will be displayed and the cursor will move to the allocation percentage of the same partition. Proceed to step 6.

   If you do not wish to change the system name of this partition, press ***RETURN*** only. The cursor will move to the allocation percentage of the same partition. Proceed to step 6.

6. If you wish to change the percentage of Winchester disk space that is allocated to a partition, type a non-fraction **number** in the range n-100 (where n is the number displayed at the bottom of the screen on the right side of the Minimum allocation message) when the cursor appears in a percentage position. Then press ***RETURN***. The percentage

you entered will (usually) be displayed, and the allocation in kilobytes will be automatically calculated and displayed. The cursor will move down to the next partition name position. Return now to step 4. (If you have just allocated the percentage for the 16th partition on the table, the cursor will move down to the default boot partition number. Under these circumstances, you should proceed to step 7.)

NOTE: If you enter a percentage that would cause a total allocation of more than 100 percent, PART will allocate only the difference between 100 percent and the total percent of allocation to all other partitions on the table. In this manner, PART prevents you from over-allocating your Winchester disk space. Furthermore, you should not allocate more than 8 megabytes (8192 kilobytes) to any single partition.

If you do not wish to change the allocation percentage of this partition, then press ***RETURN*** only. The cursor will move down to the next partition name position. Return now to step 4. (If the positions for partition name, system name, and percentage on one line of the table are all blank, then pressing RETURN at the blank percentage position will cause the cursor to move down to the default boot partition number. Under these circumstances, you should proceed to step 7.)

7. If you wish to change or establish a default boot partition, type the number of a partition that is featured in the table. You can use the BACK SPACE key to edit this entry. Then press ***RETURN***. The cursor will move to a prompt beneath a menu of PART options. Proceed to step 8.

   If the default boot partition identifies a partition that is featured on the table and if you do not wish to change this partition's default booting status, then press ***RETURN*** only.

The cursor will move to a prompt beneath a menu of PART options. Proceed to step 8.

If you prefer that none of your partitions have the default booting status, press the **space bar** only. The cursor will move to a prompt beneath a menu of PART options. Proceed to step 8.

8. After you have typed an entry for the default boot partition, PART displays a menu and a prompt in the following form:

```
B - Modify default boot partition
P - Partition Maintenance
R - Restore to original partitions
E - Exit
Choose desired option. <D, P, R or E>
```

If you are satisfied with the partition arrangement and wish to exit from the PART utility, type **E**. Then proceed to step 9. The cursor will remain at the end of a prompt, but a different menu will appear at the bottom of the screen.

If you wish again to change partition arrangement features that you have just entered, type **P**. Then return to step 4. The cursor will move up to the partition name of the first partition, at the top of the table.

If you wish to change partition arrangement features again, but prefer to have the table appear as it did at the beginning of this PART session, type **R**. Then return to step 4. The cursor will move up to the partition name of the first partition, at the top of the table.

If you wish again to change the default boot partition, type **B**. Then return to step 7. The cursor will move up to the default boot partition.

9. When you enter E for "Exit" at the previous prompt, the following menu and prompt appear:

```
M - Make changes and exit
A - Abort, make no changes and exit

Choose desired option. <M or A>
```

If you want to exit from the PART utility and change the status of Winchester disk partition features to reflect the changes that you entered during this PART session, type **M**. This entry has the potential to destroy any data that might exist on the Winchester disk. The A: system prompt will be displayed.

If you want to end this PART session without any changes to the Winchester disk, type **A**. Each partition feature will revert to the status it maintained before you invoked the PART utility. Any and all changes you may have entered during this PART session will be nullified, as if you had not even invoked PART. The A: system prompt will be displayed.

You have just completed the Winchester Utility Procedure. Remove the Winchester Utility Backup Disk for Winchester Utility Backup Disk from the floppy disk drive, and store it safely away.

NOTE: You must reset your computer and boot up again after completing a PART session.

SOFTWARE TRANSFER PROCEDURE

This procedure will help you to move and (where necessary) customize the following software items to one or more Winchester disk partitions:

- The CP/M-85 Operating System
- CP/M-85 support utility files
- Application program files
- Data files used with application programs

You should perform this procedure after using the PART utility, after backing up your Winchester Utility Disk, or after using the PREP utility.

Procedure Synopsis

This procedure requires you to perform the following activities in sequence:

Floppy Disk Bootup
ASSIGN
FORMAT
MVCPM217
SYSGEN
PIP
Winchester Partition Bootup
PIP
CONFIGUR

If you wish to transfer software to more than one CP/M partition, you must also perform the following activities in sequence for each of your additional partitions:

ASSIGN
FORMAT
SYSGEN
PIP

Floppy Disk Bootup

This bootup activity helps you to load the CP/M Operating System into the computer from a floppy disk (Distribution Disk I), so that it can control CP/M utilities.

1. Insert CP/M-85 Distribution Disk I into the 5.25-inch floppy disk drive slot of the Z-100, close the drive latch.

2. Reset the system by entering ***CTRL-RESET*** (if you have not already done so).

3. If the light on the 5.25-inch floppy disk drive glows after you reset the system, then skip ahead to step 5.

   If the light on the Winchester disk drive glows after you reset the system, then wait several seconds until the pointing finger prompt is displayed on the screen. Then proceed to step 4.

   If no drive light glows after you reset the system, then the pointing finger prompt should be displayed on the screen. Then proceed to step 4.

4. At the pointing finger prompt, press the **B** key, the ***F1*** key, and a ***RETURN***.

5. Wait for a message and prompt to appear in the following form:

```
CP/M-85 VERSION 2.2.101  01/28/83

A>
```

When the A> system prompt appears, leave Distribution Disk I in the floppy disk drive slot and proceed to the ASSIGN activity.

ASSIGN

The ASSIGN utility assigns CP/M partitions to drive names, so that you can move software and data to and from these partitions.

CP/M will allow you to have as many as two partitions assigned to drive names at one time. But during this activity, you will assign only one partition to a drive name.

1. Type **ASSIGN ?** and press ***RETURN***. ASSIGN will display a list of the partition names that were set up with the PART program. Such a display might look something like this:

```
PARTITION NAME      OS NAME      SIZE
---------------     ----------   -------
DATABASE            ;Z-DOS       1200k
SPREAD-SHEET        ;CP/M        1000k
WORD/PROCESSING     ;CP/M        1000k
ACCOUNTING          ;CP/M        1800k
```

Your partitions will probably have different names, though they will be displayed in this form.

2. Select the partition that you want to become your Backup Partition.

3. Type the command **ASSIGN X:={partition}** ***RETURN*** at the system prompt.

   Where **X:** is the name of the drive to which you are assigning the partition. If you do not have 8-inch disk drives connected, enter **C:** for the drive name. If you have 8-inch disk drives connected, enter **E:** for the drive name.

   where **{partition}** identifies the partition you wish to select. A partition is identified by a partition name, and optionally by a system name. (It is not necessary to include the system name if the Winchester disk contains only one partition with the specified partition name.

A sample entry could be

ASSIGN C:=SPREAD-SHEET;CP/M *RETURN*.

4. If you wish to confirm the assignment, type **ASSIGN** and press ***RETURN***. The ASSIGN utility will display the drive assignment you just entered. A sample display might appear in the following form:

```
C: = SPREAD-SHEET;CP/M
```

Leave Distribution Disk I in drive A and proceed to the FORMAT activity.

FORMAT

The FORMAT utility will prepare the newly assigned partition for data storage.

1. At the CP/M prompt A>, type **FORMAT** and press ***RETURN***. This entry invokes FORMAT, which will display the following message:

```
CP/M-85 Format Version 2.2.101

This program is used to initialize a disk.
All information currently on the disk will be destroyed.
Is that what you want? (y/n):
```

2. Type **Y**. FORMAT will display:

```
Which drive do you wish to use for this operation?
```

3. If you do not have any 8-inch disk drives connected, type **C**.

   If you have any 8-inch disk drives connected, type **E**.

   FORMAT will display:

   ```
   Will format partition assigned to drive X:

   Press RETURN to begin, anything else to abort.
   ```

4. Press ***RETURN***. FORMAT will begin preparing the surface of the partition. When finished preparing the partition, FORMAT displays the message:

   ```
   Do you have any more disks to format? (y/n):
   ```

5. Type **N**. FORMAT will now display:

   ```
   A>
   ```

Leave the Distribution Disk in the floppy disk drive slot and proceed to the MVCPM217 activity.

MVCPM217

The MVCPM217 activity helps you to move the CP/M system kernel (the portion of the operating system exclusive from the BIOS files) from a floppy disk to the Winchester disk partition.

The MVCPM217 utility is necessary because floppy disks and Winchester partitions are controlled by different controller cards. MVCPM217 adjusts the system kernel to match the controller card that it is being moved to.

1. Type the command **MVCPM217** ***RETURN*** at the system prompt.

2. Wait for a display in the following form to appear:

```
MVCPM217 VERSION 2.2.101

CONSTRUCTING nnk CP/M vers 2.2
READY FOR "SYSGEN" OR
"SAVE 38 CPMnn.COM"

A>
```

Leave the Distribution Disk in the floppy disk drive slot and proceed immediately to the SYSGEN activity.

NOTE: The MVCPM217 activity moves the CP/M system kernel to a special location within computer memory. You must perform the SYSGEN activity immediately after the MVCPM217 activity, or else the result of the MVCPM217 activity will be lost.

SYSGEN

The SYSGEN utility puts the CP/M system that was just moved into memory by MVCPM217 on the newly assigned Winchester partition.

1. Type the command **SYSGEN *RETURN*** at the A> system prompt. This entry invokes SYSGEN, which will display a message in the following form:

```
CP/M-85 SYSGEN VER 2.2.101
SOURCE DRIVE NAME (OR RETURN TO SKIP):
```

2. Press ***RETURN***. (This entry signifies that the source of the system kernel is computer memory, rather than a disk drive.) SYSGEN will display:

```
DESTINATION DRIVE NAME (OR RETURN TO REBOOT):
```

3. If you do not have any 8-inch disk drives connected, type **C**.

   If you have any 8-inch disk drives connected, type **E**.

   SYSGEN will display a prompt in the following form:

   ```
   DESTINATION ON C, THEN TYPE RETURN
   ```

4. Press ***RETURN***. SYSGEN will display:

   ```
   FUNCTION COMPLETE
   DESTINATION DRIVE NAME (OR RETURN TO REBOOT):
   ```

5. Press ***RETURN***. Now CP/M will display the system prompt:

   ```
   A>
   ```

Leave Distribution Disk I in the floppy disk drive slot and proceed to the PIP utility.

PIP

You will use the PIP utility to copy all of the files from Distribution Disk I to the partition.

1. If you do not have any 8-inch disk drives connected, type the command **PIP C:=A:*.*[RV]** ***RETURN*** at the system prompt.

   If you have any 8-inch disk drives connected, type the command **PIP E:=A:*.*[RV]** ***RETURN*** at the system prompt. PIP will display the names of all the files from Distribution Disk I as they are copied, in the following form:

   ```
   COPYING -
   ALTCHAR.SYS
   .
   .
   .
   XSUB.COM
   ```

2. Wait for PIP to display the entire list of files. Then CP/M will again display the system prompt:

   ```
   A>
   ```

When you have completed the PIP activity, remove CP/M-85 Distribution Disk I from the floppy disk drive slot and store it in a safe place. Then proceed to the Winchester Partition Bootup activity.

Winchester Partition Bootup

This bootup activity helps you to load the CP/M Operating System into the computer from the partition, so that it can control CP/M utilities.

1. Reset the system by entering ***CTRL-RESET*** (if you have not already done so).

2. If the light on the 5.25-inch floppy disk drive glows after you reset the system, then press the ***DELETE*** key. The pointing finger prompt should then be displayed on the screen. (Do not be alarmed if the "Boot Abort" or "Device Error" message also appears.) Proceed to step 3.

   If the light on the Winchester disk drive glows after you reset the system, then wait several seconds until the pointing finger prompt is displayed on the screen. Then proceed to step 3.

   If no drive light glows after you reset the system, then the pointing finger prompt should be displayed on the screen. Proceed to step 3.

3. At the pointing finger prompt, type a bootup command in the following form:

   B ***F3*** **:{bootstring}** ***RETURN.***

   Where **B** tells the computer that you wish to boot up. The computer will automatically display the remaining letters in the word "Boot".

   where **F3** is one of the brown function keys located in the top row of your keyboard. This entry tells the computer what type of disk you wish to boot up from. The computer will display "f3" in reverse video.

   where **:{bootstring}** tells the computer which partition you wish to use to boot up. The colon must be the first character in this entry. The remaining characters must be the partition name, and optionally the system name, of a bootable partition that exists on your Winchester disk.

where ***RETURN*** tells the computer to begin processing your bootup entry.

NOTE: You can omit the :{**bootstring**} specification from your bootup command if you have already set the desired partition as your "Default Boot Partition" through the PART utility.

For example, you could type the following entry to boot up to a Winchester disk CP/M partition named "SPREAD-SHEET":

B *F3* : SPREAD-SHEET;CP/M *RETURN*

If your Winchester disk contained only one partition with the "SPREAD-SHEET" partition name, then it would be unnecessary to include the system name (;CP/M) in the bootstring.

NOTE: Do not press the space bar while typing your bootup entry. Spaces appear in this example for clarity.

4. Wait several seconds, until a message and prompt appear in the following form:

```
CP/M-85 VERSION 2.2.101  01/28/83
A>
```

When the A> system prompt appears, proceed to the PIP activity.

PIP

This activity will help you to copy files to your partition from the following three sources:

- CP/M-85 Distribution Disk II
- 5.25-inch or 8-inch soft-sectored, 48-tpi application program disks (distribution disks or transfer disks)
- Data files used for application programs

1. Insert CP/M Distribution Disk II into the floppy disk drive slot of the Z-100. This slot will be called drive C during this activity.

2. Type the command **PIP A:=C:*.*[V]** ***RETURN*** at the system prompt. PIP will display the names of all the files from Distribution Disk II as they are copied, in the following form:

```
COPYING -
ASCII.LIB
.
.
.
Z217DRVR.LIB
```

3. Wait for PIP to display the entire list of files. Then CP/M will again display the system prompt:

```
A>
```

4. Remove CP/M Distribution Disk II from the floppy disk drive, and store it in a safe place.

5. Insert an application program disk into a floppy disk drive slot (5.25-inch or 8-inch).

6. Type a command in the form **PIP A:=X:{filename.ext}[V]** ***RETURN*** at the system prompt.

   Where **X:** is the name of the drive from which you are copying files. If you are copying from a 5.25-inch drive, enter **C:** for the drive name. If you are copying from an 8-inch drive, enter **E:** for the drive name.

   where **{filename.ext}** is the primary name and extension of a file you wish to copy from the application program disk. If you wish to copy all of the files from this disk, enter ***.***. The *.* entry is a wild card file name that represents all of the files on the application program disk.

   where **[V]** is an option that causes PIP to verify the accuracy of the copy operation.

   PIP will display the names of the specified files on the application program disk as they are copied, in the following form:

   ```
   COPYING -
   SC.COM
   SC.OVL
   ```

   NOTE: The names of the files copied will depend on the contents of your source disk.

7. Wait for PIP to display the entire list of files. Then CP/M will again display the system prompt:

   ```
   A>
   ```

8. Repeat step 5, step 6, and step 7 for each application program disk or data disk from which you wish to copy files to the partition.

   NOTE: If you wish to copy some application program files and/or data files to different partitions, repeat the ASSIGN, FORMAT, MVCPM217, SYSGEN, and PIP activities.

When you have finished copying files to the partition, proceed to the CONFIGUR activity.

CONFIGUR

The CONFIGUR utility adjusts the CP/M Operating System on your partition for your hardware and preferences.

You do **not** need to perform this CONFIGUR activity if you have the following:

- A serial printer (such as the Z-25 or the H-25) that is set at 4800 baud, accepts 8 bits per character with no parity bit, handshakes with RTS pin number 4, is ready when handshaking signal is high, and has no software protocol.

  and/or

- A modem (such as the WH-13, the Lexicon WH-23, UDS WH-33, or the Hayes WH-43) that is set at 300 baud, accepts 8 bits per character with no parity bit, and uses no handshaking.

If you have a printer and/or modem that is **not** listed in these descriptions, then begin this activity at step 1.

1. Type **CONFIGUR** ***RETURN***. CONFIGUR will display the following menu:

```
CP/M-85 System Configuration Utility version 2.2.101
     Copyright (c) 1982 by Zenith Data Systems

              *** MAIN MENU ***

        P - Printer Configuration
        M - Modem Configuration
        C - Command Configuration
        I - I/O Map Configuration
        ? - Brief Help message

        X - Exit

        Selection [P,M,C,I,X or ?] :
```

2. Type **P** and ***RETURN***. CONFIGUR will display the following menu:

```
*** Printer Configuration ***

1- MX-80 or other PARALLEL Centronics-interface printer
2- H/Z-25
3- H-14 or TI-810(WH-24)
4- Dec LA-34 or LA-36
5- Diablo 620
6- Diablo 630,1610,1620,1630 or 1640(WH-44)
7- MX-80 Serial
8- Votrax Type 'n Talk
9- User-defined SERIAL Printer

Please choose the number that corresponds to your printer :
```

3. Enter the number to the left of your printer's name and ***RETURN***. CONFIGUR will display a message listing some characteristics of your printer. If these characteristics do not match those of your printer, either change your printer settings (see printer manual) or specify characteristics for a "User-defined" printer (see CONFIGUR section in "Reference Guide" of the CP/M-85 manual).

   NOTE: If your printer is not listed by name in the "Printer Configuration" menu, press **9** and ***RETURN***, and refer to the "Reference Guide" of the CP/M-85 manual for instructions.

4. When the message listing the characteristics of your printer is displayed, press ***RETURN*** at the "Press RETURN to access Main menu:" prompt. CONFIGUR will redisplay the "Configur Main Menu".

NOTE: If you have a modem that is **not** set with standard Heath/Zenith characteristics, refer now to the CONFIGUR text in the "Reference Guide" of the CP/M-85 manual.

5. Type **X** and ***RETURN*** at the "Configur Main Menu". CONFIGUR will display the following menu and prompt:

```
*** EXIT OPTIONS ***

T - Make changes temporary (to memory only)
P - Make changes permanent (to memory and disk)
Q - Make no changes

? - Brief Help Message

Choice [T,P,Q or ?]:
```

6. Type **P** and ***RETURN*** to apply the specified changes to the system, and to record this system on the partition. CONFIGUR will either display a graphic depicting the rear panel of your Z-100 computer, or relinquish control to the CP/M system.

7. If CONFIGUR displays the "Z-100 Rear Panel" graphic, then attach your printer and/or modem cables as shown in the graphic. Then proceed to step 8.

   If CP/M immediately displays the system prompt, skip to step 9.

8. After you have attached your printer and/or modem cables, press ***RETURN***. CP/M will then display the system prompt.

9. If you have a printer, test it out by entering ***CTRL-P***. Then press ***RETURN***. Your printer (if properly configured and connected) should print system prompts as they are displayed to the video screen. Enter ***CTRL-P*** again to discontinue this printer test.

If you wish to transfer the CP/M Operating System and other software to other partitions, proceed to the ASSIGN activity. If not, you have completed the Software Transfer Procedure.

ASSIGN

The ASSIGN utility assigns CP/M partitions to drive names, so that you can move software and data to and from these partitions.

You will now use ASSIGN to assign a second partition to a drive name, so that you can transfer the customized CP/M system and/or application programs and data to this second partition. You can repeat this activity for each of your CP/M partitions.

1. Type **ASSIGN** and press ***RETURN***. The ASSIGN utility will display the current assignment(s) of partition(s) to drive(s). A sample display will appear in one of the following two forms:

```
A: = SPREAD-SHEET;CP/M
```

or

```
A: = SPREAD-SHEET;CP/M
B: = WORD/PROCESSING;CP/M
```

2. Type **ASSIGN ?** and press ***RETURN***. ASSIGN will display a list of the names and sizes of all partitions on the Winchester disk. Such a display might look something like this:

```
PARTITION NAME          OS NAME       SIZE
--------------          -------       ----
DATABASE                ;Z-DOS        1200k
SPREAD-SHEET            ;CP/M         1000k
WORD/PROCESSING         ;CP/M         1000k
ACCOUNTING              ;CP/M         1800k
```

Your partitions will probably have different names, though they will be displayed in this form.

3. Select a partition other than the one currently assigned to drive A. (Type **ASSIGN *RETURN*** again if you have forgotten which partition is assigned to drive A.)

4. Type the command **ASSIGN B:={partition}** ***RETURN*** at the system prompt.

   Where **B:** is the name of the drive to which you are assigning the second partition.
   where {**partition**} identifies the partition you wish to select. A partition is identified by a partition name, and optionally by a system name. (It is not necessary to include the system name if the Winchester disk contains only one partition with the specified partition name.)

   A sample entry could be:

   ASSIGN B:=ACCOUNTING;CP/M *RETURN*.

5. If you wish to confirm the assignment, type **ASSIGN** and press ***RETURN***. The ASSIGN utility will display the drive assignment you just entered (along with the automatic assignment of the booted partition to drive A). A sample display might appear in the following form:

```
A: = SPREAD-SHEET;CP/M
B: = ACCOUNTING;CP/M
```

Proceed to the FORMAT activity.

FORMAT

The FORMAT utility will prepare the newly assigned partition for data storage.

1. At the CP/M prompt A>, type **FORMAT** and press ***RETURN***. This entry invokes FORMAT, which will display the following message:

```
CP/M-85 Format Version 2.2.101

This program is used to initialize a disk.
All information currently on the disk will be destroyed.
Is that what you want? (y/n):
```

2. Type **Y**. FORMAT will display:

```
Which drive do you wish to use for this operation?
```

3. Type **B**. FORMAT will display:

```
Will format partition assigned to drive x:

Press RETURN to begin, anything else to abort.
```

4. Press ***RETURN***. FORMAT will begin preparing the surface of the partition. When finished preparing the partition, FORMAT displays the message:

```
Do you have any more disks to format? (y/n):
```

5. Type **N**. FORMAT will now display:

```
A>
```

Proceed to the SYSGEN activity.

SYSGEN

The SYSGEN utility transfers the customized CP/M Operating System from the drive A partition to the newly assigned drive B partition.

1. Type the command **SYSGEN *RETURN*** at the A> system prompt. This entry invokes SYSGEN, which will display a message in the following form:

```
CP/M-85 SYSGEN VER 2.2.101
SOURCE DRIVE NAME (OR RETURN TO SKIP):
```

2. Type **A**. SYSGEN will display:

```
SOURCE ON A, THEN TYPE RETURN
```

3. Press ***RETURN***. SYSGEN will display:

```
FUNCTION COMPLETE
COPY SYSTEM FILES (Y/N):
```

4. Type **Y**. SYSGEN will display:

```
FUNCTION COMPLETE
DESTINATION DRIVE NAME (OR RETURN TO REBOOT):
```

5. Type **B**. SYSGEN will display:

```
DESTINATION ON B, THEN TYPE RETURN
```

6. Press ***RETURN***. SYSGEN will display:

```
FUNCTION COMPLETE
DESTINATION DRIVE NAME (OR RETURN TO REBOOT):
```

7. Press ***RETURN***. Now CP/M will display the system prompt:

```
A>
```

Proceed to the PIP utility.

PIP

This activity will help you to copy files to your second partition from the following two sources:

- 5.25-inch or 8-inch soft-sectored, 48-tpi application program disks (distribution disks or transfer disks)

- Data disks used with application programs

1. Insert an application program or data disk into a floppy disk drive slot (5.25-inch or 8-inch).

2. Type a command in the form **PIP B:=X:{filename.ext}[V]** ***RETURN*** at the system prompt.

   Where **B:** is the name of the drive to which you have assigned the second partition.

   where **X:** is the name of the drive from which you are copying files. If you are copying from a 5.25-inch drive, enter **C:** for the drive name. If you are copying from an 8-inch drive, enter **E:** for the drive name.

   where **{filename.ext}** is the primary name and extension of a file you wish to copy from the application program or data disk. If you wish to copy all of the files from this disk, enter ***.***. The *.* entry is a wild card file name that can be used to represent all of the files on the application program or data disk.

   where **[V]** is an option that causes PIP to verify the accuracy of the copy operation.

PIP will display the names of the specified files on the application program disk as they are copied, in the following form:

```
COPYING -
GLMST001.DAT
GLMST002.DAT
GLMST003.DAT
        .
        .
        .
GLMST037.DAT
```

NOTE: The names of the files copied will depend on the contents of your source disk.

3. Wait for PIP to display the entire list of files. Then CP/M will again display the system prompt:

```
A>
```

4. Repeat this PIP activity for each application program disk or data disk from which you wish to copy files to the second partition.

When you have finished copying files to the second partition, return to Page 2-29 and repeat this procedure's sequence of the following activities:

ASSIGN
FORMAT
SYSGEN
PIP

Steps in these activities that refer to the "second partition" can also be used for the third, fourth, or fifth CP/M partition — or any other established CP/M partition through the 16th partition.

When you have finished preparing each of your CP/M partitions, you have completed this procedure.

Section Three

Bootup with a Winchester Disk

The bootup activities in "Section Two: Winchester Disk Procedures" provide simplified instructions on booting up with your floppy disk drives and Winchester disk partitions.

However, CP/M-85 enables you to boot up in a wide variety of ways. This section shows you can boot up to any floppy disk drive or Winchester disk partition in your hardware environment.

NOTE: When the ZF-110 (Low-Profile with two floppy drives) and the ZF-120 (All-in-One with two floppy drives) are shipped, they are set to boot up to the left-hand or upper floppy drive automatically upon power up. When the ZW-110-32 (Low-Profile with a Winchester drive) and the ZW-120-32 (All-in-One with a Winchester drive) are shipped, they are set to boot up to a preset, non-bootable partition on the Winchester disk automatically upon power up.

WINCHESTER DISK BOOTING ALTERNATIVES

The method you must use to boot up can depend on the following factors:

- The setting of switches 0, 1, and 2 on the SW-101 dip switch component, which determine the default boot drive device
- The setting of switch 3 on the SW-101 dip switch component, which determines whether booting will be manual or automatic
- The setting of a default boot partition, which can be changed or eliminated by using the PART utility

The combined affect of all of these factors usually influences whether you need to type an explicitly detailed bootup command, whether you need to type a short ambiguous bootup command, or whether you need to type any bootup command at all.

Table 3-1 shows how you can bootup with any of the drives in your hardware environment. This table lists the drive accessed, the actions or commands used to access this drive, and the settings of the SW-101 switch that are necessary.

Drive	User Actions to Cause Bootup	SW-101 Settings (3, 2, 1, 0)
5.25-inch floppy disk drive 0	Power On (Auto-Boot) {**B**} ***RETURN*** {**B**} {***F1***} ***RETURN*** {**B**} {***F1***} {**0**} ***RETURN***	1, 0, 0, 0 0, 0, 0, 0 0, x, x, x 0, x, x, x
8-inch drive 0	Power On (Auto-Boot) {**B**} ***RETURN*** {**B**} {***F2***} ***RETURN*** {**B**} {***F2***} {**0**} ***RETURN***	1, 0, 0, 1 0, 0, 0, 1 0, x, x, x 0, x, x, x
8-inch drive 1	{**B**} {***F2***} {**1**} **RETURN**	0, x, x, x
Winchester partition	Power On (Auto-Boot)* {**B**} {**bootstring**} ***RETURN*** {**B**} {***F3***} {**bootstring**} ***RETURN*** {**B**} {***F3***} {**0**} {**bootstring**} ***RETURN***	1, 0, 1, 0 0, 0, 1, 0 0, x, x, x 0, x, x, x
An "x" in a SW-101 setting is used where a dip switch may be set to either 0 or 1 without affecting the bootup action.		

* A default boot partition must have been selected for automatic bootup to occur upon powering up the computer.

Table 3-1
Bootup Alternatives

Refer to Figure 3-1 for an illustration of the switch settings specified in Table 3-1.

NOTE: Zenith Data Systems and Heath do not currently support Z-100 hardware environments that include a Winchester disk and more than one 5.25-inch floppy disk drive.

Each line in Table 3-1 shows a different method you can use to boot up to a particular drive. Some methods require you to press extra keys as you enter the bootup command. Others require you to change the setting of SW-101 switches.

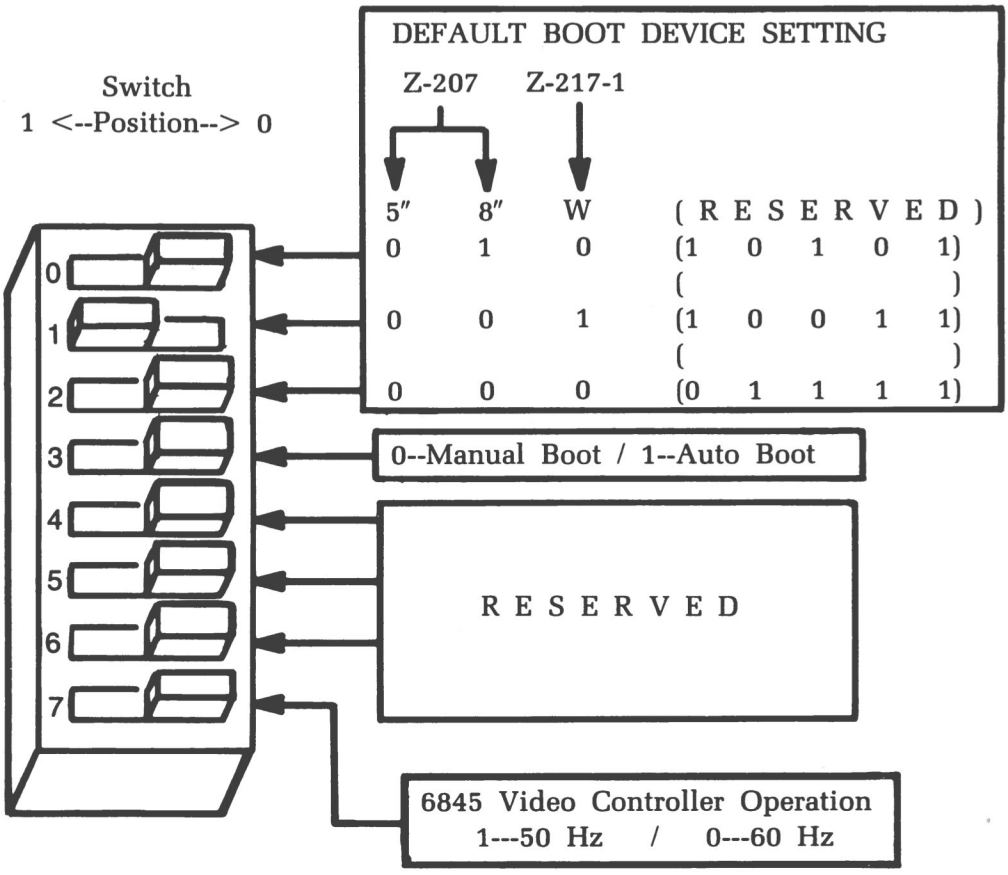

Figure 3-1
Automatic/Manual Bootup Setting (Switch SW-101)

EXPLICIT WINCHESTER BOOTUP COMMANDS

You can enter an explicit bootup command whenever the pointing finger prompt is displayed in the upper left-hand corner of your screen.

Whenever the pointing finger prompt is displayed as the lowest item on the screen, the MTR-100 program within the Z-100 is ready to accept commands such as bootup commands.

If the pointing finger prompt is not displayed, enter ***CTRL-RESET*** and then press the ***DELETE*** key. The pointed hand prompt should appear, possibly beneath an error message.

You can enter your explicit bootup command from the keyboard in response to the pointing finger prompt. There are several options that are available so that you can bootup from any of the drives or bootable partitions in your hardware environment.

Explicit bootup commands for any Z-100 drive device are entered in the following form:

Boot {**dev**} {**#**} {**S**} {**:bootstring**} ***RETURN***

Where **B** is a required input that the computer responds to by displaying oot;
where {**dev**} is an optional function key (F1 through F8) that determines which device will be accessed. (Only the function keys F1, F2, and F3 are valid {dev} entries with Z-207 floppy disk hardware and Z-217 Winchester hardware.);
where {**#**} is the optional unit number (0 or 1) that indicates which of the two possible drive slots of a particular floppy drive device will be accessed;
where {**S**} is optional and specifies that the secondary device controller is to be used;
where {**bootstring**} is an optional string that identifies the particular partition that you wish to boot. If specified, the bootstring must be preceded by a colon (:); and
where ***RETURN*** is a required carriage return.

