



Miniscribe 2012 10Mb
Full Height MFM Drive

PART v3 Utility

The Z-DOS v3 Utility that
Modifies the Partitions
of a Hard Drive
in a Z-100!

Edited by Steven W. Vagts
"Z-100 LifeLine"

PART v3 Utility

REFERENCES:

- MS-DOS Version 3 Software Manual
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Copyright (C)1984 Zenith Data Systems Corporation
- Digital Research CP/M-85 Winchester Supplement
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The PART v3 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 by default when you boot up. You do not need to run PART in order to use your Winchester disk, because when PREP was run, two partitions were already created (a Z-DOS and a CP/M partition) and were ready to FORMAT for use by MS-DOS or CP/M.

The PART utility is recorded on the Winchester Utility Disk, with other Winchester Utilities - PREP, DETECT, and SHIP. Although this disk runs under the Zenith version of the MS-DOS Operating System (hereafter, we will call it Z-DOS to alleviate any confusion that may be caused with Microsoft's MS-DOS for the PC-clones); you can boot up with it, just as you would with any other bootable disk.

CAUTION: Any changes you make to the quantity or size of partitions through PART can destroy all existing data on your Winchester disk. Therefore, you should back up all necessary data from ALL partitions before you use PART.

Note: After using the PART utility, you must enter {CTRL}-{RESET} and reboot the system with a floppy disk containing the appropriate Operating System. PART temporarily alters the operating system in memory whenever it is executed. Therefore, MS-DOS or CP/M must be reloaded into memory after every use of PART.

1 PARTITION FEATURES

Winchester disks have large storage capacities compared to floppy disks. To make practical use of all this storage space, it is divided into partitions. You can establish up to 16 MS-DOS and/or CP/M (in any combination) partitions on your Winchester disk. You can also have partitions with other operating systems on the disk. I have one hard drive with 6 operating systems!

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 assigned to that particular partition. However, you can only access a partition through a drive name either by booting up to that particular partition, or by first running the ASSIGN utility for the CP/M Operating System and Z-DOS or ASGNPART for later versions of MS-DOS.

Note: The exact capacity of your Winchester disk drive is determined by the drive's manufacturer and by the amount of usable disk space remaining after unusable space has been made inaccessible by software such as the PREP utility. Examples in this text show disk space totals for a Winchester disk that accommodates 10,000 Kb (kilobytes), the typical 10 Mb Z-100 drive. However, higher capacity drives can certainly be used.

When your Winchester disk was shipped from Zenith Data Systems or the Heath Company, it had already been prepared with two partitions. Each of these partitions occupied approximately one half of your total Winchester disk space and was given a distinct name. One of these partitions was intended for use with the CP/M-85 Operating System and software that ran under CP/M-85. The other was intended for use with the Z-DOS Operating System (Zenith's version of MS-DOS v1.0) and software that ran under Z-DOS.

The PART utility enables you to view and change the status of the following partition features:

- * Name of each partition
- * Name of 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 (approx) percentage of Winchester disk space that is and is not allocated to partitions
- * Total (precise) number of kilobytes of Winchester disk space that is and is not allocated to partitions
- * Name of the default boot partition

2 PART OPERATION

PART is a prompt- and menu-driven transient command. That is, PART must be available on disk at the time it is invoked, and PART prompts you to enter the information it requires during execution. During different phases of the PART operation, the screen display changes and the cursor moves to the appropriate screen locations as information is entered.

2.1 INVOKING PART

PART is recorded on the Winchester Utility Disk as an executable .COM file.

