
DIGITAL RESEARCHTM

CP/M®-85

Winchester

Supplement

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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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Table of Contents

| | |
|---|------|
| Introduction | VII |
| Section One: Winchester Disk Concepts 1-1 | |
| Winchester Disk Advantages | 1-1 |
| Convenience | 1-2 |
| Flexibility | 1-2 |
| Integrity | 1-2 |
| Winchester Partitions Versus Floppy Disks | 1-3 |
| Accessing Winchester Partitions | 1-4 |
| Default Boot Partition | 1-5 |
| Winchester Disk Precautions | 1-6 |
| Section Two: Winchester Disk Procedures 2-1 | |
| Winchester Utility Procedure | 2-2 |
| Procedure Synopsis | 2-2 |
| Z-DOS Bootup | 2-3 |
| DSKCOPY | 2-5 |
| PART | 2-8 |
| Software Transfer Procedure | 2-14 |
| Procedure Synopsis | 2-14 |
| Floppy Disk Bootup | 2-15 |
| ASSIGN | 2-16 |
| FORMAT | 2-17 |
| MVCMP217 | 2-18 |
| SYSGEN | 2-19 |
| PIP | 2-21 |
| Winchester Partition Bootup | 2-22 |
| PIP | 2-24 |
| CONFIGUR | 2-26 |
| ASSIGN | 2-29 |
| FORMAT | 2-31 |
| SYSGEN | 2-32 |
| PIP | 2-33 |

| | |
|--|------|
| Section Three: Bootup with a Winchester Disk | 3-1 |
| Winchester Disk Booting Alternatives | 3-2 |
| Explicit Winchester Bootup Commands | 3-5 |
| Ambiguous Winchester Bootup Commands | 3-8 |
| Automatic Bootup Feature | 3-11 |
| Bootup Concepts | 3-12 |
| Winchester Bootup Error Messages | 3-15 |
| Section Four: Winchester Disk Software | 4-1 |
| ASSIGN | 4-2 |
| 1 Winchester Disk Partitions | 4-2 |
| 2 Assigning Partition = Inserting Disk | 4-3 |
| 3 Inquiry of Available Partitions | 4-3 |
| 4 Inquiry of Current Assignments | 4-4 |
| 5 Assigning Partitions to Drive Names | 4-4 |
| 6 Valid Assignment Commands | 4-5 |
| 7 ASSIGN Error Messages | 4-6 |
| BACKUP | 4-8 |
| 1 BACKUP Operation | 4-8 |
| 2 Invoking BACKUP | 4-9 |
| 3 BACKUP Sources | 4-13 |
| 4 BACKUP Destination | 4-14 |
| 5 BACKUP Options | 4-16 |
| 6 Runtime Prompting | 4-23 |
| 7 Preparing BACKUP Routines | 4-28 |
| 8 Structure of Backup Files | 4-33 |
| 9 BACKUP Error Messages | 4-35 |
| BSYSGEN | 4-40 |
| 1 Utility Prompt Method | 4-40 |
| 2 System Prompt Method | 4-43 |
| 3 BSYSGEN Error Messages | 4-45 |
| FORMAT | 4-48 |
| 1 Utility Prompt Method | 4-48 |
| 2 System Prompt Method | 4-53 |
| 3 Disk Capacities | 4-58 |
| 4 FORMAT Error Messages | 4-59 |

| | |
|---|-------|
| MVCMP2x7 (MVCMP207 and MVCMP217) | 4-61 |
| 1 Function of MVCMP2x7 | 4-61 |
| 2 MVCMP2x7 Command Line Entry | 4-62 |
| 3 MVCMP2x7 Examples | 4-63 |
| 4 After Running MVCMP2x7 | 4-64 |
| 5 MVCMP2x7 Error Messages | 4-64 |
| PART | 4-66 |
| 1 Partition Features | 4-66 |
| 2 PART Operation | 4-68 |
| 3 The Superblock | 4-98 |
| 4 PART Error Messages | 4-103 |
| PREP | 4-106 |
| 1 Winchester Disk Features | 4-107 |
| 2 Invoking PREP | 4-110 |
| 3 Responding to Disk Characteristic Prompts | 4-111 |
| 4 PREP Operations | 4-115 |
| 5 The Reserved Winchester Area | 4-118 |
| 6 PREP Hardware Adjustments | 4-127 |
| 7 PREP Error Messages | 4-131 |
| RESTORE | 4-134 |
| 1 RESTORE Operation | 4-134 |
| 2 Invoking RESTORE | 4-135 |
| 3 RESTORE Source | 4-138 |
| 4 RESTORE Destinations | 4-139 |
| 5 RESTORE Options | 4-141 |
| 6 Runtime Prompting | 4-148 |
| 7 Preparing RESTORE Routines | 4-151 |
| 8 Structure of Backup Files | 4-156 |
| 9 RESTORE Error Messages | 4-159 |
| SHIP | 4-162 |
| 1 Winchester Disk Safety | 4-162 |
| 2 Invoking SHIP | 4-163 |
| 3 Entering the Shipping Cylinder | 4-164 |
| 4 SHIP Error Messages | 4-166 |
| SYSGEN | 4-167 |
| 1 SYSGEN Invocation | 4-167 |
| 2 SYSGEN Methods | 4-167 |
| 3 SYSGEN Error Messages | 4-172 |

| | |
|------------------------------------|-------|
| VERIFY | 4-174 |
| 1 Bad Sectors | 4-174 |
| 2 VERIFY Entries | 4-176 |
| 3 VERIFY Operation | 4-178 |
| 4 VERIFY Followup Activities | 4-179 |
| 4 VERIFY Error Messages | 4-181 |
| Index | I-1 |

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 proceed 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
MVCMP217
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 :{bootstrap} 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
.
.
.
Z217DRV.R.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} {bootstrap} RETURN {B} {F3} {bootstrap} RETURN {B} {F3} {0} {bootstrap} 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.

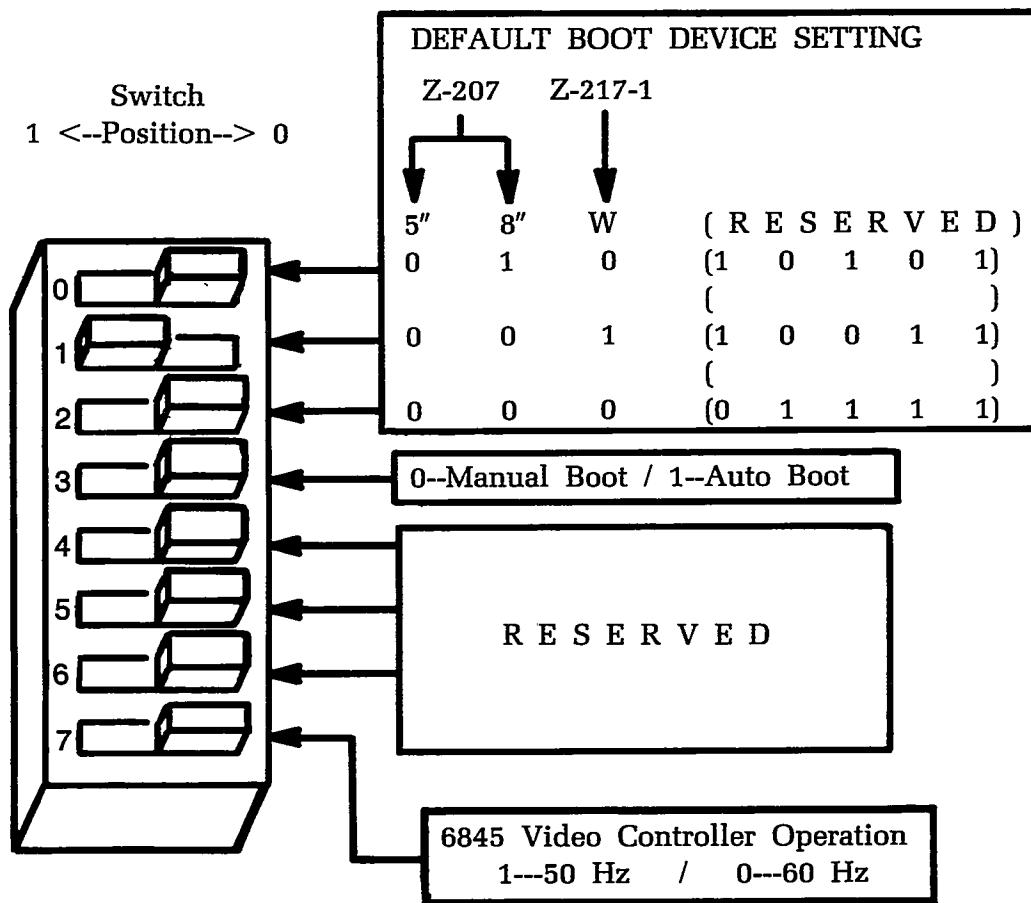


Figure 3-1
Automatic/Manual Bootup Setting (Switch SW-101)

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} {:bootstrap} RETURN

Where **B** is a required input that the computer responds to by displaying **boot**;

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 **{bootstrap}** is an optional string that identifies the particular partition that you wish to boot. If specified, the bootstrap must be preceded by a colon (:); and

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

NOTE: The bootstrap 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 bootstrap include up to 16 for partition name, one for a semicolon, and up to 10 for system name. More details about the bootstrap 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 be 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 bootstrap.

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 bootstrap.

A bootstrap 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 bootstrap 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 bootstrap, but accidentally type an entry for the bootstrap 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 bootstrap. Enter the bootstrap 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 bootstrap 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 bootstrap. All established partition names are displayed on the menu;

where ; is a semicolon that must be 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 bootstrap. 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 bootstrap 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 bootstrap 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 bootstrap 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.)

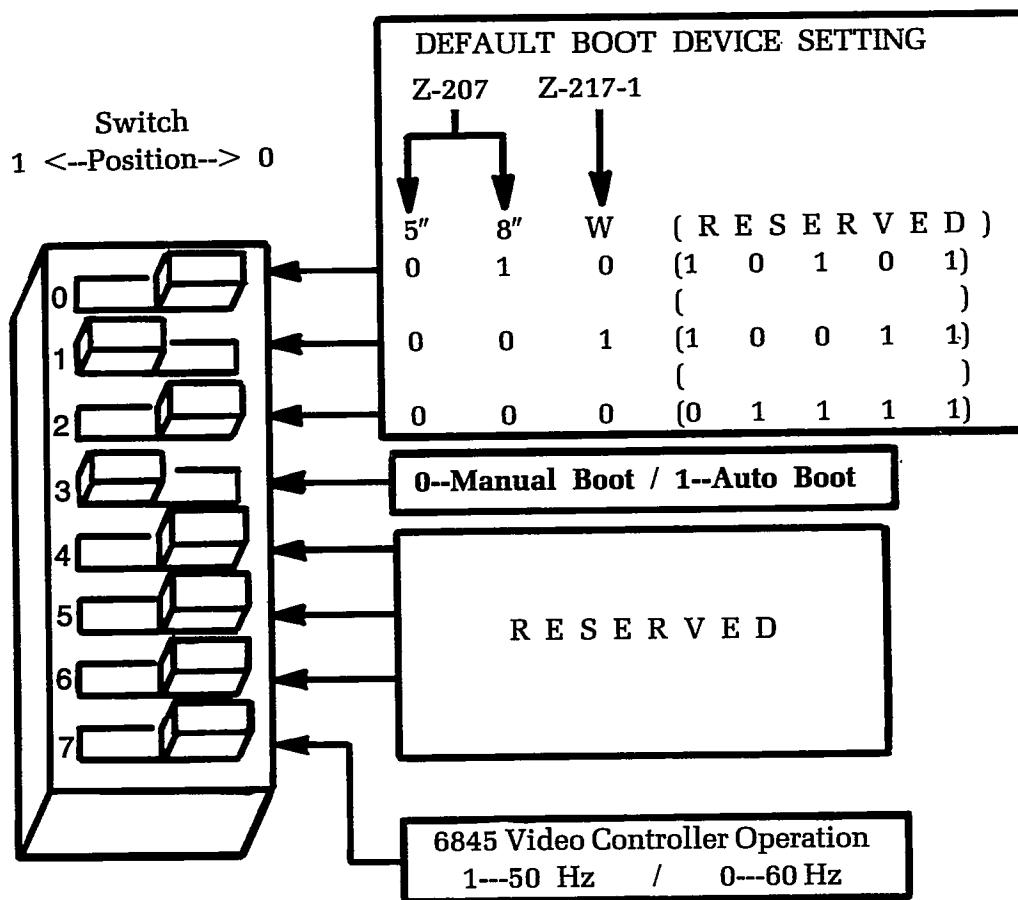


Figure 3-2
Automatic/Manual Bootup Setting (Switch SW-101)

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.

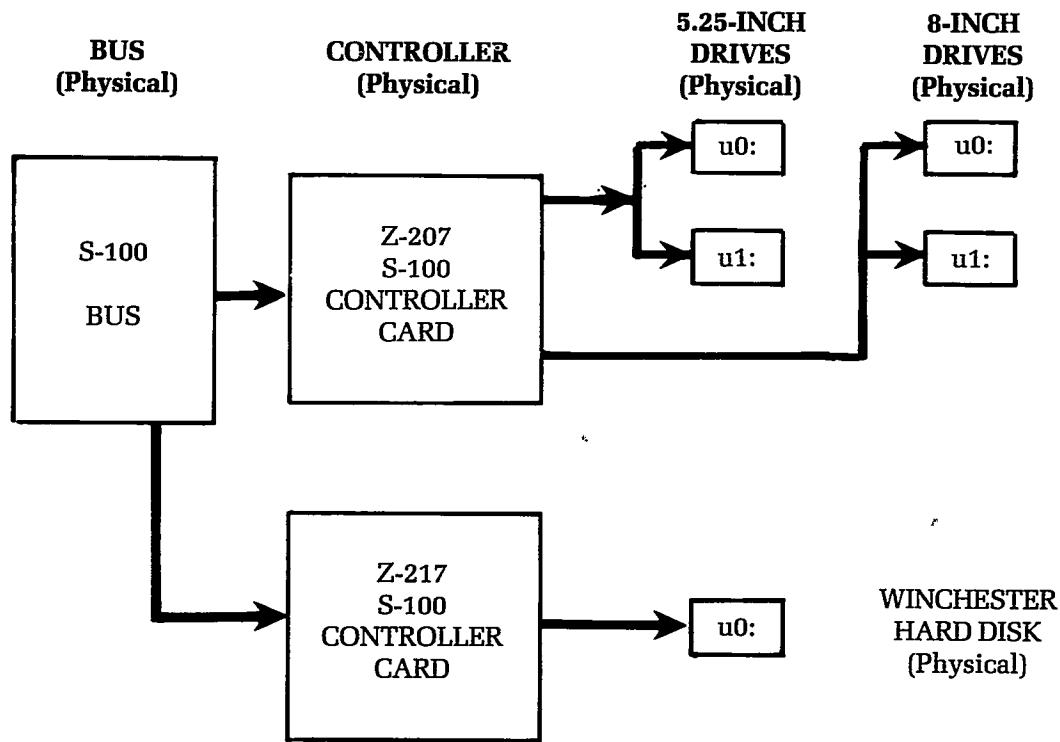


Figure 3-3
Physical Connections from the Hardware Viewpoint

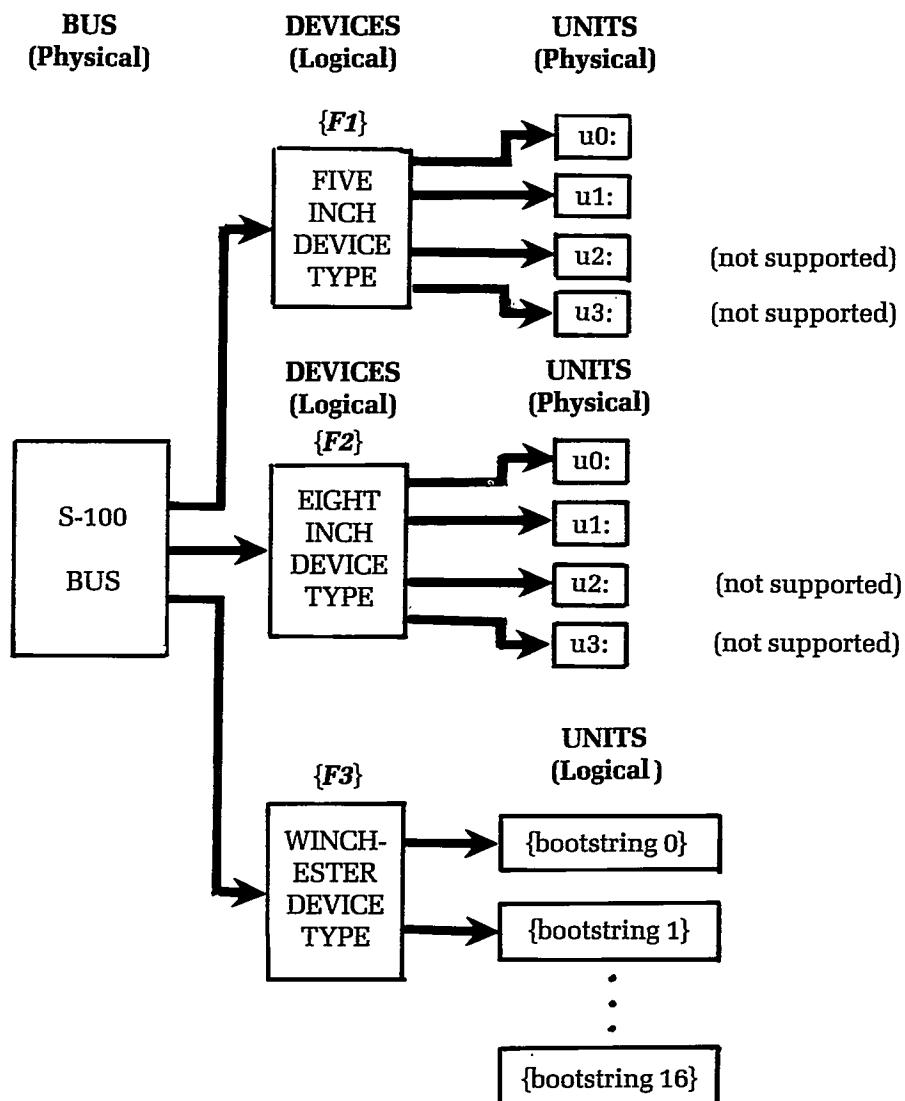


Figure 3-4
Logical Connections from the Bootup Command Viewpoint

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.

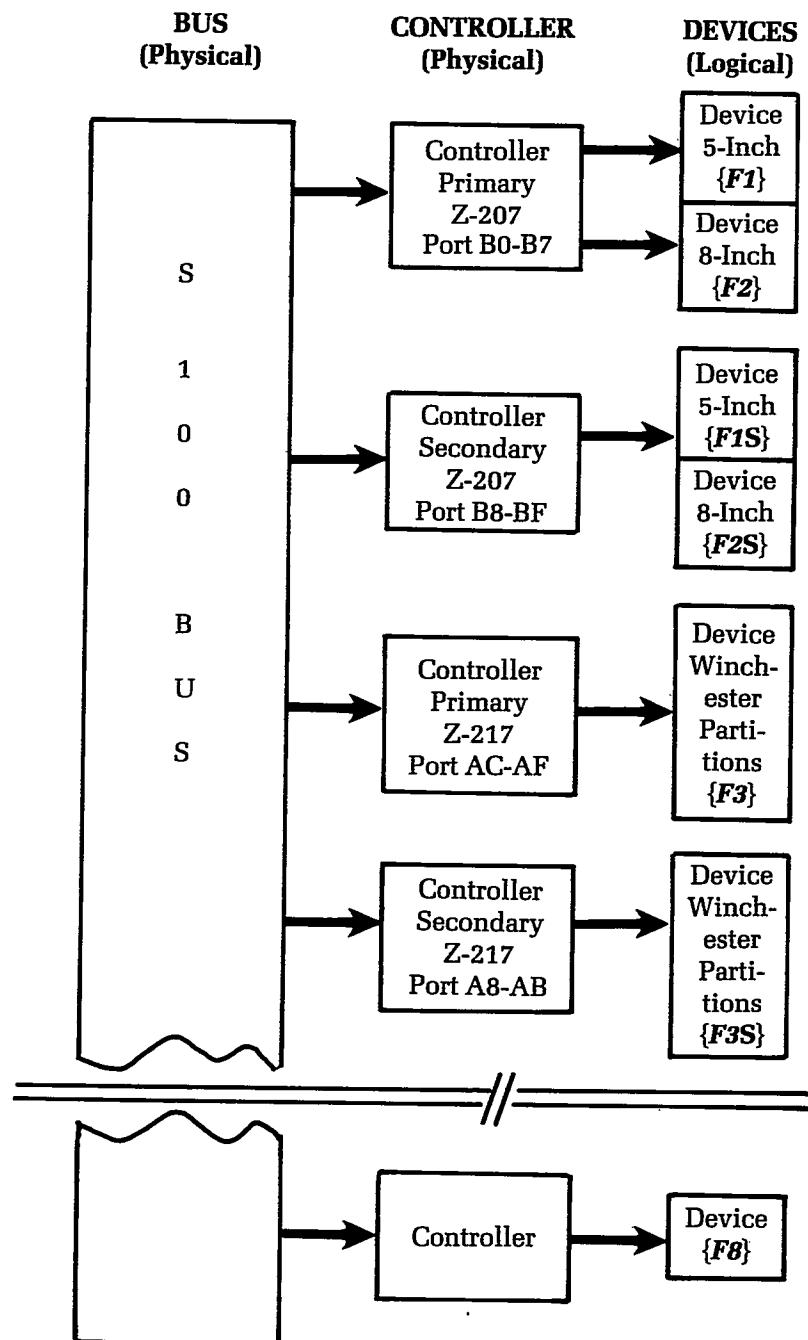


Figure 3-5
Logical Device Extensions With SW-101 DIP Switch

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 bootstrap while no default bootstrap was established, or you entered a bootup command that included an invalid bootstrap.

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 be 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 "bootstrap", 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}:{sorcfle},{s}:{sorcfle},... [{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 {sorcfle} 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}:{sorofile},{s}:{sorofile},... [{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 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 backup. For example, from the CP/M system prompt:

A>BACKUP BACK9 [L] RETURN

or the same operation from the BACKUP utility 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.

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".

WORDSTARTM 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:*.S3 [D:\$4-\$5-\$6;V] RETURN

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 | 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 both 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 |
| Single-sided | 241 kilobytes | 482 kilobytes |

This table shows the file capacities of single-sided 8-inch disks:

| | Single density | Double density |
|--------------|----------------|----------------|
| Single-sided | 241 kilobytes | 482 kilobytes |
| Double-sided | 490 kilobytes | 980 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 use with the CP/M-85 Operating System and software that runs under CP/M-85. The other is intended for use 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. | | | |
| <hr/> | | | |

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:

| Partition Name | System Name | 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:

| Partition Name | 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. | | | |
| <hr/> | | | |
| 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 |
| <hr/> | | | |
| 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:

| Partition Name | 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:

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:

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 updating 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".

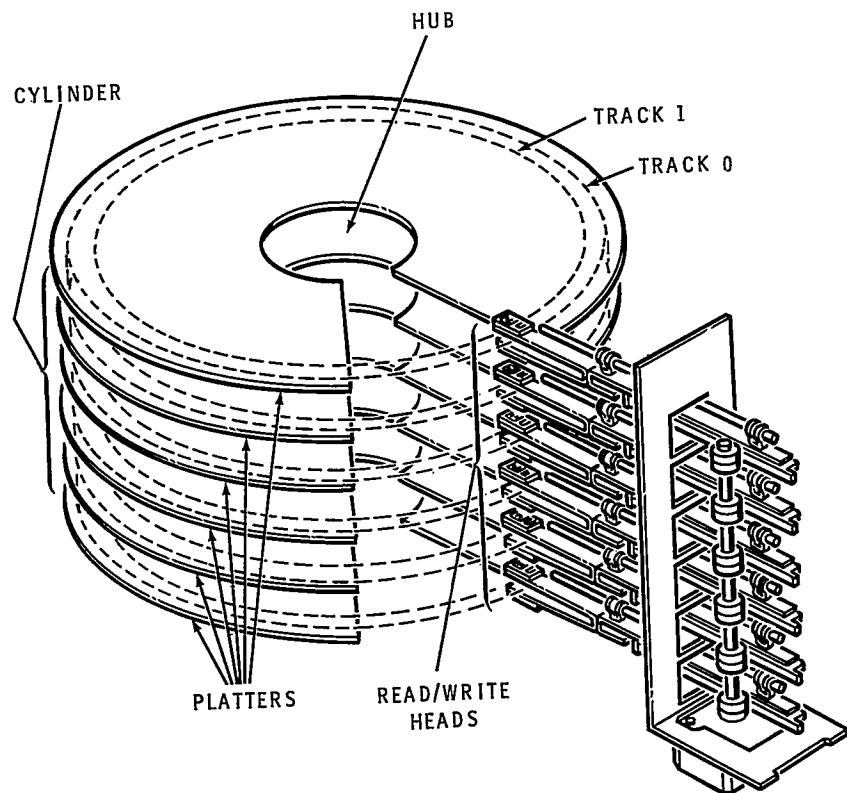


Figure 4-1
Winchester Disk Components

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 than 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 step rate 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 |

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 bootstrap or a default boot partition. A bootstrap 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 bootstrap 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 bootstrap 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 bootstrap (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.

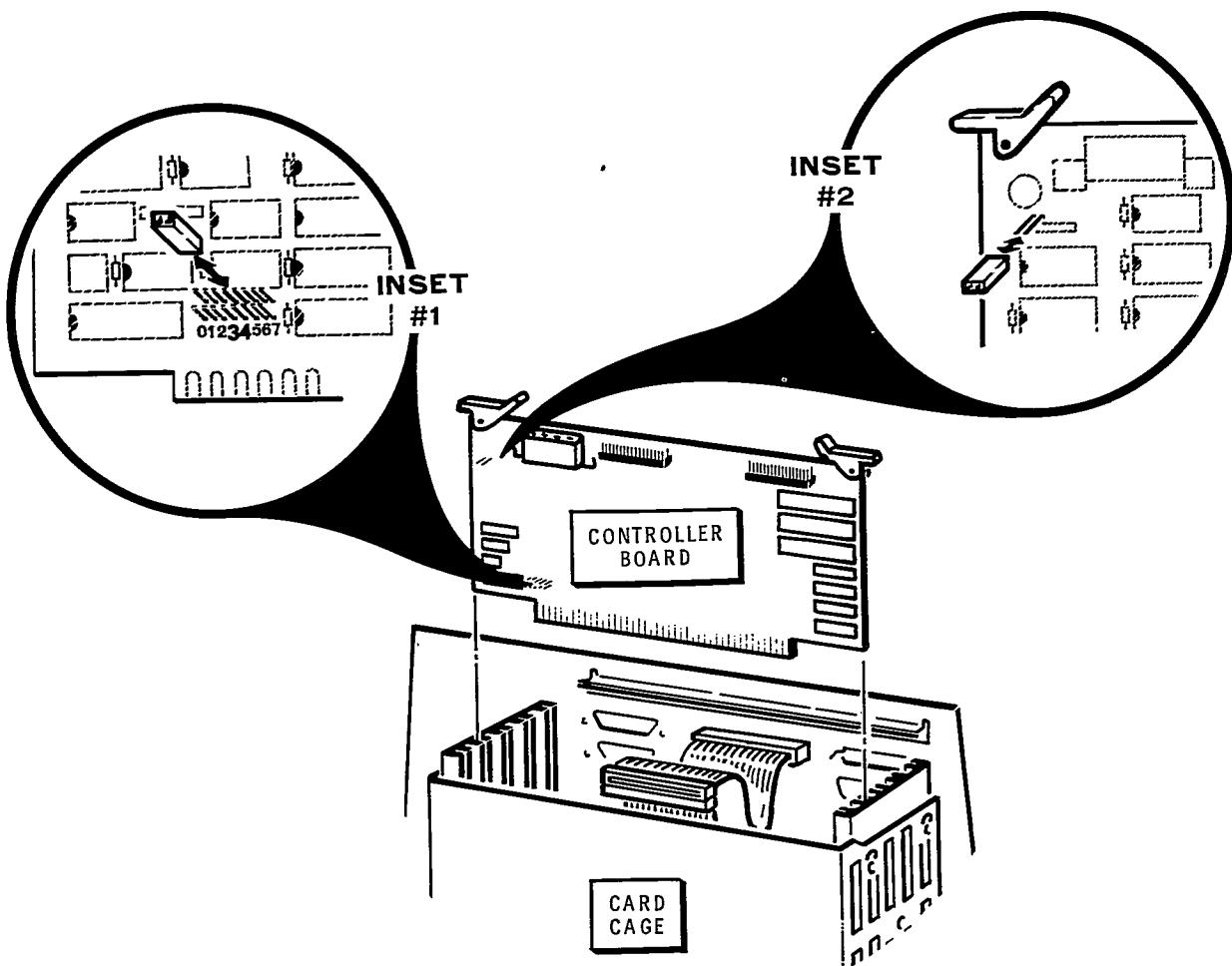


Figure 4-2
Z-217 Controller Board Adjustment

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 appropriate 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 finished 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 Backup 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}:{sorcfle} [{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 {sorcfle} 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}:{sorcfle} [{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 **{sorcfle}** 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. Ambiguous 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}:{sorcfi1e} [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 **{sorcfi1e}** 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}, {sorcfle}.{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 "{sorcfle}" 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, {sorcfle}.{nnn-1},
insert another disk in drive {x},
and hit RETURN when ready,
or hit any other key to abort.

Where “{sorcfle}” 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, {sorcfle}.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, {sorcfle}.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:*.S2=\$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.
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 meaning 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 sector, 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 specified 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.