NOTE: The bootstring in the manual bootup command can be up to 80 characters long, with the last character being a zero (30H). However if you are booting up to a partition that was established by PART or PREP, then you should include a maximum of 27 characters in this string. The 27 characters usually used in the bootstring include up to 16 for partition name, one for a semicolon, and up to 10 for system name. More details about the bootstring are provided under "Ambiguous Winchester Bootup Commands".

If a device unit is requested that is not connected or is otherwise inaccessible, the "Device Error" message is displayed.

Explicit bootup commands specifically for the Z-100 Winchester disk drive are entered in the following form:

Boot ***F3*** **{partition name};{system name}** ***RETURN***

Where **B** is a required input that the computer completes with "oot";
where **F3** is the required brown F3 function key, located in the top row of your Z-100 keyboard. This entry determines that the Z-217 controller card (rather than the Z-207) will be accessed;
where {**partition name**} is the partition name of the established partition you wish to boot. Partition names contain 1-16 ASCII characters excluding the semicolon, space, tab. This entry is mandatory unless a default boot partition has been selected;
where ; is a semicolon that must used as a separation character only when you also specify a system name; and
where {**system name**} is the operating system name of the established partition you wish to boot. Operating system names contain 1-10 ASCII characters excluding the semicolon, space, tab. The operating system name is an optional entry. You only need to specify it if the specified partition name matches that of another partition on the disk. The operating system names of all established partitions are displayed on the menu.
where ***RETURN*** is a required carriage return entry.

NOTE: The {**partition name**} and {**system name**} are both components of the bootstring.

For example, if you have a partition with the partition name "WORD/PROCESSING", and the system name "CPM", then you can boot up to this partition with the following explicit bootup command:

Boot *F3* WORD/PROCESSING;CPM *RETURN*

If you have a partition with the partition name "DATABASE", and the system name "Z-DOS", then you can boot up to this partition with the following explicit bootup command:

Boot *F3* DATABASE;Z-DOS *RETURN*

Furthermore, if you have only one partition on the disk that has the partition name "DATABASE" (rather than having several with the partition name "DATABASE" and different operating system names), then you could also boot up to this partition with the following command:

Boot *F3* DATABASE *RETURN*

AMBIGUOUS WINCHESTER BOOTUP COMMANDS

Since the Winchester disk contains separate partitions, you must specify which partition you wish to access whenever you enter a bootup command. Partitions are accessed by bootup commands that include a bootstring.

A bootstring is a string of characters that positively identifies a Winchester disk partition. This string usually includes the partition name and the system name of the partition you are trying to identify.

However if you enter an ambiguous bootup command (a bootup command without a bootstring specification), and if no "default boot partition" has been established on the Winchester disk, then the following error message will be displayed:

```
Error - Partition not found.  Type RETURN to continue.
```

This error message will also appear if you have selected a default boot partition, and then try to explicitly specify a bootstring, but accidentally type an entry for the bootstring that does not match the names of any of the established partitions.

In response to this error message, press the ***RETURN*** key. Then a menu and prompt in the following form will appear:

```
Partition              Operating System
---------              ----------------

Z-DOS                  Z-DOS
CPM                    CPM

Boot String? ........>
```

This menu enables you to specify a bootstring. Enter the bootstring of the partition you wish to boot.

NOTE: The partition names and operating system names that appear when you enter an ambiguous bootup command may differ from those shown here. Your display might show names for as many as 16 different partitions.

Type a bootstring at the prompt, in the following form:

BootString?.....>{**partition name**};{**system name**} ***RETURN***

Where {**partition name**} is the partition name of the established partition you wish to boot. Partition names contain 1-16 ASCII characters excluding the semicolon, space, tab. The partition name is a mandatory part of the bootstring. All established partition names are displayed on the menu;

where ; is a semicolon that must used as a separation character only when you also specify a system name;

where {**system name**} is the operating system name of the established partition you wish to boot. Operating system names contain 1-10 ASCII characters excluding the semicolon, space, tab. The operating system name is an optional part of the bootstring. You only need to specify it if the specified partition name matches that of another partition on the disk. The operating system names of all established partitions are displayed on the menu; and

where ***RETURN*** is a required carriage return entry.

If you have more than one partition with the same partition name, and if you do not specify a system name, then the first partition on the menu that bears the common partition name will be booted.

After you enter a valid bootstring for an established partition, the computer will load in the operating system contained on the specified partition. Then this system will display its own messages, menus, and/or prompts.

If you specify a bootstring for a CP/M partition, you will obtain a message and prompt in the following form:

```
CP/M-85 VERSION 2.2.101 01/28/83

A>
```

To avoid obtaining the "partition not found" error message, you can take either or both of the following actions:

- Carefully type an explicit bootup command whenever you boot up to the Winchester disk. This explicit bootup command should include the bootstring for an established partition.

- Use the PART utility to select an established partition as your "default boot partition", so that this partition will be accessed when you enter ambiguous bootup commands to your Winchester disk.

AUTOMATIC BOOTUP FEATURE

The method you use to boot your Z-100 computer is determined by the setting of a switch inside the computer. This switch is labeled "SW-101", and it is illustrated in Figure 3-2 of this section, with the automatic bootup feature switched on. (See your Z-100 hardware manual for further details on this switch.)

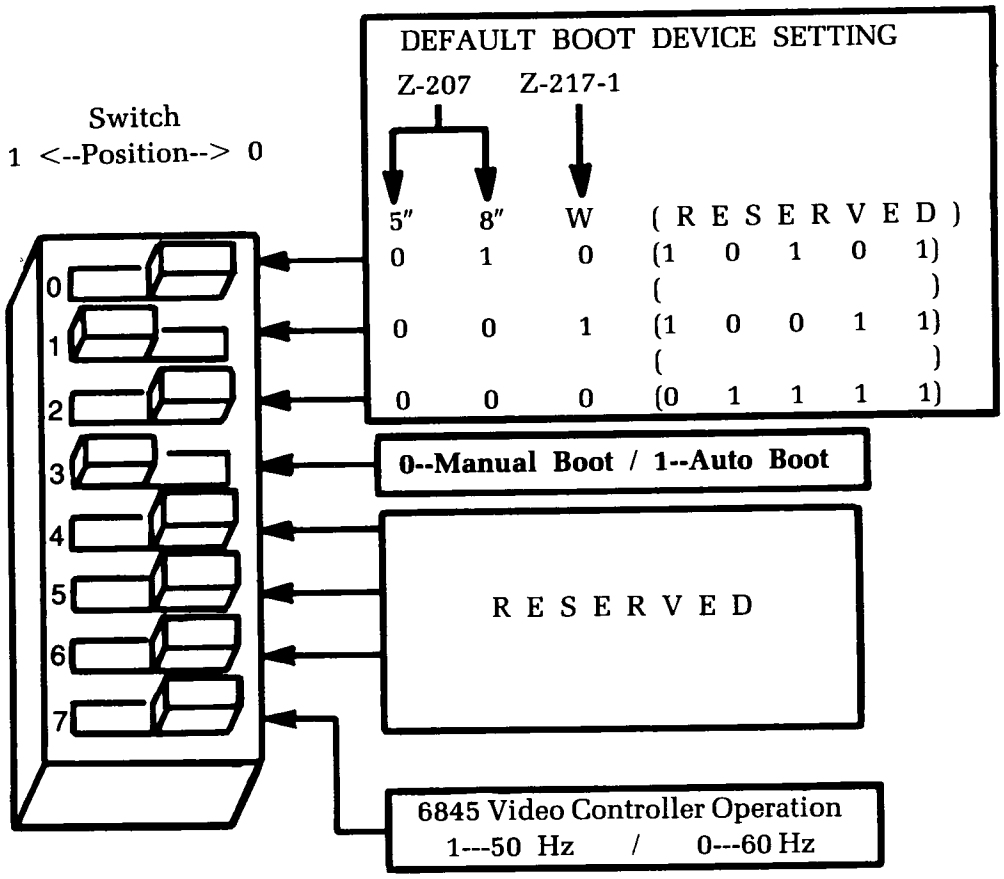

Figure 3-2
Automatic/Manual Bootup Setting (Switch SW-101)

When the 3 switch on the SW-101 is switched to the 1 setting, your Z-100 will attempt to boot up from a drive immediately after being turned on, or whenever ***CTRL-RESET*** is entered. The drive accessed during this bootup process is determined by other switches.

BOOTUP CONCEPTS

To make the manual bootup command easier to work with, it uses "logical devices" to make the distinction between the different drive types connected to your system. The difference between the actual drive controller board and the device type used by the bootup command is illustrated in Figures 3-3 and 3-4.

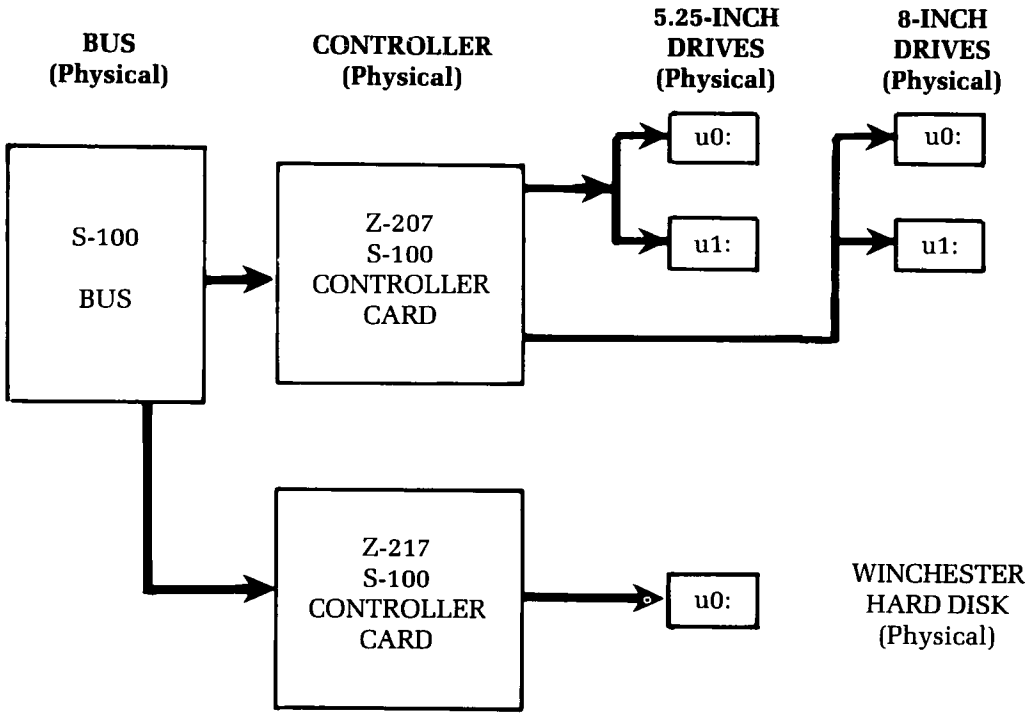

Figure 3-3
Physical Connections from the Hardware Viewpoint

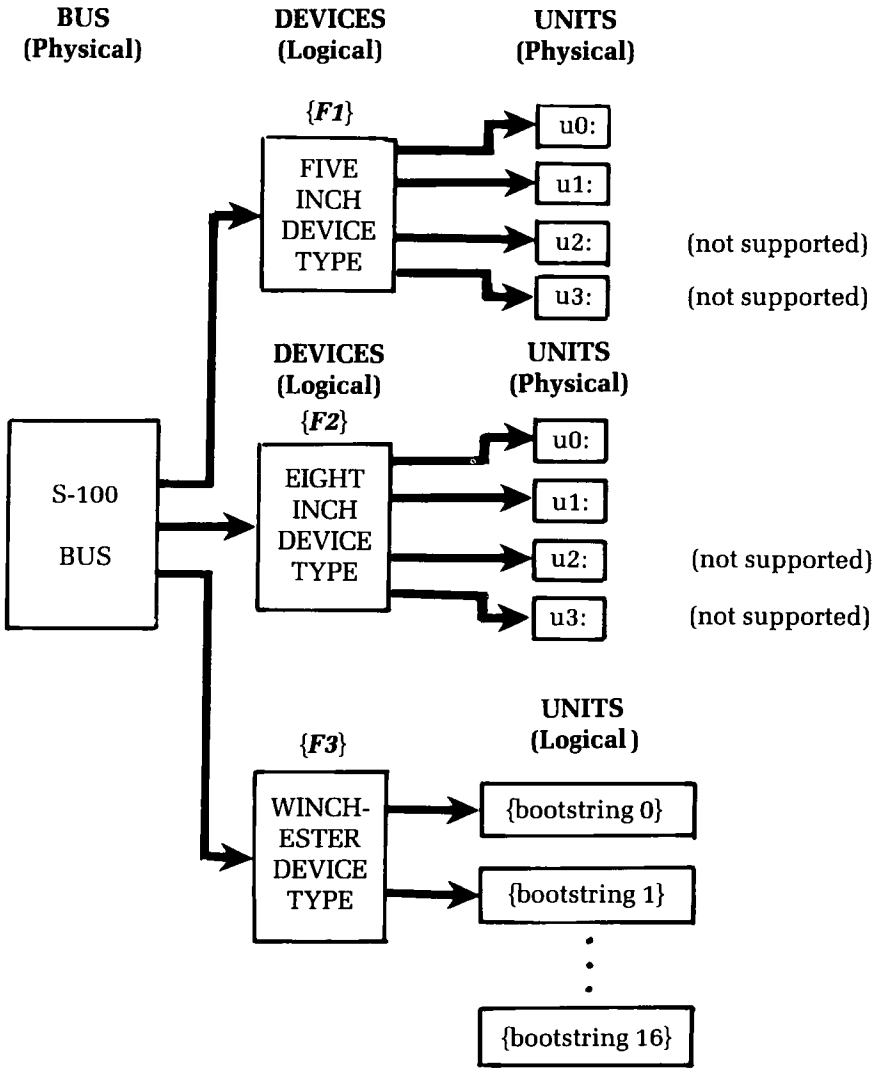

Figure 3-4
Logical Connections from the Bootup Command Viewpoint

The Z-207 controller card is designed to control both 5.25-inch and 8-inch disks. The Z-217-1 controller card is designed to control only Winchester disks. But since 5.25-inch drives, 8-inch drives, and Winchesters are each different device types, you must use different com-

mand entries and/or different switch settings in order to boot up to any particular one of these devices. Your hardware environment could be expanded even further, as shown in Figure 3-5.

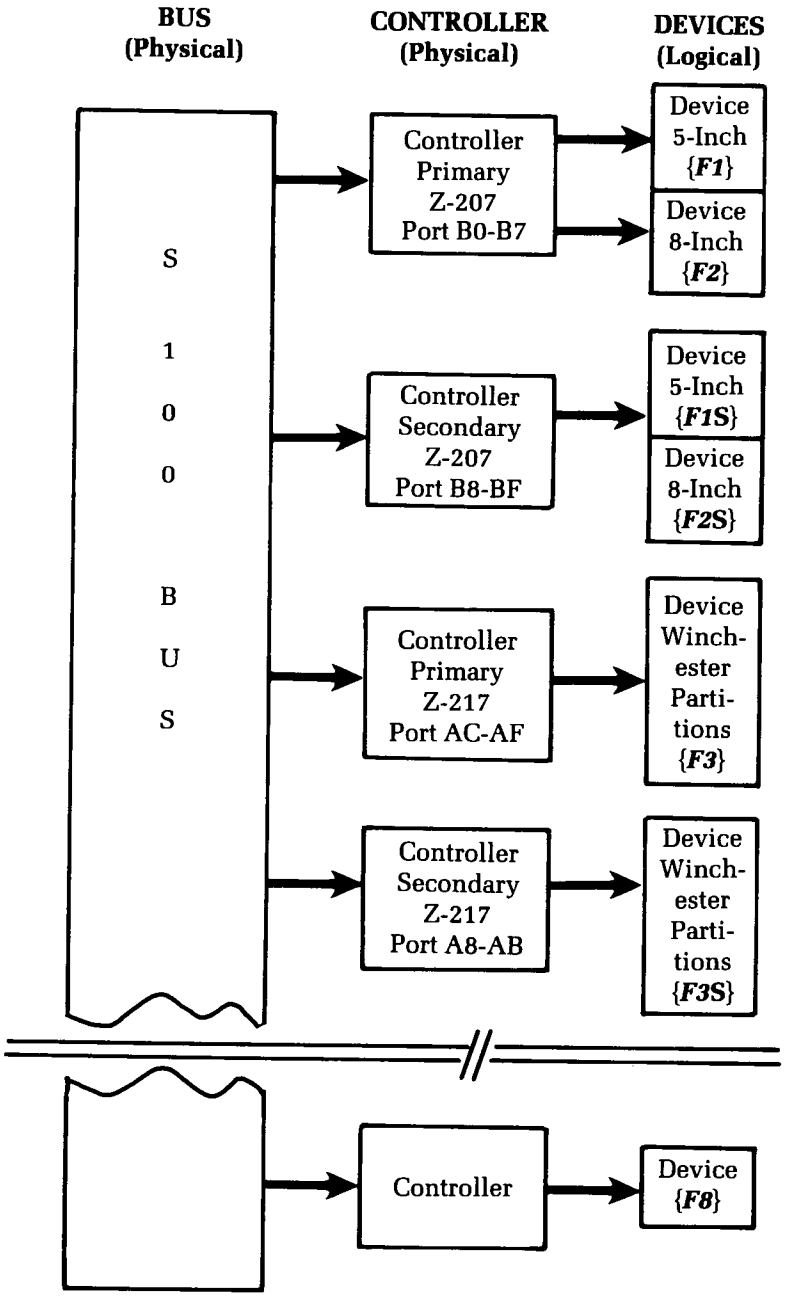

Figure 3-5
Logical Device Extensions With SW-101 DIP Switch

WINCHESTER BOOTUP ERROR MESSAGES

You might encounter the following error messages when trying to boot up to the Winchester disk.

```
Error - Partition not found.  Type RETURN to continue
```

Cause: Either you entered a bootup command without including a bootstring while no default bootstring was established, or you entered a bootup command that included an invalid bootstring.

Cure: Type ***RETURN***. A table listing all valid partitions (by partition name and operating system name) will be displayed. See the explanation in Ambiguous Bootup Command for a complete recovery from this error message.

```
Error -- Unable to read boot code from partition
```

Cause: The boot code on the specified partition is either not present, or it has developed a bad sector.

Cure: Boot up from another drive. Then back up and format the partition from which you were trying to boot up when the error message appeared. If this partition is totally inaccessible, back up all partitions and run PREP again. If this error message occurs after using PREP, contact Zenith Data Systems Technical Consultation for assistance.

```
Error -- Can not read superblock A.
```

Cause: Either the initial checksum of Superblock A does not match the most recent checksum, or the disk has a bad sector where Superblock A is recorded.

Cure: Superblock B will be used automatically, and the bootup operation will resume. However, this error message indicates that only one usable copy of the superblock remains on the disk. Although you could use the disk in this condition, all Winchester disk data will become inaccessible if Superblock B is ever damaged. Therefore, we recommend that you back up all of the files from all partitions and then run PREP if this error message appears.

```
Fatal Error -- Can not read superblock B.
```

Cause: Either the initial checksum of Superblock B does not match the most recent checksum, or the disk has a bad sector where Superblock B is recorded.

Cure: Run PREP again. If this error message occurs after repeating PREP, contact Zenith Data Systems Technical Consultation for assistance.

Section Four

Winchester Disk Software

To enhance the capabilities of your Winchester disk, this version of the CP/M-85 software package includes some new utilities and some modified utilities. These utilities are featured in alphabetical order in this section.

This section contains detailed reference text on the following aspects of these utilities (where applicable):

- Function
- Invocation
- Options
- Common applications
- Error message explanations

The text on each command is divided into numbered sub-sections concerning specific aspects of the utility.

ASSIGN

The Utility that Assigns Winchester Partitions to Drives

The ASSIGN utility enables you to access data from Winchester disk partitions by assigning the partitions to drives, or by changing partition drive assignments. ASSIGN can also identify all of the partitions on a Winchester disk, and identify which of these partitions are currently assigned to a drive name.

1 Winchester Disk Partitions

A partition is an area on the surface of a Winchester disk that performs as though it were a floppy disk drive during most CP/M operations.

The Winchester disk can be divided into as many as 16 partitions to accommodate separate groups of operating systems and files. Two of these partitions can be made accessible at one time, if they contain the same operating system.

Partitions are identified by a partition name that consists of one to 16 characters, and optionally an operation system name that consists of 10 characters.

Although one partition is accessible as soon as you boot up to the Winchester disk, no other partition can be accessed to you until you run the ASSIGN utility to assign the second partition to a drive name.

NOTE: Partitions are established on a Winchester disk by the PREP or PART utilities. Partitions are already established on your Winchester disk when it is shipped from the factory. Therefore, it is only necessary for you to use PREP and/or PART if you wish to change the partitions on your Winchester disk. See the "PART" and "PREP" sections of this supplement for more information.

2 Assigning Partition = Inserting Disk

For most CP/M operations, you can think of a Winchester partition as if it were a floppy disk. However, you must also realize that the ASSIGN activity is similar to the fundamental activity of inserting a floppy disk into a drive.

You must **insert** a floppy disk into a drive before its data can be accessed. Likewise, you must **assign** a partition to a drive before its data can be accessed (unless you booted up to the partition).

3 Inquiry of Available Partitions

To find out the names of **all** of the partitions on the Winchester disk, enter the following command:

A>**ASSIGN ?** ***RETURN***

ASSIGN will respond with a display in the following form:

```
PARTITION NAME          OS NAME        SIZE
--------------          ----------     ------
CPM-BUSINESS            ;CPM           3200k
CPM-WORDPROC            ;CPM           2860k
CPM-PROGRAMS            ;CPM           2020k
Z-DOS1                  ;Z-DOS         1600k
```

Where the characters listed beneath "PARTITION NAME" are the partition names that were designated for each partition when the PART or PREP utility was run;

where the characters listed beneath "OS NAME" are the operating system names that were designated for each partition when the PART or PREP utility was run; and

where the numbers listed beneath "SIZE" show the total capacity (in kilobytes) of the partition named to the left. This capacity includes usable file space and space that might be occupied by an operating system or by bad sectors. (To determine the amount of usable file space that is free on a partition for future files, use ASSIGN to assign that partition to a drive and run the STAT utility.)

NOTE: The partitions listed in this display may or may not be assigned.

4 Inquiry of Current Assignments

To find out the names of the partitions on the Winchester disk that are currently accessible through a drive name, enter the following command:

A>**ASSIGN** ***RETURN***

The ASSIGN utility will display equations to indicate which drive names can be used to access which partition names, as in the following example:

```
A: = CPM-WORDPROC;CPM
B: = Z-DOS1;Z-DOS
```

When you boot up to a Winchester Disk partition, that partition is automatically assigned to drive A, and a different partition can be assigned to drive B using the ASSIGN utility.

5 Assigning Partitions to Drive Names

To assign a partition to a drive, enter a command in the following form:

A>**ASSIGN {d}:={partition name};{system name}** ***RETURN***

Where {**d**} is the letter for the drive to which you wish to assign the partition;

where {**partition name**} is the partition name of the established partition you wish to assign. Partition names contain 1-16 ASCII characters excluding the semicolon, space, tab. This entry is mandatory in a drive partition assignment command;

where ; is a semicolon that must used as a separation character only when you also specify a system name; and

where {**system name**} is the operating system name of the established partition you wish to assign. Operating system names contain 1-10 ASCII characters excluding the semicolon, space, tab. The operating system name is an optional entry. You only need to specify

it if the specified {partition name} matches that of another partition on the disk.

NOTE: The {**partition name**} and {**system name**} are both components of the "bootstring", which must sometimes be specified in bootup commands.

For example, you can assign the partition named "CPM-PROGRAMS;CPM" to drive B with the following command:

A>**ASSIGN B:=CPM-PROGRAMS;CPM** ***RETURN***

Furthermore, if you have only one partition on the disk with the partition name "CPM-PROGRAMS", you can omit specification of the operating system name in the command, as shown:

A>**ASSIGN B:=CPM-PROGRAMS** ***RETURN***

6 Valid Assignment Commands

A maximum of two Winchester disk partitions can be assigned to drive names at one time, regardless of how many partitions have been established on the disk.

The drives to which you can assign a partition vary, depending upon the type of media you used to boot up and the types of drives you have in your hardware environment. The following table shows which forms of partition assignment commands you can enter depending upon your bootup media and upon any other kind of disk drive you might have. (The command forms indicated in this table use the variable {**partition name**};{**system name**} to represent the partition you wish to assign.)

Bootup Media	Additional Drives	Valid Assignment Commands
5.25-inch floppy disk	with any 8-inch floppy drives	A>**ASSIGN E:={partition name};{system name}** ***RETURN*** A>**ASSIGN F:={partition name};{system name}** ***RETURN***
5.25-inch floppy disk	with no 8-inch floppy drives	A>**ASSIGN C:={partition name};{system name}** ***RETURN*** A>**ASSIGN D:={partition name};{system name}** ***RETURN***
8-inch floppy disk	with any 5.25-inch floppy drives	A>**ASSIGN E:={partition name};{system name}** ***RETURN*** A>**ASSIGN F:={partition name};{system name}** ***RETURN***
8-inch floppy disk	with no 5.25-inch floppy drives	A>**ASSIGN C:={partition name};{system name}** ***RETURN*** A>**ASSIGN D:={partition name};{system name}** ***RETURN***
Winchester partition	not applicable	* A>**ASSIGN A:={partition name};{system name}** ***RETURN*** A>**ASSIGN B:={partition name};{system name}** ***RETURN***

* When you boot up with a Winchester partition that contains the CP/M-85 Operating System, this partition is automatically assigned to drive A.

7 ASSIGN Error Messages

BAD PARTITION NAME

EXPLANATION: User tried to assign a valid drive name to an invalid partition name, or user made syntax error during command entry. User must perform cold boot, and re-enter any assignments made.

BAD DRIVE NAME

EXPLANATION: User tried to assign a drive name other than A or B to a Winchester disk partition. Assignment commands must be re-entered.

PARTITION ALREADY IN USE

EXPLANATION: User tried to assign a new drive name to a partition name that already has an assigned drive name. The assignment of the partition's currently assigned partition must be removed before a new drive name can be assigned to the partition.

BAD OS NAME

EXPLANATION: User tried to assign a partition name with an invalid operating system name to a valid drive name. This assignment should be attempted again with an operating system name that helps to identify an existing partition.

INCORRECT VERSION OF BIOS

EXPLANATION: The operating system being used will not accommodate Winchester disk partitions, or the system's version number does not match ASSIGN's version number.

DISK READ ERROR

EXPLANATION: The operating system failed in an attempt to read from the Reserved Winchester Area (see text on PREP). Use the VERIFY utility. If this error message occurs again, contact Zenith Data Systems Technical Consultation for assistance.

BACKUP

The Utility that Facilitates File Copying from Working Disks and/or Partitions to Backup Storage Media

The BACKUP utility makes it more convenient for you to copy files from a disk or partition, because it makes more efficient use of disk space when transferring copies, and because it allows options not available through other file copying utilities.

BACKUP is especially beneficial to Winchester disk users, because so many files are involved in daily backup procedures from Winchester disk partitions. However it is possible to BACKUP files to or from either partitions or floppy disks. Therefore, this text refers to source or destination recording media as "partition/disk" or "disk/partition" wherever it would be practical for you to use either type of media.

BACKUP's function is complementary to the function of the RESTORE utility, which can return backed up files to their original media.

NOTE: The disks that receive backed up files in a BACKUP operation must be formatted. Therefore, before using BACKUP, you should determine how many disks will be necessary to receive the backed up files. (The STAT utility can be useful in determining the size of the files you wish to back up.) Then you must use the FORMAT utility to prepare each of the necessary disks.

1 BACKUP Operation

When the BACKUP utility copies files from a source partition/disk, it temporarily concatenates them to be stored as a single "backup file" on the destination media. Thus the backup file is a long, continuous string of data including individual files that are joined by BACKUP and separated by RESTORE. The backup file also contains a directory that lists all of the individual files in the exact sequence they were copied.

However, the backup file might be much larger than the capacity of your destination media. For instance, if the source in a BACKUP operation is a large Winchester disk partition and the destination is a 5.25-inch floppy disk drive, then the backup file will likely overflow the capacity of a single floppy disk.

Therefore BACKUP is capable of storing parts of the backup file on more than one disk. BACKUP accomplishes this multi-disk storage feat by recording up to the absolute capacity of the distribution media, prompting you to insert another disk, and then continuing to copy from where it left off. With this capability, BACKUP can even divide an individual file within the backup file between two or more disks.

The backup file's directory keeps track of the number of disks that were necessary to receive the entire backup file. In this directory, each of the disks used is numbered as a "volume".

The disk volumes used to receive the backup file are collectively called the "backup disk set".

The BACKUP and RESTORE utilities also enable you to view several statistics, such as the names of the files within a backup file, by entering special command line options.

NOTE: If you are performing a BACKUP operation from a floppy disk to a Winchester disk, the "backup disk set" can consist of only one partition. You will not be able to back up files to more than one partition during this operation — even if more than one formatted CP/M partition is already assigned to a drive name. Therefore, if you wish to back up files to a Winchester disk partition, you should make certain that this partition has enough free space to accommodate all of the backup files. Use the STAT utility to determine the size of the files to be backed up and the amount of free space on the partition.

2 Invoking BACKUP

You can use the BACKUP utility through either of the following methods: the Utility Prompt Method and the System Prompt Method. Both methods enable you to use optional switches that provide more control of what is backed up.

2.1 UTILITY PROMPT METHOD

With this BACKUP method, you invoke the BACKUP utility from a disk by entering the command function at the system prompt, and then entering the command argument at a prompt displayed by the BACKUP utility. The first entry under this method is in the following form:

A>**BACKUP** ***RETURN***

After an entry in this form, BACKUP will display a message and prompt in the following form:

```
          BACKUP Version x.xx
Copyright (C) 1982 Zenith Data Systems
>>
```

NOTE: The version number of the BACKUP utility (shown in this example as "x.xx") might vary.

At the >> BACKUP prompt, you should enter a command line argument in the following form:

>>**{d}:{destfile}={s}:{sorcfile},{s}:{sorcfile},... [{x};{x};...]** ***RETURN***

Where >> is the BACKUP utility prompt;
where {**d**} is the optional name of the drive that is to receive the copies being transferred. This specification is necessary only if this destination drive is not also the default drive;
where {**destfile**} is the primary name of the backup file, which you wish to contain all of the individual files copied in this operation;
where {**s**} is the optional name of the drive from which files are being copied. This specification is necessary only if this source drive is not also the default drive;
where {**sorcfile**} is the complete name of each file, separated by commas, that you wish to back up from the source partition/disk. You can enter wild card file names (using the * and ? characters); and
where {**x**} is any of the optional single letter options, separated by semicolons, that structure the BACKUP operation.

NOTE: A space is allowed, but not necessary, between the source file specifications and the options.

When BACKUP has completed the specified operation, it will redisplay the >> BACKUP prompt. You can continue entering command line arguments at BACKUP prompts indefinitely.

The BACKUP utility will display the names of each file that it copies in a vertical list, during the BACKUP operation.

When you wish to exit from the BACKUP utility to the CP/M system, press the RETURN at a BACKUP prompt. Then CP/M will display the A> system prompt.

NOTE: Like all command lines entered through the CP/M system, the BACKUP command line can contain only 127 characters. If your command line is between 78 and 127 characters in length, you can keep the entire line visible on your video screen by entering ***CTRL-E*** after the 79th character.

2.2 SYSTEM PROMPT METHOD

With this BACKUP method, you enter the command line function and the command line argument both at the system prompt, in the following form:

A>**BACKUP {d}:{destfile}={s}:{sorcfile},{s}:{sorcfile},... [{x};{x};...]** ***RETURN***

Where **BACKUP** is the command line function, stored in the file BACKUP.COM on the default or logged partition/drive;

where {**d**} is the optional name of the drive that is to receive the copies being transferred. This specification is necessary only if this destination drive is not also the default drive;

where {**destfile**} is the primary name of the backup file, which you wish to contain all of the individual files copied in this operation;

where {**s**} is the optional name of the drive from which files are being copied. This specification is necessary only if this source drive is not also the default drive;

where {**sorcfile**} is the complete name of each file, separated by commas, that you wish to back up from the source partition/disk. You can enter wild card file names (using the * and ? characters); and

where {**x**} is any of the optional single letter options, separated by semicolons, that structure the BACKUP operation.

