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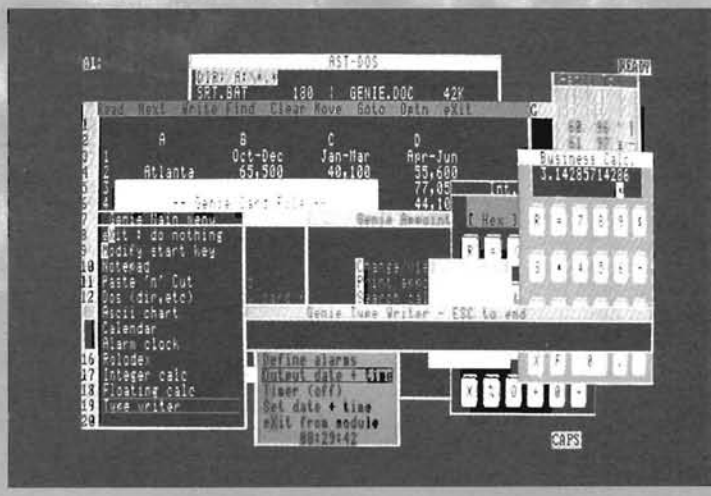

Shown here is Genie "popped up" on a Z-110 running Lotus 123. From the left are: The Genie main menu, the Genie rolodex style card file, the Genie notepad containing data cut from Lotus, the Genie DOS performing a directory command, the Genie alarm clock (at the bottom,) the Genie typewriter, Genie calendar, Genie Cut and paste, Genie Calculators, and the Genie Ascii table.

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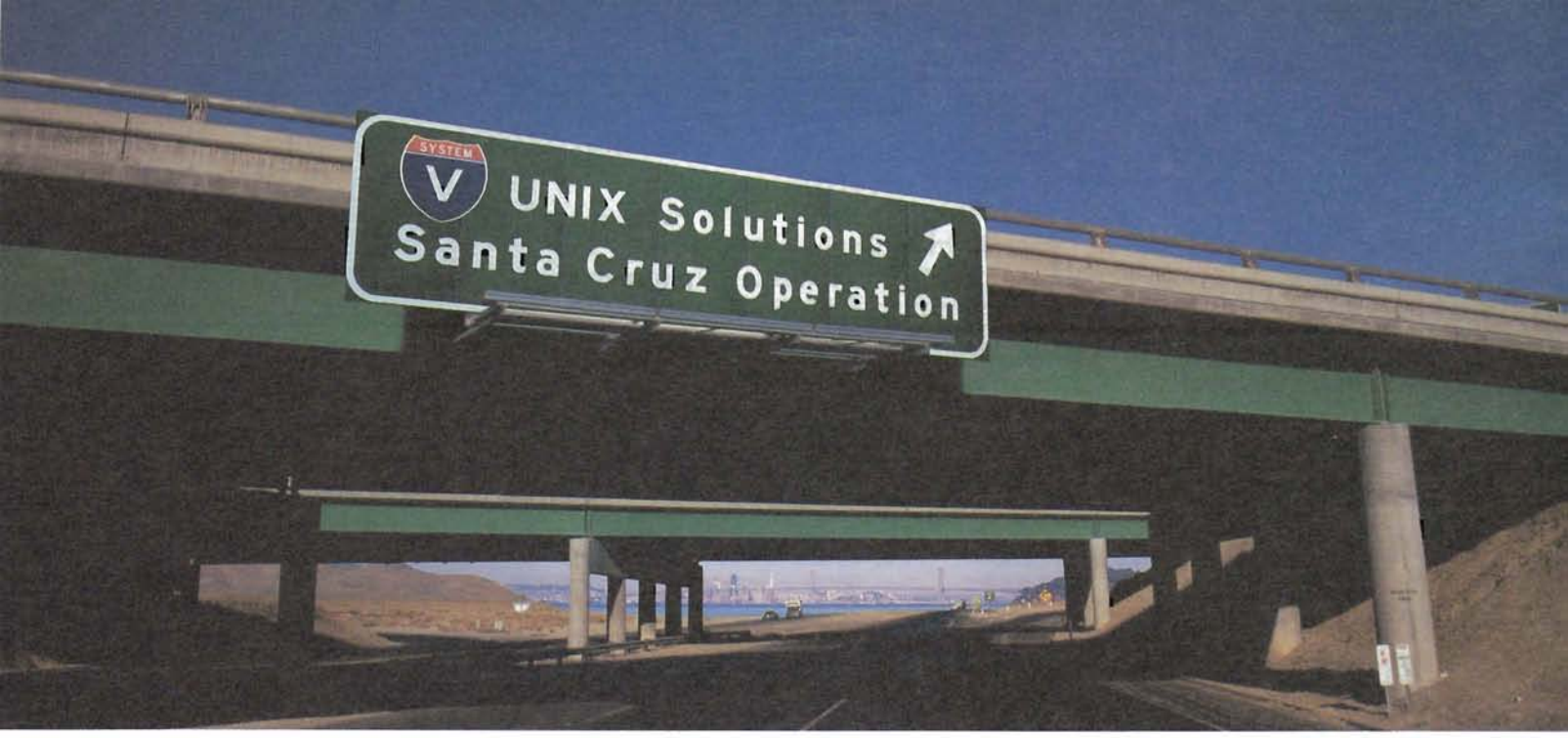
On The Cover: *If you missed the Fifth International Heath/Zenith Users' Group Conference in Chicago this year, here are a few pictures of what went on. For more coverage on HUGCON '86 turn to Page 39.*



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BUGGIN' HUG

The MDISK.DVD From MS-DOS 2

Dear HUG:

As several others have mentioned, Pat Swayne's article in the March 1985 issue of REMark has been most useful.

As one with limited knowledge in the field of assembly language programming though, I found the patch table a little confusing.

Since I don't have MS-DOS 3, and MDISK.DVD for MS-DOS 2 lacks the means to change the disk size directly, I still rely on the necessary patches to do the job.

For that reason, I developed the attached table for my use, I thought there might be others out there that could benefit from my efforts. The only difference is that this table shows the finished product and allows one to compare, within DEBUG, the actual bytes as they should appear. I am assuming that one knows how to use DEBUG or can find out elsewhere.

Additionally, I make three copies of MDISK patched for and named appropriately MDISK128, MDISK256 and MDISK384 for use with my 768k H/Z-100. My CONFIG.SYS file then boots the system according to individual system requirements. I run dBASE II and WordStar in RAM and at 8 MHz it really makes a difference.

Sincerely,

E. W. Davie
21 Juliand Street
Bainbridge, NY 13733

MDISK PATCH TABLE

	Addresses to patch					
Size	11A	11B	11C	11D	11E	11F
64k	10	00	80	00.	FF	01
128k	40	00	00	01	FF.	02.
256k	80	00	00	02	FF	03
384k	90.	00.	00	03.	FF	04.

Directory Entries	Total Sectors	FAT Sectors

	Addresses to patch		
Size	1AA	1AB	1AC
64k	00	10	33.
128k	00	20	33.
256k	00	40.	33
384k	00.	60	33.

Reserved Space

Perhaps You Will Find This Information Useful

Dear HUG:

I recently purchased a ZP-150 lap-top which works great, but the "free" ZPXFER.EXE program which came with it (CB-5063-27) would not work with my ET-100. The so-called experts at Heath had, of course, nothing constructive to say in the matter. Fortunately, I also have access to a Z-100 and, after a lot of fumbling in the dark, I was able to find that the call at 059E returned 0008 in the ET-100 and 0000 in the Z-100.

A small patch at 05A5 (JZ or NOP,NOP) and all now seems well.

I do not have any other 8088 machine, and therefore, I do not care if the program no longer runs in Brand X!

Sincerely,

William G. Lawrence
6363 Beadnell Way, Apt. 206
San Diego, CA 92117

EZ Plot Problems

Dear HUG:

I recently purchased a copy of EZ Plot (P/N 885-6003-37), a graphing program. I have been having trouble making it work. I have a Z-148 computer, with 640K RAM. I have installed a Paradise graphics board (purchased through Zenith) and a high resolution monochrome monitor (the ZVM 1240A). I operate the board in the Hercules monochrome mode, and have disabled the CGA video that came with the computer. I am reasonably certain that the video output is the cause of my problems, as the program is supposed to construct the graphs on the screen, and then do a screen dump. The program probably has a CGA video driver, but not a Hercules driver. Does anyone have a patch to make the program work? If the cure involves using DEBUG, PLEASE be detailed in your explanations, as I have no Assembly language experience.

Sincerely,

Daniel Schechter
3541 Carnation Circle
Seal Beach, CA 90740

Convert To DVORAK

Dear HUG:

I have a Zenith Z-100 computer and use MS-DOS (version 2) as the operating system. I would like to convert the keyboard to the DVORAK keyboard. I am looking for a program that will do this. I have not been able to find one. Can you tell me how I can convert the keyboard and where I can get a program that will do the conversion. I appreciate your help very much.

Thank you very much.

Sincerely yours,

Dale Woodward
Box 5033
APO New York 09179-5376

It Loses Files!

Dear HUG:

Here's an inquiry — or a warning — about using PeachText with MS-DOS 3.0 and above. It loses files!

Yes, I'm still using PeachText. Like many of you, I started with it as Magic Wand on the H-89, and found that none of the newer whiz-bang word processing packages are as flexible or do as good a job in preparing multiple customized form letters. PeachText worked well on my H-100 with Z-DOS, and also with MS-DOS 1.0 and 2.0 on the H-151 I use at the office. But then came MS-DOS 3.0, and a bug hatched.

It seems that if I end editing an old file, and want to save it to a new filename with the "END=[filename]" command, the new file usually comes up empty. It has a directory listing, but nothing in it — 0 bytes. Quick, grab the DOS disk and run CHKDISK with the "/F" switch to collect and label the lost files. Sure enough, the missing file is swept up and turned into FILE0000.CHK. Renaming it to [filename] solves the problem.

This also happens sometimes (but not always) when an old file is to be edited into a new filename, when in response to the Filename "to edit" prompt I enter OLDFILE.DOC NEWFILE.DOC. The old file stays put; the new one gets lost.

One way to solve this annoyance is to use the "X=[filename]" command to save the new file, and end the session with "quit", but it isn't easy to remember this every time. Does anyone have a solution?

Here's a tip when using Microsoft WORD on a PC-compatible (not the Z-100 version), when you are writing to a friend in Sweden and want to slash the "o" or "O". After typing the "o", press ALT and enter 008 (the ASCII backspace code), then the slash "/", and keep on with whatever you are typing. It comes out like this: Rø/f. Now if there were only some way to do an umlaut . . .

Yours truly,

George E. Bullwinkel
211 North Washington Street
Hinsdale, IL 60521

To John Bohannon

Dear John:

I noted your letter in July '86 issue of REMark.

First, I would seriously doubt whether MBASIC has any Z-80 code in it. The Heath specs for all Microsoft 8-bit products required that they run on a standard H-8 (with the original 8080 CPU).

Second, I would question that version number — it looks more like a mis-typing of your CP/M version 2.2.03, and MBASIC did not use 3-number version designations. For the H-8/89, there were versions 4.7, 4.82, and 5.21; a version for the Z-100 was 5.22.

What many of the H-8/89 Microsoft languages do is to actually check to see whether they are in fact running on an H-8 or '89. This is done by switching the Monitor ROM back in and checking a byte or two, then going back to Org 0. I have my H-8 MBASIC 5.21 running just fine on my Z-100, which would seem to indicate that it's 8080 code, and that the check can be bypassed.

I gather that you have some experience with DDT. For 5.21, patch the "OUT F2" instructions at both 5F44 and 5F57 to double NOPs. Then, patch the first JNZ 5F55 after the OUT F2 to a JMP 5F55. Exit DDT and "SAVE 96 MBASIC89.COM" to keep it. By the way, it should still work fine on an '89 at that point.

If you have a version other than 5.21, it's different addresses, of course. Be aware that this test sequence appears twice in the code, and you want to patch the *second* occurrence.

Hope this helps — if not, let me know.

Sincerely,

Al Heigl
Mill City Records
Box 3759
Minneapolis, MN 55403

Needs New Software Cassettes

Dear HUG:

I recently pulled my old H-8 out of its niche in the basement, and was delighted (Actually, it was more thrilling than the first time I turned it on!) to find out it was in perfect working condition after six years of disuse.

Unfortunately, the software tapes (yes cassettes!) appear to have faded and are no longer usable.

I have contacted Benton Harbor, but they were unable to help. Can you or any of your members supply any of the old H-8 system software in cassette form? Even a hexadecimal listing would be great.

Thank you.

Sincerely,

Jon Giorgini
1321 Cherokee Avenue
West St. Paul, MN 55118-2005

Looking For A Music Editor

Dear HUG:

Being new with Heath/Zenith both in hardware, ZF-158-42, and HUG, I was delighted with my first issue of REMark. It was read from cover to cover. Back in the 70's I bought an IMSAI 8080 kit and have been updating until being infected with Heath/Zenith.

Robert Shamo's letter shown on page 43 of the July '86 issue was very interesting wherein he is "Looking For A Music Editor". I too would like to have a copy of such a music editor when it becomes available. Playing the Organ is very relaxing.

It is nice to be aboard!

Sincerely,

Don Johnson
3139 SW Altadena Terrace
Portland, OR 97201

Thanks For The Help

Dear HUG:

You will probably all remember my inquiries regarding a music editor program. Since you were kind enough to give me leads and encouragement, I wanted to thank each of you . . .

MEI
328 E-1 1300 North
Chesterton, IN 46304

Richard List
2104 Village Drive
Pittsburgh, PA 15221

Donald Durbin, Jr.
274 Citrus Avenue
Perris, CA 92370

Daniel Ingersoll
120 Claremont Road
Oak Ridge, TN 37830

Farm Computer Center, Inc.
Michael Hulett
295 Mulberry Drive
P.O. Box 61107
Christiansburg, VA 24073
Denver, CO 61107

And also let you know that I have purchased SONGWRIGHT III.

Three of the five of you told me about this program, or its earlier versions. I received it last week and learned in no time how to use it. Does what I need done and at the reasonable price of $50.00. For those who do not know about it, you may obtain from Michael Hulett, P.O. Box 61107, Denver, CO 80206.

Thanks, everybody!