To invoke PART, insert the Winchester Utility Disk into the floppy drive, make that drive the default drive by typing X: (where X is the drive letter), and press {RETURN}. Enter PART at the system prompt and press {RETURN}:

A:PART{RETURN}

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

```
                PART version x.xx
    Copyright (C) 1985, 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 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.

Proceed (Y/N)? _

Pressing {N} at the prompt will end PART and return you to the system prompt.

Note: You can use PART to select a default boot partition without destroying existing files 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 invalid entry while using PART, it is recommended that you back up your Winchester disk before using PART for any purpose.

ERROR CONDITIONS

BAD COMMAND OR FILE NAME

This error is displayed if the PART.COM file is not on the disk you are using to run PART. Try the command again after inserting a disk containing the PART.COM file into the drive.

SEEK ERROR READING DRIVE A, ABORT, RETRY, IGNORE

This error is displayed if the disk has been removed from the default drive since bootup. Reinsert a disk containing PART.COM in the drive, close the drive latch, and press R.

BDOS ERR ON X: SELECT

This error is displayed if you try to run PART after booting up with a disk containing the CP/M-85 Operating System. Reset the computer, boot up to the disk containing the MS-DOS Operating System and the PART.COM file (It is recommended that you use the Winchester Utility Working Disk). Then repeat the PART command at the A: system prompt.

2.2 PART OPERATIONS

Pressing {Y} at the prompt to continue with PART, you will be prompted to specify the Winchester drive unit you want to access. The screen displays:

Winchester drive unit number (0-3): _

Up to four Winchester drive units identified by unit numbers 0-3 can be used. Enter the unit number of the desired Winchester disk drive. (Most hardware systems are configured so that a single Winchester disk drive is unit 0.)

When you have specified the Winchester drive to be used, PART displays a partition table showing all possible partitions (up to 16) and the names and sizes of those that have been defined. Below the partition table is a brief menu from which you can select PART operations. You can:

- * Modify the default boot partition,
- * Create new partitions and/or redefine existing partitions, or
- * Exit PART and return to the operating system command level.

The partition table and menu are displayed as shown in figure 2. Notice that the display shown is for a Winchester disk that has been divided into two partitions of equal size, one for Z-DOS and one for CP/M. This is the initial condition of 10 Mb (megabyte) Winchester disks shipped from Zenith Data Systems, or if you have run PREP on your drive. If your Winchester disk has a different capacity, the actual size of the partitions displayed for your drive will be different.

	<i>Partition Name</i>	<i>Operating System Name</i>	<i>Percentage</i>	<i>Kilobytes</i>
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> _

Figure 2. Typical Partition Table and Main Menu Display

2.3 CHOICE OF OPERATION

From a three-line menu, you have the choice of selecting a different default boot partition, changing the arrangement of your Winchester disk partitions, or exiting from PART. You select a PART operation by typing B, P, or E as the cursor flashes at the end of the prompt on the bottom of the screen.

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.