NOTE: A space must be entered between the BACKUP command line function and the drive and/or file name specifications. A space is allowed, but not necessary, between the source file specifications and the options.

The BACKUP utility will display the names of each file that it copies in a vertical list, during the BACKUP operation.

After BACKUP has completed the specified operation, CP/M will display the A> system prompt.

NOTE: Like all command lines entered through the CP/M system, the BACKUP command line can contain only 127 characters. If your command line is between 78 and 127 characters in length, you can keep the entire line visible on your video screen by entering ***CTRL-E*** after the 78th character.

2.3 HELP DISPLAY METHOD

With this BACKUP method, you enter the command line function and a ? (question mark) at the system prompt, as shown:

A>**BACKUP ?** ***RETURN***

This command will cause the display of messages that summarize the purpose, command line, and options of the BACKUP utility. The system prompt will appear below the BACKUP display.

This invocation method does not back up files. It is designed to provide you with a convenient quick reference to a few aspects of the BACKUP utility.

3 BACKUP Sources

A BACKUP command line can include one or more sources. When specifying sources, you must always specify a file, and sometimes a drive.

The source files specified in a BACKUP command line should be identified by complete file names, including the primary name (1-8 characters) and the extension (1-3 characters if used).

Whenever a specified source file does not reside on the default drive, a drive name should be specified in front of it. You can back up files from any valid drive during a BACKUP operation.

Wild card, or ambiguous, file names can be specified, using the * or ? wild card characters. (Wild card file names can be particularly useful when you have many files to copy, because a command line can contain a maximum of only 127 characters.)

Any number of source file names can be specified in a command line (as long as the limit of 127 characters per command is not exceeded). However if two or more source file names are specified, they must be separated by commas.

NOTE: The number of source files that can be backed up in a single BACKUP operation is limited by the amount of space on the first disk/partition used to receive the backup volumes. This disk/partition must have enough free space to accommodate the entire backup file directory. The backup file directory is described in "8 Structure of Backup Files".

Source file specification is required in all BACKUP command lines except those entered with the [B] option, for the sole purpose of displaying characteristics of all of the master backup files on disk; or in those entered with the [L] option, for the sole purpose of displaying a list of the individual files within a backup file.

The following source file specification:

.ASC,TEST?,C:*.

would cause copies to be made of all files on the default drive with an .ASC extension; all files on the default drive that are five characters long beginning with TEST and have no extension (such as TEST0, TEST1, TESTS, TESTY, etc.); and all files on drive C.

To further demonstrate the characteristics of source file specifications:

A:DEMO.*,B:SYSTEM.COM,E:82*.DOC,????.DAT

would cause copies to be made of all files on drive A with DEMO as primary name and any extension; the file SYSTEM.COM on drive B; all files on drive E that have a primary name beginning with 82 and that have a .DOC extension; and all files on the default drive that have a four letter (or less) primary name with a .DAT extension.

NOTE: If any of the source files you specify are random files (as opposed to sequential files), these files might contain more records when restored with the RESTORE utility.

4 BACKUP Destination

A BACKUP command line can include only one destination. When specifying this destination, you must always specify the primary name of a file, and sometimes a drive.

The file specified as the destination will ultimately become the backup file that will contain all of the individual files that are copied.

The destination file specified in a BACKUP command line should be identified by a primary file name only (1-8 characters). The extension should not be specified, because BACKUP applied extensions to the backup file automatically. (BACKUP will apply the extension "000" to the first backup file volume, "001" to the second, "002" to the third, etc.)

Wild card file name characters (* or ?) cannot be used to specify a destination file.

Whenever a specified destination file does not reside on the default drive, a drive name should be specified in front of it. You can back up files to any valid drive during a BACKUP operation.

NOTE: However if your destination drive is assigned a partition, you will only be able to create one backup file volume. If the files you wished to backup will not fit on this volume, then you will have to abort the BACKUP operation.

A destination file specification is required in all BACKUP command lines except those entered with the [B] option, for the sole purpose of displaying characteristics of all of the master backup files on the default disk.

Consider an example where the primary file name "C:QUITTIME" is entered as destination in a command line. The ensuing BACKUP operation required that five disks (backup file volumes) be inserted into drive C to accomodate all of the source files.

The resulting set of destination disks (backup file volumes) would contain the following backup files:

QUITTIME.000
QUITTIME.001
QUITTIME.002
QUITTIME.003
QUITTIME.004

The file "QUITTIME.000" would be the master backup file volume, which contains the backup file directory.

5 BACKUP Options

The BACKUP utility enables you to structure any backup operation by specifying the following options in a command line:

B Backup directory — displays a directory listing statistics about all master backup files.

D Date stamping — applies today's date to the directory of individual files within a backup file.

E Exception files — exclude exception files from backup operation

L List directory — list the directory of the backup files

Q Query each — query yes or no on each file before backing up

S System files — include system files in the backup

U User number — backup files from specified user area(s) in addition to the current user area

V Verify — verify the file after backup operation

Switches are always the last items specified in a BACKUP command line. They must be enclosed within square brackets, and separated by semicolons when more than one is used.

If a switch requires specification of files, then the option letter should be separated from these file specifications by a colon. When more than one file specification is necessary within a single option, then the file specifications should be separated by commas.

Options are entered in the following form:

[{x};{x}:{details},{details},{details};{x};...]

Where {**x**} is an option letter;
where {**details**} are additional character strings (such as the date, file names, or user numbers) that must be specified with some options;
where the **[ ]** square brackets must enclose the options;
where the **;** (semicolon) must separate multiple options;
where the **,** (comma) must separate the file names and/or user numbers used with some options; and
where the **:** (colon) must separate some option letters from accompanying {details}.

5.1 B BACKUP DIRECTORY

The B option causes a directory display listing statistics about all of the master backup files (those backup files with the "000" extension) on a specified disk.

This directory lists the primary name of each master backup file, the number of volumes in the backup set that begins with each master, the number of files in each set of backup files, and the date of each backup operation.

Only the drive containing the master backup file(s) needs to be known in command lines entered for the sole purpose of producing a B option directory. Therefore, specify this drive in the command line unless it is the default drive.

You can use the B option in commands of the following form:

A>**BACKUP {d): [B]** ***RETURN***

Where **BACKUP** is the command line function, stored in the file BACKUP.COM on the default or logged partition/drive;
where {**d**} is the optional name of the drive that has received the copied files, and stored them within backup file volumes. This specification is necessary only if this destination drive is not also the default drive; and
where **[B]** is the single letter option that causes the display of master backup file features.

The B option may be used with both methods of invoking backup. For example, from the CP/M system prompt:

A>**BACKUP C: [B]** ***RETURN***

or the same operation from the BACKUP utility prompt:

>>**C: [B]** ***RETURN***

The B directory listing would appear in the following form:

Name	Volumes	Files	Date
QUITTIME	3	117	4-27-83
SAVEME	1	48	10-24-82
STORAGE	5	231	2-30-84

5.2 D DATE STAMPING

The date option enables you to specify the date for this BACKUP operation within the command line, without having to answer a date prompt. This date will appear in the displays caused by the B option. Specify the date option and date string in either of the following forms:

[D:{mm}-{dd}-{yy}]

[D:{mm}/{dd}/{yy}]

Where {**mm**} is a one- or two-digit entry for the month, within the range 1-12;
where {**dd**} is a one- or two-digit entry for the day of the month, within the range 1-31;
where {**yy**} is a one- to four-digit entry for the year, within the range 0-9999; and
where either - (hyphens) or / (slashes) can be used to separate month from day and day from year, although - (hyphen) will always appear in the dates of the display produced by the [B] option.

If you do not specify the D option, then BACKUP will prompt you to specify the date during each BACKUP session in which you specify both source and destination.

If you do specify the D option in a command in which both source and destination are specified, BACKUP should begin to copy individual files, displaying the drive name, file name, and user area number of each individual file as it is copied, in the following form:

```
E:FILENAM1.EXT from user 9
E:FILENAM2.EXT from user 9
E:FILENAM3.EXT from user 9
          .
          .
          .
E:FILENAMn.EXT from user 9
```

5.3 E EXCEPTION FILES

The backup operation takes place for all of the files except that file given as an exception file. The file listed with the E option is then ignored during the operation. The E option is entered in the following form:

[E:{filespec},{filespec}]

Where **E** is the option;
where {**filespec**} represents files that are to be excluded from the operation. If a file being excluded does not reside on the default drive, then you must also specify the name of the drive that contains it. Ambiguous file names (with * or ? wild card characters) can be specified; and
where the , (comma) and : (colon) are required separation characters.

For example:

A>BACKUP BACK1=*.DAT [E:TEMPFILE.DAT] ***RETURN***

would backup all files from the default drive that have a .DAT extension — except the file named TEMPFILE.DAT, which would be omitted.

5.4 L LIST DIRECTORY

The L option causes BACKUP to give the internal directory of files that are contained within a specified backup file. The directory information would list the volume number at which each individual file starts and ends, the user from which each individual file came, and the amount of disk space occupied by each file.

The L option is used for commands in the following form:

A>**BACKUP {d}:{destfile} [L]** ***RETURN***

Where **BACKUP** is the command line function, stored in the file BACKUP.COM on the default or logged partition/drive;
where {**d**} is the optional name of the drive that has received the copies being transferred. This specification is necessary only if the destination drive is not also the default drive;
where {**destfile**} is the primary name of the backup file, which you wish to contain all of the individual files copied in this opeation; and
where **[L]** is the single letter option that causes the display of backup file directory features.

The L option may be used with both methods of invoking backup. For example, from the CP/M system prompt:

A>**BACKUP BACK9 [L]** ***RETURN***

or the same operation from the BACKUP utilty prompt:

>>**BACK9 [L]** ***RETURN***

The L directory listing will appear in the following form:

Filename	User	Start Volume	End Volume	Size in Kilobytes
INDIVID1.DAT	0	1	1	3264
INDIVID2.DAT	0	1	1	19582
INDIVID1.DOC	15	2	3	7236
INDIVID2.DOC	15	3	3	22230

4 file(s) on 3 volume(s)

5.5 Q QUERY EACH

When the Q option is used, you are queried before each file is backed up, by a prompt in the following form:

```
Backup {x}:{sorcfile} from user {n} (Y/N) ?
```

Where "{x}" is the drive containing a source file that you specified for this operation; and
where "{sorcfile}" is a source file that you specified for this operation.
where "{n}" is the number (0–15) of the user area from which the source file could be backed up.

A prompt in this form is displayed for each file BACKUP encounters that matches the source specifications you entered.

For example, if the current user area is 0 and three .DOC files exist on source disk B in user area 0, and if the command to BACKUP was:

A>**BACKUP C:BACK1=B:*.DOC [Q]** ***RETURN***

then BACKUP would ask:

```
Backup B:FILE1.DOC from user 0 (Y/N) ?
```

After you respond it would ask,

```
Backup B:FILE2.DOC from user 0 (Y/N) ?
```

and finally,

```
Backup B:FILE3.DOC from user 0 (Y/N) ?
```

In response to such a prompt, press **Y** or **y** to cause the file to be backed up. Press **N** or **n** to prevent the file from being backed up.

5.6 S SYSTEM FILES

The S option allows BACKUP to backup files that have been set in the directory (by the STAT utility) as system files. System files will not be backed up merely because of this option, but only if this option is used in a command line where system files are specified as sources.

When the S option is not included in the command line, system files are ignored during the BACKUP operation — even if these files are specified in the command line.

5.7 U USER NUMBER

The U option causes BACKUP to back up only the individual files within the specified user area(s). If you do not include a U option in the BACKUP command, then BACKUP will back up only the individual files from the current user area.

NOTE: CP/M enables you to divide each of your disks and partitions into 16 separate user access areas, numbered 0-15. When you boot up a partition or disk, you are working within user area 0 until you enter a USER command. See the "USER" text in the "Reference Guide" of your CP/M-85 manual for more information on user areas.

Specify the user option in the following form:

[U:n1,n2,...]

Where **U** is the option letter;
where **:** (colon) must separate the option letter from the user number(s); and
where **n1** stands for the number (0–15) of one of the user areas from which BACKUP will copy individual files. If you specify more than one user area number, separate each with a comma.

You can specify as many as 16 user areas with a single U option. You can specify any user area(s) regardless of the user area currently being used.

5.8 V VERIFY

The V option causes BACKUP to verify all files copied. With V, BACKUP reads each source file after it is copied to make sure that the source and destination copies are identical.

During the operation, BACKUP displays messages in the following form:

```
E:FILENAM1.EXT from user 12
Verifying E:FILENAM1.EXT
E:FILENAM2.EXT from user 12
Verifying E:FILENAM2.EXT
E:FILENAM3.EXT from user 12
Verifying E:FILENAM3.EXT
          .
          .
          .
E:FILENAMn.EXT from user 12
Verifying E:FILENAMn.ext
```

6 Runtime Prompting

After you invoke BACKUP and enter a command to perform some operations, you will be prompted to enter the date and/or to insert various disks.

6.1 DATE PROMPT

Whenever you enter a BACKUP command in which both source and destination are specified and the D option is not specified, BACKUP will prompt you to enter today's date, so that the backup file directory can show the date on which the operation took place. (If you do not specify both destination and source in the command line, or if you do specify the D option, then no date prompt will appear.)

This date will appear after you have entered a command line, and it will appear in the following form:

```
Enter today's date:
```

You should respond to this prompt with an entry in the following form:

```
Enter today's date: {mm}-{dd}-{yy} RETURN
```

Where **{mm}** is a one- or two-digit entry for the month, within the range 1-12;
where **{dd}** is a one- or two-digit entry for the day of the month, within the range 1-31;
where **{yy}** is a one- to four-digit entry for the year, within the range 0-9999; and
where either - (hyphens) or / (slashes) can be used to separate month from day and day from year, although - (hyphen) will always appear in the dates of the display produced by the [B] option.

NOTE: If you enter BACKUP commands through the utility prompt method, you will be prompted to enter the date only once during the BACKUP session. The date that you enter at the prompt (displayed after the first command you enter with both source and destination) will be applied to any backup file copied until you exit from BACKUP.

After you have specified a date, BACKUP should begin to copy individual files, displaying the drive name and file name of each individual file as it is copied, in the following form:

```
E:FILENAM1.EXT from user 9
E:FILENAM2.EXT from user 9
E:FILENAM3.EXT from user 9
```

6.2 DISK INSERTION PROMPT

If a BACKUP operation requires more than one backup disk to accommodate all of the source files, then you will be prompted to insert formatted disks each time a previously inserted disk becomes full. BACKUP will keep track of the number and sequence of the disks you insert, and designate a "Volume" number for each disk in the set.

NOTE: If you are performing a BACKUP operation from a floppy disk to a Winchester disk partition, the Backup Disk Set can consist of only one partition. You will not be able to back up files to any other partition during this operation — even if another assigned formatted CP/M partition exists on the Winchester disk. Therefore, if you wish to back up files to a Winchester disk partition, you should make certain that this partition has enough free space to accommodate all of the backup files. Use the ASSIGN and STAT utilities beforehand to determine file size and free partition space.

When BACKUP has filled a backup disk to capacity, it will display a message in the following form:

```
Insert another disk in drive x for backup,
and hit RETURN when ready,
or hit any other key to abort.
```

Where "drive x" identifies the destination drive you specified in the BACKUP command.

If you are ready to continue the operation, insert a disk that has been formatted by the CP/M-85 FORMAT utility. This disk can also contain other files. Then you should close the drive latch and press the ***RETURN*** key.

If you do not wish to continue the operation, or if your destination media is a Winchester disk partition, then press some key other than the ***RETURN*** key. The BACKUP operation will end, and a prompt will appear. (The BACKUP utility prompt will appear if you had invoked BACKUP by the utility prompt method. The CP/M system prompt will appear if you had invoked BACKUP by the system prompt method.)

NOTE: If you are backing up to one or more floppy disks, then you can use disks that have been formatted with either Version 2.2.100 FORMAT or Version 2.2.101 FORMAT.

6.3 MASTER DISK INSERTION PROMPT

The first disk in the backup set is known as "volume one", or the "master volume" of the backup file. This disk contains a file with the primary name that was specified in the command line as the destination, and with the extension "000".

As the specified source files for a BACKUP operation are being backed up, BACKUP accumulates a list of statistics, such as the names of the individual files it backs up and the number of volumes required.

After all of the files have been copied, BACKUP will try to record this list in the directory at the beginning of the master disk. If the operation required more than one backup volume, then BACKUP will prompt you to reinsert the master disk of the backup set.

The prompt that requests reinsertion of the master disk volume appears in the following form:

```
Insert backup master volume 1,  {destfile}.000,  in drive {x},
hit RETURN when ready.
```

Where "{destfile}" is the primary file name you specified for the destination file; and

where "{x}" identifies the destination drive you specified in the BACKUP command.

In response to a prompt in this form, you should insert the master volume disk (the disk that was first inserted in the destination drive during this BACKUP operation). Then you should close the drive latch and press the ***RETURN*** key.

BACKUP will then try to record statistics about the BACKUP operation in the master backup file directory.

If BACKUP finds the master backup file on the disk you just inserted, it will record the statistics in the directory, and a prompt (utility prompt or system prompt) will appear to signal the end of this BACKUP operation.

If BACKUP cannot find the master backup file on the disk you just inserted, it will display a message in the following form:

```
Can not open master backup file, {destfile}.000,
insert another disk in drive {x},
and hit RETURN when ready,
or hit any other key to abort.
```

Where "{destfile}" is the primary file name you specified for the destination file. (The copy of this file with the "000" extension is called the master backup file.); and

where "{x}" identifies the destination drive you specified in the BACKUP command.

If you wish to complete the operation and can obtain the disk that contains the master backup file (which has the primary name displayed as {destfile} and the "000" extension), then insert this disk in the specified drive, close the drive latch, and press ***RETURN***.

If you do not wish to continue the operation or cannot obtain the disk that contains the master backup file, then press any key other than ***RETURN***. The BACKUP operation will end and a prompt (utility or system prompt) will appear.

7 Preparing BACKUP Routines

If you create backups on a regular basis, BACKUP can come in very handy. BACKUP was designed specially so that you would be able to store the BACKUP command lines that you enter on a regular basis, so that they can be entered automatically, with far less typing.

To store BACKUP commands for automatic execution, you will need a text editor or word processor and the SUBMIT utility.

The text editor or word processor will enable you to prefabricate and store commonly entered BACKUP command lines in a disk file. The SUBMIT utility will enable you to type a short, simple command line that causes automatic execution of all the stored BACKUP commands.

This text explains a few BACKUP routines geared toward users of some popular application software products supplied by Zenith Data Systems. The text on each routine shows you how to prepare the routine by explaining the following essential facts:

- The type of user who would probably benefit from using the routine
- The names of the drives in which you should store particular files during the routine
- The form of the file you should create (with your text editor or word processor) to store commonly entered BACKUP command lines
- The form of the SUBMIT command you should type each time you wish to use the routine

NOTE: To successfully prepare a BACKUP routine, you should understand the operation of the SUBMIT utility. For information on SUBMIT, refer to the "SUBMIT" text in the "Reference Guide" of your CP/M-85 manual.

GENERAL PURPOSE BACKUP ROUTINE

This routine can be helpful for anyone who wants to backup an entire partition regularly. Steps 1 through 3 can be considered preparation steps, that you need to perform only once. Steps 4 through 6 should be performed every time you conduct the routine.

1. Using a text editor or word processor, open a text file under the name **GNBACKUP.SUB**.

2. Into this file, enter the following command line:

   BACKUP $1:GENBACK=$2:*.* [D:$3-$4-$5;V] ***RETURN***

3. Close the text file GNBACKUP.SUB

4. Use the PIP utility to copy the text file GNBACKUP.SUB and the utility file SUBMIT.COM to drive A, if they are not there already.

5. When you are ready to perform the BACKUP routine, type **A:** ***RETURN*** to make drive A the default drive.

6. Type a command in the following form:

A>**SUBMIT GNBACKUP {floppy} {partition} {mm} {dd} {yy}** ***RETURN***

Where {**floppy**} is the drive letter of the floppy disk drive to which you wish to back up your files;
where {**partition**} is the drive letter of the Winchester disk partition from which you wish to backup your files;
where {**mm**} is a one- or two-digit entry for the current month, within the range 1-12;
where {**dd**} is a one- or two-digit entry for today's date, within the range 1-31; and
where {**yy**} is a one- to four-digit entry for the current year, within the range 0-9999.

For example, if today is February 30, 1984, and you wish to back-up files from the drive A partition to the drive C floppy disk, then you should type the following command:

A>**SUBMIT GNBACKUP C A 2 30 84** ***RETURN***

BACKUP will back up all files from the partition into a backup file with the primary name "GENBACK".

SUPERCALC™ BACKUP ROUTINE

This routine can be helpful to users of the SuperCalc spread sheet program who wish to regularly backup all SuperCalc data files from a Winchester disk partition. Steps 1 through 3 can be considered preparation steps, that you need to perform only once. Steps 4 through 6 should be performed every time you conduct the routine.

1. Using a text editor or word processor, open a text file under the name **SCBACKUP.SUB**.

2. Into this file, enter the following command line:

   BACKUP $1:SCBACK=$2:*.CAL [D:$3-$4-$5;V] ***RETURN***

3. Close the text file SCBACKUP.SUB

4. Use the PIP utility to copy the text file SCBACKUP.SUB and the utility file SUBMIT.COM to drive A, if they are not there already.

5. When you are ready to perform the BACKUP routine, type **A:** ***RETURN*** to make drive A the default drive.

™ SuperCalc is a trademark of Sorcim Corporation.

6. Type a command in the following form:

A>**SUBMIT SCBACKUP {floppy} {partition} {mm} {dd} {yy}** ***RETURN***

Where **{floppy}** is the drive letter of the floppy disk drive to which you wish to back up your files;
where **{partition}** is the drive letter of the Winchester disk partition from which you wish to backup your files;
where **{mm}** is a one- or two-digit entry for the current month, within the range 1-12;
where **{dd}** is a one- or two-digit entry for today's date, within the range 1-31; and
where **{yy}** is a one- to four-digit entry for the current year, within the range 0-9999.

For example, if today is February 30, 1984, and you wish to back-up files from the drive A partition to the drive C floppy disk, then you should type the following command:

A>**SUBMIT SCBACKUP C A 2 30 84** ***RETURN***

BACKUP will back up all SuperCalc data files from the partition into a backup file with the primary name "SCBACK".

WORDSTAR™ BACKUP ROUTINE

This routine can be helpful to users of the WordStar word processor who wish to regularly backup all WordStar text files that have the same file name extension. Steps 1 through 3 can be considered preparation steps, that you need to perform only once. Steps 4 through 6 should be performed every time you conduct the routine.

1. Using WordStar's non-document editing mode, open a text file under the name **WSBACKUP.SUB**.

2. Into this file, enter the following command line:

BACKUP $1:WSBACK=$2:*.$3 [D:$4-$5-$6;V] ***RETURN***

™ WordStar is a trademark of MicroPro International Corporation.

3. Save the text file WSBACKUP.SUB.

4. Use the PIP utility to copy the text file WSBACKUP.SUB and the utility file SUBMIT.COM to drive A, if they are not there already.

5. When you are ready to perform the BACKUP routine, type **A:** ***RETURN*** to make drive A the default drive.

6. Type a command in the following form:

A>**SUBMIT WSBACKUP {floppy} {partition} {ext} {mm} {dd} {yy}** ***RETURN***

Where {**floppy**} is the drive letter of the floppy disk drive to which you wish to back up your files;
where {**partition**} is the drive letter of the Winchester disk partition from which you wish to backup your files;
where {**ext**} is the one- to three-letter file name extension of the text files you wish to back up;
where {**mm**} is a one- or two-digit entry for the current month, within the range 1-12;
where {**dd**} is a one- or two-digit entry for today's date, within the range 1-31; and
where {**yy**} is a one- to four-digit entry for the current year, within the range 0-9999.

For example, if today is February 30, 1984, and you wish to back-up files with the "DOC" extension from the drive A partition to the drive C floppy disk, then you should type the following command:

A>**SUBMIT WSBACKUP C A DOC 2 30 84** ***RETURN***

BACKUP will back up all WordStar text files with the specified file name extension from the partition into a backup file with the primary name "WSBACK".

8 Structure of Backup Files

The BACKUP utility backs up several source files into a single backup file. This backup file contains all of the files that were copied, in the order they were specified. At the beginning of the backup file is a directory of the copied files. The BACKUP utility maintains this directory to show the names of the files within the backup file, so that the RESTORE utility, when used, will be able to copy the files to other media.

At the beginning of the backup file directory is an entry for the backup file itself. This backup file directory entry is a sequence of bytes that are stored in the following form:

Purpose of bytes	ID	File Control Block (FCB)	R	quantity of copied files	date of backup	R	release number	version number	R
Quantity of bytes	1	32	4	2	2	7	1	1	14 = 64 bytes

Where "ID" is a byte that is set to one to distinguish this master backup directory entry from normal file directory entries;

where "File Control Block (FCB)" is a set of bytes that describe the drive name, primary file name, file name extension, and other characteristics used by CP/M to store files;

where "R" stands for reserved bytes that are not used for any particular purpose in this version of the software;

where "quantity of copied files" is the number of individual files stored within the backup file;

where "date of backup" is the date that the user entered in response to a prompt during the BACKUP operation; and

where "release number" and "version number" are included to insure that this software will be used only with compatible releases and versions of BACKUP and RESTORE.

NOTE: The file name extension in the "File Control Block (FCB)" of the backup file directory entry is the file name extension of the last volume of the backup disk set — and not necessarily the extension of the volume that contains the directory. Thus you can determine how many volumes were used to accommodate all of the backed up files by looking at the directory in the first volume. (The first volume is the volume given the extension "000" during the BACKUP operation.)

Immediately following the backup file entry in the backup file directory are several sequences of bytes, each describing attributes of one of the individual files that was copied into the backup file during the BACKUP operation. The bytes of the individual file directory entry are stored in the following form:

Purpose of bytes	ID	File Control Block (FCB)	R	start volume	end volume	start position	end position	file length	U	R
Quantity of bytes	1	32	4	1	1	2	2	2	1	18 = 64 bytes

Where "ID" indicates the location of this individual file entry amongst the other individual file entries in the directory. If the value of this byte is 2, then the entry describes an individual file within the backup file. If the value of this byte is FF, then the entry is a "dummy" entry that merely signals the end of the backup file, and does not describe an individual file;

where "File Control Block (FCB)" is a set of bytes that describe the drive name, primary file name, file name extension, and other characteristics used by CP/M to store files;

where "R" stands for reserved bytes that are not used for any particular purpose in this version of the software;

where "start volume" indicates the number of the first backup file volume used to accommodate this individual file;

where "end volume" indicates the number of the last backup file volume used to accommodate this individual file;

where "start position" is the number of 128-byte records between the beginning of the backup file volume and the beginning of this individual file;

where "end position" is the number of 128-byte records between the beginning of the backup file volume and the record following the end of this individual file;
where "file length" is the length of this individual file, as measured in 128-byte records; and
where "U" is the number of the user area from which the file came.

The number of individual source files that can be backed up in a single BACKUP operation is limited by the amount of space on the first disk/partition used to receive the backup volumes. This disk/partition must have enough free space to accommodate the entire backup file directory.

NOTE: If any of the source files you specify are random files (as opposed to sequential files), these files might become larger when restored with the RESTORE utility.

9 BACKUP Error Messages

```
Verify error, try BACKUP again (Y/N)?
```

BACKUP has detected that the copy of a backed up file on destination media is different from the original copy of the file on the source media. This message usually indicates a surface imperfection on the destination media.

Press **Y** if you wish to have BACKUP try to recopy and verify the same individual file, overwriting the bad copy of this file. Then BACKUP will resume displaying the names of the individual files as they are copied and verified, beginning with the file in which the verification error occurred.

Press **N** if you wish BACKUP to skip the file that it just failed to verify, and try to copy and verify the next of the specified source files.

```
Backup filename can not be ambiguous.
```

You specified * or ? wild card characters in the destination file name for the BACKUP operation. Repeat the command specifying the destination with an explicit file name.

```
Cannot open master backup file {filename}.000,
not enough space on disk.
```

The disk/partition specified as the destination media for the backup file {filename} did not have enough free disk space to accommodate the entire backup file directory. Repeat the BACKUP operation specifying a larger partition for the destination (if you are backing up files to the Winchester disk) or inserting a formatted floppy disk with more free space (if you are backing up files to a floppy disk drive).

```
Extension on backup file specified, will be ignored.
```

This occurs whenever you try to assign a backup file an extension, by specifying a full file name for a destination file. If this occurs, BACKUP ignores the extension you specified and uses its standard, sequentially numbered extensions. Program operation will not be disturbed.

```
Can not find master backup file {filename}.000.
```

This message occurs when the /L option is requested for a file from a disk where the master backup {filename}.000, is not present.

```
File {filename}.{ext} is not found.
```

This message occurs whenever a file is specified for BACKUP or RESTORE and that file is not on the disk.

```
Insert another disk in drive {x} for backup,
and hit RETURN when ready,
or hit any other key to abort.
```

The disk just used to receive some of the copied files is now full. Remove this disk from the drive, label it, insert another formatted disk into the destination drive, close the drive latch, and press the ***RETURN*** key.

```
Invalid backup file
```

This message occurs if the backup file specified in a command does not contain valid information. This may occur if the file specified was not a backup file, but had a "000" extension, or if the data in a backup file had degraded (possible due to a bad sector, or inadvertent exposure for the media to an electromagnetic field).

```
Invalid date in option
```

This message occurs if the date given with the D option was not entered in the proper form. If any of the numbers in the date are out of range, if any numbers are separated by invalid characters, or if the D option letter is omitted, then this message will appear.

```
Invalid date
```

This message occurs if the date entered in response to the date prompt does not conform to the proper form for entering dates. If any of the numbers in the date are out of range, or if any numbers are separated by invalid characters, then this message will appear.

```
Invalid drive designation on BACKUP file.
```

This message occurs when a drive name is used that is not in the range of supported drive names (A through F).

```
Invalid exception file specifications.
```

This message will occur if the exception file specified has a syntax error in the specification.

```
Invalid filename.
```

This message appears when a file name is specified that does not conform to CP/M file naming conventions.

```
Invalid selection file specifications.
```

This message is generally caused by a typographical error in the command line. The message results when parameters in the command line appear garbled or incorrectly punctuated.

```
Invalid option [x] specified.
```

This message occurs if BACKUP is unable to recognize the option [x] that was specified in the command.

```
Not enough parameters specified.
```

This message results when the command to BACKUP is not complete enough for BACKUP to carry out the intended operation.

```
Can not open master backup file {filename}.000,
insert another disk in drive x:
and hit RETURN when ready,
or hit any other key to abort.
```

This message occurs if the disk that has been inserted is not volume 1. Insert the correct disk.

```
Can not open backup file {filename}.{nnn},
insert another disk in drive x
and hit RETURN when ready,
or hit any other key to abort.
```

This message occurs when you are asked to insert volume nnn + 1 (which would contain {filename}.{nnn}) and the wrong disk is inserted. Insert the correct disk.

```
Invalid user option
```

This message occurs if the user number specified with the U option is not in the range 0–15 or if a user number was specified with improper syntax.

```
Invalid version of BACKUP for {filename.000}.
```

This message occurs if you have used different versions of the BACKUP, for instance in a command that included the [L] option. When producing a directory of a backup file, use the same version of BACKUP as you used to create the backup file.

```
No files selected.
```

This message occurs if none of the source files you specified in the BACKUP command exist on the default or specified source media.

BSYSGEN

The Utility that Copies the Operating System Between Disks

The BSYSGEN utility is used to transfer either part or all of the CP/M operating system to a disk, depending on the circumstances. Unlike the SYSGEN utility the BSYSGEN utility can **not** be used to copy the system kernel directly from memory to a disk after running a MVCPM2x7 utility, although it can copy a file that was recorded on a disk by the SAVE command after a run of a MVCPM2x7 utility. ("MVCPM2x7" stands for either the MVCPM207 utility or the MVCPM217 utility.)

NOTE: This release of the CP/M Operating System consists of a system kernel and two or three system files. The system files are BIOS85.SYS and BIOS88.SYS, and sometimes ALTCHAR.SYS. To make a disk bootable, you must put the system kernel on the disk's system tracks **and** the BIOS85.SYS and BIOS88.SYS files in the disk's file area. The ALTCHAR.SYS system file will be used by CP/M if it is present on the bootable disk, although it is not necessary to make a disk bootable.