Bob Shamo
18W 665 Thirteenth Street
Lombard, IL 60148

Free Update For Flexi-Graph Users

Dear HUG:

Micro Doc and New Orleans General Data Services are pleased to announce that Flexi-Graph version 1.1 is now being shipped. All registered owners may obtain a FREE UPDATE by simply returning the Flexi-Graph distribution disks to Micro Doc, 3108 Jackson Street, Bellevue, NE 68005. The update adds support for EcoSoft C, a new routine to make it easy to produce text centered on the screen (especially when using the Hershey character fonts), corrects a number of minor errors, and provides pen-and-ink corrections to the documentation. All three distribution disks must be returned. Be sure to make backups before sending the originals. (Please call Fred Pospeschil at Micro Doc, (402) 219-0795 if you have any questions).

Yet another input on the use of the NEC V20 with the 8087.

Over the past months there have been a number of reports on using the NEC V20 CPU in the various Heath/Zenith computers. I would like to report that I have been using V20s in my machines since last summer and have not had any problems. My Z-161 is running with the Little-Lightning speed up kit which provides the V20 as part of the speedup process. I find this speedup kit to be well worth the money and was very easy to install.

My Z-120 has been running with a UCI 8 MHz speedup kit and 1.5 MByte RAM disk for over a year with an 8088. Installing an 8 MHz V20 did provide a modest performance improvement. I then added the Z-316 8087 daughter board and an 8 MHz 8087 to support the floating point math used in graphics programs. To date, I have not experienced any problems with all of these components working together. One of the additional advantages of using a V20 with the 8087 is that the V20 is low power and, therefore, does not generate as much heat as a standard 8088.

There is another aspect of the V20 which has not been reported as far as I have seen. That is — the V20 is actually an 80186 when you look at the additional instructions it provides (exclusive of also running 8080 code). Dave Troendle of NOGDS noticed this and tested it with the CI C86 compiler which has a compiler switch which causes 80186 code to be produced. He found that the same program ran about 30% faster when compiled with the 80186 switch and run on a system with a V20. This is something C86 users may find useful.

Micro Doc
Fred Pospeschil
3108 Jackson Street
Bellevue, NE 68005

More On WordStar!

Dear HUG:

When ZDS adapted WordStar to the Z-100 (not the PC version), they did us all a "favor" by removing the setting of WordStar's "default" disk from the install utility, and made the determination "automatic." Unfortunately, this "favor" completely destroyed the meaning of the "default" drive. What WordStar meant is the place to look for its overlay files, the place to look for .COM or .EXE programs to run using the R command from the Main Menu, and where to look to reload itself after "R"unning another program. What Zenith gave us was a call to DOS function 19h which determines the *current* drive. They then plug this value into the location 2DC (known in CP/M versions of WordStar as DEFDSK). It is this "feature" of the Zenith WordStar which makes it impossible to invoke, for instance, a WordStar which resides with its overlays on the A: drive from DOS when sitting on the B: drive. To edit files on B:, it is necessary to switch to A:, invoke WordStar, and then either change the logged drive or prefix any filename by B:. Though inconvenient, this is at least tolerable.

The real problem arises when the poor user graduates to a hard disk or even a RAM disk. Because WordStar doesn't know about subdirectories, it can only operate in the current directory on any given drive, and for Zenith's "default" drive to function, that must be the subdirectory in which WordStar and its overlays reside. So, if you have a 20 Meg hard disk partitioned as, for example E:, and you place WordStar in E:\WP, you can forget about editing files anywhere else on the 20 Megs! If you access WordStar via a PATH, it will complain that it can't find its overlays. If you use a .BAT file to CD to subdirectory WP, you have no way to edit files in any other subdirectory on E:. Enter the CD.EXE utility by Joseph Katz in REMark Vol. 7, No. 4. After placing it in the WordStar directory, it will allow you to change subdirectories, but as soon as you do so, WordStar will no longer be able to find its overlays! So far, all of this is "standard" WordStar. The solution (in MS-DOS 2) is to place WordStar on its own drive (read partition for a hard disk!) and then use a .BAT file to switch to it, and change the logged disk to wherever you want, as with floppies. Of course, for a large hard disk this can be wasteful.

Along comes the SUBST command in MS-DOS 3, and one might think all your troubles are gone. Just, for example, SUBST D: E:\WP, and now put D:\ in your path and hope for the best. But here's where ZDS strikes again! It's really the same problem, because you still can't invoke WordStar from anywhere but D:, and so still need a .BAT file to get you there!

The real solution is to just undo Zenith's "favor" once and for all. This turns out to be quite straightforward because the code needed to do it fits exactly into the offending few locations. For reasons unknown to me, Zenith has duplicated the overlay file-

names deep down in its customization code, (this code seems to be related to "R"unning a program, although no such code exists in the PC version, and it works fine!) and these locations must have DEFDSK attached to them as well.

Using DEBUG (as usual on a COPY of WS.COM, not the original!) carry out the following few changes. The addresses given below are appropriate to WordStar Version 3.30 as distributed by Heath/Zenith for the Z-100. For safety's sake, I suggest you first use DEBUG to "U"nassemble the code at 55BA to make sure your addresses are the same as mine. You should find

```
MOV AH,19
INT 21
MOV [02DC],AL
```

If you don't, do a search for this code using the DEBUG Search command

```
S 100 L 7341 B4 19 CD 21 A2 DC 02
```

and use the address returned to you in place of 55BA below. In the listing below, "xxxx" represents the segment address of the code loaded by DEBUG and will depend on the configuration of your machine and how many resident programs (like PSC or PRINT) you have loaded. Only the offset addresses following the ":" are significant. "??" represents a number corresponding to the drive you will install WordStar and its overlays on. For example, if you use the MS-DOS 3 SUBST command to attach WordStar's directory to D:, ?? = 4; if you use RAMDRIVE J:, ?? = 0A (decimal 10). DON'T type in the comments to the right of the changes, nor the "-" which is the DEBUG prompt.

```
d>DEBUG WS.COM
-E 2DC ??                  Set DEFDSK;  01=A:, 02=B:,     ,
                             0A=J:,
-A 55BA                    Enter DEBUG's Assemble mode
                             at loc 55BA
xxxx:55BA MOV AL,[2DC]     Replace Zenith code with something
                             which works!
xxxx:55BD MOV [6CE4],AL
xxxx:55C0 MOV [6D09],AL
xxxx:55C3                  You must enter a blank line to
                             exit "A" mode
-W                         Write out your new version
7341 bytes written.        DEBUG's response to the Write
                             command
-Q                         Quit to DOS
```

If you have more than one version of WS with different configurations, you may want to put the above (without the "-" and addresses) in a file, for example, FIXWS.DAT, and then invoke it for all your WS.COM's as follows (don't forget the blank line before the W, and put a <CR> after the Q):

```
DEBUG WS1.COM < FIXWS.DAT
DEBUG WS2.COM < FIXWS.DAT
```

I've found that these changes make WordStar as easy to use on the Z-100 as it is on the old CP/M machines, or on PCs! It's too bad it took me 3 years to get around to doing it, but SUBST was the last straw!

Sincerely,

Howard Rubin
229 N. Taylor Avenue
Oak Park, IL 60302

Mouse Pack

Dear HUG:

I especially enjoyed Jerry Furst's review of Paul Herman's MOUSE PACK, which ran in REMark, Vol. 7, Issue 5, Page 25. I've been wishing I had a mouse for several applications, so I was eager to try Mr. Herman's product. I called him and found that he will sell the MOUSE PACK software, the Logitech Logimouse C-7, and/or Doodler in any combination. His mouse-only price is about $5.00 off list, I believe.

One interesting addition to the article: Mr. Herman's software uses the default settings of the Logimouse C-7, and doesn't give you the ability to change the mouse parameters. Some programs require other parameters (baud rate, report rate, data format), and they are resettable from their default values by simply sending appropriate codes to the mouse. Doing that can be a trick, however!

What I did was this: I needed to change the baud rate. My mouse is attached to J-1, serial port "A" on the Z-100. The codes for baud rates are "*n" = 1200 baud, "*o" = 2400 baud, "*p" = 4800 baud, and "*" = 9600 baud. But how to get the code to J-1?

Here's a procedure that works:

1. CONFIGUR the PRN device to option E: DIABLO 630/640. That's a 1200 baud serial printer, attached to J-1. You need a 1200 baud printer, because that's the mouse's default baud rate.
2. Somehow, write the appropriate code to the PRN device — I used ZBASIC, LPRINT "*q", SYSTEM.
3. Re-CONFIGUR your PRN device to the way you had it.
4. If you unplug the mouse from the port for a few seconds it will revert to the default settings.

That way works, but I'd imagine that there's a lot better way to write to J-1 than reconfiguring the whole machine . . . Couldn't someone of the really smart members give us an assembly listing for an EXE file to do the job? Say a file named "B12.EXE" and another named "B96.EXE" so that we could just run them and effect the changes. Or better yet, one command which would accept appended arguments designating which of the parameters to change and to what . . .

By the way, for assistance with the Logimouse call Karen at (800) 552-8885 (Logitech Technical Support). She's very knowledgeable and helpful.

Milton H. Bank, II
P.O. Box 8668, NPS Station
Monterey, CA 93943

Additional Information

Dear HUG:

Here's a modification to my letter to you. This super modification should be credited to Mr. William H. Schuette, who suggested it in BUSS #123.

Instead of my suggested way to write "*q" to J-1 (clumsy, very clumsy in comparison!), instead of my procedural step 2 do this:

2a. Somehow create a file called "9600.CMD" which contains only the two characters "*q". You could use WordStar in the

Continued on Page 80

Getting The Most Out Of Hierarchial Directories

Part 2

Eric L. Pang
1530 Nehoa Street
Honolulu, HI 96822

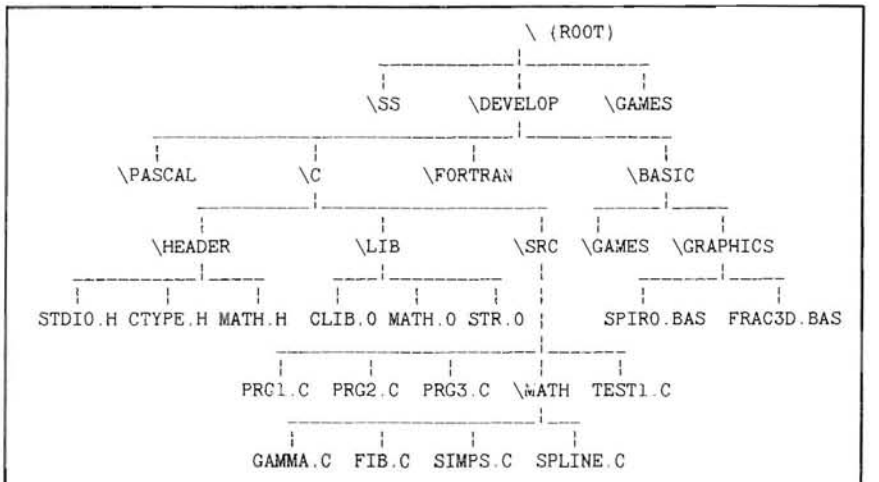


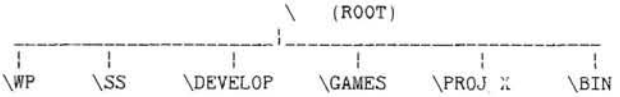
Figure 1
A hierarchial directory structure, with subdirectories and files, for program development.

Introduction

In a previous article, I discussed hierarchial directories under MS-DOS. In this article, I will present ideas on organizing files and programs within the hierarchial structure. Although you may not have enough room on a floppy disk to implement the complete directory structure presented here, a floppy disk-based system can also benefit greatly from having files organized in a hierarchial manner, with perhaps different branches of the "tree" residing on different diskettes.

Setting Up The Subdirectories

We want to set up subdirectories so we can organize and come to grips with files and programs we will have to deal with. Let's start off by creating the "obvious" subdirectories: 1) word processing, 2) spreadsheet, 4) program development and 3) games. We will have another directory to hold files for a project we are working on and a final directory for all our executable files (or "transient commands" as called by the makers of MS-DOS).



The first subdirectory, \WP, will contain all our word processing text files, e.g. letters, memos, etc. Further subdirectories could be created under \WP to handle these files more efficiently, such as having one subdirectory for correspondence or correspondence with a particular company and another for interoffice memoranda, e.g.

```
\WP\ATT    \WP\IBM    \WP\MEMO    \WP\LETTERS    \WP\MISC
```

The second subdirectory, \SS, would contain all spreadsheet work sheets and templates.

\DEVELOP is a big subdirectory which includes source code for all the programs we are working on. \DEVELOP will be further divided according to development language and type of program. A diagram of this subdirectory is shown in Figure 1. In this figure, there are subdirectories for \PASCAL, \C, \FORTRAN and \BASIC. As a representative subdirectory, let's examine \C a little more closely.

\C contains three subdirectories, \HEADER which contains various header and include files, \LIB which contains compiled C modules and libraries, and \SRC which holds the program source code. Under subdirectory \SRC is another subdirectory, \MATH, which contains source code for a number of mathematical routines and functions. An example of how these files can work together, a program may have these statements at the beginning of a program,

```
#include "\develop\c\header\stdio.h"
#include "\develop\c\header\math.h"
#include "\develop\c\src\math\gamma.c"
#include "\develop\c\src\math\spline.c"
```

and use the following command to compile and link it

```
cc -O prg1.c   ./lib/clib   ./lib/math
```

Similar subdirectory structures can be created for the other programming languages you have

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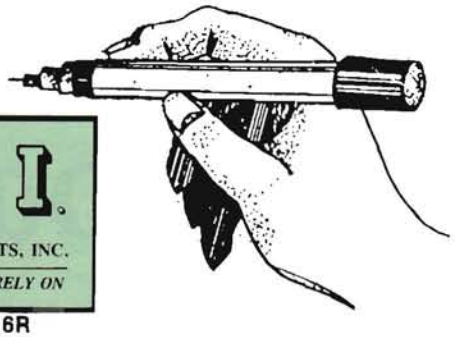

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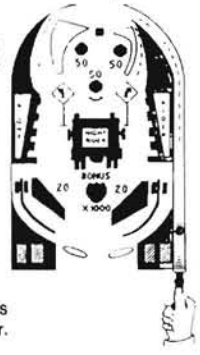

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You may have noticed that the root directory contains a subdirectory for games while \BASIC also contains a subdirectory for games. The idea here is that in the development stage, the game program is kept under \DEVELOP\BASIC\GAMES. After the program is debugged, the program is copied from \DEVELOP\BASIC\GAMES to \GAMES.

