ZDOS 4.06

PART version 4 Documentation

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Z-DOS v4 PART

PART Version 4 is a DOS MFM hard drive utility that enables you to change the quantity, size and names of a hard drive's partitions. It also enables you to specify which partition should be accessed when you boot up.

You do not need to run PART in order to use your hard drive because when PREP was run, one or more partitions were already created. While earlier versions of PREP created a Z-DOS and a CP/M partition, PREP v4 creates one or more partitions depending upon the size of the hard drive:

* One partition on drives less than 32Mb in size.
* Additional partitions on drives greater than 32Mb in size.

The partitions created are ready to FORMAT for use by any version of MS-DOS or CP/M.

The PART utility should be located on a bootable Hard Drive Utility floppy disk, with the other hard drive utilities, PREP, DETECT, and SHIP.

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

Note: PART v4 requires Z-DOS v4.06 and MTR-ROM v4.3 or later and is for use with MFM encoded hard drives only. Other utilities MUST be used with RLL, SCSI or IDE hard drives.

Note: After using the PART v4 utility, access to the partition(s) for the hard drive is disabled.

However, if no change in a partition's size was made, you can re-enable access to the partitions by using ASGNPART without rebooting. If the size was changed, you need to reboot the system with a floppy disk containing the appropriate Operating System.

1 Partition Features

Hard drives have large storage capacities. 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 hard drive. You can also have partitions with other operating systems on the disk.

A partition behaves like a floppy disk in most operations, because you can access a partition's data and/or software by entering commands that refer to the drive name that has been 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 hard drive is determined by the drive's parameters as set by the manufacturer and by the amount of usable disk space remaining after unusable space has been made inaccessible by software such as the PREP utility.

When your Winchester hard drive was shipped from Zenith Data Systems or the Heath Company, or if it has been prepared with earlier versions of PREP, two partitions were created.

Each of these partitions occupied approximately one half of your total hard disk space and was given a distinct name.

One of these partitions was named 'CPM' and was intended for use with the CP/M-85 Operating System and software that ran under CP/M-85. The other was named 'Z-DOS' and 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.

All versions of the Heath/Zenith 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 hard disk space that is and is not allocated to partitions
  * Total (precise) number of kilobytes of hard disk space that is and is not allocated to partitions
  * Name of the default boot partition

New to PART v4, the utility is now able to use a Flag Byte. The flag byte contains special information about the partition. For this version of PART, 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, and indicates that the partition requires formatting before use. The FORMAT command resets the flag byte to 0 for each partition that you format.

Note: The FORMAT utility supplied with CP/M-85 does not use or set this flag byte.

2 PART Version 4 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 Help

PART v4, as with most Z-DOS v4 utilities, has a help screen that can be invoked by typing either of the following commands.

    PART ?
    PART /?

This displays the help screen of Figure 1.

Let's look closer at each of the switches:

   /Ca   Controller Card - specifies Z-217 controller card "A" or "B". Unlike the Z-207 Floppy Disk Controller Card which has jumpers that can change the card's address, the Z-217 Winchester Contoller Card's address can only be changed by the firmware in a PROM on the card. Nevertheless, PART has the capability to recognize a second card if someone ever goes through the trouble to program one.

   /Un   Unit - specifies the UNIT number (0-3) of the drive. If not used, the program will question the operator for the device unit number.

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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). It also dynamically calculates and totals the size of all partitions as you specify each partition's allocation percent.

Access to the partition(s) for the unit is disabled, but can be re-enabled with ASGNPART without rebooting if no change in size occurs.

              Usage: [d:\][pathname\]PART [?][/x]
Where:
  d:\   - Is the optional drive with transient command file.
  pathname\   - Is the optional path to transient command file.
  ?   - Prints this message.
  /x   - Is any combination of the following switches:
      /Ca   - Specifies Z217 controller card "A" or "B".
      /Un   - Specifies UNIT number of the drive (0-3).