BSYSGEN can be used by two methods: the Utility Prompt Method or the System Prompt Method.

1 Utility Prompt Method

Under the Utility Prompt Method, you first load the BSYSGEN utility into computer memory, and then respond to BSYSGEN prompts that define the operation.

1.1 UTILITY PROMPT COMMAND ENTRY

To begin under the Utility Prompt Method, type the following command at the system prompt:

A>**BSYSGEN** ***RETURN***

The following display will appear:

```
BSYSGEN VER 2.2.101
SOURCE DRIVE NAME :
```

1.2 SPECIFYING THE SOURCE

At the "SOURCE DRIVE NAME :" prompt, you can specify the drive containing the disk from which the system will be copied. Enter the letter that stands for that drive.

The following example shows how you would answer this prompt if the source of the system was to be the disk in drive A:

```
SOURCE DRIVE NAME (OR RETURN TO SKIP): A
```

NOTE: BSYSGEN can only copy the system between disks of the same type. Therefore, you can **not** enter a carriage return at this BSYSGEN prompt to copy a system that has been moved into computer memory by a MVCPM2x7 utility. (If you do wish to copy the system from memory immediately after a MVCPM2x7 activity, use the SYSGEN utility.)

BSYSGEN will now prompt you to confirm your selection of the source drive, with a prompt in the following form:

```
SOURCE ON A, THEN TYPE RETURN:
```

You can confirm your specification of the source drive name by entering a carriage return at this prompt. (You can also abort the BSYSGEN operation and return control to the operating system by entering ***CTRL-C*** at this prompt.)

If you confirm the "SOURCE ON" prompt with a carriage return, BSYSGEN will then display the message:

```
FUNCTION COMPLETE
COPY SYSTEM FILES (Y/N):
```

1.3 COPYING SYSTEM FILES WITH BSYSGEN

To instruct BSYSGEN to copy the files BIOS85.SYS and BIOS88.SYS (and ALTCHAR.SYS if it exists on the source disk) from the source disk to the destination disk, press **Y** at the "COPY SYSTEM FILES (Y/N):" prompt. If you do **not** wish to copy system files, press **N**.

NOTE: If you decline to copy the system files using the BSYSGEN utility, you can copy them using the PIP utility.

If you pressed Y to copy the system files, BSYSGEN will display the "DESTINATION DRIVE NAME (OR RETURN TO REBOOT):" prompt. If you pressed N to forgo the copying of system files, BSYSGEN will also prompt for destination.

1.4 SPECIFYING THE DESTINATION

After you have made an entry at the "COPY SYSTEM FILES" prompt, BSYSGEN will prompt for destination as shown:

```
DESTINATION DRIVE NAME (OR RETURN TO REBOOT):
```

The first time this prompt appears, you should type the drive letter for the disk that you wish to receive the system. For instance, type **B**. BSYSGEN would then display a prompt in the following form:

```
DESTINATION ON B, THEN TYPE RETURN
```

Confirm your destination specification by entering a carriage return at such a prompt.

BSYSGEN will again display the "DESTINATION DRIVE NAME (OR RETURN TO REBOOT):" prompt. This time, you can specify a different drive name, insert a new disk into the former destination drive and specify this drive again as the destination, or enter a carriage return to cause a warm boot. (A warm boot will exit you from the BSYSGEN utility to the CP/M Operating System. Then a system prompt will be displayed.)

2 System Prompt Method

The System Prompt Method, enables you to enter all of the specifications necessary for a BSYSGEN operation in a single command line.

2.1 SYSTEM PROMPT COMMAND ENTRY

System Prompt Method BSYSGEN commands are entered in the following form:

A>**BSYSGEN** {**destination**}={**source**}{**[option,option]**} ***RETURN***

Where **BSYSGEN** is the command line function, stored in the file BSYSGEN.COM on the logged disk;
where {**destination**} is the name of the drive (A, B, C, D, E, or F) containing the formatted disk that you wish to receive the copy of the system;
where {**source**} can be either a drive name, a file name, or both; and
where {**[option,option]**} represents letters enclosed in square brackets **[ ]** and separated by a comma **,** to specify how the BSYSGEN operation should be conducted.

NOTE: In a CP/M command line "equation", the source is always on the right and the destination is always on the left.

2.2 BSYSGEN DATA SOURCES

The source of the transferred data in a System Prompt Method command can be one of the following types:

- Drive Name, including a letter for a drive within your hardware environment and a colon, as with **A:**, **B:**, **C:**, **D:**, **E:**, and **F:**;

- File Name, which specifies a file that was created and stored by consecutive MVCPM2x7 and SAVE commands, as with **CPM48.SYS** or **CPM64.SYS**; or

- Drive Name and File Name, where the file desired for the system resides on a disk in other than the default drive and the drive name must specify that drive, as with **B:CPM48.SYS** or **C:CPM64.SYS**.

2.3 BSYSGEN OPTIONS AND DEFAULTS

BSYSGEN command lines entered by the System Prompt Method can include the following options (enclosed in square brackets [ ]):

B The BIOS88.SYS and BIOS85.SYS files (and ALTCHAR.SYS if it exists on the source) will be copied from the specified source to the specified destination. If files named BIOS88.SYS, BIOS85.SYS, and ALTCHAR.SYS already exist on the destination disk, they will be overwritten.

N No prompts will be displayed during this operation.

When you enter a BSYSGEN command line with source and destination specifications, and neglect to specify options, BSYSGEN will perform the operation according to these default criteria:

- BIOS88.SYS, BIOS85.SYS, and ALTCHAR.SYS files will **not** be copied (as if the B option was not specified);
- Prompt **will** be displayed to confirm which drive will receive the copy of the system (as if option N was not entered). The BSYSGEN prompt displays in the following form:

```
BSYSGEN VER 2.2.101

DESTINATION ON B, THEN TYPE RETURN
```

2.4 SYSTEM PROMPT METHOD EXAMPLES

A>**BSYSGEN B:=A:** ***RETURN*** BSYSGEN will copy the system kernel from the disk in drive A to the disk in drive B. The system files from A will **not** be copied and a prompt **will** appear before the copying, by default.

A>**BSYSGEN B:=D:[N]** ***RETURN*** BSYSGEN will copy the system kernel from the disk in drive D to the system tracks of the disk in drive B. The system files will **not** be copied, by default. A prompt will **not** appear before the copying, as specified by the N option.

A>**D:BSYSGEN B:=C:CPM48.SYS[B,N]** ***RETURN*** The BSYSGEN utility, in this case, is stored on the disk in drive D. It will copy the system kernel from the file named "CPM48.SYS" (recorded onto the disk in drive C by the SAVE command after creation in memory by a MVCPM2x7 command), and put it on the system tracks of the disk in drive B. It will also copy the system files from drive C to drive B, and display no prompts during the operation, as specified by options.

3 BSYSGEN Error Messages

```
INVALID DRIVE NAME
```

EXPLANATION: User must specify drive names using the names of drives that exist in the hardware environment, and are recognized by the operating system that was loaded at bootstrap.

```
NO SOURCE FILE ON DISK
```

EXPLANATION: The drive specified as "SOURCE DRIVE" did not contain one of the BIOS files (BIOS85.SYS or BIOS88.SYS). Use a different disk in the source drive, or copy working BIOS files to the source disk, or rename existing BIOS files to "BIOS85.SYS" and "BIOS88.SYS".

SOURCE FILE INCOMPLETE

EXPLANATION: BSYSGEN failed in an attempt to copy the system files from the disk in the source drive. This file might have been damaged by disk media flaws or partially overwritten. The user should reset, bootup, and re-enter the BSYSGEN command using a different disk in the source drive.

WRITE ERROR DURING SYSTEM FILES

EXPLANATION: The user should try BSYSGEN again with a destination disk that is write-enabled, formatted, and has at least 12 kilobytes of free space to accommodate the system files.

ERROR READING SYSTEM FILES

EXPLANATION: BSYSGEN failed in an attempt to copy the system files from the disk in the source drive. This file might have been damaged by disk media flaws or partially overwritten. The user should reset, bootup, and re-enter the BSYSGEN command using a different disk in the source drive or using a different disk to bootup.

PERMANENT ERROR, TYPE RETURN TO IGNORE

EXPLANATION: The system kernel or system files are either incompatible with the destination disk type or otherwise flawed. The user should reset, bootup, and re-enter the BSYSGEN command using a different disk in the source drive or using a different disk to bootup. Under some circumstances, the user must use a MVCPM2x7 utility before BSYSGEN.

UNABLE TO SELECT DRIVE

EXPLANATION: Specify the name of a drive that can be accessed by BSYSGEN. Such a drive must be a valid drive that is recognized by the operating system.

COMMAND SYNTAX ERROR

EXPLANATION: System Prompt Method command line was entered without following the entry form explained in "2.1 System Prompt Command Entry". Enter command again after reviewing this entry form.

ILLEGAL OPTION

EXPLANATION: System Prompt Method command line was entered with an option other than a B or an N. Re-enter command with either, none, or all of the BYSYSGEN options B and N. Enclose the option(s) in square brackets and spearate them with a comma if boih are used.

FORMAT

The Utility that Prepares Disk or Partition Surface

The FORMAT utility prepares a floppy disk or Winchester partition for the storage of data by establishing storage areas on the disk surface. At the same time, FORMAT erases any data that remains on the disk or partition from prior use, and sometimes inspects the recording surface for imperfections that could impair data storage or transmission. FORMAT also enables you to determine how much data you will be able to store on a floppy disk.

CAUTION: Because FORMAT erases all existing data on a disk or partition, make certain that you only format disks or partitions containing expendable data or no data. You can use the DIR or STAT commands (see the "Reference Guide" of the CP/M-85 manual) to check for valuable data files before formatting. However, the DIR and STAT commands do not always display all of the files on a disk or partition.

You can use the FORMAT utility through either of two methods: the Utility Prompt Method or the System Prompt Method.

1 Utility Prompt Method

With this FORMAT method, you load the FORMAT utility into memory by entering a command at the system prompt. Then you answer a series of FORMAT prompts to define the formatting operation.

1.1 UTILITY PROMPT COMMAND ENTRY

Answer the system prompt with a command in the following form:

A>**FORMAT** ***RETURN***

When invoked through the FORMAT prompt method, FORMAT first identifies itself with name, version number, and a caution about its capabilities. It also asks you if you wish to continue the operation, as shown:

```
Format Version 2.2.101

This program is used to initialize a disk.
All information currently on the disk will be destroyed.
Is that what you want? (y/n):
```

Respond to this question by entering **Y** if you wish to format a disk or partition. Enter **N** if you do not.

1.2 SPECIFYING THE DISK OR PARTITION TO BE FORMATTED

After you have confirmed your intention to format a disk or partition, FORMAT asks:

```
Which drive do you wish to use for this operation?:
```

Answer this prompt by entering the letter of the drive containing the disk (or assigned the partition) you wish to format. The drive you specify must be a valid disk drive in your hardware environment.

The drive you specify does not necessarily have to be a physical drive. For instance if you have only one physical 5.25-inch drive slot, then you can specify drive B at this prompt. You will later be prompted to put the appropriate 5.25-inch disk in the drive.

However if you specify a Winchester partition, this partition must have already been assigned a drive name. If the partition you wish to format is not currently assigned to the specified drive name, you must exit from the FORMAT utility and use the ASSIGN utility to assign this partition to the drive. You can exit from FORMAT at the "Which drive" prompt by entering ***CTRL-C***.

1.3 DEFINING THE FORMAT OPERATION

After you specify the drive containing the disk or partition you wish to format, FORMAT will display a message another prompt. The kind of prompt FORMAT displays depends upon whether you are trying to format a 5.25-inch floppy disk, an 8-inch floppy disk, or a Winchester partition.

Formatting a 5.25-Inch Disk

If you specified a drive that contains a 5.25-inch disk, the FORMAT utility enables you to specify the number of sides you want formatted by displaying the following prompt:

```
Number of Sides? (1=single, 2=double):
```

Entering the number **1** at this prompt will give the formatted disk a file capacity of 148 kilobytes. Entering the number **2** will give the formatted disk a file capacity of 304 kilobytes.

NOTE: All 5.25-inch disks formatted with this CP/M release are automatically formatted at double density. Therefore, the FORMAT utility will not prompt you to specify the density (level of data concentration) at which you want a 5.25-inch disk formatted.

After you respond to the "Number of Sides?" prompt, FORMAT will display a prompt in the following form to enable you to begin or cancel the FORMAT operation:

```
Put the disk you wish to be formatted in drive x.
Press RETURN to begin, anything else to abort.
```

(The character "x" stands for the letter of the disk drive you specified.) Entering a carriage return at this prompt will begin the actual formatting operation, while entering any other keyboard character will help you to end the FORMAT operation.

NOTE: It takes at least a minute for FORMAT to format a disk. During this time the light on the specified disk drive will glow.

Formatting an 8-Inch Disk

If you are formatting an 8-inch disk, the FORMAT utility enables you to specify the level of density at which you wish to store data by displaying the following prompt:

```
Which density? (S=single, D=double):
```

The "density" of a disk refers to the level of concentration of the data stored on its surface. Higher density levels sometimes decrease data access reliability.

- If the disk in the specified drive is single-sided, then entering the letter **S** (for single density) at this prompt will give the formatted disk a file capacity of 241 kilobytes. Entering the letter **D** (for double density) will give the formatted disk a file capacity of 482 kilobytes.

- If the disk in the specified drive is double-sided, then entering the letter **S** (for single density) at this prompt will give the formatted disk a file capacity of 490 kilobytes. Entering the letter **D** (for double density) will give the formatted disk a file capacity of 980 kilobytes.

NOTE: Some 8-inch disks allow you to format only one side and others allow you to format both sides. These two types of disk are distinguished by the position of a small hole in the disk jacket, near the center spindle hole. The number of sides that can be formatted on a particular 8-inch disk is an unchangeable feature of that particular disk. The FORMAT utility automatically detects the position of this hole and prepares to format the disk on the appropriate number of sides.

After you respond to the "Which density?" prompt, FORMAT will display a prompt in the following form to enable you to begin or cancel the FORMAT operation:

```
Put the disk you wish to be formatted in drive x.
Press RETURN to begin, anything else to abort.
```

(The character "x" stands for the letter of the disk drive you specified.) Entering a carriage return at this prompt will begin the actual formatting operation, while entering any other keyboard character will help you to end the FORMAT operation.

NOTE: It takes at least a minute for FORMAT to format a disk. During this time the light on the specified disk drive will glow.

Formatting a Winchester Disk Partition

If you specified a drive that has been assigned a Winchester partition, FORMAT will display a prompt in the following form to enable you to begin or cancel the FORMAT operation:

```
Will format partition assigned to drive x:

Press RETURN to begin, anything else to abort.
```

(The character "x" stands for the letter of the partition you specified.) Entering a carriage return at this prompt will begin the actual formatting operation, while entering any other keyboard character will help you to end the FORMAT operation.

The file capacity of the partition you are formatting is determined before you invoke the FORMAT utility, by the PREP utility (which automatically allocates half of the Winchester disk space to a single CP/M partition), or by the PART utility (which enables you to determine the size of your partitions). See text sections on "PREP" and "PART" for more information.

NOTE: As FORMAT formats a partition, the light on the Winchester disk drive will glow.

1.4 ENDING A FORMAT OPERATION

When FORMAT finishes preparing a disk's surface, or when you press "anything else to abort" the FORMAT utility, FORMAT will display the following prompt:

```
Do you have more disks to format? (y/n):
```

If you wish to format another disk or partition without reinvoking FORMAT, press **Y** at this prompt. FORMAT will again prompt to specify the drive containing the disk or partition you wish to format.

If you do not wish to format another disk or partition, press **N**. FORMAT will display the system prompt, at which you can enter any CP/M command.

NOTE: You can also end a FORMAT operation by entering ***CTRL-C*** at the "Which drive" prompt.

2 System Prompt Method

The System Prompt Method enables you to include all of the specifications necessary for the FORMAT operation in a single command line. Enter this command line at the CP/M system prompt.

2.1 COMMAND LINE ENTRY

System Prompt Method FORMAT commands are entered in the following form:

A>**FORMAT** {**drive**}:{**[option,option]**} ***RETURN***

Where **FORMAT** is the command line function, stored in the file FORMAT.COM on the logged disk;
where {**drive**} is the letter of the drive that contains the disk or partition you wish to format (this letter must represent a valid drive in your hardware environment, such as **A**, **B**, **C**, **D**, **E**, or **F**); and

where {**[option,option]**} represents letters and/or numbers enclosed in square brackets [ ] and separated by commas , to specify how the formatting operation should be conducted.

NOTE: You can specify logical (imaginary) drive names in FORMAT commands, as well as physical (visible) drive names. Then you will be prompted to insert two different disks alternately into a single physical drive slot.

2.2 FORMAT OPTIONS

FORMAT command lines entered by the System Prompt Method can include the following options:

SD 8-inch disk formatted to Single Density;

DD 8-inch disk formatted to Double Density;

1S 5.25-inch disk formatted on only one side;

2S 5.25-inch disk formatted on both sides;

F Fast formatting, because the routine test of disk surface media is not performed;

N No prompt displayed between FORMAT command entry and FORMAT execution;

Options should be enclosed in square brackets, and separated by commas when more than one is used. Options are the last item in a System Prompt Method FORMAT command line before the carriage return.

NOTE: All 5.25-inch disks are automatically formatted at double density by this version of FORMAT. 8-inch disks are automatically formatted on the number of sides for which the disk has been certified by the manufacturer. (FORMAT detects this certification by checking the position of the small hole in the disk cover next to the center spindle hole.)

2.3 SYSTEM PROMPT METHOD DEFAULTS

When you enter a FORMAT command line with a drive specification, and decline to specify some or all of the possible options, FORMAT will prepare the disk according to the following default criteria:

- 5.25-inch, disk formatted to Double Density (regardless of any options you might specify);
- 8-inch disk formatted to Double Density (as if you specified the DD option);
- 5.25-inch disk formatted on both sides (as if you specified the 2S option);
- 8-inch, single-sided disk formatted on one side (regardless of any options you might specify);
- 8-inch, double-sided disk formatted on both sides (regardless of any options you might specify);
- Disk surface will be tested for data retention (as if you did not specify the F option); and
- Prompts will be displayed between FORMAT command entry and FORMAT execution (as if you did not specify the N option). Therefore, whenever you enter a System Prompt Method command without the N option, the following prompt will appear:

```
CP/M-85 Format Version 2.2.101

This program is used to initialize a disk.
All information currently on the disk will be destroyed.
Is that what you want? (y/n):
```

To confirm your intention to run a FORMAT operation, enter a **Y** at this prompt. Then FORMAT will display a prompt in the following form if you specified a floppy disk:

```
Put the disk you wish to be formatted in drive x.
Press RETURN to begin, anything else to abort.
```

or the following prompt if you specified a Winchester partition:

```
Will format partition assigned to drive x:

Press RETURN to begin, anything else to abort.
```

To begin execution of the FORMAT operation for a floppy disk, insert the appropriate disk in drive x (where drive x is the drive you specified in the command line) and enter a carriage return. To begin execution of the FORMAT operation for a Winchester partition, simply enter a carriage return.

To abort the FORMAT utility, enter any keyboard character other than Y or y at the "Is that what you want?" prompt, or press anything other than RETURN at the "Press RETURN to begin, anything else to abort." prompt. In either case, the FORMAT operation will end and CP/M will display the system prompt.

2.4 SYSTEM PROMPT METHOD EXAMPLES

A>**FORMAT B:[2S]** ***RETURN*** FORMAT will prepare the surface of the disk in drive B (a 5.25-inch disk) to double density and on both sides, as specified by options. FORMAT will display prompts before formatting and test the disk surface while formatting, by default.

A>**FORMAT B:** ***RETURN*** FORMAT will prepare the surface of the disk in drive B (a double-sided 8-inch disk). Due to manufacturer's certification, this disk will be formatted on both sides. By default, this disk will be formatted to double density. Also by default, FORMAT will display prompts before formatting and test the disk surface while formatting.

A>**FORMAT B:[2S,1S]** ***RETURN*** If your command line contains contradictory options, FORMAT will acknowledge the last one. Hence, in this case, FORMAT will format the surface of the disk in drive B (a 5.25-inch disk) on only one side, as specified by the last side quantity option. FORMAT will also display prompts before formatting and test the disk surface while formatting, by default.

A>**C:format B:[Sd,f,N]** ***RETURN*** The FORMAT utility, in this case, is stored on the disk in drive C. It will prepare the surface of the disk in drive B (a single-sided 8-inch disk) to single density, as specified by the "Sd" option. Since the disk was manufactured for single-sided data storage, only one side will be formatted. The "f" option specifies that this formatting operation will be performed without a disk media test. The "N" option specifies that FORMAT will not prompt you to confirm your intentions before the formatting operation begins.

NOTE: As with any other command entered at a CP/M system prompt, you can edit a FORMAT command line with the ***DELETE*** key, or erase the entire command line by entering ***CTRL-X***.

3 Disk Capacities

The following three tables show the amount of file space remaining on various kinds of disks after they are formatted under various kinds of conditions. (The FORMAT utility also prepares areas of the disk for the recording of the CP/M system kernel and the disk file directory, although the space reserved for such software items is not included in these tables.)

The following table shows the file capacities of 5.25-inch, soft-sectored disks formatted in 48-tpi drives:

	Single-sided	Double-sided
Double density	148 kilobytes	304 kilobytes

This table shows the file capacities of single-sided 8-inch disks:

	Single density	Double density
Single-sided	241 kilobytes	482 kilobytes

This table shows the file capacities of double-sided 8-inch disks:

	Single density	Double density
Double-sided	490 kilobytes	980 kilobytes

The file capacity of a formatted Winchester disk partition is determined before you invoke the FORMAT utility, by the PREP utility (which automatically allocates half of the Winchester disk space to a single CP/M partition), or by the PART utility (which enables you to determine the size of your partitions). See the sections on "PREP" and "PART" for more information.

NOTE: The FORMAT utility supplied with this CP/M version cannot format any disk to extended double density. However this CP/M version can write to or read from a disk that was formatted at extended double density by the FORMAT utility of some other CP/M versions.

4 FORMAT Error Messages

```
Drive not available in current configuration
```

EXPLANATION: If you entered a drive name that has not been assigned a partition, or does not exist in your hardware, enter a different drive name.

```
Disk is write protected.
Unable to format this disk.
Do you have any more disks to format? (y/n):
```

EXPLANATION: Remove any adhesive tab that might be attached to the write-enable notch on a 5.25-inch disk cover, or cover the write-protect notch on an 8-inch disk. The "Do you have" prompt appears with this message only when you enter a Utility Prompt Method command.

```
Unable to format this disk. Place a different disk in the drive
and press any key to begin...
```

EXPLANATION: The disk to be formatted is damaged or improperly inserted in the drive. Try again or replace the disk.

```
ILLEGAL FORMAT OPTION
```

EXPLANATION: System Prompt Method command line was entered with undefined characters in place of options.

```
ILLEGAL COMMAND SYNTAX
```

EXPLANATION: System Prompt Method command line was entered with undefined characters in place of options.

DISK IS NOT OF TYPE SPECIFIED

EXPLANATION: A System Prompt Method command line specified a drive that contained a disk which did not match the specified disk type.

OPTION NOT AVAILABLE

EXPLANATION: A Utility Prompt Method prompt was answered with characters which were not possible under the circumstances. Enter a pertinent option at this prompt.

PARTITION IS SMALLER THAN MINIMUM ALLOWABLE SIZE

EXPLANATION: Winchester disk partitions under CP/M can be as small as 64 kilobytes. Back up any valuable software and/or data stored on other partitions and use the PART utility to create CP/M partitions that are at least 64 kilobytes in size. Then try the FORMAT utility again.

PARTITION IS LARGER THAN CP/M MAXIMUM SIZE -- ONLY 8 MEG USABLE

EXPLANATION: The partition being formatted has been allocated 8 megabytes (8192 kilobytes) or more Winchester disk space. You will only be able to access the first 8192 kilobytes on the partition. To make the rest of the partition's space accessible, Back up any valuable software and/or data stored on other partitions and use the PART utility to make the partition smaller and to allocate the remaining space to another partition. Then try the FORMAT utility again.

Incorrect version of BIOS

EXPLANATION: The CP/M-85 system and FORMAT being used are not of the same version. Use a CP/M-85 system and FORMAT utility that were both copied from the same CP/M-85 distribution disk. Then try to FORMAT utility again.

MVCPM2x7
(MVCPM207 and MVCPM217)

The Utility that Customizes a CP/M System Kernel for Memory Size and Disk Type

The MVCPM2x7 utilities will adjust the CP/M system kernel so that it has the proper memory size for your purposes, and so that it recognizes the type of disk (floppy or Winchester partition) it will be recorded on. It can change the system's size within a range of 48 through 64 kilobytes of Random Access Memory (RAM). This utility should be followed immediately with another utility or command, such as SYSGEN or SAVE.

NOTE: The two MVCPM2x7 utilities are provided in separate files because each one is intended for use with a specific disk controller card. MVCPM207 is intended for the Z-207 controller card, and MVCPM217 is intended for the Z-217-1 controller card.

If you have a Z-207 card and wish to create a CP/M-85 system for a floppy disk (floppy disks are controlled by the Z-207 card), then use MVCPM207.

If you have a Z-217-1 card and wish to create a CP/M-85 system for a Winchester disk partition (Winchester disks are controlled by the Z-217-1 card), then use MVCPM217.

1 Function of MVCPM2x7

MVCPM2x7 loads the kernel of a CP/M Operating System (the part exclusive of system files BIOS85.SYS, BIOS88.SYS, and ALTCHAR.SYS) into a special location in computer memory. At this location, it adjusts the system kernel to either a specified memory size or the total available memory size of the computer. It also adjusts the system for the type of disk (floppy or Winchester partition) that it will eventually be recorded (when SYSGEN is run).

MVCPM2x7 must also observe and measure the BIOS85.SYS file that will eventually be used with the system kernel, to allow sufficient space for this BIOS file. MVCPM2x7 always relies upon a SYSGEN or SAVE command to copy the system kernel that MVCPM2x7 loaded into memory.

2 MVCPM2x7 Command Line Entry

The MVCPM2x7 command line is entered in the following form, with three specifications separated by a space, as shown:

A>**MVCPM{xxx}** **{nn}** **{d}:{biosfile.ext}** ***RETURN***

Where **{xxx}** is the number that matches the model number of disk controller card that controls the disk that will eventually receive the system being moved. If xxx is 207, the system will be prepared for a floppy disk. If xxx is 217, the system will be prepared for a Winchester partition;

where the **{nn}** variable represents the memory size that the transferred system kernel will occupy, in multiples of 1024 bytes (kilobytes). This is an optional value. If the "*" character or no value is entered, the system kernel will be set to occupy the entire memory capacity of the computer being used, by default. (Your Z-100 computer, as used with this version of CP/M, has a memory range of 48K through 64K.) This value can be less than or equal to the actual memory capacity of the computer. If it is larger than the computer's capacity, then the CP/M system created will be useless in the computer;

where the **{d}** variable represents the letter of the disk drive containing the system files that are to be matched up with the system kernel being moved. This variable is optional. If omitted, MVCPM2x7 will assume that the created system kernel should be modified to be compatible with the system files that are currently active in computer memory; and

where the **{biosname.ext}** variable represents the name of the file containing the system components normally stored in the file BIOS85.SYS. This variable is optional. If omitted, MVCPM2x7 will assume the file name "BIOS85.SYS".

NOTE: The "*" character must be entered when you specify **no** value for the memory {**nn**} variable, and **do** specify a value for the drive name {**d**} and/or BIOS file name {**biosname.ext**}. In this sort of command line, the "*" character acts as a "place holder" so that your drive name and/or file name parameters are not interpreted as a memory value because it was entered in the memory value space.

During execution, the MVCPM2x7 utility will respond with a message in the following form:

```
MVCPM2x7 VERSION 2.2.101

CONSTRUCTING nnk CP/M vers 2.2
READY FOR "SYSGEN" OR
"SAVE 38 CPMnn.COM"
```

3 MVCPM2x7 Examples

The following command lines and explanations are specific examples of MVCPM2x7 command entry.

A>**MVCPM207 48** ***RETURN*** The system kernel created by this command will operate with 48K of RAM. The kernel will be adjusted for memory size and for a floppy disk, using the BIOS that was loaded into computer memory at bootup for reference.

A>**MVCPM217 * C:** ***RETURN*** The system kernel created by this command will probe computer memory and operate at computer's memory capacity (64K). This kernel will be adjusted for memory size and for a Winchester partition, using the BIOS files stored in drive C for reference.

4 After Running MVCPM2x7 . . .

MVCPM2x7 should be immediately followed by either:

- The SYSGEN utility, which will transfer the adjusted CP/M system kernel to the system tracks of a specified disk; or by
- The SAVE resident command, which will transfer the adjusted CP/M system kernel to a file on a specified disk.

If the user performs any **other** activity immediately after running MVCPM2x7, the work of MVCPM2x7 will probably be destroyed.

5 MVCPM2x7 Error Messages

```
INVALID MEMORY SIZE
```

EXPLANATION: Valid memory sizes are between 48K and 64K.

```
SYNCHRONIZATION ERROR
```

EXPLANATION: The serial number of the MVCPM2x7 utility used must match that of the CP/M-85 Operating System used.

```
READ ERROR
```

EXPLANATION: MVCPM2x7 cannot read data from a file the user specified because the file and/or disk surface is flawed.

```
NO FILE
```

EXPLANATION: MVCPM2x7 cannot read data from a file the user specified because it cannot find the file on the specified drive.

```
NO SPACE
```

EXPLANATION: The system files the user specified will not fit in memory.

```
BAD LOAD
```

EXPLANATION: A file specified by the user did not load properly. The user should try the MVCPM2x7 command again or specify a different file.

```
File not found.
```

EXPLANATION: MVCPM2x7 could not find the file the user specified as the BIOS on the specified disk.

```
UNABLE TO READ BIOS FILE
```

EXPLANATION: MVCPM2x7 was unable to read system file software from the disk. Copy the files BIOS85.SYS and BIOS88.SYS to this disk or a new disk and try MVCPM2x7 again.

PART

The Utility that Rearranges Winchester Disk Partitions and/or Changes the Partition Used for Default Bootup

The PART utility enables you to change the quantity, size, and names of Winchester disk partitions. It also enables you to specify which partition should be accessed when you boot up. You do not need to run PART in order to use your Winchester disk, because a CP/M partition was prepared on the disk before it was shipped.

The PART utility is recorded on the Winchester Utility Disk, which is shipped with your Winchester disk hardware documentation. The PREP utility is also recorded on this disk. Although this disk runs under the Z-DOS Operating System, you can boot up with it — just as you would a CP/M disk.

CAUTION: Any changes you make to the quantity or size of partitions through PART can destroy all existing data on your Winchester disk. Therefore, you should back up all necessary data from all partitions before you use PART.

NOTE: After using the PART utility, you must enter ***CTRL-RESET*** and reboot the system with a floppy disk containing the CP/M-85 Operating System.

1 Partition Features

Winchester disks distributed by Zenith Data Systems or Heath have large storage capacities. To make practical use of all this storage space, it is divided into partitions. You can establish up to 16 CP/M partitions on your Winchester disk. You can also have partitions with other operating systems on the disk.

A partition behaves like a floppy disk in most operations, because you can access a partition's data and/or software by entering commands that refer to the drive name that has been designated for that particular partition. However, you can only access a CP/M partition through a drive name either by booting up to that particular partition, or by first running the ASSIGN utility.

NOTE: The exact capacity of your Winchester disk drive is determined by the drive's manufacturer and by the amount of usable disk space remaining after unusable space has been made inaccessible by software such as the PREP utility. Examples in this text show disk space totals for a Winchester disk that accommodates 10,000 kilobytes. However it is possible that your disk will accommodate a different amount.

When your Winchester disk is shipped from the factory, it has already been prepared with two partitions. Each of these partitions occupies approximately one half of your total Winchester disk space. Each is also given a distinct name. One of these partitions is intended for used with the CP/M-85 Operating System and software that runs under CP/M-85. The other is intended for use of with the Z-DOS Operating System (sold separately) and software that runs under Z-DOS.