\PROJ__X is a "heterogeneous" directory that contains different types of files, text files, spreadsheet files, programs and source code. Instead of keeping them in their respective directories, \WP, \SS and \DEVELOP, it would make file management for this project much easier if they were kept under their own directory. Files under \PROJ__X could be organized in the manner shown in Figure 2.

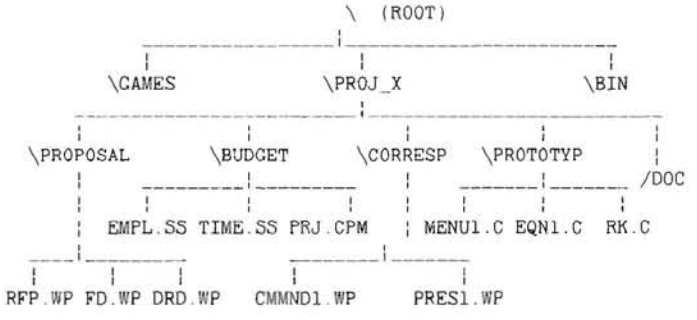

Figure 2
Directories and files contained under subdirectory PROJ-X.

Although the majority of the contents in \PROJ__X\PROPOSAL would contain text files, portions of a spreadsheet or source could also be included from other subdirectories. \PROJ__X \PROTOTYP could contain a mix of source code, binary files and documentation. As you can see, there is no hard and fast rule governing how directories are set up and what is contained within them (e.g. strictly work processing).

So far, I have not mentioned which directories will contain the word processor, spreadsheet program or compilers. The subdirectory \BIN, which is short for binary, will contain these programs and the majority of the other commands and utilities. Although it may seem logical at first to put the word processing program under \WP, you saw several occasions where the word processor could also be used for editing source code, project proposals and program documentation. The spreadsheet program is used by templates in both \SS and \PROJ__X\BUDGET If you develop programs, you would not want to have one copy of the linker under \C and another under \FORTRAN, nor would you want to have one copy of BASIC under \GAMES and another for development work. Therefore, even though we took time to lay out our directory structure in order to bring organization to our working files, it would actually be more simple, efficient and expedient to keep all our executable programs lumped together in one subdirectory, \BIN.

Accessing The Programs And Executable Code

We now have put our subdirectory hierarchy in place and an idea of the types of files we will be dealing with and where they will reside. Again, all our application programs will reside in \BIN.

Because of the complexity involved with manipulating files in a hierarchial directory structure (remember, the full file specification for any given file must include its path, e.g. "\develop\c\src \math\gamma.c"), a number of MS-DOS commands are available to make our work (i.e. typing) a little easier.

The first command is CHDIR (or CD) and is used to specify the path name for files in a given directory on a given drive. For example "CHDIR \develop\c\scr\math" would change the current working directory to the C math subdirectory on the currently logged drive, and any files under this directory can be accessed by simply typing its "short" file name.

MS-DOS transient commands (executable programs) do not adhere to this method though. Instead, the PATH command is used. This command tells MS-DOS where to look for the transient command files if it is not found in the current working directory. The syntax for this command is,

```
PATH [d:] [pathname] [;[d:]pathname]    ]
```

where "d:" is an optional drive designation and "pathname" is the name of the subdirectory where the command can be found. Additional paths can be constructed by separating them with a semicolon, e.g.

```
PATH I:\;I:\BIN;I:\DEVELOP\C;J:\
```

If MS-DOS cannot find the executable program or transient command file in the currently logged drive and directory, it will search for the file in the root directory on drive I:. If the file is not found here, subdirectory \BIN on drive I: is searched. If the command cannot be found, it will keep searching the PATH, as \DEVELOP\C on drive I: is next on the list. As a last resort, drive J: is searched. An error message is displayed if the command is not found after this last attempt. Typing the PATH command by itself will display the current path setting.

In our example, we would want to set the path to \BIN. This can be accomplished by typing

```
PATH \BIN
```

at the MS-DOS prompt or including it in a batch file, such as AUTOEXEC.BAT. Thus, we can move to and set the subdirectory of a particular disk drive with the CHDIR command and have MSDOS search a list of subdirectories specified by PATH in order to find our executable programs.

Caveat

One problem with MS-DOS, or with the writers of MS-DOS software, is that applications which use overlays, such as some word processors and database packages, cannot use PATH to find the location of their overlays, nor do the applications check the MS-DOS "environment" to determine the PATH setting.

That is, although we can run our word processor from any subdirectory thanks to PATH, the word processor will complain of not having access to its overlay files. The only way to correct this problem is to have copies of the overlay files in every subdirectory that the application will run. This, of course, defeats the purpose of having hierarchial directories and spending time organizing our files (back to good old CP/M and ZCPR).

To overcome this deficiency of MS-DOS, two commercial products are available. One product is FilePath 3.0 by SDA Associates, P.O. Box 36152, San Jose, CA 95158 (408) 281-7747 at $37.50. The other is SuperPATH by Martin Scot Development Corporation, 4515 Purdue N.E., Seattle, WA 98105 (206) 527-9605 at $39.95. I have heard of a similar public domain program, but do not know its name or where to find it.

The idea behind these commands is that you can specify the subdirectories where MS-DOS should look for your transient commands or programs in a similar way you would use PATH, e.g.

```
SPATH I:\;I:\BIN
```

for SuperPATH, but as an added bonus, overlay files and regular files will be found, too. This means duplicate copies of your overlay files are not required. Program development will also be easier. Using C example above, SuperPATH will now allow us to write,

```
#include "stdio.h"
#include "math.h"
#include "gamma.c"
#include "spline.c"
```

and the find the desired files no matter what directory we were in or where the files reside (by intercepting DOS open file, file size and exec calls). Included in the SuperPATH package are a number of other programs, including an extended directory program, a program to display your directory tree and a program to rename directories. These commands can be run from disk or made resident in memory.

Summary

This article was not meant to be the definitive way of setting up hierarchial directories. I wanted to give you some points to consider in deciding what directories can be created and ideas on how you could set the tree up. The MS-DOS commands, CHDIR and PATH, were briefly discussed. To fully use the power and convenience of hierarchial directories, a deficiency in the way MS-DOS and MS-DOS software handle program overlay files was brought up. Although the solution would be to have copies of the overlays in strategic subdirectories, this defeats the purpose of setting up hierarchial directories in the first place. Two commercial products were mentioned that solve this problem with overlays.

. . . if you don't need this, then forget it.

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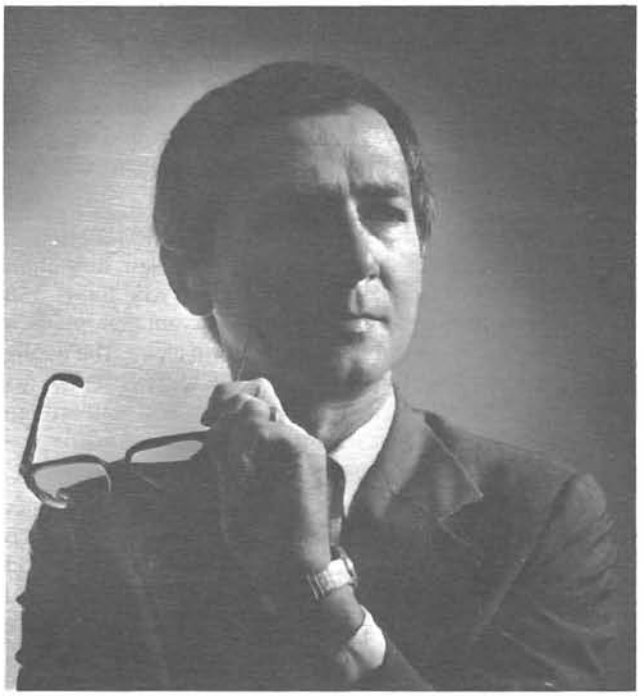


Mainstream Computing

Joseph Katz
103 South Edisto Avenue
Columbia, SC 29205

Last month I began describing some modifications that made my H-158 more capable in my work right now. It's not intended as a model for you to follow, only as an example of two points I wish you'd consider if you haven't already. The first is that you ought to reassess your microcomputing situation periodically. Mine changes from time to time. Yours might too. My second point is that you ought to do your reassessment in light of current hardware developments. Sometimes when my situation changes there are reasonably-priced ways to make my computers do better for me. Your reasonable expenditures might be repaid as handsomely. They can increase your equipment's productivity and prolong its useful life. That's what I tried recently with my H-158.

As I said last month, it now has 1 MB of RAM on Boca Research's inexpensive *BOCARAM* Expanded Memory board, one 30 MB Seagate fixed hard disk, a SyQuest hard disk drive with four removable hard disk cartridges, and an Adaptec controller that uses 2,7 RLL (Run Length Limited) encoding to pack 50% more data on the hard disk drives than they otherwise could hold. I talked about all that last month.

This month I'll finish with explanations of how I put two floppy diskette drives, a high resolution monochrome monitor, and a faster microprocessor in the H-158. Then, to illustrate the point that you really do have to keep in touch with hardware developments, I'll show you how Software Wizardry's new *WildFire* just made my slow Z-152 slightly faster than my souped up H-158. I probably won't shuffle all the other improvements from the H-158 to the Z-152, however. The H-158 right now does what I need. I do wish, however, that the cases on my machines had something like zippers instead of screws.

Two Floppies

Adding a second floppy diskette drive to my H-158 was easy, but not so easy as adding the second hard disk drive. As I said last month, there's room in the H-158's drive cage for three half-height drives of either kind. I used two of the slots for hard drives, which left space for only one internal floppy diskette drive.

I wanted a second floppy diskette drive to make copying diskettes easier. Since I use several different machines, I often have to do diskette-to-diskette copies as the way to get programs and data from one machine to another. Some of those machines, moreover, use different diskette formats. As I said in August, I've been using Micro Interface's *RUNCPM Z80* to transfer data from my Kaypro 4-84, a CP/M machine, to one of the MS-DOS computers. In either case, with only the standard single floppy diskette drive I had to transfer from the original floppy to the hard disk, then from the hard disk to the copy floppy. Sure, it's possible to copy from Drive A to Drive B when there's only one physical drive in the machine. It's also slow and tedious, requiring several swaps of the two diskettes in and out of the one drive. I think the nuisance is big enough to make the cost of a second drive seem very low.

Because there was no room in the machine for a second floppy diskette drive after I put in the two hard disk drives, I made the second floppy drive external. It's in a separate cabinet with its own power supply, a combination that came from Ray Massa's Studio Computers. I also picked up a substitute for the floppy drive connecting cable that came with the H-158. Two of the three connectors on the substitute are the same as on the original: one connects to the floppy diskette drive controller, the other to the internal floppy drive. Where the original cable continues a few inches and terminates with a connector for a second drive, this substitute goes several inches more to a male plug similar to the one on the controller. This plug fits into a holder that screws to the cabinet in place of one of its bianks. I have another cable with the proper female connectors on each end: one end goes into that plug on the computer, the other fits onto an edge connector projecting from the external drive's cabinet. That way I can unplug the drive from both ends whenever I need to shift things for cleaning. The setup sounds klutzy but it's not, nor does it look too

bad either: the cable is tucked neatly out of the way and the cabinet is a light tan that sort of complements the colors on the H-158.

If you add a second floppy drive to your computer, remember to configure both drives properly. First set the jumpers on each drive to identify the internal as Drive A and the external as Drive B. Then remove the terminating resistor from the first drive and make sure there is a terminating resistor on the second. The last, and only the last, floppy diskette drive in a series must have a terminator. Yes, I know there's a terminator on the last hard disk drive too, but the floppy diskette drives and hard disk drives are treated as different series. The last drive in each series must be terminated. Don't look to me for specific instructions on how to do all this with your specific drives. Each brand and model has its own system. If you need instructions because you don't have experience doing this kind of thing, you need the help of your dealer.

I tend to trust the advice of any dealer who specializes in Heath and Zenith equipment and advertises regularly in the Heath- and Zenith-specific magazines. You might find things getting complicated awfully fast if you need advice from a dealer not familiar with your kind of machine, especially if you need it by phone. Remember that these compatibles are functional equivalents of the rest but, like all the rest, have their own peculiarities. A dealer who specializes in Heath/Zenith equipment has both the experience and the motivation to help with it. They know their stuff and they conduct business in a well-defined community in which reputation is important. One reason why you can find cheaper prices from many bargain mail order dealers is they usually don't sell you knowledge, experience, or support. If you need it, expect to pay for it. And if you're not reasonably familiar with computer tinkering, expect problems when you try modifying your machine. I'm sure you'll be reasonable in your expectations and realistic in your approach. I'm not trying to pitch Heath/Zenith dealers now. In fact, the small profit they'll make on what you need for adding a second floppy drive will disappear immediately if they have to spend any time talking you through its installation.

A High Resolution Monochrome Monitor

You shouldn't have any problem or need any help installing a high resolution monochrome monitor and high resolution monochrome adaptor board. All you do is slide the board into a vacant slot on the backplane and plug the monitor into the jack on the board. The instructions with Zenith's monitor and board also direct you to set a DIP switch on the CPU board: Switch 2 on SW202 goes to the "off" position. I did, but you don't have to. The switch instructs the computer about what to do when it boots, whether to boot to the monochrome or the CGA (Color Graphics Adaptor) display. If your work, like mine, involves mostly word processing or other manipulation of text, you probably will be using mostly the monochrome display. In that case it seems to make sense to enable it as soon as the computer boots. I did. If you have some reason for wanting the initial display to appear on the CGA's monitor, don't change the standard switch setting. It's easy enough to switch displays with your software later.

I hope you're not as confused by that paragraph as I would have been years ago. My mistakes were the result of ignorance initially and obstinacy later. In the very beginning of my career with compatibles, when they were new and things were murky, I assumed there was no difference between the monochrome monitor you could use on a CGA (Color Graphics Adaptor) board and the monochrome monitor you plugged into a Monochrome Adaptor. There's a big difference. Then, when I knew that there was at least some difference between the two, I thought that any differences would be insignificant practically. Sure, I knew that the CGA was a compromise and that the monochrome display was supposed to be better for working with text. But I thought that these differences existed mostly in the realm of theory.