Figure 1.
PART v4 Help Screen

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                        PART version 4.06
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     Type "PART ?" for switch definitions.


     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)? _
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Figure 2.
PART v4 Opening Screen

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2.2 Invoking PART

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

To invoke PART, insert the Hard Drive 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 the opening screen of Figure 2.

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

CAUTION: 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 hard drive before using PART for any purpose.

2.3 PART Operations

Pressing {**Y**} at the prompt to continue with PART, you will be prompted to specify the Winchester hard drive unit you want to access.

The screen displays:

   Winchester drive unit number (0-3): _

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

When you have specified the hard 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 3.

Note: The upper part of the display shown is for a hard drive that had been divided into two partitions of equal size, one for MS-DOS and one for CP/M. This is the initial condition of a 10 megabyte Winchester hard disk shipped from Zenith Data Systems, or if you had run an early version of PREP on your drive. The lower part of Figure 3, shows the partition display as a result of running PREP v4. The default partition name 'PART1' is shown. Additional partitions would default to 'PART2', 'PART3', and so on, depending upon the total size of the hard drive.

NOTE: If your hard drive has a different capacity, the actual size of the partitions displayed for your drive will be different.

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      Partition Name      Operating System Name   Percentage    Kilobytes    Flag
      --------------      ---------------------   ----------    ---------    ----
  1.  Z-DOS               Z-DOS                    50.00%         5485
  2.  CPM                 CPM                      50.00%         5485
  3.
  4.
  = = = = = = = = = = = = = = = = = = = = = = = = = = = = = = = = = = = = = = = =
      Partition Name      Operating System Name   Percentage    Kilobytes    Flag
      --------------      ---------------------   ----------    ---------    ----
  1.  PART1               MS-DOS                  100.00%        10970        80
  2.
  3.
  4.
     /\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\
 15.
 16.

Total Utilization (Allocated/unallocated)       100.00/0.00    10970/0
Default boot partition number: 1    <PART1;MS-DOS             >

    B - Modify default boot partition
    P - Partition maintenance
    E - Exit
Choose desired option. <B, P or E> _
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Figure 3.
Typical Partition Table and Main Menu Display

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     /\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\
 15.
 16.
Total Utilization (Allocated/unallocated)       100.00/0.00    10970/0
Default boot partition number: _

Enter the number of the default boot partition, CR=Unchanged, Space=Undefined.
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Figure 4.
Entering Default Boot Partition

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      Partition Name      Operating System Name   Percentage    Kilobytes    Flag
      --------------      ---------------------   ----------    ---------    ----
  1.  PART1               MS-DOS                  100.00%        10970        80
  2.
  3.
     /\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\
 15.
 16.
Total Utilization (Allocated/unallocated)       100.00/0.00    10970/0
Default boot partition number: 1    <PART1;MS-DOS             >
  Special Characters: Use CR, TAB, and Arrow Keys to navigate screen.
   At start of Part name, use SPACE to Delete, INS LINE to Add partition.
   At start of % Allocation, use + or - to fine tune partition size.
  0% can be used for temporary place holder. Flag shows Never Formatted & New.
Minimum allocation = 0.01% Enter Percent in 10,000ths Unit 0  512 byte Sectors
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Figure 5.
Changing Partition Table Display

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2.4 Choice of Operation

From the three-line menu of Figure 3:

    B - *Modify default boot partition*
    P - *Partition maintenance*
    E - *Exit*

You have the choice of selecting a different default boot partition, changing the arrangement of your hard disk partitions, or exiting from PART. Select a PART operation by pressing {**B**}, {**P**}, or {**E**} as the cursor flashes at the end of the prompt on the bottom of the screen.

The default boot partition (Figure 4) 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 auto- matically accessed when you type a bootup command without specifying a partition name.

Note: To boot 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 oper- ating 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.

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

Pressing {**B**} to select or change a default boot partition will change the bottom of the screen display to appear as in Figure 4.