The PART utility enables you to view and change the status of the following partition features:

- Name of each partition
- Name of the operating system to be placed on each partition
- Approximate percentage of disk space allocated to each partition
- Precise capacity of each partition in kilobytes (1024-byte units)
- Total (approximate) percentage of Winchester disk space that is and is not allocated to partitions
- Total (precise) number of kilobytes of Winchester disk space that are and are not allocated to partitions
- Name of the one partition that is accessed when you boot up without specifying a partition

2 PART Operation

The PART utility enables you to change the status of partition features by typing different kinds of entries in response to prompts. During different phases of PART operation, features of the screen display will change and the cursor will move to the appropriate screen location after your entries. PART operation usually prompts you to make the following kinds of entries in sequence:

1) PART Invocation
2) PART Ratification
3) Choice of Operation
4) Partition Names
5) System Names
6) Allocation Percentages
7) Default Boot Partition Number
8) Choice of Operation
9) Choice of Exit Method

NOTE: If you wish to rearrange partitions, then you will probably repeat steps 4), 5), and 6) several times (once for each partition) before you perform step 7). If you merely wish to set a new default boot partition, then you will skip steps 4), 5), and 6).

2.1 PART INVOCATION

PART is recorded on the Winchester Utility Disk (supplied with your Winchester disk hardware and documentation) as an executable .COM file.

Entry Rules

To invoke the PART utility, enter the following command at the system prompt:

A: **PART** ***RETURN***

NOTE: Enter the PART command at the Z-DOS system prompt just as you would at a CP/M system prompt.

Resulting Display

After it is invoked, the PART utility displays identification messages, a caution, and a prompt, as shown:

```
                PART version x.xx
Copyright (C) 1982, Zenith Data Systems Corporation


The PART utility helps you to:

* change the arrangement of your Winchester disk partitions and/or
* select a partition (default boot partition) to which you can
  boot up without specifying the partition's name

PART displays a table showing the names of each partition (a
partition name and a system name) and the amount of disk space
allocated to each partition (in percentages and in kilobytes). PART
also dynamically calculates and totals the kilobyte size of all
partitions as you specify each partition's allocation percentage.

CAUTION: Using PART can destroy all files on your Winchester disk.
Do  not use PART until you  have transferred backup copies of your
Winchester disk files to floppy disks.

Proceed (Y/N)?
```

NOTE: The version number of the PART utility (shown in this example as "x.xx") might vary.

Error Conditions

If the PART.COM file is not on the disk you are using to run PART, you will receive the following "Bad command or file name" error message. Try the command again after inserting a disk containing the PART.COM file into the drive. Use the **DIR *RETURN*** command at the "A:" system prompt to determine whether a disk has this file.

If the disk has been removed from drive A since bootup, you will receive a "Seek error reading drive A Abort, Retry, Ignore" error message. Insert a disk containing PART.COM in drive A, close the drive latch, and press **R**.

If you try to run PART after booting up with a disk containing the CP/M-85 Operating System, then you will receive an error message in the form: "Bdos Err On X: Select". Reset the computer, boot up to the disk containing the Z-DOS Operating System and the PART.COM file. (We recommend that you use the Winchester Utility Backup Disk.) Then repeat the PART command at the A: system prompt.

2.2 PART RATIFICATION

At the initial PART display, you have the choice of ratifying your intentions to use the PART utility as it is described in the displayed messages (and subject to the displayed caution), or exiting from the PART utility.

2.2.1 CONTINUING TO USE PART

An affirmative answer to this prompt verifies your intentions to continue using PART.

Entry Rules

Type **Y** at this prompt if you fully understand the consequences of using PART and still wish to continue.

CAUTION: Rearrangement of Winchester disk partitions can destroy any software or data now stored on the disk. Therefore we recommend that you make backup copies of any valuable software and/or data now stored on the Winchester disk before verifying your intentions to use PART.

NOTE: You can use PART to select a different "default boot partition" without destroying software or data, as long as you make no entries to change the arrangement of partitions.

Resulting Display

When you have ratified your intentions to use PART, the current status of several partition features is visible on a screen display of the following form:

```
    Partition Name    Operating System Name    Percentage    Kilobytes
    --------------    ---------------------    ----------    ---------
 1. Z-DOS              Z-DOS                   50%           5000
 2. CPM                CPM                     50%           5000
 3.
 4.
 5.
 6.
 7.
 8.
 9.
10.
11.
12.
13.
14.
15.
16.
Total Utilization (Allocated/unallocated)      100/0         10000/0
Default boot partition number: 1   <Z-DOS;Z-DOS                >

    B - Modify default boot partition
    P - Partition maintenance
    E - Exit
Choose desired option. <B, P or E> _
```

The PART display shown above is the display that will appear the first time you run PART after shipment of a Zenith Data Systems (or Heath) Winchester disk, or after you have run the PREP utility. If you have already used PART since shipment or since running PREP, then some features of this display might appear differently.

2.2.2 Declining to Use PART

Type any character other than Y or y if you do not wish to use PART at this time. The A: system prompt will be displayed.

2.3 CHOICE OF OPERATION

After ratifying your intentions to use the PART utility, you have the choice of selecting a different default boot partition, changing the arrangement of your Winchester disk partitions, or exiting from PART.

A three-line menu enables you to select a PART operation by typing B, P, or E as the cursor flashes at the end of the prompt on the bottom of the screen.

2.3.1 Choosing to Modify Default Boot Partition

The default boot partition is usually the partition that you intend to use most often for booting up. Any established bootable partition that is selected as the default boot partition is the partition that will be automatically accessed when you type a bootup command without specifying a partition name. (In order to boot up to any other partition, you must specify the partition name, and sometimes the system name, in your bootup command.)

Entry Rules

Type **B** at this prompt to select an default boot partition. This operation will not prompt you to change the arrangement of any partitions. If you choose this activity, skip the next three steps and refer to "2.7 Default Boot Partition Number" for further instructions.

Resulting Display

After typing the B entry to "Modify default boot partition", the activities menu and prompt will be replaced by the "Enter number of new default boot partition" prompt. Additionally, the number and names of the current default boot partition will be replaced by the cursor on the display line beneath the table, as shown:

```
/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\
15.
16.
Total Utilization (Allocated/unallocated)        100/0           10000/0
Default boot partition number: 1    <Z-DOS;Z-DOS                   >
```

Enter number of new default boot partition.

When a display in this form appears, proceed to "2.7 Default Boot Partition Number".

2.3.2 Choosing Partition Maintenance

The "Partition Maintenance" operation leads you to add partitions, remove partitions, change the names of partitions, and/or change the percentage of space allocated to partitions. Then this activity also prompts you to select a default boot partition.

Entry Rules

Type **P** at this prompt to begin changing the arrangement of partitions. (At the end of this operation, you will also be prompted to change the setting of the default boot partition.)

Resulting Display

When you choose the "Partition maintenance" operation, the cursor moves to the beginning of the first partition name in the table and the operations menu is replaced by a "Minimum allocation" message at the bottom of the display, as shown:

```
   Partition Name      Operating System Name     Percentage     Kilobytes
   --------------      ---------------------     ----------     ---------
1. Z-DOS               Z-DOS                     50%            5000
2. CPM                 CPM                       50%            5000
3.
/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\
15.
16.
Total Utilization (Allocated/unallocated)   100/0          10000/0
Default boot partition number: 1   <Z-DOS;Z-DOS             >

Minimum allocation = 2%
```

When a display in this form appears, proceed to "2.4 Partition Name."

2.3.3 Choosing to Exit

Type **E** at this prompt to exit from the PART utility completely. The A: system prompt will be displayed immediately.

2.4 PARTITION NAME

After you have chosen the "Partition maintenance" operation, the cursor moves to the first character of a "Partition Name".

2.4.1 Changing or Adding a Partition Name

When the cursor moves to a position beneath the "Partition Name" column on the table, you can change the name of an existing partition or add a new partition to the table by entering the partition name as the first feature of this partition.

Entry Rules

A partition name is any string of **1-16 ASCII characters**, with the exception of the semicolon (;) and non-printing characters such as a space or tab. After entering this string, press the ***RETURN*** key. Then the cursor will move to the operating system name position for this partition.

PART will always display partition name letters (if any) in upper case, although you can enter them in either lower or upper case.

When the cursor arrives at the first character of a partition name, you will immediately erase the old partition name by pressing any key other than ***RETURN*** or the space bar.

While entering a partition name, you can press the ***BACK SPACE*** key to erase one character to left. If, when changing an old name, you press BACK SPACE until you have erased your entire new name, the old name will be redisplayed.

Partitions that you intend to give the same operating system name should be given different partition names.

Examples

The following examples are valid partition names:

```
CP/M _ ACCOUNTING     DATABASE     WORD/PROCESSING       George

Spread _ sheet     Z-DOS _ ACCOUNTING          Thelma        BASIC
```

Resulting Display

After you have entered 1-16 characters and pressed the RETURN key for a partition name, the new partition name will be displayed and the cursor moves to the operating system name position for this partition, as shown in the following partial display:

```
   Partition Name     System Name        Percentage    Kilobytes
   --------------     -----------        ----------    ---------
1. DATABASE           Z-DOS                 50%          5000
2. CPM                CPM                   50%          5000
3.
4.
/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\
```

Error Conditions

If you press the semicolon key or the TAB key and then press the RETURN key, the partition name will appear to vanish while the other features for the partition remain. However when you have finished making an entry for this partition's allocation percentage, the old partition name for this partition will reappear.

You cannot finish PART operation after giving two partitions the same partition names unless they are given different system names. However, it will wait until you make an entry for the default boot partition before displaying the "duplicate name error" message in reverse video. If this message appears, you will have to correct the duplicate names before exiting from PART.

2.4.2 Bypassing a Partition Name

When the cursor moves to a position beneath the "Partition Name" column on the table, you can retain an old partition name and advance to the system name or stop rearranging the partitions completely.

Entry Rules

To refrain from changing a partition name, press only the RETURN key.

Resulting Displays

If the cursor was at a partition where a partition name already existed, then the RETURN entry causes the cursor to move ahead to the system name of the same partition, as shown in the following partial display:

```
   Partition Name      System Name          Percentage    Kilobytes
   --------------      -----------          ----------    ---------
1. Z-DOS               Z-DOS                   50%          5000
2. CPM                 CPM                     50%          5000
3.
4.
\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\
```

If the cursor was at a position beneath the "Partition Name" category where no partition name has yet been established, a RETURN entry will move the cursor ahead to the "Default boot partition number" feature, as shown in the following partial display:

```
   Partition Name      Operating System Name    Percentage    Kilobytes
   --------------      --------------------     ----------    ---------
1. Z-DOS               Z-DOS                    50%           5000
2. CPM                 CPM                      50%           5000
3.
4.
\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/
15.
16.
Total Utilization (Allocated/unallocated)       100/0         10000/0
Default boot partition number: _
```

Enter the number of the default boot partition.

2.4.3 Removing a Partition

When the cursor moves to a position beneath the "Partition Name" column on the table, you can remove all features of this partition from the table.

Entry Rules

To remove a partition from the table without inserting a new partition in its place, simply press the **space bar**.

Resulting Display

The partition name, system name, allocation percentage, and allocation kilobytes for this partition will disappear. Then the features for all of the partitions below will move up one number. The cursor remains in the same position, although it now blinks at the partition name of a different partition.

If the partition you have removed was the default boot partition, then the "is undefined" message will be displayed.

Additionally, the "Total Utilization" (in both percentage and kilobytes) will show a different amount of "unallocated" space in reverse video (unless the removed partition was allocated zero percent of the disk).

The following partial display shows how the screen might appear after you remove a partition:

```
   Partition Name     Operating System Name    Percentage    Kilobytes
   --------------     ---------------------    ----------    ---------
1. CPM                CPM                      50%           5000
2.
3.
4.
\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\
15.
16.
Total Utilization (Allocated/unallocated)      50/50        5000/5000
Default boot partition number: is undefined


  Minimum allocation = 2%
```

Error Condition

If you remove a partition that was the default boot partition, then the "is undefined" message will be displayed until you make an entry for the default boot partition. If you then press RETURN to bypass setting the default boot partition feature, PART will display the "boot partition error" message in reverse video and prevent you from exiting from PART.

2.5 OPERATING SYSTEM NAME

After you have pressed the RETURN key during a partition name entry, the cursor moves to the first character of an "Operating System Name".

System names are not mandatory for partitions, although they must be used when the same partition names are used for different partitions.

2.5.1 Changing a System Name

When the cursor moves beneath the "Operating System Name" column on the table, you can change the system name of a partition.

Entry Rules

A system name is a string of **1-10 ASCII characters**, with the exception of the semicolon (;) and non-printing characters such as a space or tab. After entering this string, press the ***RETURN*** key.

PART will display system name letters in upper case, although you can enter them in either lower or upper case.

When the cursor arrives at the first character of a system name, you can immediately erase the old system name by pressing any key other than RETURN.

While entering a system name, you can press the ***BACK SPACE*** key to erase one character to left. If, when changing an old name, you press BACK SPACE until you have erased your entire new name, the old name will be redisplayed.

The same system name can be used for several partitions, as long as the partition names are different.

Example Entries

The following examples are valid operating system names:

CPM Z-DOS UNDER-DOS Acronym-DOS

NOTE: The Z-DOS operating system requires that you use the operating system name "Z-DOS" (as it is spelled here) for the partition(s) you plan to use for Z-DOS programs. We recommend that you use the operating system name "CPM" for the partitions you plan to use for CP/M programs, although CP/M does not require any particular system name.

Resulting Display

After you have entered 1-10 characters and pressed the RETURN key for a system name, the new system name will be displayed and the cursor moves to the allocation percentage position for this partition, as shown in the following partial display:

```
   PartitionName      SystemName             Percentage   Kilobytes
   --------------     -----------             ----------   ---------
1. DATABASE           CPM                     50%          5000
2. CPM                CPM                     50%          5000
3.
4.
```

\/

Error Conditions

If you try to enter the same system name for two partitions that also have the same partition name, PART will wait until you make an entry for the default boot partition display the "duplicate name error" message in reverse video. If this message appears, you will have to correct the duplicate names before exiting from PART.

If the names you have entered duplicate the names of a partition that has a greater number on the left side of the table, and if this partition with the greater number is the default boot partition, then the number of the default boot partition will automatically change to the smallest number of the two partitions that have the same names. This change in the number of the default boot partition occurs after you have made an entry for the allocation percentage of the duplicate partition with the smallest number.

If you press the semicolon key or the TAB key or the space bar and then press the RETURN key, the operating system name will appear to vanish while the other features for the partition remain. However when you have finished making an entry for the default boot partition, the old system name for this partition will reappear.

2.5.2 Bypassing the System Name

When the cursor moves beneath the "Operating System Name" column on the table, you can retain the old system name (or leave this feature blank) and skip ahead to the same partition's allocation percentage.

Entry Rules

To refrain from changing a system name, press only the RETURN key.

Resulting Display

The RETURN only entry causes the cursor to move ahead to the percentage feature of the same partition, without making any change to the system name, as shown in the following partial display:

```
   PartitionName     System Name              Percentage    Kilobytes
   --------------    -----------              ----------    ---------
1. DATABASE           Z-DOS                       50%          5000
2. CPM                CPM                         50%          5000
3.
4.

/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\
```

2.6 ALLOCATION PERCENTAGE

After you have made an entry at an "Operating System Name" position, the cursor moves to the "Percentage" position for the same partition.

2.6.1 Setting a Percentage

When the cursor moves to the first digit of a "Percentage" (of Winchester disk space allocation), you can set an allocation percentage.

Entry Rules

You must enter percentages by typing a whole **number in the range n-100**, where **n** is the number displayed at the bottom of the screen on the right side of the "Minimum allocation" message.

The percentage you enter for a CP/M partition must be low enough so that this partition will not be larger than 8 megabytes (8192 kilobytes). (If you allocate more than 8 megabytes to a partition, CP/M-85 will not be able to access part of this partition.)

NOTE: Different brands and models of Winchester disk require different minimum allocations.

Resulting Displays

For every allocation percentage you enter, PART automatically calculates the exact number of kilobytes that should be allocated to a partition according to the percentage you entered. PART also automatically calculates the total quantity of percentage points and kilobytes that are allocated and unallocated.

If you set an allocation percentage that brings the total allocation of disk space to 100 percent, and if you are entering it for one of the first 15 partitions on the table, then the cursor will move down to the partition name position of the next partition (whether this partition has been established yet or not) and the screen will appear in the form of the following partial display:

```
    Partition Name     Operating System Name   Percentage   Kilobytes
    --------------     ---------------------   ----------   ---------
1.  DATABASE           CPM                      30%          3000
2.  CPM                CPM                      70%          7000
3.  _
4.

/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/

15.
16.
Total Utilization (Allocated/unallocated)       100/0        10000/0
Default boot partition number: is undefined

     Minimum allocation = 4%.
```

If you set an allocation percentage that brings the total allocation of disk space to 100 percent, and if you are entering it for the 16th partition on the table, then the cursor will move down to the default boot partition position and the screen will appear in the form of the following partial display:

```
   Partition Name     Operating System Name     Percentage     Kilobytes
   --------------     ---------------------     ----------     ---------
1. DATABASE           CPM                       6%             600
2. SPREAD-SHEET       CPM                       6%             600
/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\

15. COBOL             UNDER-DOS                 6%             600
16. FUN&GAMES         ACRONYM-DOS               10%            1000
Total Utilization (Allocated/unallocated)       100/0          10000/0
Default boot partition number: _
```

Enter number for the default boot partition.

NOTE: If you establish 16 partitions on your disk, and have not allocated all of the disk space with your percentage entry for the 16th partition, PART will automatically allocate all of the remaining disk space to the 16th partition — no matter how much space you try to allocate to this partition.

If you set an allocation percentage that brings the total allocation of disk space to less than 100 percent, and if you are entering it for one of the first 15 partitions on the table, then the cursor will move down to the partition name position of the next partition (whether this partition has been established yet or not). Additionally, the "Total Allocation" figures will display the amount of "unallocated" space (in both

percentages and kilobytes) in reverse video. The screen will appear in the form of the following partial display:

```
   PartitionName      Operating System Name    Percentage   Kilobytes
   --------------     ---------------------    ----------   ---------
1. DATABASE           CPM                      50%          5000
2. CPM                CPM                      20%          2000
3. _
4.
\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/
15.
16.
Total Utilization (Allocated/unallocated)      70/30     7000/3000
Default boot partition number: _


     Minimum allocation = 2%
```

NOTE: You can exit from PART with part of your disk unallocated.

Error Conditions

PART will monitor the percentages you enter for each partition, and dynamically lower any percentage you enter if it would have brought the total allocation to more than 100 percent of disk space. Thus PART will never allow you to allocate more than 100 percent of your Winchester disk space, and the displayed percentages will never total more than 100.

PART keeps the total allocation percentages at or below 100 percent by subtracting percentage points from partitions, starting with the partitions at the bottom of the table. In cases of extreme over allocation, PART might even reduce the allocation percentages of some partitions to zero percent.

The minimum possible allocation percentage, which differs depending on the kind of Winchester disk you have purchased, is displayed at the bottom of the screen whenever you are in position to enter an allocation percentage. If you enter an allocation percentage lower than the minimum limit for your Winchester disk, PART will automatically convert this percentage to zero percent.

Whenever the percentage of a partition is zero percent, PART will prevent you from exiting until you have changed this percentage to a value at or above the minimum percentage allowed for your own particular Winchester disk.

If you try to enter a non-numeric character, a fractional or decimal point number, or a number greater than 100, then the terminal will beep and the cursor will remain at the percentage position. Then you can enter a valid number.

You can exit from PART after allocating less than 100 percent of the disk space to partitions. The unallocated space on your Winchester disk will be inaccessible until you use either the PART utility or the PREP utility.

2.6.2 Bypassing the Percentage

When the cursor moves to the first digit of an existing "Percentage" (of Winchester disk space allocation), you can skip ahead to the partition name of the next partition, or skip ahead to the default boot partition number.

Entry Rules

To retain the percentage that is currently displayed for a partition and skip ahead to another partition feature, press the RETURN key only.

Resulting Displays

The displays that result after you have bypassed a percentage entry are similar in form to those that appear when you enter a number, although the percentage of the partition for which you just made the entry will not change.

The cursor will move to the partition name position for the next partition, unless you have just bypassed the percentage for the 16th partition in the table, in which case the cursor will move down to the default boot partition position.

Error Conditions

If you bypass the percentage feature for a newly established partition (by specifying no number and pressing the RETURN key), then PART will display "0%" for this partition. Additionally, the "allocation error" message will appear in reverse video when the operations menu reappears. Furthermore, you will be prevented from exiting from PART until you correct the partition table so that no partitions are allocated "0%" of the disk space.

2.7 DEFAULT BOOT PARTITION NUMBER

After you have either chosen the "Modify default boot partition" operation or finished a "Partition maintenance" operation, the cursor will move to the default boot partition position. The current default boot partition number and names will vanish from the display.

2.7.1 Selecting a Default Boot Partition

When the cursor moves to the default boot partition position, you can select a different partition to be accessed during bootup.

The default boot partition position is at the right side of the "Default boot partition number:" message. When the cursor moves to this position, the number and names of the current default boot partition vanish from the display, and the "Enter the number of the new default boot partition." message appears at the bottom of the screen.

Entry Rules

To establish a default boot partition, you must enter the **number of an established partition** and press RETURN.

This number must be in the range 1-16. It must be listed in the table to the left of an established partition name. The number, partition name, and system name of the partition you specified by number will be displayed between angle brackets.

Resulting Display

If you enter **3** as your default boot partition number, and if line 3 on your partition table looks like the following:

```
3. WORD/PROCESSING    CPM                    15%          1500
```

then part of the display showing your new default boot partition number will appear as follows:

```
   Partition Name     Operating System Name    Percentage    Kilobytes
   --------------     ---------------------    ----------    ---------
1. DATABASE           CPM                      30%           3000
2. SPREAD-SHEET       CPM                      30%           3000
3. WORD/PROCESSING    CPM                      15%           1500
4. BASIC              Z-DOS                    25%           2500
5.
/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\
15.
16.
Total Utilization (Allocated/unallocated)      100/0         10000/0
Default boot partition number: 3 <WORD/PROCESSING;CPM           >
     B - Modify default boot partition
     P - Partition maintenance
     R - Restore to original partitions
     E - Exit
Choose desired option. <B, P, R or E>
```

NOTE: The operations menu is displayed beneath the default boot partition number as soon as you make an entry for this feature. Refer to "2.8 Entering Choice of Operation" for instructions on using this menu at this stage of the program.

Error Conditions

If you try to enter a number (in the 1-16 range) for which there is no established partition on the table, the invalid number will vanish and the cursor will remain at the number position until you enter a valid number and press RETURN.

If you try to enter a number that is out of the 1-16 range, the computer beeps and the cursor remains at the number position until you enter a valid number and press RETURN.

2.7.2 Bypassing the Default Boot Partition

When the cursor moves to the default boot partition number, you can retain the current default boot partition, and advance to the PART operations menu.

Entry Rules

To bypass changing the default boot partition feature, press only the ***RETURN*** key at this position.

Resulting Display

The number and names of the current default boot partition will be redisplayed, and the cursor will move to the "Choose desired option" prompt beneath the operations menu, as shown:

```
\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\
15.
16.
Total Utilization (Allocated/unallocated)       100/0          10000/0
Default boot partition number: 1 <DATABASE;CPM                    >
     B - Modify default boot partition
     P - Partition maintenance
     R - Restore to original partitions
     E - Exit
Choose desired option. <B, P, R or E> _
```

Refer to "2.8 Entering Choice of Operation" for instructions on using the operations menu at this stage of the PART utility.

Error Condition

If you have caused the default boot partition feature to become undefined by removing a partition from the table (as explained in "2.4.3 Removing a Partition"), and then bypass the default boot partition, you will still encounter the "boot partition error" message, as shown in the following partial display:

```
/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/
15.
16.
Total Utilization (Allocated/unallocated)      100/0        10000/0
Default boot partition number: is undefined
boot partition error
     B - Modify default boot partition
     P - Partition maintenance
     R - Restore to original partitions
Choose desired option. <B, P or R>_
```

Furthermore, you will not be able to exit from PART until you either enter the number of an existing partition or remove the default boot partition.

2.7.3 Removing the Default Boot Partition

When the cursor moves to the default boot partition number, you can remove this feature altogether and advance to a PART operations menu.

Entry Rules

To remove the default boot partition, press the **space bar** only.

Resulting Display

The "is undefined" message will be displayed at the default boot partition position. However, you will not encounter the "boot partition error" message. Additionally, the operations menu and prompt appear, as shown in the following partial display:

```
/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\
15.
16.
Total Utilization (Allocated/unallocated)      100/0         10000/0
Default boot partition number: is undefined
     B - Modify default boot partition
     P - Partition maintenance
     R - Restore to original partitions
     E - Exit
Choose desired option. <B, P, R or E> _
```

Refer to "2.8 Entering Choice of Operation" for instructions on using the operations menu at this stage of the PART utility.

NOTE: If you remove the default boot partition, you will have to enter bootup commands that specify partition names (and possibly also operating system names) in order to boot up with any partition.

2.8 ENTERING CHOICE OF OPERATION

After you completed a PART operation (such as "Modify default boot partition" or "Partition maintenance"), the operations menu will appear.

This menu is the same as the menu explained in "2.3 Choice of Operation", with the addition of the "R – Restore to original partitions" operation.

NOTE: If you have encountered an error condition, the "E – Exit" operation might not be displayed. Therefore you must choose one of the operations that enables you to change partition features, and correct the error condition before PART will allow the "E – Exit" operation.

2.8.1 Choosing to Modify Default Boot Partition

The partition that is selected as the default boot partition is the partition that will be automatically accessed when you type a bootup command without specifying a partition name.

Entry Rules

Type **B** at this prompt to select a default boot partition.

Resulting Display

After typing the B entry to "Modify default boot partition", the activities menu and prompt will be replaced by the "Enter number of new default boot partition" prompt. Additionally, the number and names of the current default boot partition will be replaced by the cursor on the display line beneath the table.

When a display in this form appears, refer back to "2.7 Default Boot Partition Number" for further instructions.

2.8.2 Choosing Partition Maintenance

The "Partition Maintenance" operation leads you to add partitions, and/or change the percentage of space allocated to partitions. Then this activity also prompts you to select a default boot partition.

Entry Rules

Type **P** at this prompt to begin changing the arrangement of partitions.

Resulting Display

When you choose the "Partition maintenance" operation, the cursor moves to the beginning of the first partition name in the table and the operations menu is replaced by a "Minimum allocation" message at the bottom of the display.

When a display in this form appears, refer back to "2.4 Partition Name".

2.8.3 Restoring Partition Features

When the cursor moves to the "Choose desired option." prompt, you can end the PART session, rearrange your partitions starting either with your most recent entries or with the partition features set as they appeared when you invoked PART, or reselect a default boot partition starting either with your most recent entries or with the default boot partition that was set when you invoked PART.

Entry Rules

Type **R** if you want each partition feature to revert to its status at the time you invoked the PART utility.

Resulting Display

When you choose the "R – Restore to original partitions" operation, PART will redisplay the operations menu without the "R – Restore to original partitions" option. The partition table will show the names, allocations, and default boot partitions that were already established when you invoked PART, as shown in the following display:

```
   Partition Name     Operating System Name    Percentage    Kilobytes
   --------------     ---------------------    ----------    ---------
 1. Z-DOS             Z-DOS                     50%           5000
 2. CPM               CPM                       50%           5000
 3.
 4.
 5.
 6.
 7.
 8.
 9.
10.
11.
12.
13.
14.
15.
16.
Total Utilization (Allocated/unallocated)      100/0         10000/0
Default boot partition number: 1   <Z-DOS;Z-DOS                 >

     B - Modify default boot partition
     P - Partition maintenance
     E - Exit
Choose desired option. <B, P or E> _
```

NOTE: This display is identical to the display presented in "2.3 Choice of Operation".

Error Conditions

If you enter a character other than B, P, R, or E, PART will cause the computer to beep and the cursor to remain at the end of the prompt until you enter a valid letter.

2.8.4 Beginning the Exit Operation

When you exit from the PART operation after changing any partition features (through the "Modify default boot partition" or "Partition maintenance" operations), you will have to choose this operation and then make an entry at another menu.

Entry Rules

Type **E** if you wish to exit from the PART utility.

Resulting Display

When you choose the "E – Exit" operation, the following exit menu and prompt will be displayed at the bottom of the screen:

```
M - Make changes and exit
A - Abort, make no changes and exit

Choose desired option. <M or A> _
```

Error Conditions

If you enter a character other than B, P, R, or E, PART will cause the computer to beep and the cursor to remain at the end of the prompt until you enter a valid letter.

2.9 CHOICE OF EXIT METHODS

When you choose the "E – Exit" operation after changing partition features, the final exiting menu appears.

CAUTION: Before typing an entry at this menu, review the partition table carefully to be certain that your partitions are allocated as you want them. Remember that any rearrangement of partitions can destroy data on the Winchester disk, and that no changes are actually made to the Winchester disk until you enter the M option.

NOTE: Regardless of the exit method you choose, you will have to enter ***CTRL-RESET*** and reboot the system after exiting from PART.

2.9.1 Making Changes to the Winchester Disk

When the cursor moves to the prompt beneath the final exit menu, you can change the partition features according to your entries while exiting from PART.

Entry Rules

Type **M** if you want to exit from the PART utility and change the status of Winchester disk partition features to reflect the changes that you entered during this PART session.

CAUTION: This entry has the potential to destroy any data that might exist on the Winchester disk.

Resulting Display

After you choose and enter the "Make changes" option the Z-DOS system prompt will appear, as shown:

```
A:
```

Error Conditions

If you enter a character other than M or A, PART will cause the computer to beep and the cursor to remain at the end of the prompt until you enter a valid letter.

2.9.2 Aborting Changes to the Winchester Disk

When the cursor moves to the prompt beneath the final exit menu, you can nullify all of the changes you have entered while exiting from PART.

Entry Rules

Type **A** if you want to end this PART session without any changes to the Winchester disk.

Resulting Display

After you choose and enter the "Abort" option, the Z-DOS system prompt will appear, as shown:

```
A:
```

NOTE: Each partition feature will revert to the status it maintained before you invoked the PART utility. Any and all changes you may have entered during this PART session will be nullified, as if you had not even invoked PART.

Error Conditions

If you enter a character other than M or A, PART will cause the computer to beep and the cursor to remain at the end of the prompt until you enter a valid letter.

3 The Superblock

NOTE: Information concerning the superblock is not essential for use of the PART utility or the Winchester disk. This information is provided for users who wish to obtain a deeper understanding of some of the activities that PART performs in order to partition a Winchester disk.

Winchester disk space is allocated according to information contained within a unit of software that is stored on a reserved area of the Winchester disk. This unit of software is called the "superblock".

The superblock is a unit of Winchester support software that enables you to access specific partitions. The superblock is initially recorded on your disk when you use the PREP utility.

The superblock is also recorded on Winchester disks obtained from Zenith Data Systems or Heath — whether or not you use the PREP utility.

To insure the integrity of the superblock information, two copies of the superblock are recorded on the disk. These copies are named "Superblock A" (the copy used in most cases) and "Superblock B" (a backup copy used only when Superblock A is unusable).

After you use PART to change partitioning features (such as partition name, system name, allocation percentage, and default boot partition), PART updates both copies of the superblock and other Winchester support software units. Other Winchester support software units are explained in the text entitled "5 The Reserved Winchester Area" under "PREP".

The information within each copy of the superblock resembles the information shown on the partition table that is displayed when you use the PART utility. The superblock is structured as shown in Table 4-1.

	16 bytes	10 bytes	1 byte	3 bytes
1.	Partition Name	System Name	flag	Start Sector
2.	Partition Name	System Name	flag	Start Sector
3.	Partition Name	System Name	flag	Start Sector
4.	Partition Name	System Name	flag	Start Sector
5.	Partition Name	System Name	flag	Start Sector
6.	Partition Name	System Name	flag	Start Sector
7.	Partition Name	System Name	flag	Start Sector
8.	Partition Name	System Name	flag	Start Sector
9.	Partition Name	System Name	flag	Start Sector
10.	Partition Name	System Name	flag	Start Sector
11.	Partition Name	System Name	flag	Start Sector
12.	Partition Name	System Name	flag	Start Sector
13.	Partition Name	System Name	flag	Start Sector
14.	Partition Name	System Name	flag	Start Sector
15.	Partition Name	System Name	flag	Start Sector
16.	Partition Name	System Name	flag	Start Sector
17.	blanks	blanks	blanks	Start Sector
	16 bytes	10 bytes	1 byte	3 bytes

Table 4-1
Superblock Structure

NOTE: The superblock does not include all of the software necessary to facilitate Winchester disk access. Other Winchester support software, used for Winchester bootup and isolation of unusable disk media, are explained in the text entitled "5 The Reserved Winchester Area" under "PREP".

