DRIVECFG v4 Documentation

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Z-DOS v4 DRIVECFG

DRIVECFG is a Z-DOS v4 configuration program for disk drive selection created by John Beyers, "*Z-100 LifeLine*" Staff.

Introduction:

The DRIVECFG program will configure a disk copy of the BIOS (IO.SYS) for the physical or imaginary drives connected to the Heath/ Zenith Z-207 Floppy Drive Controller Card, the physical drives connected to the Heath/Zenith Z-217 or the CDR Z-317 MFM Hard Drive Controller Cards, a RAM drive, the EEPROM on the Z-100 LifeLife SCSI (LLSCSI) controller card, and the NVsRAM on the new Z-100 LifeLine IDE (LLIDE) controller card.

If a modified Z-205 (swappable) card is installed, then **DOSmemLIMIT** may be set above 768Kb and **Z205asUMB** can be Enabled, permitting most of ZPC.COM and the transient portion of COMMAND.COM to be loaded into the same memory space as the MTR-ROM.

The command line parameters are limited to the location of the BIOS that needs to be altered. If no parameters are given, the program assumes IO.SYS is in the default drive and directory. If only 'drive:' is given, it assumes IO.SYS is in the default directory for that drive. If it is not found in the default locations, you will be prompted for a location.

Once in the program, you may select up to 26 physical or 25 imaginary drives for the BIOS. As shipped, all devices (hard disk drives, an EEPROM or NVsRAM (on their respective LLSCSI or LLIDE card), or a swappable Z-205 card) are included in the BIOS.

Primary and secondary Z-207, Z-217, & Z-317 controller cards are supported. This means a maximum of sixteen floppy drives and eight physical MFM hard drives are supported. The number of accessible hard drive partitions is only limited by the drive letters available.

Note: While secondary Z-217 Hard Drive Controllers are possible, to our knowledge none exist because they required a change to their programmable chips to accommodate the card's address change.

Except for some of the special drives listed above, any drive letter may be assigned to any drive type.

Note: There should be no reason to change the BIOS, however, the BIOS can easily be recompiled to remove any of the special devices that are not installed, such as the EEPROM or NVsRAM (on their respective LLSCSI or LLIDE card), or a swappable Z-205 card, however, once removed, you may not add them again without recompiling the BIOS.

To use HIGH or DUAL density drives on the 34 pin connector, a slight modification to the Z-207 floppy disk controller is necessary. The procedures can be found as an article on the "*Z-100 LifeLine*" Website.

The original Z-DOS version 4 BIOS configuration had drives A: and B: as 48tpi or 96tpi 5", drives C: and D: as 48tpi 8", and drives E: thru H: as hard disk partitions. However, you are no longer limited to hard coded drive letter assignments. Any drive type or hard disk partition can be assigned any drive letter.

An imaginary drive may also be assigned to any floppy disk drive; however, a drive letter must be available for each assigned type of imaginary drive.

Several versions of Z-DOS v4 have been distributed over the last several years. However, the most recent change, Z-DOS v4.06, has been made to accommodate the new Z-100 LifeLine IDE Controller Card.

Z-207 Floppy Controller DIP Switch

Early Z-DOS v4 revisions messed with setting the Z-207 Floppy Controller DIP switch sections 0 and 1 to accommodate the mixing of 96tpi and 40tpi 5-1/4" drives on the same computer.

This caused a conflict when running earlier versions of DOS on these Z-100s because these DOS versions expected to see these switches set in accordance with their own requirements.

Yes, ALL versions of DOS, including the original Z-DOS, can still be run on all version 4.x MTR-ROMs. With Z-DOS v4.06, however, these odd DIP switch settings are no longer used.

In fact, Z-DOS v4.06 does not care what sections 0 and 1 are set to any more. It is recommended that you reset the DIP switch setting to their original definitions to accommodate their use by pre-v4 versions of DOS. Please see your User's Manual for these settings.

It is also recommended that you contact me at the *"Z-100 LifeLine"* for the updated Z-DOS v4.06 and MTR-ROM v4.3 as soon as possible. It only costs $40.00 and these earlier Z-DOS v4 versions are NO LONGER SUPPORTED.

Finally, various Z-100 operational parameters can be modified from the bottom of the main screen by using the function keys. Pressing {**F12**} presents a second screen of options and will toggle between the two screens.

Requirements:

DRIVECFG can ONLY be used with Z-DOS v4 on the Z-100 and requires a version 4 monitor ROM. At the present time, Z-DOS v4 can only be used on a native Z-100. None of the PC-emulator systems (e.g., Easy-PC or Gemini) presently recognize Z-DOS v4. Hopefully, a PC version of Z-DOS will be developed in the future.