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.

Note: Once a change has been made to the parti- tion table, a new, fourth menu item is added to menu of options:

    R - *Restore to original partitions*

Pressing {**P**} for Partition Maintenance will position the cursor at the beginning of the first partition name. By following a sequence of steps, you can define or change partition names, partition operating system names, or partition size (as a percentage of total hard disk capacity). You can create new partitions or delete partitions that are no longer needed.

2.5 Partition Name

Pressing {**P**} for Partition Maintenance results in the display of Figure 5.

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 (as a percentage of total hard disk capacity). You can create new partitions or delete partitions that are no longer needed.

After you have chosen "Partition maintenance", 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. While lower case letters can be used, all letters in the partition name will be shown in uppercase when they are displayed in the table.

Note: To eliminate naming confusion, beginning with this version of PART, valid characters for the partition and operating system names are now limited to those valid for file names and directories. This means previously valid char- acters, such as / or \, are no longer valid.

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 should be given different partition names. The following examples are valid partition names:

    CPM_ACCOUNTING   DATABASE
    WORDPROCESSING   GEORGE
    SPREADSHEET   Z-DOS_ACCOUNTING
    BASIC   LETTERS
    GEMINI   PEACHTEXT

After you have entered the new partition name and pressed {RETURN}, the cursor moves to the operating system name for this partition.

If the cursor was at a position beneath the "Partition Name" category where no partition name has yet been established, pressing {RETURN} will move the cursor ahead to the "Default boot partition number" feature.

While the cursor is beneath the "Partition Name" column in 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 at the new partition name.

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).

Note: 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.

Note: The PART operation will not finish if two partitions have the same names unless they are given different system names. However, it will wait until an entry is made for the default boot partition before displaying the **"DUPLICATE NAME ERROR"** message in reverse video. If this message appears, correct the duplicate names before exiting PART.

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

2.5.1 PC-Emulator System Requirements

Gemini PC-emulator system:

The Gemini system requires a Zenith version of PC-DOS on a bootable floppy or on its own special partition on the hard drive.

The partition name must be **"GEMINI"**. No special operating system name is required, except as noted below. The Gemini system supports a maximum of two physical hard drives and one GEMINI partition may exist on each physical disk drive.

The Z-DOS version 4 hard drive utilities and ZPC have been changed to permit cross access between a hard drives' Z-100 native partitions and a GEMINI Boot partition.

This means files can be copied or accessed from the Z-100 native mode, or ZPC, to/from the GEMINI partition.

There are some caveats for GEMINI use:

1. PREP CANNOT be used with the /K switch. The drive must have all 512 byte sectors.
2. The **"GEMINI"** partition must have its operating system named **"VER4"**.
3. ASGNPART will abort if a GEMINI VER4 partition is selected on a 1024 bytes/sector drive (PREPped with the /K switch).
4. The GEMINI Boot partition is ONLY accessible from the Z-100 side if it is named GEMINI VER4. No other GEMINI partitions are accessible from the Z-100 side.
5. Be extremely careful not to mix DOS utilities between the GEMINI partition (which still requires PC-DOS) and the Z-DOS partitions.

Please note: If the Gemini partition is named GEMINI and the operating system name is anything but VER4, then use of the /K switch is still permitted, but cross access is denied.

EasyPC PC-emulator system:

The EasyPC system requires a Zenith version of PC-DOS on a bootable floppy or loaded on its own partition on a hard drive. This partition must be named **"UCI" and** the operating system must be named **"UCI"**. During the boot process, the EasyPC ROM BIOS will only recognize the UCI;UCI name. No provision has been made to try cross access to an EasyPC partition at this time.

EasyPC is limited to one drive only.

The Scottie Board and ZPC:

The Scottie Board and ZPC do NOT require the use of a separate PC-DOS and therefore do **NOT** require a separate partition on the hard drive.