```

/\ /\ /\ /\ /\ /\ /\ /\ /\ /\ /\ /\ /\ /\ /\ /\ /\ /\ /\ /\ /\ /\
15.
16.
Total Utilization (Allocated/unallocated) 100/0      10000/0
Default boot partition number: _

```

Enter number of new default boot partition.

Notice that the number and names of the current default boot partition has also been replaced by the cursor on the display line beneath the table.

Pressing {P} for Partition Maintenance will display the table of Partitions and position the cursor at the beginning of the first partition name. Following a sequence of steps, you can define or change partition names, partition operating system names, or partition size (in percentage of total Winchester disk capacity). You can create new partitions or delete partitions that are no longer needed. Section 2.4, Partition Name, discusses the full procedure.

(In order to boot up to any other partition, you must specify the partition name, and the system name if there are two partitions with the same name, in your bootup command). The bootable partition must contain the operating system files required to boot the system. If you specify an existing partition that does not contain the requisite operating system files, an error message will appear when you attempt to boot up from that partition.

To select or change a default boot partition, press {B} at the main menu prompt. The bottom of the screen display will then appear as:

Pressing {E} at this prompt will cause you to exit from the PART utility completely. The A: system prompt will be displayed immediately.

2.4 PARTITION NAME

Pressing {P} for Partition Maintenance results in the following display:

	<i>Partition Name</i>	<i>Operating System Name</i>	<i>Percentage</i>	<i>Kilobytes</i>
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 the display appears in this form (when the menu selections are not shown and the cursor is positioned within the partition table), follow a sequence of steps to define or change partition names, partition operating system names, or partition size (in percentage of total Winchester disk capacity). You can create new partitions or delete partitions no longer needed.

After you have chosen the "Partition maintenance" operation, the cursor moves to the first character of a "Partition Name". When the cursor moves to a position beneath the "Partition Name" column on the table, you can change the name of an existing partition or add a new partition to the table by entering the partition name as the first feature of this partition.

A partition name is any string of 1-16 ASCII characters. Any characters can be used except the semicolon, space, tab, or any non-printing characters. Names can be entered in uppercase, lowercase, or any combination of both. All letters in the partition name will be shown in uppercase when they are displayed in the table.

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}. Pressing {RETURN} will move the cursor to the Operating System Name, without changing the Partition Name. Pressing the {SPACE BAR} will remove all features of this partition from the table.

While entering a partition name, you can press the {BACK SPACE} key to erase one character to left. If, when changing an old name, you press {BACK SPACE} until you have erased your entire new name, the old name will be redisplayed.

Partitions that you intend to give the same operating system name must be given different partition names. The following examples are valid partition names:

CP/M ACCOUNTING	DATABASE
WORD/PROCESSING	GEORGE
SPREADSHEET	BASIC
LETTERS	GEMINI

After you have entered the new partition name and pressed {RETURN}, the cursor moves to the operating system name position for this partition. If the cursor was at a position beneath the "Partition Name" category where no partition name has yet been established, a {RETURN} entry will move the cursor ahead to the "Default boot partition number" feature.

While the cursor is beneath the "Partition Name" column on the table, you can remove all features of this partition from the table without inserting a new partition in its place. Pressing the {SPACE BAR} will cause the partition name, system name, allocation percentage, and allocation kilobytes for this partition to disappear. Then the features for all of the partitions below will move up one number. The cursor remains in the same position, but now blinks at the partition name of a different partition.

If the partition you have removed was the default boot partition, the default boot partition line at the bottom of the screen will show an "is undefined" message. This 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.

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).

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 the PART operation while giving two partition's the same partition names unless they are given different operating 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.

If you remove a partition that was the default boot partition, then the "is undefined" message will be displayed until you make an entry for the default boot partition. If you then press {RETURN} to bypass setting the default boot partition feature, PART will display the "BOOT PARTITION ERROR" message in reverse video and prevent you from exiting from PART.

2.5 OPERATING SYSTEM NAME

After you have pressed the {RETURN} key during a partition name entry, the cursor moves to the first character of an "Operating System Name".

System names are not mandatory for partitions, although they must be used when the same partition names are used for different partitions.

When the cursor moves beneath the "Operating System Name" column on the table, you can change the system name of a partition, in the same manner as the Partition Name.

An Operating System Name is a string of up to 10 ASCII characters. Any character can be used except the semicolon, space, tab, or any non-printing character. PART will display system name letters in upper case, although you can enter them in either lower or upper case.

When the cursor arrives at the first character of a system name, you can immediately erase the old system name by pressing any key other than {RETURN}. While entering a system name, you can press the {BACK SPACE} key to erase one character to left. If, when changing an old name, you press {BACK SPACE} until you have erased your entire new name, the old name will be redisplayed. As with the Partition Name, pressing {RETURN} will retain the old system name (or leave this feature blank) and skip ahead to the same partition's allocation percentage.

The same system name can be used for several partitions, as long as the partition names are different. The following examples are valid operating system names:

CPM	CP/M	Z-DOS
MS-DOS	PASCAL	C

Note: The Z-DOS operating system required that you use the operating system, name "Z-DOS" (as it is spelled here) for the partition(s) you plan to use for Z-DOS programs. However, Z-DOS v4.x does not permit the use of '/' in the OS names, so you may wish to get used to using ZDOS and CPM as the OS names.

After you have entered the Operating System Name and pressed {RETURN}, the cursor moves to the allocation percentage position for this partition.