However, ZPC and the Scottie Card should work as before and may recognize all the new drive capabilities recently added to the Z-100. They have just not been fully tested yet.

Invoking DRIVECFG:

DRIVECFG can be invoked from the DOS system prompt by typing the command:

DRIVECFG [filespec]

Where the optional [filespec} is the full filename and path. For example:

DRIVECFG Drive:\Directory\FILENAME.EXT

FILENAME.EXT is generally IO.SYS, but it can be any name that you wish that uses the file structure of IO.SYS. If the location of IO.SYS is not provided on the command line, IO.SYS is assumed to be on the default drive and directory. If only "Drive:" is given, IO.SYS is assumed to be in the default directory for that drive. If IO.SYS cannot be found at the default locations, you will be prompted for a location.

Upon invocation, the DRIVECFG setup screen is displayed, as shown in Figure 1.

Note: As we mentioned briefly earlier, DRIVECFG assigns drive letters to the various floppy and hard drives and a few special devices on the computer using Z-DOS v4. With the release of Z-DOS v4.06, the default drive configuration has been changed to accommodate the new LLIDE Controller Card.

On my computers, for standardization among the many different computer configurations that I have around the house, I generally assign the first four drive letters, A: thru D: to the floppy drives; E: thru H: to the MFM hard drive partitions; I: is mapped as an Imaginary drive by assigning it to map physical drive A:; and finally, J: is assigned to the EEPROM on the LLSCSI board or the NVsRAM on the IDE board, depending on if either is installed.

The next available drive letter is then automatically assigned to any drive and their partitions found on either board during bootup.

If additional partitions or drives were detected during bootup, these would be assigned drive letters automatically until either no more drive partitions were detected, or we ran out of drive letters.

This has worked out well for me in the past and helps avoid confusion when using the different configurations on my many different computers.

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=============================================================================
| MS-DOS Version 4.01    Reconfigure Drive Assignments    BIOS Version 4.06 |
|---------------------------------------------------------------------------|
|DRIVE         TYPE          PIN CARD UNIT||DRIVE         TYPE         PIN CARD UNIT|
|---------------------------------------------------------------------------|
|A: LOW Den.  48tpi 5 1/4"  34 Z207p 0  ||                                  |
|B: DUL Den. 135tpi 3 1/2"  34 Z207p 1  ||                                  |
|C: LOW Den.  48tpi 5 1/4"  34 Z207p 2  ||                                  |
|D: LOW Den.  48tpi 5 1/4"  34 Z207p 3  ||                                  |
|E: Default Boot Partition     Z217p    ||                                  |
|F: Fixed Disk Partition       Z217p    ||                                  |
|G: Fixed Disk Partition       Z217p    ||                                  |
|H: Fixed Disk Partition       Z217p    ||                                  |
|I: Imaginary Drive mapped to A:        ||                                  |
|J: EEPROM on IDE  LifeLine Board  s    ||                                  |
|K: **Next Available Drive to Assign**  ||                                  |
|                                       ||                                  |
|                                       ||                                  |
|---------------------------------------------------------------------------|
|MTR ROM v4.3  768K RAM  64K COLOR Video        "F0" Key for current settings.|
|---------------------------------------------------------------------------|
  F1 Scrn Saver 10Min F4 DOSmemLIMIT 768K F7 ALTCFG 3 Sec Wt F10 ChrTblMap SINGL
  F2 SSav Eatky ENABL F5 MaxDOSsecSZ 1024 F8 Signon    ENABL F11 DispLOW   ENABL
  F3 HdWareCLS  ENABL F6 Z207Mod P=B S=B F9 ANSI       ENABL F12 ALT FUNCTION
  HIT Drive Letter or Use Cursor Keys to select Drive (ESC when DONE)
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Figure 1.
DRIVECFG Setup Screen

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The DRIVECFG window is divided into several areas. Many of these will contain different information depending upon your computer configuration. The top section will give the DOS and BIOS versions being used. At this printing, MS-DOS.SYS is v4.01 and the BIOS (IO.SYS) is v4.06

The large section below shows the present (default) drive configuration. We will get back to this Drive Assignment Window in a minute.

The thin section below the drive information gives the present ROM and memory information. MTR-ROM v4.3 is the latest. I have 768K total RAM installed and 64K Color Video installed on the video board.

During bootup, all of the above information will be displayed as the IO.SYS opening screen. The next available drive letter will be updated to accommodate all the partitions detected on any LLSCSI or LLIDE drives that may be detected during boot. Also the CPU model (8088 or V-20) will be displayed in the bottom section after the RAM information.