3.1 THE START SECTOR

The structure of the superblock is similar to the layout of the partition table that is displayed while you are using PART. For each partition, it contains a partition name (1–16 characters) and an operating system name (1–10 characters).

However, in undating the superblock, PART converts the allocation percentages that you entered into a different kind of statistic that can be used during partition access to determine where a partition begins and ends. PART converts the percentage value into the number of the start sector number of each partition.

Although you can establish only 16 partitions on the Winchester disk, there are 17 partition entries defined in the superblock. The size of each partition is determined by the difference between the "Start Sector" values of adjacent partitions.

It is necessary to define a 17th partition so that the size of the 16th partition (if established by the user) can be calculated by subtracting the start sector value of the 16th partition from the start sector value of the 17th partition.

The partition preceding the first partition that has spaces (20H) entered for its partition name will be considered to be the last usable partition defined in the table. The start sector of this partition will be one greater than the last sector allocated. The partition name entry for the 17th partition is always spaces.

3.2 THE FLAG BYTE

Partitions are also labeled with a flag byte.

The flag byte contains special information about the partition. For this version of the PART utility, only the high order bit is defined. This bit is set to one whenever PREP is run, or whenever PART is run with PART changes being made. The operating system that is eventually recorded on the disk can reset this byte when the system's formatting utility is run on the partition.

The FORMAT utility supplied with this version of CP/M-85 does not use or set this flag byte.

3.3 DISK SPACE CALCULATION

The PART utility allocates portions of Winchester disk space using 512-byte sectors as the primary unit of measure, and converts the quantities of sectors (512-byte units) into kilobytes (1024-byte units) for the totals displayed on the screen. PART determines how much space to allocate by performing the following internal operations in sequence:

1. observing the total size of the Winchester disk being used,
2. monitoring the percentages you enter,
3. calculating the number of sectors that is closest to this percentage,
4. converting sectors to kilobytes, and
5. displaying this kilobyte quantity on the screen.

Thus the amount of disk space that is actually allocated will not always be exactly equal to the percentage you entered, but rounded to the nearest kilobyte.

If you enter an allocation percentage that is greater than the remaining space percentage on the disk, then PART will calculate the number of kilobytes of space remaining on the disk, calculate this amount to the nearest one percent, and display this remaining percentage instead of the percentage that you tried to enter.

Because of PART's rounding of space portions to the nearest percentage, the percentages allocated to your partitions might not always add up to exactly 100 percent when the disk is full. Furthermore, this rounding can also cause partitions that were divided into equal percentages to have slightly unequal kilobyte capacities.

3.4 VERIFYING THE SUPERBLOCK

PART updates information in Superblock A and Superblock B at the locations where these superblock copies were initially recorded (by the PREP utility). By spacing these two copies of the superblock several sectors apart, PART decreases the chance that both copies could be damaged simultaneously.

A checking code called a "checksum" is calculated by PART for each of the copies of the superblock before PART records these superblock copies on the Winchester disk. The results of these checksums are recorded in a data structure known as the Software Boot Code (see text entitled "5 The Reserved Winchester Area" under "PREP").

Then, when execution of either PART or PREP is repeated on the same Winchester disk, the utility first performs checksums to verify that the superblocks have not changed since the original checksums were performed.

If the PART utility encounters difficulty in reading Superblock A, or if the results of the second checksum of Superblock A differ from the results of the original checksum, then PART tries to read Superblock B.

If the PART utility encounters difficulty in reading Superblock B, or if the results of the second checksum of Superblock B differ from the results of the original checksum, then PART will display an error message.

4 PART Error Messages

```
Allocation error
```

You have established one or more partitions that are presently allocated zero percent of the disk. (PART might have subtracted from the original amount of space you allocated to these partitions when you allocated too much space to other partitions.) You must repeat the "Partition maintenance" operation and change allocation percentages of one or more partitions to conform with percentage entry rules (see "2.6 Allocation Percentage").

```
Boot Partition error
```

You have removed the default boot partition from the table during a "Partition maintenance" operation. You can either replace this partition through the "Partition maintenance" operation, or select valid default boot partition through the "Modify default boot partition" or "Partition maintenance" operation.

```
Duplicate Names error
```

You have established more than one partition with both the same partition name or the same operating system name. You must change at least one of the names of one of these partitions through the "Partition maintenance" operation.

NOTE: The above three error messages can appear in a series if more than one error condition exists at the same time. The form of these series error messages can be:

```
Allocation and Boot Partition error
Allocation and Duplicate Names error
Boot Partition and Duplicate Names error
Allocation and Boot Partition and Duplicate Names error
```

All such error messages are displayed in reverse video, between the default boot partition position and the operations menu.

The conditions that produce any of these error messages will also prevent you from exiting from the PART utility until you have corrected the errant condition(s).

```
Unable to communicate with the Z-217 controller
```

The PART utility was unsuccessful in an attempt to access the Z-217 controller, which controls the Winchester disk. This problem could indicate that the Z-217 controller is not firmly plugged into the S-100 bus, the drive cable connectors are not securely fastened, or that the controller has a hardware malfunction. Check to see that the controller card and all cable connectors are secure. Then run PREP and PART in sequence. If this error occurs after repeated attempts to run PREP and PART, contact Zenith Data Systems Technical Consultation for assistance.

```
Z-217 controller error on Set Drive Parameters command
```

One or more responses to the five drive characteristic questions were not valid for the particular drive connected. A malfunction of the Z-217 controller is also possible. Recheck the characteristics of your drive. Then run PREP and PART in sequence. If this error occurs after repeated attempts to run PREP and PART, contact Zenith Data Systems Technical Consultation for assistance.

```
Error - unable to re-write tables
```

PART is unable to record changes to the superblock after you have specified changes to the partition table and exited from PART. PART might succeed in recording some of the changed superblock information over the old superblock before this error message occurs, leaving portions of new and old superblocks on your Winchester disk. Therefore, you should use the PREP utility and then repeat the PART utility.

```
Unable to read superblock/SBC, disk unusable
```

PART either unsuccessful in reading information stored in the existing software boot code, or successfully read the software boot code and detected a checksum error. Use the PREP utility and then repeat the PART utility.

```
Fatal Error -- Can not read superblock B.
```

A bad sector error has occurred in the backup copy of the superblock (Superblock B). Try to run the PREP utilities on the disk in sequence. If repeated attempts to use PREP and PART fail, then contact Zenith Data Systems Technical Consultation for assistance.

PREP

The Utility that Initializes a Winchester Disk

The PREP utility prepares the magnetic surface of many different types of Winchester disk for use as mass storage devices in a Z-100 environment. The PREP utility is seldom (if ever) needed by most users.

The PREP utility is recorded on the Winchester Utility Disk, which is shipped with your Winchester disk hardware documentation. Although this disk runs under the Z-DOS Operating System, you can boot up with it — just as you would with a bootable CP/M-85 disk.

CAUTION: Using PREP will destroy all software and/or data stored on your Winchester disk. Do not use PREP until you have transferred your Winchester disk files to floppy disks. Winchester disks supplied by Zenith Data Systems or Heath have already been prepared by PREP before they are shipped. Therefore, users of these disks will need to use PREP only if they are consistently encountering an unreasonable number of disk access errors, and cannot correct this problem with the VERIFY utility.

NOTE: Before you use the PREP utility, a hardware component called a "jumper" must be installed at the "format enable" location on your Z-217 Winchester disk drive controller card. This jumper is already installed (although unused) at a different location on your Z-217 controller card when the card is shipped. Therefore, before you can use the PREP utility, you must move the jumper to the "format enable" location. This procedure is explained under the heading "PREP Hardware Adjustments" of the text on PREP.

After you use the PREP utility, you will have to reset and reboot the system with a bootable floppy disk.

Additionally, you should remove the jumper from the format enable location on the Z-217 controller card between the time you finish using PREP and the time you perform routine activities that involve data storage on the Winchester disk.

WARNING: Unplug your computer from its power source before touching any hardware component within the computer's cabinet.

1 Winchester Disk Features

"Winchester disks" come in a variety of sizes and configurations, but they all have common features. The central feature and core of a Winchester disk device is a rigid platter. The typical platter consists of a non-magnetic metal (generally aluminum) disk, coated with a thin plating of ferric oxide or cobalt. This platter itself is the Winchester disk, as opposed to the floppy disk, which has a plastic (usually mylar) core with a thin coating of a similar magnetic substrate.

1.1 PLATTERS

Winchester disk platters are generally sealed to prevent particulate matter from the environment (such as dust, smoke, dirt, or hair) from contaminating a platter's surface or read/write head. Winchester disks are available in a variety of sizes and with one or more platters. Winchester disks can be either "fixed" or "removable". The fixed disk is permanently mounted inside the device, but removable Winchester disks come in disk packs or cartridges and may be removed or interchanged.

1.2 READ/WRITE HEADS

The read/write heads are electromagnets that slide back and forth a fraction of an inch above the surface of Winchester disk platters. The movement of a Winchester disk drive's read/write heads between the hub of the platters and the edge of the platters is called "stepping". Therefore, this movement is measured by an amount known as the "step rate".

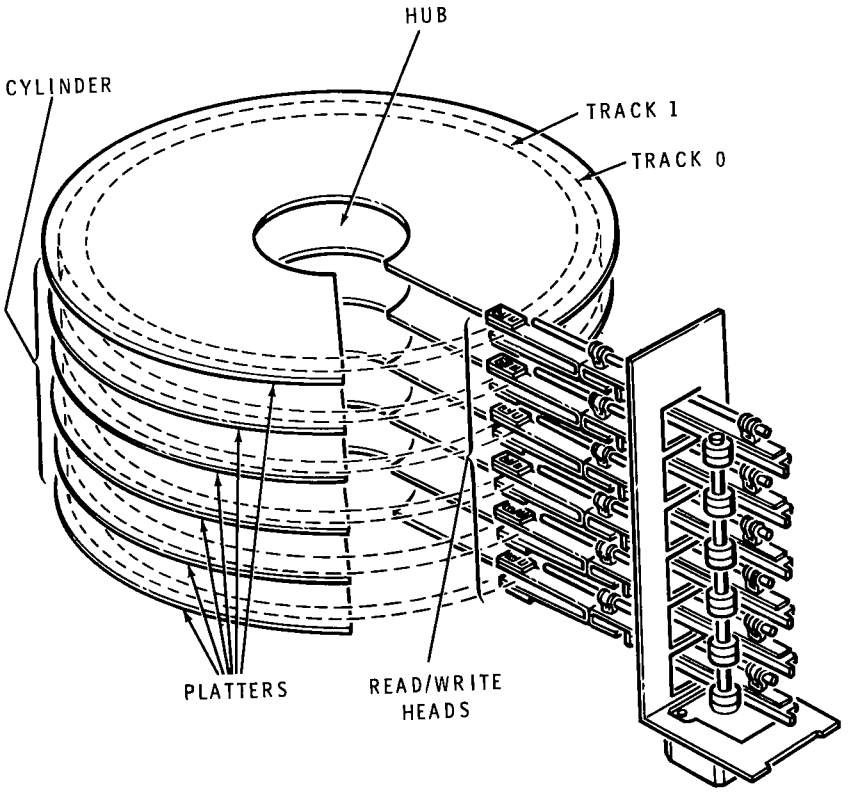

Figure 4-1
Winchester Disk Components

1.3 LOGICAL WINCHESTER DISK DIVISIONS

Winchester disks that are supplied by Zenith Data Systems and Heath can be divided into several logical subunits called "partitions". This is partly because large quantities of storage locations are easier to deal with if they are subdivided. The various subdivisions help speed storage and retrieval of data.

1.4 SECTORS

A "sector" is the basic unit of data organization for disk drive devices. Like floppy disks, Winchester disks are divided into sectors. Winchester disk sectors under CP/M-85 are 512 bytes long.

1.5 TRACKS AND CYLINDERS

Each recording surface of a Winchester disk platter is also divided into concentric rings called "tracks", which are similar to the tracks of a floppy disk. The Winchester disks initialized by PREP are formatted with 18 sectors per track. A further division of a Winchester disks storage area is the cylinder (see Figure 4-1). A "cylinder" is a collection of all tracks that are located the same distance from the outer edge of each recording surface. Winchester disk read/write heads can access all of the data stored on a particular cylinder without any stepping movement.

For example, if a Winchester disk drive has four read/write heads, the drive can access a cylinder of 72 sectors (4 tracks times 18 sectors) without stepping (moving the heads). This amounts to a total of 36864 bytes (36 kilobytes) being read or written.

2 Invoking PREP

Invoke PREP by entering the following command at the Z-DOS system prompt:

A: **PREP *RETURN***

When you invoke PREP, the following display appears:

```
                    PREP version 1.00
          Copyright (C) 1982, Zenith Data Systems

The PREP utility helps you to:

  * initialize surface of Winchester disk
  * test data retention capabilities of Winchester disk media
  * isolate questionable disk sectors
  * divide the surface of Winchester disk into two partitions
    of equal size (one Z-DOS partition and one CP/M partition)

PREP may prompt you to specify five Winchester disk characteristics in
order to identify the type of Winchester disk you have installed.
Then PREP displays messages as it operates on the disk.

Caution:  Using PREP can destroy all files on your Winchester disk.
Winchester disks supplied by Zenith or Heath are prepared by PREP
before they are shipped. Users of these disks will use PREP only
after consistently encountering an unreasonable number of disk access
errors. Do not use PREP until you have transferred backup copies of
your Winchester disk files to floppy disks.

Do you wish to proceed with PREP (Y/N)?
```

Typing an **N** at this prompt ends the PREP utility and returns you to the system prompt.

Typing a **Y** causes PREP to display the following prompt:

```
Please type P to proceed
```

Typing any response other than P ends the PREP utility and returns you to the system prompt.

3 Responding to Disk Characteristic Prompts

Typing **P** at the "Please type P to proceed" prompt causes PREP to continue operation.

If the disk has been previously prepared by PREP and no errors are found in the first sector of the boot code (see the text entitled "5 The Reserved Winchester Area"), PREP skips these disk characteristic prompts, assumes the disk surface has been previously initialized, and proceeds immediately to disk initialization (see the text entitled "4.1 Initializing the Disk").

If the disk has not been prepared with PREP, or if there is an error found in the first sector of the boot code (see "5 The Reserved Winchester Area"), then the following five disk characteristic prompts will appear in sequence:

```
Enter number of heads in hex:
Enter number of cylinders in hex:
Enter reduced write current cylinder in hex:
Enter pre-comp cylinder in hex:
Enter step rate code in hex:
```

The significance of each of these disk characteristic prompts is explained here.

```
Enter number of heads in hex:
```

At this prompt, type a hexadecimal value for the number of read/write heads contained in the drive you are preparing. Then press ***RETURN***.

```
Enter number of cylinders in hex:
```

At this prompt, type the hexadecimal value of the number of cylinders contained in the drive you are preparing. Then press ***RETURN***.

For disks with floating read/write heads, this number would be equal to the total number of tracks divided by the total number of read/write heads. For disks with fixed read/write heads, this number would be equal to the total number of tracks divided by the total number of usable platter surfaces.

```
Enter reduced write current cylinder in hex:
```

At this prompt, type the hexadecimal value for the location of the first cylinder at which read/write head current must be reduced. Then press ***RETURN***.

Toward the hub of the platters, where the circumference of each cylinder is smaller, data storage sectors are recorded closer together than the sectors on cylinders near the edge of the platters. Therefore, some Winchester disk drives reduce the electrical current sent to the read/write head when they write data on cylinders that are close to the hub of the disk platters. This reduction of current helps to prevent magnetic interference between the data sectors that are recorded extremely close together.

```
Enter pre-comp cylinder in hex:
```

At this prompt, enter the hexadecimal value for the number of the first cylinder at which write precompensation must take place. Then press ***RETURN***.

On the cylinders located close to the hub of a Winchester disk, where data is recorded at extremely high density, bit shift can occur. "Bit shift" is a phenomenon where the data bits written at a particular location spread apart slightly on the media after they have been written. Bit shift is most likely to occur when similar bits are written close together. The "pre-comp" (write precompensation) characteristic compensates for bit shift by writing some bits earlier or later that the normal rate of data writing. Precompensation for Winchester disks causes a slight deviation (about 12 nanoseconds for every 100 nanoseconds) from the normal rate of data writing during the writing of bits that are apt to shift.

```
Enter step rate code in hex:
```

At this prompt, you should enter the hexadecimal value code that indicates the rate at which the read/write heads step between tracks. Then press ***RETURN***.

After you respond to the "step rate code" prompt, PREP will automatically begin to perform its three operations (see "4 PREP Operations") in sequence.

The PREP utility is capable of preparing a wide variety of Winchester disks for data storage. Table 4-2 lists several different Winchester disks available in the microcomputer market and indicates the hexadecimal values you should enter to prepare each disk when prompted by PART for a specific disk characteristic.

The labels for the columns of numbers in Table 4-2 correspond to PREP characteristic prompts. If the model number of your Winchester disk is listed in the left-hand column of the table, then enter the numbers listed in the right-hand columns in sequence as the characteristic prompts are displayed.

According to Table 4-2, if you have a Miniscribe Mod II 2012 Winchester disk drive, you should respond to the drive characteristic prompts as follows:

```
Enter number of heads in hex: 4 RETURN
Enter number of cylinders in hex: 132 RETURN
Enter reduced write current cylinder in hex: 200 RETURN
Enter pre-comp cylinder in hex: 80 RETURN
Enter steprate code in hex: 1 RETURN
```

Drive Model	Total Heads	Total Cylinders	Reduced Current Cylinder	Write Pre-comp Cylinder	Step Rate Code
Seagate					
ST-406	2	132	200	80	1
ST-412	4	132	200	80	1
ST-419	6	132	200	80	1
ST-506	4	99	80	40	96
ST-706	2	132	200	80	1
Miniscribe					
Mod II 2012	4	132	200	80	1
Mod III 3012	2	264	300	80	1
Mod IV 4020	4	1E0	200	80	1
IMI					
5006H	2	132	200	D6	1
5012H	4	132	200	D6	1
5018H	6	132	200	D6	1
Tandon					
TM 602S	4	99	80	40	96
TM 603S	6	99	80	40	96

Table 4-2
Responses to PREP Characteristic Prompts

4 PREP Operations

PREP begins to prepare the surface of your Winchester disk either after displaying the initial screen messages or after you respond to the five disk characteristic prompts. PREP prepares the disk by performing three operations in sequence: Initializing the Disk, Testing the Disk Media, and Initializing the Reserved Winchester Area.

4.1 INITIALIZING THE DISK

After you have responded to the disk characteristic prompts, PREP initializes the surface of the disk for the test that will follow. While this occurs, you will see the message:

```
Initializing the disk...
```

This initialization is similar to FORMAT in that it magnetically records a map of all sectors on the disk surface. When the surface has been initialized, the message shows:

```
Initializing the disk...completed
```

and then PREP begins testing the disk media.

NOTE: If your Winchester disk hardware has not been properly adjusted, the following message will be displayed instead of the "Initializing the disk..." message:

```
Error during formatting of the drive.
```

If this message appears, you must now perform a hardware adjustment as explained in the text entitled "6 PREP Hardware Adjustments".

4.2 TESTING THE DISK MEDIA

PREP performs seven test passes to check the integrity of the disk's storage capability. During each pass, PREP writes a predetermined code to each sector (the drive light will flicker) and then reads back that code to verify that it remained correct (the drive light will appear as constantly on). PREP keeps you informed of its progress by displaying the message:

```
Media test in progress, pass n
```

Where n is the number (in the range 1-7) of the pass that it is currently conducting.

Be patient. This PREP operation can take from 45 to 90 minutes because of the large number of sectors that PREP must test.

PREP uses a different code on each pass it makes through the test. If PREP finds sectors containing unusable media, it stores the address of these sectors, and later places these sector addresses into a bad sector table.

4.3 INITIALIZING THE RESERVED WINCHESTER AREA

After completing the media tests, PREP records and verifies the Reserved Winchester Area (see "5 The Reserved Winchester Area") on the first several sectors of the Winchester disk. During this operation, PREP displays the following message:

```
Initializing the disk...
```

If PREP adds the word completed to the end of this display, and displays the system prompt, then all PREP operations are complete. The display should appear as follows:

```
Initializing the disk...completed

A:
```

Then you should reset the system and boot up with a bootable floppy disk. If you wish to use the PART utility immediately, then boot up with a copy of the Winchester Utility Disk. If you wish to perform any other operation, then boot up with a floppy disk.

NOTE: You will not be able to access any partition after using PREP until you reset the system and boot up with a bootable floppy disk.

CAUTION: After using PREP, you should remove a hardware component called a jumper from the "format enable" location on the Z-217 Winchester Disk Controller Board. Refer to the text entitled "6 PREP Hardware Adjustments" for instructions on removing this component. This procedure will help to protect the data on your Winchester disk from being destroyed accidentally.

5 The Reserved Winchester Area

NOTE: Information concerning the Reserved Winchester Area is not essential for use of the PREP utility or the Winchester disk. This information is provided for users who wish to obtain a deeper understanding of the operations that PREP performs in order to prepare a Winchester disk.

When the PREP utility is run, it records units of Winchester support software on the first 36 usable sectors of the Winchester disk. These software units are collectively known as the Reserved Winchester Area. They are recorded on the Winchester disk during PREP's reserved area initialization operation (see 4.3 Initializing the Reserved Winchester Area). These software units are arranged as shown in Table 4-3.

SECTORS USED	WINCHESTER SUPPORT SOFTWARE UNITS
5	Software Boot Code (SBC)
1	Superblock A
1	Bad Sector Table A
11	blank
1	Superblock B
1	Bad Sector Table B
16	blank
36	TOTAL RESERVED WINCHESTER AREA

Table 4-3
Winchester Support Software Units
within Reserved Winchester Area

The most important Winchester support software units listed in Table 4-3 are the software boot code, the superblocks, and the bad sector tables.

These units are vital to you during Winchester bootup because they help you to access a particular partition after you access the Winchester disk itself. Users of CP/M-85 with the Winchester disk also use these data structures to make unusable media (bad sectors) inaccessible before FORMAT is run.

The blanks inserted between the "A" copies of the superblock and bad sector table and the "B" copies of these units help to decrease the chance that all important Winchester support software units could be damaged simultaneously.

If you must access any part of the reserved Winchester area, you can determine the location of the Winchester support software units by examining the pointers in the software boot code. The software boot code will begin at sector zero regardless of the location of the other software units.

5.1 THE SOFTWARE BOOT CODE (SBC)

The "software boot code" (SBC) is a Winchester support unit that helps locate the partition to be booted after entry of a Winchester disk bootup command. The SBC also helps you to avoid bad sectors during disk access by referring to a bad sector table.

PREP records the SBC on the first 5 sectors of the Winchester disk during initialization of the reserved Winchester area (see "4.3 Initializing the Reserved Winchester Area").

5.1.1 Role of SBC During Bootup

When you enter a Winchester disk bootup command (see "Bootup with a Winchester Disk"), the computer will load the SBC into Random Access Memory (RAM).

Once within RAM, the SBC begins to access a partition. The partition that is accessed is determined either by a bootstring or a default boot partition. A bootstring can be specified by the user during bootup. A default boot partition is stored in a fixed location within the SBC (see the text entitled "5.1.2 SBC Entries").

In order to access a partition, the SBC must match the specified bootstring or default boot partition with a partition that exists in the superblock's table of partitions (see the text entitled "5.2 The Superblock").

When the SBC finds a partition that matches the specified bootstring or default boot partition, the SBC loads the first 32 sectors of that partition into RAM. If the accessed partition contains CP/M-85, then the CP/M-85 boot loader program will begin to execute the remainder of the bootup operation.

5.1.2 SBC Entries

The entries included in the first 128 bytes of the SBC are described in Table 4-4.

BYTES	SBC ENTRIES
3	System bytes
1	PART/SBC version number (Used to synchronize different releases of software)
1	PART/SBC revision number (Used to synchronize different releases of software)
27	Default bootstring (16 bytes define the partition name, one byte defines the semicolon, and 10 bytes define the operating system name)
3	Beginning sector address of bad sector table A
3	Beginning sector address of bad sector table B
3	Beginning sector address of superblock A
3	Beginning sector address of superblock B
2	Sector size (512 bytes per sector)
2	Sectors per track (18)
6	Reserved for future expansion
3	Number of sectors on entire Winchester disk
1	Reserved for future expansion
2	Checksum for superblock copy A
2	Checksum for superblock copy B
2	Checksum for bad sector table copy A
2	Checksum for bad sector table copy B
12	Set drive for Z-217 controller
3	Address of first user sector (first sector beyond Reserved Winchester Area)
6	Date partitioned, or default date, when PART is run (When PREP is run, the value 00 is used for each byte.)
2	Checksum of SBC (assuming initial value is zero)
39	Reserved for future expansion
128	FIRST QUARTER-SECTOR OF SBC

Table 4-4
Software Boot Code Entries

The format for each three-byte sector number is low, middle, high byte.

NOTE: Table 4-4 describes one quarter-sector of the five-sector SBC. The rest of the SBC consists of the assembly instructions that lead to the actual access of the specified partition.

5.1.3 SBC Verification

A checking code called a "checksum" is calculated by PREP for the SBC before PREP records the SBC on the disk. The results of these checksums are recorded in entries within the SBC.

Then, when execution of either PART or PREP is repeated on the same Winchester disk, verification checksums are performed to verify that the SBC has not changed since the original checksums were performed.

If the SBC has changed, or if it cannot be read, then an error message will be displayed.

The SBC also contains the checksums used to verify the other Winchester support units (the superblocks and bad sector tables).

5.2 THE SUPERBLOCK

The "superblock" is a Winchester support unit that contains information about each partition on the disk. It contains the following items for each of 17 defined partitions:

- partition name
- operating system name
- flag byte (to show whether PREP or PART has been run on the disk since the last time the partition was formatted)
- address of the starting sector

5.2.1 Superblock Entries

These items occupy 30 bytes per entry. The 17 superblock entries are structured as shown in Table 4-5.

BYTES	SUPERBLOCK ENTRY
30	Entry for 1st partition (including 16-bytes partition name, 10-byte system name, 1-byte flag, and 3-byte starting sector)
30	Entry for 2nd partition (including 16-bytes partition name, 10-byte system name, 1-byte flag, and 3-byte starting sector)
30	Entry for 3rd partition (including 16-bytes partition name, 10-byte system name, 1-byte flag, and 3-byte starting sector)
.	.
.	.
.	.
30	Entry for 16th partition (including 16-bytes partition name, 10-byte system name, 1-byte flag, and 3-byte starting sector)
30	Entry for 17th partition (including 16-bytes partition name, 10-byte system name, 1-byte flag, and 3-byte starting sector)
2	Reserved for future expansion
512	TOTAL FOR EACH SUPERBLOCK

Table 4-5
Superblock Entries

NOTE: Refer to the text entitled "5.2 The Superblock" in the text on PART for a detailed explanation of the components of each superblock entry and other information concerning the superblock.

5.2.2 Superblock Verification

During initialization of the reserved Winchester area (see the text entitled "4.3 Initializing the Reserved Winchester Area"), PREP records superblock entries twice on the Winchester disk. The primary copy of the superblock, called Superblock A, is used unless some of its contents have been damaged since it was recorded. The backup copy of the superblock, called Superblock B, is used if Superblock A is damaged. Each copy is recorded several sectors apart to decrease the chance that both could be damaged simultaneously.

A checking code called a "checksum" is calculated by PREP for each superblock copy before PREP records these superblock copies on the Winchester disk. The results of these checksums are recorded in the software boot code (see "5.1 The Software Boot Code (SBC)").

Then, when execution of either PART or PREP is repeated, verification checksums are performed to verify that the superblocks have not changed since the original checksums were performed.

If Superblock A cannot be read, or if the results of the second checksum of Superblock A differ from the results of the original checksum, then the utility tries to read Superblock B.

If Superblock B cannot be read, or if the results of the second checksum of Superblock B differ from the results of the original checksum, then all partitions will be inaccessible.

5.3 THE BAD SECTOR TABLE

The "bad sector table" is an ordered list of the addresses of each sector on the disk that contains unusable media. The information in the bad sector table enables CP/M-85 to avoid bad sectors (unusable media) when it accesses a partition during your everyday activities.

The bad sector table can include the addresses of as many as 169 bad sectors. Each bad sector address is recorded in a three-byte entry. Entries that do not contain the address of a bad sector are filled with three zeroes.

5.3.1 Bad Sector Table Entries

The structure of the bad sector table is explained in Table 4-6.

During media testing (see "4.2 Testing the Disk Media"), PREP maintains a record of the location of all the bad sectors (sectors containing unusable media) that it finds on the disk. Then, during initialization of the reserved Winchester area (see "4.3 Initializing the Reserved Winchester Area"), PREP creates a table of all bad sectors and records two copies of this table on the disk.

BYTES	BAD SECTOR TABLE ENTRY
3	Address of 1st bad sector found by PREP
3	Address of 2nd bad sector found by PREP
3	Address of 3rd bad sector found by PREP
3	Address of 4th bad sector found by PREP
.	.
.	.
.	.
3	Address of 168th bad sector found by PREP
3	Address of 169th bad sector found by PREP
3	Last entry in table (always contains 000)
2	Reserved for future expansion
512	TOTAL FOR EACH BAD SECTOR TABLE

Table 4-6
Bad Sector Table Entries

5.3.2 Bad Sector Table Verification

The primary copy of the bad sector table, called Bad Sector Table A, is used unless some of its contents have been damaged since it was recorded. The backup copy of the bad sector table, called Bad Sector Table B, is used if Bad Sector Table A is damaged. Each copy is recorded several sectors apart, to decrease the chance that both could be damaged simultaneously.

A checking code called a "checksum" is calculated by PREP for each of the copies of the bad sector table before PREP records these bad sector table copies on the Winchester disk. The results of these checksums are recorded in the software boot code (see "5.1 The Software Boot Code (SBC)").

Then, when execution of PREP or PART is repeated on the same Winchester disk, verification checksums are performed to verify that the bad sector tables have not changed since the original checksums were performed.

If Bad Sector Table A cannot be read, or if the results of the second checksum of Bad Sector Table A differ from the results of the original checksum, then Bad Sector Table B is read.

If Bad Sector Table B cannot be read, or if the results of the second checksum of Bad Sector Table B differ from the results of the original checksum, then no bad sector table information will be available in the Reserved Winchester Area. If the FORMAT utility is then used on a partition of this disk, it will assume that the disk has no bad sectors and format without avoiding any bad sectors. If the VERIFY utility is used on this disk, it will find no bad sector table to which it can append new bad sectors. Therefore, it will search the disk for all bad sectors and create a new bad sector table.

6 PREP Hardware Adjustments

Before you can use the PREP utility, a hardware component within your Z-100 computer must be moved from one location to another. This text section explains the procedure you must perform in order to properly move this component.

This component must be moved because its position during use of PREP is different from its position during all other Winchester disk activities.

6.1 JUMPER DESCRIPTION

This hardware component is called a "jumper". A jumper is an insulated metal clip or wire used to connect different locations on a circuit board.

In this case, the jumper used is a small conductive metal clip covered with a box-like plastic case. This kind of jumper is known as a Berg jumper.

This jumper is designed to fit over two metal pins protruding from the circuit board known as the Z-217 Winchester Disk Controller Board (or controller card).

When you use PREP, the jumper must cover two of the pins on the Z-217 to allow PREP to initialize the Winchester disk. When you perform any activity other than PREP, the jumper must be stored at a different location on the Z-217.

6.2 JUMPER MOVEMENT PROCEDURE

This procedure explains the sequence of steps you should perform to adjust your hardware both before and after using PREP.

WARNING: The internal components of your computer can cause severe electric shock if touched while the computer is running. Therefore, you should turn off your computer and unplug it from its power source before touching any hardware component within the computer's cabinet.

1. Remove any disk that may be in the floppy disk drive.

2. Turn off your computer's power and unplug it from the power source.

3. Remove the cabinet top from your computer. (Refer to Appendix I of the Z-100 Series User's Manual for detailed information on removing this top.)

4. Locate the Z-217 Winchester Disk Controller Board in the "Card Cage" illustrated in Figure 4-2.

   NOTE: Your computer also contains a disk controller board for floppy disks (called the Z-207). The Z-217 Winchester Disk Controller Board is the board that is connected to the Winchester disk drive (rather than the floppy disk drive) by a flat, ribbon-like cable.