2.6 Operating System Name

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

While system names are not mandatory for partitions, they must be used when duplicate partition names are used.

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. While lower case letters can be used, all letters in the operating system name will be shown in uppercase when they are displayed in the table.

Note: To eliminate naming confusion, beginning with PART version 4, valid characters for the partition and operating system names are now limited to those valid for file names and directories. This means previously valid characters, such as / or \, are no longer valid.

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   CPM-86   Z-DOS
     MS-DOS   PASCAL   C

Note: The Z-DOS operating system required that you use the operating system name, **"Z-DOS"** for the partition(s) you plan to use for Z-DOS programs.

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

Note: If a duplicate system name is used for two partitions also having the same partition name, PART will wait until you make an entry for the default boot partition before showing the **"DUPLICATE NAME ERROR"** message in reverse video. If this message appears, correct the duplicate names before exiting PART.

Note: If you have entered a duplicate name 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 parti-tion, 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.

Note: 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.

2.7 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, press {RETURN} to 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.

While older versions of PART entered percentages as whole numbers from n-100, PART has been changed, beginning with version 4, to increase the flexibility by entering percentages to two decimal places, without the decimal. In other words, to enter 50%, you must enter 5000. You must enter percentages by typing a whole number in the range n00-10000, where n is the number displayed at the bottom of the screen in the **"Minimum allocation"** message.

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).

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.

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 establised yet or not). Additionally, the "Total Allocation" figures will display the amount of "unallocated" space (in both percentages and kilobytes) in reverse video.

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 hard 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 hard drive 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 hard drive, PART will automatically convert this percentage to zero percent.

Note: 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 hard drive.

Note: If you try to enter a non-numeric character, a fractional or decimal point number, or a number greater than 10000, then the terminal will beep and the cursor will remain at the percentage position until you 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 hard drive will be inaccessible until you use either the PART utility or the PREP utility.

CP/M Limit: The percentage you enter for a CP/M partition must not exceed **8 megabytes** (8192 kilobytes). If you allocate more than 8 megabytes to a partition, CP/M-85 will not be able to access part of this partition. I do not know if this limit applies to all versions of CP/M.

GEMINI Limit: The percentage you enter for a GEMINI partition must be low enough so that this partition will not be larger than **17 megabytes**. If you allocate more than 17mb to a partition, the GEMINI system will subtract 17mb from the usable size of the 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 re-appears. Furthermore, you will be prevented from exiting PART until you correct the partition table so that no partitions are allocated "0%" of the disk space.

Once the cursor is in the blank Partition Name column and you have completed naming and allocating memory to each of the desired partitions, your screen may look something like the example of Figure 6. If you press {RETURN}, you are given the opportunity to change the Default boot partition (Figure 4).

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       Partition Name     Operating System Name   Percentage    Kilobytes    Flag
       --------------      ---------------------   ----------    ---------    ----
   1. Z-DOS               Z-DOS                     30.00%        3000         81
   2. GEMINI              VER4                      20.00%        2000         81
   3. CPM                 CPM                       10.00%        1000         81
   4. WORDPROCESS         MS-DOS                    10.00%        1000         81
     /\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\
  14. FUN&GAMES           OMEGA-DOS                 10.00%        1000         81
  15.
  16.
  Total Utilization (Allocated/unallocated)        100.00/0.00   10000/0
  Default boot partition number: 1    <Z-DOS;Z-DOS              >
     Special Characters: Use CR, TAB, and Arrow Keys to navigate screen.
      At start of Part name, use SPACE to Delete, INS LINE to Add partition.
      At start of % Allocation, use + or - to fine tune partition size.
     0% can be used for temporary place holder. Flag shows Never Formatted & New.
  Minimum allocation = 0.01% Enter Percent in 10,000ths Unit 0  512 byte Sectors
```

Figure 6.
Example of a Completed Partition Table

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    /\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\
15.
16.
Total Utilization (Allocated/unallocated)  100.00/0.00   10000/0
Default boot partition number: 6 <WORDPROCESS;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> _
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Figure 7.
Returning to the Main Menu

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2.8 Default Boot Partition

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

*   Menu item {**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.

The default boot partition position is at the right side of the "Default boot partition number:" message (See Figure 4).

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 is at the "Default Boot Partition Number" field, 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.

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, as shown in Figure 7.

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}. An "is undefined" message will be displayed at the default boot partition position. However, you will not encounter the "boot partition error" message.

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

Note: 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}.

Note: 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.

Note: 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.

2.9 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 "R - Restore to original partitions". See Figure 7.

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.

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.

2.10 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, Quit to DOS
    R - Make changes, Return to PART
    A - Abort changes, Return to PART
    Q - Abort changes, Quit to DOS
```