Gad, what an idiot I was. There I sat, hour after hour almost every day for years, working with a fuzzy display just so I could save some money on what I thought was a frill. My eyes hurt and my back ached after a few hours into a session, and I became irritable. But real men don't use real monochrome, I thought.

Finally (it took years) I had the opportunity to get a *ZVM-1240* high resolution monochrome monitor and *Z-329* high resolution Monochrome Adaptor card. Since I was fiddling with the H-158 anyway, I figured to take even theoretical advantages. What a difference! Instead of fuzzy little characters and always the wrong contrast, I see sharp, crisp, well-formed letters and numbers. Less eyestrain. Fewer backaches. The major reason is that there are more dots to make each character than there are with a monochrome display on the CGA board.

You can't use a high resolution monochrome display with graphics software, but Zenith computers are built so you don't have to make an exclusive choice. The CGA is built into the computer and you leave it in: you have no choice. By all means leave on your old monitor too: you have the choice of removing it, but leave it on the system in case you want to use any software that displays graphics. Your Heath/Zenith compatible is designed for this extraordinary kind of flexibility, so why not take advantage of it. Then add the Monochrome Adaptor board and plug in its monitor. Many graphics programs (such as *PC Storyboard*) will switch to the CGA board and its monitor automatically when they are run and return to the Monochrome Adaptor and its monitor when they are exited. Other programs (*Fontasy*, for example) require manual switching. All it involves is the command MODE CO80 before you run the program: I have batch files that first set the mode and then run such a program.

I won't willingly go back to word processing with a CGA display now that I have been using the high resolution monochrome display. If your work involves long sessions of staring at text on a monitor, spring for high resolution monochrome. You'll thank me for nagging you to do it.

A Faster Microprocessor

It cost me around $20 to boost my H-158 from a 1.5 to a 2.6 Performance Index on the *SYSINFO* program in Peter Norton's *Norton Utilities*. All I did was replace the 8088-2 Intel microprocessor with an 8 MHz NEC V-20 microprocessor. The 8088-2 is on the CPU (Central Processing Unit) board, which is the second board from the left of the power supply if you followed the instructions for building the H-158 from a Heathkit. The board probably is in the same position if you have a Z-158 instead, or bought an assembled H-158, but in any case it's clearly marked. Heathkit builders have some big advantages when modifying their equipment. They are familiar with its innards and they are supplied with the *Service Data Manual*. The 8088-2 is in socket U-238. Replace that chip with the 8 MHz NEC V-20, making sure that the notch in the chip points the same way as the notch in the socket. Make sure, too, to handle the chips properly, as explained in the Heathkit assembly booklet. Then reassemble and reboot the computer. With the clock switch in its "out" position so the machine is running at 8 MHz, you'll be flying — relatively speaking.

Don't fool yourself. Benchmarks rarely measure general performance. Unless your kind of work involves whatever a benchmark

measures, there's no necessary relationship between it and real performance. Even someone with modest programming abilities can cook a benchmark to prove anything at all: I can whip up one that demonstrates the superiority of a TRS-80 Model I to a Cray. A quick disassembly of SYSINFO.COM shows it calculates the Performance Index based on multiply and divide instructions compared with how fast they are done on a stock 4.77 MHz IBM PC. Since it's not possible to use a compatible with only those instructions, Norton's Performance Index — like most benchmarks — is not useful as a general measurement. I've mentioned it here only because some readers would wonder if I hadn't. Your real work is your best benchmark, I think. Most of the programs I use daily run perceptibly faster on the NEC V-20 than on the 8088-2. My sense is that the modified H-158 works about 20-30% faster on what I do because of the V-20. It seems well worth the chip's modest price.

I've noticed only two quirks as a result of this modification. One is trouble when booting the H-158 at its faster clock speed. So I don't. I boot the computer with the speed switch in, then release it once the computer is running. If you make the chip replacement and have trouble rebooting, chances are the clock speed switch was out. Push it in before you reboot. The second quirk is not much more than that: a quirk. The V-20 runs faster than the 8088-2 even at the H-158's slow speed, so there's no way to run this machine at 4.77 MHz now. I don't care.

WildFire Is Hot

Software Wizardry's *WildFire* arrived after I put the H-158 back together and while I was polishing this column. I dropped everything to install *WildFire* in my Z-152. Then I decided to revise this part of the column to include my reactions to *WildFire*. The coincidence of its arrival with what I have been talking about so far was too good to pass up.

I did my major modifications to my H-158 instead of my Z-152 because the 158 represents the later generation of compatibles, designed for either a 4.77 MHz or 8 MHz clock speed. It's inherently faster than the Z-152, and therefore, was the more likely candidate for modification: my anticipated payback was greater. The Z-152 represents the earlier generation of compatibles designed to run at the standard 4.77 MHz speed of the original IBM PC. I already had souped it up to the extent I thought safe for its kind of machine. Soon after the 5 MHz version of NEC's V-20 became available, I substituted one for the Z-152's Intel 8088 microprocessor. I was happy with the speed increase. The Norton Performance Index of my stock Z-152 was 1.0, exactly the same as the original PC. With the 5 MHz V-20 in place, the Performance Index went to 1.7, which supposedly makes the modified 152 about 70% faster than the original PC. I guess it really was 20-30% faster, and I was happy.

Now *WildFire* puts my simple little modification to shame. It boosts the top speed of the Z-152 to a Performance Index of 2.8 — supposedly about 1.8 times faster than the original PC, slightly less than twice as fast as the top speed on a stock Z-158, and a tad faster than the top speed on my souped-up Z-158. Sigh.

I can't compare the performance of *WildFire* to other speed modifications of the Z-152 because I haven't tried any. You'll probably laugh a lot at my reasoning if you're a hardware engineer. It's my very own reasoning, however, and I'm stuck with it. What I think is that Zenith introduced the Z-151 and Z-152 as 100% compatibles at a time when neither more nor less than strict adherence to IBM's standards was the absolute requirement for selling a mainstream computer. Z-100 owners had been asking "Why won't all that IBM software run on my Z-100?" Zenith's evident goal was to make a machine about which no one could ask that question. That's one reason why, according to my understanding of history, there were many revisions of the 150's ROM early on: to make it meet a compatibility standard. So, my reasoning goes, the machine's designers would not stray unnecessarily from the standard. Since 4.77 MHz was part of the standard, and since the machine's designers could not be sure of side effects if they departed from it, I've never even tried replacing the 8088 with an 8 MHz V-20 or experimented with any of the commercial modifications that just jacked up the clock speed to around 8 MHz. I suspect there are more sophisticated modifications than that kind available for the Z-152 but I haven't had the opportunity to see any.

Although *WildFire* includes an 8 MHz V-20 replacement microprocessor and support for its faster clock speed, its approach seems to go beyond that of a simple speed fix into the realm of performance modification. I guess it's like the difference between doping a horse before a race and training him throughout his career.

WildFire comes in a black plastic box holding an instruction booklet, a front panel with switches, a slim ribbon cable, a small piggyback circuit board, and nine chips. You take the cover off the computer and loosen its bezel (the decorative plastic thing that has the Heath or Zenith nameplate). The ribbon cable connects *WildFire*'s switchplate to the piggyback board, and snakes behind the bezel so most of it is concealed after the computer is back together again. Only the CPU (Central Processing Unit) board in the computer needs to be worked on. You slip it out of the backplane and replace nine chips with those supplied with *WildFire*. Then you remove a tenth chip and snap the piggyback board into its socket. Since *WildFire* uses a piggyback instead of a separate board, it doesn't require a slot of its own. Reassemble the computer, stick the *WildFire* front panel somewhere nice on the bezel (there's adhesive on the back of the front panel), and you're finished.

The instruction booklet I received with my *WildFire* was marked "preliminary" on every page. Even so, it was relatively clear. I made only a couple of mistakes, neither of which was more than a temporary nuisance.

At some point I had put a 5 MHz 8087 Numeric Data Processor in the Z-152. Of course it had to be removed because now the Z-152 would be an 8 MHz machine. The instruction booklet says so plainly. I removed the chip. But, presumably on the principle that any dolt should not need reminding, the preliminary manual offers no reminder to reset the dip switch on the CPU board to tell the computer it no longer has the 8087. Well I'm not just any dolt. I didn't remember, and the result was a message declaring a non-maskable interrupt error accompanying every action of the computer. Then I remembered the switch and reset it. But the error message remained when I rebooted.

Unfortunately for him, Tom Jorgenson picked that time to telephone to ask if I had received *WildFire* and if so what were my initial reactions. When I mentioned the NMI error, he gasped and called Dale Wilson to the phone so the three of us could counsel together. I explained my machine's initial configuration and began to track what I had done in the installation. "And then I reset Switch 2 on DIP Switch 2 to indicate there was no NDP.. .." "You mean DIP Switch 1, right?" asked Dale. "Err, umm, hold the phone" I said and dashed to the computer. I got DIP Switch 2 back to its original setting, set DIP Switch 1 instead, and rebooted. No

NMI errors. To show you I have character, I made no attempt whatsoever to conceal my mistake. I simply dashed back to the phone and explained to Dale that my orientation as an English professor was letters, not numbers, and went on to explain how the world would be less confusing if Zenith had called them DIP Switch A and B. Dale didn't sigh more than once or twice before agreeing. He has character. "That's why it's a preliminary manual," he said slowly. "We'll revise it to make the instructions absolutely foolproof." I'm not sure what he meant by that.

Aside from the time spent straightening out my *gaffe* in setting the wrong DIP switch, installation took about half a leisurely hour. The instructions are good enough and *WildFire* is planned carefully enough so it's a simple modification to install. Almost anyone can do it, I think. About the only thing I don't like is the permanent adhesive used to stick its front panel to the bezel. Although the modification itself is reversible, installation of the front panel isn't. That panel would be next to impossible to remove undamaged. The instructions agree. So I left the backing paper on the adhesive and used double-sided foam tape to stick the panel to the computer. Such tape comes as standard equipment when you marry a graphics artist, or you can buy some — tape, not artists — cheaply at an artists' supply store. If we want to deinstall *WildFire*, I'll probably have to peel tape residue from the computer but that's a less unappealing prospect than destroying the panel.

We've been using the *WildFire*-modified Z-152 for only a few days now, but of course I've tried it with a variety of different kinds of applications software. Benchmarks are fun, but they don't measure performance during real work. *WildFire* does very well at the kind of real work we do. *NewWord 3*, the *WordStar* descendant, loaded respectably but not quickly on a Z-152 at the stock 4.77 MHz. With *WildFire* it loads quickly. Jumping from one end of a long document to the other also goes much quicker now. *XyWrite III*, on the other hand, is recognized as the fastest word processing program available for compatibles. I agree, with just one exception: the hyphenation dictionary, required for justifying text, takes so long to load on a stock Z-152 that it makes me cry. Although *WildFire* does not completely remove that bottleneck, it's now not so much an obstruction. There's only one way to describe its speed after *XyWrite* finishes loading on the modified Z-152: instantaneous. Everything happens *now*, the way things should happen in a word processing program.

Complex graphics software isn't really a fair test of a modification like *WildFire*, so of course I tried it. The results were surprising. We liked *PC Storyboard*'s response on the stock Z-152; on *WildFire* we like it much, much more. It snaps. *Freelance*, a top-selling presentation graphics program, had been quick in everything except redrawing the screen whenever we loaded a picture. That function was agonizingly slow, which was why we had put an 8087 in the Z-152: to speed up the display for graphics programs. *Freelance*'s performance on *WildFire* is good enough so I'm not in panic haste to get an 8 MHz 8087 in the machine. I will get one, but this program is now usable without an NDP. Others might be too. All of them ought to perform close to their peak with the combination of *WildFire* and an 8 MHz 8087. Maybe Software Wizardry ought to offer a special deal on such a graphics pack? My expectation is that when we try an Expanded Memory Board such as *BOCARAM* in the *WildFire* Z-152, Microsoft *Windows* will be useful too. I haven't tried the combination yet, but that's been my experience with my now-slightly-slower (I can't believe I said that) H-158.

WildFire is aptly named: it makes my Z-152 run like wildfire, with a speed I find incredible even though I see it happening. The old 152 thinks it's a new 158.

I haven't had any problems at all with *WildFire*. Of course, I haven't had time to really wring it out yet. There'll be time, and I'll let you know if any problems develop. I must say I don't anticipate any problems. One reason is my experience of Software Wizardry, which shows they are more conservative than even I am. I've not known them to rush a product to market. Another reason is that I did some awful things to the *WildFire* displayed at HUGCON: I had prepared a disk full of nasty programs, including PC Tech Journal's suite of exercises for ATs running at 8 MHz with an 80287 Numeric Data Processor. (Jeff Soliday, *WildFire*'s designer, got back at me by rerunning the benchmarks after adding an 8 MHz 8087 to *WildFire*. The Z-152 scored something like 1-1/2 times the speed of the *AT*. Of course it doesn't really. So much for benchmarks. The real moral of this story is, don't fool around with Jeff Soliday.) The *WildFire* on display ran all day every day the exhibit area was open, and anyone who wanted to play with it was free to do so. I didn't see it fail.

There's one circumstance — not a problem — you ought to know if you've never used a fast PC. You know all about it if you own a Z-158 or Z-241 because you encounter the same circumstance. Some software assumes that the machine runs at 4.77 MHz and depends on that assumption for timing. Many games, especially public domain games, are based on the assumption. You may recall my saying, a while back, that the monsters always won when I played *PACMAN* on my Z-152 after I put in the 5 MHz V-20: the machine went too fast for the game's assumptions. You'll have problems running software that makes such an assumption. But good professionally-written software, especially things produced in the past year or so, checks its environment for any conditions on which it absolutely depends. You oughtn't to have trouble with that kind of software. The rest will be a problem because of the inability to slow *WildFire* down to the speed of a stock PC — the same thing I mentioned in discussing my speed modification of the H-158 a few paragraphs back.