○





Index

A

Allocation percentage, 4-82, 4-101
ALTCHAR.SYS, 4-40, 4-42, 4-44, 4-168, 4-171
 Application programs, 2-24, 2-33
ASSIGN, 1-4, 4-2, 4-179
 Automatic bootup, 3-11

B

Backup, 2-5
 Backup file, 4-8, 4-15, 4-33, 4-134, 4-138, 4-156
BACKUP, 1-2, 4-8, 4-134, 4-179
 Bad sector, 4-174
 Bad sector address, 4-177
 Bad sector table, 4-118, 4-124, 4-174
BIOS85.SYS, 4-40, 4-42, 4-44, 4-168, 4-171
BIOS88.SYS, 4-40, 4-42, 4-44, 4-168, 4-171
 Boot command, 2-3, 2-15, 2-22, 3-3, 3-5, 3-8, 4-179
 Boot loader, 4-120
 Boot up, 2-3, 2-15, 2-22, 3-3, 3-5, 3-8, 4-179
 Bootstring, 2-22, 3-3, 3-5, 3-9
 Bootup
 automatic, 3-11
 manual, 2-3, 2-15, 2-22, 3-3, 3-5, 3-8, 4-179
BSYSGEN, 4-40, 4-167

C

Capacity, 4-50, 4-51, 4-58
 Checksum, 4-102, 4-122, 4-124, 4-126
 Commands
 ASSIGN, 1-4, 4-2, 4-179
 BACKUP, 1-2, 4-8, 4-134, 4-179
 BSYSGEN, 4-40, 4-167
 CONFIGUR, 2-26

DIR (Z-DOS), 2-7

DSKCOPY, 2-5
FORMAT, 1-3, 2-17, 2-31, 4-48, 4-180
MVCPM207, 4-61, 4-167, 4-170
MVCPM217, 2-18, 4-61, 4-167, 4-170, 4-180
PART, 1-2, 1-3, 1-5, 2-8, 4-66
PIP, 2-21, 2-24, 2-33, 4-171
PREP, 1-2, 1-3, 4-106
RESTORE, 1-2, 4-134, 4-180
SAVE, 4-64
SHIP, 1-3, 4-162
SYSGEN, 4-40, 4-167
VERIFY, 1-3, 4-174

Controller, 1-2, 3-12, 4-61, 4-106, 4-163, 4-175

CONFIGUR, 2-26

Cylinder, 4-109, 4-111, 4-114, 4-162, 4-164

D

Date, 2-4, 4-18, 4-23

Default boot partition, 1-5, 2-11, 4-72, 4-87

Destination

BACKUP, 4-14
BSYSGEN, 4-42, 4-43
RESTORE, 4-139
SYSGEN, 4-169, 4-170

DIR (Z-DOS), 2-7

Directory entries

 backup files, 4-33, 4-156
 individual file, 4-34, 4-157

Disk

 floppy, 1-3
 Winchester, 1-1, 1-3
DSKCOPY, 2-5
 Drive, 1-3

E

Exception files
 BACKUP, 4-19
 RESTORE, 4-143

F

Flag byte, 4-101, 4-122
FORMAT, 1-3, 2-17, 2-31, 4-48, 4-180
Format-enable, 4-106, 4-130

H

Heat, 1-6

I

Initialization
 of disk, 4-115
 of Reserved Winchester Area, 4-117

J

Jumper, 4-127

L

Logical sector, 4-177

M

Manual bootup, 2-3, 2-15, 2-22, 3-3, 3-5, 3-8, 4-179
Maximum allocation, 2-11
Minimum allocation, 2-10
Miniscribe Mod II 2012, 4-114, 4-165
Modem, 2-26
MTR-100, 3-5
MVCMP207, 4-61, 4-167, 4-170
MVCMP217, 2-18, 4-61, 4-167, 4-170, 4-180

O

Operating system name, 2-10, 4-79, 4-99
Option
 BACKUP, 4-16
 BSYSGEN, 4-44
 FORMAT, 4-54
 RESTORE, 4-141
Overwriting files, 4-145

P

PART, 1-2, 1-3, 1-5, 2-8, 4-66

Partition

 default boot, 1-5, 2-11, 4-72, 4-87
 definition, 1-1, 1-2, 1-3, 1-4
 name, 2-9, 4-74
 table, 4-99, 4-123
Percentage, 4-82, 4-101
Physical shock, 1-6, 4-162
PIP, 2-21, 2-24, 2-33, 4-171
Platter, 4-107, 4-162
Pre-comp cylinder, 4-112, 4-114
PREP, 1-2, 1-3, 4-106
Printer, 2-26

Q

Query
 BACKUP, 4-21
 RESTORE, 4-145

R

RAM, 4-61
Random Access Memory, 4-61
Read/Write head, 4-106, 4-111, 4-114, 4-162
Reduced write current cylinder, 4-112, 4-114
Reserved Winchester Area, 4-100, 4-118
RESTORE, 1-2, 4-134, 4-180

S

SAVE, 4-64
SBC, 4-118, 4-119
Sectors, 4-109, 4-174
SHIP, 1-3, 4-162
Shipping, 4-162
Shipping cylinder, 4-164
Software boot code, 4-118, 4-119
Source

 BACKUP, 4-13
 BSYSGEN, 4-41, 4-43
 RESTORE, 4-138
 SYSGEN, 4-168, 4-170
Starting sector, 4-100, 4-123
Step rate, 4-112, 4-114
Superblock, 4-98, 4-118, 4-122
Switch (SW-101), 3-2, 3-11
SYSGEN, 4-40, 4-167

System files

copied by BACKUP, 4-22
copied by BSYSGEN, 4-40, 4-42, 4-44
copied by RESTORE, 4-146
copied by SYSGEN, 4-168, 4-171
System kernel, 4-61
System name, 2-10, 4-79, 4-99
Software Transfer Procedure, 2-1, 2-14

T

Table

bad sector, 4-118, 4-124, 4-174
partition, 4-71, 4-99, 4-122
Track, 4-109

U

User number

BACKUP, 4-22
RESTORE, 4-147

Utilities

ASSIGN, 1-4, 4-2, 4-179
BACKUP, 1-2, 4-8, 4-134, 4-179
BSYSGEN, 4-40, 4-167
CONFIGUR, 2-26
DSKCOPY, 2-5
FORMAT, 1-3, 2-17, 2-31, 4-48, 4-180
MVCMP207, 4-61, 4-167, 4-170
MVCMP217, 2-18, 4-61, 4-167, 4-170, 4-180
PART, 1-2, 1-3, 1-5, 2-8, 4-66
PIP, 2-21, 2-24, 2-33, 4-171
PREP, 1-2, 1-3, 4-106
RESTORE, 1-2, 4-134, 4-180
SHIP, 1-3, 4-162
SYSGEN, 4-40, 4-167
VERIFY, 1-3, 4-174

V

Verification
with BACKUP, 4-23
of disk media, 4-174
with DSKCOPY, 4-6
with RESTORE, 4-147
with VERIFY, 4-174

VERIFY, 1-3, 4-174

Volume

BACKUP, 4-9, 4-25, 4-26, 4-34
RESTORE, 4-134, 4-149, 4-158

W

Winchester disk, 1-1, 1-2, 1-6, 4-108, 4-175
Winchester Utility Disk, 2-1, 2-2, 4-66,
4-106, 4-162
Write pre-compensation cylinder, 4-112, 4-114

Z

Z-100, VIII, 3-11
Z-207, 3-13, 4-61
Z-217, 3-13, 4-61, 4-163, 4-106, 4-175, 4-177
Z-DOS, 2-3, 4-66, 4-106, 4-162, 4-174



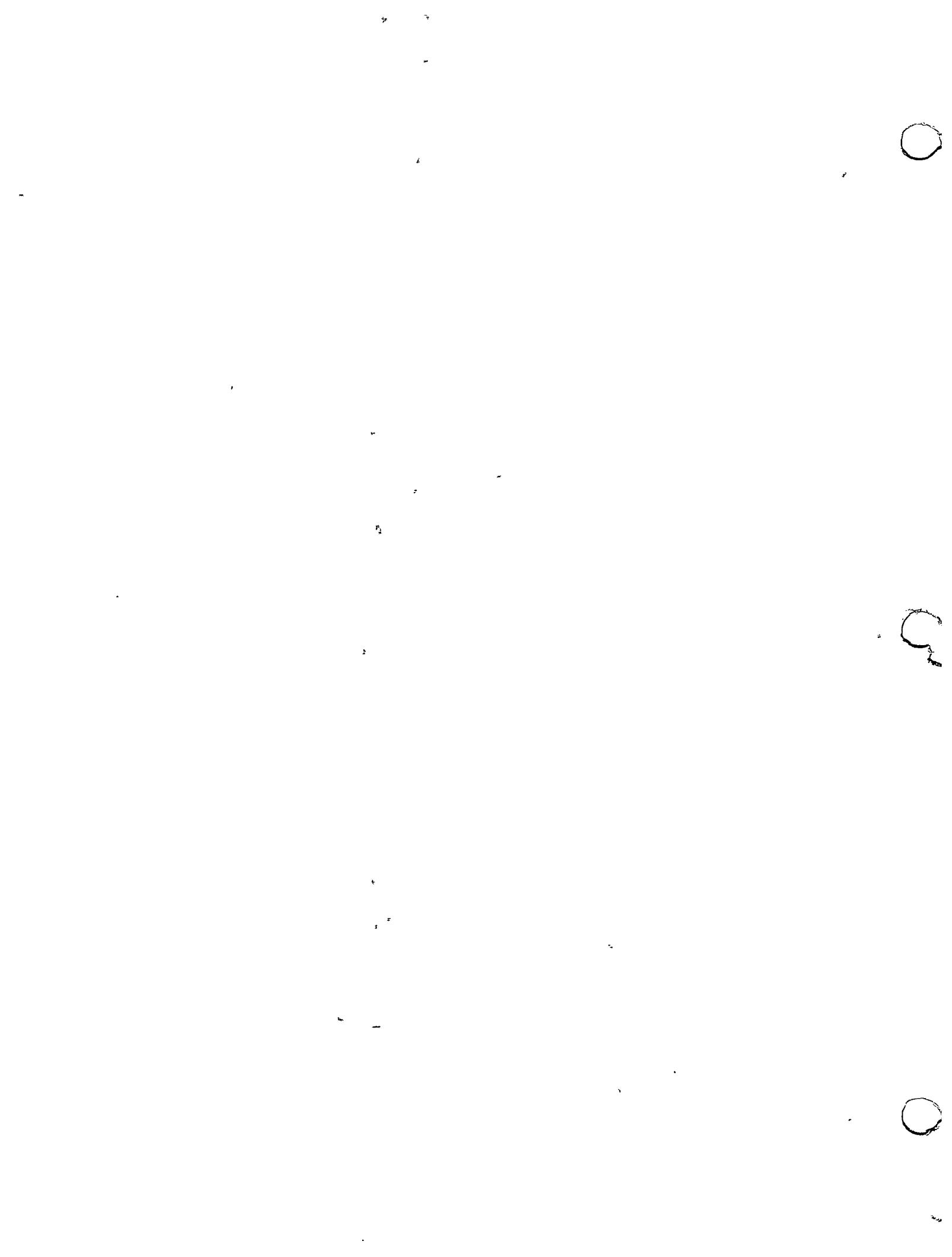












Z-DOS™
Winchester
Supplement

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HEATH

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ESSENTIAL REQUIREMENTS for using: Z-DOS Winchester Utilities

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

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TABLE OF CONTENTS

| | | |
|--|---|------|
| Preface | Reasons for Z-DOS Supplement | VII |
| | Affected Operations | IX |
| | Affected Code | X |
| | Revised Utilities | XI |
| | New Utilities | XII |
| | A Note About the Changes | XIV |
| | Notation Used in this Supplement | XV |
| Introduction to Winchester Disks | Chapter 1 | |
| | Concepts | 1.1 |
| | Winchester Partitions versus Floppy Disks | 1.2 |
| | Winchester Disk Advantages | 1.3 |
| | Default Boot Partition | 1.4 |
| | Winchester Disk Precautions | 1.5 |
| About Boot-up and System Initialization | Chapter 2 | |
| | Moving Z-DOS from Partition to Memory | 2.1 |
| | Boot-Up | 2.2 |
| | System Initialization | 2.4 |
| System Resources | Chapter 3 | |
| | Hardware Considerations | 3.1 |
| | Disk Space | 3.3 |
| | Memory | 3.3 |
| | File System | 3.4 |
| Disk Drive Names | Chapter 4 | |
| | Drive Names for Winchester Disk Systems | 4.1 |
| | Default Drive | 4.3 |
| Getting Started | Chapter 5 | |
| | Winchester Boot-Up | 5.1 |
| | Switch SW-101 | 5.2 |
| | Boot Command | 5.3 |
| | Boot Command Devices | 5.8 |
| | Winchester Boot-Up Error Messages | 5.12 |

TABLE OF CONTENTS

Chapter 6

| | |
|--|------|
| Reasons for Procedures | 6.1 |
| Winchester Utility Procedure | 6.2 |
| System Transfer Procedure | 6.16 |
| Accessing More than Two Z-DOS Partitions | 6.33 |

Winchester Disk Procedures

Chapter 7

| | |
|---|------|
| BACKUP (Create Master Backup Files) Command | 7.1 |
| Invoking BACKUP | 7.2 |
| Sources | 7.5 |
| Destinations | 7.6 |
| Switches | 7.7 |
| Runtime Prompting | 7.13 |
| BACKUP Routines | 7.16 |
| The Backup File | 7.19 |
| BACKUP Error Messages | 7.24 |

BACKUP

Chapter 8

| | |
|------------------------------------|-----|
| FORMAT (Format Disk) Command | 8.1 |
| FORMAT Operations | 8.2 |
| Invoking FORMAT | 8.5 |
| Disk Format Variations | 8.8 |

FORMAT

Chapter 9

| | |
|--|-----|
| MAP (Physical to Logical Drive Name Mapping) Command | 9.1 |
| Invoking MAP | 9.2 |
| MAP Examples | 9.4 |

MAP

Chapter 10

| | |
|---|-------|
| PART (Winchester Disk Partitioning) Command | 10.1 |
| Partition Features | 10.2 |
| PART Operation | 10.3 |
| Invoking PART | 10.4 |
| PART Ratification | 10.5 |
| Choice of Operation | 10.7 |
| Partition Name | 10.10 |
| Operating System Name | 10.15 |

PART

TABLE OF CONTENTS

| | |
|-------------------------------------|-------|
| Allocation Percentage | 10.18 |
| Default Boot Partition Number | 10.24 |
| Entering Choice of Operation | 10.29 |
| Choice of Exit Methods | 10.33 |
| The Superblock | 10.35 |
| The Starting Sector | 10.37 |
| The Flag Byte | 10.38 |
| Disk Space Calculation | 10.38 |
| Verifying the Superblock | 10.39 |
| PART Error Messages | 10.40 |

PREP

Chapter 11

| | |
|---|-------|
| PREP (Winchester Disk Partitioning) Command | 11.1 |
| Winchester Disk Features | 11.2 |
| Invoking PREP | 11.5 |
| Responding to PREP Questions | 11.6 |
| PREP Operations | 11.10 |
| The Reserved Winchester Area | 11.12 |
| The Software Boot Code (SBC) | 11.14 |
| The Superblock | 11.16 |
| The Bad Sector Table | 11.19 |
| PREP Hardware Adjustments | 11.21 |
| PREP Error Messages | 11.25 |

RESTORE

Chapter 12

| | |
|---|-------|
| RESTORE (Restore Master Backup Files) Command | 12.1 |
| Invoking RESTORE | 12.2 |
| Source | 12.6 |
| Destinations | 12.6 |
| Switches | 12.8 |
| Runtime Prompting | 12.13 |
| RESTORE Error Messages | 12.15 |

SHIP

Chapter 13

| | |
|---|------|
| SHIP (Park Winchester Read/Write Heads) Command | 13.1 |
| SHIP Entries | 13.2 |
| SHIP Error Messages | 13.4 |

TABLE OF CONTENTS

Chapter 14

| | |
|--|------|
| VERIFY (Verify Winchester Sectors) Command | 14.1 |
| Bad Sectors | 14.2 |
| VERIFY Entries | 14.3 |
| VERIFY Operation | 14.5 |
| VERIFY Followup Activities | 14.6 |
| VERIFY Error Messages | 14.7 |

| | |
|--------------------|-----|
| Index | S.1 |
|--------------------|-----|

VERIFY

| |
|--------------|
| Index |
|--------------|

PREFACE

Reasons for Z-DOS Supplement

With the advent of the Z-217 and H-217 Winchester hard disk drive controller card and the Z-217-2 and H-217-2 5.25-inch Winchester hard disk drive (from here on referenced as a Z-217 Winchester disk, or more simply as the Winchester), some additions and exceptions need to be taken to the Z-DOS Operating System Manual. This Winchester Disk Support Supplement augments the information that is contained in the Z-DOS manual.

The presentation of the material in this supplement follows the same form as the Z-DOS manual—using Brief, Details, and Application. Some material from the Z-DOS manual has been repeated where it was necessary to complete a thought, fill in the overall details being covered, and avoid fragmentation. The material in this supplement takes precedence over that in the Z-DOS manual. However, the Z-DOS manual needs to be studied thoroughly to make the best use of the operating system.

**Brief,
Details, and
Application**

The Brief is designed to provide a quick reference to the topic covered within the chapter. The Brief is primarily important to the advanced user or as a summary to the chapter content. The Details section is a comprehensive guide to every useful fact about the topic, elaborating on the information provided in the Brief. The Application section (where it is used) is a summary of what is contained in the chapter. The Application provides examples of practical use of the product to put information from the Details section to work.

**Changes to
the Z-DOS
Manual**

If this is your first contact with Z-DOS, familiarize yourself with the material in the first six chapters of the Z-DOS manual. You may want to take note of the following changes and additions:

Chapter 2 of this supplement, “About Bootstrap and System Initialization”, includes information about how and when the Winchester disk affects the system during the boot. This updates the text headed “About Bootstrap and System Initialization” in the Z-DOS manual.

Chapter 3 of this supplement, “System Resources”, shows the Winchester disk’s relation to the system resources. This chapter updates the text headed “System Resources” in the Z-DOS manual.

PREFACE

Reasons for Z-DOS Supplement

Chapter 4 "Disk Drive Names", updates the text headed "Disk Drives" in the Z-DOS manual.

Chapter 5 "Getting Started", contains the new Winchester disk boot up information. This chapter supplements the text headed "Getting Started" in the Z-DOS manual.

Chapter 6 "Winchester Disk Procedures", contains the step-by-step procedures for using a Winchester disk drive for the first time. This chapter should be used instead of the "Getting Started" text that is also headed "Create a Backup System Disk" in the Z-DOS manual.

The following sections briefly describe some of the changes occurring in Z-DOS for Release 1.10 (Winchester Support), since Release 1.00. Detailed information about most of these changes can be found amongst the 14 chapters of this supplement.

PREFACE

Affected Operations

Boot

Z-DOS release 1.10 enables you to boot specific portions of the Winchester disk called "partitions". The act of booting a partition is similar to the act of booting a floppy disk.

This Z-DOS release enables you to create as many as 16 partitions on a Winchester disk. These partitions are listed in sequence on a table called the "superblock". In the superblock, each partition is identified by its partition name, operating system name, size, and other criteria. (Partitions containing Z-DOS are always identified with the operating system name "Z-DOS".)

When you boot a Z-DOS partition that is listed in the superblock, that partition is automatically accessible as drive E:. If another Z-DOS partition is listed later in the sequence of superblock partitions, then this partition is automatically accessible as drive F:.

If you boot a floppy disk, the first and second (if any) Z-DOS partition listed in the superblock will automatically become accessible as drives E: and F:, respectively.

PREFACE

Affected Code

The BIOS locks in the structure of the Z-DOS partitions it locates during BIOS the boot procedure.

IO.SYS Source Code Changes:

| | |
|-----------|---|
| DEFSBC | defines superblock. |
| DSK_PREAD | physical sector read on Winchester (DSKREAD does logical sector read; PREAD and READ are offset). |
| MAXDSKW | maximum physical drive number (4 or 5) of established Winchester partitions |
| DSK_TYPE | 00 = Z-207 Drive/Controller 01 = Z-217 Drive/Controller |
| DSK ASN | Disk Assign; Bit 1 assigned if partition. |
| DSK_FRS | Restore disk step rate to normal. |
| DSK_BSEC | Partition Base Sector. |
| DSKW_NPS | Number of physical sectors in partition. |
| DSKW_FAT | Winchester FAT description |
| DSKW_SIZE | Winchester Block Size |

PREFACE**Revised Utilities**

| | |
|-----------------|---|
| CONFIGUR | Prompts change from A: – D: to A: – F:. |
| DSKCOPY | Upleveled from 1.01 to 1.02. Prompts for drives A: – F:.. |
| DSKCOMP | Upleveled from 1.01 to 1.02. Prompts for drives A: – F:.. |
| FORMAT | FORMAT does not truly format a partition (PREP does the actual formatting). The FORMAT command performs almost the same operations on a partition as it does on a floppy disk when you enter FORMAT/C. FORMAT also outlines sector boundaries on a partition while avoiding sectors with unusable media (bad sectors) that have been found and listed by other utilities. When formatting a partition, FORMAT states: Will FORMAT partition assigned drive E: ; instead of: Place disk in drive A: . |
| | After formatting a partition, format does not ask: Format another (Y/N)? but returns to the system prompt. |
| | When FORMAT is used on a partition, the directory written to that partition will occupy 30 sectors and hold 480 entries. |
| MAKE | MAKE reads the complete data (instruction) file into memory on beginning, thus allowing disks to be swapped immediately. |
| MAP | Drive names E: and F: are displayed by the map table. |
| | NOTE: When one of two 5.25 inch soft-sectored drives is replaced, or when only one is installed, B: appears as imaginary. This is not a software change but should be noted by anyone replacing a floppy disk with a built-in Winchester. |
| RDCPM | Upleveled from 1.13 to 1.15. |

PREFACE

New Utilities

BACKUP provides a means for any readable logical device to be backed up to any writable logical device (providing that they both intelligibly accept binary as well as ASCII characters — this excludes CON and PRN in most cases). A multitude of switches are available for this utility that allow it to be used very selectively in its capacity. These switches also provide a selective means of control even during automated use from a batch file. Its counterpart is RESTORE.

BACKUP

PART provides a means of defining 16 partitions on a hard disk, and allocating a percentage of the space available to each partition. The Winchester disk comes already partitioned with 50% of the Winchester space allocated to Z-DOS (partition name: Z-DOS) and 50% allocated to CP/M (partition name: CPM). Because the disk is partitioned at the factory, you need not use PART unless you want a different storage allocation, or unless you require more than one partition. After making any changes with PART, you must reboot before you can access any partition.

PART

PREP performs the actual formatting of the Winchester disk. It creates the superblocks and bad sector tables. PREP creates one Z-DOS and one CP/M partition of equal lengths by default. The Winchester disk comes prepared with PREP from the factory. You need not use PREP (VERIFY generally suffices) unless you receive one of the error messages listed in the section on PREP that states PREP must be used. After running PREP, you must reset the system and boot up with a floppy disk before you can access any partition.

PREP

RESTORE provides a means to restore data from any readable logical device to any writable logical device (providing that they both intelligibly accept binary as well as ASCII characters — this excludes CON and PRN in most cases).

RESTORE

RESTORE complements the activities performed by BACKUP. RESTORE also provides switches for a high degree of selectivity in its capacity (particularly useful while being used in a batch file).

PREFACE

New Utilities

- PSC** The source code for a new utility has been included that provides a bare-bones method of copying information currently displayed on the CRT to the LST device. Information about the LST device needs to be selected in the source code by adjusting the conditionals for the appropriate device. The file PSC.ASM contains source code and comments.
- SHIP** The SHIP utility helps you to protect the components of your Winchester from damage that can be caused by physical shock during shipping or other physical movements. You should use SHIP whenever you plan to move your Winchester disk — even if you are only moving it across the room. After using SHIP, you must reset the system and reboot.
- VERIFY** The VERIFY utility alleviates running PREP, in most cases, when media errors are received. PREP overwrites all data stored on the Winchester disk. VERIFY does not. VERIFY merely identifies bad sectors so that a subsequent FORMAT operation can separate them from usable disk sectors. After using VERIFY, you must reset the system and reboot.

PREFACE

A Note About the Changes

The obvious reason for these changes is to provide support for Winchester disks running under the Z-217 controller, which ultimately improves the capabilities of the Z-100 by providing more on-line storage. However, to provide support for the Winchester, only the BIOS (IO.SYS), and the FORMAT utility needed to change. The additional changes are made as ongoing enhancements: utilities and processes that make the Z-100 into a more flexible and powerful business tool.

Because the Winchester disk comes from the factory with default partitions already setup, you do not need to use PREP and you may not need to use PART unless you want to change the default partitions (50% Z-DOS and 50% CP/M storage space is allocated) to fit different needs.

The BACKUP and RESTORE utilities are useful for any disk drive devices in your Z-100 hardware environment, whether floppy disk drives or Winchester disk drive partitions.

PREFACE

Notation Used in this Supplement

The following notation has been used to describe the syntax of commands:

- < > Angle brackets indicate an item that is to be entered (when boldface alone does not suffice).
 - If these brackets contain lowercase text, that text defines the type of response that you make (i.e., your response belongs to a class or type described by the text).
 - If these brackets contain uppercase text, that text is the literal name of a key or command (file).
- [] Square brackets indicate that the item enclosed is optional.
- ... Ellipses indicate that the preceding item may be optionally repeated as many times as is needed.

In addition to the previous, the following notation is also used:

- RETURN** indicates the "RETURN" key (a carriage return is to be entered).
- CTRL** indicates the "CTRL" key (Control).
- CTRL-<letter>** indicates that you should hold the "CTRL" key down and press the key labelled <letter>. For instance, when the notation "CTRL-C" is used, hold down the control key and press the key labelled C.
- <**d:**> indicates a disk drive name.
- <**dev**> indicates a logical device name.
- <**filename**> indicates the primary name of a file. A <filename> can also be used to signify a logical device name (<**dev**>).

PREFACE

Notation Used in this Supplement

<.ext> indicates the extension of a file.

<filespec> indicates [**<d:>**]<filename>[**<.ext>**], where a filename must be given; the drive name is optional but should be given if the drive name is not the current default drive; and the extension is optional. A <filespec> can also be used to signify a logical device name (**<dev>**).

CHAPTER 1 INTRODUCTION TO WINCHESTER DISKS

Concepts

Brief

Winchester disks have greater storage capacity and greater data retrieval/storage speed than floppy disks.

Logical divisions of the Winchester, called partitions, are used to subdivide and allocate storage space.

Partitions are bootable when they are properly initialized, partitioned, and formatted as a system disk, which transfers the system files. The Winchester comes from the factory with one Z-DOS partition (and one CP/M partition) ready to be formatted with a FORMAT/S command, which will make the Z-DOS partition bootable.

Partitions are booted by typing special boot entries or by establishing one partition as a "default boot partition" using the PART utility.

Details

There are two basic types of disk drives that are used for data storage by the Z-100 series computer—floppy disks, and Winchester hard disks. (The floppy disk is discussed in your Z-DOS manual.)

A "Winchester disk" is a stack of round metal platters coated with a magnetic oxide. This disk is permanently enclosed in a vacuum 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 operations, a Winchester partition behaves just like a floppy disk. Therefore, when explanations in the Z-DOS manual refer to a "disk", the same explanation is often applicable to a partition as well.

INTRODUCTION TO WINCHESTER DISKS

Winchester Partitions versus Floppy Disks

For most Z-DOS operations, you can think of a Winchester partition as if it were a floppy disk. However there are differences, as well as similarities, between Winchester partitions and 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 name.
- Each can contain an operating system, so that you can boot a partition or a 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. The partitions in Winchester drives supplied by Zenith Data Systems or Heath cannot be removed from the Winchester disk drive, although partitions can be created, eliminated, enlarged, or contracted by special programs (PREP and PART). (Some Winchester disk drive units with removable platters are available elsewhere in the microcomputer market.)
- The Z-DOS operating system is able to access any existing floppy disk drives upon bootup. Z-DOS can access a maximum of two Winchester partitions upon bootup, if two Z-DOS partitions have been created (note that Winchester disks supplied by Zenith Data Systems

INTRODUCTION TO WINCHESTER DISKS

Winchester Partitions Versus Floppy Disks

or Heath are shipped from the factory with only one Z-DOS partition set up). Z-DOS can make use of up to 16 partitions, but only two adjacent partitions can be accessed at any one time.

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 Z-DOS 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 Z-DOS software (BACKUP and RESTORE) provide you with a convenient method for backing up large quantities of disk files, and then restoring these files 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.

INTRODUCTION TO WINCHESTER DISKS

Winchester Disk Advantages

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.

Integrity

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.

Default Boot Partition

Booting up with a partition requires different procedures than booting up with a floppy disk.

You must either type special bootup entries 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 an optional system name, though not necessarily the Z-DOS system.

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. "Chapter 5: Getting Started" of this supplement 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

INTRODUCTION TO WINCHESTER DISKS

Default Boot Partition

partition is established as the default boot partition, you do not need to enter its partition name and system name in order to boot up with it. "Chapter 10: PART" 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.

Winchester Disk Precautions

Because 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.

- Keep electric motors, appliances, telephones, etc, away from 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 above 32 degrees Celsius (90 degrees Fahrenheit) or temperatures below 15 degrees Celsius (60 degrees Fahrenheit)
- Do not subject the Winchester disk (or the cabinet containing the Winchester disk) to physical shocks or impacts.
- Keep the Winchester disk away from sources of smoke or other extremely warm air.

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

CHAPTER 2

ABOUT BOOT-UP AND SYSTEM INITIALIZATION

Moving Z-DOS from Partition to Memory

Brief

During the boot-up activity, the system is initialized by the following sequence:

From a Winchester Disk Drive (Z-217 Controller):

- The Software Boot Code (SBC) is loaded into memory, from the first cylinder of the Winchester disk, by the MTR-100 ROM.
- The SBC then locates the requested partition and loads the “boot loader” from the reserved sectors (sectors 0 – 31 on a partition).

From a Floppy Disk Drive (Z-207 Controller):

- The boot loader is loaded into memory by the MTR-100 ROM.