Choose desired option. <M, R, A or Q>_

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 hard drive, and that no changes are actually made to the hard drive until you enter the {**M**} option.

Press {**M**} if you want to save the changes that you entered during this PART session and quit to DOS.

Press {**R**} if you want to save the changes that you entered during this PART session and return to PART for additional work.

CAUTION: If you choose either the "**M** or **R** - Make changes" options, there is the potential to destroy any data that might exist on the hard drive.

Press {**A**} if you want to abort the changes that you entered during this PART session and return to PART for additional work.

Press {**Q**} if you want to abort the changes that you entered during this PART session and quit to DOS. Unless you selected {**R**} earlier to save any prior changes, you will exit this PART session without any changes to the hard drive. 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.

After you choose the "**M** - Make changes" or "**Q** - Abort changes" options, the MS-DOS system prompt will appear. If you changed the size of any of the partitions, you will need to reboot the system and reformat the changed partition(s) before continuing. Otherwise, run ASGNPART to regain access to the hard drive's partitions.

Note: Under previous versions of PART, you had to enter {CTRL}-{RESET} and reboot after exiting from PART. Beginning in PART version 4, this is only necessary if the size of a partition was changed. Use ASGNPART to regain access to the hard drive partitions.

Note: If you enter a character other than M, R, A or Q, 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 hard drive. For users who wish to obtain a deeper understanding of some of the activities that PART performs in order to partition a hard drive, please see the PREP article on the "*Z-100 LifeLine*" website for more information regarding the Superblock.

Hard drive space is allocated according to information contained within a unit of software that is stored on a reserved area of the hard drive, called the "superblock".

The superblock enables you to access specific partitions and is initially recorded on your hard drive when you use the PREP utility. To insure the integrity of the superblock information, two copies of the superblock are recorded on the drive.

After you use PART to change partitioning fea-
tures (such as partition name, system name,
allocation percentage, and default boot parti-
tion), PART updates both copies of the super-
block and other Winchester support software
units.

3.1 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 the number of the start sector
number of each partition.

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

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

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

3.2 The Flag Byte

Partitions are also labeled with a "flag byte".
The flag byte contains special information about
the partition. For this version of the PART
utility, only the 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 reset the flag to 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. The FORMAT
utility supplied with CP/M-85 does not use or
set this flag byte.

3.3 Disk Space Calculation

The PART utility allocates portions of hard
drive 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
   hard drive 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 half
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 .01 percent, and display this
calculated value rather than the percentage you
entered.

Because of PART's rounding of space portion
percentage, the percentages allocated to your
partitions might not always add up to exactly
100 percent when the disk is full. Furthermore,
this rounding can also cause partitions that
were divided into equal percentages to have
slightly unequal kilobyte capacities.

3.4 Verifying the Superblock

PART updates information in the Superblocks at
the locations where the superblock copies were
initially recorded by the PREP utility.
A check code called a "checksum" is calculated
by PART for each of the copies of the superblock
before PART records these superblock copies on
the hard drive. The checksums are recorded in
the Software Boot Code.

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

If PART encounters difficulty in reading Super-
block A, or if the checksums differ, then PART
tries to read Superblock B.