What you can do with some things is take advantage of *WildFire*'s ability to select between a slower and a faster speed — just like a Z-158. *WildFire*'s switching is slicker than the pushbutton on the back of a Z-158. It's on the front panel where you can see it, instead of on the back where you can't. That awful location for the switch on the Z-158 is what I consider the machine's second biggest nuisance. The first biggest nuisance is that there's no quick way to tell at which speed the Z-158 is switched to run: I have to feel the pushbutton to see if it's in or out, then try to remember which position means what. There is a membrane switch marked "high" and another marked "low" on *WildFire*'s front panel, and an LED that glows when the speed is set high. I can figure that out at a glance. So if you use software that needs a slower machine than *WildFire* fired high, you can set it to low speed by pressing the switch. The monsters will kill you even when they're loafing around. If you depend on some software that absolutely requires the old 4.77 MHz standard, don't put *WildFire* on the Z-152. It can't be slowed down that much.

Having said all that, I feel silly saying now that there's one tiny little touch on *WildFire* that really tickles me. It includes a reset switch. It took an arrogant man to design the original PC without one, and a bunch of lemmings to follow that design out the window. One of the first things I add to a computer that moves in here is a reset switch. In fact, I explained how to add one to the 150 and Z-158 in my very first "Mainstream Computing." Those reset switches, however, are pushbuttons installed in a hole drilled through a blank at the back of the machine. Using one there involves blind

groping again, and again I don't like it. *WildFire*'s reset switch is on its front panel, where it belongs, and off to the left of its speed switches, where it's unlikely to be pressed by accident. Nice touch. So, too, is a bonus. With the right software, such as Micro Interfaces' *RUNCPM*, you'll be able to run CP/M programs written for the 8080 or 8085 (but not the Z-80) microprocessor.

You can install *WildFire* in the Z-151, Z-152, or Z-161, the earlier *XT* compatibles. If you own one of them and have been thinking about getting an *AT* compatible just for the sake of its speed, you might be smart to spring for *WildFire* and wait for a look at the new microcomputers sure to arrive within the next micro growing season.

So's The ZOOM/MODEM PC 2400

True to its promise, Zoom Telephonics delivered the 2400 Baud version of its *ZOOM/MODEM PC* right on schedule. That has to be a record of some kind: one law of microcomputer marketing seems to be that all schedules fall apart so nothing is deliverable when predicted. There hasn't been time for prolonged use of this version under various conditions yet, but in normal daily use here for communicating with CompuServe and local bulletin boards the *ZOOM/MODEM PC 2400* has performed with the same reliability as the *ZOOM/MODEM PC 1200*. It's indeed reliable.

It also seems to have even more features than the *ZOOM/MODEM PC 1200*, as if the *ZOOM/MODEM PC 1200* was shy of features. I haven't had time to explore any of the new ones yet, nor have I had time to try out 2400 Baud. I have to hunt down some useful 2400 Baud numbers. Can you tell me about boards I can use at 2400 Baud without having to call first to make application for admission? I'd really like suggestions about Heath/Zenith boards and those specializing in the C programming language and UNIX.

Fortunately, the arrival of the *ZOOM/MODEM PC 2400* coincided with the return of my 241 from repairs. Heading my list of things to do was try out the *ZOOM/MODEM PC 1200* in it: that modem arrived during one of the periods when the 241 was dead, so I promised to let you know whether it meets Zoom's claim that it works in *AT*s. It works in *AT*s. So does the *ZOOM/MODEM PC 2400*. I had time to try it too.

The *ZOOM/MODEM PC 2400* comes in the same models as the 1200 Baud modem: the *ST* at $499, the *XT* at $549. Leaf back to my description of the 1200 Baud version in the August 1986 *REMark* and you'll probably get an idea of the difference between the two models. If that glance makes you want the *ZOOM/MODEM PC 1200* instead, you'll be pleased to hear that Zoom Telephonics has just reduced the price of the *XL* — the top of that line — by $50 to $349.

By the way, I recently heard another possible objection to internal modems — one I hadn't anticipated. It threw me at first. The objection came from someone who had a friend who had an internal modem that fried when there was a surge, possibly a spike on the phone lines, and damaged the computer. It could happen. Of course, an external modem can cause the same kind of damage for the same reason. External modems aren't immune to spikes or surges. I don't know if either kind of modem is more susceptible to such things than the other. Maybe. Maybe not.

It seems a quibble about the wrong thing though. Who, after all, really cares whether damage comes from a little surge or a littler surge? My area has a rainy season that includes many electrical storms which occasionally knock out at least some telephones in this neighborhood. A while back I described one such storm that almost seems to have fused some nearby professional offices. I haven't heard reports of any damage to either internal or external modems then, nor has my own equipment suffered any damage. If you're concerned, and we all probably ought to be concerned no matter what kind of modem we use, you ought to have a good surge protector on any computer device connected to any electrical source. Surge protectors are available for modems, as well as for computers. They cost around $90. If you're really concerned, though, unplug the modem's telephone line when it's not in use and unplug the computer when it's not in use.

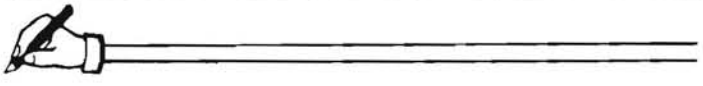
Products Discussed

Run/CPM-Z80 $199.95
Micro Interfaces Corp.
6824 N.W. 169th Street
Miami, FL 33015
800/637-7226

Zenith *ZVM-1240* monitor $239.00
Zenith *Z-329* monochrome video card $200.00
Veritechnology Electronics Corp.
Box 167
St. Joseph, MI 49085
(800) 253-0570

WildFire $249.00
Software Wizardry, Inc.
1106 First Capitol Drive
St. Charles, MO 63301
(800) 862-8948 / (314) 724-2336

ZOOM/MODEM 2400 PC ST $499.00
ZOOM/MODEM 2400 PC XT $549.00
Zoom Telephonics Inc.
207 South Street
Boston, MA 02111
(617) 423-1072



Mainstream Mailbag

One-drive Floppy Copies

Your articles in *REMark* are superb . . . On my Z-158 which has only one floppy and a hard disk what is the simplest way to make a copy of a program? What I am doing is creating a temporary file in C drive, copying that to A drive, and then erasing the temporary file. Is there a DOS command to achieve that in one step?

Herbert Anderson
Seattle, WA

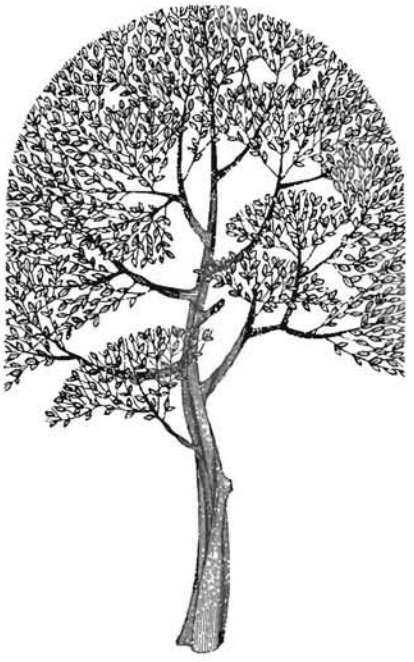
Yes. **COPY A:FILENAME B:** Of course you should substitute the real name of the file you want to copy for my generic "FILENAME."

MS-DOS assigns your single floppy diskette drive to two of what in computerese are called "logical drives." "Conceptual drives" seems the better term. These two conceptual drives are Drive A and Drive B. If you had two real, "physical drives" (computerese again), each of the two conceptual drives would be assigned to each of the two physical drives. Since you don't have two physical drives, MS-DOS keeps track of which conceptual drive is currently assigned to the one physical drive. It will prompt you to swap disks

when necessary to copy from Drive A to Drive B on a single physical drive.

Good grief. I can't seem to make the background explanation any clearer without taking more space than seems reasonable for the specific question you asked. Here's a simple way to see the situation in action: put a formatted floppy in the drive and close the door; read the directory and you'll see it identified as Drive A; then give the command **DIR B:** and see what happens.

By coincidence, your question came as I was finishing the current "Mainstream Computing." You'll have seen from reading the column that I completely agree with you and decided to address the problem directly by installing a second floppy drive. If all you have is one floppy and one hard disk drive, and if it's a fixed hard disk drive to which you don't need constant access, you could install two internal floppy drives by sinking the hard disk drive. There's room for it in your computer and the cost shouldn't be more than around $200. ✱



Roots II

A Dream Program For Genealogists

Tom Huber
Senior Technical Writer
Zenith Data Systems

Part 1

Roots II is the latest of a series of genealogical programs from CommSoft. It is designed for use on MSDOS-based computers, including some of the older computer designs that have been converted to use the PC (8088 processor) design. As it is received, it can be quickly and easily installed on IBM, Compaq, and Zenith PC-compatible computers; the 8-bit Kaypro with SWP 16-bit coprocessor board; the Heath/Zenith Z-100; and any MSDOS computer that uses a standard ANSI-compatible console. Other PC-compatible computers may or may not be able to run *Roots II*. Since CommSoft is constantly updating the program for new systems that will run it, you should contact them regarding any system-specific questions. The last time I talked with CommSoft, I was told that *Roots II* had been successfully tested on over a hundred different computer models.

The entire genealogical database is loaded from disk into memory, so the speed of machines, such as the newer AT PC series makes the program truly transparent to the user. Even computers, such as the original IBM PC, that run at 4.77 MHz are fast. Real limitations will not be experienced until you attempt to use the program with single-density or single-sided 5.25-inch disk drives, which I don't recommend. Computers that use the lower-capacity drives are generally not PC- or MSDOS based. There are versions of this program available for CP/M, but these have less capacity and lack some of the features of *Roots II*.

Most evaluations for software do not encompass as much material as is contained in this review. Genealogical-related activities cross boundaries seldom encountered in most other hobbies, for genealogy is done not only by amateur family historians, but also those with strong interests in the Mormon religion, national heritage, or family honor. Skeletons sometimes lurk in family closets that one or more family members would prefer not to have surface. Illegitimate births, adoption, and divorces are subjects that can often be just as touchy as either politics or religion. Add these together and you have a hobby that deals with controversies like no other.

Because *Roots II* is an extensive program and because Genealogy is a relatively deep subject, this review is spread out over three issues. This first segment will cover the background of genealogy and provide an introduction to *Roots II*. The second segment will cover the installation of *Roots II* and part of its operation. The third segment of this review covers the remainder of *Roots II*'s operation and my conclusions about this program.

Just prior to the introduction of the home microcomputer (Apple II, Commodore PET, Radio Shack Model I, and Heath H-8), I wrote a program that worked on a DEC PDP-11 system. Its disk capacity of 256K limited my program to 500 entries of unprocessed data. The files were unlinked, but by using a complex indexing system, the software was able to link families together and print a family descendant book consisting of family group records, starting with the oldest ancestor and working forward to the latest generation. However, the 8-inch drives were not reliable and the constant loading and unloading of the heads soon ruined a disk. In addition, the system required repeated entries of similar data for each child in a family and believe me, after entering data on fourteen children, I became a bit tired of typing.

By using data compression methods and linked lists, Herbert Drake, Jr., the author of *Roots II*, and CommSoft, the publisher, have squeezed 4,095 subjects and their vital records (including marriages) into less than 320K of disk space. With the database loaded into memory and by overlaying the program's functions, a system with about 390K of user memory will make full use of the program's capabilities. With MSDOS version 2 or 3, you can create a "RAM" disk and preload the overlay program files into memory, which speeds access to various parts of the program. This adds another 128K to the memory requirements, for 512K or two banks of 256K, which is not uncommon in the newer PC-compatible computers. If you don't have the memory capacity, high-capacity 8-inch disks or a Winchester system add considerable speed to the operation of the program.

All genealogical programs, including *Roots II* and its predecessors, build and manage databases. As far as I have been able to determine, this is the only reasonable way to work with family records on a computer. My early attempts at computerizing my family files used a database, as did early efforts of the Mormon church. These all had major drawbacks in the amount and kind of data that could be entered. Most of today's genealogical programs appear to have similar limits, though with *Roots II* they are minimized.

I have been gathering family history since I was in the military, some twenty-odd years ago. With the help of many people, my files now fill a legal-sized file drawer and several smaller boxes. Before obtaining Roots, I attempted to adapt Condor's relational database management system (*rDBMS*), but quickly found that it lacked the ability to automatically link files and produce satisfactory family history reports that I could publish. While I have not used Ashton-Tate's *dBASE* programs for this purpose, I feel that similar problems would be encountered.

When I discovered *Roots II* about a year ago, it appeared to do everything I wanted in a genealogical program. A quick telephone call to the people at Commsoft verified that *Roots II* was what I wanted. Since then (admittedly a long time for evaluating software) I have put the program through its paces.

Simply put, *Roots II* is the Cadillac of all genealogical programs. I have not seen any other genealogy program that approaches its speed or capability. It is provided on two "keyed" 8-sector, 5.25-inch, double-sided disks.

A keyed program requires that you have a distribution disk mounted in your computer so that the "key" can be read when the program is started. The key is recorded between sectors on one of the higher tracks. This appears to be similar to a copy-protection method used by Lotus 1-2-3. The key and the program both carry a serial number which discourages unauthorized duplication of the distribution disks.

Genealogists that need to set up Roots for more than one client or database can obtain unkeyed versions of Roots. While this version is more expensive, $299.00 instead of $199.00, I consider it a reasonable price to pay for the privilege for making working copies and protecting the original distribution disks in a professional environment. Compared to other genealogical programs, I consider the software to be well worth the higher asking price. The real value of *Roots* to the genealogist is in its use, not its protection against piracy.

Installing *Roots II* is fairly straight-forward, unless you are using an unusual version of MSDOS. Then you may have some real problems, but if you follow the directions provided by CommSoft, it can be installed on most systems.

Using the MSDOS SYS command to transfer the operating system to a distribution disk makes it bootable. Once you have a keyed disk with the operating system on it, you can install Roots for your particular computer's needs. This includes console drivers for machines such as the Zenith Z-100 or the 8-bit Kaypro with an SWP 16-bit coprocessor board. README files provide the details without having to provide separate programs for each type of computer that runs MSDOS. Printers that talk through a serial or parallel interface are well supported by *Roots II*. Most features can be directly supported, but if you have special report requirements or one of the new laser printers with proportional spacing, you may want to use a word processing system to provide complete control. My Heath H-25 printer has features that were quite easy to implement from the program.

Roots II also allows you to change the drive used to find the key, and that allows more flexibility in two-drive systems. Since the program files are not recorded on the distribution disks in any abnormal manner, you can copy all the programs from the original disks to backups, 8-inch disks, or a rigid disk partition. Single-drive users must use one of the distribution disks with the operating system installed on it.