After the Boot Loader is in memory:

- IO.SYS is loaded into memory by the boot loader and displays its banner. Then,
- IO.SYS determines hardware status, checks for the existence of two Z-DOS partitions (which, if found, are incorporated into the BIOS), and initializes the attached devices (including the logical devices CON, AUX, and PRN); then,
- Z-DOS.SYS is loaded by IO.SYS. Then,
- Z-DOS.SYS displays its banner and is initialized by IO.SYS for internal working tables, a correct location for FAT's (File Allocation Table) directory and data buffers, then,
- IO.SYS looks for and loads a file called ALTCHAR.SYS if it exists on the default drive (see Appendix N in the Z-DOS manual).
- IO.SYS loads COMMAND.COM into a location allocated by Z-DOS.SYS. Control passes to,
- COMMAND.COM (details on COMMAND.COM are found in the Z-DOS manual in the text entitled “COMMAND.COM and Command Execution”), and COMMAND.COM's banner is displayed.

ABOUT BOOT-UP AND SYSTEM INITIALIZATION

Boot-up

Details

The Z-DOS operating system cannot perform any microcomputer activity until it is loaded into computer memory. The task of loading Z-DOS into computer memory is shared by Z-DOS itself and by a component of the Z-100 called the MTR-100 ROM. Z-DOS and MTR-100 perform this task during an activity called "boot-up" or "cold boot" or "bootstrap".

How does
Z-DOS get
Started

A boot-up activity can be initiated either by turning on the computer or by entering a boot-up command through the keyboard.

NOTE: The boot-up activity can occur between MTR-100 and any operating system that has been customized to work with Z-100 hardware. However, in this document, we will explain the boot-up activity as it pertains to the Z-DOS operating system.

The "boot" is a small program stored within the hardware (MTR-100) that serves to establish a communications link between an operating system (Z-DOS in this case) and the various physical parts of the computer. The boot-up activity is so named because, by means of this activity, Z-DOS "pulls itself up by its bootstraps". After several years of use, the term "bootstrap" has evolved into the terms "boot" and "boot-up". This activity enables Z-DOS to be copied from the disk and into the computer's memory. Once Z-DOS is installed in memory, it issues instructions and coordinates the actions of the appropriate parts of the computer.

What is a
Boot-up
Activity

During the boot-up activity, the boot program checks the specified device for a disk (or a partition) and searches a particular location that has been reserved on the disk for a boot loader (the boot code).

During the
Boot-up
Activity

NOTE: When the ROM is directed to the Z-217 controller during boot-up, the ROM loads a pre-loader called the SBC (Software Boot Code). The SBC determines which partition is to be booted and then loads the first 32 sectors from the partition into memory. If these 32 sectors contain the boot loader program of a particular operating system, then the boot loader continues the activity as it would were it loaded from a floppy disk.

ABOUT BOOT-UP AND SYSTEM INITIALIZATION

Boot-up

The boot loader is recorded on a disk whenever it is formatted (during FORMAT/C, a disk receives a new copy of the boot loader, though formatting is not renewed). The disk is considered "bootable" when the system files are recorded on the disk (system files are placed on a disk by running FORMAT/S). A bootable disk is one from which the boot code can place the operating system into memory. This activity requires that both the boot loader and system files be present.

After the boot loader is found, it is copied from the disk into memory and the loader continues the boot-up process. The boot loader looks for, locates, and copies (loads) the Z-DOS system from the disk into memory (if the operating system files are not present, the message No System appears on your console).

Once the operating system is in memory it examines the hardware environment to determine its characteristics (memory size, location and type of peripherals, etc.), checks to see if a superblock (the superblock is covered in "Chapter 11: PREP") exists on a Winchester disk that references any partitions allocated to Z-DOS and prepares both itself and the hardware for operation, and then takes control.

Z-DOS is composed of three basic components. When Z-DOS is copied from the disk into memory during the boot-up procedure, three files that make up Z-DOS are transferred. (An explanation of files and filenames is found in the text entitled "Files and Filenames" in the Z-DOS manual.)

These files are:

IO.SYS
Z-DOS.SYS
COMMAND.COM

When the boot loader is first copied into memory Z-DOS checks the directory on the disk or partition to make certain that the first file listed is IO.SYS. The boot loader then loads this file into memory. If this file is not the first file in the directory, the No System error message will be displayed on the video screen.

ABOUT BOOT-UP AND SYSTEM INITIALIZATION

System Initialization

After IO.SYS is read into memory, control is passed to it from the boot loader and a series of setup routines is performed. These routines prepare the system for operation and prepare the peripherals that are connected. IO.SYS also checks to see if there is a superblock on an attached Winchester disk. If the superblock points to Z-DOS partitions, the characteristics of the first two (or one if only one is found) Z-DOS partitions are fixed in the BIOS. This preparation is known as "initialization". "Initialization" generally means that something is being made ready for immediate or first use.

NOTE: If the boot command is issued to the Z-207 controller, the operating system incorporates information about the first two Z-DOS system partitions it locates in the superblock. If the boot command is issued to the Z-217 controller, the operating system takes the specified or implied Z-DOS partition and the next occurrence of a Z-DOS partition in the superblock, if there is one, and incorporates that information.

IO.SYS then moves the Z-DOS.SYS file to a specific location in memory and Z-DOS displays a banner that gives the information about the version in use.

The Z-DOS.SYS internal structure is initialized and specific areas are set aside within memory. These areas are used for workspace and for storage of directory information from each valid partition or disk drive that is connected. When IO.SYS finishes these tasks, the disk drives (and partitions) are initialized and IO.SYS looks on the default drive's disk for a file named ALTCHAR.SYS (see Appendix N in the Z-DOS manual), which is used for special character fonts. If ALTCHAR.SYS is found, it is read into memory at a specific location for use in the character font.

IO.SYS then checks the disk to find a file named COMMAND.COM and loads it into a specific workspace in memory. IO.SYS then passes control over to COMMAND.COM, and COMMAND.COM displays its banner.

The files named IO.SYS, Z-DOS.SYS, and COMMAND.COM combine to form the operating system that controls all system resources. Note that the two system files Z-DOS.SYS and IO.SYS are "hidden" files and are not displayed when a directory command (DIR) is executed.

All of these steps occur in a few seconds: the boot occurs, Z-DOS initializes itself and its hardware, and control is passed to the command processor to wait for your commands.

CHAPTER 3

SYSTEM RESOURCES

Hardware Considerations

Brief

System resources consist of:

- Disk Space (Including Partitions)
 - Memory
 - Peripheral Devices (printer, monitor, modem, terminals, etc.)
-

Details

The system and peripherals connected to the computer are known as System Resources. System resources include peripheral devices such as terminals, printers, and serial lines. However, a system's most important system resources are its disk space and its memory. The relationship between the operating system and system resources is shown in Figure 3.1.

SYSTEM RESOURCES

Hardware Considerations

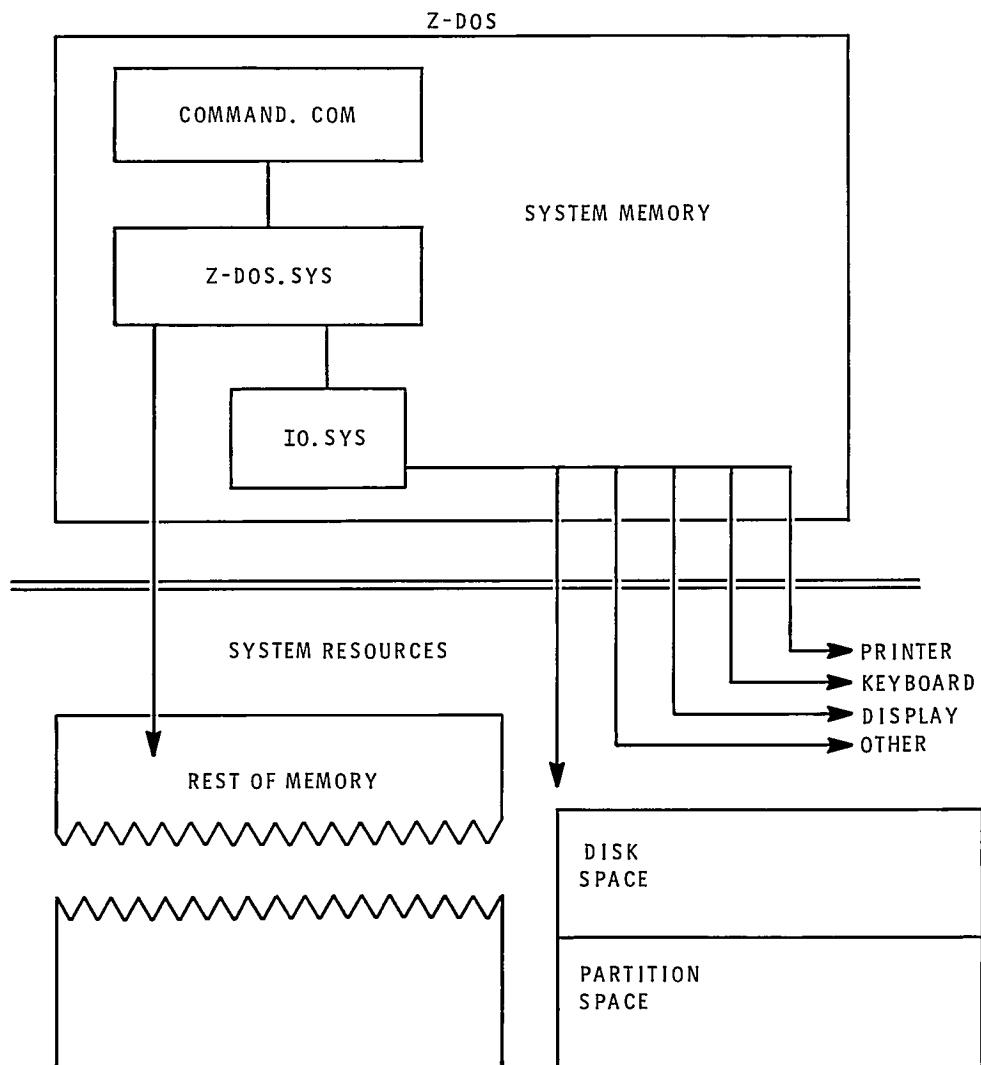


Figure 3.1
Z-DOS and Its Resources

SYSTEM RESOURCES

Disk Space

In Z-DOS, disk space is divided into four parts:

| | |
|-------------------------|---|
| Reserved Sectors | The reserved sectors contain information that is used each time Z-DOS is booted up. On floppy disks and partitions the Boot Loader occupies the reserved space. On the Winchester, outside of any partitions, some space is reserved that includes the superblocks, and bad sector tables (information about superblocks and bad sector tables is found in the text entitled "The Reserved Winchester Area" in "Chapter 11: PREP"). |
| Directory | The directory contains information about each file on a given disk. This information includes the file's complete filename, its size, and its time and date of last modification. |
| FAT's | The File Allocation Table (FAT) contains location information for the data that is contained in each file on a given disk. Note that Z-DOS does not require a file's contents to reside in physically contiguous disk sectors. Additional information regarding FAT's are contained in Chapter 8 of this supplement, under the FORMAT command. |
| Files | The greatest majority of disk space is reserved for the contents of files. An individual file does not necessarily reside in contiguous sectors on disk, and may be "scattered" so that all sectors may be used. |

Memory

Besides controlling a system's disk space and its other devices, Z-DOS must also control main memory. This means that Z-DOS must be capable of loading files into memory either as data files or as files that are to be executed.

| | |
|-------------------------------|---|
| Files Loaded by IO.SYS | The actual loading of files is performed by IO.SYS, the lowest level of the Z-DOS operating system. Loading of executable files is supervised by COMMAND.COM. For most programs, control is returned to Z-DOS after either normal or abnormal termination of a program. |
|-------------------------------|---|

SYSTEM RESOURCES

Memory

Part of COMMAND.COM may be overlaid to make room for a particularly large executable file. After execution of such a file, Z-DOS automatically loads the overlaid part of COMMAND.COM back into system memory. Normal execution of COMMAND.COM resumes.

COMMAND.COM
Overlaid

If the overlaid part of COMMAND.COM is not available on disk because the disk on which it resides has been removed, the following message appears:

Insert system disk in default drive
and strike any key when ready

Also, if an incorrect version of COMMAND.COM is found, a similar message appears:

Invalid COMMAND.COM
Insert system disk in default drive
and strike any key when ready

File System

The preceding discussion of system resources explored many of the internal aspects of the operating system. A file system, on the other hand, can be thought of as the external organization of system resources. It provides a way of talking about files and devices.

Z-DOS supports device independent I/O. The distinction between files and devices is an internal distinction, not an external one. Therefore, you can treat files and devices alike, and refer to either with filenames or filespecs. Both of these are covered in the Z-DOS manual under the heading "Z-DOS Conventions."

Device
Independent
Input/Output

SYSTEM RESOURCES

File System

However, disk space is slightly different because it is divided into drives and partitions. The disk space in a drive and on a particular disk is further subdivided into files, as shown in Figure 3.2.

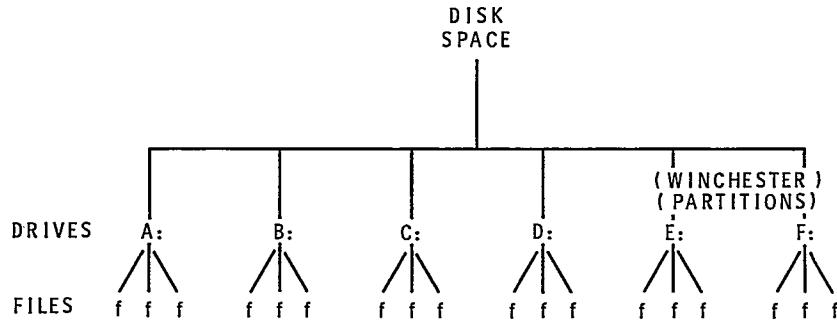


Figure 3.2
Disk Space Divisions

With this version of Z-DOS, drives are named so that up to 6 different drives can be referenced. Drives are named with the letters A through F. Each letter is followed by a colon (:). This colon separates the name of the drive from individual filenames or wildcard filenames within that drive. This letter-colon combination is called a drive designation.

NOTE: This release of Z-DOS only allows drive names A: through F:.

This version of Z-DOS supports the following 6 different disk formats:

- 1) single-sided double-density 48 tpi 5.25-inch:
(drive A: and drive B:)
- 2) double-sided double-density 48 tpi 5.25-inch:
(drive A: and drive B:)
- 3) double-sided double density 96 tpi 5.25-inch:
(drive A: and drive B:)
- 4) single-sided single-density 8-inch:
(drive C: and drive D:)
- 5) double-sided double-density 8-inch:
(drive C: and drive D:)

SYSTEM RESOURCES

File System

- 6) variable-size (up to 8 megabytes) 5.25-inch partition:
(drive E: and drive F:)

When Z-DOS is booted, the drive name assignments are fixed. After Z-DOS has been booted, the name assignments may be reassigned with the MAP command (details on MAP are found in "Chapter 9: MAP"). The fixed drive names are illustrated in Table 3.1.

| Drive | Z-DOS Assignment |
|--|------------------|
| left-hand or upper 5.25 inch drive | A: |
| right-hand or lower 5.25 inch drive | B: |
| left-hand or upper 8-inch drive | C: |
| right-hand or lower 8-inch drive | D: |
| Z-DOS (first or specified Z-DOS partition in superblock) Z-DOS (second or next Z-DOS partition in superblock) | E: F: |

Table 3.1
Z-DOS Fixed Drive Name Assignments

CHAPTER 4

DISK DRIVE NAMES

Drive Names for Winchester Disk Systems

Brief

Supported Drive Names: A B C D E F

After a boot, the booted drive is the default drive. All requests assume the default drive unless otherwise specified. To assign another drive as the default drive from the A: prompt, you would enter:

A: d: RETURN

where A: is the current default drive's prompt;
d: is the name of the drive to log-in; and
RETURN is a carriage return.

The new drive (shown as d:) then becomes the default drive and the system prompt is for example, D: (if you entered D:).

To access a file from a non-default drive, you enter:

A: d:filename RETURN

where A: is the current (default) drive's prompt;
d: is the drive name where the file resides;
filename is the primary name of the file;
RETURN is a carriage return.

Details

Partitions on a Winchester disk are treated in most cases like floppy disks. Because of this, drive names are used to refer to partitions.

Drive
Names

A disk drive is a device that copies data to and from disk storage media. These data transfers occur between memory and the disk. Because of

DISK DRIVE NAMES

Drive Names for Winchester Disk Systems

the Z-DOS device-independent input/output handling, memory may seem transparent (not obviously apparent, nor present and involved) during some types of transfers. What this means is that you can type in data on your keyboard and it may be directed to a disk, although it actually does go from keyboard to memory and then to disk.

To allow you to refer to disks and files within your disk drives, the Z-DOS operating system recognizes each drive in your hardware environment by a distinct drive name. Partition names are used to divide up the storage area of a Winchester disk into separate logical sections that can be treated as if they were separate disk drives. Because partitions may be treated like separate drives, information regarding disk drives and drive names also applies to partitions and the drive names assigned to partitions.

NOTE: There is a distinction between the drive name assigned to a partition, and the partition name and system name of the partition. Partitions are given drive names by the Z-DOS operating system. However, before Z-DOS has been loaded into computer memory (during bootup), you must have some other way of accessing a partition with your computer.

Therefore, before the bootup operation has finished loading Z-DOS into memory, your partitions are accessible by partition names and system names. Partition names and system names are assigned to partitions by the PREP or PART utilities. PREP and PART store these names on the Winchester disk to enable you to bootup.

A drive name is the name that Z-DOS uses when a particular partition is referenced. The drive name that is assigned to a partition is the name that you will use during most of your Winchester disk activities. (The assignment of partitions to drive names is explained in "Chapter 5: Getting Started".)

This version of Z-DOS allows a drive name to consist of a letter of the alphabet from "A" to "F", and a colon (:).

DISK DRIVE NAMES

Drive Names for Winchester Disk Systems

Supported Drive Names

Currently, the supported drive names are "A", "B", "C", "D", "E", and "F". "A" and "B" refer to your system's 5.25-inch disk drives; "C" and "D" refer to your system's 8-inch disk drives; "E" and "F" refer to the first two Z-DOS partitions that occur in the superblock (information about the superblock is contained in "Chapter 10: PART") of a Winchester disk. These name assignments can be changed by the MAP utility included in your Z-DOS software (described in "Chapter 9: MAP"). The MAP utility is included for those special instances when renaming drives may be desirable.

The Default Drive Upon Bootup

The drive (or partition) that Z-DOS is copied from is the initial "default drive". When you boot Z-100 models ZF-110-22 or ZF-120-22 without specifying an alternate drive, the A: system prompt that your console displays, confirms that Z-DOS is in the computer. When you boot Z-100 models ZW-110-22 or ZW-120-22 (once Z-DOS partitions have been allocated and formatted) without specifying an alternate drive, the E: system prompt that your console displays, confirms that Z-DOS is in the computer.

If you boot from another drive, the default drives prompt <d:> is displayed (where <d:> is the name assigned by Z-DOS; see Table 3.1). You can always be certain which drive is your default drive because the system prompt shows the name of the current default drive. The default drive is the drive to which the system will refer, unless you tell the system to refer to a different drive.

Changing the Default Drive

You can change the default drive by typing the name of another drive and a carriage return at the A: prompt, as:

A: B: RETURN

DISK DRIVE NAMES

Default Drive

This entry produces a new system prompt, indicating that drive B: is now the default drive, as:

A: B: RETURN

B:

NOTE: Any drive that is changed to the default drive in this fashion must be a valid drive within your hardware environment. For this drive to be accessed, it must either contain a properly formatted disk or be assigned a properly formatted partition. However, the default drive's floppy disk or partition does **not** have to contain the Z-DOS system files, since copies of these files are loaded into memory during bootup.

Experiment with switching default drives by entering drive names (with a carriage return) one-at-a-time at the system prompt. When you switch default drives in this fashion, Z-DOS assumes that a program you request is on the disk in the new default drive.

CHAPTER 5

GETTING STARTED Winchester Boot-up

Brief

There are two methods that you can use to boot Z-DOS on the Z-100:

Method 1: Auto-Boot

Method 2: Manual Boot

Command Format:

Boot[<dev>][<#>][<S>][:<boot string>] RETURN

where **B** is required input that the computer completes with **oot**;
<dev> is an optional function key (F1 through F8) that determines which device the computer is to use.(Only the function keys F1, F2, and F3 are valid **<dev>** entries with Z-217 Winchester hardware.);
<#> is the optional unit number of the device type connected to the device controller that is to be used;
<S> is optional and specifies that the secondary device controller is to be used;
<bootstring> is an optional string identifying the particular partition that you wish to boot. If entered, this string must be preceded by a colon (:); and
RETURN is a required carriage return.

Details

Z-DOS and your Winchester disk hardware environment enable you to boot up in a wide variety of ways. This chapter shows you how to boot up to any floppy disk drive or Winchester disk partition.

Through slight alterations of your hardware settings and/or the software on your Winchester disk, you can also determine whether you will need to type an explicitly detailed boot-up command, a short ambiguous boot-up command, or any boot-up command at all.

GETTING STARTED

Switch SW-101

The method you use to boot your Z-100 Computer is determined by a switch setting inside the Computer. You do not need to change this switch unless you would prefer a different setting. The switch is numbered SW-101 in your hardware manual (see Figure 5.1). This switch selects the default boot device and comes preset at the factory for Auto-Boot. Z-100 computers without a built in Winchester (Models ZF-110-22 or ZF-120-22) are set to boot from drive A:. Z-100 Computers with the Winchester built in (Models ZW-110-22 or ZW-120-22) are set to boot from the Winchester.

To determine if your Z-100 computer is set for Auto-Boot without checking Switch SW-101, power up the computer when it is fully connected to its components and to an appropriate power supply. If a drive active light turns on within a minute after powerup (without any keyboard entries), then the SW-101 switch is set for Auto-Boot.

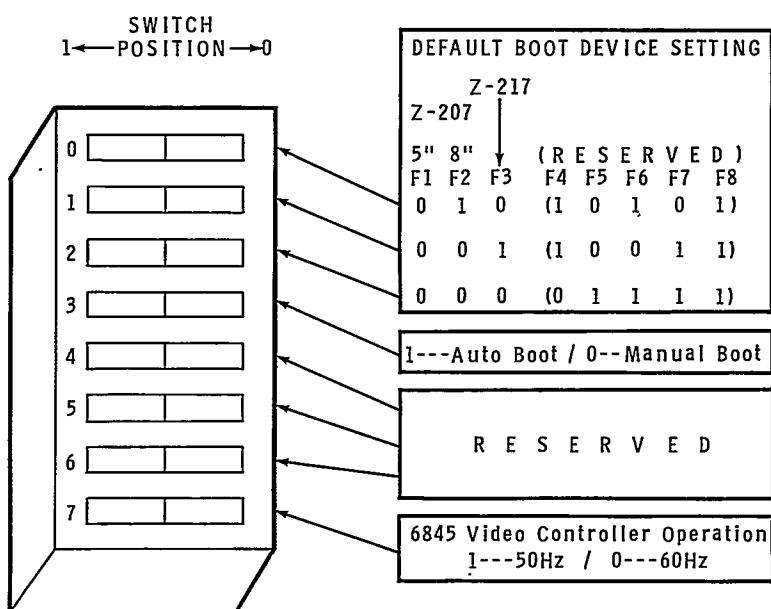


Figure 5.1
Manual/Auto Boot Setting (Switch SW-101)

GETTING STARTED

Boot Command

The MTR-100 ROM Boot command is performed from the keyboard in response to the "pointing finger" prompt. There are several options available so that you can boot from any of the drives in your system.

The Boot command syntax is:

BOOT[<dev>][<#>][<S>][:<boot string>] RETURN

where **B** is required input that the computer completes with **00T**; **<dev>** is an optional function key (F1 through F8) that determines which device is to be used. (Only the function keys F1, F2, and F3 are valid **<dev>** entries with Z-217 Winchester hardware.); **<#>** is the unit number to be used; **<S>** is optional and specifies that the secondary device controller is to be used; **<bootstring>** is an optional string that identifies the particular partition that you wish to boot. If specified, this string must be preceded by a colon (:); and **RETURN** is a required carriage return.

NOTE: The bootstrap in the manual boot-up command can be up to 80 characters long, with the last character being a zero. 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 bootstrap include up to 16 for partition name, one for a semi colon, and up to 10 for system name. More details about the bootstrap are provided later in this chapter.

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

Because the Winchester disk contains separate partitions, you must specify which partition you want to access whenever you enter a boot command. Partitions are accessed by boot commands that include or imply (in the case of the default bootstrap) a bootstrap.

GETTING STARTED

Boot Command

If you enter a boot command for the Winchester with a bootstrap that is misspelled or refers to a non-existent (or inaccessible) partition, the displayed message is Error – partition not found. Type RETURN to continue.

Ambiguous
Boot Command

Also, if you enter a boot-up command for the Winchester without a bootstrap specification, and if you have not selected one partition as your “default boot partition” (through the PART utility), you again get the message:

Error – partition not found. Type RETURN to continue.

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?>

GETTING STARTED

Boot Command

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

NOTE: The partition names and operating system names in the display of this menu may differ from those shown here. These partition names are the default partitions that are setup on your Winchester disk before leaving the factory. Your display could show names for as many as 16 different partitions and operating systems.

The bootstrap is entered at the prompt, in the following form:

Boot String?.....><**partition**>[;<**system**>]

Where <**partition**> 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 bootstrap. All established partition names are displayed on the menu;

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

where <**system**> 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 bootstrap. 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.

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 bootstrap 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.

GETTING STARTED

Boot Command

If you specify a bootstrap for a bootable Z-DOS partition, the identification messages and date request appear similar to the following:

Z-DOS/MS-DOS BIOS release 1.00, version 1.10

Z-DOS/MS-DOS release 1.01, version 1.25
(C)Copyright 1982 Zenith Data Systems

Z-DOS/MS-DOS Command release 1.00, version 1.20
Current date is Tue 1-04-1983
Enter new date:..

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

- Carefully type an explicit boot-up command whenever you boot up to the Winchester disk. This explicit boot-up command should include the bootstrap 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 boot-up commands to your Winchester disk.

Table 5.1 illustrates the boot commands you can enter in order to access a particular drive device. The last command listed for each device in this table is the most explicit command, and the command that will always work regardless of the setting of the SW-101 switch.

Explicit
Boot Command

GETTING STARTED**Boot Command**

| Drive | Command Format | SW-101 (3, 2, 1 & 0) |
|---|---|--|
| A | Power On (Auto-Boot) RETURN | 1, 0, 0, 0 |
| | <F1> RETURN | 0, 0, 0, 0 |
| | <F1> RETURN | 0, x, x, x |
| | | 0, x, x, x |
| B | <F1> RETURN | 0, x, x, x |
| C | Power On (Auto-Boot) RETURN <F2> RETURN <F2> RETURN | 1, 0, 0, 1 0, 0, 0, 1 0, x, x, x 0, x, x, x |
| D | <F2> RETURN | 0, x, x, x |
| E | Power On (Auto-Boot) RETURN <F3>RETURN <F3><:bootstrap>RETURN | 1, 0, 1, 0 0, 0, 1, 0 0, x, x, x 0, x, x, x |
| F | Z-DOS does not allow a Boot to a partition assigned F: (F: is assigned to the next partition with the "Z-DOS" operating system name, if one exists, that occurs in the superblock after the partition that is assigned E:.) | |
| NOTE: "x" in SW-101 switch setting indicates that position may be set to either "1" or "0". | | |

Table 5.1
Possible Ways to Boot Drives A, B, C, D, E and F

GETTING STARTED

Boot Command

NOTE: The boot loader examines the superblock for partitions bearing the "Z-DOS" system name from beginning to end. If you boot up to a Z-DOS partition and no Z-DOS partitions are found after the booted partition, the loader will not re-examine the superblock from the beginning. Therefore, if you bootup to the last Z-DOS partition entered in the superblock, no other Z-DOS partitions will be accessible—even if another one exists earlier in the superblock.

Boot Command Devices

To make the Boot command easier to work with, the Z-100 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 boot command is illustrated in Figures 5.2 and 5.3.

