Z-DOS™ Winchester Supplement

595-2854

Printed in the
United States of America

ZENITH data systems

HEATH

NOTICE

This software is licensed (not sold). It is licensed to sublicensees, including end-users, without either express or implied warranties of any kind on an "as is" basis.

The owner and distributors make no express or implied warranties to sublicensees, including end-users, with regard to this software, including merchantability, fitness for any purpose or non-infringement of patents, copyrights or other proprietary rights of others. Neither of them shall have any liability or responsibility to sublicensees, including end-users, for damages of any kind, including special, indirect or consequential damages, arising out of or resulting from any program, services or materials made available hereunder or the use or modification thereof.

Technical consultation is available for any problems you encounter in verifying the proper operation of this product. Sorry, but we are not able to evaluate or assist in the debugging of any programs you may develop. For techincal assistance, write:

Zenith Data Systems Corporation
Software Consultation
Hilltop Road
St. Joseph, Michigan 49085

or call:

(616) 982-3884 Application Software/SoftStuff Products
(616) 982-3860 Operating Systems/Languages/Utilities

Consultation is available from 8:00 AM to 7:30 PM (Eastern Time Zone) on regular business days.

Z-DOS is a trademark of Zenith Data Systems Corporation.

Copyright © 1983 by Zenith Data Systems Corporation.

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

HEATH COMPANY
BENTON HARBOR, MICHIGAN 49022

ZENITH DATA SYSTEMS CORPORATION
ST. JOSEPH, MICHIGAN 49085

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

Chapter 7 — **BACKUP**
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

Chapter 8 — **FORMAT**
FORMAT (Format Disk) Command 8.1
FORMAT Operations 8.2
Invoking FORMAT 8.5
Disk Format Variations 8.8

Chapter 9 — **MAP**
MAP (Physical to Logical Drive Name Mapping) Command 9.1
Invoking MAP 9.2
MAP Examples 9.4

Chapter 10 — **PART**
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

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 (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 **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

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 the boot procedure. BIOS

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

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.

PART

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.

PREP

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.

RESTORE

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 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

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

<**.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

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

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.

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

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

How does Z-DOS get Started

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".

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.

What is a Boot-up Activity

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.

During the 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).

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

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

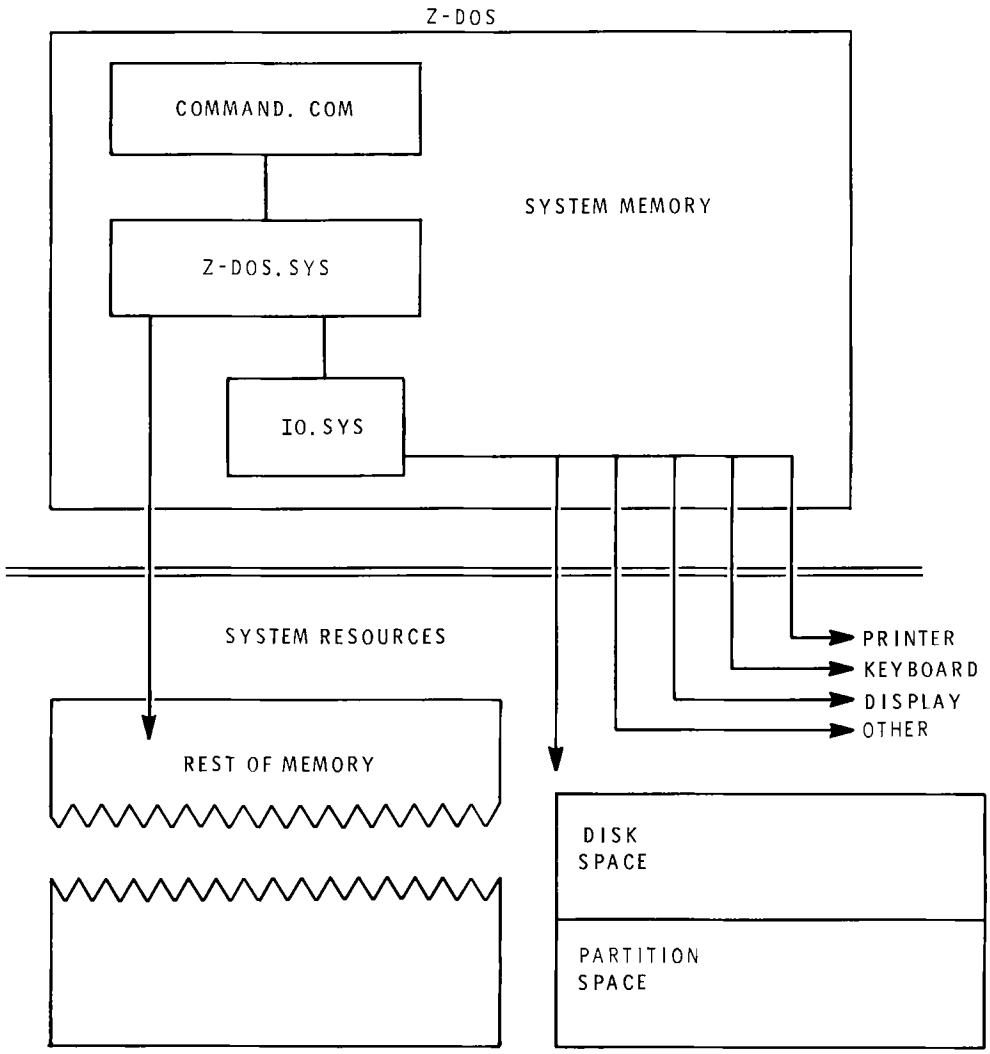


Figure 3.1
Z-DOS and Its Recources

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

COMMAND.COM Overlaid

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.

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.

Device Independent Input/Output

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."

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.

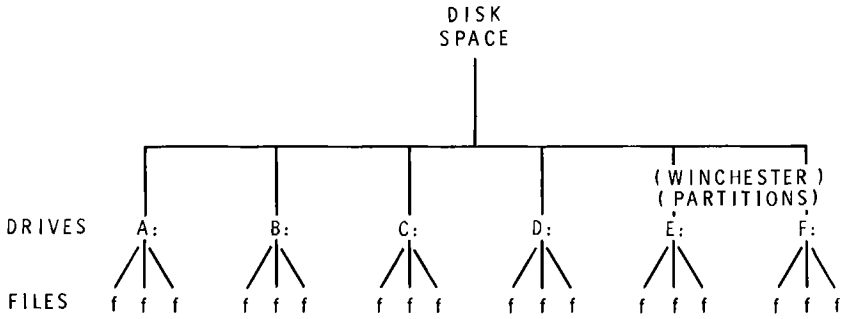


Figure 3.2
Disk Space Divisions

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:)

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)	E:
Z-DOS (second or next Z-DOS partition in superblock)	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.