To run Roots, place one of the two distribution disks in drive A (or the drive you specified with the INSTALL program) and start the program. Once the key is read and verified against the internally recorded serial number, it will not be needed again. The distribution disk can be removed and stored away from the computer, which helps prevent accidental erasure. With two distribution disks (albeit with different files on them), it takes a major catastrophe to accidentally destroy the use of both disks.

Genealogy, The Mormons, And History

What is genealogy? Simply put, it is the gathering and compiling of data on individuals in the human family. It encompasses not only vital statistics, such as births, christenings, marriages, and deaths, but it also concerns itself with the history of individuals: where each person lived and what they did. Because religion played an important part in determining the course of human events, that data also often needs to be recorded to aid future family historians.

My own research does indicate that the majority of early genealogical books were published after the mid-nineteenth century. Since it takes time to gather information (ten years is not unusual, prior to publishing one's findings), that would mean that most genealogical research would have had to start about the time of "restoration of the keys . . . in 1836," taught by the LDS. However, even before this time, there was some interest in keeping records. For instance, the vital records for Rhode Island, where some of my ancestors settled in the 1600's, are quite complete (I found published lists of births, deaths, and marriages in the Denver, Colorado, Public Library.

However, I believe it was also about this time that Americans generally became a literate people. Public education was stressed — I certainly found plenty of ancestors and relatives who taught school as they pushed westward where they eventually ended up in Oregon Territory in 1861. With the exception of the records from some of the colonies, such as Rhode Island, and prior to the keeping of more complete census records from 1850 on, vital statistics were not very well kept, particularly in the sparsely populated, frontier areas. About all that I can locate are skimpy records of wills, taxes, and land transactions, or those kept by some religious organizations (parishes and churches). Perhaps more than anything else, political bodies and their fetish for red tape created a need(?) for more records, causing America to become a record-keeping country.

You might note, however, that genealogies of sorts have been kept by many peoples. Those that come to mind include the one that started Alex Haley on the road to his African home and ancestors as he relates in his book, Roots, and those of the peoples of the South Seas in naming their children (I understand that ancestral lineage is pronounced in the full name of the individual). For those of you who are familiar with the Bible, you will also remember that Israel was a record keeping nation; thus we have the genealogies related in the Books of Moses in the Old Testament and in citing the lineage of Jesus Christ in the New Testament.

The Reasons For Doing Genealogy

I believe family records are collected for three basic reasons. If you are now gathering or have gathered genealogical information, then you probably fall into one of these categories. If you feel you don't, then I would appreciate a note from you explaining why you collect family history.

1. The first reason is religious. It is the LDS commitment to sealing the entire human family together for the salvation of the earth and mankind as part of the LDS doctrine known as *the plan of salvation*. That includes everybody, including those who are not members of the LDS church.

2. The second reason behind genealogical work is an interest toward publishing the results of a compiled history. This would include work done by professional researchers and serious hobbyists (there are a lot of these people out there) including people like me. Here the object is often a final, published work and not simply gathering a bunch of data in a shoe box or computerized database.

3. The third reason for doing any genealogy is a native curiosity about people and a desire to know more about your own ancestors or someone else's ancestors. To these people, I add historians who often gather data about some person from our past, but seldom get around to publishing the results of that effort. The reason I don't include hobbyists in this group is that hobbyists are often more dedicated than professionals who do this kind of work for a vocation.

You may note a strong similarity between the second and third reasons with the prime difference being one of dedication to the task.

The LDS Reason

As I stated, the first reason for doing genealogical research is religious. However, the commitment of individuals within the LDS church varies with each person's *testimony of the work*.

The Professional And Hobbyist

The second reason behind genealogical work is usually an interest toward publishing the results of a gathered history. While I do have an LDS background, this is my main objective in gathering the material, particularly since so many people in my family have contributed toward my collection. My plans go beyond those of most LDS and include a desire to publish those that have a shoestring relationship to me, since these people are important to younger members of my family. I have found other LDS in this same category, as well as numerous non-LDS hobbyists.

Professional genealogists, those who gather and compile information on behalf of others, must be put into this category as well. The results of their efforts are not usually made publicly available, but you can consider the confidential reports back to their clients to be a form of a published work.

One of the more interesting aspects of gathering genealogical data is the gathering of historic information, anecdotes, and family traditions. My ancestors, who were numbered among the Mennonites of Lancaster County, Pennsylvania, held a number of traditions or stories about their ancestry. Since many of these were gathered during the 1930's, the family historian of that time included political comments and stated that my ancestors "were not the *subservient* Germans under Hitler's yoke," but were from the independent Swiss stock. The fact that they were essentially chased out of Switzerland for not bearing arms (the first of the conscientious objectors?) had little to do with the historian's viewpoint. What I found to be most interesting was the political viewpoints at the time that these traditions were written (1933); these are as important to me as some of the traditions.

The Curiosity Reason

The third reason for doing genealogy appears to be a native curiosity about people and the desire to gather, but not necessarily publish, information about these people. I also tend to include historians who gather data about people from our past, but never get around to publishing it. I also must include part-time hobbyists. Professionals and dedicated hobbyists tend to be more careful in gathering information and will work harder to clear up discrepancies than people in this category.

As an example of this from an unrelated field Vasily Sergeivich Kalinnikov, a little-known Russian composer who died shortly after the turn of the century, was chided often by his friend Rimsky-Korsakov for not working more conscientiously. When asked about the orchestration of a symphony Kalinnikov was working on, he told Korsakov, "I transcribed [meaning moved] it from my table to the piano." To me, Kalinnikov approached his composing the way people in this category approach genealogy: They can sometimes be good, but are seldom very consistent in their effort.

At the other end of the scale are those hobbyists who are collectors. That is, they obtain any and all scraps of information they can find, often filling shoe boxes with photographs, notes, and clippings. Then filling larger boxes, suitcases (I've seen some of these), and finally cedar chests, with anything they can find. Unfortunately, that information is seldom processed or put into any reasonable order and, when the collector dies, much is discarded because nobody knows what to do with all the junk. (Did I say junk?)

In between these two extremes, the collector and the historian, fall two other types of genealogists, also belonging to this same larger third group, but who do not function at a serious level while doing genealogical research.

The first might be considered a professional, except that the purpose behind the research is purely social. This type of person wants to belong to an organization, such as the DAR or sons of the English Empire. There are many different organizations, almost all of which need some proof of your ancestry. Unfortunately, once this proof has been established, the research is put to one side and the social order of the organization is enjoyed. Too often, this type of genealogist likes to brag about the genealogy ("My ancestors came over on the Mayflower.") and hide embarrassing information about grandfather Charley (who ended up in prison for robbing a bank; or the fact that the claim to the famous ancestor is through an illegitimate child).

The second, and fortunately, not very common, are a real problem for a family. These are so-called (often, self-styled) genealogists who are family *gossip gatherers*. They like to be the center of attention (as most gossipers) and like to be known as the *authority* on the subject. Unfortunately, they are not very careful how they gather the information and often end up as the *National Enquirer* in the family.

To recap, then, there are three reasons for doing genealogy: religious, which requires accuracy and double-checking of all gathered information; professional and serious hobby, which requires

Continued on Page 25

Configuring The Z-120 With Gemini Board Emulator

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With the arrival of the small computer contract, many of us are now using Z-120s to automate numerous routine tasks and to simplify the paperwork maze we all must travel. The extensive libraries of "IBM compatible" software presently available, provide a strong attraction to increase the Z-120 utility by means of the Gemini board. The article that follows offers a brief guide, based on our own lessons learned, to bring such boards "on-line" easily.

Initially, I had doubts about attempting to install a Gemini board myself. I had never disassembled a microcomputer before, never felt an inclination to do so, and in fact, had never even handled a micro chip until our shipment of Gemini boards arrived. However, after setting up over 20 of the systems (Z-120 models with Winchester hard drives) in a 2 week period, I'm now an old hand at it. Let me emphasize that I am NOT electronically inclined in any way. Nevertheless, I found that installing a Gemini board was similiar to installing spark plugs in a car. Just as you do not have to be a qualified mechanic to change plugs, you don't have to be an electronic wizard to install a Gemini board. With proper instructions, you can do it too!

Both Zenith and D.E.L. Professional Systems, Ltd., the Gemini board manufacturer, provide clear instructions for installing the emulator board into the Z-120 computers. The one exception was the Zenith instructions for installing the 64K video chips on the video board. The Z-291-1 Installation Manual included with the video chips, neglected to mention that the J307 jumper on the video board must be moved to the '64K' position after installing the new video chips. An error message to that effect will be displayed when the computer is turned on if this is not done. (A detailed description of the video jumpers can be found in the Zenith Hardware Technical Manual, pages 4.1-4.4.). Fortunately, this step is mentioned in the Gemini Emulator Operations Guide included with the Gemini board. Also, in approximately one-fourth of our systems, the video board did not have any jumpers at the J307 position. Our local authorized Zenith dealer provided us with all the spares we needed.

The key to installing the boards is having the proper tool. The instructions recommend using either a special tool (micro chip puller for an 8088 chip) or a small flat-bladed screwdriver for removing the 8088 processor from the motherboard. Beg, borrow, buy or steal that special tool! On the first system, I used a screwdriver and bent half the pins one way, and the other half the other way. I was able to straighten the pins and reuse that chip; however, I immediately located that special tool. This can almost totally eliminate the possibility of damaging them.

I found the most confusing part of Gemini installation to be configuring the Winchester hard disk. For our systems, the space on the hard disk was to be evenly divided between the Zenith and IBM modes, with MSDOS installed on both. This is not a requirement, it's just how our systems were configured. (Detailed descriptions of the commands can be found in the appropriate manuals). By trial and error, I developed the following procedures for configuring our systems using MSDOS (Ver 2.22) for the Z-100, the Z-100 Winchester Disk Utilities, and MSDOS for the Z-150 (Ver 3.10).

Step 1. If you have data saved on the hard disk, be sure to back it up before proceeding as all data will be destroyed.

Step 2. Following the directions on page 66-7 of the Z-100 User's Manual, Winchester Supplement, remove the jumper from the interrupt plugs on the Z-217 controller card and place it over the Format Enable plugs on the upper left corner of the board. This allows you to format the hard disk. Replace the controller card and computer cover.

Step 3. Turn the CPU on. If you have installed the board properly, the "GEMINI" screen will be displayed. (If not, recheck the entire installation procedure.) Select the Zenith mode by pressing "Z". You should now get the system monitor prompt (a small hand pointing to a flashing underline). If not, enter CTRL and RESET at the same time and then press the DELETE key to interrupt the autoboot process (Ref. Z-100 User's Manual, p 2.2).

Step 4. Insert the Winchester Utility Disk into Drive A:. Enter 'B','F1', and RETURN to boot from the diskette.

Step 5. Enter the command, PART, to partition the hard disk. Following the directions on pages 24-37 of the Winchester Supplement, enter the information (partition name, operating system, percentage, and default partition number) so it matches the table below. (If you do not want to divide the space evenly, then enter your own percentages.)

Partition Name	Operating System Name	Percentage	Kilobytes
1. MSDOS	MSDOS	50%	5481
2. GEMINI	DRIVE	50%	5481

```
3.
4.
Total utilization (allocated/unallocated) 100/0     10962/0
Default boot partition number: 1  <MSDOS;MSDOS>
```

Step 6. Remove the Winchester Utility Disk and insert the Z-100 MSDOS disk. Enter CTRL and RESET to reboot. (Ref. step 3.) Enter 'B', 'F1', and RETURN to boot from the diskette.

Step 7. Enter the following command to assign drive "E:" to the hard disk: ASSIGN 0:MSDOS;MSDOS E:

Step 8. Format the hard disk and download the Z-100 MSDOS system files to the Zenith partition by entering: FORMAT E:/S/V

Step 9. The Zenith portion of the hard disk is now ready for your use. You can build directories, install batch files, download software, and configure the printer.

Step 10. Enter CTRL and RESET to reboot the system and return to the GEMINI screen. Insert the Z-150 MSDOS disk #1. Select "I" for the IBM mode. At the next prompt {->}, enter "b" and RETURN, to boot from the diskette. Remove MSDOS disk #1 and insert MSDOS disk #2. Enter the command, PART, to establish the IBM partition. Enter the information (start and stop cylinder and default partition) so it matches the table below. (Again, if you did not allocate the space evenly between the IBM and Zenith modes, then your figures will differ from those below.)

```
    Partition      Start      Stop      Size in    Percentage
      Type       Cylinder   Cylinder  Kilobytes  of the Disk

1   DOS              1        303       5481       100.0%
2   Unallocated
3.  Unallocated
4.  Unallocated

Winchester Unit = 0
Default Partition = 1
Maximum cylinder number = 303
Minimum DOS allocation = 32 Kilobytes
```

Step 11. Enter CTRL and RESET and again select "I" for the IBM mode. Insert the Z-150 MSDOS disk #1 and boot the system by entering "b" at the arrow prompt. Enter the following command to assign the drive designation of "C:" to the IBM portion of the hard drive: ASGNPART 0:1 C:

Step 12. Format the hard disk and download the Z-150 MSDOS system files to the IBM partition by entering: FORMAT C:/S/V. Be patient! This step takes 10 to 15 minutes.

Step 13. As in step 9, the IBM partition is now ready for your directories, software, batch files and printer configuration. This completes the configuration of your hard disk.

Step 14. To complete the installation, return to step one and replace the jumper on the Z-217 controller card in its original position.

Due to the lack of software, our daily use of the IBM mode has been primarily word processing, using PC-Write. In this capacity, the board works great. We used this word processor extensively on an IBM before acquiring our Zenith and have been able to duplicate all processing with the Gemini board. I have also tested dBASEII in limited applications and run the RBASE 5000 tutorial. All features tested work as designed. In my opinion, the board is well worth the effort required for its installation and configuration. It adds a new dimension to the Z-120 and affords its owners many more software opportunities.

*

Continued from Page 23

the researcher to gather a large amount of information, often fragmented; and curiosity, which entails stories, traditions, and often a lot of notes.

When I started my review of *Roots II*, I wanted to address each type of person who gathers genealogy on an individual basis, but I soon found that an honest evaluation was going to occupy enough pages to fill a fair-sized booklet, not to mention three magazine articles. Since room just does not permit that kind of analysis, please accept my word that *Roots II* will help almost every type of genealogist, whether they are in this field for religious, professional, or hobby reasons.