5. Gently slide the Z-217 controller board upward until the area shown in Inset #1 of Figure 4-2 is above the top of the card cage. Do not remove the Z-217 board completely from the card cage. As you slide the board upward, be certain that some of the board is still anchored between the card cage's vertical tracks.

   NOTE: In order to slide the Z-217 controller board upward, you might first have to temporarily unplug Z-217 cables or a cable that lies above the Z-217 board.

6. Locate the jumper covering the pins shown in Inset #1 of Figure 4-2. Remove this jumper by carefully sliding it away from the board. Be careful not to bend the pins.

   NOTE: The pins shown in Inset #1 are known as the Z-217 interrupt pins. These pins need not be connected by the jumper while you are using PREP.

7. Locate the two pins shown in Inset #2 of Figure 4-2. Carefully slide the jumper over these pins. Be careful not to bend the pins.

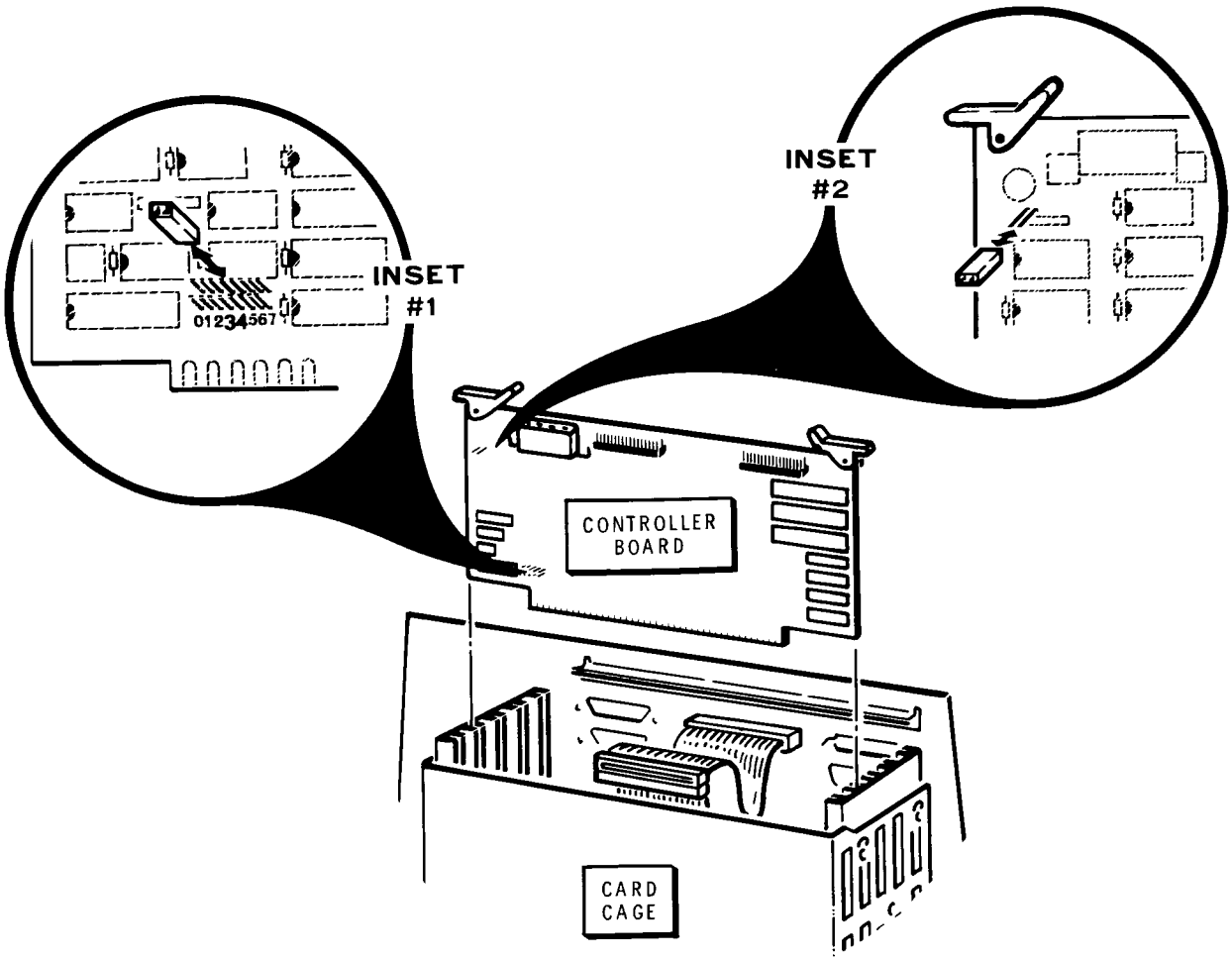

Figure 4-2
Z-217 Controller Board Adjustment

NOTE: The pins shown in Inset #2 are known as the "format enable" pins. When connected by the jumper, your Winchester disk can be initialized by PREP.

8. Gently slide the Z-217 board downward until the bottom edge of the board is securely engaged to the horizontal connector at the bottom of the card cage.

   NOTE: Be careful that the Z-217 remains between the same pair of vertical card cage tracks as you slide it downward.

9. If you have unplugged any internal cables, plug them back into the apropriate sockets on the controller boards. Make sure that all cables are firmly connected.

10. Replace the top cover of your computer and make sure that it is completely latched into position.

11. Plug the computer back into the power source and turn on the computer.

Proceed to use the PREP utility as explained in the text entitled "2 Invoking PREP".

When you have finihsed using the PREP utility, perform the steps of this procedure in reverse sequence to remove the jumper from the Z-217 format enable pins and replace it on the Z-217 interrupt pins.

CAUTION: You must remove the jumper from the format enable pins before performing any other activity. If this jumper remains on the format enable pins, irregularities in the power supply can cause the Winchester disk to be automatically initialized during normal use of the disk. This initialization will destroy any data recorded on the disk.

7 PREP Error Messages

```
Bad sector count exceeded for this drive.
```

Cause: The upper bound limit for bad sectors has been exceeded. This could indicate a hardware malfunction.

Cure: Run PREP again. If this error message reappears after repeated use of PREP, then contact Zenith Data Systems Technical Consultation for assistance.

```
Error -- Can not read superblock A.
```

Cause: A bad sector error has occurred in the primary superblock (Superblock A).

Cure: PREP will automatically use the backup copy of the superblock (Superblock B) and resume the operation it was conducting when the error message was displayed. However, this message indicates that only one usable copy of the superblock remains on the disk. Although you could use the disk in this condition, all Winchester disk data will become inaccessible if Superblock B is ever damaged. Therefore, we recommend that you run PREP again if this error message appears.

```
Error -- Drive capacity > 32 megabytes!
```

Cause: PREP has calculated that the Winchester disk drive connected to the Z-217 controller is larger than the maximum allowable size of 32 megabytes.

Cure: Run PREP, being careful to respond with the correct values to the drive characteristic prompts.

```
Error during formatting of the drive.
```

Cause: This could mean that you responded incorrectly to the five prompts about the drive's characteristics. This message could also indicate either a hardware malfunction or improper positioning of the format enable jumper on the Z-217 controller board.

Cure: Refer to the text entitled "6 PREP Hardware Adjustment". If you have not already done so, move the jumper to the "format enable" position on the Z-217 controller board. Then invoke PREP again, and double check your responses to the five drive characteristic prompts if they appear. After using PREP, remove the jumper from the "format enable" position.

```
Invalid HEX value, Try again:
```

Cause: Value entered was not a valid hexadecimal number, or the value entered was outside of the possible range.

Cure: Double check the appropriate hexadecimal value against the disk manufacturer's documentation or Table 4.2 in this supplement. Then attempt to enter the correct value at the prompt again.

```
Track 0 contains bad sector(s).
```

Cause: A bad sector error has occurred in the reserved area of the Winchester disk. This could indicate a hardware malfunction.

Cure: Run PREP again. If this error message reappears after repeated use of PREP, then contact Zenith Data Systems Technical Consultation for assistance.

```
Unable to communicate with the Z217 controller
```

Cause: PREP can not locate the Z-217 controller. This could mean that the Z-217 is not firmly plugged into the S-100 bus, that the drive cable connectors are not securely fastened, or that the controller has a hardware malfunction.

Cure: Check to see that the controller card and all cable connectors are secure, and run PREP again.

```
Unable to write default PART values
```

Cause: An error was encountered as PREP attempted to write the superblocks. This error condition can be caused by media imperfections at the sectors where PREP is trying to write a copy of the superblock.

Cure: Run PREP again. If this error message reappears after repeated use of PREP, then contact Zenith Data Systems Technical Consultation for assistance.

```
Z-217 controller error on Set Drive parameters command
```

Cause: One or more responses to the five drive characteristic prompts were not valid for the particular drive connected. A malfunction of the Z-217 controller is also possible.

Cure: Recheck the drive characteristics and run PREP again. If this error occurs after repeated attempts to run PREP, consult Zenith Technical Consultation or your service representative.

RESTORE

The Utility that Facilitates File Copying to Disks and/or Partitions for Active Use

The RESTORE utility makes it possible for you to access working files from the backup files produced by the BACKUP utility, and copy them back to the media you use for your daily microcomputer tasks.

RESTORE is especially beneficial to Winchester disk users, because so many files are involved in daily backup procedures from Winchester disk partitions. However it is possible to RESTORE files to or from either partitions or floppy disks. Therefore, this text refers to source or destination recording media as "partition/disk" or "disk/partition" wherever it would be practical for you to use either type of media.

RESTORE's function is complementary to the function of the BACKUP utility, which makes optimum use of disk space by storing working files inside of a special backup file.

1 RESTORE Operation

When the BACKUP utility copies individual files from a source partition/disk, it temporarily concatenates them to be stored as a single "backup file" on the destination media. Thus the backup file is a long, continuous string of data including individual files that are joined by BACKUP and separated by RESTORE. The backup file also contains a directory that lists all of the files in the exact sequence they were copied.

Often BACKUP stores parts of the backup file on more than one disk. BACKUP accomplishes this multi-disk storage feat by recording up to the absolute capacity of the distribution media, prompting you to insert another disk, and then continuing to copy from where it left off. With this capability, BACKUP can even divide a file within the backup file between two disks. Each of the disks necessary to accommodate the entire backup file is called a "volume" of the backup file, and given a volume number.

The RESTORE and BACKUP utilities also enable you to view several statistics, such as the names of the files within a backup file, by entering special command line options.

The BACKUP utility informs RESTORE of the sequence used to store backed up files by listing this sequence in the directory of the special backup file. Thus when RESTORE begins to restore files from the Back-up Disk Set, it reads the list of files from the backup file directory and restores them to the original media in the listed sequence.

2 Invoking RESTORE

You can use the RESTORE utility through either of the following three methods: the Utility Prompt Method, the System Prompt Method, or the Help Display Method.

2.1 UTILITY PROMPT METHOD

With this RESTORE method, you invoke the RESTORE utility from a disk by entering the command function at the system prompt, and then entering the command argument at a prompt displayed by the RESTORE utility. The first entry under this method is in the following form:

A>**RESTORE** ***RETURN***

After an entry in this form, RESTORE will display a message and prompt in the following form:

```
          RESTORE Version x.xx
Copyright (C) 1982 Zenith Data Systems

>>
```

NOTE: The version number of the RESTORE utility (shown in this example as "x.xx") might vary.

At the >> RESTORE prompt, you should enter a command line argument in the following form:

>>{**d**}:{**destfile**},{**d**}:{**destfile**},... = {**s**}:{**sorcfile**} [{**x**};{**x**};...] ***RETURN***

where >> is the RESTORE utility prompt;
where {**d**} is the optional name of the drive that is to receive the copies being transferred. This specification is necessary only if this destination drive is not also the default drive;
where {**destfile**} is one of the individual file names that is being extracted from within the backup file and copied to the destination media, where it will (once again) be accessible by its own file name;
where {**s**} is the optional name of the drive from which the backup file is being copied. This specification is necessary only if this source drive is not also the default drive;
where {**sorcfile**} is the primary name of the backup file. Wild card file name characters (* and ?) are not allowed; and
where {**x**} is any of the optional single letter options, separated by semicolons, that structure the RESTORE operation.

When RESTORE has completed the specified operation, it will redisplay the >> RESTORE prompt. You can continue entering command line arguments at RESTORE prompts indefinitely.

The RESTORE utility will display the names of each file that it copies in a vertical list, during the RESTORE operation.

When you wish to exit from the RESTORE utility to the CP/M system, press the RETURN at a RESTORE prompt. Then CP/M will display the A> system prompt.

NOTE: Like all command lines entered through the CP/M system, the RESTORE command line can contain only 127 characters. If your command line is between 78 and 127 characters in length, you can keep the entire line visible on your video screen by entering ***CTRL-E*** after the 79th character.

2.2 SYSTEM PROMPT METHOD

With this RESTORE method, you enter the command line function and the command line argument both at the system prompt, in the following form:

A>**RESTORE {d}:{destfile},{d}:{destfile},... = {s}:{sorcfile} [{x};{x};...]** ***RETURN***

Where **RESTORE** is the command line function, stored in the file RESTORE.COM on the default or logged partition/drive;
where {**d**} is the optional name of the drive that is to receive the copies being transferred. This specification is necessary only if this destination drive is not also the default drive;
where {**destfile**} is one of the individual file names that is being extracted from within the backup file and copied to the destination media, where it will (once again) be accessible by its own file name;
where {**s**} is the optional name of the drive from which the backup file is being copied. This specification is necessary only if this source drive is not also the default drive;
where {**sorcfile**} is the primary name of the backup file. Wild card file name characters (* and ?) are not allowed; and
where {**x**} is any of the optional single letter options, separated by semicolons, that structure the RESTORE operation.

The RESTORE utility will display the names of each file that it copies in a vertical list, during the RESTORE operation.

After RESTORE has completed the specified operation, CP/M will display the A> system prompt.

NOTE: Like all command lines entered through the CP/M system, the RESTORE command line can contain only 127 characters. If your command line is between 78 and 127 characters in length, you can keep the entire line visible on your video screen by entering ***CTRL-E*** after the 78th character.

2.3 HELP DISPLAY METHOD

With this RESTORE method, you enter the command line function and a ? (question mark) at the system prompt, as shown:

A>**RESTORE ?** ***RETURN***

This command will cause the display of messages that summarize the purpose, command line, and options of the RESTORE utility. The system prompt will reappear below the RESTORE display.

This invocation method does not cause restoration of backed up files. It is designed to provide you with a convenient quick reference to a few aspects of the RESTORE utility.

3 RESTORE Source

A RESTORE command line can include only one source. When specifying this source, you must always specify the primary name of a file, and sometimes a drive.

The file specified as the source is the backup file into which all of the individual files were copied.

The source file specified in a RESTORE command line should be identified by a primary file name only (1-8 characters). The extension should not be specified, because the BACKUP utility has already applied extensions to each backup file volume. (BACKUP applies the extension "000" to the first backup file volume, "001" to the second, "002" to the third, etc.) During the RESTORE operation, you will be prompted to insert backup file disk volumes at appropriate times.

Wild card file name characters (* or ?) cannot be used to specify a source file.

Whenever a specified source (backup file) does not reside in the default drive, a drive name should be specified in front of it. You can restore files to any valid drive during a RESTORE operation.

A source file specification is required in all RESTORE command lines except those entered with the [B] option, for the sole purpose of displaying characteristics of all of the master backup files on the default disk.

Consider an example where the primary file name "C:QUITTIME" is entered as source in a command line. The ensuing RESTORE operation required that five disks (backup file volumes) be inserted into drive C to completely disperse all of the individual files that had been stored within QUITTIME.

The source disks contained the following backup files volumes:

QUITTIME.000
QUITTIME.001
QUITTIME.002
QUITTIME.003
QUITTIME.004

The file "QUITTIME.000" was the master backup file volume, which contained the backup file directory.

4 RESTORE Destinations

A RESTORE command line can include one or more destinations. When specifying destinations, you must always specify a file, and sometimes a drive.

The destination files specified in a RESTORE command line should be identified by complete file names, including the primary name (1-8 characters) and the extension (1-3 characters if used).

Whenever a specified destination file does not reside on the default drive, a drive name should be specified in front of it. You can restore files to any valid drive during a RESTORE operation.

Wild card, or ambiguous, file names can be specified, using the * or ? wild card characters. (Wild card file names can be particularly useful when you have many files to copy, because a command line can contain a maximum of only 127 characters.)

Any number of destination files can be specified in a command line (as long as the limit of 127 characters per command is not exceeded). However if two or more destination files are specified, they must be separated by commas.

A destination file specification is required in all RESTORE command lines except those entered with the [B] option, for the sole purpose of displaying characteristics of all of the master backup files on a disk; or in those entered with the [L] option, for the sole purpose of displaying a list of the individual files within a backup file.

The following destination file specification:

.ASC,TEST?,C:*.

would cause the release (from within the backup file) of all files with an .ASC extension to the default drive; all files (from the backup file) that are five characters long beginning with TEST and have no extension (such as TEST0, TEST1, TESTS, TESTY, etc.) to the default drive; and all files (from the backup file) to drive C.

To further demonstrate the characteristics of destination file specifications:

A:DEMO.*,B:SYSTEM.COM,E:82*.DOC,????.DAT

would cause the release (from within the backup file) of all files with DEMO as primary name and any extension to the disk/partition in drive A; the file SYSTEM.COM to drive B; all files (from the backup file) that have a primary name beginning with 82 and that have a .DOC extension to drive E; and all files (from the backup file) that have a four letter (or less) primary name with a .DAT extension to the default drive.

NOTE: Many of the individual files stored within the backup file may be identified by both the name of the file and the name of the drive from which they were originally copied. However, the drive name stored with the file name in the backup file does not affect the RESTORE operation in any way. In a restore command line, the drive names you specify for destination files identify the drives to which you want the individual files to go, as they are released from the backup file.

5 RESTORE Options

The RESTORE utility enables you to structure any backup operation by specifying the following options in the command line:

B Backup directory — displays a directory listing statistics about all master backup files.

E Exception files — exclude exception files from restore operation

L List directory — list the directory of the backup files

O Overwrite files — overwrite any existing files with the same name

Q Query each — query yes or no on each file before restoring

R Read only — overwirte read/only (R/O) files without prompt

S System files — restore system files if specified

U User number — restore files that were backed up from specified user area(s) in addition to the current user area

V Verify — verify the file after restoring it.

Options are always the last items specified in a RESTORE command line. They must be enclosed within square brackets, and separated by semicolons when more than one is used.

If a switch requires specification of files, then the option letter should be separated from these file specifications by a colon. When more than one file specification is necessary with a single option, then the file specifications should be separated by commas.

Options are entered in the following form:

[{x};{x}:{details},{details},{details};{x};...]

Where {**x**} is an option letter;
where {**details**} are additional character strings (such as the date, file names, or user numbers) that must be specified with some options;
where the **[ ]** square brackets must enclose the options;
where the **;** (semicolon) must separate multiple options;
where the **,** (comma) must separate the file names and/or user numbers used with some options; and
where the **:** (colon) must separate some option letters from accompanying {details}.

5.1 B BACKUP DIRECTORY

The B option causes a directory display listing statistics about all of the master backup files (those backup files with the "000" extension) on a specified disk.

This directory lists the primary name of each master backup file, the number of volumes in the backup set that begins with each master, the number of files in each set of backup files, and the date of each backup operation.

Only the drive containing the master backup file(s) needs to be known in command lines entered for the sole purpose of producing a B option directory. Therefore, specify this drive in the command line unless it is the default drive.

You can use the B option in commands of the following form:

A>**RESTORE {d}: [B]** ***RETURN***

Where **RESTORE** is the command line function, stored in the file RESTORE.COM on the default or logged partition/drive;
where {**d**} is the optional name of the drive that has received the copied files, and stored them within backup file volumes. This specification is necessary only if this destination drive is not also the default drive; and
where **[B]** is the single letter option that causes the display of master backup file features.

The B option may be used with both methods of invoking RESTORE. For example, from the CP/M system prompt:

A>**RESTORE C: [B]** ***RETURN***

or the same operation from the RESTORE utility prompt:

>>**C: [B]** ***RETURN***

The B directory listing would appear in the following form:

Name	Volumes	Files	Date
QUITTIME	3	117	4-27-83
SAVEME	1	48	10-24-82
STORAGE	5	231	2-30-84

5.2 E EXCEPTION FILES

The restore operation takes place for all of the files except that file given as an exception file. The file listed with the E option is then ignored during the operation. The E option is entered in the following form:

[E:{filespec},{filespec}]

Where **E** is the option;
where {**filespec**} represents files that are to be excluded from the operation. If a file being excluded does not reside on the default drive, then you must also specify the name of the drive that contains it. Amgibuous file names (with * or ? wild card characters) can be specified; and
where the , (comma) and : (colon) are required separators.

For example:

A>**RESTORE BACK1 = *.DAT [E:TEMPFILE.DAT]** ***RETURN***

would restore all files from the default drive that have a .DAT extension except the file named TEMPFILE.DAT, which would be omitted.

5.3 L LIST DIRECTORY

The L option causes RESTORE to give the internal directory of files that are contained within a specified backup file. The directory information would list the volume number where the files start and end, and the size of the file.

The L option is used for commands in the following form:

A>**RESTORE {d}:{ sorcfile} [L]** ***RETURN***

Where **RESTORE** is the command line function, stored in the file RESTORE.COM on the default or logged partition/drive;
where **{d}** is the optional name of the drive that has received the copies being transferred. This specification is necessary only if this drive is not also the default drive;
where **{sorcfile}** is the primary name of the backup file, which you wish to contain all of the individual files copied in this operation; and
where **{L}** is the single letter option that causes the display of backup file directory features.

The L option may be used with both methods of invoking RESTORE. For example, from the CP/M system prompt:

A>**RESTORE BACK9 [L]** ***RETURN***

or the same operation from the RESTORE utility prompt:

>>**BACK9 [L]** ***RETURN***

The L directory listing will appear in the following form:

Filename	User	Start Volume	End Volume	Size in Kilobytes
TESTFIL1.DAT	0	1	1	3264
TESTFIL2.DAT	0	1	2	19582
TESTFIL1.DOC	11	2	3	7236
TESTFIL2.DOC	11	3	3	22230

4 file(s) on 3 volume(s)

5.4 O OVERWRITE FILES

During operation, if RESTORE encounters a file with the same filename as the backup file, RESTORE asks if the file should be deleted with a message in the following form:

```
File {filename} already exists, do you wish to delete it (Y/N)?
```

When the O option is used, RESTORE overwrites the original copy of the file on the destination media (the copy that "already exists") without the query.

5.5 Q QUERY EACH

When the Q option is used, you are queried before each file is restored, by a prompt in the following form:

```
Restore {x}:{destfile} to user {n} (Y/N) ?
```

Where "{x}" is the drive containing an individual file that you specified for this operation. The drive name is only displayed if it is not the default drive;
where "{destfile}" is an individual file from within the backup file that you specified for restoration; and
where "{n}" represents the number (0–15) of the user area to which the {destfile} will be restored.

A prompt in this form is displayed for each file RESTORE encounters that is contained within the backup file you specified as the source.

For example, if the current user area is 0 and you wanted to restore two .DOC files from the "BACK1" backup file on drive C to their individual file names in user area 0, and if the command to RESTORE was:

A>**RESTORE B:*.DOC=C:BACK1 [Q]** ***RETURN***

then RESTORE would ask:

```
Restore B:FILE1.DOC to user 0 (Y/N) ?
```

After you respond it would ask,

```
Restore B:FILE2.DOC to user 0 (Y/N) ?
```

In response to such a prompt, press **Y** or **y** to cause the file to be restored. Press **N** or **n** to prevent the file from being restored.

5.6 R READ/ONLY FILES

The R option enables RESTORE to overwrite individual files that have read/only (R/O) status on the destination media without displaying a prompt.

As a default (in the absence of the R option), the following prompt is displayed if you are restoring individual files to destination media where files by the same name exist with the read/only (R/O) status:

```
File {filename.ext} read only (R/O), do you wish to delete it (Y/N) ?
```

Where "{filename.ext}" is the complete file name of the file you are trying to restore.

NOTE: The STAT utility is used to apply read/only (R/O) or read/write (R/W) status to a file, as explained in the "STAT" text in the CP/M-85 manual.

5.7 S SYSTEM FILES

The S option allows RESTORE to restore files that are set in the directory (by the STAT utility) as system files. System files will not be restored merely because of this option, but only if this option is used in a command line where system files are specified as destinations.

When the S option is not included in the command line, system files are ignored during the RESTORE operation — even if these files are specified in the command line.

5.8 U USER NUMBER

The U option causes RESTORE to restore only the individual files within the specified user area(s). If you do not include a U option in the RESTORE command, then RESTORE will restore only the individual files from the current user area.

NOTE: CP/M enables you to divide each of your disks and partitions into 16 separate user access areas, numbered 0-15. When you boot up a partition or disk, you are working within user area 0 until you enter a USER command. See the "USER" text in the "Reference Guide" of your CP/M-85 manual for more information on user areas.

Specify the user option in the following form:

[U:n1,n2,...]

Where **U** is the option letter;
where **:** (colon) must separate the option letter from the user number(s); and
where **n1** stands for the number of one of the user areas to which RESTORE will restore individual files. If you specify more than one user area number, separate each with a comma.

You can specify as many as 16 user areas with a single U option. You can specify any user area(s) regardless of the user area currently being used.

5.9 V VERIFY

The V option causes RESTORE to verify all files copied. With the V option, RESTORE reads each source file after it is copied to make sure that the source and destination copies are identical.

During a verified RESTORE operation, the names of the copied and verified files will be displayed in the following form:

```
E:FILENAM1.EXT to user 12
Verifying E:FILENAM1.EXT
E:FILENAM2.EXT to user 12
Verifying E:FILENAM2.EXT
E:FILENAM3.EXT to user 12
Verifying E:FILENAM3.EXT
E:FILENAM4.EXT to user 12
Verifying E:FILENAM4.EXT
          .
          .
          .
E:FILENAMn.EXT to user 12
Verifying E:FILENAMn.EXT
```

6 Runtime Prompting

After you invoke RESTORE and enter a command, RESTORE should begin to restore files, displaying the drive name and file name of each individual file as it is copied, in the following form:

```
E:FILENAM1.EXT to user 9
E:FILENAM2.EXT to user 9
E:FILENAM3.EXT to user 9
E:FILENAM4.EXT to user 9
          .
          .
          .
E:FILENAMn.EXT to user 9
```

However, during an extensive RESTORE operation, you might be prompted to insert other specifically named disks.

If the BACKUP operation that created a backup disk set required more than one backup disk to accommodate all of the individual files, then a subsequent RESTORE operation will probably have to require that more than one disk be inserted to allow dispersal of the individual files.

The BACKUP utility kept track of the number and sequence of the disks used to accommodate the files and designated a "Volume" number for each disk that it prompted you to insert when creating the backup disk set.

Thus the subsequent RESTORE operation must echo the prompts displayed by BACKUP to instruct you to reinsert the same disks in the proper sequence.

The RESTORE prompts that request reinsertion of the backup disk set volumes appear in the following form:

```
Insert backup volume {nnn}, {sorcfile}.{nnn-1}, in drive {x},
and hit RETURN when ready.
```

Where "{nnn}" is the number of the volume number of the disk RESTORE needs now in order to continue restoring individual files from the backup disk set;
where "{sorcfile}" is the primary file name that was applied to all of the backup files during the BACKUP operation;
where "{nnn-1}" is the file name extension of the particular disk that RESTORE needs now in order to continue restoring individual files from the backup disk set. (This extension number is always one less than the corresponding volume number.); and
where "{x}" identifies the source drive you specified in the RESTORE command line.

"Volume nnn" corresponds to the backup file with extension nnn-1. The volume number is always one more than the number of the volume's file name extension.

In response to a prompt in this form, you should insert the specified volume (disk) in the specified drive. Then you should close the drive latch and press RETURN.

If RESTORE finds the backup file volume that it needed on the disk you just inserted, it will continue to restore individual files in sequence, displaying the drive and file names as they are restored.

If RESTORE cannot find the master backup file on the disk you just inserted, it will display a message in the following form:

```
Can not open backup file, {sorcfile}.{nnn-1},
insert another disk in drive {x},
and hit RETURN when ready,
or hit any other key to abort.
```

Where "{sorcfile}" is the primary file name that was applied to all of the backup files during the BACKUP operation;
where "{nnn-1}" is the file name extension of the particular disk that RESTORE needs now in order to continue restoring individual files from the backup disk set. (This extension number is always one less than the corresponding volume number.); and
where "{x}" identifies the source drive you specified in the RESTORE command line.

If you wish to complete the operation and can obtain the disk that contains the specified backup file, then insert this disk in the specified drive, close the drive latch, and press ***RETURN***.

If you do not wish to continue the operation or cannot obtain the disk that contains the specified backup file, then press any key other than RETURN. The RESTORE operation will end and a prompt (utility or system prompt) will appear.

The first disk in the backup set is known as "volume 1", or the "master volume" of the backup file. This disk contains a file with the primary name that was specified in the command line as the destination, and with the extension "000".

Sometimes during the RESTORE operation, RESTORE will need to access the contents of the backup master volume. RESTORE displays a slightly different prompt when it needs to access this particular volume, as shown:

```
Insert backup master volume 001, {sorcfile}.000, in drive {x},
and hit RETURN when ready.
```

Where the word "master" is added;
where the volume number is always "001" for a master volume; and
where the file name extension is always "000" for a master volume.

If RESTORE is prompting the master volume in particular, and you insert a disk that does not contain the master volume, then the error message displayed is also slightly different from that which is displayed when other volumes are needed, as shown:

```
Can not open master backup file, {sorcfile}.000,
insert another disk in drive {x},
and hit RETURN when ready,
or hit any other key to abort.
```

Where the word "master" is added; and
where the file name extension is always "000" for a master volume.

7 Preparing RESTORE Routines

If you restore backups on a regular basis, RESTORE can come in very handy. RESTORE was designed specially so that you would be able to store the RESTORE command lines that you enter on a regular basis, so that they can be entered automatically, with far less typing.

To store RESTORE commands for automatic execution, you will need a text editor or word processor and the SUBMIT utility.

The text editor or word processor will enable you to prefabricate and store commonly entered RESTORE command lines in a disk file. The SUBMIT utility will enable you to type a short, simple command line that causes automatic execution of all the stored RESTORE commands.

This text explains a few RESTORE routines geared toward users of some popular application software products supplied by Zenith Data Systems. The text on each routine shows you how to prepare the routine by explaining the following essential facts:

- The type of user who would probably benefit from using the routine
- The names of the drives in which you should store particular files during the routine
- The form of the file you should create (with your text editor or word processor) to store commonly entered RESTORE command lines
- The form of the SUBMIT command you should type each time you wish to use the routine

NOTE: To successfully prepare a RESTORE routine, you should understand the operation of the SUBMIT utility. For information on SUBMIT, refer to the "SUBMIT" text in the "Reference Guide" of your CP/M-85 manual.

GENERAL PURPOSE RESTORE ROUTINE

This routine can be helpful for anyone who wants to restore an entire backup disk set regularly. Steps 1 through 3 can be considered preparation steps, that you need to perform only once. Steps 4 through 6 should be performed every time you conduct the routine.

1. Using a text editor or word processor, open a text file under the name **GNRESTOR.SUB**.

2. Into this file, enter the following command line:

   RESTORE $1:*.* = $2:GENBACK [V] ***RETURN***

3. Close the text file GNRESTOR.SUB

4. Use the PIP utility to copy the text file GNRESTOR.SUB and the utility file SUBMIT.COM to drive A, if they are not there already.

5. When you are ready to perform this restore routine, type **A:** ***RETURN*** to make drive A the default drive.

6. Type a command in the following form:

   A>**SUBMIT GNRESTOR {partition} {floppy}** ***RETURN***

   Where {**partition**} is the drive letter of the Winchester disk partition to which you wish to restore your files; and
   where {**floppy**} is the drive letter of the floppy disk drive from which you wish to restore your files;

   For example, if you wish to restore files from the backup file with the primary name "GENBACK" in the drive A floppy disk to the drive C Winchester partition, then you should type the following command:

   A>**SUBMIT GNRESTOR C A** ***RETURN***

RESTORE will restore all files from the backup file with the primary name "GENBACK" back to the partition under their individual file names.

SUPERCALC RESTORE ROUTINE

This routine can be helpful for anyone who wants to restore Supercalc data files from an entire backup disk set regularly. Steps 1 through 3 can be considered preparation steps, that you need to perform only once. Steps 4 through 6 should be performed every time you conduct the routine.