Default Drive

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

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.

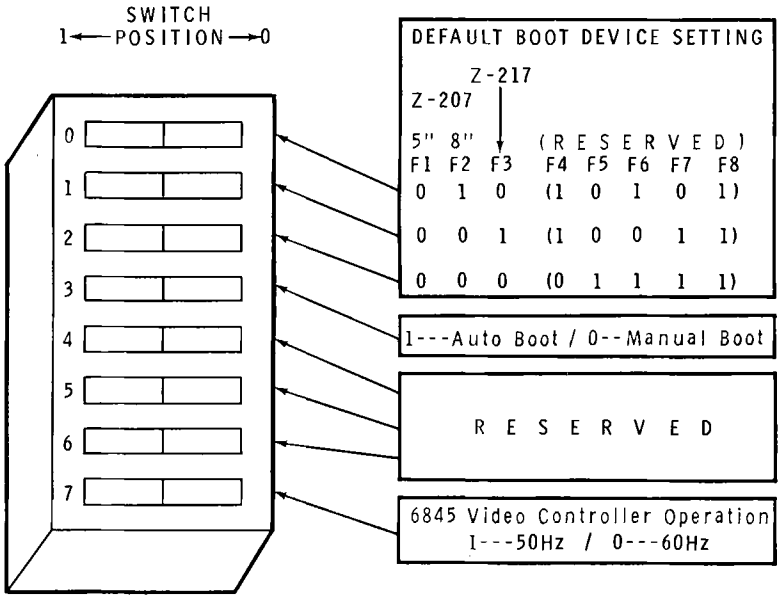


Figure 5.1

Manual/Auto Boot Setting (Switch SW-101)

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 OOT;
<**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 bootstring 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 bootstring include up to 16 for partition name, one for a semi colon, and up to 10 for system name. More details about the bootstring 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 bootstring) a bootstring.