Next month, I will discuss installing Roots on the Z-100, initializing Roots, and some of the features of the program.

Roots II is available from:

CommSoft
2452 Embarcadero Way
Palo Alto, CA 94303
(415) 493-2184
$195.00 (keyed version)
$295.00 (unkeyed version)

About The Author

***Tom Huber** is a senior technical writer for Zenith Data Systems. He has authored numerous Zenith Data Systems user, technical, and service manuals and published a number of magazine articles in the twenty years he has worked with computers.*

Throughout this review on *Roots II*, I refer to the Church of Jesus Christ of Latter-day Saints as the LDS church or simply, the church and its members as LDS. *

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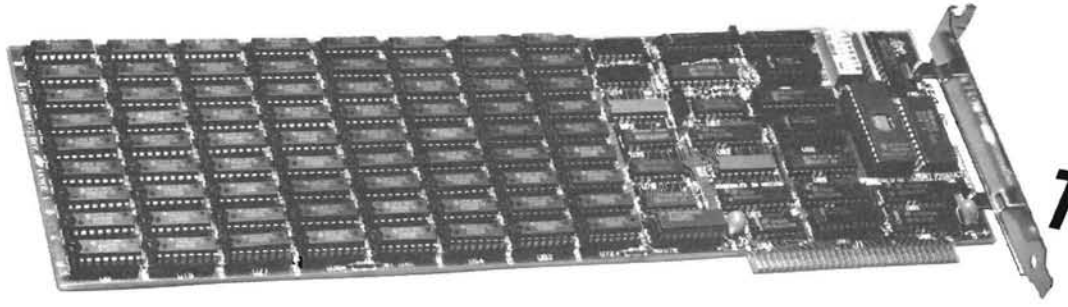

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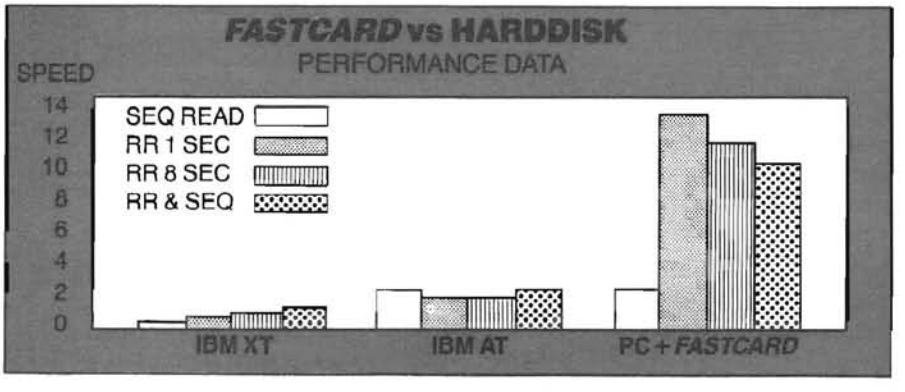

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PC Or (Not PC)
That IS The Question!

Jim Buszkiewicz
HUG Software Developer

As a famous one-eyed sailor once said, "I can stands so much, and I can't stands no more!", I figure it's about time someone shed some light on the kind of computer you really have, and which software will work on it.

Way back when IBM first released their PC computer Heath/Zenith was getting ready to release their sixteen bit computer system. This computer, of course, was the H/Z-100; more specifically, the H/Z-110 and H/Z-120. After half-height drives became popular and the speed of the units upgraded to 8 mhz, the numbers changed to H/Z-1108 and H/Z-1208. Over the years, this dual processor (8085 and 8088) computer was simply known as the Z-100 (wired) or H-100 (kit). Although this system was capable of running every version of MS-DOS, and superior in every way to the IBM PC, it was NOT PC compatible. In all the references I've seen to this series of computers, 'H/Z-100' is the most accepted and is being used as such by HUG.

Recognizing that there was a lot of GREEN in following BIG BLUE, Zenith decided that a series of PC compatible computers was the next step to take. Shortly after the H/Z-100 computers were released, the Z-150 and Z-160 computers were announced. These systems were TRUE IBM compatibles. It is rumored that due to certain contracts, these systems were referred to as Z-100 PCs. Heath, of course, followed up with the kit versions, retaining the same numbering system, only changing the 'Z' to an 'H'. As time would have it, the Z-138, 148, 158, 171, and the new 181 systems emerged. These were all IBM PC compatibles and are still being referred to as H/Z-100 PCs!

Now, what about the H/Z-241 and H/Z-248's? Some people refer to them as the H/Z-200 series, others call them ATs, and still others refer to them as H/Z-200 PCs. At this point, I feel that no matter what you call it, it's still a PC compatible and can be referred to as an H/Z-100 PC, or maybe better still, H/Z-200 PC.

Now that you're totally confused, let's simplify. If your computer has two processors in it, then it's an H/Z-100 (not PC). If your 16 bit computer only has one processor, runs IBM type software, then your computer is a 'PC compatible', or H/Z-100 PC. So you see, H/Z-100 PC actually refers to a whole series of model numbers ranging from the H/Z-150 up to the H/Z-248.

Now that you know what kind of computer you bought, let's see which kind of software will work on your system. First of all, HDOS will NOT work on your computer. That operating system was Heath's original 8 bit software, written for the H-8 and H-89 computers. Z-DOS was the first operating system for the H/Z-100 (not PC), and was really MS-DOS Version 1.25! Z-DOS will not run on your H/Z-100 PC. MS-DOS is software you're really interested in, for it's available for all of Heath/Zenith 16 bit computer systems, and will probably have the best selection of software available for it, no matter which computer you're using.

Believe it or not, the part numbers on HUG products really do mean something. Allow me to expulse: All HUG part numbers begin with '885-'. The Heath parts department made us do that so they could tell what was ours to begin with. Following that number is another 4 digit number. This 4 digit number is the actual product code. For example, all 6000 series products will run on your H/Z-100 PC. Bet you didn't know that, did you? All 8000 series products is royalty software and could possibly run on ANY H/Z machine. The only way to determine that would be to read the abstract of the program itself. Finally, ALL 3000 series products will run on any H/Z-100 (not PC) computer. A large majority of them will ALSO work on the H/Z-100 PC systems. Again, the abstract of the product would have to be checked for this compatibility.

When we 'create' software here at HUG, we've always written it so it would work on ANY 16 bit Heath/Zenith system, or wrote two versions, so as not to leave out any one particular group of computers. Believe me, it's a lot easier writing software for one type of computer system hardware than it is for two, but then again, "WE'RE NOT JUST AN ORDINARY USERS' GROUP!". *

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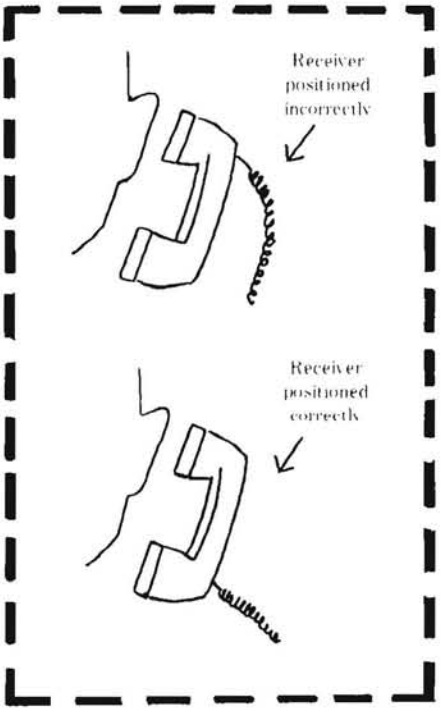

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A Winchester For The '89

Part Nine

Peter Ruber
P.O. Box 502
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SigmaSoft Strikes Again [1]

When I began this series, Winchester hardware implementations for the '89 were primarily limited to the SASI hardware interface developed by Magnolia Microsystems (see Part 2, March 1986) and their CP/M implementation; and the Quikstor software package from Quikdata, Inc. which conformed to standard Heath/Zenith CP/M and HDOS, but used the Magnolia interface (see Part 3, April 1986). Along the way there was Heath's own short-lived Z-67 Winchester system, but it was not discussed because both the hardware and software were removed from distribution about 6 months before the '89 itself became extinct.

Since that time, several new products from C.D.R. Systems and Ampro Computers were released. They used the powerful SCSI hard disk interface, that provided the '89 with multi-user and networking capabilities, a domain that was thought to be the exclusive property of 16-bit computers.

I suppose 8-bit computers like the '89 are a bit primitive when you compare them to the graphics abilities of a PC. But, with the addition of a hard disk system you gain a tremendous amount of speed and power in a no-frills sort of way. If these additional Winchester systems had not materialized, I probably would have phased out my own '89, except for occasional projects.

But I have had a change of heart because my '89 is very good at performing the kind of tasks I require — namely word processing. Even screen editing is much faster on the '89 than on any of the PCs I've worked with. And a hard disk system only enhances these virtues.

Rather than spend additional money on enhancing my "clone", I decided to invest in yet another '89 and a couple of '19 terminals for my Ampro CP/M and PC-DOS "Little Boards" with hard disks, because their inherent speed advantage and clearer CRT display over the PC's make these much better working tools.

A Winchester & Floppy Interface

My '89 is currently hyper-ventillating over the latest product offering from SigmaSoft & Systems — a kind of Grand-Slam approach to implementing both a Winchester and floppy disk interface all in one package.

The primary hardware component in this package has been on the market for several years and used in other computer systems. Its application in the '89 proves that there are devious minds at work at SigmaSoft.

This is a versatile system with many options. Since there is so much to explore and explain, I will devote the next two articles to the new SigmaSoft Disk System.

The Nuts & Bolts

The Western Digital WD1002-05 controller is a multi-faceted piece of hardware that combines a hard disk interface and soft-sector disk controller all on one board. It isn't the only species of its kind. The OMTI 20L will perform a similar function, but is limited to controlling 2 hard disk and 2 floppy drives, whereas the WD1002-05 will handle 3 hard disks and 4 floppy drives.

This has enabled SigmaSoft to offer '89 users a combined interface that doesn't use any of the right-hand expansion slots. Since the WD1002-05 is essentially a Parallel-driven interface, SigmaSoft modified the Universal Parallel Interface card they have been using with their Interractive Graphics Controller Card by adding 2 logic chips and a second 34-pin header.

The new UPI card provides 16 parallel ports. Six are used by the IGC, 2 are Printer ports; the remaining 8 by the floppy and hard disk interface. Since both of these are assigned Port 0, you can, if you like, leave your Z-37 and H-17 or H-47 controllers installed and still use them.

SigmaSoft also has a new version of their Universal Parallel Interface available for the H-8, so that their Winchester/Floppy imple-

mentation can be used on this computer, too. This is especially welcome, because a soft-sector/hard disk for this computer system is extremely hard to come by. Quikdata recently offered a limited run of the H-8 Z-37 controller at nearly twice the cost of the WD 1002-05, which has probably sold out at the time this article appears.

Continuing the precedent they established with the IGC, SigmaSoft offers a total hardware and software integration with their Disk System. This means that it is compatible with:

Heath/Zenith CP/M
Heath/Zenith HDOS
C.D.R. CP/M
Magnolia CP/M
TMSI H-1000 replacement CPU board

The SigmaSoft Disk System can be installed inside the H-89, an H-19 in conjunction with an H-8, or it can be installed in an external cabinet. The SigmaBIOS replacement ROM that is provided with the system allows you to have three types of disk devices resident at one time, though only two can be configured as BOOT devices. The secondary boot device need not necessarily be the Z-37 compatible soft-sector disk controller on the WD1002, but any two additional disk controller types. The C.D.R. hard disk system allows 2 types of floppy disk controllers. The Magnolia and Quikdata systems allow only 1 type of floppy controller due to I/O port decoding limitations.

The SigmaBIOS and the partitioning support software allows the presence of both CP/M and HDOS partitions on the same disk — up to a maximum of 16 partitions.

The basic 10-MB system costs only $895. The 20-MB version is $995. If you presently own a Z-37 controller, this board commands a premium price on the market and can be sold for $200-250. This further reduces your overall investment and makes this system very affordable.

Mounting the SigmaSoft Disk System inside your '89 should not provoke any power supply fears because SigmaSoft provides you with a small supplemental power supply that mounts inside the cabinet between the power transformer and the power distribution board. This is to compensate for the fact that the WD1002 controller will consume up to 3.0 amps of +5 volts. Were you to draw this much power from the '89s own supply, you would throw the system into cardiac arrest, a subject I discussed in Part 4 of this series. In checking with Western Digital and SigmaSoft, I learned that current production models of the WD1002 controller actually consume only 1 5 amps from the +5 volt supply. Even so, this is still too much of a load for the '89 to handle without assistance.

All the literature and documentation provided by SigmaSoft states that if you install the WD1002-05 and hard disk inside the '89 you cannot use their IGC card. This is due to the fact that the supplemental power supply provides a regulated +5 volts needed by the WD1002; whereas the IGC supplemental power supply provides +8 volts of unregulated power which is then refined through a +5 volt regulator on the board.

I consulted with Clay Montgomery of SigmaSoft who indicated to me that the Disk System power supply can be daisy chained off the IGC power board and then mounted in the empty area on the front left of the Video Board directly under the CRT. The reason for not advertising this fact is that you must insulate the power supply to insure there is no contact with any of the Video Board components or the CRT. They prefer that you call them for advice on this installation. It is a risky procedure if not handled properly.

H/Z-89 Installation

If you contemplate installing the SigmaSoft hard disk inside the '89, the first step is to mount the supplemental power supply board. When I reviewed SigmaSoft's IGC board in the August 1985 issue of REMark, I spent some time outlining this procedure because it was a bit delicate. I'm glad I did, because in the past year I have received calls from a number of people who apparently didn't heed my warning about insulating the braided grounding strap that snakes around the power supply area. If any bare portion of this strap comes in contact with the supplemental power supply, you will short the '89s power distribution board. Rather than dwell on these steps a second time, please go back and read my IGC review.

If you're working with an early model '89 with an H-17, you will need to replace the secondary address decoder IC at U516 with Heath Part #444-83. This is only available from Heath. Newer models have this part installed.