**Boot
Command's
Logical
Devices**

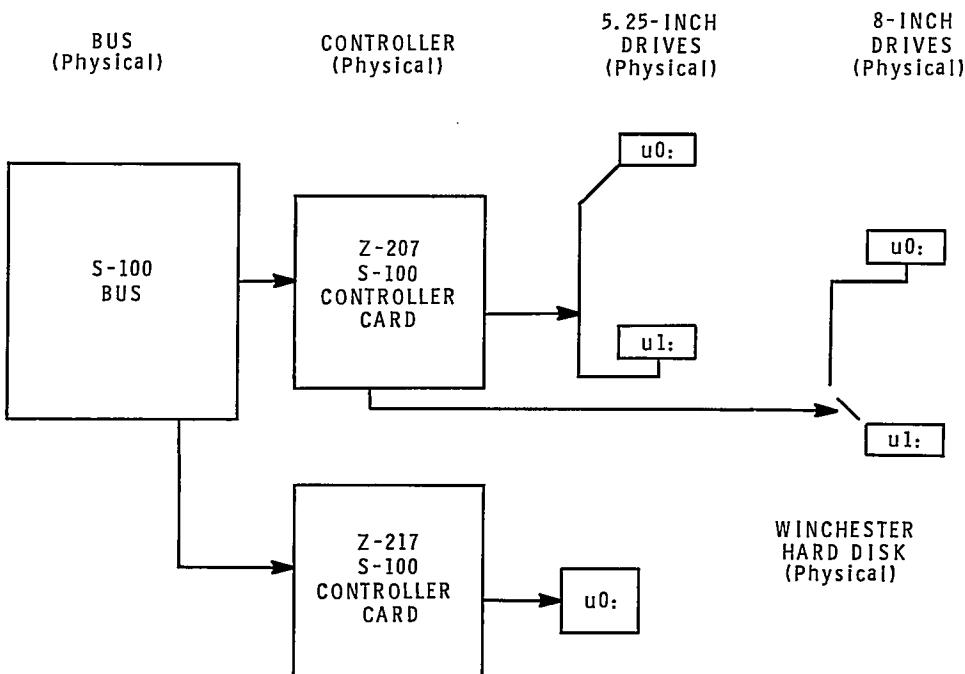


Figure 5.2

Physical Connections from the Hardware Viewpoint

GETTING STARTED

Boot Command Devices

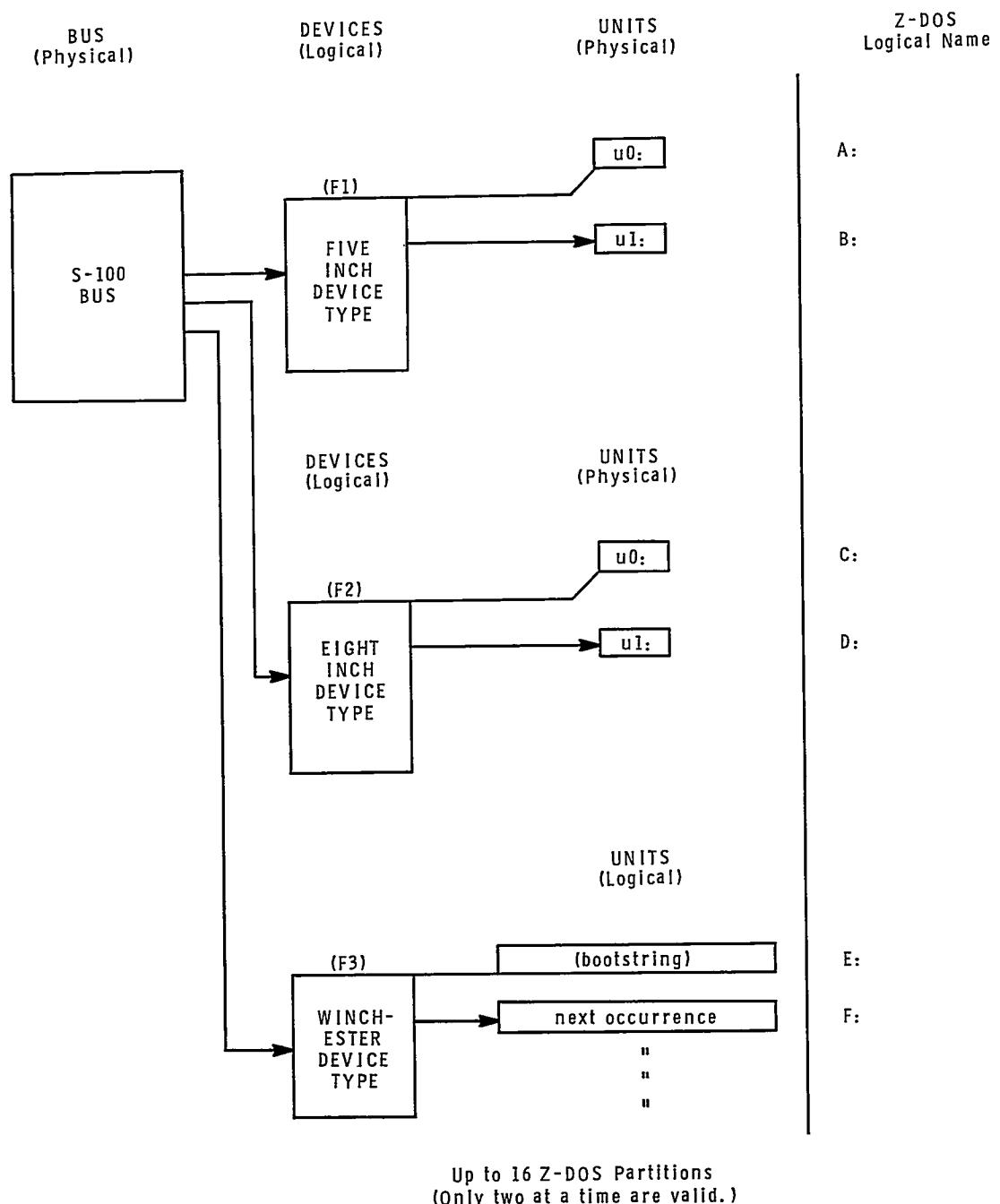


Figure 5.3
Logical Connections from the Bootstrap Command Viewpoint

GETTING STARTED

Boot Command Devices

Because the Z-207 controller card is designed to control both 5.25-inch and 8-inch disks, a method must be used that makes a distinction between these two. This method must also work with the Z-217 controller card and allow for future expansion to other controller cards that might control a different type of device, or it might control several combined (see Figure 5.4, which illustrates the theory of such expansions).

The controller shown at the top of Figure 5.4 shows the Z-100's standard controller card (Z-207). The other controllers that are shown are just theoretical for this diagram, which illustrates how the boot command syntax works for possible device expansion.

GETTING STARTED

Boot Command Devices

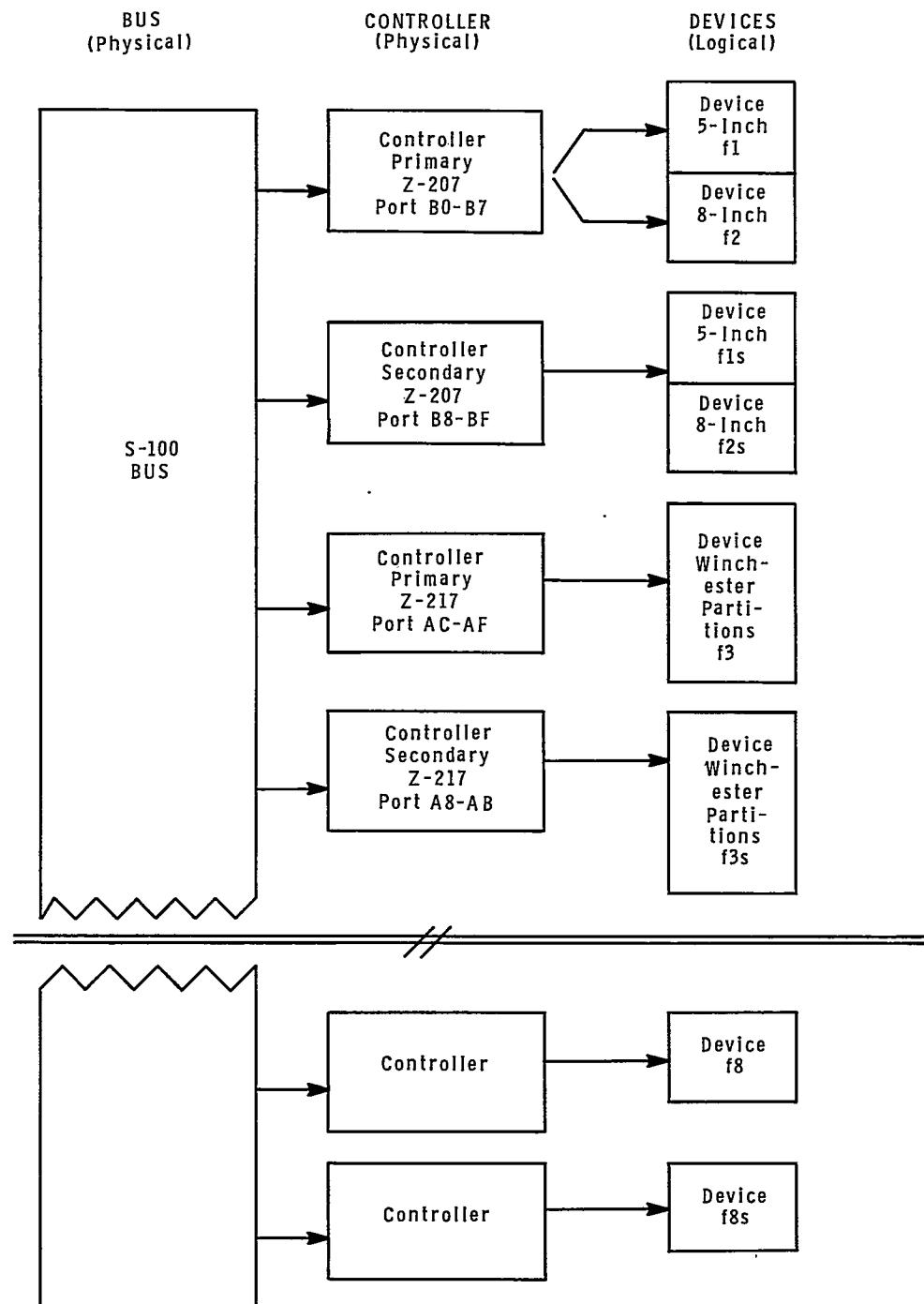


Figure 5.4
Logical Device Extensions with SW-101 DIP Switch

GETTING STARTED

Winchester Boot-up Error Messages

Error -- Partition not found. Type RETURN to continue

Cause: Either you entered a boot-up command without including a boot-string while no default bootstrap was established, or you entered a boot-up command that included an invalid bootstrap.

Cure: Type **RETURN**. Then a table listing all valid partitions (by partition name and operating system name) will be displayed. See the explanation in Ambiguous Boot-up 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.

GETTING STARTED

Winchester Boot-up Error Messages

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.

CHAPTER 6

WINCHESTER DISK PROCEDURES

Reasons for Procedures

Brief

Several procedures are available to use and create backup copies of your Winchester Utility Disk.

To create an additional copy of the Winchester Utility Disk, you might perform the following activities:

Power On, Boot-up, DSKCOPY

To change the arrangement of partitions on your Winchester disk or the default boot partition, you might perform the following activities:

Power On, Boot-up, PART

To do both of the above, you might perform the following activities:

Power On, Boot-up, DSKCOPY, PART

To copy software from Z-DOS Distribution Disks I and II to both partitions and backup floppy disks, you should perform the following activities:

Floppy Disk Boot-up, Partition, FORMAT, COPY to Partition, RE-NAME, Floppy Disk FORMAT, COPY to Floppy Disk, DSKCOPY, COPY to Partition, and CONFIGUR

Details

You cannot boot up from the Winchester disk or a partition until the Winchester is prepared with PREP, partitioned with PART, formatted by FORMAT, and the Z-DOS system is placed on the partition. Once this has taken place, your partition can be used to perform either a manual boot-up, or an automatic boot-up (discussed fully in your Z-DOS manual). SW-101 must be set in order to perform automatic boot-up from a bootable Win-

WINCHESTER DISK PROCEDURES

Reasons for Procedures

chester partition (the following procedures work whether you are set for automatic boot-up or manual boot-up, but automatic boot-up information and Figure 5.1 in "Chapter 5: Getting Started", should be studied if you want to change the method at some future time).

Before you begin using your Winchester disk for everyday tasks, perform the following two procedures as necessary:

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

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

The instructions within each procedure will inform you when it is possible to skip an activity, if you do not need to perform it.

NOTE: The text entitled "Accessing More than Two Z-DOS Partitions" at the end of this chapter provides suggestions and examples concerning Z-DOS partition arrangements for several different applications. If you use Z-DOS with several different application programs, read this section before you perform the Winchester Utility Procedure.

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).

WINCHESTER DISK PROCEDURES

Winchester Utility Procedure

Neither 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 Z-DOS partition when they are shipped. Therefore some users can skip activities within this procedure or proceed directly to the "System Transfer Procedure" described later in this chapter.

Procedure Synopses

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

Power On
Boot-up
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:

Power On
Boot-up
PART

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

Power On
Boot-up
DSKCOPY
PART

Power On

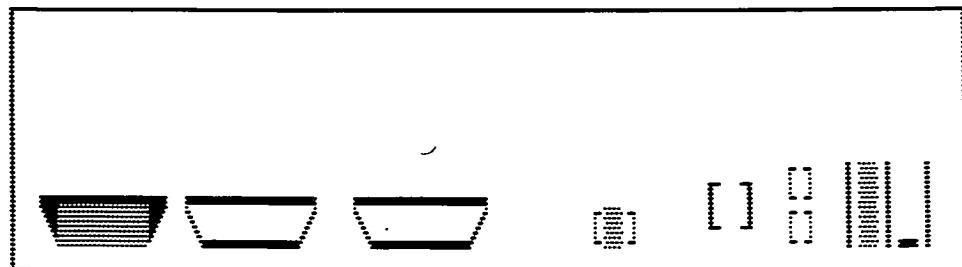
This first activity should begin after you unpack your Computer and connect all of your peripheral devices to it. (Refer to the Z-100 User's Manual for information on connecting peripheral devices to the Computer.) No peripherals are required for this procedure except for a video monitor, which must be connected if you have a low-profile Z-100.

- () 1. Make certain that the power switch, which is located on the back of your Computer, is in the OFF position (lower half depressed).

WINCHESTER DISK PROCEDURES

Winchester Utility Procedure

Z-100 Rear Panel



| Printer Serial | Modes Serial | Printer Parallel | Light Pen | Power Plug | Power Switch |
|-------------------|-----------------|---------------------|--------------|---------------|-----------------|
|-------------------|-----------------|---------------------|--------------|---------------|-----------------|

- () 2. Make certain that the power switches on any peripheral devices (printer, modem, video terminal, external disk drives) that are connected to your computer, are in their respective OFF positions.
- () 3. Double check all cables and cords to make certain that they are securely connected.
- () 4. Remove any floppy disks or protective drive shipping cardboard from the disk drives connected to your Computer.
- () 5. Turn the power switch to each of your peripheral devices to their respective ON positions.
- () 6. Turn the power switch on your Computer to the ON position (depress upper half).

WINCHESTER DISK PROCEDURES

Winchester Utility Procedure

- () 7. At this point, if switch SW-101 has not been reset from the factory setting, either:

the light on the 5.25-inch floppy disk drive will begin to glow (if you have a ZF-110-22 or ZF-120-22);

OR

within several seconds the light on your Winchester disk drive will begin to glow (if you have a ZW-110-22 or a ZW-120-22).

- () 8. If a floppy disk drive light began to glow, press the **DELETE** key immediately. The message **Boot Abort** and the finger prompt will appear on your screen.

OR

If the Winchester disk drive light begins to glow, and you have not partitioned (with PART) and formatted (with FORMAT) the Winchester since it arrived from the factory, the pointing finger prompt will appear on the screen after several seconds.

NOTE: If you turn your Computer off and on, or if you press **CTRL-RESET** at this point, you will need to repeat Step 8 before proceeding to the Boot-up activity.

If the pointing finger prompt is the lowest item displayed on the screen, proceed to the Boot-up activity.

If the pointing finger prompt is not the lowest item displayed on the screen, repeat the Power On activity.

WINCHESTER DISK PROCEDURES

Winchester Utility Procedure

This Boot-up 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 the Z-DOS utilities.

Boot-up

- () 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. In response to the pointing finger prompt (which should still be the lowest item displayed on your video screen, from the Power On activity), press the **B** key, then the **F1** key, and then the **RETURN** key.
- () 3. 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 1.01, version 1.25

(C)Copyright 1982 Zenith Data Systems

Z-DOS/MS-DOS Command release 1.00, version 1.20

Current date is Tue 1-04-1983

Enter new date:..

- () 4. At the Enter new date prompt, type the current date in the following form:

Current date is Tue 1-04-1983

Enter new date <mm>--<dd>--<yy> RETURN

Where <mm> is a number in the range 1–12, representing a month;

<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

<yy> is a number in the range 80–99 (for 1980–1999) or 1980–2099 representing a year.

WINCHESTER DISK PROCEDURES

Winchester Utility Procedure

- () 5. Then Z-DOS will display a message in the following form:

```
Current time is 8:00:12.50  
Enter new time: -
```

- () 6. At the Enter new time prompt, type the current time in the following form:

```
Current time is 8:00:12.50  
Enter new time: <hh>:<mm>:<ss> RETURN
```

Where <hh> is a number in the range 0–23 representing the hours;
<mm> is a number in the range 0–59 representing the minutes. This entry is optional. If omitted, 00 is assumed; and
<ss> is a number in the range 0–59 representing the seconds. This entry is optional. If omitted, 00 is assumed.

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

A:-

If either copy of your Winchester Utility Disk is has become unusable, 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 proceed to the PART activity.

WINCHESTER DISK PROCEDURES

Winchester Utility Procedure

The DSKCOPY activity helps you copy all of the software from your Winchester Utility Disk to a blank floppy disk.

DSKCOPY

- () 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 RETURN when ready.
```

- () 5. Remove the Winchester Utility Disk from the drive.

- () 6. On a blank, 5.25-inch, double-sided, double-density, 48-TPI, floppy disk affix a label that you have titled "Winchester Utility Backup Disk". You may want to include the date on the label so that you always know which disk is your most current copy.

- () 7. Insert the Winchester Utility Backup Disk in the 5.25-inch floppy disk drive slot, close the drive latch, and press **RETURN**. The floppy disk drive light will glow for several seconds. Then

WINCHESTER DISK PROCEDURES

Winchester Utility Procedure

DSKCOPY will display the following prompt:

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

- () 8. Remove the Winchester Utility Backup Disk from the drive, insert the Winchester Utility Disk, and press **RETURN**. DSKCOPY will continue to display prompts in the following form:

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

- () 9. When a prompt in this form reads Place disk B in drive A:, insert the Winchester Utility Backup Disk and press **RETURN**.

When a prompt in this form reads Place disk A in drive A:, insert the Winchester Utility Disk and press **RETURN**.

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

Verifying... Place disk A in drive A:.
Hit RETURN 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**. Then the system prompt will 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.

WINCHESTER DISK PROCEDURES

Winchester Utility 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 "System Transfer Procedure".

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.

PART

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 Z-DOS partition when it is shipped to you. This pre-allocated Z-DOS partition occupies one half (50%) of the total Winchester disk space, while a pre-allocated CP/M partition occupies the other half (50%).

WINCHESTER DISK PROCEDURES

Winchester Utility Procedure

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 "Chapter 10: PART" of this supplement.

- () 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:

Do you wish to proceed with PART (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. 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. The cursor will move to the partition name of the first partition, at the top of the table. Proceed to step 4.

WINCHESTER DISK PROCEDURES

Winchester Utility Procedure

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 5. (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**. 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.

WINCHESTER DISK PROCEDURES

Winchester Utility Procedure

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.

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.

WINCHESTER DISK PROCEDURES

Winchester Utility Procedure

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. <B, 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 3. The cursor will remain at the prompt, but the Restore option will vanish from the menu. The partitions will appear as they did before you began making changes during this session.

WINCHESTER DISK PROCEDURES

Winchester Utility Procedure

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 number.

- () 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. The A: system prompt will be displayed.

You have just completed the Winchester Utility Procedure. Remove the Winchester Utility Backup Disk from the floppy disk drive, and store it safely away. Then proceed to the "System Transfer Procedure".

NOTE: After using the PART utility, you must reset and reboot the system. PART temporarily alters the Z-DOS system in memory each time PART is used. Therefore Z-DOS must be reloaded into memory after every use of PART.

WINCHESTER DISK PROCEDURES

System Transfer Procedure

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

- the Z-DOS Operating System
- Z-DOS support utility files
- application program files
- data files used with application programs

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

NOTE: This procedure enables you to transfer software to one or two partitions at a time. If you wish to transfer software to more than two Z-DOS partitions, refer to "Accessing More than Two Z-DOS Partitions" for further information.

Before beginning this procedure, you should have two usable copies of the Winchester Utility Disk.

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

Floppy Disk Boot-up
Partition FORMAT
COPY to Partition
RENAME
Floppy Disk FORMAT
COPY to Floppy Disk
DSKCOPY
COPY to Partition
CONFIGUR

NOTE: The "Floppy Disk FORMAT" and "COPY to Floppy Disk" activities of this procedure help you to create floppy disk backup copies of Z-DOS distribution disks.

WINCHESTER DISK PROCEDURES

System Transfer Procedure

Floppy Disk Boot-up This Boot-up activity helps you to load the Z-DOS operating system into the computer from a floppy disk (Distribution Disk I), so that it can control Z-DOS utilities.

- () 1. Insert Z-DOS Distribution Disk I into the 5.25-inch floppy disk drive slot of the Z-100, and close the drive latch.
- () 2. Enter **CTRL-RESET** to reset the system (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 press the **DELETE** key. The pointing finger prompt should be displayed on the screen.

If the light on the Winchester disk drive glows after you reset the system, then hold down the **DELETE** key. While you are holding down the **DELETE** key, enter **CTRL-RESET** again. After you have released the **CTRL** and **RESET** keys, release the **DELETE** key. The pointing finger prompt should be displayed on the screen.

If no drive light glows after you reset the system, then proceed immediately to step 4.

- () 4. In response to the pointing finger prompt, press the **B** key, then the **F1** key, and then the **RETURN** key.
- () 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 1.01, version 1.25
(C) Copyright 1982 Zenith Data Systems

Z-DOS/MS-DOS Command release 1.00, version 1.20

A:DATE
Current date is Tue 1-04-1983
Enter new date:..

WINCHESTER DISK PROCEDURES

System Transfer Procedure

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

```
A:DATE  
Current date is Tue 1-04-1983  
Enter new date <mm>-<dd>-<yy> RETURN
```

Where <mm> is a number in the range 1–12, representing a month;
<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
<yy> is a number in the range 80–99 (for 1980–1999) or 1980–2099 representing a year.

- () 7. Then Z-DOS will display a message in the following form:

```
A:TIME  
Current time is 8:00:12.50  
Enter new time:..
```

- () 8. At the "Enter new time" prompt, type the current time in the following form:

```
A:TIME  
Current time is 8:00:12.50  
Enter new time <hh>:<mm>:<ss> RETURN
```

Where <hh> is a number in the range 0–23 representing the hours;
<mm> is a number in the range 0–59 representing the minutes. This entry is optional. If omitted, 00 is assumed; and
<ss> is a number in the range 0–59 representing the seconds. This entry is optional. If omitted, 00 is assumed.

WINCHESTER DISK PROCEDURES

System Transfer Procedure

- () 9. After you have entered a time, the command line **MAKE SYSCOPY.DAT** will appear briefly. Then identification messages and prompts for the **MAKE** utility will be displayed.
- () 10. At the **Do you wish to continue? (Y/N) <Y>** prompt, enter **CTRL-C**. Then Z-DOS will display the following prompt:

Terminate batch job (Y/N)?

- () 11. At the **Terminate batch job** prompt, press **Y**. The **A:** system prompt will now appear on your screen, to show that Z-DOS is ready to accept the commands that you type at the keyboard.

A:..

When the **A:** system prompt appears, leave Distribution Disk I in the floppy disk drive slot and proceed to the Partition **FORMAT** activity.

Partition FORMAT

The **FORMAT** utility will prepare the partition for data storage and record Z-DOS on this partition.

- () 1. At the **A:** system prompt, type the command:

A:FORMAT/S/V E: RETURN

Where **FORMAT** is a utility that prepares disks to hold data;
/S is a switch that causes **FORMAT** to copy the Z-DOS operating system to the prepared disk;
/V is a switch that causes **FORMAT** to verify the integrity of the format, isolate bad sectors on the formatted disk, and make the bad sectors inaccessible; and
E: is the drive name for the first Z-DOS partition found on the Winchester disk. This is the partition that will be affected by the **FORMAT** operation.

WINCHESTER DISK PROCEDURES

System Transfer Procedure

NOTE: Winchester disks obtained through Zenith Data Systems or Heath are already furnished with one Z-DOS partition named "Z-DOS;Z-DOS". Unless you have changed partition arrangement or names through the PART utility, this partition has been automatically assigned to the drive name E:.

FORMAT will display the message:

Format version 1.6

Will FORMAT partition assigned drive E:
Strike any key when ready

- () 2. Press any key to begin the FORMAT operation. This operation can last several minutes, depending on the size of the partition being formatted. During this operation, the light on the Winchester drive will glow. When the operation is finished, Z-DOS will display the system prompt.
- () 3. If you have only one Z-DOS partition (that is, if you did not change the default "Z-DOS;Z-DOS" partition that was shipped from the factory), then proceed to the COPY to Partition activity.

If you have a second Z-DOS partition, then type the following command at the system prompt:

A: **FORMAT/S/V F: RETURN**

Where **FORMAT** is a utility that prepares disks to hold data;
/S is a switch that causes FORMAT to copy the Z-DOS operating system to the prepared disk;
/V is a switch that causes FORMAT to verify the integrity of the format, isolate bad sectors on the formatted disk, and make the bad sectors inaccessible; and
F: is the drive name for the second partition occurring in the Superblock with any partition name and the system name "Z-DOS", and is effected by the FORMAT operation.

WINCHESTER DISK PROCEDURES

System Transfer Procedure

NOTE: Winchester disks obtained through Zenith Data Systems or Heath are already furnished with only one Z-DOS partition. You cannot format a second Z-DOS partition unless you have established one through the PART utility. If you have established a second Z-DOS partition on the Winchester disk, then this partition has automatically been assigned to drive F:.

FORMAT will display the message:

Format version 1.6

Will FORMAT partition assigned drive F:
Strike any key when ready

- () 4. Press any key to begin the FORMAT operation. This operation can last several minutes, depending on the size of the partition being formatted. During this operation, the light on the Winchester drive will glow. When the operation is finished, Z-DOS will display the system prompt.

Leave Distribution Disk I in the floppy disk drive slot and proceed to the COPY to Partition activity.

**COPY
to Partition**

You will use the COPY command to copy all of the files from Distribution Disk I to the partition.

- () 1. Type the command **COPY A:.* E: RETURN** at the system prompt.

A: COPY A:.* E: RETURN

WINCHESTER DISK PROCEDURES

System Transfer Procedure

COPY will display the names of all the files from Distribution Disk I as they are copied, in the following form:

```
Copying -  
ALTCHAR.SYS  
. . .  
RESTORE.EXE  
30 file(s) copied
```

NOTE: The number of files copied during this step might not match the total shown in this partial example of the COPY display.

- () 2. Wait for COPY to display the entire list of files. Then Z-DOS will again display the system prompt:

A:..

When you have completed the COPY activity, remove Z-DOS Distribution Disk I from the floppy disk drive slot and store it in a safe place. Then proceed to the Floppy Disk FORMAT activity.

The FORMAT utility will prepare a blank floppy disk for data storage and record Z-DOS on this floppy disk.

Floppy Disk FORMAT

- () 1. Change the default disk drive by typing the following entry at the A: system prompt:

A: E: RETURN

The E: system prompt will now appear on your screen, to show that drive E: (a Z-DOS partition) is now the default drive.

E:

WINCHESTER DISK PROCEDURES

System Transfer Procedure

- () 2. Insert a blank, soft-sectorized, 5.25-inch disk into the 5.25-inch drive slot.

CAUTION: The disk you insert in step 2 should be a blank, write-enabled disk. Do not use a distribution disk or any disk containing valuable software and/or data.

- () 3. At the E: system prompt, type the command:

E:FORMAT/S/V A: RETURN

Where **FORMAT** is a utility that prepares disks to hold data; **/S** is a switch that causes FORMAT to copy the Z-DOS operating system to the prepared disk; **/V** is a switch that causes FORMAT to verify the integrity of the format, isolate bad sectors on the formatted disk, and make the bad sectors inaccessible; and **A:** is the drive name for the 5.25-inch drive in your Z-100 computer.

FORMAT will display the message:

Format version 1.6

Insert new diskette for drive A:
and strike any key when ready

- () 4. Press any key to begin the FORMAT operation. This operation lasts several seconds. When the operation is finished, Z-DOS will display a message showing byte amounts relevant to the formatted disk and the following prompt:

Format another (Y/N) ?

- () 5. Enter **N** at the Format another (Y/N) ? prompt. Then Z-DOS will display the E: system prompt.

E:

Proceed to the RENAME activity.

WINCHESTER DISK PROCEDURES

System Transfer Procedure

The RENAME activity enables you to prevent the automatic execution of several commands when you later boot your Winchester partition.

RENAME

NOTE: This activity is not absolutely essential in order to transfer the system, but it helps to eliminate unnecessary steps from this procedure by preventing the automatic execution of MAKE and other commands.

- () 1. At the E: system prompt, type the following command:

E: RENAME AUTOEXEC.BAT DONTEXEC.BAT RETURN

- () 2. Wait for the E: system prompt.

Proceed to the COPY to Floppy Disk activity.

You will use the COPY command to copy all of the files from the partition to the recently-formatted floppy disk.

COPY
to Floppy
Disk

- () 1. Type the command **COPY E:.* A: RETURN** at the system prompt.

E: COPY E:.* A: RETURN

COPY will display the names of all the files from the partition as they are copied, in the following form:

Copying –
ALTCHAR.SYS

.

.

.

RESTORE.EXE

30 file(s) copied

- () 2. Wait for COPY to display the entire list of files. Then Z-DOS will again display the system prompt:

E:..

WINCHESTER DISK PROCEDURES

System Transfer Procedure

When you have completed the COPY activity, remove the disk from drive A and carefully label it "Z-DOS Backup Disk I". Then proceed to the DSKCOPY activity.

DSKCOPY The DSKCOPY activity helps you copy all of the software from Z-DOS Distribution Disk II to a blank floppy disk. This activity is optional because you will later copy the software from Z-DOS Distribution Disk II to the Winchester partition.

- () 1. Type the command **DSKCOPY/V RETURN** at the E: 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. Insert Z-DOS Distribution Disk II in the floppy disk drive, and press **RETURN**. Then DSKCOPY will display the following prompt:

Formatting destination... Place disk B in drive A:.
Hit RETURN when ready.

- () 5. Remove Z-DOS Distribution Disk II from the drive.

- () 6. On a blank, 5.25-inch, double-sided, double-density, 48-TPI, floppy disk affix a label that you have titled "Z-DOS Backup Disk II". You may want to include the date on the label so that you always know which disk is your most current copy.

WINCHESTER DISK PROCEDURES

System Transfer Procedure

- () 7. Insert Z-DOS Backup Disk II in the 5.25-inch floppy disk drive slot, close the drive latch, and press **RETURN**. 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 RETURN when ready.

- () 8. Remove Z-DOS Backup Disk II from the drive, insert the Z-DOS Distribution Disk II, and press **RETURN**. DSKCOPY will continue to display prompts in the following form:

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

- () 9. When a prompt in this form reads Place disk B in drive A:, insert Z-DOS Backup Disk II and press **RETURN**.

When a prompt in this form reads Place disk A in drive A:, insert Z-DOS Distribution Disk II and press **RETURN**.

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

Verifying... Place disk A in drive A:
Hit RETURN 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**. Then the system prompt will be displayed again, as shown:

A: _

Proceed to the COPY to Partition activity.

WINCHESTER DISK PROCEDURES

System Transfer Procedure

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

- Z-DOS Distribution Disk II
- 5.25-inch or 8-inch soft-sectorized, application program distribution disks
- data disks used for application programs

() 1. Insert Z-DOS Distribution Disk II into the floppy disk drive slot (drive A) of the Z-100.

() 2. Type the command **COPY A:.* E: RETURN** at the system prompt. COPY will display the names of all the files from Distribution Disk II as they are copied, in the following form:

Copying -

RDCPM.COM

.

.

DEFZ217.ASM

38 file(s) copied

() 3. Wait for COPY to display the entire list of files. Then Z-DOS will again display the system prompt:

E:..

() 4. Remove Z-DOS 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).

WINCHESTER DISK PROCEDURES

System Transfer Procedure

- () 6. Type a command in the form **COPY X:<filename.ext> Y:
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 **A:** for the drive name. If you are copying from an 8-inch drive, enter **C:** for the drive name;

<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 wildcard file name that represents all of the files on the application program disk; and

Y: is the name of the Winchester disk partition to which you are copying files. If you wish to copy the files to the partition you booted, then enter **E:** for this partition. If you wish to copy the files to second Z-DOS partition (and if you have a second Z-DOS partition accessible), then enter **F:** for this partition.

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