GETTING STARTED

Ambiguous Boot Command

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

Also, if you enter a boot-up command for the Winchester without a boot-string 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? ........>
```

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

NOTE: The partition names and operating system names 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 bootstring 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 bootstring. 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 bootstring. You only need to specify it if the specified partition name matches that of another partition on the disk. The operating system names of all established partitions are displayed on the menu.

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

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

GETTING STARTED

Boot Command

If you specify a bootstring 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 bootstring for an established partition.

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

Explicit Boot Command

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.

Drive	Command Format	SW-101 (3, 2, 1 & 0)
A	Power On (Auto-Boot)	1, 0, 0, 0
	<B> RETURN	0, 0, 0, 0
	<B><F1> RETURN	0, x, x, x
	<B><F1> RETURN	0, x, x, x
B	**<B><F1> RETURN**	0, x, x, x
C	Power On (Auto-Boot)	1, 0, 0, 1
	<B> RETURN	0, 0, 0, 1
	<B><F2> RETURN	0, x, x, x
	<B><F2> RETURN	0, x, x, x
D	**<B><F2> RETURN**	0, x, x, x
E	Power On (Auto-Boot)	1, 0, 1, 0
	<B>RETURN	0, 0, 1, 0
	<B><F3>RETURN	0, x, x, x
	<B><F3><:bootstring>RETURN	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

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

Boot Command's Logical 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.

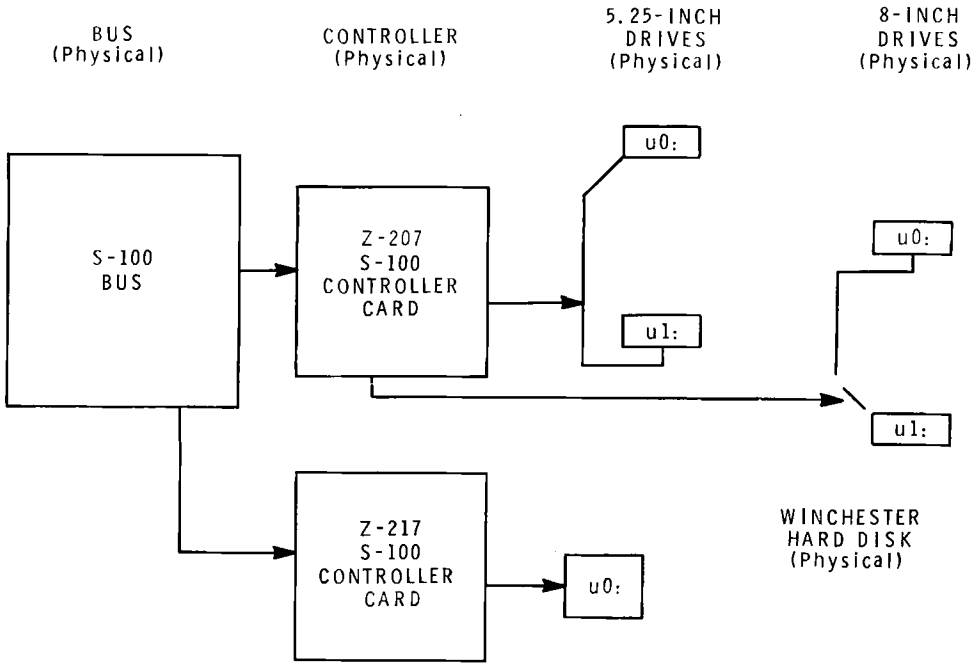


Figure 5.2

Physical Connections from the Hardware Viewpoint

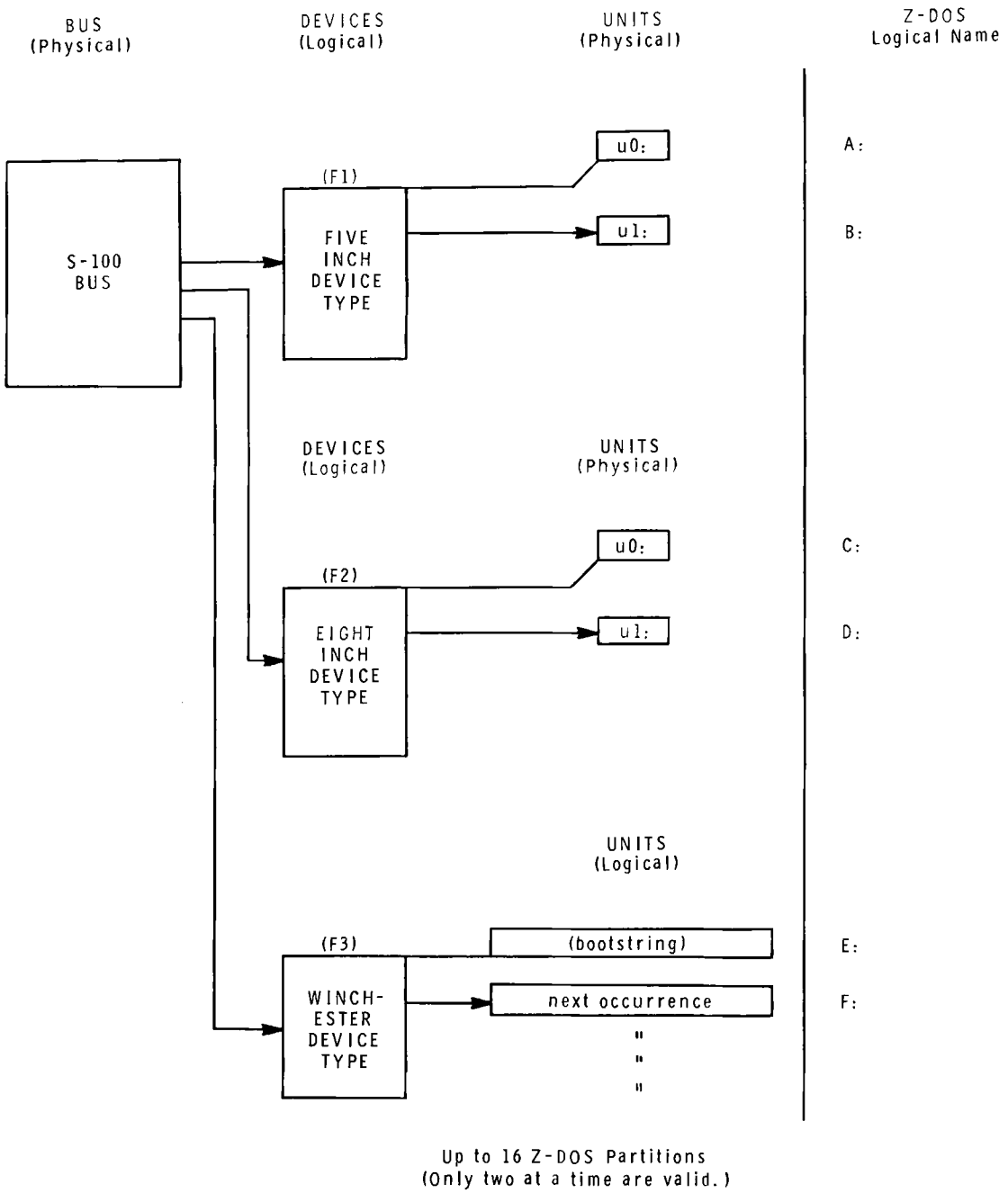


Figure 5.3

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 contoller 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.

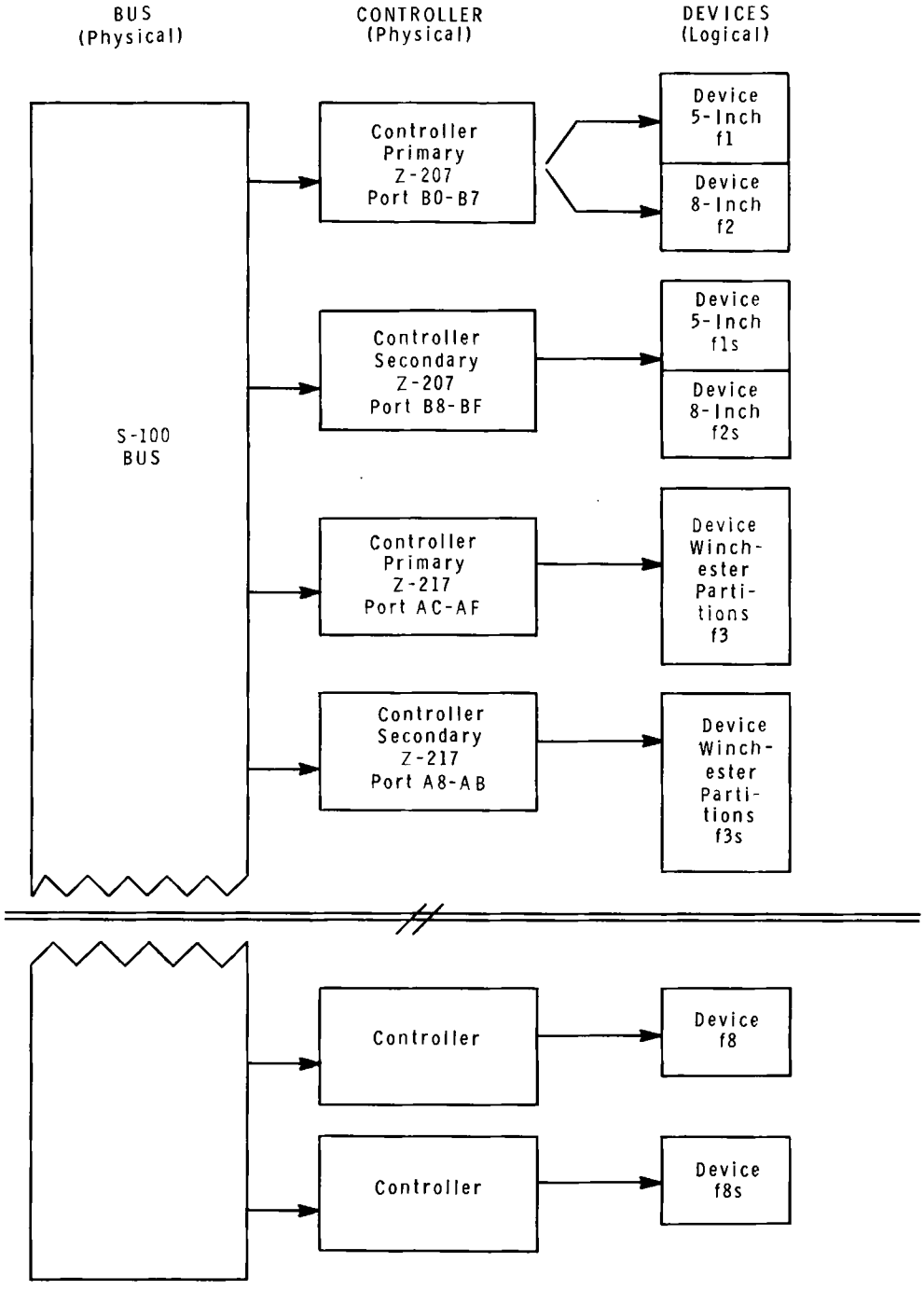


Figure 5.4

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 bootstring was established, or you entered a boot-up command that included an invalid bootstring.

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.

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 SystemsTechnical 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, RENAME, 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

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).

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

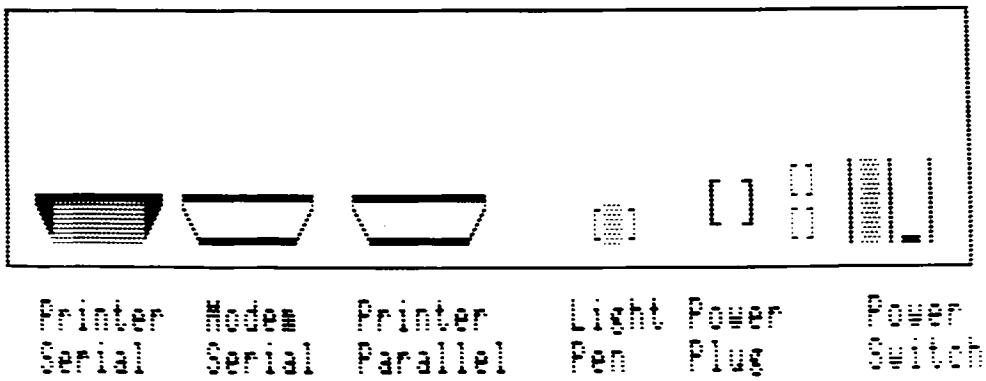
Power On

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

Z-100 Rear Panel



( ) 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).

( ) 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 Procedures

Boot-up

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.

( ) 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.

( ) 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 Procedures

DSKCOPY

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

( ) 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

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

( ) 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".

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 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%).

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

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.

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

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.

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:_
```