1. Using a text editor or word processor, open a text file under the name **SCRESTOR.SUB**.

2. Into this file, enter the following command line:

   RESTORE $1:*.* = $2:SCBACK [V] ***RETURN***

3. Close the text file SCRESTOR.SUB

4. Use the PIP utility to copy the text file SCRESTOR.SUB and the utility file SUBMIT.COM to drive A, if they are not there already.

5. When you are ready to perform this restore routine, type **A:** ***RETURN*** to make drive A the default drive.

6. Type a command in the following form:

   A>**SUBMIT SCRESTOR {partition} {floppy}** ***RETURN***

   Where {**partition**} is the drive letter of the Winchester disk partition to which you wish to restore your files; and
   where {**floppy**} is the drive letter of the floppy disk drive from which you wish to restore your files;

   For example, if you wish to restore SuperCalc data files from the backup file with the primary name "SCBACK" in the drive A floppy disk to the drive C Winchester partition, then you should type the following command:

   A>**SUBMIT SCRESTOR C A** ***RETURN***

RESTORE will restore all files from the backup file with the primary name "SCBACK" back to the partition under their individual file names.

WORDSTAR RESTORE ROUTINE

This routine can be helpful to users of the WordStar word processor who wish to regularly restore all WordStar text files that have the same file name extension. Steps 1 through 3 can be considered preparation steps, that you need to perform only once. Steps 4 through 6 should be performed every time you conduct the routine.

1. Using WordStar's non-document editing mode, open a text file under the name **WSRESTOR.SUB**.

2. Into this file, enter the following command line:

   RESTORE $1:*.$2 = $3:WSBACK [V] ***RETURN***

3. Close the text file WSRESTOR.SUB

4. Use the PIP utility to copy the text file WSRESTOR.SUB and the utility file SUBMIT.COM to drive A, if they are not there already.

5. When you are ready to perform this restore routine, type **A:** ***RETURN*** to make drive A the default drive.

6. Type a command in the following form:

A>**SUBMIT WSRESTOR {partition} {ext} {floppy}** ***RETURN***

Where {**partition**} is the drive letter of the Winchester disk partition to which you wish to restore your files;
where {**ext**} is the one- to three-letter file name extension of the text files you wish to back up; and
where {**floppy**} is the drive letter of the floppy disk drive from which you wish to restore your files;

For example, if you wish to restore WordStar text files that have the file name extension "DOC", and if these files are now within the backup file with the primary name "WSBACK" in the drive A floppy disk, and if you wish to restore to the drive C Winchester partition, then you should type the following command:

A>**SUBMIT WSRESTORE C DOC A *RETURN***

RESTORE will restore all files from the backup file with the primary name "WSBACK" back to the partition under their individual file names.

8 Structure of Backup Files

The BACKUP utility backs up several source files into a single backup file. This backup file contains all of the files that were copied, in the order they were specified. At the beginning of the backup file is a directory of the copied files. The BACKUP utility maintains this directory to show the names of the files within the backup file, so that the RESTORE utility, when used, will be able to copy the files to other media.

At the beginning of the backup file directory is an entry for the backup file itself. This backup file directory entry is a sequence of bytes that are stored in the following form:

Purpose of bytes	ID	File Control Block (FCB)	R	quantity of copied files	date of backup	R	release number	version number	R
Quantity of bytes	1	32	4	2	2	7	1	1	14 = 64 bytes

Where "ID" is a byte that is set to one to distinguish this master backup directory entry from normal file directory entries;
where "File Control Block (FCB)" is a set of bytes that describe the drive name, primary file name, file name extension, and other characteristics used by CP/M to store files;
where "R" stands for reserved bytes that are not used for any particular purpose in this version of the software;
where "quantity of copied files" is the number of individual files stored within the backup file;
where "date of backup" is the date that the user entered in response to a prompt during the BACKUP operation; and
where "release number" and "version number" are included to insure that this software will be used only with compatible releases and versions of BACKUP and RESTORE.

NOTE: The file name extension in the "File Control Block (FCB)" of the backup file directory entry is the file name extension of the last volume of the backup disk set — and not necessarily the extension of the volume that contains the directory. Thus you can determine how many volumes were used to accommodate all of the backed up files by looking at the directory in the first volume. (The first volume is the volume given the extension "000" during the BACKUP operation.)

Immediately following the backup file entry in the backup file directory are several sequences of bytes, each describing attributes of one of the individual files that was copied into the backup file during the BACKUP operation. The bytes of the individual file directory entry are stored in the following form:

Purpose of bytes	ID	File Control Block (FCB)	R	start volume	end volume	start position	end position	file length	U	R
Quantity of bytes	1	32	4	1	1	2	2	2	1	18 = 64 bytes

Where "ID" indicates the location of this individual file entry amongst the other individual file entries in the directory. If the value of this byte is 2, then the entry describes an individual file within the backup file. If the value of this byte is FF, then the entry is a "dummy" entry that merely signals the end of the backup file, and does not describe an individual file;

where "File Control Block (FCB)" is a set of bytes that describe the drive name, primary file name, file name extension, and other characteristics

where "R" stands for reserved bytes that are not used for any particular purpose in this version of the software;

where "start volume" indicates the number of the first backup file volume used to accommodate this individual file;

where "end volume" indicates the number of the last backup file volume used to accommodate this individual file;

where "start position" is the number of 128-byte records between the beginning of the backup file volume and the beginning of this individual file;

where "end position" is the number of 128-byte records between the beginning of the backup file volume and the record following the end of this individual file;

where "file length" is the length of this individual file, as measured in 128-byte records; and

where "U" is the number of the user area from which the individual file came.

The number of individual source files that can be backed up in a single BACKUP operation is limited by the amount of space on the first disk/partition used to receive the backup volumes. This disk/partition must have enough free space to accommodate the entire backup file directory.

NOTE: If any of the source files you specify are random files (as opposed to sequential files), these files might become larger when restored with the RESTORE utility.

9 RESTORE Error Messages

```
Verify error, try RESTORE again (Y/N)?
```

RESTORE has detected that the copy of a backed up file on destination media is different from the original copy of the file on the source media.

Press **Y** if you wish to have RESTORE try to recopy and verify the file that could not be verified. RESTORE will try to overwrite the copy of the file that could not be verified. Then RESTORE will resume displaying the names of the individual files as they are copied and verified, beginning with the file in which the verification error occurred.

Press **N** if you wish to skip the file that could not be verified. Then RESTORE will try to copy and verify the next individual file that is listed in the backup file.

```
Backup filename can not be ambiguous.
```

You specified * or ? wild card characters in the source file name for the RESTORE operation. Repeat the command specifying the source with an explicit file name.

```
Extension on backup file specified, will be ignored.
```

This occurs whenever you try to assign a backup file an extension, by specifying a full file name for a destination file. If this occurs, RESTORE ignores the extension you specified and uses its standard, sequentially numbered extensions. Program operation will not be disturbed.

```
Cannot find master backup file {filename}.000.
```

This message occurs when the /L option is requested for a file from a disk where the master backup {filename}.000, is not present.

```
File {filename}.{ext} is not found.
```

This message occurs whenever a file is specified for BACKUP or RESTORE and that file is not on the disk.

```
Invalid backup file
```

This message occurs if the backup file specified in a command does not contain valid information. This may occur if the file specified was not a backup file, but had a "000" extension, or if the data in a backup file had degraded (possibly due to a bad sector, or inadvertent exposure of the media to an electromagnetic field).

```
Invalid drive designation on RESTORE file.
```

This message occurs when a drive name is used that is not in the range of supported drive names (A through F).

```
Invalid exception file specifications.
```

This message will occur if the exception file specified has a syntax error in the specification.

```
Invalid filename.
```

This message appears when a file name is specified that does not conform to CP/M file naming conventions.

```
Invalid selection file specifications.
```

This message is generally caused by a typographical error in the command line. The message results when parameters in the command line appear garbled or incorrectly punctuated.

```
Invalid option [x] specified.
```

This message occurs if RESTORE is unable to recognize the option that was specified in the command.

```
Not enough parameters specified.
```

This message results when the command to RESTORE is not complete enough for RESTORE to carry out the intended operation. Enter the command again specifying additional options or file specifications.

```
Cannot open master backup file {filename}.000,
insert another disk in drive x
hit RETURN when ready,
or hit any other key to abort.
```

This message occurs if the disk that has been inserted is not volume 1. Insert the correct disk.

```
Cannot open backup file {filename}.{nnn},
insert another disk in drive x
hit RETURN when ready,
or hit any other key to abort.
```

This message occurs when you are asked to insert volume nnn+1 (which would contain {filename}.{nnn}) and the wrong disk is inserted. Insert the correct disk.

```
Invalid user option
```

This message occurs if the user number specified with the U option is not in the range 0–15 or if a user number was specified with improper syntax.

```
Invalid version of RESTORE for {filename.000}.
```

This message occurs if you have used different versions of RESTORE and BACKUP. Always use a copy of the RESTORE utility that bears the same version number as the BACKUP utility that you used to create backup file {filename.000}.

```
No files selected.
```

This message occurs if none of the source files you specified in the RESTORE command exist on the default or specified source media.

```
Out of disk space on restoration of {filename.ext}.
insert another disk and hit RETURN
or hit any other key to abort
```

The disk to which you are trying to restore files does not contain enough blank space to accommodate an individual file. You should insert a disk that has enough space into the destination drive and press the RETURN key, or press a key other than the RETURN key and enter a RESTORE command with different destination file specifications.

SHIP

The Utility that Moves Read/Write Heads to a Safe Position

The SHIP utility moves the read/write heads of a Winchester disk to a position where they can not contact and destroy stored data on a disk platter in case of physical shock.

The SHIP utility is recorded on the Winchester Utility Disk, which is supplied with your Winchester disk hardware documentation. Although the Winchester Utility Disk runs under the Z-DOS Operating System, you can boot up with it — just as you would with a bootable CP/M-85 disk.

1 Winchester Disk Safety

Winchester disks are sensitive precision instruments that can be easily affected by physical shock or impact. The data stored on a Winchester disk is also vulnerable. Because of this vulnerability, you should take special precautions by running SHIP before shipping your Winchester disk, or even before moving the disk across the room.

The SHIP command enables you to protect your Winchester disk, and the data on the disk. SHIP affords this protection by moving the disk's read/write heads towards the hub of the Winchester disk platters. When in this position, the heads and platters will not be damaged by platter vibration that can be caused by physical shock.

Although platters can be caused to vibrate at their outside edges, the platter area near the hub is rigid enough to inhibit vibration. Therefore, the heads and platters are safer when the heads are near the hub.

Run SHIP whenever you intend to physically move the unit containing your Winchester disk.

To use SHIP, invoke the utility at the system prompt and enter a cylinder address value at the prompt, as explained below.

NOTE: The Z-217 controller card causes the read/write heads to move to cylinder zero the first time you access the Winchester disk after power up. Therefore, the head positioning caused by SHIP will remain in effect only until you turn the disk on again and access it.

2 Invoking SHIP

To invoke SHIP by this method, type the following command:

A:**SHIP** ***RETURN***

When invoked, SHIP displays a message in the following form:

```
          SHIP version 1.00
Copyright(C) 1983, Zenith Data Systems

The SHIP utility helps you to:

  * Position the read/write heads of the Winchester disk
    At a safe location for subsequent transportation
    of the Winchester disk unit.

SHIP will prompt you to specify a cylinder address to
identify where the read/write heads should be moved.

Enter shipping cylinder address in hex:
```

3 Entering the Shipping Cylinder

At the "Enter shipping cylinder address in hex:" prompt you should enter a hexadecimal value for the address of the cylinder at which the read/write heads should be positioned when the Winchester disk is physically moved. Refer to Table 4-7 or to your Winchester disk hardware documentation if you are uncertain of this number. Then press ***RETURN***.

NOTE: If you do not wish to move the heads at this time, then enter ***CTRL-C*** at the prompt.

After you have responded to the SHIP prompt, SHIP will move the read/write heads to the specified cylinder. Then Z-DOS will display the system prompt:

```
A:
```

NOTE: After using the SHIP utility, you will have to reset and reboot the system with a bootable floppy disk.

Table 4-7 shows the values you should enter in response to the SHIP prompt if you own any of the list Winchester disks.

Drive Model	Cylinder Position for Shipping
Seagate	
ST-406	131
ST-412	131
ST-419	131
ST-506	9A
ST-706	131
Miniscribe	
Mod II 2012	14F
Mod III 3012	28D
Mod IV 4020	209
IMI	
5006H	148
5012H	148
5018H	148
Tandon	
TM 602S	9A
TM 603S	9A

Table 4-7
Responses to SHIP Prompts

NOTE: If Table 4-7 and your Winchester disk hardware documentation do not explain how the read/write heads should be positioned, then respond to the SHIP prompt by entering the hexadecimal value for the last cylinder on your disk. For instance if your disk has 132 cylinders, enter **132** and ***RETURN*** at this prompt.

4 SHIP Error Messages

```
Invalid HEX value, Try again:
```

Cause: Value entered was not a valid hexadecimal number, or the value entered was outside of the possible range.

Cure: Double check the appropriate hexadecimal value against the disk manufacturer's documentation or Table 4-7. Then enter the correct value at the question again, and press ***RETURN***.

```
Unable to communicate with the Z-217 controller
```

Cause: SHIP can not locate the Z-217 controller. This could mean that the Z-217 is not firmly plugged into the S-100 bus, that the drive cable connectors are not securely fastened, or that the controller has a hardware malfunction.

Cure: Check to see that the controller card and all cable connectors are secure, and run SHIP again.

```
Z-217 controller error on Set Drive Parameters command
```

Cause: Your response to the Enter shipping cylinder address in hex prompt was not valid for the particular drive connected. A malfunction of the Z-217 controller is also possible.

Cure: Recheck the drive parameters and run SHIP again. If this error occurs after repeated attempts to run SHIP, consult Zenith Technical Consultation or your service representative.

SYSGEN

The Utility that Puts the Operating System on a Disk

The SYSGEN utility is used to transfer the operating system to a disk. Under some circumstances, SYSGEN does this task by itself. Sometimes SYSGEN needs the help of other utilities before an entire, usable system can be put on the disk.

1 SYSGEN Invocation

No matter which SYSGEN method is to be performed, the SYSGEN utility is invoked by entering the following command at the system prompt:

A>**SYSGEN** ***RETURN***

A display in the following form will appear:

```
SYSGEN VER 2.2.101
SOURCE DRIVE NAME (OR RETURN TO SKIP):
```

Your next entry depends on the SYSGEN method you are using.

2 SYSGEN Methods

You must consider the circumstances before running SYSGEN, so that you use the appropriate SYSGEN method. Use of a MVCPM2x7 utility will often influence your choice of a SYSGEN method. Thus you have a choice of the following two SYSGEN methods:

- If a MVCPM2x7 utility was **not** used to customize the system for memory capacity, then use the "2.1 Disk to Disk Method". (The BSYSGEN utility could also be used under these circumstances.)

- If a MVCPM2x7 utility (which moves a system kernel into computer memory) was used before SYSGEN, use the "2.2 Computer to Disk Method".

NOTE: When the CP/M Operating System is copied to a disk, it is moved in two parts: the system kernel and the system files. The "2.2 Computer to Disk Method" method does not copy the system files. If this method is used, then the PIP utility must be used to copy the system files.

2.1 DISK TO DISK METHOD

If the operating system is being copied between two disks of the same type, you can copy both the system kernel and the system files to the destination disk using this SYSGEN method. (This method is used when a MVCPM2x7 activity does **not** precede the SYSGEN activity.)

Under these circumstances, you should answer the "SOURCE DRIVE NAME" prompt by typing the letter for a drive name, as shown:

```
SOURCE DRIVE NAME (OR RETURN TO SKIP): x
```

Where x is the letter of the source drive.

SYSGEN will respond with a prompt in the following form:

```
SOURCE ON x, THEN TYPE RETURN
```

Answer this prompt with a carriage return. SYSGEN will read the system kernel from the source disk, and signal that it has done so with the following message:

```
FUNCTION COMPLETE
```

Then SYSGEN will offer the option of copying the system files (BIOS88.SYS, BIOS85.SYS, and ALTCHAR.SYS) from the source disk with the prompt:

```
COPY SYSTEM FILES (Y/N):
```

If you wish to copy the system files from the source disk, then **Y** should be pressed, and SYSGEN will again display the message:

```
FUNCTION COMPLETE
```

If you do **not** wish to copy the system files (BIOS85.SYS, BIOS88.SYS, and ALTCHAR.SYS) with SYSGEN, press **N** at this prompt.

After either entry, SYSGEN will prompt for the drive that contains the destination disk. The user should answer the prompt as shown:

```
DESTINATION DRIVE NAME (OR RETURN TO REBOOT): y
```

Where y is the letter of a valid, working drive.

Then SYSGEN will display the prompt:

```
DESTINATION ON y, THEN TYPE RETURN
```

Enter a carriage return at this prompt, to confirm the destination drive choice. SYSGEN will put the system kernel and in some cases the system file, onto the destination disk. (The disk in drive "y").

Then SYSGEN will again display the prompt:

```
DESTINATION DRIVE NAME (OR RETURN TO REBOOT):
```

If you wish to copy the same system components to a different destination disk, then type the letter of the drive containing this disk.

If you do not wish to SYSGEN other disks, then enter a carriage return. The SYSGEN activity will end, and CP/M will display the system prompt.

2.2 COMPUTER TO DISK METHOD

If you have just run a MVCPM2x7 utility to customize the operating system for memory capacity, then a system kernel still resides in a special location of computer memory. You can copy this system kernel from the computer to the disk by using this SYSGEN method.

When SYSGEN prompts for "SOURCE DRIVE NAME", you must enter ***RETURN*** — **not** a drive name.

```
SOURCE DRIVE NAME (OR RETURN TO SKIP) RETURN
```

SYSGEN will now prompt you for the drive that contains the destination disk. Answer the prompt as shown:

```
DESTINATION DRIVE NAME (OR RETURN TO REBOOT) y
```

Where y is the letter of the drive containing the disk that is to receive the system kernel. (The system files cannot be copied through this SYSGEN method.)

SYSGEN will request confirmation with the prompt:

```
DESTINATION ON y, THEN TYPE RETURN
```

Enter a carriage return at this prompt. SYSGEN will put the system kernel onto the destination disk (the disk in drive y).

Then SYSGEN will again display the prompt:

```
DESTINATION DRIVE NAME (OR RETURN TO REBOOT):
```

If you wish to copy the same system components to a different destination disk, then the letter of drive containing this disk should be entered.

If you do not wish to SYSGEN other disks, and you have **not** specified drive A at a previous "DESTINATION DRIVE" prompt, enter a carriage return at this "DESTINATION DRIVE" prompt. The SYSGEN activity will end, and CP/M will display the system prompt.

If you do not wish to SYSGEN other disks, and you specified drive A at a previous "DESTINATION DRIVE" prompt, then you must reset the computer at the second "DESTINATION DRIVE" prompt rather than entering a carriage return. Resetting the computer at this prompt is necessary because entry of a carriage return at this prompt induces a warm boot, which would cause the new system kernel (recently recorded on the disk in drive A) to be loaded into computer memory. It is undesirable to load any part of this new system kernel into memory on a warm boot because it might have just been changed by a MVCPM2x7 utility. Therefore, it might be of a different size than the system kernel that was loaded into memory at bootup.

If you are copying the CP/M system from memory to a destination disk (as you would after using MVCPM2x7), SYSGEN will not be able to copy the system files for you. Since the system files (BIOS85.SYS, BIOS88.SYS, and ALTCHAR.SYS) are essential to make a disk bootable, you must copy them using the PIP utility. If ALTCHAR.SYS can be copied also

The PIP utility can be used to transfer the system files, as shown:

A>**PIP y:=x:*SYS[RV]** ***RETURN***

Where **y** is the destination disk receiving copies of the system files;
where **x** is the source disk from which the system files are copied;
where ***.SYS** is a wild card file name that stands for BIOS85.SYS, BIOS88.SYS, and ALTCHAR.SYS (if present on source); and
where**[RV]** are PIP parameters used to help you copy a file that has system status, and to help you verify the accuracy of the copy operation.

3 SYSGEN Error Messages

INVALID DRIVE NAME

EXPLANATION: User must specify drive names using the names of drives that exist in the hardware environment, and are recognized by the operating system that was loaded at bootup.

NO SOURCE FILE ON DISK

EXPLANATION: The drive specified as "SOURCE DRIVE" did not contain the system files. Use a different disk in the source drive, or rename BIOS files that had been given names other than "BIOS85.SYS" and "BIOS88.SYS".

SOURCE FILE INCOMPLETE

EXPLANATION: SYSGEN failed in an attempt to copy the system files from the disk in the source drive. This file might have been damaged by disk media flaws or partially overwritten. Reset, bootup, and re-enter the SYSGEN command using a different disk in the source drive.

WRITE ERROR DURING SYSTEM FILES

EXPLANATION: Run SYSGEN again with a destination disk that is write-enabled, formatted, and has at least 12 kilobytes of free space.

ERROR READING SYSTEM FILES

EXPLANATION: SYSGEN failed in an attempt to copy system file software from the disk in the source drive. These files might have been damaged by disk media flaws or partially overwritten. Reset, bootup, and re-enter the SYSGEN command using a different disk in the source drive or using a different disk to perform bootstrap.

```
PERMANENT ERROR, TYPE RETURN TO IGNORE
```

EXPLANATION: The system kernel or system files are either incompatible with the destination disk type or otherwise flawed. Reset, bootup, and re-enter the SYSGEN command using a different disk in the source drive or using a different disk to bootup. Under some circumstances, the user must use a MVCPM2x7 utility before SYSGEN.

```
UNABLE TO SELECT DRIVE
```

EXPLANATION: SYSGEN could not read to or write from a disk in a particular drive. Make certain that a formatted disk is properly inserted in the drive and try SYSGEN again.

VERIFY

The Utility that Isolates Recent Bad Sectors on Your Winchester Disk

The VERIFY utility examines your Winchester disk for any bad sectors (media imperfections) that have occurred since the disk was shipped or since the PREP utility was last used. Then VERIFY adds the addresses of these bad sectors to a list of bad sectors that was recorded on the Winchester disk when PREP was run. This list is called the bad sector table.

The VERIFY utility is shipped on the Winchester Utility Disk.

The PREP utility has already been run on all Winchester disks supplied by Zenith Data Systems or Heath. (Refer to the text entitled "The Bad Sector Table" under "PREP" for information on the bad sector table.)

NOTE: After using the VERIFY utility, you must reset and reboot the system. Use bootable media other than the Winchester Utility Disk to reboot after using VERIFY.

1 Bad Sectors

Bad sectors are media imperfections that can cause hard errors during Winchester disk access operations. Hard errors are conditions in which an operation failed after a number of repeated attempts. Recovery from a hard error usually brings an abrupt end to the operation being attempted.

However, the VERIFY utility enables you to prevent hard errors from occurring in the future if these errors were caused by bad sectors. If VERIFY finds a reasonable number of new bad sectors (between 1 and 169), it adds them to the bad sector table that was originally created by the PREP utility.

The PREP utility (which is used before shipping on Winchester disks supplied by Zenith Data Systems or Heath) initializes the Winchester disk. PREP also helps you to make bad sectors inaccessible by creating a table of all the bad sectors, and storing this table on the Winchester disk.

Then, the next time you format a partition, FORMAT will take into consideration the newly acknowledged bad sectors. FORMAT will set up sector boundaries that will prevent usage of the bad sectors during all operations that occur after the formatting operation.

However, you might also obtain hard errors during Winchester disk access due to the following other problems:

- Excessive physical shock
- Entry of foreign material (such as smoke) into the Winchester disk chamber
- Malfunction of the Z-217 controller card
- Temporary loss of power to the disk

If one of these problems causes a hard error, then the disk might not have any new bad sectors for VERIFY to find. In such a case, you should back up the files from your Winchester disk. Then you should use the PREP utility. If you still encounter hard errors after using PREP, contact Zenith Data Systems Technical Consultation for assistance.

2 VERIFY Entries

VERIFY does not destroy any of the data on the Winchester disk. However, if you use VERIFY to isolate bad sectors, then we recommend that after VERIFY, you use BACKUP to copy all files from the partition on which the bad sectors occurred. Then you should use FORMAT on the partition on which the bad sectors occurred. Finally you should use RESTORE to replace the backed up files on this partition.

2.1 INVOKING VERIFY

To invoke VERIFY, type the following command at the system prompt:

A: **VERIFY** ***RETURN***

VERIFY will display the following message and prompt:

```
            VERIFY version 1.00
Copyright(C) 1982, Zenith Data Systems

The VERIFY utility helps you to:

  *  Locate sectors that have failed since you last ran PREP

Do you wish to proceed with VERIFY (Y/N)?
```

2.2 CONFIRMING INTENTIONS TO USE VERIFY

At the "Do you wish to proceed with VERIFY (Y/N)?" prompt, you can press **Y** to continue with the utility, or press any other key to exit to the system.

If you press Y to continue, VERIFY displays the following prompt:

```
Enter bad sector address, or zero to end:
```

2.3 ENTERING BAD SECTOR ADDRESSES

When error conditions are encountered during Winchester disk access operations, CP/M-85 displays a hard error message that is slightly different from the floppy disk hard error message explained in "Appendix A: Operating System Error Messages" in the CP/M-85 manual.

This Winchester disk error message appears in the following form:

```
HARD {operation} ERROR ON DRIVE {d:} STATUS {nn} SECTOR {ssss}
```

Where "{operation}" identifies the operation that was being performed when the error occurred. This operation could be worded as:

READ

or

WRITE

where "{d:}" is the name of the drive to which the partition was assigned when an error was encountered on the partition;

where "{nn}" is a code for the status of the error. These status codes are explained in the Z-217 Technical Manual; and

where "{ssss} is the logical hexadecimal address of the sector on which the hard error occurred. (Logical sector addresses begin with the first sector on the entire Winchester disk, which is sector 0000.)

An error message in this form does not always indicate that your Winchester disk has bad sectors. When you receive such an error message, record the status code, and refer to the Z-217 Technical Manual to determine the meaining of this code. If the error message includes a status code with the number 80 or 81 or a number from 00 through 05 or from 20 through 40, then the error message probably does **not** indicate a bad sector or a reason for using the VERIFY utility.

However, if the error message includes a status code with a number from 10 through 17, then it is likely that your Winchester disk has developed a bad sector. Therefore, you should record the sector address that is also displayed in the error message, and use this sector address to respond to the "Enter bad sector address, or zero to end:" prompt.

We recommend that you also record the partition name and system name of the partition on which the error(s) occurred.

At the "Enter bad sector address, or zero to end:" prompt, enter the address of the logical sector at which the error(s) occurred, or type the digit zero (0) to begin media verification.

If you enter the address of a logical secotr, then VERIFY will continue to display the

```
Enter bad sector address, or zero to end:
```

until you enter a zero.

3 VERIFY Operation

When VERIFY begins to search for bad sectors (after you have typed a zero at the bad sector address prompt) VERIFY displays the message:

```
Beginning verification...
```

3.1 VERIFICATION COMPLETION

When VERIFY is finished verifying the disk, it will display the following message:

```
Beginning verification...Completed
```

3.2 VERIFICATION REPORT

If VERIFY found no bad sectors during the operation, it will also display the following message:

```
No bad sectors located.
```

If VERIFY found a reasonable number (1–169) of bad sectors during its search, it will display the following message:

```
Bad sectors located. Tables modified
```

NOTE: The words Tables modified will not appear in this message if VERIFY is unsuccessful in recording the new bad sector information at the end of the bad sector table.

If VERIFY finds more than 169 bad sectors on the Winchester disk, it will display the following message:

```
Bad sector count exceeded for this drive.
```

4 VERIFY Followup Activities

After you use the VERIFY utility, the data stored on your Winchester disk will still be intact (except the data that was recorded over bad sectors). However, the addition to the bad sector table that VERIFY provides will not be put to use until you use the FORMAT utility on the newly verified media.

The bad sectors that VERIFY found will not become inaccessible until FORMAT is used on the partition that contained the bad sectors. FORMAT will redefine the sector boundaries of the partition so that the bad sectors cannot be accessed.

Reset Reset the computer after using VERIFY, (No partition will be accessible until you do.)

Boot up If you have not already done so, boot up to a floppy disk or partition (other than the partition just verified) that contains the CP/M-85 Operating System.

ASSIGN If necessary, assign the partition on which the error occurred to a drive.

BACKUP Use the BACKUP utility to copy all of the files from the partition to floppy disks.

FORMAT When all of the Winchester disk files have been safely backed up to floppy disk media, use the FORMAT utility. Specify the drive that has been assigned the partition on which the bad sector(s) occurred.

MVCPM217 If you have booted up with a floppy disk, use the MVCPM217 utility to create a CP/M system in memory that can later be transferred to the newly formatted partition. If you have booted up with another partition, then skip using the MVCPM217 utility.

SYSGEN Invoke the SYSGEN utility. If you have booted up with a floppy disk and used the MVCPM217 utility, then press ***RETURN*** at the "SOURCE DRIVE NAME (OR RETURN TO SKIP):" prompt. If you have booted up with another partition and not used the MVCPM217 utility, then enter the drive name for the booted partition at the "SOURCE DRIVE NAME (OR RETURN TO SKIP):" prompt.

RESTORE After formatting this partition, use the RESTORE utility to copy the backed up files back to the Winchester disk partition.

You should take the earliest possible opportunity after verifying to perform these activities to insure the safety of your stored software and data.

5 VERIFY Error Messages

```
Bad sector count exceeded for this drive.
```

Cause: The upper bound limit of 169 bad sectors has been exceeded. This could indicate a hardware malfunction.

Cure: Run VERIFY again. If this error message appears after repeating VERIFY, then run PREP. If this error message appears after running PREP, then contact Zenith Data Systems Technical Consultation for assistance.

```
Error -- Can not read superblock A.
```

Cause: A bad sector error has occurred in the primary superblock (Superblock A).

Cure: This condition is self correcting. The backup or secondary superblock (Superblock B) will now be used. However, we advise that you now back up all of your files and then run PREP and PART again. If superblock B ever becomes unreadable, all data on the Winchester disk will become inaccessible.

```
Error -- Drive capacity > 32 megabytes!
```

Cause: VERIFY has calculated that the Winchester drive connected to the Z-217 controller card is larger than the maximum allowable size of 32 megabytes.

Cure: Run VERIFY being careful to respond with the correct values to the drive parameter questions.

```
Error -- Unable to read boot code from partition
```

Cause: The boot code on the spedified partition is either not present, or it has developed a bad sector.

Cure: Boot from another drive. Then run VERIFY, reset, reboot, and run ASSIGN, BACKUP, FORMAT and RESTORE on the partition where the error occurred. If that partition is totally unavailable, you may need to run the PREP utility.

```
Fatal Error -- Can not read superblock B.
```

Cause: A bad sector error has occurred in the backup copy of the superblock.

Cure: Run VERIFY again.

```
Invalid HEX value, Try again:
```

Cause: Value entered was not a valid hexadecimal number, or the value entered was outside of the possible range.

Cure: Double check the appropriate hex value, and re-enter.

```
Track 0 contains bad sector(s).
```

Cause: A bad sector error has occurred in the reserved area of the hard disk. This could indicate a hardware malfunction.

Cure: Run VERIFY again. If this error message appears after repeating VERIFY, then run PREP. If this error message appears after running PREP, then contact Zenith Data Systems Technical Consultation for assistance.

```
Unable to communicate with the Z217 controller
```

Cause: VERIFY can not locate the Z-217 controller. This could mean that the Z-217 is not firmly plugged into the S-100 bus, all of the drive cable connectors are not securely fastened, or that the controller has a hardware malfunction.

Cure: Check to see that the controller card and all cable connectors are secure, and run VERIFY again. If this error message appears after repeating VERIFY, then run PREP. If this error message appears after running PREP, then contact Zenith Data Systems Technical Consultation for assistance.

```
Unable to re-write tables, disk unusable!
```

Cause: VERIFY is unable to record data in the reserved Winchester area of your Winchester disk.

Cure: Run PREP. If this error message appears after running PREP, then contact Zenith Data Systems Technical Consultation for assistance:

```
Z-217 controller error on Set Drive Parameters command
```

Cause: One or more of the drive characteristics specified in the reserved Winchester area is not valid for your Winchester disk drive.

Cure: Run PREP, making certain that you enter the proper drive characteristics for your Winchester disk drive. If this error message appears after running PREP, then contact Zenith Data Systems Technical Consultation for assistance.

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