Below this section, three lines of function key definitions are displayed in reverse video. The User can use these to configure most of the remaining bootup variables or operational parameters of the Z-100.

There are two screens of these variables or parameters and pressing the {F12} key will

toggle between these screens.
Function Keys:

Primary Parameters Screen:

The function keys used for defining these Z-100 parameters are defined as:

F0 - Enters display drive parameters mode. To use this function key, first highlight one of the drives presented above. Next press {**F0**}. The highlighted area below the window then changes to display the drive parameters.

For example, highlighting drive A: will display:

  LOW Density 48tpi 5 1/4", 34 pin connector,
  Unit 0, Primary Z207 card, Double Restore
  DISABLED, Drive step rate 6 Clock tics,
  Transfer spin rates 250K (300rpm), 500K
  (300rpm).

Without yet pressing the {**ESC**} key to exit, move the highlighted bar down to Drive B: by using the down arrow key. The drive information changes to:

  DUAL Density 135tpi 3 1/2", 34 pin
  connector, Unit 1, Primary Z207 card,
  Double Restore DISABLED, Drive step rate
  3 Clock tics, Transfer spin rates 250K
  (300rpm), 500K (300rpm).

Drives C: and D: show the same as A:.

Drives E: thru H: show:

  *Fixed Hard Drive Partition, Primary
  Z217 controller card.*

Drive I: shows:

  Imaginary Drive mapped to A:

Drive J: shows:

  EEPROM Device on the IDE Board

Drive K: shows:

  Unassigned drive letter

Press the {**ESC**} key to return to the function
key display.

F1 - Screen Saver. This setting will cause the
screen to blank if no keyboard activity is
detected in a user selectable period of 1-10
minutes in one minute increments. If DISAB is
selected, the screen saver is disabled and will
not go blank.

F2 - Screen Saver EatKey. This function
determines whether the first key pressed is
eaten (ENABLE) or not (DISABL). If eaten, the
first key pressed is NOT displayed. Select
either ENABL or DISAB.

F3 - Hardware Clear Screen. I am uncertain as
to what is meant here. Your choice is to select
ENABL or DISABL. If someone determines what
exactly this does, please let me know.

F4 - DODmemLIMIT. This function is used to
limit DOS from 736K to 992K in 32K steps of
Memory at boot time. While the main board can
have as much as 768K of RAM, the Z-100 is
actually able to address 1024K of memory at any
time. The additional memory can be from Z-205
256K RAM Cards, modified Z-205 RAM cards or
third party RAM cards. By limiting the memory
addressable by DOS, the excess memory may be
reserved for use by RAM drives. See **{F6}** on the
second Alternate Function display screen for
additional information.

F5 - MaxDOSsecSZ. This function sets the DOS
disk buffer size (512 - 8192 bytes/sector).
1024 BPS is necessary if 8" drives are connected
or if the PREP/K switch was used on a hard disk
drive.

F6 - Z207Mod. This function selects the Z207
Hardware modification scheme used. Choices are:
HUGHES, BARFIELD, or NO MOD.

The HUGHES modification was used to place dual
density 3-1/2" or 5-1/4" drives on the 50 pin
connector, but at the loss of 8" capability.

The BARFIELD modification was used to place high
density or dual density drives on the 34 pin
connector, but required the latest ROM to work.

F7 - ALTCFG. This function selected a time
within which a selection had to be made for an
Alternate CONFIG.SYS file to be used. If a key
was not pressed in time, the default CONFIG.SYS
was used. Selection choices are: DISABLED, Uncnd
Wt (Unconditional wait), or x Sec Wt where x
could be from 9 seconds to 1 second in one
second increments.

F8 - Signon. Enable or Disable the display of
the IO.SYS sign-on screen at boot time. Select
either ENABL or DISABL.

F9 - ANSI. Enable or Disable the loading of the
ANSI functions in the BIOS screen setting
functions. Select either ENABL or DISABL.

F10 - ChrTblMap. This function sets the
Character Table Map font to use. The choices
are: SINGL (single-dot; the original Z-100
character set with graphics characters), DOUBL
(double-dot as used in the old IBM-PC font), or
OLD (original Z-100 font without the graphics
which were loaded separately with ALTCHAR.SYS or
ALTCHR.SYS)

F11 - DispLOW. Use to Enable or Disable the
display of the lower characters (less than 32h).
These were some of the original IBM-PC
characters. Select either ENABL or DISABL.

F12 - ALT FUNCTION. Toggles to the second
Alternate Function parameter setting screen.