( ) 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.

( ) 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.

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

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.

Floppy Disk FORMAT

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

( ) 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:
```

( ) 2. Insert a blank, soft-sectored, 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

RENAME

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

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.

COPY to Floppy Disk

You will use the COPY command to copy all of the files from the partition to the recently-formatted 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:_
```

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

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-sectored, 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).

( ) 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
WSMSGS.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:_
```

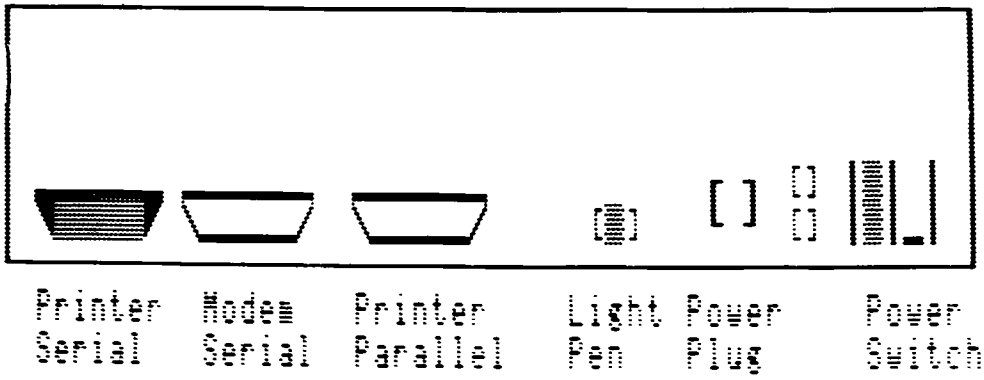
( ) 8. Repeat step 5, step 6, and step 7 for each application program disk or data disk from which you wish to copy files to the partition.

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



WINCHESTER DISK PROCEDURES

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.

( ) 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 you 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.

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

This would result in:

	Partition Name	Operating System Name
	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.	

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
	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
inaccessible	8.	
not applicable		

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 seperated 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
F: is assigned to
inaccessible
not applicable

5. BASIC Z-DOS
6. DATABASE-MGR Z-DOS
7. CUSTOMER-FILES Z-DOS
8.

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

inaccessible
E: is assigned to
F: is assigned to
not applicable

5. BASIC Z-DOS
6. DATABASE-MGR Z-DOS
7. CUSTOMER-FILES Z-DOS
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. BACK-UP 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 Winches-ter 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.

Method One

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

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.
```

```
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.

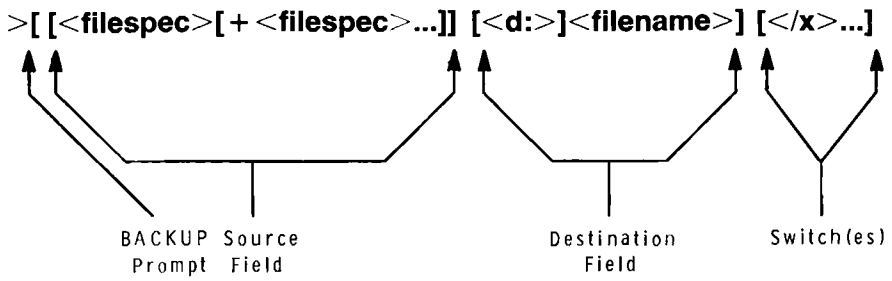
```
          BACKUP Version 1.01
Copyright (C) 1982 Zenith Data Systems

>
```

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

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.

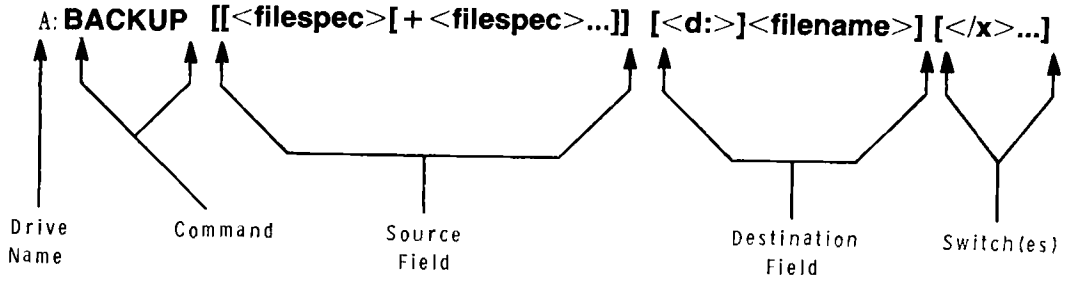
NOTE: Do not use an extension with the destination filename during BACKUP. The extension is assigned automatically to a BACKUP destination file as it is created. More information about extensions is provided later in this chapter.

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 filespecs 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.

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

/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
```

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.