If PART encounters difficulty in reading Super-
block B, or if the checksums of Superblock B
differ, then PART will display an error message.

4 PART Error Messages

In addition to the usual errors, such as "Drive Not Ready", others need additional explanation:

ABORTING, You must run ASGNPART to regain access to drive

Cause: You elected to abort PART without completing or saving your changes.

Cure: Rerun PART to complete the partitioning operation or run ASGNPART if PART is not necessary.

Allocation Error

Cause: You have established one or more partitions that are presently allocated zero percent of the disk. (You may have allocated too much space to other partitions.)

Cure: You must repeat the "Partition Maintenance" operation and change allocation percentages of one or more partitions to conform with percentage entry rules.

ANSI commands must be available for this version of PART!

Cause: ANSI is in version 4 of IO.SYS and can be enabled or disabled with DRIVECFG.
Cure: Run DRIVECFG and enable ANSI at the bottom of the first screen by pressing F9.

Bad command line switch. "PART ?" for valid switches.

Cause: You attempted to run PART with an invalid switch.

Cure: Check the valid switches; rerun PART.

Bad Command or File Name

Cause: This error is displayed if the PART.COM file is not on the disk you are using to run PART.

Cure: Try PART again after inserting a disk containing the PART.COM file into the drive.

BDOS err on X: Select

Cause: This error is displayed if you try to run PART after booting up with a disk containing the CP/M-85 Operating System.

Cure: 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 Hard Drive Utility working disk). Run PART at the A: system prompt.

Boot Partition Error

Cause: You have removed the default boot partition from the table during a "Partition Maintenance" operation.

Cure: 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.

Both Partition Tables have bad CRC, continue?

Cause: PART has found both partition tables to be bad. It may not be able to record changes to the superblock properly after you have specified changes to the partition table and exited from PART.

Cure: While you may continue, PART might succeed in recording some of the changed superblock information, the superblock may become corrupt. It would be best to use the PREP utility to correct the superblock problem, then rerun PART.

DOS/BIOS version ERROR. You must use BIOS version 4.06, and DOS version 4.00. The versions are displayed at boot time and with the VER command.

Cause: You are trying to run PART with an incorrect DOS/BIOS version.

Cure: Use correct DOS/BIOS version; run PART.

Duplicate Names Error

Cause: You have established more than one partition with both the same partition name or the same operating system name.

Cure: You must change at least one of the names of one of these partitions through the "Partition Maintenance" operation.

ERROR - Unable to Rewrite Tables

Cause: 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 hard drive.

Cure: It would be best to use the PREP utility to correct the superblock problem, then rerun PART.

Fatal Error -- Cannot Read Superblock B

Cause: A bad sector error has occurred in the backup copy of the superblock (Superblock B).

Cure: Try to run the PREP and PART utilities on the disk in sequence.

PART only runs on a Zenith Z-100 Machine!

Cause: You attempted to run PART on the wrong kind of computer.

Seek error reading drive A, Abort, Retry, Ignore

Cause: This error is displayed if the disk has been removed from the default drive.

Cure: Reinsert a disk containing PART.COM in the drive and press {R} for Retry.

Unable to communicate with the Z-217 controller

Cause: 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.

Cure: Check to see that the controller card and all cable connectors are secure. Then run PREP and PART in sequence.

Unable to read superblocks/SBC, disk unusable

Cause: PART was unsuccessful in reading the information stored in the software boot code, or the software boot code was read successfully but a checksum error was detected.

Cure: Run PREP and then rerun PART.

Z-217 controller error on Set Drive Parameters command

Cause: One or more responses to the six drive characteristic questions in PREP were not valid for the particular drive connected or there is a malfunction of your hard drive.

Cure: After checking for a malfunctioning hard drive, run PREP and PART in sequence.

Note: Some of the above 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).

If you have any questions or comments, please email me at:

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Cheers,

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