ERROR CONDITIONS

If you try to enter the same system name for two partitions that also have the same partition name, PART will wait until you make an entry for the default boot partition 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.

If the names you have entered duplicate the names of a partition that has a greater number on the left side of the table, and if this partition with the greater number is the default boot partition, then the number of the default boot partition will automatically change to the smallest number of the two partitions that have the same names. This change in the number of the default boot partition occurs after you have made an entry for the allocation percentage of the duplicate partition with the smallest number.

If you press the semicolon key, {TAB}, or {SPACE BAR} and then press {RETURN}, the operating system name will appear to vanish while the other features for the partition remain. However, when you have finished making an entry for the default boot partition, the old system name for this partition will reappear.

2.6 ALLOCATION PERCENTAGE

After you have made an entry at an "Operating System Name" position, the cursor moves to the "Percentage" position for the same partition, where you can set an allocation percentage.

If you do not wish to change the percentage allocation for an existing partition, pressing {RETURN} will skip the Percentage field and go on to the next partition or go on to define the default boot partition if there are no more partitions in the table.

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.

For every allocation percentage you enter, PART automatically calculates the exact number of kilobytes that should be allocated to a parti-

tion 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).

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.

Note: If you establish 16 partitions on your disk, and have not allocated all of the disk space with your percentage entry for the 16th partition, PART will automatically allocate all of the remaining disk space to the 16th partition - no matter how much space you try to allocate to this partition.

If you set an allocation percentage that brings the total allocation of disk space to less than 100 percent, and if you are entering it for one of the first 15 partitions on the table, then the cursor will move down to the partition name position of the next partition (whether this partition has been established yet or not). Additionally, the "Total Allocation" figures will display the amount of "unallocated" space (in both percentages and kilobytes) in reverse video.

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

ERROR CONDITIONS

PART will dynamically monitor the percentages you enter for each partition, and lower any percentage you enter if it would have brought the total allocation to more than 100 percent of disk space. Thus PART will never allow you to allocate more than 100 percent of your Winchester disk space, and the displayed percentages will never total more than 100.

PART keeps the total allocation percentages at or below 100 percent by subtracting percentage points from partitions, starting with the partitions at the bottom of the table. In cases of extreme over allocation, PART might even reduce the allocation percentages of some partitions to zero percent.

The minimum possible allocation percentage, which differs depending on the kind of Winchester disk you have purchased, is displayed at the bottom of the screen whenever you are in position to enter an allocation percentage. If you enter an allocation percentage lower than the minimum limit for your Winchester disk, PART will automatically convert this percentage to zero percent.

Whenever the percentage of a partition is zero percent, PART will prevent you from exiting until you have changed this percentage to a value at or above the minimum percentage allowed for your own particular Winchester disk.

If you try to enter a nonnumeric character, a fractional or decimal point number, or a number greater than 100, then the terminal will beep and the cursor will remain at the percentage position. Then you can enter a valid number.

You can exit from PART after allocating less than 100 percent of the disk space to partitions. The unallocated space on your Winchester disk will be inaccessible until you use either the PART utility or the PREP utility.

The percentage you enter for a CP/M partition must be low enough so that this partition will not be larger than 8 Mb (8192 kilobytes). (If you allocate more than 8 Mb to a partition, CP/M-85 will not be able to access part of this partition).

If you bypass the percentage feature for a newly established partition (by specifying no number and pressing the RETURN key), then PART will display "0%" for this partition.

Additionally, the "allocation error" message will appear in reverse video when the operations menu reappears. Furthermore, you will be prevented from exiting from PART until you correct the partition table so that no partitions are allocated "0%" of the disk space.

2.7 DEFAULT BOOT PARTITION

PART will prompt you to specify a default boot partition in three circumstances:

- * B (Modify default boot partition) was entered at the PART menu prompt,
- * Partition Maintenance was just completed for the 16th partition, or
- * {RETURN} was pressed when the cursor was positioned in the Partition Name field of a blank line in the partition table.

When the cursor is at the "Default Boot Partition Number" field of the partition table, as shown in the example below, you may specify a default boot partition, skip the field so the existing default boot partition remains the default, or indicate that you do not want to define a default boot partition.

The display at this point may look like:

	<i>Partition Name</i>	<i>Operating System Name</i>	<i>Percentage</i>	<i>Kilobytes</i>
1.	MS-DOS	MS-DOS	30%	3000
2.	CP/M	CP/M	10%	1000
3.	WORD/PROCESS	MS-DOS	10%	1000
/\ /\				
/\ /\				
14.	FUN&GAMES	OMEGA-DOS	10%	1000
15.				
16.				
<i>Total Utilization (Allocated/unallocated)</i>			100/0	10000/0
Default boot partition number: <u> _ </u>				

Enter number of new default boot partition.

Notice that the number and names of the current default boot partition has also been replaced by the cursor on the display line beneath the table.

When the cursor moves to this position, the number and names of the current default boot partition vanish from the display, and the "Enter number of new default boot partition" message appears at the bottom of the screen.

When the cursor moves to the default boot partition position, you can select any bootable partition to be accessed during bootup.

To establish a default boot partition, you must enter a number (1-16) of an established partition and press {RETURN}. The number, partition name, and system name of the partition you specified by number will be displayed between angle brackets, for example:

The default boot partition position is at the right side of the "Default boot partition number:" message.