Secondary Parameters Screen:

From the second Alternate Function display
screen the following various additional
parameters can be set:

F1 - Z217BootDrv. This function assigns the
Z-217 or Z-317 (from CDR) hard drive's default
boot partition. Select NONE or any one of a
maximum of 4 assigned drive letters. These have
to have been one of the MFM drive letters
assigned by DRIVECFG in the drive window. For
example, in the default assignments provided
above, you have a choice of E:, F:, G:, or H:.

F2 - DispZ217config. This function will display
the Z-217 BIOS's hard disk configuration. Before
using, you need to press the {**F3**} key to read
the information from the drive.

For example, for my drive, you had to answer a
question first:

  *Select (P)rimary or (S)econdary Controller
  Card [CR = Primary]...* **P**

Then the Z217 Configuration of Table 1 was
displayed in a separate window over the DRIVECFG
drive selection window.

At the bottom of the screen was the comment:

  *Hit (D)ecimal, (H)ex, or any other key
  to continue... _*

This would change the values being displayed in
the table from decimal to hex or back.

~~~~~~

PRIMARY Z217 CARD	UNIT 0	UNIT 1	UNIT 2	UNIT 3
Maximun Head Number	4	N	N	N
Maximum Cylinder Number	305	O	O	O
Reduced Write Current Cyl	307			
Precomp Cylinder	128	D	D	D
Step Rate (Value * 20 uS)	1	R	R	R
ECC Error Correction Span	127	I	I	I
Interleave Factor	4	V	V	V
Cell Size (0=512, 1=1024)	0	E	E	E
Fill Character	229			

This is a separate window displayed over the DRIVECFG screen.
At the bottom of the screen the function key parameters is replaced
by the comment:

Hit (D)ecimal, (H)ex, or any other key to continue... _

This would change the values being displayed from decimal to hex or back.

Table 1.
Z217 Configuration

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F3 - ReadZ217config. Read the Z-217's current hard disk configuration. When pressed, you are asked which drive to read. Follow this function with the **{F2}** key to see the information.

F4 - SetZ217config. While usually the drive information is available automatically, we have found that some CDR Z-317 setups require that you set the information manually. Use this function to set the Z-217 BIOS's hard disk configuration from the **{F3}** configuration above.

F5 - ReConfigZ217. Use to reconfigure the Z-217 set-up - 0 heads produces 'NO DRIVE'. Use **{F4}** to save these changes.

F6 - Z205asUMB. This function permits using the Z-205 RAM board as an UpperMemoryBlock. This is necessary if DOSLIMIT > 768K. Select between ENABL and DISABL. See **{F4}** on the main screen.

F7 - Print SHIFT-F12. This function permits selecting a new print screen hot key. When pressed, the following is displayed:

Hit new PRINT SCREEN "HOT KEY" now
(RET to DISABLE, ESC to ABORT)._

The default is **{SHIFT}-{F12}.**

F8 - Swim CONTROL-_. This function permits selecting a new Software Interrupt hot key. When pressed, the following is displayed:

Hit new SOFTWARE INTERRUPT "HOT KEY"
now (RET to DISABLE, ESC to ABORT)._

The default is **{CTRL}-{_}.**

Note: The "hot key" combination selected with the **{F8}** Swim - Monitor Software Interrupt Key, may be used to break out of a user program, such as if the computer is hung up, or if you wish to change some operational parameter without having to either exit the program or reboot.

Pressing the hot key combination will take you to the monitor ROM hand prompt where you may then use the ROM's debugging commands or change the operating parameters of the machine (i.e. change Lines/Screen). The {**G**}o command will return you to the program (the screen is not saved, so you may need to execute some command to restore your screen - i.e., in a word processing program a page up/page down will restore the screen. Remember nothing is lost - just not displayed).

F9 - PagUp CONTROL-^. This function permits selecting a new Page Up hot key. When pressed, the following is displayed:

Hit new PAGE UP "HOT KEY" now
(RET to DISABLE, ESC to ABORT)._

The default is **{CTRL}-{^}.**

Note: The video board must have the full complement of 64Kb video memory chips for video paging. Pressing the hot key combination will display the previous page if the LinesPerScreen is equal to or less than 26. If LPS is greater than 26, the previous page will be partially displayed, but offset due to the video board's memory mapping algorithm. See the hardware manual for a fuller explanation of the video boards memory mapping.

F10 - KeyClick. This function Enables or Disables the Z-100's Keyclick. Select either ENABL or DISABL.

F11 - WordWrap. This function Enables or Disables word wrapping at the end of the displayed line of text or graphics. If Disabled, the remaining text after the line displayed on the screen is lost until the next carriage return. Select either ENABL or DISABL.

F12 - ALT FUNCTION. Toggles to the first Alternate Function parameter setting screen.

Drive Assignment Window:

Now let's get back to the large window in the middle. As we briefly stated at the start, this window shows a list of drives in the default drive configuration. When first invoked, the last entry will be the "**Next Available Drive to Assign**" entry and it will be highlighted.

By pressing the up arrow we can highlight any of the drives above this entry, or we can press the drive letter we wish to highlight to go directly to that drive letter.

Let's review the procedures used to change an entry. To do this, press the letter {**I**}. Without needing the colon or even a carriage return, we are instantly brought up to the entry, drive I: and our first menu window is displayed in reverse video:

```
(F0) Imaginary Drive
(F1) LD  48tpi 5" 34 pin
(F2) LD  96tpi 5" 34 pin
(F3) LD 135tpi 3" 34 pin
(F4) HD 135tpi 3" 34 pin
(F5) DD  96tpi 5" 34 pin
(F6) DD 135tpi 3" 34 pin
(F7) HD 135tpi 3" 50 pin
(F8) HD  96tpi 5" 50 pin
(F9) DD  48tpi 8" 50 pin
(F10) Fixed Disk Partition
(F11) EPROM Device
(F12) Z205 Memory Disk
(DELETE) Unassign Drive
```

The first column shows the choices - either press a function key or the {DELETE} key to proceed to the next menu.

The second column shows the choice of floppy disk density you wish to choose for the drive selected.

Note: You can generally choose ANY drive type for any drive letter from A to Z.

CAUTION: If you intend to reserve the capability of using ANY operating system with the computer, you should continue to use a drive configuration recognized by these other operating systems. Generally, this means that:

- Drives A: and B: be a 5" floppy drive of either 48tpi or 96tpi density and the DIP switch on the Z-207 Floppy Controller Card set for the appropriate drive density selected.
- Drives C: and D: be reserved for 8" drives.
- Drives E: and F: be reserved for the MFM Hard Drives on a Z-217 or Z-317 Hard Drive Controller.

ONLY Z-DOS v4.x recognizes the new drive configurations available through DRIVECFG.

The third column shows the track density.

The fourth column shows the drive size.

And the fifth column shows the connector size on the Z-207 Floppy Controller Card.

Function Keys Defined:

The menus for each of these function keys is different, so let's take them one at a time.

   (F0) Imaginary Drive: Any of the floppy drives can have a respective Imaginary drive. You remember these from the early days of the single drive computers. In order to do COPY operations between disks on these single drive computers, drive B: was actually an imaginary version of drive A:. The computer would ask you to switch disks after each stage of a COPY operation by placing the appropriate disk in drive A: or B: at the appropriate time.

With the new drive configurations usable by DRIVECFG, you could conceivably be limited to a single drive of a particular density. So when you wish to use COPY to transfer files between disks of the same density, you need to assign a second drive letter to the same drive, just as in the old days. Hence, in the default config- uration, I have assigned Imaginary Drive I: to the more commonly used physical drive A:, which is often the only 48tpi 5" drive attached.

I also figured Drive I: could easily be remembered as being Imaginary.

Note: Remember that you do NOT need to have a drive connected, even if DRIVECFG is configured saying one is attached. It is more like just having a drive letter reserved for the drive, if it is attached at some point.

Selecting **{F0}** displays only one question:

   Select Physical Drive Letter to map
   this Imaginary Drive(ESC to Cancel)..._

Upon pressing a drive letter, the Imaginary drive is configured as shown under drive letter I: in the default menu.

Let's go up to Drive A:, either by using the arrow keys or by pressing the {A} key. Again, the drive menu is shown. Let's reconfigure it next.

   (F1) LD 48tpi 5" 34 Pin: This is the standard low density 360Kb drive originally placed in the Z-100. Selecting **{F1}** gives the following series of questions:

   Select (P)rimary or (S)econdary Controller
   Card [CR = Primary]... _

Press either {**P**} or {**S**} or press {RETURN} to select Primary by default.

   Select Unit (0-3) [CR = 0]... _

Note: Some floppy drives only allow choosing unit 0 or 1, usually by switch or jumper. Some even required soldering a jumper to change the single default setting. You may recall that some PCs used a twist in the cable to change the floppy drive unit number. So be careful here. Be sure the drive is set to the unit number you select.

Upon selecting the unit number, you are displayed a table of Step Rates:

         48tpi Step Rates
    (0) - 6 clock tics delay
    (1) - 12 clock tics delay
    (2) - 20 clock tics delay
    (3) - 30 clock tics delay

And below you are asked the question:

   Select Step Rate (0-3) [CR = fastest]. _

Generally select the fastest, by pressing {RETURN}. If you experience unexplained drive read/write errors, you might wish to select a higher delay value.

Next, the question:

   Does Drive require Double Restore[CR = No]?

I have never seen a drive that requires Double Restore and I do not know what that does. Some of the older 8" drives may require this - check the drive documentation. Try just pressing {RETURN}. If you have difficulty, here is another setting to play with.

Once you press {RETURN} you have configured drive A: and all the temporary menus disappear. Let's go to drive B: next.

   (F2) LD 96tpi 5" 34 Pin: This is the standard low density 96tpi drive often used in later Z-100s. ROMs earlier than ZROM v4.3 required a special setting of the DIP switch on the Z-207 Floppy Controller Card to be able to use 96tpi drives, but this latest ZROM ignores the DIP switch entirely and relies on the settings of each drive configured by DRIVECFG.

So, selecting **{F2}** gives the same series of questions as with **{F1}**, except the step rates are different:

         Fast Step Rates
    (0) - 3 clock tics delay
    (1) - 6 clock tics delay
    (2) - 10 clock tics delay
    (3) - 15 clock tics delay

And below you are asked the question:

   Select Step Rate (0-3) [CR = fastest]. _

Generally select the fastest, by pressing {RETURN}. Again, if you experience unexplained drive read/write errors, you might wish to select a higher delay value.

Following the Double Restore question, you are again done. You have configured drive B: and all the temporary menus disappear.