```
Copying -
WS.COM
WSMSG.S.OVR
WSOVLY1.OVR
INSTALL.COM
4 file(s) copied
```

NOTE: The filenames displayed when you perform this activity may differ from those shown in this example.

- () 7. Wait for COPY to display the entire list of files. Then Z-DOS will again display the system prompt:

E:_

WINCHESTER DISK PROCEDURES

System Transfer Procedure

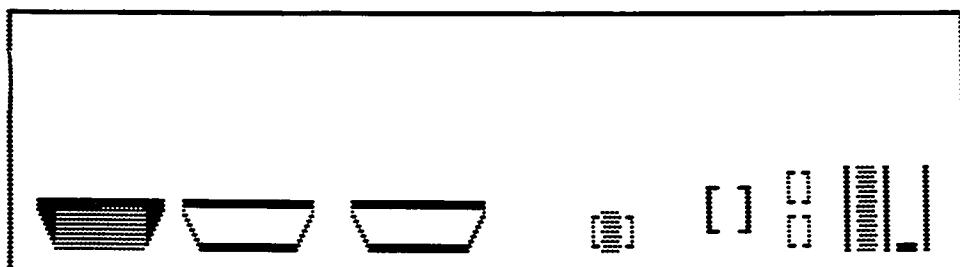
- () 8. Repeat step 5, step 6, and step 7 for each application program disk or data disk from which you wish to copy files to the partition.

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

CONFIGUR The CONFIGUR utility adjusts the Z-DOS operating system on your storage devices for your hardware and preferences.

You do *not* need to perform this CONFIGUR activity if there are no peripherals connected to J1 (PRN device for serial printer) or J2 (AUX device) or J3 (PRN device for parallel printers) on the back of your computer.

Z-100 Rear Panel



| Printer Serial | Modem Serial | Printer Parallel | Light Pen | Power Plus | Power Switch |
|-------------------|-----------------|---------------------|--------------|---------------|-----------------|
|-------------------|-----------------|---------------------|--------------|---------------|-----------------|

WINCHESTER DISK PROCEDURES

System Transfer Procedure

Also, the configuration is preset with values for the following two default devices. You do *not* need to run CONFIGUR if you have only 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 handshaking protocol. Connect to J1.

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. Connect to J2.

- () 1. If your Z-DOS system has already been adjusted for your printer, then you have completed the System Transfer Procedure.

If your Z-DOS system has *not* yet been adjusted for your printer, type the following command at the system prompt:

A:CONFIGUR RETURN

CONFIGUR will display an identification message, a menu, and a prompt.

- () 2. At the Enter selection (A-C): prompt, type **A** (to Configure PRN device). CONFIGUR will now display a menu listing several hardware products.
- () 3. At the Enter selection (A-J): prompt, type the letter for the printer you will use. CONFIGUR will now display a diagram of the rear panel of your Z-100 computer, showing the port into which your printer should be plugged.

NOTE: If your printer is not listed in the display, or if you have changed the switch settings on your printer since it was shipped, then refer to the Z-DOS manual for instructions on using CONFIGUR.

WINCHESTER DISK PROCEDURES

System Transfer Procedure

- () 4. Compare your computer's rear panel with the diagram to make sure that your printer is properly attached. Then at the Strike any key to continue... prompt, press any key on the keyboard. CONFIGUR will display the identification message, main menu, and selection prompt.
- () 5. At the Enter selection (A-F): prompt, type **F** (to Make changes to both disk and memory). CONFIGUR will display a drive name prompt.
- () 6. At the Enter drive name with system to modify (A-F): prompt, type **E**. CONFIGUR will adjust the Z-DOS operating system on the partition assigned as drive E: to work with your printer. Then CONFIGUR will redisplay its identification message, main menu, and selection prompt.
- () 7. If you have a second accessible partition, then at the Enter selection (A-F): prompt, type **D** (to Make changes to disk). CONFIGUR will display a drive name prompt. If you have only one accessible partition, skip to step 9.
- () 8. At the Enter drive name with system to modify (A-F): prompt, type **F**. CONFIGUR will adjust the Z-DOS operating system on the partition assigned to drive F: to work with your printer. Then CONFIGUR will redisplay its identification message, main menu, and selection prompt.
- () 9. At this Enter selection (A-F): prompt, type **D** (to Make changes to disk). CONFIGUR will display a drive name prompt.

WINCHESTER DISK PROCEDURES

System Transfer Procedure

- () 10. Insert Z-DOS Backup Disk I into the 5.25-inch drive of your Z-100.
- () 11. At the Enter drive name with system to modify (A-F): prompt, type **A**. CONFIGUR will adjust the Z-DOS operating system on Z-DOS Backup Disk I to work with your printer. Then CONFIGUR will redisplay its identification message, main menu, and selection prompt.
- () 12. At this Enter selection (A-F): prompt, type **C** (to Exit program). Then Z-DOS will display the system prompt.
- () 13. If you have a printer, test it out by entering **CTRL-P**. Then press **RETURN** several times. Your printer (if properly configured and connected) should print system prompts. Enter **CTRL-N** to discontinue this printer test.

You have completed the System Transfer Procedure.

NOTE: If you ever encounter bad sectors during everyday use of any Winchester disk partition, then refer to the "Chapter 14: VERIFY" for information on the use of the VERIFY utility.

WINCHESTER DISK PROCEDURES

Accessing More than Two Z-DOS Partitions

If you have allocated more than two partitions to operate under Z-DOS, and you wish to make them bootable, study the following diagrams.

If you used PART to partition your Winchester disk as shown, then several transactions would be necessary to make all of these partitions accessible.

| Partition Name | Operating System Name | Percentage | Kilobytes |
|-------------------|-----------------------|------------|-----------|
| 1. Z-DOS | Z-DOS | 40% | 2185 |
| 2. SPREAD-SHEET | Z-DOS | 10% | 547 |
| 3. GENERAL-LEDGER | Z-DOS | 10% | 547 |
| 4. WORD-PROCESSOR | Z-DOS | 10% | 547 |
| 5. BASIC | Z-DOS | 10% | 547 |
| 6. DATABASE-MGR | Z-DOS | 10% | 547 |
| 7. CUSTOMER-FILES | Z-DOS | 10% | 543 |
| 8. | | | |
| 9. | | | |
| 10. | | | |
| 11. | | | |
| 12. | | | |
| 13. | | | |
| 14. | | | |
| 15. | | | |
| 16. | | | |

During the preceding procedures, you could have made both the Z-DOS; Z-DOS and SPREAD-SHEET;Z-DOS partitions bootable. This occurs when Z-DOS is booted from the Z-207 controller (drives A:, B:, C:, or D:). When this happens Z-DOS selects the first two Z-DOS partitions from the Superblock and assigns them E: (to Z-DOS;Z-DOS) and F: (to SPREAD-SHEET;Z-DOS) respectively. The same would occur after Z-DOS;Z-DOS had been made bootable (formatted with a FORMAT/S/V E: command), if the boot-up command were **B F3 :Z-DOS;Z-DOS**.

WINCHESTER DISK PROCEDURES

Accessing More than Two Z-DOS Partitions

This would result in:

| | Partition Name | Operating System Name |
|-------------------|-------------------|-----------------------|
| E: is assigned to | 1. Z-DOS | Z-DOS |
| F: is assigned to | 2. SPREAD-SHEET | Z-DOS |
| inaccessible | 3. GENERAL-LEDGER | Z-DOS |
| inaccessible | 4. WORD-PROCESSOR | Z-DOS |
| inaccessible | 5. BASIC | Z-DOS |
| inaccessible | 6. DATABASE-MGR | Z-DOS |
| inaccessible | 7. CUSTOMER-FILES | Z-DOS |
| not applicable | 8. | |

If F: (SPREAD-SHEET;Z-DOS) were made bootable by entering a FORMAT/S/V F: command, then resetting the system to power up configuration (CTRL-RESET) and booting from the Z-217 with the command:

B F3 :SPREAD-SHEET;Z-DOS

would make the assignments to the following partitions:

| | Partition Name | Operating System Name |
|-------------------|-------------------|-----------------------|
| inaccessible | 1. Z-DOS | Z-DOS |
| E: is assigned to | 2. SPREAD-SHEET | Z-DOS |
| F: is assigned to | 3. GENERAL-LEDGER | Z-DOS |
| inaccessible | 4. WORD-PROCESSOR | Z-DOS |
| inaccessible | 5. BASIC | Z-DOS |
| inaccessible | 6. DATABASE-MGR | Z-DOS |
| inaccessible | 7. CUSTOMER-FILES | Z-DOS |
| not applicable | 8. | |

WINCHESTER DISK PROCEDURES

Accessing More than Two Z-DOS Partitions

In turn, if F: in this case (GENERAL-LEDGER;Z-DOS) were formatted with a FORMAT/S/V F: command to make it bootable, the command:

B F3 :GENERAL-LEDGER;Z-DOS

would cause the assignments to change to:

| | Partition Name | Operating System Name |
|-------------------|-------------------|-----------------------|
| inaccessible | 1. Z-DOS | Z-DOS |
| inaccessible | 2. SPREAD-SHEET | Z-DOS |
| E: is assigned to | 3. GENERAL-LEDGER | Z-DOS |
| F: is assigned to | 4. WORD-PROCESSOR | Z-DOS |
| inaccessible | 5. BASIC | Z-DOS |
| inaccessible | 6. DATABASE-MGR | Z-DOS |
| inaccessible | 7. CUSTOMER-FILES | Z-DOS |
| not applicable | 8. | |

Up to 16 Z-DOS partitions can be prepared for use in this fashion. Here is one additional example that illustrates what occurs if the Winchester disk is shared by various operating systems:

| | Partition Name | Operating System Name |
|-------------------|-------------------|-----------------------|
| E: is assigned to | 1. Z-DOS | Z-DOS |
| inaccessible | 2. CPM | CPM |
| F: is assigned to | 3. GENERAL-LEDGER | Z-DOS |
| inaccessible | 4. WORD-PROCESSOR | Z-DOS |
| inaccessible | 5. BASIC | Z-DOS |
| inaccessible | 6. DATABASE-MGR | Z-DOS |
| inaccessible | 7. CUSTOMER-FILES | Z-DOS |
| not applicable | 8. | |

This assignment could occur if the boot were performed from the Z-207 device, or if the command **B F3 :Z-DOS;Z-DOS** were specified. Z-DOS takes the first two Z-DOS partitions, and skips over the CP/M partition listed in second place in this table.

WINCHESTER DISK PROCEDURES

Accessing More than Two Z-DOS Partitions

NOTE: If you have programs that need to access programs or data on other partitions, you want to make sure that they are one after the other (or separated by operating system partitions other than Z-DOS). Otherwise, both partitions cannot be accessed at a time. For instance, consider this table:

| Partition Name | Operating System Name | Percentage | Kilobytes |
|-------------------|-----------------------|------------|-----------|
| 1. Z-DOS | Z-DOS | 40% | 2185 |
| 2. SPREAD-SHEET | Z-DOS | 10% | 547 |
| 3. GENERAL-LEDGER | Z-DOS | 10% | 547 |
| 4. WORD-PROCESSOR | Z-DOS | 10% | 547 |
| 5. BASIC | Z-DOS | 10% | 547 |
| 6. DATABASE-MGR | Z-DOS | 10% | 547 |
| 7. CUSTOMER-FILES | Z-DOS | 10% | 543 |
| 8. | | | |

If BASIC;Z-DOS and DATABASE-MGR required access to CUSTOMER-FILES;Z-DOS, the above partitioning arrangement would not work. You could only get:

| | | |
|-------------------|-------------------|-------|
| E: is assigned to | 5. BASIC | Z-DOS |
| F: is assigned to | 6. DATABASE-MGR | Z-DOS |
| inaccessible | 7. CUSTOMER-FILES | Z-DOS |
| not applicable | 8. | |

by booting with the command **B F3 :BASIC;Z-DOS**, or you could get:

| | | |
|-------------------|-------------------|-------|
| inaccessible | 5. BASIC | Z-DOS |
| E: is assigned to | 6. DATABASE-MGR | Z-DOS |
| F: is assigned to | 7. CUSTOMER-FILES | Z-DOS |
| not applicable | 8. | |

by booting with the command **B F3 :DATABASE-MGR;Z-DOS**.

WINCHESTER DISK PROCEDURES

Accessing More Than Two Z-DOS Partitions

An arrangement that enables you to access the CUSTOMER-FILES; Z-DOS partition during use of the BASIC;Z-DOS partition or during use of the DATABASE-MGR;Z-DOS partition, could be:

| Partition Name | Operating System | Name | Percentage | Kilobytes |
|-------------------|------------------|------|------------|-----------|
| 1. Z-DOS | Z-DOS | | 40% | 2185 |
| 2. SPREAD-SHEET | Z-DOS | | 10% | 547 |
| 3. GENERAL-LEDGER | Z-DOS | | 10% | 547 |
| 4. WORD-PROCESSOR | Z-DOS | | 10% | 547 |
| 5. BASIC | Z-DOS | | 10% | 547 |
| 6. CUSTOMER-FILES | Z-DOS | | 10% | 547 |
| 7. DATABASE-MGR | Z-DOS | | 10% | 543 |
| 8. | | | | |

Under this partitioning arrangement, you could get:

| | | |
|-------------------|-------------------|-------|
| E: is assigned to | 5. BASIC | Z-DOS |
| F: is assigned to | 6. CUSTOMER-FILES | Z-DOS |
| inaccessible | 7. DATABASE-MGR | Z-DOS |
| not applicable | 8. | |

by booting with the command **B F3 :BASIC;Z-DOS**,

Under this partitioning arrangement, you could also get:

| | | |
|-------------------|-------------------|-------|
| inaccessible | 5. BASIC | Z-DOS |
| E: is assigned to | 6. CUSTOMER-FILES | Z-DOS |
| F: is assigned to | 7. DATABASE-MGR | Z-DOS |
| not applicable | 8. | |

by booting with the command **B F3 :CUSTOMER-FILES;Z-DOS**.

CHAPTER 7**BACKUP****BACKUP (Create Master Backup Disk Files) Command****Brief**

Format:

BACKUP ?

or

BACKUP

or

BACKUP [[<filespec>[+ <filespec>...]] [<d:>]<filename>][</x> ...]

Command

Location: File

Switches:

Default state: /F off, /Q off, /S off, and /V off.

- /A AFTER date (backup files dated after today's or the specified date)
- /B BEFORE date (backup files dated before today's or the specified date)
- /D DIRECTORY master (Locate all master backup files and give directory)
- /E EXCEPTION files (files to exclude from operation)
- /F FORMAT silent (format all destination disks without query)
- /L LIST directory (list the directory of the backup file)
- /N NO formatting (do not format backup disks)
- /Q QUERY each (query yes or no on each file before operation)
- /S SUPPRESS stamp (do not stamp the date on the disk)
- /T TODAY's date (backup files with today's date)
- /V VERIFY files (verify the files after BACKUP operation)

Purpose: Create a single backup file from multiple source files.

BACKUP

BACKUP (Create Master Backup Disk Files) Command

Details

Backing up files from Z-DOS partitions could take a great deal of time and effort because Z-DOS partitions can hold up to 480 files each. BACKUP provides a time-saving method for you to automate the procedure necessary for backing up routine work.

BACKUP is not limited, however, to creating backups from Z-217 Winchester disk partitions. BACKUP may be used to backup from any readable device to any writable device as long as both can read or write both ASCII and Binary characters (this excludes PRN and CON from most operations). BACKUP is most useful when dealing with large numbers of files or when used to backup files selectively.

Invoking BACKUP

There are three methods to invoke BACKUP. One method provides a brief description of BACKUP and its options. The other two methods cause BACKUP to execute. Both of these latter methods may use optional switches that give you more control over the BACKUP operation.

For a brief description of the command and a list of the optional switches and their syntax:

Method One

A:BACKUP ? RETURN

BACKUP displays a set of messages in the following form:

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

The BACKUP utility is designed to take any number of source files and put them into a single, long file that may extend across several volumes. Source can originate on any readable device. The backup destination is a writable device.

BACKUP

Invoking BACKUP

Syntax: A:BACKUP [[<filespec>[+<filespec>...]] [<d:>]<filename>] [</x>...]

Switches: Default state: /F off, /Q off, /S off, and /V off.

| | |
|----------------------------------|--------------------|
| /A AFTER date. /A:<mm-dd-yy> | /N NO formatting. |
| /B BEFORE date. /B:<mm-dd-yy> | /Q QUERY each. |
| /D DIRECTORY master. | /S SUPPRESS stamp. |
| /E EXCEPTION files. | /T TODAY's date. |
| /F FORMAT silent. | /V VERIFY files. |
| /L LIST directory. <filespec> /L | |

A:

NOTE: The version number of the BACKUP utility (shown above as x.xx) may vary.

Method Two From the Z-DOS command line with no arguments. For example:

A:BACKUP RETURN

BACKUP responds with its banner and returns a right angle bracket (>), BACKUP's command prompt.

```
BACKUP Version 1.01
Copyright (C) 1982 Zenith Data Systems
```

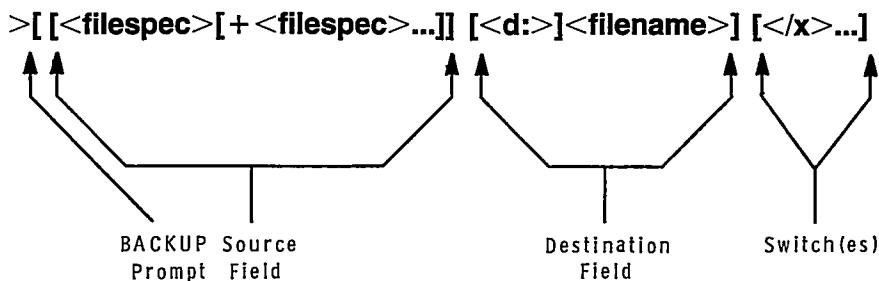
>

At this prompt, commands to BACKUP may be entered. BACKUP terminates when only RETURN is pressed at this prompt, and you are returned to the Z-DOS system prompt.

BACKUP

Invoking BACKUP

Commands that are issued at the BACKUP prompt are in the form:



where:

- the first **<filespec>**, which may be ambiguous (using wildcard characters “*” and “?”), designates a source file;
- the second **<filespec>** is one or more optional ambiguous file-specs separated from the first and from each other by plus (+) signs;
- <d:>** is an optional drive name if the destination is other than the default drive;
- <filename>** is the destination filename and must not use wildcard characters and must not include an extension; and
- </x>** is optional and may be one or more switches.

Source field, destination field, and switches are explained in detail later in this chapter.

NOTE: Do not use an extension with the destination filename during BACKUP. The extension is assigned automatically to a BACKUP destination file as it is created. More information about extensions is provided later in this chapter.

BACKUP

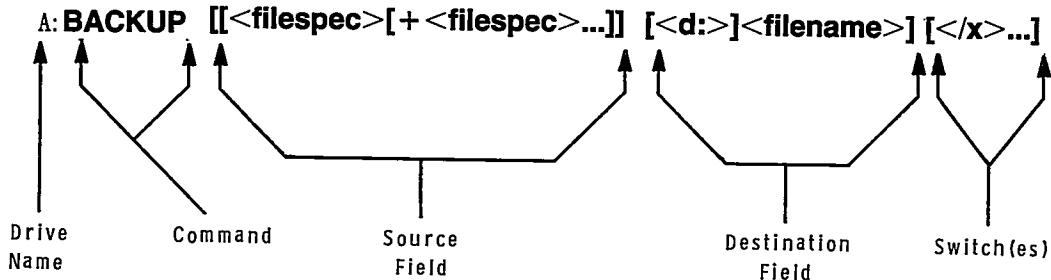
Invoking BACKUP

Method Three From the Z-DOS prompt with arguments, in the format:

A:BACKUP [[<filespec>[+<filespec>...]] [<d:>]<filename>][</x>...]

where: each **<filespec>**, which may be ambiguous (use wildcard characters "*" and "?"), designates a source file;
 the second **<filespec>** is one or more optional ambiguous file-specs separated from the first and from each other by plus (+) signs;
<d:> is an optional drive name if the destination is other than the default drive;
<filename> is the destination filename and must not use wildcard characters and must not include an extension; and
</x> is optional and may be one or more switches.

The command line structure for BACKUP is typical of other Z-DOS utilities:



Sources

The source file(s) are specified as filespecs that are optionally ambiguous. Each source specification (if there is more than one specified) is separated by a plus sign (+) in the format:

<filespec> + <filespec> + <filespec> + <filespec> ...

BACKUP

Sources

For example:

.ASC + TEST? + C:*.

would indicate: 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 (e.g., TEST0, TEST1, TESTS, TESTY, etc.); and all files on drive C:.

As another example:

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

would indicate: all files on drive A: with DEMO as filename and any extension; the file SYSTEM.COM on drive B:; all files on drive E: that have a filename beginning with 82 and that have a .DOC extension; and all files on the default drive that have a four letter (or less) filename with a .DAT extension.

NOTE: The device from which each source file comes is remembered when you run BACKUP. Therefore, when you restore your source files with the RESTORE utility, each source file can be restored to the device from which it was backed up.

Destination

A destination file specification is required if any source files are specified. Wildcard characters cannot be used. The destination file must not be ambiguous. The destination filespec should follow the format:

[<d:>]<filename>

where: <d:> is the name of the destination drive that must be specified if the destination is not the default drive;
<filename> is an unambiguous filename of from one to eight characters in length. No extension should be entered for the destination file.

BACKUP

Destination

NOTE: When you run BACKUP, an extension is automatically added to the filename of the destination file. This extension will consist of three digits, as explained in the Extension Assignment text of this chapter.

You should specify only one destination file in a BACKUP command. This destination file will be used to store all of the specified source files in a format described in the The Backup File text of this chapter.

Switches

The default state for BACKUP is query for formatting of disks (the opposite of the /F switch), no filename query on each file (opposite of the /Q switch), no verification after backup (opposite of the /V switch), and the date stamped on the disk (opposite of the /S switch).

NOTE: All BACKUP switches that accept parameters must be immediately followed by a colon (no space), and that colon (:) is immediately followed by the parameter (again, no space). If the switch is used without a parameter, no colon is used.

/A AFTER date. Files with dates after today's date or after the specified date are backed up. If a date other than today's date is used, the syntax follows the form:

/A[:<mm-dd-yy>]

where: a colon (:) is required to show that a specified date is to follow;
mm is a one or two digit numeral signifying the month;
dd is a one or two digit numeral signifying the day;
yy is a two digit numeral signifying the year; and
hyphens (-) are the required separator to avoid confusion with the slash (/) used for switches.

The /A switch used alone will search for all files dated after the date that was given to Z-DOS either when it was first booted up or through the most recent use of the DATE command.

BACKUP

Switches

- /B BEFORE date. Files with dates before today's date or before the specified date are backed up. If a date other than today's date is used, the syntax follows the form:

/B[:<mm-dd-yy>]

where: a colon (:) is required to show that a specified date is to follow;
mm is a one or two digit numeral signifying the month;
dd is a one or two digit numeral signifying the day;
yy is a two digit numeral signifying the year; and
hyphens (-) are the required separator to avoid confusion with the slash (/) used for switches.

The /B switch used alone will search for all files dated before the date that was given to Z-DOS when it was first booted up or through the most recent use of the DATE command.

- /D DIRECTORY master. Use of the /D switch causes BACKUP to locate all master files with the extension "000" and display a heading line with today's date and a directory of information about the master files. The directory would contain the name and date of the backup file, the number of files, and the number of volumes that the backup files reside on. The master file directory is displayed in the form:

| Name | Volumes | Files | Date | 4-15-84 |
|----------|---------|-------|----------|---------|
| BACKFILE | 3 | 10 | 12-19-83 | |
| BACK2 | 5 | 127 | 9-01-83 | |
| BACK3 | 1 | 1 | 8-22-83 | |

BACKUP

Switches

The syntax of the /D switch is:

>[<d:>] /D

where <d:> is an optional drive name which must be specified if a directory of other than the default drive is required; and
/D is the required switch for the directory operation.

- /E EXCEPTION files. Files listed after the /E switch are excluded from the BACKUP operation. Files not listed after the /E switch are backed up. Syntax for the /E switch is in the following form:

/E:<filespec>[+ <filespec>...]

where: colon (:) is required;
<filespec> is an ambiguous or unambiguous file specification that selects files that are to be excluded from the operation; and
[+ <filespec>...] is one or more optional ambiguous or unambiguous filespecs, each of which must be preceded by a plus sign (+) when used.

For example:

A: BACKUP *.DAT BACK1 /E:TEMPFILE.DAT + TEMP2.DAT

would backup all files from the default drive that have a .DAT extension except the file named TEMPFILE.DAT, and the file TEMP2.DAT, each of which would be omitted.

BACKUP

Switches

- /F FORMAT silent. The /F switch prevents BACKUP from prompting you with the Format backup disk (Y/N) ? prompt before it formats a destination disk.

During a backup operation without the /F switch, backup will inquire:

Format backup disk (Y/N) ?

and then it will inquire:

Single or double sided (S/D)?

With /F selected, the first query will not appear. However, BACKUP still inquires how many sides. Also, with /F selected, when BACKUP fills one disk and requires a new disk, it will display the message:

Insert another disk in drive <d:> for backup
and hit RETURN when ready or any other key to abort.

- /L LIST directory. The /L switch causes BACKUP to give the internal directory of the files that are contained within a specified backup file. The directory information includes the date of the file, the volume number where the files start and end, and the size of the file. At the end of the directory listing is a statement of how many files are contained within the backup file and how many volumes contain the complete backup file.

Syntax for the /L switch is in the form:

<filespec> /L

where: <filespec> is the master filename; and
/L is the required switch.

BACKUP

Switches

/L may be used with both methods of invoking backup. For example, from the Z-DOS command prompt:

A: BACKUP BACK9 /L RETURN

or the same command from the BACKUP prompt:

>BACK9 /L RETURN

The **/L** directory listing is displayed in the following form:

| Device | Filename | Date | Start Volume | End Volume | Size in bytes |
|--------------------------|--------------|----------|-----------------|---------------|------------------|
| E: | TESTFIL1.DAT | 10-10-82 | 1 | 1 | 3264 |
| E: | TESTFIL2.DAT | 10-10-82 | 1 | 2 | 19582 |
| F: | TESTFIL1.DOC | 8-01-82 | 2 | 3 | 887236 |
| F: | TESTFIL2.DOC | 9-17-82 | 3 | 3 | 22230 |
| 4 file(s) on 3 volume(s) | | | | | |

- /N** NO formatting. The **/N** switch prevents BACKUP from formatting any destination disks during the BACKUP operation.

The Format backup disk (Y/N) ?prompt and the Single or double sided (S/D) ? will not appear after you have entered a BACKUP command with the **/N** switch. Instead, when one disk is full another needs to be inserted, BACKUP immediately displays a prompt in the following form:

Insert another disk in drive <d:> for backup
and hit RETURN when ready or any other key to abort.

BACKUP

Switches

- /Q QUERY each. When /Q is used, you are queried before each file is backed up. With /Q the message, Backup <filespec> (Y/N) ? is requested for each file BACKUP encounters that matches the source specifications. For example, if three .DOC files existed on the source disk and the command to BACKUP was:

A: BACKUP B:*.DOC C:BACK1 /Q RETURN

BACKUP would prompt:

Backup B:FILE1.DOC (Y/N) ?

after you respond to this prompt, you would be prompted:

Backup B:FILE2.DOC (Y/N) ?

and finally,

Backup B:FILE3.DOC (Y/N) ?

- /S SUPPRESS stamp. Use of the /S switch suppresses the date stamp. (Default operation causes the stamp to be stamped on the source disk.) This switch is useful when a write protected disk is backed up, because the date file cannot be written on the source disk. This switch is also useful if you wish the freedom to back up any file from the source media—regardless of the date. Additional information regarding the date stamp is provided in the section on “The Backup File”.

NOTE: Whenever you perform a BACKUP operation without specifying the /S switch, BACKUP records the date of the operation on the source disk in a file named LASTBACK.SYS. LASTBACK.SYS prevents the backup of files that have not been changed since the last stamped BACKUP operation. Once LASTBACK.SYS has been written on the disk, all subsequent BACKUP operations performed with this source disk will be affected by it (unless the affect of the date stamping is overridden by a /A or /B or /T switch). LASTBACK.SYS is a hidden file. Therefore it can not be viewed with the DIR command or erased with the ERASE or DEL commands.

BACKUP

Switches

- /T TODAY's date. Files with today's date are backed up. The /T switch causes BACKUP to search for all files dated with the date that Z-DOS returns as today's date if you use the DATE command.
- /V VERIFY files. The /V switch 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. This switch can be used as shown in the following example:

A: BACKUP *.* BACK1 /V RETURN

where: A: is the default drive name;
BACKUP is the command invocation;
 . signifies all files as the source;
BACK1 is the backup file's name; and
 /V indicates that all files should be verified for accuracy.

Runtime Prompting

During BACKUP operations in which the entire backup file will not fit on one destination disk, a message in the following form will be displayed:

Insert backup master volume 1, <filename>.000, in drive <d:>
and hit RETURN when ready.

This message might occur more than once during a backup operation so that BACKUP can update and adjust the backup file's internal directory.

The following message appears unless you entered a BACKUP command line with the /F and/or /N switches:

Format backup disk (Y/N) ?

BACKUP

Runtime Prompting

If you respond by pressing **N** (for "no"), as if the destination media has already been formatted, then BACKUP will proceed to back up the specified files. If you respond by pressing **Y** (for "yes"), that you want BACKUP to format the destination media, the following message will be displayed:

Format Single or Double sided (S/D) ?

This message occurs prior to formatting any destination disks. If your destination media is a single-sided 8-inch floppy disk, you must press **S**; and if your destination media is a double-sided 8-inch floppy disk, you must press **D**. Regardless of what kind of media you have in the destination drive, a response other than **S** or **D** returns you to the preceding message, Format backup disk (Y/N)?.

When you specify the /Q (QUERY each) switch, BACKUP queries you with a message in the following form for each file it encounters:

BACKUP <filename.ext> (Y/N) ?

During the operation of BACKUP, a constant report is displayed of the source file being copied to the backup file. This report appears in the following form:

```
FILENAM1.EXT  
FILENAM2.EXT  
FILENAM3.EXT  
FILENAM4.EXT  
. . .  
FILENAMn.EXT
```

BACKUP

Runtime Prompting

When the /V (VERIFY) switch is selected, BACKUP reports when it begins to verify the file. Thus, the runtime report that appears with verification is displayed in the following form:

```
FILENAM1.EXT  
Verifying FILENAM1.EXT  
FILENAM2.EXT  
Verifying FILENAM2.EXT  
FILENAM3.EXT  
Verifying FILENAM3.EXT  
. . .  
FILENAMn.EXT  
Verifying FILENAMn.EXT
```

Each file is verified directly after it is backed up.

If a verify error occurs during BACKUP, the screen displays:

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

Responding by pressing **Y** will attempt to BACKUP the file and verify it again.

Responding by pressing **N** causes the backup of that file to be aborted. Then BACKUP will attempt to back up the next selected file.

BACKUP

BACKUP Routines

Application

If you create backups on a routine basis, BACKUP can come in handy. BACKUP was designed so that you can use it from a batch file. This automates most of the backup process and makes it relatively easy to make your routine backups. Several examples are given below, one or more of which might serve your needs. For more information on batch files, refer to the text entitled "COMMAND.COM and Command Execution" and "Batch Processing (.BAT)" of the Z-DOS manual.

NOTE: BACKUP is assumed to be on the default drive for all of the batch file examples given below.

If you do a lot of different types of work on a daily basis but you need to create backups every day, you might try this as a batch file.

General
Purpose
Backup

Open a file called GENBACK.BAT with EDLIN or another text editor and enter:

BACKUP %1*.* %2GENBACK /T /V

Now, save the file.

This backup file may now be invoked by entering:

[<d:>]GENBACK <d:> <d:> RETURN

where: the first <d:> is the name of the drive containing a disk that has the batch file named GENBACK.BAT;
 the second <d:> is the name of the source drive where the files you want to back up are located; and
 the third <d:> is the name of the drive where you want to send the backup file.

This batch file creates a backup file named GENBACK.000 (and possibly other volumes of this backup file named GENBACK.001, GENBACK.002, etc.) from all files on the specified source drive that are stamped with today's date and then verifies that the copies are identical.

BACKUP

BACKUP Routines

Condor Backup This batch file is useful after you have been working with Condor's Data Base Manager or File Manager®.

Using a text editor, open a batch file called CDBMBACK.BAT (for the data base manager) or a batch file called CFMBACK.BAT (for the file manager).

For CDBMBACK.BAT enter the following in the batch file:

BACKUP %1*.DEF + %1*.FRM + %1*.DAT + %1*.RPT + %1*.IDX %2CDBMBACK /V

For CFMBACK.BAT enter the following in the batch file:

BACKUP %1*.DEF + %1*.FRM + %1*.DAT %2CFMBACK /V

The Condor Data Base Manager backup batch file is invoked by entering:

[<d:>]CDBMBACK <d:> <d:> RETURN

The Condor File Manager backup batch file is invoked by entering:

[<d:>]CFMBACK <d:> <d:> RETURN

These create backup files named CDBMBACK.000 or CFMBACK.000 from all files on the specified source drive where your data disk should be located, and then the copies are verified to see that they are identical.

BACKUP

BACKUP Routines

This batch file is useful for backing up data files created by an accounting application program that helps you store data in files with the .DAT extension.

Accounting
Backup

Using a text editor, create a file called ACCTBACK.BAT and enter:

BACKUP %1*.DAT %2ACCTBACK /V

The accounting backup batch file is invoked with the command:

[<d:>]ACCTBACK <d:> <d:> RETURN

A backup file named ACCTBACK.000 is created from all files on the specified source drive where your data disk is, and then it is verified that the copies are identical.

This batch file is useful for backing up data files created through use of a spreadsheet application program, such as Supercalc™.

Supercalc
Backup

Using a text editor, create a file called SCALBACK.BAT and enter:

BACKUP %1*.CAL %2SCALBACK /V

The Supercalc backup batch file is invoked with the command:

[<d:>]SCALBACK <d:> <d:> RETURN

All of your Supercalc files with the .CAL extension will be saved to a backup file named SCALBACK.000, and the copies will be verified.

BACKUP

The Backup File

NOTE: This section contains information that is not essential to enable you to use BACKUP and RESTORE. This information describes some of the tasks that these utilities perform beyond the concern and awareness of most users.

BACKUP makes backup files by placing all source files into a single file. This single file is a backup master file or, simply, a backup file. The backup file is a composite of one or more source files placed end to end. These source files are joined together into a backup file by BACKUP and separated by RESTORE. The backup file also contains a directory of all of the source files that it contains.

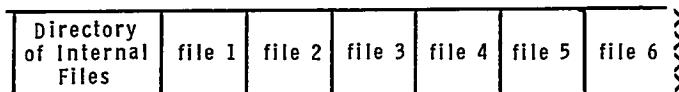


Figure 7.1
Data Content of a BACKUP Created File

**Extension
Assignment**

Each backup file created by BACKUP has a filename that you select, which consists of from one to eight legal Z-DOS filename characters. BACKUP assigns its own three-digit extensions.

When files from a relatively large capacity storage device (such as a Winchester disk) or from various storage devices are transferred to a smaller storage device (such as a built-in 5.25-inch disk drive) the source files can require more space than the smaller device has available. When the source files for a BACKUP operation are larger than the destination media, more than one disk is required for the backup file and a series of disks are used. The backup file in this case is actually a sequence of files with the same filename. Each of the files within the sequence has a different three-digit extension.

BACKUP

The Backup File

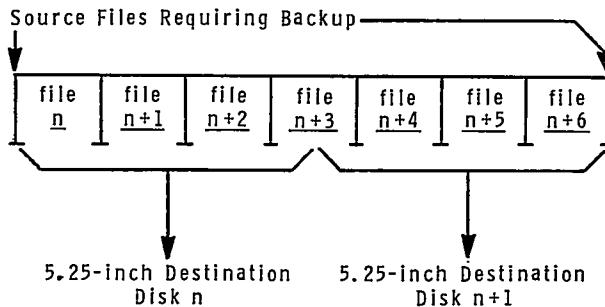


Figure 7.2
The distribution of BACKUP source files
across several destination disks.

BACKUP must keep track of all of the source files—even when the backup file is larger than the storage available. To do this, BACKUP assigns sequential extensions to the filename, starting with the number 000 (which is the master volume and the backup file's beginning entry) and increments that extension one number for each disk that the master file extends across. Each separate disk used to store a backup file is called a volume and is assigned a volume number.

Use of More than One Volume

The volume number is always the current file extension's value plus one. This way you can always tell which volume a backup disk is by using the DIR command. For example:

<filename>.000 is Volume 1
 <filename>.001 is Volume 2
 <filename>.002 is Volume 3

<filename>.nnn is Volume nnn + 1

BACKUP

The Backup File

If a backup file is named BACKFILE and it extends across three disks, the DIR command shows the first disk's directory with an entry "BACKFILE.000" (which would be Volume 1), the second disk contains the entry "BACKFILE.001" (Volume 2), and the third contains "BACKFILE.002" (Volume 3).

Suppose you have a 5.25-inch disk that runs out of free space midway through a BACKUP operation and also midway through an individual source file. You need a way to keep track of both halves of the file. BACKUP provides a method for you to do this. BACKUP records this information in the backup file's internal directory by listing the volume that the file starts on and the volume that the file ends on. This is illustrated in Figure 7.3.

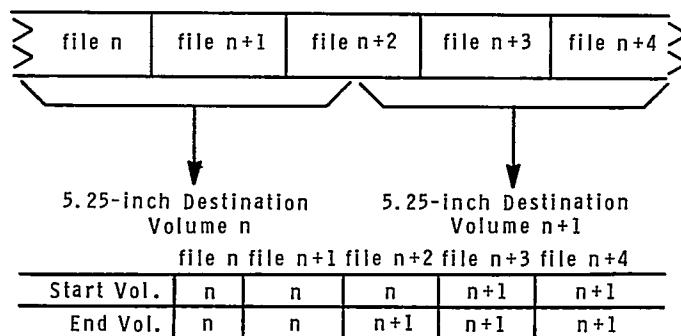


Figure 7.3
A Backup File's Internal Directory of Files and Volumes

BACKUP

The Backup File

The directory that is displayed after entry of a command with the /L switch (as explained in the text entitled "Switches" in this chapter) might be displayed as follows:

| Device | Filename | Date | Start Vol. | End Vol. | Size in Bytes |
|--------|----------|------|------------|----------|---------------|
| E: | FILE1 | .DAT | 10-10-82 | 1 | 3264 |
| E: | FILE2 | .DAT | 10-10-82 | 1 | 19582 |
| F: | FILE3 | .DAT | 8-01-82 | 2 | 887236 |
| F: | FILE4 | .DAT | 9-17-82 | 3 | 22230 |

4 file(s) on 3 volume(s)

The structure of a backup file, as mentioned earlier, is a directory followed by the source file or files that are being backed up. These source files are placed sequentially within the backup file. This arrangement requires only a little additional space for the backup file.

The directory is a composite of two types of entries. The first entry provides information about the backup file itself. The other entry contains information about a file that has been backed up. The actual layout of the entries are as follows:

| | | | | | | | | |
|----|--------------|--------|-----------|--------|----------|----------|--------|------------|
| ID | Extended FCB | 4 res. | no. files | 9 res. | Rel. no. | Ver. no. | 6 res. | = 64 bytes |
| 1 | 40 | 4 | 2 | 9 | 1 | 1 | 6 | |

Backup File
Directory
Entry

Figure 7.4:
Backup File Directory Entry

BACKUP

The Backup File

The extension on the FCB is used to record the number of volumes that the backup contains. (The FCB is defined in “Appendix H: Disk Directory Structures and FCB Definition” of the Z-DOS manual.) The FCB also contains the date that the backup was created. The number of files is also entered here, as are the release and version numbers for compatibility with future versions. The ID byte for this entry is set to zero to distinguish this entry from normal file directory entries.

Source File
Directory
Entry

| ID | Extended FCB | 4 res. | start vol. | end vol. | start posit. | no. bytes | 9 res. | = 64 bytes |
|----|--------------|--------|------------|----------|--------------|-----------|--------|------------|
| 1 | 40 | 4 | 1 | 1 | 4 | 4 | 9 | |

Figure 7.5:
Source File Directory Entry

This entry is one that is used for a source file that is contained by the backup file. This entry contains information such as the file’s name, starting and ending volumes, where the file starts and the length of the file. The ID byte for this entry indicates the location of this source file entry amongst the other source file entries in the directory. If the value of this byte is 2, then the entry describes a source 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 a source file.

Date
Stamp

As a default condition with BACKUP, a date stamp is written to a file on the source disk. The date stamp is written to a file named LASTBACK.SYS, which is set as both a hidden and a system file. If LASTBACK.SYS is written on the source disk, then the date stamp is used for all future BACKUP operations performed on the same stamped source disk.

BACKUP

The Backup File

For example, one application of the date stamp becomes apparent during execution of the following command:

A: BACKUP *.* BACKFILE RETURN

When BACKUP begins to execute this command, it checks the source disk for the LASTBACK.SYS file. If LASTBACK.SYS is found, then all files are backed up that have dates later than the date stamped in LASTBACK.SYS.

If it is necessary to override this feature and backup files dated before or on the date of the date stamp, the date switches (/A AFTER date, or /B BEFORE date) can specify the dates that BACKUP is to use for the operation.

If no LASTBACK.SYS file exists on the source disk, then all files are eligible for the BACKUP command.

BACKUP Error Messages

During BACKUP operation, you may receive one of the following error messages:

Backup filename can not be ambiguous.

This message occurs if the wildcard characters “?” or “*” occur in the backup file’s name.

Cannot find master backup file <filename>.000.

This message occurs when a /L switch is requested for a file from a disk on which the master backup <filename>.000, does not reside.

BACKUP

BACKUP Error Messages

Cannot open backup file <filename>.<nnn>, insert another disk 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.

Cannot open master backup file <filename>.000, insert another disk 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.

Cannot open master backup file <filename>.000, not enough space on disk.

This message will occur if there is less than 1 kilobyte of space available on the disk where the backup file is to be written. Try again, using a disk that is not as full.

Conflicting switches /F and /N specified.

This message occurs if the switches for Format silent and No formatting were both requested. Reenter the appropriate command line with the correct switch.

Extension on backup file specified, extension 000 will be assumed.

This occurs whenever you try to assign a backup file an extension. (Backup file extensions are explained in the text entitled "The Backup File" in this chapter.) If this occurs, BACKUP ignores the extension you requested and uses its standard, sequentially numbered extensions.

BACKUP

BACKUP Error Messages

Format failure, insert another disk and hit return, or hit any other key to abort.

This message occurs if an error occurs while trying to format a destination disk during BACKUP. This could be caused by the use of incorrect media or by damaged media. In either case, obtain another blank disk for the destination. Later you can run FORMAT on the disk that was to be the destination disk when the error message occurred to determine whether the disk's media is usable. If the disk cannot be formatted, you may need to discard that disk.

Insert another disk in drive <d:> for backup, and hit return when ready, or hit any other key to abort.

This message occurs if the disk that you placed in the drive for backup has no more space available on it.

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 has become inaccessible due to media damage.

Invalid date in switch.

This message occurs if the date given with the /B or /A switches was not in the correct format. Reenter the command line using proper syntax.

Invalid drive designation on BACKUP file.

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

BACKUP

BACKUP Error Messages

Invalid exception file specifications.

This message occurs if exception files were specified with a syntax error.

Invalid filename.

This message appears when a filename is specified that does not conform to the Z-DOS filename conventions.

Invalid selection file specifications.

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

Invalid switch </x> specified.

This message occurs if BACKUP is unable to recognize the switch that was specified in the command.

Invalid version of BACKUP for file <filename.000>.

This message occurs only if you use incompatible versions of the BACKUP program.

No files selected.

You get this message if your command line did not contain any valid filename, or if no files were selected because the files you specified for this operation were not stamped with the appropriate date.

BACKUP

BACKUP Error Messages

Not enough parameters specified.

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

Too many parameters specified.

This message will appear if you have entered more parameters than BACKUP can handle properly.

Verify error, try backup again (Y/N) ?

This message occurs if a file does not verify correctly after a backup operation. You can choose to retry the file or continue on to the next file.

CHAPTER 8

FORMAT

FORMAT (Format Disk) Command

Brief

Format: **FORMAT [d:][/x]**

Command
Location: File

Purpose: Prepare disk or partition media for Z-DOS operations by defining boundaries on surface of media.

Switches: /C (rewrite reserved sectors, clear FATs and directory)
/M (format media as single-sided)
/N (no prompts—suppress prompts)
/S (copy system files during format)
/V (verify the format and gathers up bad sectors so they cannot be used)

Details

The FORMAT utility writes a magnetic map on the recording surface of the disk in the drive specified. It initializes the directory and file allocation tables. The boot loader is copied onto track 0, starting at sector 1. (This occurs whether or not the /S switch is given.)

FORMAT

FORMAT Operations

If the disk's format were visible it would appear as:

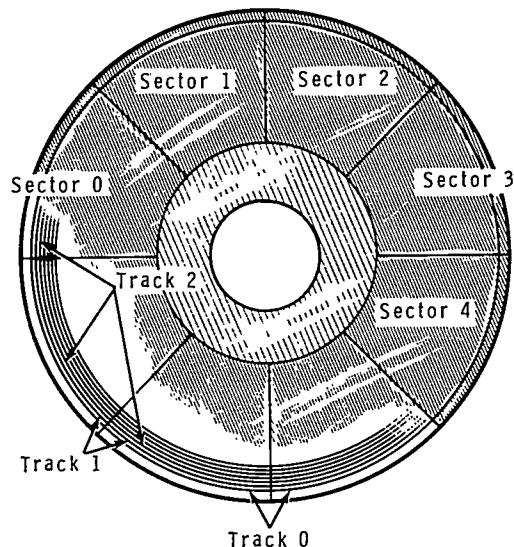


Figure 8.1
Layout of Disk Sectors and Tracks

The number of tracks per disk side varies depending on the type of disk being used. A 5.25-inch 48 tpi disk has 40 tracks per disk side. A 5.25-inch 96 tpi disk has 80 tracks per side. All 8-inch disks are fixed to an industry standard of 77 tracks per side.

Winchester disks, being of different construction, can have several sides, tracks and configurations (See "Chapter 11: PREP" for information about Winchester disk platters, sides, heads, tracks, sectors, and cylinders.)

The FORMAT utility does not truly format a partition (PREP does the actual formatting). FORMAT on a partition does the equivalent of FORMAT/C, and reads the Bad Sector Table. FORMAT/V reads the Bad Sector Table and checks all other sectors for verification.

Different types of disk require different formats. If the disk is a floppy disk, FORMAT assumes that the disk is to be formatted on both sides.

FORMAT

FORMAT Operations

NOTE: If you wish to format a disk on only one side (as with a single-sided 8-inch disk), you must specify the /M switch in the FORMAT command line. However if you wish to format a double-sided 8-inch disk, you must not specify the /M switch.

When a disk is formatted at double-density, FORMAT writes more data patterns (recorded signals) on each track of the disk than when the disk is formatted at single-density. At double-density, these data patterns are written closer together than they are at single-density.

Winchester disks can only be formatted in one density. The data pattern used for Winchester disks is determined by the disk manufacturer.

Drive A: and B: Formats

single-sided double-density 48 tpi 5.25-inch;
double-sided double-density 48 tpi 5.25-inch;
double-sided double density 96 tpi 5.25-inch;

Drive C: and D: Formats

single-sided single-density 8-inch;
double-sided double-density 8-inch;

Drive E: and F: Formats

partition defined by PART or PREP, 5.25-inch (up to 8 megabytes)
partition defined by PART or PREP, 5.25-inch (up to 8 megabytes)

All Z-DOS floppy disk formats have an essential structure in common:

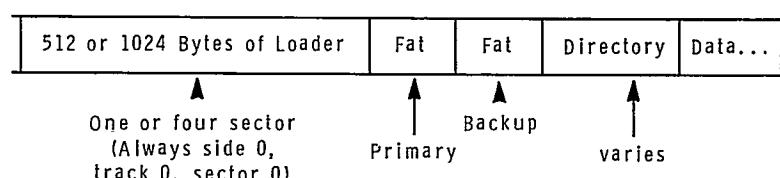


Figure 8.2
Floppy Disk Format

FORMAT

FORMAT Operations

All Z-DOS partition formats have an essential structure in common:

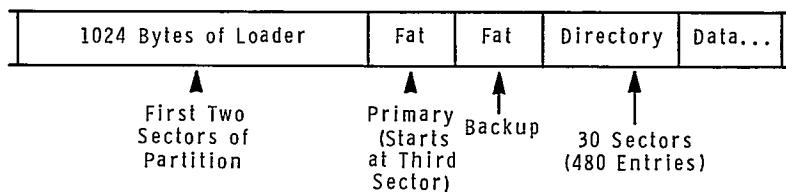


Figure 8.3
Winchester Partition Format

These figures show how the information on a disk would appear to be organized if you could see it all in consecutive order.

For all options selected, except the /C switch (Winchester disk are formatted as if FORMAT/C were the command given), FORMAT initializes each track on the disk. It next goes back to logical sector 0, track 0, side 0, and writes the boot loader code to the first 512 or 1024 data byte locations on the disk.

NOTE: FAT stands for “file allocation table”, which is explained in “Appendix H: Disk Directory Structures and FCB Definition” of the Z-DOS manual.

FORMAT next writes one dummy FAT. Actually, only the first byte (which is reserved) of the FAT is written. This FAT byte tells the system how many sides are to be formatted on the disk (FORMAT determines tpi for floppy disks by checking the DIP switch on the Z-207 controller card). It writes:

- FFH—for 48 tpi single-sided
- FEH—for 48 tpi double-sided
- FDH—for 96 tpi double-sided

For 8-inch disks, the FAT ID byte is ignored. FORMAT assumes double-sided unless the /M switch is used. FORMAT formats 8-inch single-sided disks as single-density and formats 8-inch double-sided disks as double-density.

For Winchester disks, the FAT ID byte is also ignored.

FORMAT

Invoking FORMAT

FORMAT may be entered at the system prompt with a variety of options; or FORMAT may be entered without selecting any options to assume defaults.

The FORMAT command line without options can be entered as follows:

A: FORMAT RETURN

Initial Messages

When this has been entered for a floppy disk, FORMAT responds with a message and prompt in the following form:

Format version 1.6

Insert new diskette for drive d:
and strike any key when ready

When this has been entered for a Winchester partition, FORMAT responds with a message and prompt in the following form:

Format version 1.6

Will FORMAT partition assigned drive d:

When FORMAT is entered in this fashion, it assumes that the disk to be formatted is in the default drive.

To format a disk or partition in a drive other than the current default, the drive name should be specified in a command line of the following form:

A: FORMAT <d:> RETURN

where <d:> is the name of the drive containing the disk or partition to be formatted.

FORMAT

Invoking FORMAT

Several options are available in the form of switches.

Switches

The /C switch causes FORMAT to rewrite the boot loader, FATs, and directory. With the /C switch selected the disk is not initialized (the tracks are assumed to have already been initialized), therefore the disk or partition must have been previously formatted by the Z-DOS FORMAT utility.

The /M switch causes FORMAT to format a disk as single-sided instead of double-sided. (Double-sided formatting is the default). You must specify this switch if you are formatting an 8-inch single-sided disk, or else an error message will be displayed. You must not specify this switch if you are formatting an 8-inch double-sided disk, or else an error message will be displayed.

The /N switch causes FORMAT to skip all of the prompts. When selected, FORMAT displays its banner, formats the disk in the specified device, and then displays the system prompt when it finishes. Use this switch with caution. Make certain that you specify the drive containing the disk (or assign the partition) that you wish to format.

The /S switch causes FORMAT to copy all of the operating system files on the disk in the default drive to the newly formatted disk. The files that are copied are:

| | |
|-------------|--|
| IO.SYS | |
| Z-DOS.SYS | |
| COMMAND.COM | |
| ALTCHAR.SYS | (if present on default drive disk or partition during FORMAT operation) |

These files are copied in the order shown.

The /V switch causes FORMAT to check the format to see that it was written correctly. Any bad sectors that are found are mapped out of the available disk space so that they cannot be used for data storage by the operating system. At the end of the format operation, if bad sector(s) are found, a message is displayed telling the byte count for the bad sectors found.

FORMAT

Invoking FORMAT

Completion When FORMAT has finished formatting a disk, it displays a message that briefly reports the way in which it formatted the disk. FORMAT's completion message will differ depending on the kind of disk being formatted and the command line entered. This message appears in the following form:

for 5.25-inch (48 tpi) with no switches selected:

```
322560 bytes total disk space  
322560 bytes available on disk
```

for 5.25-inch (48 tpi) with the /S switch selected:

```
322560 bytes total disk space  
23552 bytes used by system  
299008 bytes available on disk
```

for 5.25-inch (48 tpi) with the /M switch:

```
160256 bytes total disk space  
160256 bytes available on disk
```

for 5.25 (48 tpi) with both /M and /S switches:

```
160256 bytes total disk space  
23552 bytes used by system  
136704 bytes available on disk
```

for 8-inch with no switches:

```
1250304 bytes total disk space  
1250304 bytes available on disk
```

for 8-inch with the /S switch:

```
1250304 bytes total disk space  
22528 bytes used by system  
1227776 bytes available on disk
```

FORMAT

Invoking FORMAT

All of the completion messages in FORMAT take this form, although the byte count given may vary widely. Partition byte counts have the potential to vary the most.

NOTE: The byte totals shown here might differ from those displayed when you use FORMAT.

Immediately after the completion message for floppy disks, FORMAT asks:

Format another (Y/N) ?

Press **N** or **n** for “no” to obtain the system prompt. Press **Y** or **y** for “yes” to cause the program to run again (using the same drive and/or switches specified in the original command line).

After FORMAT formats a partition, Z-DOS will immediately display the system prompt. (FORMAT will not display the Format another (y/n)? prompt as it does after formatting floppy disks.)

Disk Format Variations

The space allocated for the directory and data sectors varies with the type of disk format. In Figures 8.4 through 8.8, the different sector allocations for the initial disk sectors on logical side 0, track 0, sector 0 (up to their first sector used for data) are shown for each of the current Z-DOS formats.

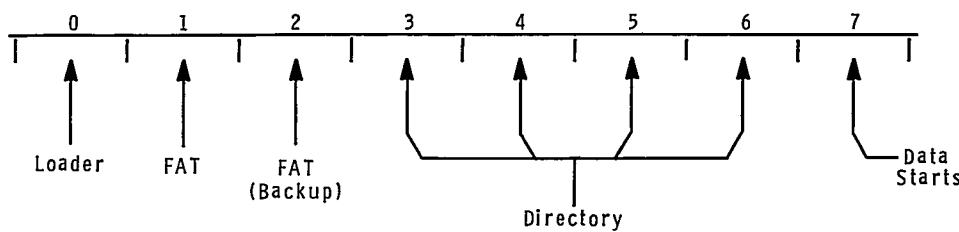


Figure 8.4

5.25-inch Single-sided Double-density 48 tpi Disk Format

FORMAT

Disk Format Variations

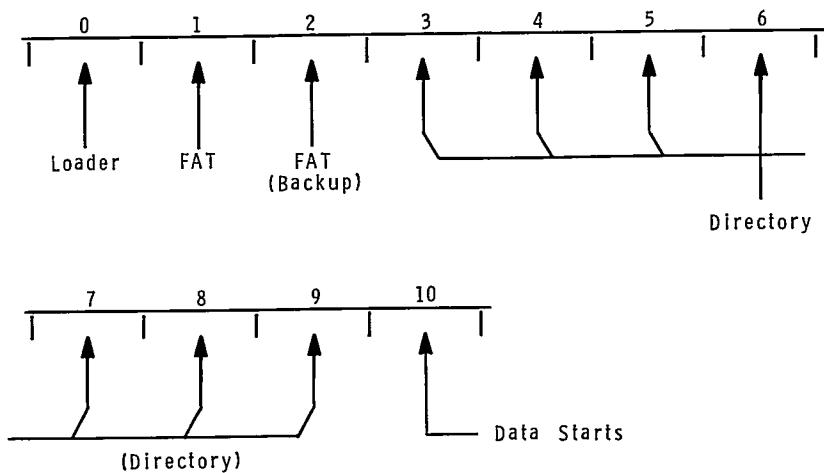


Figure 8.5
5.25-inch Double-sided Double-density 48 tpi Disk Format

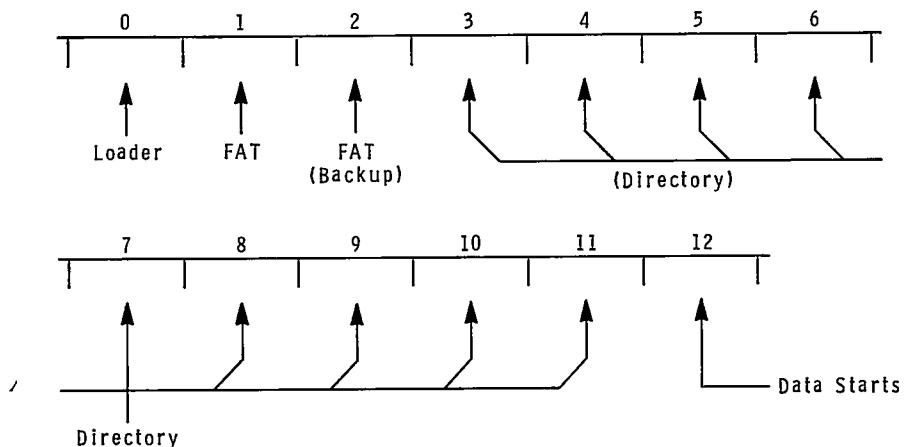


Figure 8.6
5.25-inch Double-sided Double-density 96 tpi Disk Format

FORMAT

Disk Format Variations

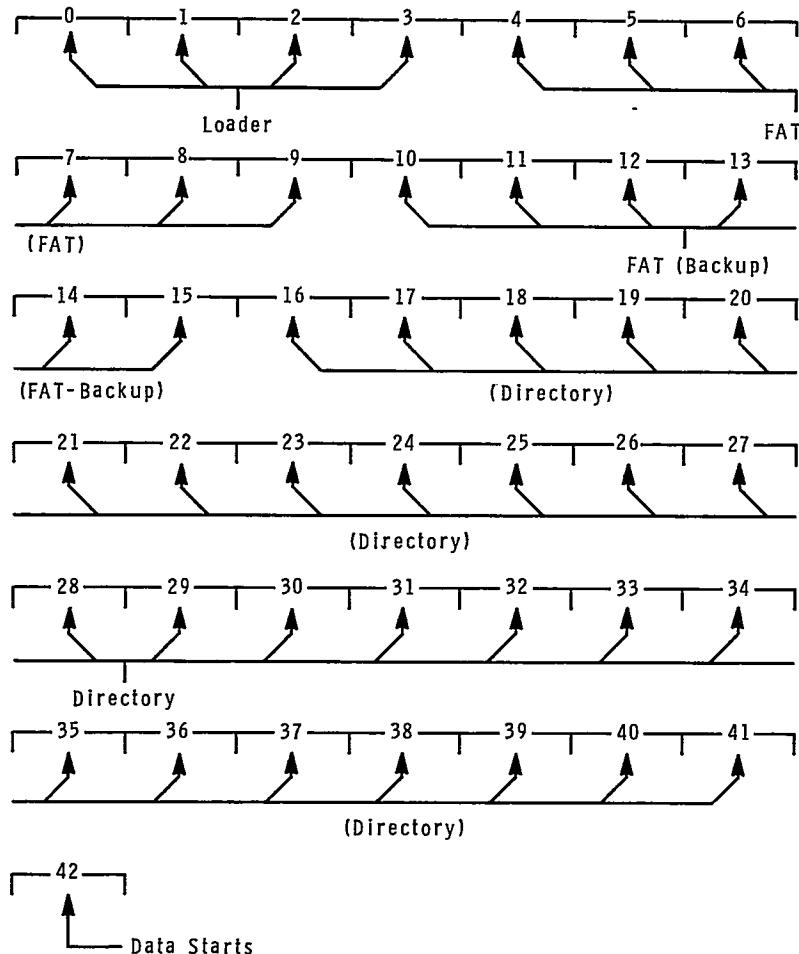


Figure 8.7

8-inch Single-sided Single-density 77 Track Disk Format

FORMAT

Disk Format Variations

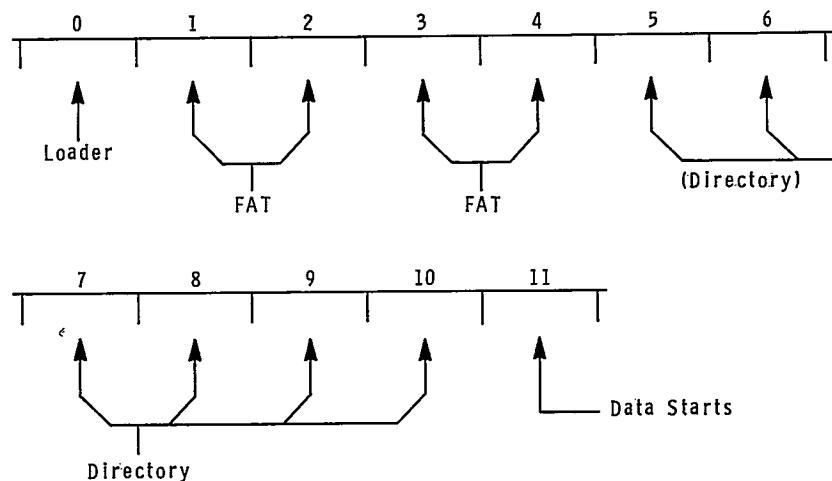


Figure 8.8
8-inch Double-sided Double-density 77 Track Disk Format

The space that is allocated for directory and data structures on a Winchester partition, follows the same type of format. Winchester partitions have:

- Two reserved sectors of boot code (1024 bytes);
- Two FATs (from one to twelve sectors each);
- 30 directory sectors allowing 480 entries with each entry containing 32 bytes; and
- Four sectors per cluster (clusters are always 2K).

To calculate FAT size in bytes:

$$\text{FAT} = (((\text{NPS} - \text{NRS} - \text{NDS} - \text{FAT})/\text{CF}) * 1.5) / 512)$$

where:

- NPS = the number of physical sectors;
- NRS = the number of reserved sectors (always 2);
- NDS = the number of directory sectors (30 a for partition);
- FAT = the FAT size, recursively calculated by repeating the formula until it stabilizes;
- CF = the cluster factor (4 sectors (2K));
- 1.5 = the cluster byte size; and
- 512 = sector size in bytes.

FORMAT

Disk Format Variations

The BIOS uses this formula to calculate FAT size, but does it in one pass. Therefore, the result is rounded up, since the FAT is not used in the calculation. The BIOS formula would appear:

$$\text{FAT} = (((\text{NPS} - \text{NRS} - \text{NDS})/\text{CF}) * 1.5) / 512)$$

where: NPS = the number of physical sectors;
NRS = the number of reserved sectors (always 2);
NDS = the number of directory sectors (30 for partition);
CF = the cluster factor (4 sectors (2K));
1.5 = the cluster byte size; and
512 = sector size in bytes.

CHAPTER 9**MAP****MAP (Physical to Logical Drive Name Mapping) Command****Brief**Format: **MAP [</x>] [d: n]**

or

MAP ?

Command

Location:

File

Purpose: Allows you to reassign the logical drive names to physical drive units.

Details

The MAP utility allows you to reassign the logical drive names so that they refer to different physical drives or to Winchester disk partitions. This alters the default one-to-one mapping that exists from physical (both real and imaginary) to logical drives within the operating system. The term real refers to a logical drive name that is assigned to a drive or a partition on a drive that is physically connected to your computer; and imaginary refers to a logical drive name that does not have its corresponding drive actually connected or no corresponding partition exists. (If you have only one 5-inch drive (as you do when a Winchester disk is built into your ZW-110-22 or ZW-120-22), then it is assigned to drive A. A is a real drive, and B refers to an imaginary drive since there is no corresponding physical drive.)

MAP

Invoking MAP

One kind of MAP command provides you with an instructional screen display explaining MAP command syntax. You can enter this command as follows:

A: MAP ? RETURN

MAP will respond to this command with the following display:

MAP [/Z/I] [d: n]

/Z-Reset table to default values

/I-Make drive imaginary

d:-Logical drive name

n- Physical drive number

To invoke MAP in order to see the current logical to physical assignments, you can type:

A: MAP RETURN

MAP with no options specified causes a table of assignments to display in the following form:

MAP Version 1.02
Copyright (C) 1982 Zenith Data Systems

| Physical Drive | Kind | Logical Names | Type | Assigned |
|----------------|------------|---------------|-----------|----------|
| 0 | 5 Inch | drive A: | Real | A: |
| 1 | 5 Inch | drive B: | Imaginary | A: |
| 2 | 8 Inch | drive C: | Real | C: |
| 3 | 8 Inch | drive D: | Real | D: |
| 4 | Winchester | E: | Real | E: |
| 5 | Winchester | F: | Real | F: |

MAP

Invoking MAP

The display shown here reflects the default name assignments for a system having one 5-inch and two 8-inch disk drive units connected to the Z-207 controller board and a Winchester disk drive connected to a Z-217 controller.

NOTE: The word "Real" in the "Type" category does not necessarily indicate that you have all of the kinds of drives listed, connected, turned on, or assigned.

In the example, "Physical Drive" is the number of the drive; "Kind" is the device type; "Logical Name" is the default drive names in the range from A through F; "Type" is either Real or Imaginary (an imaginary type occurs when only one of the two possible drives is connected. For instance, only one 5-inch drive is connected, the other is shown as imaginary); and "Assigned" shows the current logical name to physical drive assignments.

To reassign drive names with MAP, you type:

A: **MAP <d:> <n> RETURN**

where **<d:>** is the logical name for the drive; and
 <n> is the number of the drive.

MAP

MAP Examples

For example, if you typed:

A: MAP B: 0 RETURN

you would in effect be naming the drive that boots as drive A with the name of B. If you have not made any other name assignments, your drive responds as both A: and B:. The map table would appear like:

MAP Version 1.01
Copyright (C) 1982 Zenith Data Systems

| Physical Drive | Kind | Logical Names | Type | Assigned |
|----------------|--------------|---------------|-----------|----------|
| 0 | 5 Inch drive | A:,B: | Real | A: |
| 1 | 5 Inch drive | | Real | B: |
| 2 | 8 Inch drive | C: | Real | C: |
| 3 | 8 Inch drive | D: | Imaginary | C: |
| 4 | Winchester | E: | Real | E: |
| 5 | Winchester | F: | Real | F: |

Notice that the type for physical drive 3 shows as imaginary. An imaginary type drive occurs when only one of two possible drives is connected to a device. Therefore, the table shown previously could occur on a Z-100 having two 5.25-inch drives, one 8-inch drive (the C: drive) connected to the Z-207 controller, and one Winchester disk drive connected to a Z-217 controller.

If you typed the command:

A: MAP/Z RETURN

MAP

MAP Examples

the logical to physical assignments are reset to the original boot condition. If you issued this command on the same machine that produced the previous table, MAP would display:

MAP Version 1.02
Copyright (C) 1982 Zenith Data Systems

| Physical Drive | Kind | Logical Names | Type | Assigned |
|----------------|--------------|---------------|-----------|----------|
| 0 | 5 Inch drive | A: | Real | A: |
| 1 | 5 Inch drive | B: | Imaginary | A: |
| 2 | 8 Inch drive | C: | Real | C: |
| 3 | 8 Inch drive | D: | Real | D: |
| 4 | Winchester | E: | Real | E: |
| 5 | Winchester | F: | Real | F: |

Physical drive 0 has a logical name of A and physical drive 1 would again be named as the B drive. The /Z switch always resets the drive name assignments to their initial values (the names that the drives are assigned when an initial boot is performed).

CHAPTER 10

PART

PART (Winchester Disk Partitioning) Command

Brief

Format: **PART**

Command

Location: File

Purpose: The PART utility provides a means to allocate disk space to different partitions on a Winchester disk.

Details

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. If you obtained your Winchester disk from Zenith Data Systems or Heath, you do not need to run PART in order to use your Winchester disk because a Z-DOS 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, SHIP, and VERIFY utilities are also recorded on this 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 use the BACKUP utility to back up all necessary data from all partitions before you use PART.

NOTE: After using the PART utility, you must reset and reboot the system. PART temporarily alters the Z-DOS system in memory each time PART is used. Therefore Z-DOS must be reloaded into memory after every use of PART. Use a bootable disk other than the Winchester Utility Disk to reboot after using PART.

PART

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 partitions on your Winchester disk and record a different operating system on each partition.

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.

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 isolated into inaccessible areas by software such as the PREP utility. Examples in this text show disk space totals for a Winchester disk that accommodates 10,000 kilobytes (10 megabytes), although it is possible that your disk will accommodate a different amount.

Winchester disks obtained from Zenith Data Systems or Heath are shipped from the factory with two usable partitions already established on the disk surface. Each of these partitions occupies one half of your total Winchester disk space. Each is also given a distinct name. One of these partitions is intended for use with the Z-DOS operating system and software that runs under Z-DOS. The other is intended for use with the CP/M-85 operating system and software that runs under CP/M-85.

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

PART

Partition Features

- total (precise) number of kilobytes of Winchester disk space that are and are not allocated to partitions
- name of the one-and-only partition that is accessed when you boot up without specifying a partition.

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.

PART

PART Operation

Invoking PART

PART is recorded on the Winchester Utility Disk (supplied with your Winchester disk hardware and documentation) as an executable .COM file.

To invoke the PART utility, enter the following command at the system prompt:

Entry Rules

A:PART RETURN

After it is invoked, the PART utility displays identification messages, a caution, and a prompt, as shown:

Resulting Display

```
PART version 1.01
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 copies of your Winchester disk files to floppy disks.

Do you wish to proceed (Y/N)?

PART

PART Operation

Error Conditions

If the PART.COM file is not on the disk you are using to run PART, you will receive the

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

Not ready 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**.

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.

Continuing to Use PART

Entering **Y** at this prompt ratifies 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 if you have not yet done so, you should exit from PART by typing **N** and then make backup copies of any valuable software and/or data now stored on the Winchester disk. Then you should invoke PART and ratify your intentions to use PART.

PART

PART Operation

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. However, to prevent the possibility that you could destroy data by making an erroneous entry while using PART, we recommend that you back up your Winchester disk data before using PART in any way.

After 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:

Resulting
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>.

PART

PART Operation

The PART display in this example shows a Winchester disk that has been divided into two nearly equal partitions. This is the initial condition of Winchester disks that have just been shipped from Zenith Data Systems or Heath, or that have just been prepared by the PREP utility. Since the total capacity of Winchester disk drives varies, the kilobyte amounts shown for Zenith Data Systems or Heath drives might differ from those shown here. However, the percentages and names will be the same as those shown here. If you have already used PART since shipment or since running PREP, then some features of this display might appear differently.

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.

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 to the right of the prompt on the bottom of the screen.

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.)

PART

PART Operation

Type **B** at this prompt to select a 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 the text in this chapter entitled “Default Boot Partition Number” for further instructions.

Entry Rules

After typing the B entry to modify the 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:

Resulting Display

```
~~~~~  
15.  
16.  
Total Utilization (Allocated/unallocated) 100/0 10000/0  
Default boot partition number:-
```

Enter number of new default boot partition.

When a display in this form appears, proceed to the text entitled "Default Boot Partition Number".

Choosing Partition Maintenance

The partition maintenance operation enables 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.

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.)

Entry Rules

PART

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. <u>Z-DOS</u> | 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 the text in this chapter entitled "Partition Name".

Choosing to Exit

Type **E** at this prompt to exit from the PART utility completely. The **A:** system prompt will be displayed immediately.

PART

PART Operation

Partition Name

After you have chosen the partition maintenance operation, the cursor moves to the first character of a partition name.

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.

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.

Entry Rules

PART will always display partition name letters (if any) in uppercase, although you can enter them in either lowercase or uppercase.

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 the 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.

The following examples are valid partition names:

Examples

DATABASE WORD/PROCESSING George

Spread-sheet Z-DOS_ACCOUNTING Thelma BASIC

PART

PART Operation

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 this 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.

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.

PART

PART Operation

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 this partial display:

Resulting 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 partition name position where no partition name was displayed, a RETURN entry will move the cursor ahead to the default boot partition number feature, as shown in this partial display:

Enter the number of the default boot partition.

PART

PART Operation

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.

To remove a partition from the table without inserting a new partition in its place, simply press the **space bar**.

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, and if later on you also bypass the entry for default boot partition number, then the **is undefined** message will be displayed instead of a default boot partition.

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).

PART

PART Operation

The following partial display shows how the screen might appear after you remove a partition:

Minimum allocation = 2%

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.

Error Conditions

PART

PART Operation

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.

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 uppercase, although you can enter them in either lowercase or uppercase.

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 the 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.

Examples

The following examples are valid operating system names:

Z-DOS CPM UNDER-DOS Acronym-DOS ZENDOS

PART

PART Operation

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 software and/or data. You will not be able to access a Z-DOS partition unless its system name is "Z-DOS".

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 this partial display:

| Partition Name | System Name | Percentage | Kilobytes |
|--------------------|-------------|------------|-----------|
| 1. DATABASE | Z-DOS | 50% | 5000 |
| 2. WORD/PROCESSING | Z-DOS | <u>50%</u> | 5000 |
| 3. | | | |
| 4. | | | |

Resulting Display

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 number. Then after your default boot partition number entry, PART will 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.

Error Condition

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.

PART

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 or adding a system name, press only the RETURN key. |
| Resulting Display | Enter only RETURN to cause the cursor to move ahead to the percentage feature of the same partition, without making any change to the system name, as shown in this partial display: |

PART

PART Operation

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.

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.

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.

NOTE: Different brands and models of Winchester disk require different minimum allocations. PART determines and displays this amount automatically.

[Entry Rules](#)

PART

PART Operation

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 this partial display:

| Partition Name | Operating System Name | Percentage | Kilobytes |
|---|-----------------------|------------|-----------|
| 1. DATABASE | Z-DOS | 30% | 3000 |
| 2. WORD/PROCESSING | Z-DOS | 70% | 7000 |
| 3. _ | | | |
| 4. | | | |
| | | | |
| | | | |
| 15. | | | |
| 16. | | | |
| Total Utilization (Allocated/unallocated) | | 100/0 | 10000/0 |
| Default boot partition number: is undefined | | | |

Minimum allocation = 2%

PART

PART Operation

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 | Z-DOS | 6% | 600 |
| 2. WORD/PROCESSING | Z-DOS | 6% | 600 |
| | | | |
| 15. COBOL | ACRONYM-DOS | 6% | 600 |
| 16. FUN&GAMES | OMEGA-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.

PART

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 percentage and kilobytes) in reverse video. The screen will appear in the form of this partial display:

Minimum allocation = 2%

NOTE: You can exit from PART with part of your disk unallocated.

PART

PART Operation

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.

**Error
Condition**

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 overallocation, 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 that is 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 fraction, a 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.

PART

PART Operation

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 an allocation percentage, although the bypassed percentage 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. |
|-------------------------|--|

PART

PART Operation

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 number, partition name, and system name of the current default boot partition will vanish from the display.

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 boot-up.

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.

To establish a default boot partition, you must enter the *number of an established partition* and press RETURN.

Entry Rules

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.

PART

Resulting Displays

If you enter 3 as your default boot partition number, and if line 3 on your partition table looks like the following:

3. SPREAD-SHEET Z-DOS 15% 1646

then part of the display showing your new default boot partition number will appear as:

NOTE: The operations menu is displayed beneath the default boot partition number as soon as you make an entry for this feature. Refer to the text in this chapter entitled "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**.

PART

PART Operation

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**.

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.

To bypass changing the default boot partition feature, press only the **RETURN** key at this position.

Entry Rules

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:

Resulting Displays

15. 

16.

Total Utilization (Allocated/unallocated) 100/0 10000/0

Default boot partition number: 1 <DATABASE; Z-DOS >

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 the text in this chapter entitled "Choice of Operation" for instructions on using the operations menu at this stage of the PART utility.

PART

PART Operation

Error Conditions

If you have caused the default boot partition feature to become undefined by removing a partition from the table (as explained in the text in this chapter entitled Removing a Partition), and then bypass the default boot partition, you will still encounter the boot partition error message, as shown in this 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.

PART

PART Operation

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.

To remove the default boot partition, press the **space bar** only.

Entry Rules

The 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:

Resulting Display

15.
16.

Total Utilization (Allocated/unallocated) 100/0 100000/0

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 the text in this chapter entitled “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.

PART

PART Operation

Entering Choice of Operation

After you completed a PART operation (such as the Modify default boot partition operation or the Partition maintenance operation), the operations menu will appear.

This menu is the same as the menu explained in the text in this chapter entitled "Choice of Operation", with the addition of the restore to original partitions operation.

NOTE: If you have encountered an error condition, the 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 exit operation.

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 boot-up 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 the text in this chapter entitled "Default Boot Partition Number" for further instructions.

PART

PART Operation

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 operation also prompts you to select a default boot partition.

Type **P** at this prompt to begin changing the arrangement of partitions.

Entry Rules

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.

Resulting Display

When a display in this form appears, refer back to the text in this chapter entitled "Partition Name".



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.

Type **R** if you want each partition feature to revert to its status at the time you invoked the PART utility.

Entry Rules

PART**PART Operation****Resulting
Display**

When you choose the 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 this 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 the text entitled "Choice of Operation" near the beginning of this chapter.

**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.

PART

PART Operation

Beginning the Exit Operation

When you exit from the PART operation after entering any partition features (through the Modify default boot partition operation or the Partition maintenance operation), you will have to choose this operation and then make an entry at another menu.

Type **E** if you wish to exit from the PART utility.

Entry Rules

When you choose the exit operation, the following exit menu and prompt will be displayed at the bottom of the screen:

Resulting Display

M – Make changes and exit

A – Abort, make no changes and exit

Choose desired option. <M or A>

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.

Error Conditions

PART**PART Operation****Choice of Exit Methods**

When you choose the **Exit** operation after entering 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.

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.

PART

PART Operation

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.

Type **A** if you want to end this PART session without any changes to the Winchester disk.

Entry Rules

After you choose and enter the Abort option, the Z-DOS system prompt will appear, as shown:

Resulting Display

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.

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.

Error Conditions

PART

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 "The Reserved Winchester Area" of "Chapter 11: 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 10.1.

PART**The Superblock**

| | 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 10.1
Superblock Structure

PART

The Superblock

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 Reserved Winchester Area of the "Chapter 11: PREP" text.

The Starting 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 updating 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 starting sector 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.

PART

The Superblock

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 Z-DOS resets this flag byte to zero for each partition that you format.

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 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.

PART

The Superblock

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.

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 "The Reserved Winchester Area" of "Chapter 11: 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.

PART

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 the text in this chapter entitled "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 a 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 and the same operating system name. You must change at least one of the names of at least one of these partitions through the partition maintenance operation.

NOTE: The three previous 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:

PART

PART Error Messages

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 error 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.

PART

PART Error Messages

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**PREP (Winchester Disk Preparation) Command****Brief**

Format: **PREP**

Command
Location: File

Purpose: To magnetically prepare a Winchester disk surface for mass storage of software and/or data.

Details

The PREP utility initializes a Winchester disk so that it is ready to use as a mass storage device by the Z-100 computer. PREP is seldom (if ever) used by most users.

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.

PREP

PREP (Winchester Disk Preparation) Command

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 in the text entitled "PREP Hardware Adjustments" of this chapter.

After you use the PREP utility, you will have to reset and reboot the system with a bootable floppy disk. PREP temporarily alters the Z-DOS system in memory each time PREP is used. Therefore Z-DOS must be reloaded into memory after each use of PREP. 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.

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.

PREP**Winchester Disk Features**

| | |
|---|--|
| 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. |
| Read/Write Heads | The read/write heads are electromagnets that slide back and forth above the surface of Winchester disk platters. Read/write heads are extremely close to (but not touching) platter surfaces. 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". |
| Logical Winchester Disk Division | 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. |
| 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 Z-DOS are 512 bytes long, just as they are with floppy disks. |

PREP

Winchester Disk Features

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 11.1). 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.

Tracks and
Cylinders

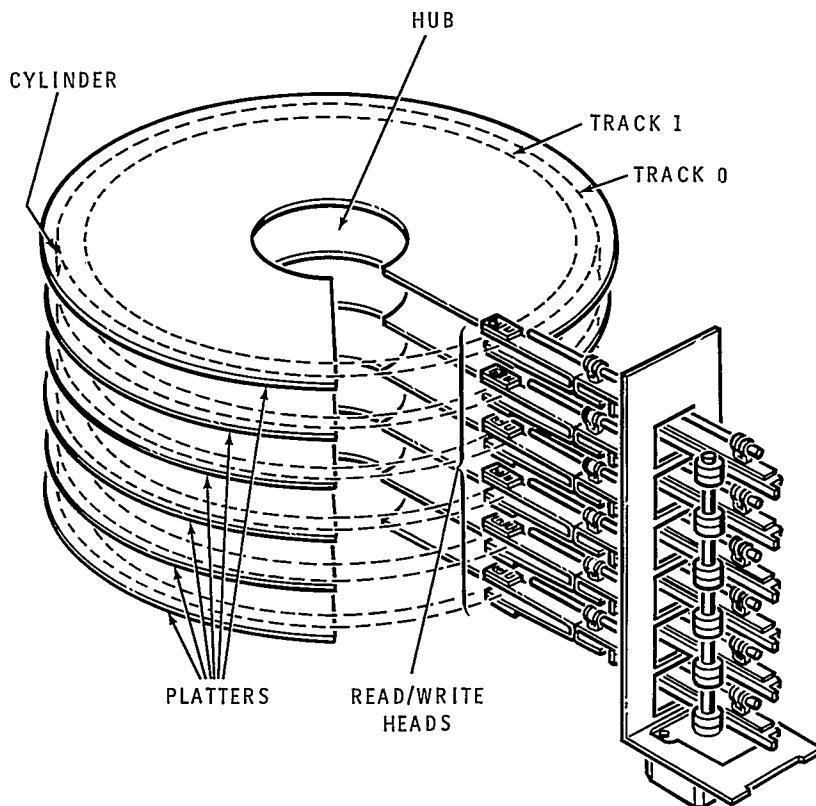


Figure 11.1
A Typical Winchester Disk

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 or use of different sets of heads. This amounts to a total of 36,864 bytes (36 kilobytes) read or written.

PREP

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.

PREP

Invoking PREP

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.

Responding to PREP Questions

Typing **P** at the Please type P to continue 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 in this chapter entitled "The Reserved Winchester Area"), PREP skips these disk parameter questions, assumes the disk surface has been previously initialized, and proceeds immediately to disk initialization (see the text in this chapter entitled Initializing the Disk).

Prepared
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 The Reserved Winchester Area), then the following five disk parameter questions will appear in sequence:

Unprepared
Disk

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 parameter questions is explained here.

Disk
Parameters

* 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**.

PREP

Responding to PREP Questions

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 pre-compensation 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"

PREP

Responding to PREP Questions

(write pre-compensation) characteristic compensates for bit shift by writing some bits earlier or later than the normal rate of data writing. Pre-compensation 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 PREP Operations) in sequence.

The PREP utility is capable of preparing a wide variety of Winchester disks for data storage. Table 11.1 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 parameter.

The labels for the columns of numbers in Table 11.1 correspond to PREP parameter questions. 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 parameter questions are displayed.

According to Table 11.1, if you have a Miniscribe Mod II 2012 Winchester disk drive, you should respond to the drive parameter questions 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 step rate code in hex: **1 RETURN**

PREP**Responding to PREP Questions**

| 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 11.1
Responses to PREP Parameter Questions

PREP

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 parameter questions. PREP prepares the disk by performing three operations in sequence: Initializing the Disk, Test Passes, and Initializing the Reserved Winchester Area.

After you have responded to the disk parameter questions, PREP initializes the surface of the disk for the test that will follow. While this occurs, you will see the message:

Initializing the disk...

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 the seven test passes begin.

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 "PREP Hardware Adjustments" of this chapter.

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:

Test Passes

Media test in progress, pass n

PREP

PREP Operations

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.

Initializing the Reserved Winchester Area

After completing the media tests, PREP records and verifies the Reserved Winchester Area (see "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 floppy disk containing the Z-DOS Operating System. 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, than boot up with a different bootable Z-DOS 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.

PREP

PREP Operations

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 "PREP Hardware Adjustments" of this chapter for instructions on removing this component. This procedure will help to protect the data on your Winchester disk from being destroyed accidentally.

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 Initializing the Reserved Winchester Area). These software units are arranged as shown in Table 11.2.

PREP**The Reserved Winchester Area**

| 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 11.2

**Winchester Support Software Units
within Reserved Winchester Area**

The most important Winchester support software units listed in Table 11.2 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 Z-DOS 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 the 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.

PREP

The Reserved Winchester Area

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 Initializing the Reserved Winchester Area).

When you enter a Winchester disk bootup command (see “About Bootstrap and System Initialization”), the computer will load the SBC into Random Access Memory (RAM).

Role of
SBC During
Bootup

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 “SBC Entries” in this chapter).

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 “The Superblock” in this chapter).

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 Z-DOS, then the Z-DOS boot loader program will begin to execute the remainder of the bootup operation.

The entries included in the first 128 bytes of the SBC are described in Table 11.3.

SBC Entries

PREP**The Reserved Winchester Area**

| 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 boot string (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 11.3
Software Boot Code Entries

PREP

The Reserved Winchester Area

The format for each three-byte sector number is low, middle, high byte.

NOTE: Table 11.3 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.

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.

SBC
Verification

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).

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

These items occupy 30 bytes per entry. The 17 superblock entries are structured as shown in Table 11.4.

Superblock
Entries

PREP**The Reserved Winchester Area**

| 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 11.4
Superblock Entries

PREP

The Reserved Winchester Area

NOTE: Refer to the text entitled "The Superblock" in "Chapter 10: PART" for a detailed explanation of the components of each superblock entry and other information concerning the superblock.

During initialization of the reserved Winchester area (see the text in this chapter entitled 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.

Superblock Verification

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 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.

PREP**The Reserved Winchester Area****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 Z-DOS 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.

**Bad Sector
Table Entries**

The structure of the bad sector table is explained in Table 11.5.

During media testing (see Test Passes), 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 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 11.5
Bad Sector Table Entries

PREP

The Reserved Winchester Area

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.

Bad Sector Table Verification

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 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.

PREP

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.

**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.

PREP

PREP Hardware Adjustments

This procedure explains the sequence of steps you should perform to adjust your hardware both before and after using PREP.

Jumper
Movement
Procedure

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 11.2.

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 11.2 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 vertical tracks of the card cage.

PREP**PREP Hardware Adjustments**

NOTE: In order to slide the Z-217 controller board upward, you might first have to temporarily unplug the 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 11.2. Remove this jumper by carefully sliding it away from the board. Be careful not to bend the pins.

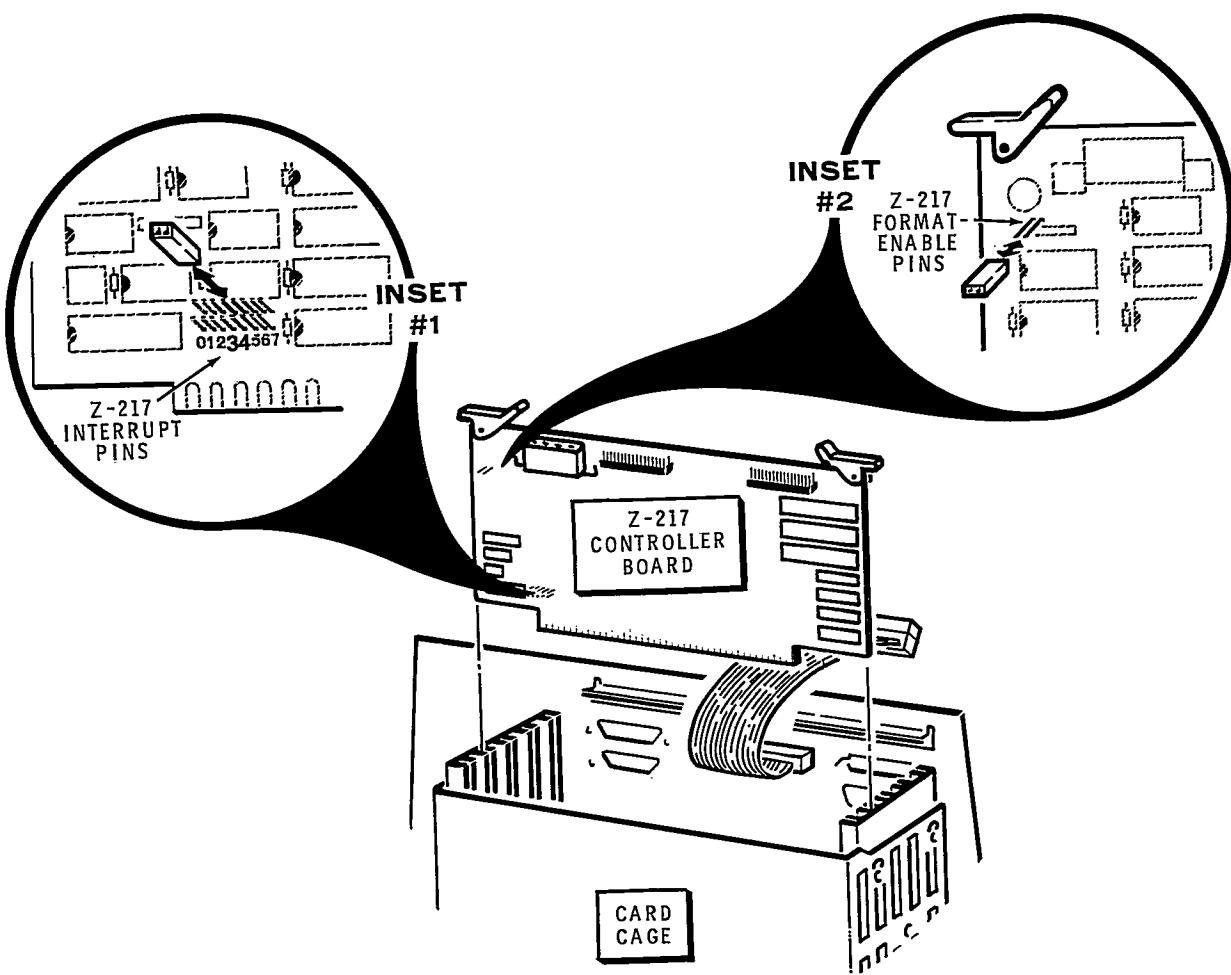


Figure 11.2
Z-217 Controller Board Adjustment

PREP

PREP Hardware Adjustments

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 11.2. Carefully slide the jumper over these pins. Be careful not to bend the pins.

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 appropriate 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 earlier in this chapter.

When you have finished 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.

PREP

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 parameter questions.

PREP

PREP Error Messages

Error during formatting of the drive.

Cause: This could mean that you responded incorrectly to the five questions about the drive's parameters. 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 "PREP Hardware Adjustment" in this chapter. 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 parameter questions 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 11.1. Then attempt to enter the correct value at the question 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.

PREP

PREP Error Messages

Unable to communicate with the Z-217 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 parameter questions were not valid for the particular drive connected. A malfunction of the Z-217 controller is also possible.

Cure: Recheck the drive parameters and run PREP again. If this error occurs after repeated attempts to run PREP, consult Zenith Technical Consultation or your service representative.



CHAPTER 12**RESTORE****RESTORE (Restore Master Backup Disk Files) Command****Brief**

Format:

RESTORE ?

or

RESTORE

or

RESTORE [[<d:>]<filename> [<filespec>[+ <filespec>...]]][</x>...]

Command

Location: File

Switches:

Default state: /O off, /Q off, and /V off.

- /A AFTER date (restore files stamped after today's or the specified date)
- /B BEFORE date (restore files stamped before today's or the specified date)
- /D DIRECTORY master (Locate all master backup files and give directory)
- /E EXCEPTION files (files to exclude from RESTORE operation)
- /L LIST directory (list the directory of the backup file)
- /O OVERWRITE files (overwrite existing files on destination disk)
- /Q QUERY each (query yes or no on each file before operation)
- /T TODAY's date (restore files with today's date)
- /V VERIFY files (verify the files after RESTORE operation)

Purpose: Recreate the original source files on the destination disk.

RESTORE

RESTORE (Restore Master Backup Disk Files) Command

Details

As BACKUP provides a method for you to automate backing up routine work, RESTORE automates the retrieval of data stored in backup files. RESTORE unlinks the sequential file structure of a backup file (created during a preceding BACKUP operation) and restores the individual files back to their respective devices. Like BACKUP, RESTORE offers a number of optional switches that provide a large degree of control for the restoration of files.

Invoking RESTORE

There are three methods to invoke RESTORE. One method provides a brief description of RESTORE and lists the optional switches. Both of the other methods may use optional switches that provide more control of what is backed up.

You can obtain a display of instructive messages summarizing use and activities of the RESTORE utility by entering the following command:

Method One

A: RESTORE ? RETURN

This method causes a display in the following form:

RESTORE Version x.xx
Copyright (C) 1982 Zenith Data Systems

The RESTORE utility is designed to complement the BACKUP utility. RESTORE extracts specified files from the single, long file that BACKUP creates, and returns those files to their original drives.

Syntax: A: RESTORE [[<d:>]<filename> [<filespec>[+<filespec>...]]] [</x>...]

RESTORE

Invoking RESTORE

Switches: Default state: /O off, /Q off, /R off, and /V off.

| | |
|----------------------------------|---------------------|
| /A AFTER date. /A:<mm-dd-yy> | /O OVERWRITE files. |
| /B BEFORE date. /B:<mm-dd-yy> | /Q QUERY each. |
| /D DIRECTORY master. | /T TODAY's date. |
| /L LIST directory. /L +filespec> | /V VERIFY files. |

A:

NOTE: The version number of the RESTORE utility (shown above as x.xx) may vary.

- Method Two** You can enter several RESTORE commands after invoking the utility only once if you enter the following:

A: **RESTORE RETURN**

RESTORE responds with its banner and returns a right angle bracket (>), RESTORE's command prompt.

RESTORE Version x.xx
Copyright (C) 1982 Zenith Data Systems

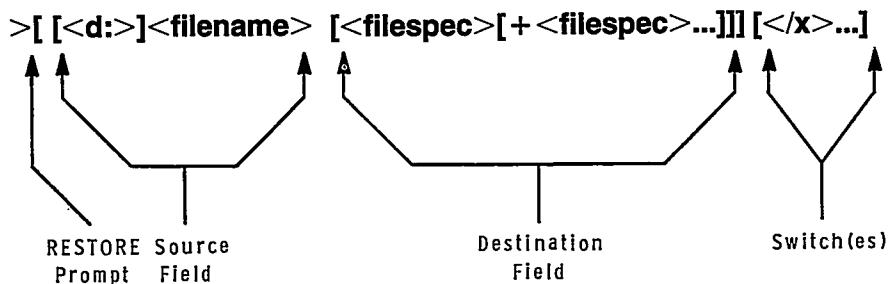
>

At this prompt, commands to RESTORE may be entered. RESTORE terminates when only RETURN is pressed at this prompt, and you are returned to the Z-DOS system prompt.

RESTORE

Invoking RESTORE

Commands that are issued at the RESTORE prompt are in the form:



where: <*d:*> is an optional drive name if the source is other than the default drive;
<*filename*> is the source filename and must not use wildcard characters and must not include an extension;
the first <*filespec*>, which may be ambiguous (using wildcard characters "*" and "?"), designates a file to be restored;
the second <*filespec*> is one or more optional ambiguous filespecs of files that are to be restored. Each filespec must be separated by plus (+) signs; and
</*x*> is optional and may be one or more switches.

NOTE: Do not use an extension with the source filename (filename of a backup file) in a RESTORE command line. The extension was assigned automatically to the RESTORE source file when it was created by a BACKUP operation. More information about extensions is given in the text entitled "The Backup File" in "Chapter 7: BACKUP".

RESTORE

Invoking RESTORE

Method Three

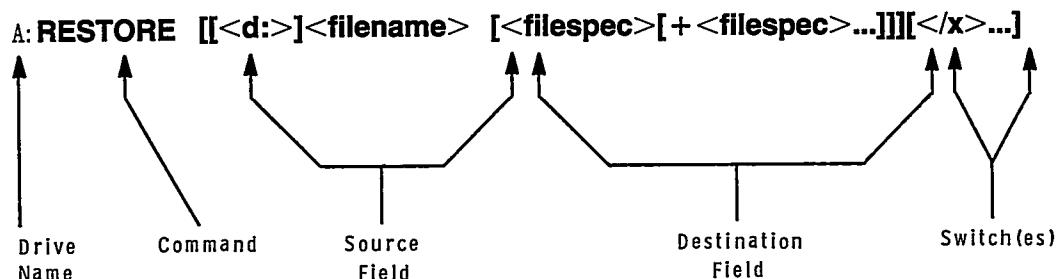
You can enter one entire RESTORE command line at the Z-DOS system prompt by entering the following:

A: RESTORE [[<d:>]<filename> [<filespec>[+ <filespec>...]]][</x>...]

where: <d:> is an optional drive name if the source is other than the default drive;
 <filename> is the source filename and must not use wildcard characters and must not include an extension;
 the first <filespec>, which may be ambiguous (using wildcard characters "*" and "?"), designates a file to be restored;
 the second <filespec> is one or more optional ambiguous filespecs of files that are to be restored. Each filespec must be separated by plus (+) signs; and
 </x> is optional and may be one or more switches.

NOTE: Do not use an extension with the source filename (filename of a backup file) in a RESTORE command line. The extension was assigned automatically to the RESTORE source file when it was created by a BACKUP operation. More information about extensions is given in the text entitled "The Backup File" in "Chapter 7: BACKUP".

The command line structure for RESTORE is typical of other Z-DOS utilities:



RESTORE

Source

The source file is always the name of a backup file. A source file specification is required if a destination file or files are given. Wildcard characters cannot be used. The source file must not be ambiguous.

The source filespec should follow the format:

[<d:>]<filename>

where: <d:> is the name of the source drive that must be specified if the source is not the default drive;
<filename> is an unambiguous filename of a backup file from one to eight characters in length.

NOTE: Do not enter an extension for the source file in a RESTORE command. RESTORE will find and use the specified backup file by looking for a file with the filename you specified and three digits for the extension. The three-digit extension was automatically added to the backup file filename when you used the BACKUP utility.

You should specify only one source file in a RESTORE command. This source file contains all of the files that you backed up when you used BACKUP, in a format described in the text entitled "The Backup File" in "Chapter 7: BACKUP".

Destinations

The destination field for RESTORE is unique to most Z-DOS destination fields. The destination field also describes (or further defines) the source. The specification in a RESTORE destination field describes which files inside the backup file are to be restored. Files in the backup file are automatically directed to the drive that they were originally backed up from.

The destination file or files that are specified are filespecs that are optionally ambiguous. Each destination specification (if there is more than one specified) is separated by a plus sign (+) in the format:

<filespec> + <filespec> + <filespec> + <filespec> ...

RESTORE

Destinations

For example:

.ASC + TEST? + C:*.

would indicate: all files backed up from the default drive with an .ASC extension; all files backed up from the default drive that are four or five characters long beginning with TEST and having no extension (e.g., TEST, TEST0, TEST1, TESTS, TESTY, etc.); and all files backed up from drive C:.

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

would indicate: all files backed up from drive A: with a DEMO filename and any extension; the file SYSTEM.COM backed up from drive B:; all files backed up from drive E: that have a filename beginning with 82 and that have a .DOC extension; and all files backed up from the default drive that have a four letter (or less) filename with a .DAT extension.

RESTORE will only restore files to the devices from which they were backed up by BACKUP. Therefore you should be aware of the identity of the device from which the files were backed up when you specify the destination in the RESTORE command line.

For example, if you used BACKUP to back up files from the disk in drive C, you should specify drive C in front of the destination specification of the RESTORE command line. After backing up files with the command

D: BACKUP C:*.* STORAGE

you must be aware that the backed up files stored within STORAGE.000 (and any other existing volumes of the backup file) were backed up from drive C:. Therefore to restore these same files, you must enter the command

RESTORE

Destinations

D:RESTORE STORAGE C:*.*

If you did not specify C: before the *.*, RESTORE would try to restore any of the files that had been backed up from the default drive (D). After finding no such files within the backup file, RESTORE would display the No files selected. error message and restore no files.

Switches

The default state for RESTORE is query for overwrite of existing files (the opposite of the /O switch), no filename query on each file (opposite of the /Q switch), and no verification after backup (opposite of the /V switch).

NOTE: All RESTORE switches that accept parameters must be immediately followed by a colon (no space), and that colon (:) is immediately followed by the parameter (again, no space). If the switch is used without a parameter, no colon is used.

- /A AFTER date. Files with dates after today's date or after the specified date are restored. If a date other than today's date is used, the syntax follows the form:

/A:mm-dd-yy

where: a colon (:) is required to show that a specified date is to follow;
mm is a one or two digit numeral signifying the month;
dd is a one or two digit numeral signifying the day;
yy is a two digit numeral signifying the year; and
hyphens (-) are the required separator to avoid confusion with the slash (/) used for switches.

The /A switch used alone will search for all files dated after the date that was given to Z-DOS when it was first booted up or through the most recent use of the DATE command.

RESTORE

Switches

/B BEFORE date. Files with dates before today's date or before the specified date are restored. If a date other than today's date is used, the syntax follows the form:

/B:mm-dd-yy

where: a colon (:) is required to show that a specified date is to follow;

mm is a one or two digit numeral signifying the month;

dd is a one or two digit numeral signifying the day;

yy is a two digit numeral signifying the year; and

hyphens (-) are the required separator to avoid confusion with the slash (/) used for switches.

The /B switch used alone will search for all files dated before the date that was given to Z-DOS when it was first booted up or through the most recent use of the DATE command.

/D DIRECTORY master. Use of the /D switch causes RESTORE to locate all master files with the extension "000". Then RESTORE displays a directory of information about the master files and a heading bearing today's date. The information would contain the name and date of the backup file, the number of files, and the number of volumes that the backup files reside on.

The master file directory would appear in the form:

| Name | Volumes | Files | Date | 4-15-84 |
|----------|---------|-------|----------|---------|
| BACKFILE | 3 | 10 | 12-19-83 | |
| BACK2 | 5 | 127 | 9-01-82 | |
| BACK3 | 1 | 1 | 8-22-82 | |

RESTORE

Switches

- /E EXCEPTION files. The restore operation takes place for all of the files except the files given as exception files. The files specified with the /E switch are then ignored during the operation. Syntax for the /E switch is in the form:

/E:<filespec>[+ <filespec> + ...]

where: the colon (:) is required; and
<filespec> is one of the ambiguous or unambiguous file specifications that is to be excluded from the restoration operation.

For example:

E: RESTORE A:BACK1 *.DAT /E:TEMPFILE.DAT

would restore all files backed up into BACK1.000 that have a .DAT extension and were backed up from drive E—except the file named TEMPFILE.DAT.

- /L LIST directory. The /L switch causes RESTORE to give the internal directory of files that are contained within a specified backup file. The directory information would list the date of the file, the volume numbers where the files start and end, and the size of the file. At the end of the directory listing is a statement of how many files are contained within the backup file and how many volumes contain the complete backup file.

Syntax for the /L switch is in the form:

<filespec> /L

where: <filespec> is the master filename; and
/L is the required switch.

RESTORE

Switches

/L may be used with both retrieval methods of invoking RESTORE.

For example, from the Z-DOS command prompt:

A: RESTORE BACK9 /L RETURN

or the same command from the RESTORE prompt:

>BACK9 /L RETURN

The /L directory listing would appear in the form:

| Device | Filename | Date | Start Vol. | End Vol. | Size in Bytes |
|--------|--------------|----------|---------------|-------------|------------------|
| E: | TESTFIL1.DAT | 10-10-82 | 1 | 1 | 3264 |
| E: | TESTFIL2.DAT | 10-10-82 | 1 | 2 | 19582 |
| F: | TESTFIL1.DOC | 8-01-82 | 2 | 3 | 887236 |
| F: | TESTFIL2.DOC | 9-17-82 | 3 | 3 | 22230 |

4 file(s) on 3 volume(s)

- /O OVERWRITE files. During operation, if RESTORE encounters a file with the same filename as the file that is being restored, RESTORE asks if the file should be deleted with the message, File <filename> already exists, do you wish to delete it (Y/N) ?. When the /O switch is used, RESTORE overwrites the conflicting file without first displaying the prompt and waiting for your affirmative response.

- /Q QUERY each. When /Q is used, you are queried before each file is restored. With /Q the message, Restore <filespec> (Y/N) ? is requested for each file RESTORE encounters that matches the RESTORE specifications.

RESTORE

Switches

For example, if three .DOC files existed in a backup file on drive B: that is named BACK219 and the command to RESTORE was:

A: RESTORE B:BACK219 *.DOC C:BACK1 /Q RETURN

RESTORE would ask:

Restore FILE1.DOC (Y/N) ?

after your response, RESTORE would ask,

Restore FILE2.DOC (Y/N) ?

and finally,

Restore FILE3.DOC (Y/N) ?

- /T TODAY's date. Files with today's date are restored. The /T switch causes RESTORE to search for all files in the backup file that are stamped with the date that Z-DOS returns as today's date if you use the DATE command.
- /V VERIFY files. The /V switch causes RESTORE to verify all files copied. With /V, RESTORE reads each restored file after it is copied to make sure that the source and destination copies are identical.

RESTORE

Runtime Prompting

During the operation of RESTORE, you most likely will encounter:

Insert volume nnn, <filename>. <nnn-1>, in drive <d:> and
hit RETURN when ready.

This message occurs when RESTORE requires the next volume of the backup master file to be placed in the drive so that RESTORE can continue the restoration of all specified files. Notice that the extension number of the backup file requested is one less than the volume number. (See the text entitled "The Backup File" of "Chapter 7: BACKUP" for additional information regarding backup file extensions and volume numbers.)

Another message that appears is,

Extension on backup file specified, will be ignored.

This occurs whenever you try to specify a backup file extension. When the RESTORE operation commences, it always requires the backup master file with the extension .000. If this message occurs, RESTORE ignores the extension you specified and uses its standard, sequentially numbered extensions.

During the operation of RESTORE, a constant report is displayed of the source files being copied from the backup file. This report will appear in the following form:

```
<d:>FILENAM1.EXT  
<d:>FILENAM2.EXT  
<d:>FILENAM3.EXT  
<d:>FILENAM4.EXT  
. .  
<d:>FILENAMn.EXT
```

RESTORE

Runtime Prompting

When the /V (VERIFY) switch is selected, BACKUP reports when it begins to verify the file. The report on the screen would appear like:

```
<d:>FILENAM1.EXT  
Verifying <d:>FILENAM1.EXT  
<d:>FILENAM2.EXT  
Verifying <d:>FILENAM2.EXT  
<d:>FILENAM3.EXT  
Verifying <d:>FILENAM3.EXT  
<d:>FILENAM4.EXT  
Verifying <d:>FILENAM4.EXT  
. .  
. .  
<d:>FILENAMn.EXT  
Verifying <d:>FILENAMn.EXT
```

Each file is verified directly after it is restored.

If a verify error occurs during RESTORE, the screen displays:

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

Responding by pressing **Y** will cause RESTORE to try to restore and verify the file again.

Responding by pressing **N** causes restoration of the file being verified to be aborted. Then RESTORE attempts to restore and verify the next file within the backup file.

RESTORE

RESTORE Error Messages

During operation, you may receive one of the following error messages:

Backup filename can not be ambiguous.

This message occurs if the wildcard characters "?" or "*" occur in the backup file's name.

Can not find master backup file <filename>.000.

This message occurs when a /L switch is requested for a file from a disk where the master backup <filename>.000, is not present.

Can not open backup file <filename>.<nnn>, insert another disk 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.

Can not open master backup file <filename>.000, insert another disk 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.

File <filename> already exists. Do you wish to delete it (Y/N) ?

This message occurs if the /O (OVERWRITE switch) has not been used during a RESTORE operation. It means that RESTORE has encountered a file on the destination disk that has the same name as the one that is about to be restored.

RESTORE

RESTORE Error Messages

File <filename>.<ext> not found.

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

Invalid backup file.

This message occurs if the backup file specified in a RESTORE 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 has degraded (possibly due to a bad sector, or inadvertent exposure to an electromagnetic field).

Invalid date in switch.

This message occurs if the date given with the /B or /A switches was not in the correct format. Reenter the correct command line with date, and continue.

Invalid drive designation on RESTORE file.

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

Invalid exception file specifications.

This message will occur if the exception files specified have a syntax error in the specification.

Invalid filename.

This message appears when a filename is specified that does not conform to the Z-DOS filename conventions.

RESTORE

RESTORE Error Messages

Invalid selection file specifications.

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

Invalid switch </x> specified.

This message occurs if RESTORE is unable to recognize the switch that was specified in the command.

Invalid version of RESTORE for file <filename.000>.

This message occurs only if you try to RESTORE a backup file created with an incompatible version of the BACKUP program.

No files selected.

This error message occurs if the destination file specifications were not files that were contained in the backup file, or if the destination file specifications were overruled by file specifications in command line switches.

Not enough parameters specified.

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

Out of disk on restoration of <filename>, insert another disk and hit return, or hit any other key to abort.

This message occurs during a restore operation if the destination disk becomes full.

RESTORE

RESTORE Error Messages

Restore <filename.ext> (Y/N) ?

When the /Q (QUERY each) switch is selected, RESTORE queries you with this message for each file it encounters.

Too many parameters specified.

This message will appear if you have entered more parameters than RESTORE can handle properly.

Verify error, try restore again (Y/N) ?

This message occurs if the files did not verify correctly after a restore operation. You can choose to repeat the restoration of the file that could not be verified, or to advance to the restoration and verification of the next file within the backup file.

CHAPTER 13

SHIP

SHIP (Park Winchester Read/Write Heads) Command

Brief

Format: **SHIP**

Command
Location: File

Purpose: Moves the read/write head of a Winchester disk to a position where it can not contact and destroy stored data in case of physical shock.

Details

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 when shipping your Winchester disk, or even when 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.

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.

SHIP

SHIP Entries

To use SHIP, invoke the utility at the system prompt and enter a cylinder address value at the prompt, as explained below.

To invoke SHIP by this method, type the following command:

A:SHIP RETURN

When invoked, SHIP displays a message in the following form:

Invoking
SHIP

```
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:

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 13.1 or to your Winchester disk hardware documentation if you are uncertain of this number. Then press RETURN.

Shipping
Cylinder

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 head to the specified cylinder. Then Z-DOS will display the system prompt:

A:

SHIP

SHIP Entries

NOTE: After using the SHIP utility, you will have to reset and reboot the system with a bootable floppy disk. SHIP temporarily alters the Z-DOS system in memory each time SHIP is used. Therefore Z-DOS must be reloaded into memory after each use of SHIP.

Table 13.1 show the values you should enter in response to the SHIP prompt if you own any of the listed 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 13.1
Responses to SHIP Prompts

SHIP

SHIP Entries

NOTE: If Table 13.1 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.

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 13.1. 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.

VERIFY

VERIFY (Verify Winchester Sectors) Command

Brief

Format: **VERIFY**

Command

Location: File

Purpose: Examines a Winchester partition and isolates questionable sector areas so that they cannot be used by Z-DOS.

Details

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" in "Chapter 11: PREP" for information on the bad sector table.)

NOTE: After using the VERIFY utility, you must reset and reboot the system. VERIFY temporarily alters the Z-DOS system in memory each time VERIFY is used. Therefore Z-DOS must be reloaded into memory after every use of VERIFY. Use bootable media other than the Winchester Utility Disk to reboot after using VERIFY.

VERIFY

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.

NOTE: 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 exerted on the disk (more than 5 Gs for a period of time greater than 11 milliseconds)
- entry of foreign material (such as smoke) into the sealed 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 more 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.

VERIFY

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.

**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)?

**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:

VERIFY

VERIFY Entries

When bad sectors are encountered during disk access operations, Z-DOS displays a hard error message that is slightly different from the floppy disk hard error message. This message appears in the following form:

Entering
Bad Sector
Addresses

```
<type> error <I/O action> drive <d>
Sector address of error is <nnnn>
Abort, Retry, Ignore:
```

where <type> indicates the type of problem that caused the error condition. This problem could be worded as:

Write Protect
SEEK
DATA
SECTOR NOT FOUND
WRITE FAULT

or

DISK

<I/O action> identifies the operation that was being performed when the error occurred. This operation could be worded as:

reading

or

writing

<d> is the name of the drive to which the partition was assigned when an error was encountered on the partition; and

<nnnn> 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.)

We recommend that you record the sector address of the error when this hexadecimal value is displayed. 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.

VERIFY**VERIFY Entries**

If you enter the address of a logical sector, then VERIFY will continue to display the

Enter bad sector address, or zero to end:
until you enter a zero.

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 following message:

Beginning verification...

Verification Completion When VERIFY is finished verifying the disk, it will display the following message:

Beginning verification...Completed

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.

VERIFY

VERIFY Operation

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.

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 the computer after using VERIFY. (No partition will be accessible until you do.)

Reset

If you have not already done so, boot up to a floppy disk or partition other than the partition just verified.

Boot-up

Therefore we recommend that you use the BACKUP utility to copy all of the files from the partition to floppy disks as soon as possible after using VERIFY.

BACKUP

Then, with all of the files safely stored on floppy disk media, use the FORMAT utility. Specify the drive that has been assigned the partition on which the bad sector(s) occurred.

FORMAT

After formatting this partition, use the RESTORE utility to copy the backed up files back to the Winchester disk partition.

RESTORE

You should take the earliest possible opportunity after verifying to perform these activities to insure the safety of your stored data.

VERIFY

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 specified partition is either not present, or it has developed a bad sector.

Cure: Boot from another drive. Then run VERIFY, 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.

VERIFY

VERIFY Error Messages

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 reenter.

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 Z-217 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.

INDEX**Winchester Supplement Index****A**

Allocation percentage, 10.18, 10.38–10.39
 Application programs, 6.27, 7.17
 Automatic bootup, 5.2

B

Backup, 6.8, 6.21, 6.25, 6.27
 Backup file, 7.6, 7.19, 12.6
 BACKUP, 1.3, 7.1, 14.6
 Bad sector, 14.2
 Bad sector table, 11.11, 11.13, 11.19, 14.1
 Boot command, 5.3, 5.7, 6.6, 6.17
 Boot loader, 2.1–2.4
 Boot up, 5.2, 5.3, 5.7, 6.6, 6.17
 Bootstrap, 5.3, 5.5
 Bootup
 automatic, 5.2
 manual, 5.2, 5.3, 5.6, 6.6, 6.17

C

Checksum, 10.39, 11.16, 11.18, 11.20
 Commands
 BACKUP, 7.1, 14.6
 CONFIGUR, 6.29
 COPY, 6.21, 6.24, 6.27
 DSKCOPY, 6.8, 6.25
 FORMAT, 6.19, 6.22, 8.1, 14.6
 MAP, 9.1
 PART, 6.10, 10.1
 PREP, 11.1
 RESTORE, 12.1, 14.6
 SHIP, 13.1
 VERIFY, 6.32, 14.1
 COMMAND.COM, 2.3, 3.3, 3.4
 Controller, 2.1, 2.2, 2.4
 CONFIGUR, 6.29
 COPY, 6.21, 6.24, 6.26, 6.27
 CP/M, 6.10, 10.2, 11.5
 Cylinder, 11.4, 13.1–13.4

D

Date, 7.7, 7.12, 7.23, 7.24, 12.8, 12.9, 12.12
 Default boot partition, 1.4, 6.13, 10.24
 Directory entries
 backup file, 7.22
 source file, 7.23
 Disk
 floppy, 1.2
 Winchester, 1.2
 DSKCOPY, 6.8, 6.25

F

Flag byte, 10.38, 11.16
 FORMAT, 6.19, 6.22, 8.1, 14.6
 Initialization
 of disk, 11.10
 of Reserved Winchester Area, 11.11
 of system, 2.1, 2.4

I

IO.SYS, 2.3, 2.4

L

Logical sector, 14.4

M

MAP, 9.1
 MTR-100, 2.1, 2.2, 5.4
 Manual bootup, 5.2, 5.3, 5.6, 6.6, 6.17, 6.23
 Modem, 6.29

O

Operating system name, 6.12, 10.15

INDEX

Winchester Supplement Index

P

PART, 1.3, 6.10, 10.1
Partition, 1.1, 4.1, 10.2
 name, 6.12, 10.10
 table, 10.6, 10.35, 11.16
Percentage, 10.18, 10.38
Peripheral devices, 6.29
Physical shock, 13.1
Platter, 11.4, 13.1
PREP, 1.4, 10.41, 11.1
Printer, 6.29, 6.31

R

Read/write head, 11.3, 13.1
Reduced write current cylinder, 11.7
Reserved Winchester Area, 10.35, 11.10
RESTORE, 1.3, 12.1, 14.6
ROM, 5.3

S

Sectors, 11.3
SHIP, 1.4, 13.1
Shipping, 13.1
Software boot code, 11.14
Stamping, 7.23
Starting sector, 10.37, 11.16
Step rate, 11.8
Superblock, 10.35, 11.16
Switch
 BACKUP, 7.7–7.18
 FORMAT, 8.6
 RESTORE 12.8–12.12
SW-101, 5.2

S

System initialization, 2.1, 2.4

System name, 6.12, 10.15
System Transfer Procedure, 6.16

T

Table
 bad sector, 11.11, 11.19
 partition, 10.6, 10.35, 11.16
Tracks, 11.4

V

Verification
 with BACKUP, 7.13
 of disk media, 14.1
 with FORMAT, 8.6
 with RESTORE, 12.12
 with VERIFY, 14.1
VERIFY, 1.4, 6.32, 14.1

W

Winchester disk, 1.2
Winchester Utility Disk, 6.2
Write pre-compensation cylinder, 11.7

Z

Z-207, 2.1, 2.4
Z-217, 2.1, 2.2, 2.4



4

6

7

8

9

A