```

/\ /\ /\ /\ /\ /\ /\ /\ /\ /\ /\ /\ /\ /\ /\ /\ /\ /\ /\ /\ /\
15.
16.
Total Utilization (Allocated/unallocated) 100/0 10000/0
Default boot partition number: 3 <WORD/PROCESSING;MS-DOS >
  B - Modify default boot partition
  P - Partition maintenance
  R - Restore to original partitions
  E - Exit
Choose desired option. <B, P, R, or E> _

```

Note: The operations menu is displayed beneath the default boot partition number as soon as you make an entry for this feature.

When the cursor moves to the default boot partition number, you can retain the current default partition, and advance to the PART operations menu, by simply pressing {RETURN} at this position. 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.

When the cursor moves to the default boot partition number, you can remove this feature altogether and advance to a PART operations menu by simply pressing the {SPACE BAR}. The "is undefined" message will be displayed at the default boot partition position. However, you will not encounter the "boot partition error" message. Finally, the operations menu and prompt appear:

```

/\ /\ /\ /\ /\ /\ /\ /\ /\ /\ /\ /\ /\ /\ /\ /\ /\ /\ /\ /\ /\
15.
16.
Total Utilization (Allocated/unallocated) 100/0 10000/0
Default boot partition number: is undefined
  B - Modify default boot partition
  P - Partition maintenance
  R - Restore to original partitions
  E - Exit
Choose desired option. <B, P, R or E> _

```

Note: If you remove the default boot partition, you will have to enter bootup commands that specify partition names (and possibly also operating system names) in order to boot up with any partition.

ERROR CONDITIONS

If you try to enter a number (in the 1-16 range) for which there is no established partition on the table, the invalid number will vanish and the cursor will remain at the number position until you enter a valid number and press {RETURN}.

If you try to enter a number that is out of the 1-16 range, the computer beeps and the cursor remains at the number position until you enter a valid number and press {RETURN}.

If you have caused the default boot partition feature to become undefined by removing a partition from the table, and then bypass the default boot partition, you will encounter the "BOOT PARTITION ERROR" message. Furthermore, you will not be able to exit from PART until you either enter the number of an existing partition or remove the default boot partition.

2.8 ENTERING CHOICE OF OPERATION

After you completed a PART operation (such as "Modify default boot partition" or "Partition maintenance"), the operations menu will appear. This menu is the same as the menu explained in "2.3 Choice of Operation", with the addition of the "R - Restore to original partitions" operation.

Note: If you have encountered an error condition, the "E - Exit" operation might not be displayed. Therefore, you must choose one of the operations that enables you to change partition features, and correct the error condition before PART will allow the "E - Exit" operation.

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 with your most recent entries or with the default boot partition that was set when you invoked PART.

The only new feature is "R - Restore to original partitions".

Pressing {R} will cause the partitions to revert to the names, allocations, and default boot partitions that were established at the time you first invoked the PART utility.

ERROR CONDITIONS

If you enter a character other than B, P, R, or E, PART will cause the computer to beep and the cursor to remain at the end of the prompt until you enter a valid letter.

2.9 EXIT PROCEDURES

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

Pressing {E} to exit will cause the following exit menu and prompt to 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> _
```