But, let's try setting it to the next value. Return to drive B:.

   (F3) LD 135tpi 3" 34 Pin: This is the low density 720Kb 3" drive that first arrived on the scene. Pressing **{F3}** gives the same standard series of questions as when you pressed **{F2}** with the faster step rates.

Following the Double Restore question, you are again done. You have configured drive B: and all the temporary menus disappear.

But, again, let's try setting it to the next value. Return to drive B:.

   (F4) HD 135tpi 3" 34 Pin: This is the newer high density 1.44Mb 3" drive that arrived next on the scene. Pressing **{F4}** gives the same standard series of questions as when you pressed **{F2}** with the faster step rates.

Following the Double Restore question, you are again done.

Let's continue reconfiguring drive B: for the other options:

   (F5) DD 96tpi 5" 34 Pin: This was the last 5" drive version and I have never seen one, so they were rarely used. Upon pressing **{F5}** you are given the standard set of questions with the faster step rates, but following the step rate question, a new one is added:

   Drive jumpered for 360 RPM in low
   density mode[CR = No]? _

As we have not discussed RPM before, let's address it now. RPM was another tool to increase drive density and therefore capacity. Our low density standard drives rotated at 300 RPM. The high density 5-1/4" drives rotated at 360 RPM. The dual density 5-1/4" drives therefore had to rotate at both to be truely compatible with the other drives. Apparently, these drives had a jumper to select. As before, press {RETURN} for the default setting and mess with this setting if problems arise.

Following this question, you are done and the temporary windows disappear. There is no question regarding Double Restore with these drives.

Returning to drive B:, let's try the next value:

   (F6) DD 135tpi 3" 34 Pin: This is the standard and most common dual density 1.44Mb/720Kb 3" drive that finally arrived on the scene. Pressing **{F6}** gives the same standard series of questions as when you pressed **{F4}**, with the faster step rates. You are not asked about the RPM as these drives only rotate at 300 RPM. This is the default value of drive B: in this Z-DOS release.

Finally, we have settings for the three main drives usable on the 50 pin connector. Let's go to drive C: for these, as the last setting will be for the 8" drives, if you have any.

(F7) HD 135tpi 3" 50 Pin: You are not limited to using these drives on the 34 Pin connector, however, the Z-207 Floppy Controller Card must have the Hughes modification in order to use the 3" or 5" drives.

Note: As I recall, the 5" drives can be used without the Hughes modification - but only to simulate the 8" drives, which have the same parameters, but only 77 tracks instead of 80. So there is some loss of capacity.

Upon pressing **{F7}** the standard series of questions are asked with the faster step rates and Double Restore.

(F8) HD 96tpi 5" 50 Pin: Use the Hughes modification on the Z-207 Floppy Controller Card to get full use of the higher capacity drive, otherwise the drive is limited to 77 tracks. Upon pressing **{F8}** the standard series of questions are asked with the faster step rates and Double Restore.

(F9) DD 48tpi 8" 50 Pin: This is the standard 8" drive used on the Z-100. However, some drives were only single side. The standard series of questions are asked with the faster step rates and Double Restore. There is NO question about single or double sided operation because single sided disks had a different hole detection pattern.

Now let's use drive E: for the next selection.

(F10) Fixed Disk Partition: This selection is used only for the MFM hard drives on the Z-217 Winschester Controller. Upon pressing **{F10}** the only question you are asked is:

Select (P)rimary or (S)econdary Controller Card [CR = Primary]... _

Press either {**P**}, {**S**} or press {RETURN} to select Primary by default.

Next, let's use drive J: for the {F11} EPROM option.

(F11) EPROM Device: There are now two controller cards available with EEPROM or NVsRAM devices, the LifeLine SCSI Controller Card and the LifeLine IDE Controller Card. Both are bootable by pressing the **{B}oot{F4}** keys, but whereas the SCSI Controller is booted if pressing **{B}oot{F4}** or **{B}oot{F4}{P}**, the IDE Controller requires the full boot command: **{B}oot{F4}{S}** for secondary controller. The LLSCSI card came first, and for consistency purposes, we did not want to mess with the original settings. Upon pressing **{F11}** the only qustion you are asked is:

Select (S)CSI or (I)DE Controller Card [CR = SCSI]... _

If you are using the LLSCSI card, just press {RETURN}. If you are using the new LLIDE Controller Card, then you must press {**I**} for IDE. If you are using neither, just press {RETURN}. Later we will delete any drive letters that will not be used.

Finally, go to drive K:, the "**Next Available Drive to Assign**" line. There is one option that was not assigned as part of the default drive configuration:

(F12) Z205 Memory Disk: The Z-205 RAM Card is the standard, but optional, memory card intended for use to increase the amount of memory in the Z-100. Up to three 256Kb cards could be used to increase the amount of memory in the Z-100 from 192Kb on the main board to 704Kb maximum. This option is NOT for these cards in this common usage. These cards will be detected automatically and no drive selections need be made.

No, I believe this option is intended for and ONLY used for those Z-205 cards configured and used as a RAM drive. Using 256Kb chips, these cards could contain up to 1Mb of addressable RAM for use as a RAM drive and are addressed in 256Kb increments ABOVE the normal 768Kb RAM located on the main board.