/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   End   Size in
                               Volume  Volume 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

/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.

/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
```

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.

General Purpose Backup

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.

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.

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.

® Condor is a registered trademark of Condor Computer Corporation.

BACKUP

BACKUP Revisited

Accounting Backup

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.

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.

Supercalc Backup

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

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.

™ Supercalc is a trademark of Sorcim Corporation.

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.

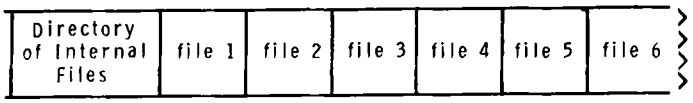


Figure 7.1
Data Content of a BACKUP Created File

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.

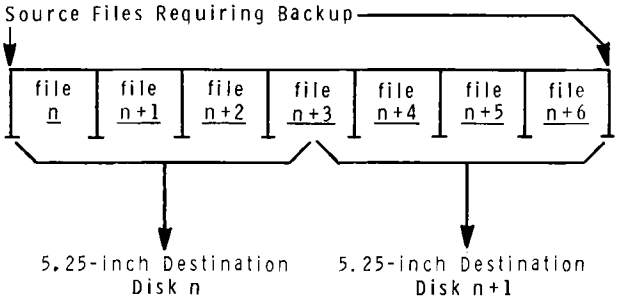


Figure 7.2
The distribution of BACKUP source files across several destination disks.

Use of More than One Volume

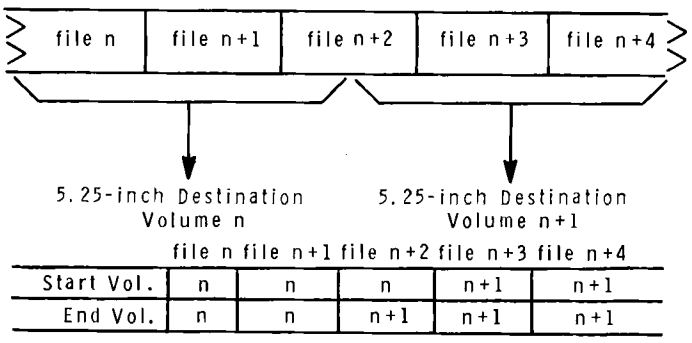
BACKUP must keep track of all of the source files—even when the backup file is larger than the storage available. To do this, BACKUP assigns sequential extensions to the filename, starting with the number 000 (which is the master volume and the backup file's beginning entry) and increments that extension 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.

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
```

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.



	file n	file n+1	file n+2	file n+3	file n+4
Start Vol.	n	n	n	n+1	n+1
End Vol.	n	n	n+1	n+1	n+1

Figure 7.3

A Backup File's Internal Directory of Files and Volumes

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:

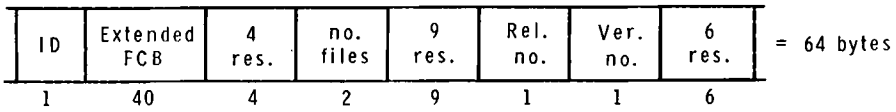
```
Device  Filename        Date    Start   End   Size in
                                 Vol.   Vol.   Bytes

  E:    FILE1   .DAT  10-10-82   1      1      3264
  E:    FILE2   .DAT  10-10-82   1      2     19582
  F:    FILE3   .DAT   8-01-82   2      3    887236
  F:    FILE4   .DAT   9-17-82   3      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:



Backup File Directory Entry

Figure 7.4:
Backup File Directory Entry

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

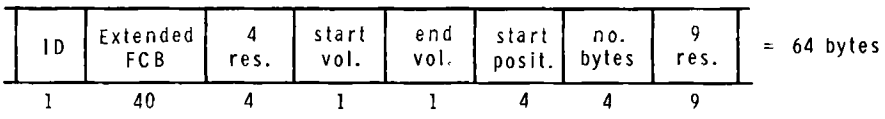


Figure 7.5:
Source File Directory Entry

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.

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.

```
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:).

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

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:

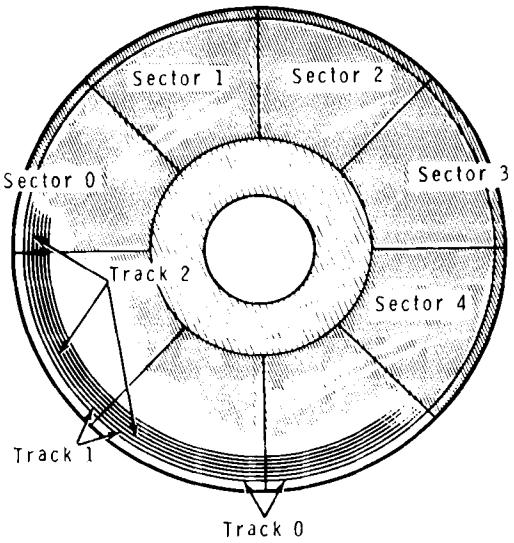


Figure 8.1
Layout of Disk Sectors and Tracks

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.

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:

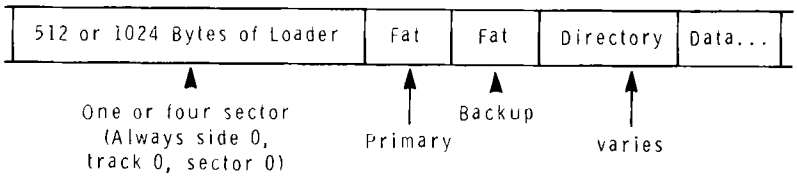


Figure 8.2
Floppy Disk Format

FORMAT

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

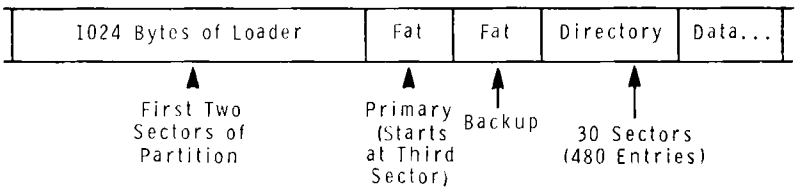


Figure 8.3
Winchester Partition Format

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.