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, any rearrangement of partitions can destroy data on the Winchester disk, and no changes are actually made to the Winchester disk until you enter the M option.

Note: Regardless of the exit method you choose, you will have to enter {CTRL}-{RESET} and reboot the system after exiting from PART.

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.

Press {A} to abort the changes. You will to exit this PART session without any changes to the Winchester disk. Nevertheless, REBOOT the system. 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.

Press {M} if you want to exit from the PART utility and change the status of the 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 may exist on the Winchester disk.

After you choose and enter the "Make changes" option, the MS-DOS system prompt will appear. However, you MUST reboot the system before continuing.

ERROR CONDITIONS

If you enter a character other than M or A, PART will cause the computer to beep and the cursor to remain at the end of the prompt until you enter a valid letter.

3 THE SUPERBLOCK

Note: Information concerning the superblock is not essential for use of the PART utility or the Winchester disk. This information is provided for users who wish to obtain a deeper understanding of some of the activities that PART performs in order to partition a Winchester disk.

Winchester disk space is allocated according to information contained within a unit of software that is stored on a reserved area of the Winchester disk. This unit of software is called the "superblock".

The superblock is a unit of Winchester support software that enables you to access specific partitions. The superblock is initially recorded on your disk when you use the PREP utility.

The superblock is also recorded on Winchester disks obtained from Zenith Data Systems or Heath - whether or not you use the PREP utility.

To insure the integrity of the superblock information, two copies of the superblock are recorded on the disk. These copies are named "Superblock A" (the copy used in most cases) and "Superblock B" (a backup copy used only when Superblock A is unusable).

After you use PART to change partitioning features (such as partition name, system name, allocation percentage, and default boot partition), PART updates both copies of the superblock and other Winchester support software units. Other Winchester support software units are explained in the text entitled "5 The Reserved Winchester Area" under "PREP".

The information within each copy of the superblock resembles the information shown on the partition table that is displayed when you use the PART utility. The superblock is structured as shown in Table 3.

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:
"ZDOS_PREP_Utility.pdf"

	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 3. Superblock Structure

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 start sector number of each partition.

Although you can establish only 16 partitions on the Winchester disk, there are 17 partition entries defined in the superblock. The size of each partition is determined by the difference between the "Start Sector" values of adjacent partitions.

It is necessary to define a 17th partition so that the size of the 16th partition (if established by the user) can be calculated by subtracting the start sector value of the 16th partition from the start sector value of the 17th partition.

The partition preceding the first partition that has spaces (20h) entered for its partition name will be considered to be the last usable partition defined in the table. The start sector of this partition will be one greater than the last sector allocated. The partition name entry for the 17th partition is always spaces.

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 higher order bit is defined. This bit is set to one whenever PREP is run and/or whenever changes are made by using the PART utility. The operating system that is eventually recorded on a partition with a flag byte set to 1 can be reset to a flag byte of 0 when the system's disk formatting utility is run on the partition.