Note: Unless I'm mistaken, it could also be used for RAM drives using lower RAM addresses, IF the DOSramLIMIT parameter value discussed above is set lower, freeing up that higher memory for use as a RAM drive.

Pressing **{F12}** gave the statement:

No Z205 Memory Disk in this BIOS.
Hit any Key... _

This intrigued me, as I had been using a Z205 RAM drive when we first began playing with the IDE Controller Card and had no problems with it. So I quickly found one of the cards and installed it in the system.

Upon bootup, it wasn't detected, so I had to review the **CONFIG.SYS** file to find what configuration option I had to use. The required driver was only installed if I pressed {**R**} for RAM drive.

So rebooting and pressing {**R**} at the appropriate time for an alternate CONFIG.SYS, this time the RAM Card was detected and listed as drive letter K: after the NVsRAM, which was still drive letter J: on my system. This time, however, the IDE drives were not listed. Reviewing **CONFIG.SYS** again, showed that pressing {**R**} did not also load the IDE driver.

By editing CONFIG.SYS to also load the LLIDEHD driver and SHARE.EXE, the next bootup listed everything; the NVsRAM as drive J:, the RAM drive as K:, and the IDE drive partitions after those.

The RAM drive worked fine. However, when I ran DRIVECFG, the RAM drive was still not listed, and when I tried to assign a drive letter, I still got the same error:

No Z205 Memory Disk in this BIOS.
Hit any Key... _

Apparently, this latest BIOS is written so that RAM cards can now be detected during Bootup in much the same manner as the IDE drives, provided the appropriate driver is loaded in CONFIG.SYS. This does away with the need for loading a separate drive letter with DRIVECFG.

However, perhaps it was left in the code for other RAM drives. For example, if you wished to increase the DOSramLIMIT by 128K with the intention of leaving a 128K RAM drive at the top of RAM and assign it a drive letter the same as other physical drives, then a separate DRIVECFG entry would become handy.

Correction to CONFIG.SYS

To make the correction to detect both the RAM drive and IDE drives at the same time, open CONFIG.SYS in your favorite text editor and locate the lines:

:R   ; RAM Disk Installed
device=Z205DSK.SYS

These lines install the Z205DSK.SYS device driver.

Immediately following, insert a new line:

#0   ; Also include LLIDEHD after Z205DSK

This will cause the common block to also be loaded.

While there are other ways to arrange to have the RAM drive detected in CONFIG.SYS, there is one advantage to mention if you do it this way.

This will cause the NVsRAM to be listed as drive J:, the RAM drive to be listed as drive K: and the IDE drives will be listed after this drive. Also, when the NVsRAM is placed in programming mode, by using {**P**} instead of {**R**} during bootup, the RAM drive driver is not loaded, the NVsRAM will become drive K:, and the IDE drives will remain unchanged.

The disadvantages?

Well, if you are going to keep a RAM drive installed in the machine all the time, you will have to keep pressing {**R**} during each bootup - a real pain. So, you will probably want to move the Z205DSK.SYS driver down into the common block and do away with :**R** altogether.

But then again, why use a RAM drive when you already have a non-volatile RAM drive (the NVsRAM Drive J:) anyway?

I only use the Z-205 RAM drive for special testing.

(DELETE) Unassign Drive: This option will delete any drive letter highlighted and change that line to read "*D: Unassigned Drive*". No other changes are made to the table of drive letters.

For example, let's go to drive D: and press {DELETE}.

You can see the change made. Go back and correct the drive as you wish, using the procedures given above.

As you delete the drives not used, they will all change as just described, EXCEPT if it is the last assigned drive. If the last assigned drive is deleted, then the "**Next Available Drive to Assign**" line will move up until it is located just below the LAST ASSIGNED DRIVE.

Programming the NVsRAM:

We have one last complication to address, and I saved it for last. I've mentioned it in prior articles also, but felt it was appropriate to mention it here also.

Presently, the IDE driver is configured to add a different drive letter to the NVsRAM when it is being programmed. This was intentional, even though it would cause some confusion.

As presently written, placing the NVsRAM in programming mode causes the IDE drives to bump down to the next available drive letter after this new drive is listed.

For example, the normal IO.SYS boot screen will list the drives as configured by DRIVECFG and others found as in Table 2.

Table 2: Normal Boot Drive Table:

A: LOW Den. 48tpi 5 1/4" 34 Z207p 0
B: DUL Den. 135tpi 3 1/2" 34 Z207p 1
C: LOW Den. 48tpi 5 1/4" 34 Z207p 2
D: LOW Den. 48tpi 5 1/4" 34 Z207p 3
E: Fixed Disk Partition   Z217p
F: Fixed Disk Partition   Z217p
G: Fixed Disk Partition   Z217p
H: Fixed Disk Partition   Z217p
I: Imaginary Drive mapped to A:
J: EEPROM on IDE LifeLine Board s
K: ST3290   FAT16   261MB LIDEp 0

As one of several protection methods against accidently programming, or inadvertently changing the NVsRAM programming, we felt it best to only enable programming the NVsRAM by loading a separate driver, EPROMDSK.SYS during the boot process.

When we want to program the NvsRAM (by running a special version of CONFIG.SYS), the NVsRAM is actually enabled for programming and the IO.SYS boot screen becomes that of Table 3.

Table 3: Boot Drive Table
NVsRAM in Programming Mode:

```
A: LOW Den.   48tpi 5 1/4"  34 Z207p 0
B: DUL Den. 135tpi 3 1/2"   34 Z207p 1
C: LOW Den.   48tpi 5 1/4"  34 Z207p 2
D: LOW Den.   48tpi 5 1/4"  34 Z207p 3
E: Fixed Disk Partition        Z217p
F: Fixed Disk Partition        Z217p
G: Fixed Disk Partition        Z217p
H: Fixed Disk Partition        Z217p
I: Imaginary Drive mapped to A:
J: EEPROM on IDE  LifeLine Board  s
K:  512K EPROMDSK/CLOCK (programming)
L: ST3290      FAT16     261MB LIDEp 0
```

Note the change beginning with drive K:.
Drive K: is now reported as a 512Kb EPROM
(NVsRAM) with a clock and is set or ready for
programming. The IDE drive(s) have been moved
down one drive letter.

CONFIG.SYS is controlling all of this and for
those of you who are still using the old three
or four line CONFIG.SYS, you will have to get
used to the new expanded version.

The new CONFIG.SYS was explained way back in
issue #59 and has been added as an article on
the "*Z-100 LifeLine*" Website. It is interesting
reading for those who need to boot their compu-
ter under changing configurations depending upon
the applications to be used.

We have seen two of these special uses here -
using {**R**} for loading the driver for a RAM drive
and using {**P**} to load the driver for placing the
NVsRAM in programming mode.

While the CONFIG.SYS as listed in issue #59 may
appear very complex, it really is not so bad
once you are familiar with the outline struc-
ture.

In issue #109 we made some modifications to
CONFIG.SYS to do the NVsRAM programming and
the article on the Website has been updated.
I recommend you read the article, CONFIG.SYS,
for further explanation.

Closing

I hope you enjoyed this exercise in using this
most critical new program, DRIVECFG.

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

Steven W. Vagts