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

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.

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
```

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.

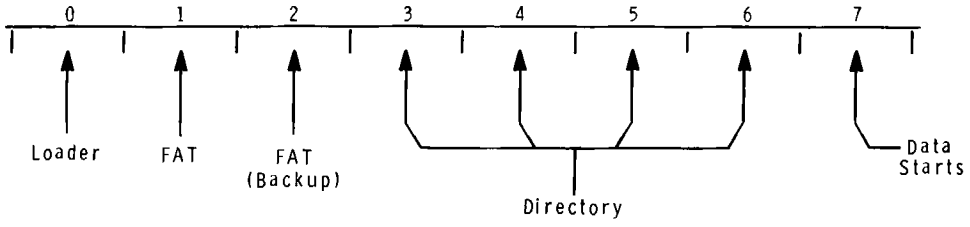


Figure 8.4

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

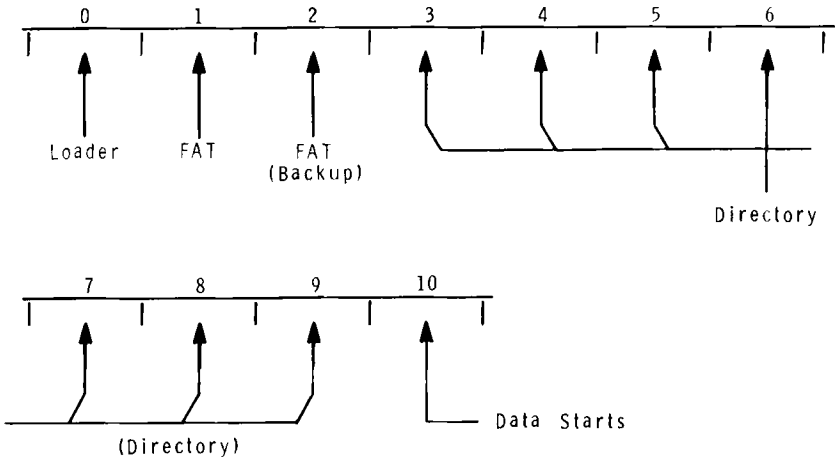


Figure 8.5

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

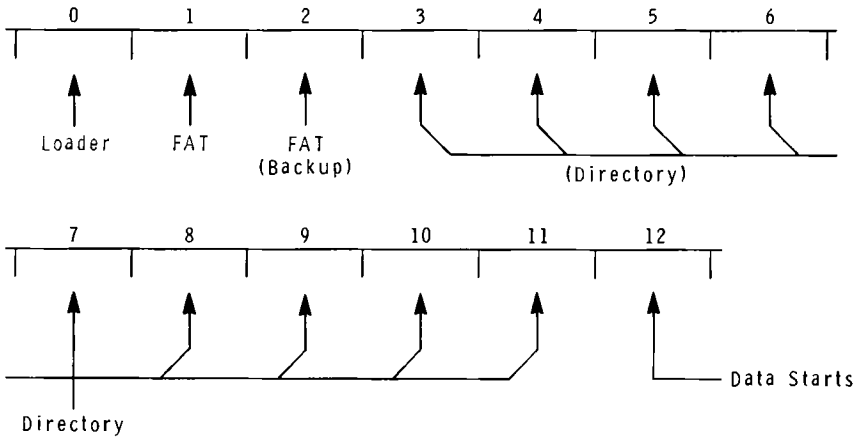


Figure 8.6

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

FORMAT

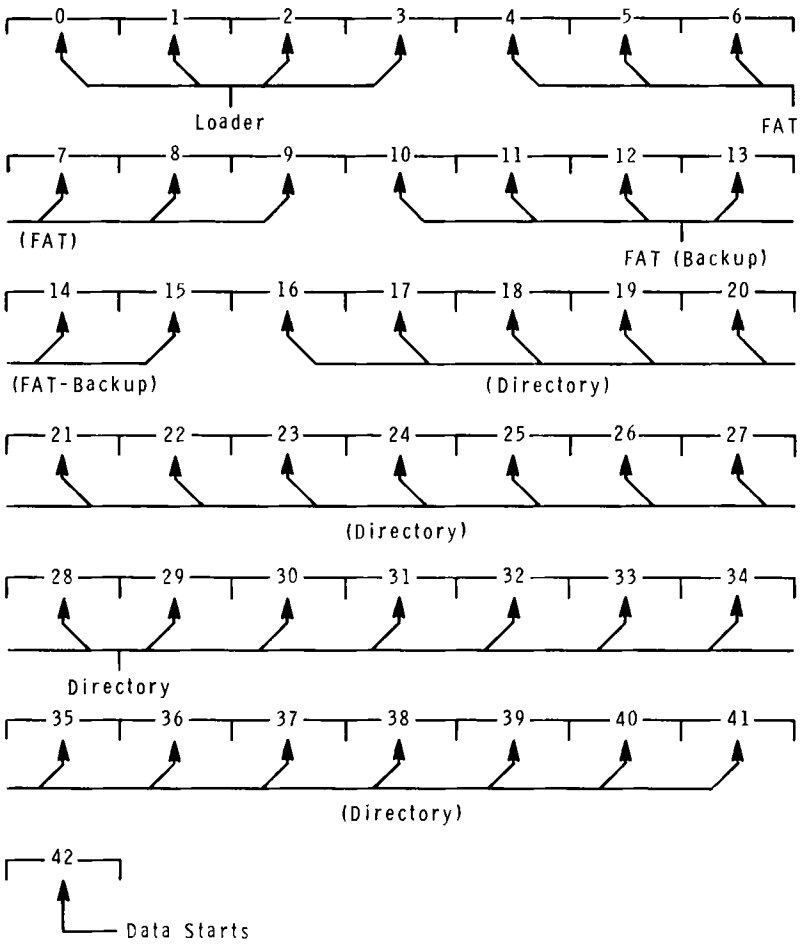


Figure 8.7

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

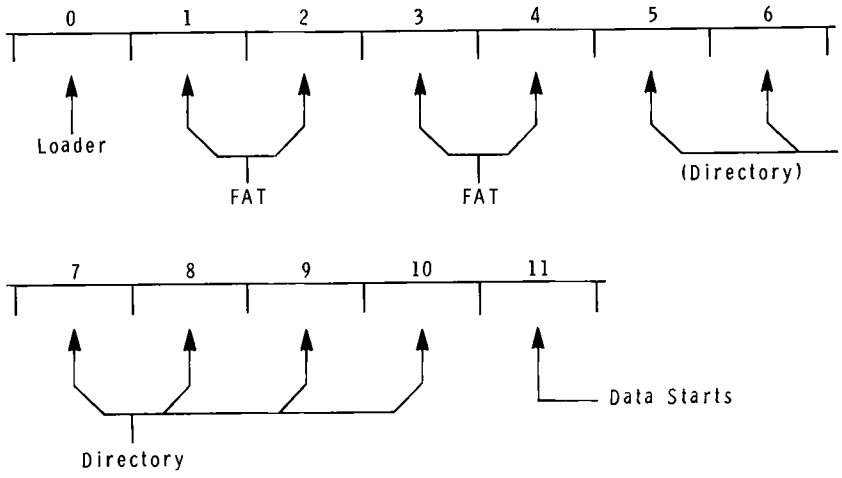


Figure 8.8

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:

FAT = ((((NPS – NRS – NDS – FAT)/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

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:

FAT = ((((NPS – NRS – NDS)/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:
```