The FORMAT command resets the flag byte to 0 for each partition that you format. However, the FORMAT utility supplied with CP/M-85 does not use or set this flag byte.

DISK SPACE CALCULATION

The PART utility allocates portions of Winchester disk space using 512-byte sectors as the primary unit of measure and converting the quantities of sectors into kilobytes (1024-byte units) for the totals displayed with the partition table. 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 entered for allocation to a partition,
3. Calculating the number of sectors closest to this percentage,
4. Converting sectors to kilobytes, and
5. Displaying this kilobyte quantity on the screen.

Therefore, the amount of disk space that is actually allocated to a given partition will not always be exactly equal to the percentage entered but will be rounded to the nearest kilobyte.

If you enter an allocation percentage that is greater than the remaining space percentage on the disk, PART will calculate the number of kilobytes of space that remain, round them to the nearest one percent, and display this calculated value rather than the percentage you entered.

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 discussed in "ZDOS_PREP_Utility.pdf".

Then, when execution of either PART or PREP is repeated on the same Winchester disk, the utility first performs checksums to verify that the superblocks have not changed since the original checksums were performed.

If the PART utility encounters difficulty in reading Superblock A, or if the results of the second checksum of Superblock A differ from the results of the original checksum, then PART tries to read Superblock B.

If the PART utility encounters difficulty in reading Superblock B, or if the results of the second checksum of Superblock B differ from the results of the original checksum, then PART will display an error message.

4 PART ERROR MESSAGES

ALLOCATION ERROR

You have established one or more partitions that are presently allocated zero percent of the disk. (PART might have subtracted from the original amount of space you allocated to these partitions when you allocated too much space to other partitions.) You must repeat the "PARTITION MAINTENANCE" operation and change allocation percentages of one or more partitions to conform with percentage entry rules (see "2.6 ALLOCATION PERCENTAGE").

BOOT PARTITION ERROR

You have removed the default boot partition from the table during a "PARTITION MAINTENANCE" operation. You can either replace this partition through the "PARTITION MAINTENANCE" operation, or select valid default boot partition through the "MODIFY DEFAULT BOOT PARTITION" or "PARTITION MAINTENANCE" operation.

DUPLICATE NAMES ERROR

You have established more than one partition with both the same partition name or the same operating system name. You must change at least one of the names of one of these partitions through the "PARTITION MAINTENANCE" operation.

Note: The above three error messages can appear in a series if more than one error condition exists at the same time. The form of these series error messages can be:

*Allocation and Boot Partition error
Allocation and Duplicate Names error
Boot Partition and Duplicate Names error
Allocation and Boot Partition and Duplicate
Names error*

All such error messages are displayed in reverse video, between the default boot partition position and the operations menu.

The conditions that produce any of these error messages will also prevent you from exiting from the PART utility until you have corrected the errant condition(s).

UNABLE TO COMMUNICATE WITH THE Z-217 CONTROLLER

The PART utility was unsuccessful in an attempt to access the Z-217 controller, which controls the Winchester disk. This problem could indicate that the Z-217 controller is not firmly plugged into the S-100 bus, the drive cable connectors are not securely fastened, or that the controller has a hardware malfunction. Check to see that the controller card and all cable connectors are secure. Then run PREP and PART in sequence.

*Z-217 CONTROLLER ERROR ON SET DRIVE
PARAMETERS COMMAND*

One or more responses to the six drive characteristic questions were not valid for the particular drive connected. It may also indicate a malfunction of your drive. Rerun PREP and PART in sequence.

ERROR - UNABLE TO REWRITE 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 was 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 -- CANNOT 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 and then repeat the PART utility.

I hope that you have found this information helpful. If you have any questions or comments, please email me at:

z100lifeline@swvagts.com

Cheers,

Steven W. Vagts