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**

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 used 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

- 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.

Entry Rules

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

A: **PART RETURN**

Resulting Display

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

```
                    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)?
```

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

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.

Resulting Display

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:

```
    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 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

Entry Rules

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.

Resulting Display

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

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 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.

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.

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 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.

Examples

The following examples are valid partition names:

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 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.

Resulting Display

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:

```
     Partition Name  SystemName     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:

```
   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.
```

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

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:_


    Minimum allocation = 2%
```

Error Conditions

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.

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 manditory 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

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".

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 this partial display:

```
   Partition Name  System Name     Percentage   Kilobytes
   --------------  -----------     ----------   ---------
1. DATABASE        Z-DOS           50%          5000
2. WORD/PROCESSING Z-DOS           50%          5000
3.
4.
\/\/\/
```

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:

```
    Partition Name  System Name    Percentage   Kilobytes
    --------------  -----------    ----------   ---------
1.  DATABASE        Z-DOS          50%          5000
2.  CPM             CPM            50%          5000
3.
4.
\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/
```

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.

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.

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

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.

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:

```
   Partition Name   Operating System Name  Percentage  Kilobytes
   --------------   ---------------------  ----------  ---------
1. DATABASE         Z-DOS                  50%         5000
2. WORD/PROCESSING  Z-DOS                  20%         1093
3. _
4.
\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\

/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/
15.
16.
Total Utilization (Allocated/unallocated)  70/30       3825/1638
Default boot partition number: is undefined


     Minimum allocation = 2%
```

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

PART

Field 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.

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.

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.

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 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:

```
   Partition Name  Operating System Name  Percentage  Kilobytes
   --------------  ---------------------  ----------  ---------
1. DATABASE        Z-DOS                  30%         3000
2. WORD/PROCESSING Z-DOS                  30%         3000
3. SPREAD-SHEET    Z-DOS                  15%         1500
4. BASIC           Z-DOS                  25%         2500
5.
\/\/\/
```

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.

Entry Rules

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

Resulting Displays

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:

```
     /\/\/\/
```

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:

```
     /\/\/\/
```

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:

```
     /\/\/\/
```

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

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.

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 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.

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 `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.

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.

Entry Rules

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

Resulting Display

When you choose the 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.

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

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.

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

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.

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.

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:

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

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 (Winchester Disk Preperation) 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.

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.

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 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.

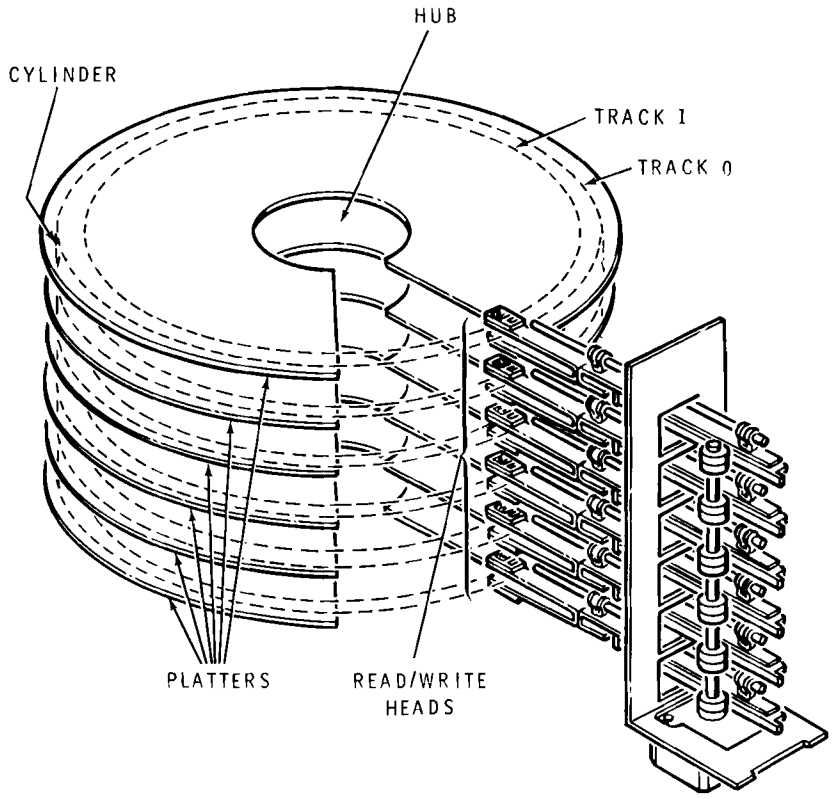


Figure 11.1
A Typical Winchester Disk

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.

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.

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.

Prepared Disk

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).

Unprepared 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:

```
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:
```

Disk Parameters

The significance of each of these disk parameter questions 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 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"

(write pre-compensation) characteristic compensates for bit shift by writing some bits earlier or later that 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
```

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.

Initializing the Disk

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...
```

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.

Test Passes

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.

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.

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.

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.

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).

Role of SBC During Bootup

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).

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.

SBC Entries

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

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

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.

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).

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

Superblock Entries

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

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.

Superblock Verification

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.

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.

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

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 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 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

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 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.

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.

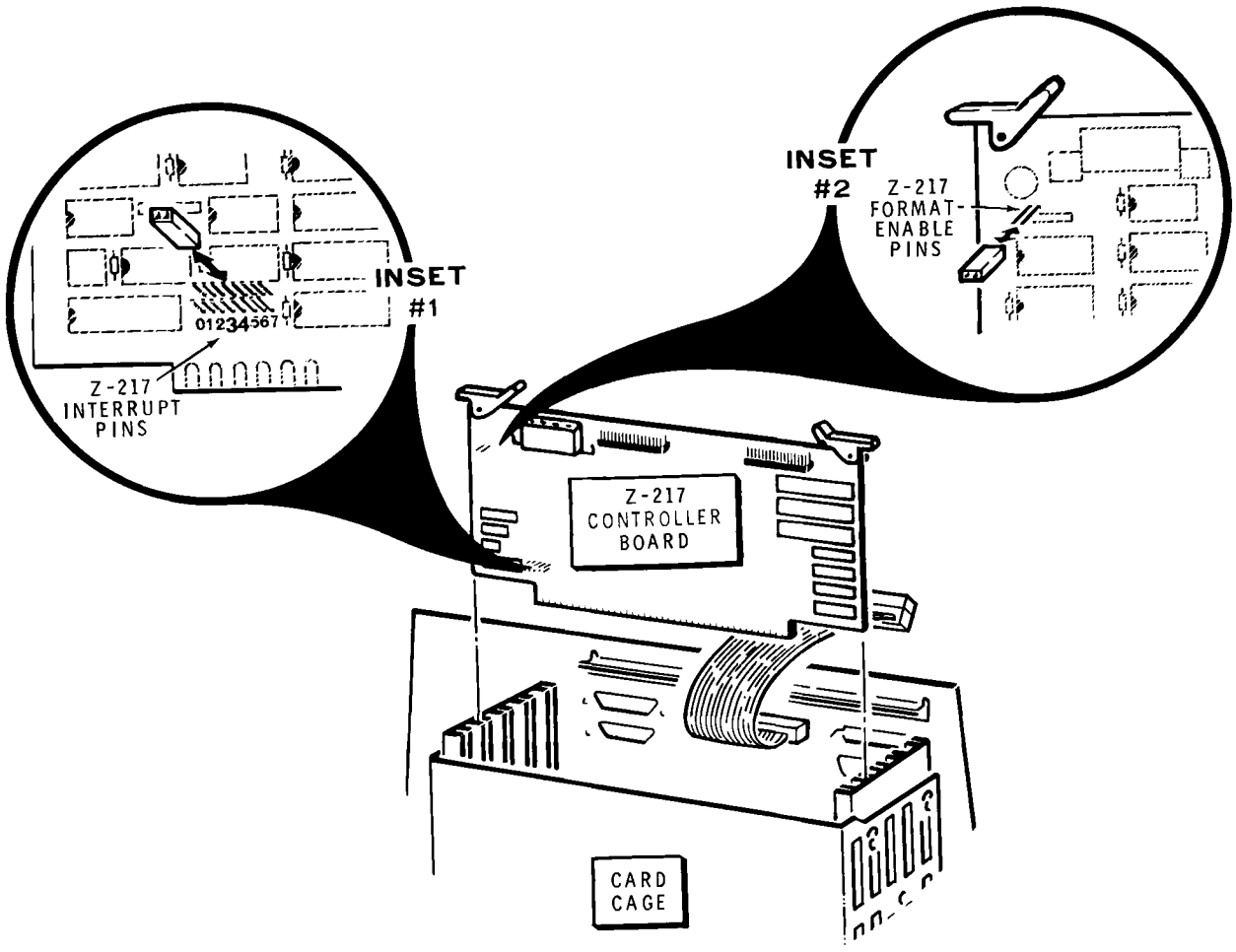


Figure 11.2
Z-217 Controller Board Adjustment

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 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 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.

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.

Method One

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

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>...]
```

```
    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.

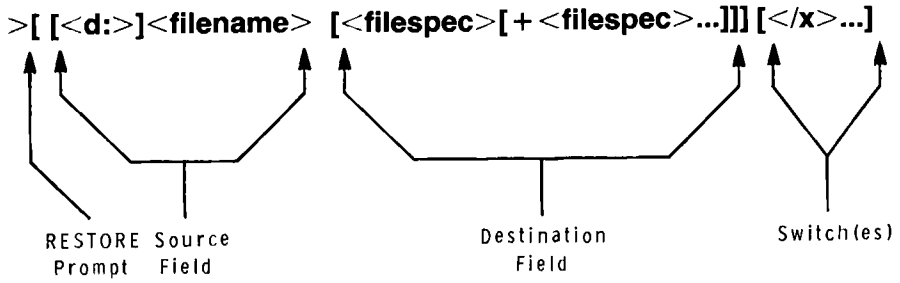
```
          RESTORE Version x.xx
Copyright (C) 1982 Zenith Data Systems

>
```

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

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".

Method Three

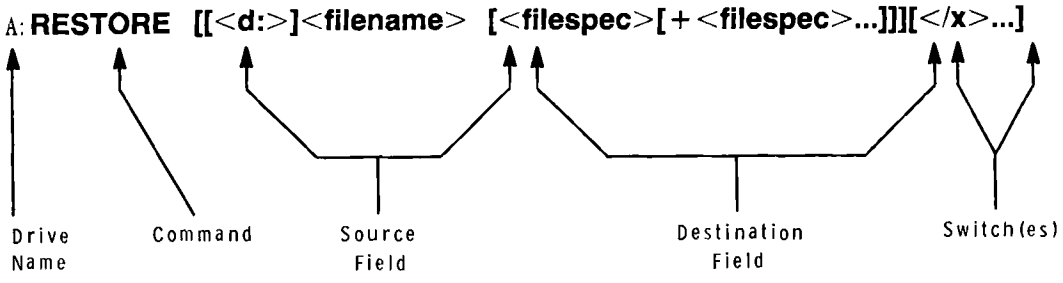
You can enter one entire RESTORE command line at the Z- DOS system prompt by entering the following:

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>...

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

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.

/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

/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.

/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  End    Size in
                                   Vol.   Vol.   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

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.

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

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 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.

```
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.

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**

Invoking SHIP

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:
```

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 13.1 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 head 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. 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

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 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 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

Entering Bad Sector Addresses

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:

```
<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.

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

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

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.

BACKUP

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.

FORMAT

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.

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 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
Bootstring, 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

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
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