In order to minimize the amount of space used by the internal hard disk drive and controller card, SigmaSoft uses the new LaPine low-power 3.5" drives. This unit has a full-size bezel and replaces any internal drive you may have in the '89. The drive power cable is used only to power the LaPine drive. The supplemental power supply provides the +5 volts (@ 3 amps) for the Western Digital controller board.

SigmaSoft's Universal Parallel Interface plugs into any of the '89s left hand expansion ports. Port decoding signals are picked up via a DIP-plug that mounts in the U553 socket and connects to the UPI through a 3-wire cable. A standard 34-wire ribbon cable then bridges the WD controller to the UPI. If you plan to add an external hard disk drive in the future, you only need a cable from the WD controller to the external cabinet.

Two LaPine hard disk drives are available for internal installation — the Titan-10 (which has a formatted capacity of 9.99 MB) and the Titan-20 (which formats to 20.15 MB). These drives have received high ratings from several computer engineering magazines and will provide years of reliable use.

All external drives are from Seagate: The 10-MB ST213 and the 20-MB ST225. The formatted capacity is the same as the LaPine Titan drives. There are also 30- and 40-MB versions. Both internal and external drives are half-height. The external drive and controller are mounted in a handsome two-tone gray cabinet that resembles the '89. It is fan-cooled and has room for two drives. The initial drive comes with a full-size bezel. On the inside, taped to the drive, is a half-height bezel, mounting hardware and cables so that a second drive can be mounted in a matter of minutes.

While this article was being written, I was informed that SigmaSoft has now added a 67-MB Maxtor XT-1085 hard disk drive to their choice of systems. This drive is primarily aimed toward businesses that require a greater amount of storage. Since the WD 1002-05 controller can handle up to 1024 cylinders and 8 heads per drive, 3 of these drives can be installed on your system. Three additional Maxtor drives can be added by installing a second UPI interface card inside the '89. This provides a total of 402-Mebabytes of hard disk storage for large applications.

H/Z-19 Installation

Since SigmaSoft has made it a point to support the H-8 with its Interractive Graphics Controller Card, it was to be expected that their Disk System would do likewise. This is a rapidly shrinking market, so it is to SigmaSoft's credit that they are continuing their support, even though it is only marginally (if at all) profitable.

Mounting the hard disk inside the H/Z-19 terminal is a major chore because you need to upgrade the power supply with that of the '89 in order to have access to the +5 and +12 volts needed by the drive. You will also need a new backplane with the cutouts so that you can connect a ribbon cable from the WD controller to the Universal Parallel Interface card that plugs inside the H-8.

This involves rewiring the AC receptacle, assembling a new power distribution board, an upright heat-sink with the appropriate voltage regulators, and a heftier power transformer. If (and I say this advisedly) you are able to obtain all these parts from Heath's Parts Department, the expense will be in excess of $100. Then, in order to perform the installation, you will need the H-19A-To-H-89A Conversion Manual (Part No. 595-2709).

It is simpler to mount the hard disk and controller card in the H-77 Drive Cabinet. If, like a surprising number of other H-8 and H-89 owners, you're still using the SS/SD 40-track drives, you can now upgrade to DS/DD 40- and/or 80-track drives at a cost of somewhere between $70-120 by shopping around for some of the many discontinued models flooding the market.

The Western Digital 1002-05 Controller

Unlike the SASI controllers which use a Serializer/Deserializer approach to transferring data to and from the host interface, or the SCSI which employs a DMA mode (through the NCR 5380) and a bus arbitration scheme, the Western Digital Controller uses the Modified Frequency Modulation scheme to transfer data from the hard disk and floppy drives through the controller to the host interface. Both the SASI and SCSI data-transfer schemes are much more complex and less efficient in terms of speed. What the SCSI controller offers by way of versatility in allowing multiple computers, controllers, I/O and high-density storage to co-exist on the same bus, it has a data-transfer limit of only 1.5 MBits per second. The WD1002 can transfer data at 5.0 MBits per second, which compensates for the slower I/O between the '89s CPU and Terminal Logic Boards.

Modified Frequency Modulation (generally referred to as MFM), is the way double-density floppy disk drive data has been transferred between the controller and the drive since the year one. A flux transition is always recorded at the center of a bitcell for each "one" data bit. No flux transition is recorded for a "zero" bit unless it is not followed by another "zero" bit. In this case, the flux transition is provided at the end of the first bit cell. What this amounts to, is that clock timing is employed to define bit cells in the transfer of data. And while this conventional method is slower when used with floppy disk systems, the ten-fold speed increase of a hard disk drive (3600 RPM vs. 300 RPM) will provide a corresponding increase in data transfer.

The WD Controller Board uses three VLSI chips to handle each chore. Floppy control is through the WD2797 FDC IC. The hard disk is managed through the WD1010 Winchester Drive Controller IC, which also provides all the data separation logic needed. Housekeeping chores are provided by a 1K x 8 Sector Buffer that keeps the data flowing smoothly on the Data Bus between the hard disk, the floppy drives and the Host Interface. The Control Bus of the system is supervised by the WD1015 Control Processor. This chip manages the on-board static RAM buffer. All bytes of data written to, and read from disk is first stored in this Sector Buffer. When the buffer is full, the data is transferred, on command, to its intended destination.

In addition to controlling data flow between the Host, Sector Buffer, and the Disk Controllers, it also translates Host Winchester command format to Floppy Disk format when addressing the WD2797 Floppy Disk Controller. This permits the Host to maintain a single command format, while in effect controlling two different disk command formats.

The WD1014 EDS chip provides the Error Detection and Support logic. Within a single device designed to add ECC (Error Correction Coding) to 5.25" Winchester disk drives, it also contains three 8-bit registers and three counters, and several latches that enhance the Control Processor capabilities for control functions in a real time operation. As such, it replaces approximately 35 TTL packages consisting of shift registers, flip-flops and combinatorial logic gates. Which explains to some extent why SigmaSoft was able to create a Host Adapter out of their UPI card by merely adding a couple of TTLs, a 34-pin header and some Data and Control lines.

Cost Comparisons

What impressed me about SigmaSoft's use of the WD1002-05 Controller Board was their obvious cost-consciousness. Purchased separately, the WD1002-05 costs $195. In effect, it replaces the approximate $275 cost of a Xebec 1410/a Hard Disk Controller, the $225 Magnolia SASI Host Adaptor Card, and the $300 Heath/Zenith Z-37 Double-Density Floppy Disk Controller — which are at the heart of the Magnolia and Quikdata Winchester Systems.

It was refreshing that SigmaSoft & Systems chose to re-think the concept of interfacing by integrating a commercially available multi-purpose product to replace proprietary system boards, while maintaining Heath/Zenith software integrity. This has resulted in a more versatile and less expensive system.

One of the inevitable results of this recent influx of new Winchester implementations (from C.D.R. and SigmaSoft) is that it tends to provide a confusing number of system choices and options for H/Z-89 users. This is more beneficial than damning, and when you're upgrading the '89, you should consider the merits and limitations of each system in relation to what you want or need for your purposes.

Eighteen months ago, when I first started the planning of this series, I was impressed with what Magnolia and Quikdata had to offer. Magnolia's original SASI interface is now almost six years old. Quikdata, who improvised on the Magnolia interface by providing software for standard Heath/Zenith CP/M and HDOS, seems to be losing ground on a cost basis, primarily because Quikdata is performing a role as a Systems Integrator, and therefore, must charge

extra for the software they have developed. The QUIKSTOR software may be a bit high-priced ($195 if purchased separately; $149 if purchased with a system) at this point in time, because there has been a tremendous drop in the cost of Winchester hardware.

Do not construe that I don't like the QUIKSTOR software. It is first rate on all accounts, as is Magnolia's implementation of CP/M. However, as I have worked with all these systems for a considerable amount of time, it was inevitable that I would become more critical.

The C.D.R. SUPER RAM 89 (with the SCSI interface) also costs more than the SigmaSoft, but then you have additional options such as 1-Megabyte of dynamic RAM, a system Clock and multi-user capability if it is ever developed as planned.

Both C.D.R. and Sigmasoft use the left side of the '89's CPU board for their expansion for the Winchester interface. The C.D.R. system frees one right-hand slot; SigmaSoft frees two right-hand slots by effectively removing the hard disk host interface and the floppy controller off the CPU board.

On the other hand, the replacement CPU boards from Ampro Computers (the SCSI CP/M and PC-DOS boards) can upgrade an H/Z-19 or '29 terminals to full computer status; or allow a high degree of IBM compatibility for the '89 by means of a co-processor board for a moderate cost.

But all of these options make the '89 upgrade an exciting prospect because there are so many "different" systems to choose from. It also demonstrates the flexibility of the original design concept that allowed future innovators to simply change the '89's ROM and tantalize us with new hardware applications.

I think this is the key point of the whole issue. The '89 is certainly unwieldly in size and complexity when you compare it to what can be accomplished in less space by 16-bit systems. But there is little charm to these bright and shiny appliances. You set them up and run them. No challenge. No fun through experimentation. No other computer of its day (or even now) has permitted so much freedom for designers, even though it has one of the most constricting expansion bus designs.

The Documentation

SigmaSoft provides a manual covering the different hardware and software installation procedures that is up to their usual high standards. Included in this 100-page document is the Western Digital 1002-05 Controller OEM Manual.

However, don't plan to breeze through it because the text is terse and covers a lot of territory. It is also a little hard to follow at times, particularly in the hardware installation sections, because it covers the '89, the '19 and H-8 in a narrative format with occasional illustrations.

While all the information is there, do read it carefully if you're not overly familiar with stripping down your system and reassembling it again. The required steps aren't difficult, but care must be taken with the internal installation of the hard disk and the supplemental power supply.

The external hard disk system installation is quite simple by comparison. However, it would have been easier to follow if all the installation steps had been prepared in a checklist type format. As such, the descriptive text could have been judiciously condensed, thus simplifying everything.

I have basically the same comments for the software installation section which I will discuss in detail in the next installment of this series. SigmaSoft assumes that you are familiar with the CP/M and HDOS conventions for modifying the BIOS to incorporate your system hardware and the installation of device drivers. If you're not, you should keep the appropriate Heath/Zenith manuals with you.

CP/M is the most difficult part and the support disk software provides no fewer than 7 different BIOS choices to cover all possible drive formats on your system. All the standard Heath/Zenith entry points have been maintained, so you will not have to fear that any software that specifically accesses the ROM will be unusable. The only exception is that the entry points for Heath's Z-67 Winchester system have been eliminated.

Separate disks are provided for CP/M and HDOS versions for partitioning the hard disk, initializing hard disks and floppies, drive head parking, parallel printer drivers and much more.

Conclusion

This is an intelligently planned piece of hardware, made even more so by the fact that SigmaSoft's Universal Parallel Interface also services their Interactive Graphics Controller card. With this you add high-resolution graphics, a 256k RAM space and print-spooling software. All of this makes me wonder what they have planned for Phase III.

* * *

Current pricing for 10- and 20-MB internal hard disk systems is $895 and $995. External systems pricing: 10-MB, $995; 20-MB, $1095; 30-MB, $1425; 40-MB, $1535; 67-MB, $2395.

For additional information on a variety of system options, and for an informative article on the SigmaSoft Disk System, please contact:

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A Software Clock/Calendar CP/M-80

Part 1

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If your programs have ever needed a source of the date or time, this article is for you. The Heath CP/M-80 BIOS, release 2.2.04, has a clock/calendar built in. I will explain how to use this undocumented feature of Heath CP/M. The clock maintains the current time in 24 hour military format. The calendar keeps track of the current date. Because the clock and calendar are maintained in software, they will need to be reset every time the computer is turned on or cold booted. The clock does not keep good time. It runs somewhat fast normally, and it runs somewhat slow when there are many disk operations. On balance, it keeps fairly good time. I have found the clock quite good for many operations; however, it cannot be used for accurate timing applications. I will describe how to make the clock/calendar operate and how to use it with Microsoft BASIC.

The first step is generating a new BIOS.SYS with the clock/calendar activated. You will change two conditionals in your BIOS.ASM source code and run MAKEBIOS to do this. Then, I will present a program to set the clock/calendar to the correct date and time. Finally, I will show how to input the correct date and time into your BASIC programs. The clock/calendar has six elements. They are the current hour, minute, second, month, day and year. The individual elements of the clock/calendar are PEEKed into integer variables. Those integer values may be stored or printed as required by your program.

The information presented here should work for any hardware configuration. If your computer has only one disk drive you will have to occasionally swap disks when the operating system tells you to. The hardware I am using is a Heathkit H-89A with two hard-sectored H-17 disk drives and 64K of memory. If you are using the older CP/M release, 2.2.03, it also has a software clock/calendar. The procedure for modifying it will not be covered, but should be similar.

Finding The Changes In The BIOS Source Listing

If you've ever examined the BIOS.ASM source code, you've seen how long a program it is. To help find where to make the changes, take out your blue bound BIOS source printout. In the 2.2.04 printout look at the top of page #003. The first line of code on the top of the page is the one that needs the change. The actual coding is:

```
TOD     EQU     FALSE
```

Make a note in your printout to change the word FALSE to TRUE. Now look three lines down for a line of code that says:

```
BRKKEY  EQU     FALSE AND INTINP
```

Make another note to change the word FALSE on that line to TRUE. The next step requires making those changes in the actual BIOS.ASM source code file.

The results of those changes is that the assembler will use the coding for the Time Of Day and Break Key features during the assembly process. The Break Key on your computer ordinarily performs no purpose. While we are reassembling the BIOS source code it might as well be made active. When your new BIOS.SYS is installed your break key may be used to stop some runaway programs.

The next step requires making those changes in the actual BIOS.ASM source code file with a text editor.

Changing The BIOS.ASM Source Code

Whenever you make any changes to your operating system, when you are writing assembler language programs or using DDT, make back-ups of everything you will be using. Only use copies, not your originals. If anything goes wrong during those operations, you could lose all of the files on a disk.

Check your text editor manual for the details of how it handles tabs. If your editor expands tab characters into spaces it cannot be used. The MAKEBIOS program to be used later requires tabs, not an equivalent number of spaces. The CP/M editor, ED, may always be used.

The BIOS.ASM file is too large for many text editors. If your editor can handle the BIOS.ASM file, make the two changes from

FALSE to TRUE described above. Use your source printout as a guide to find the code that needs to be changed. Illustration 1 may also serve as a guide to the coding that needs to be changed. 1-A shows what the code looks like before the change. 1-B shows the results with the two changes made.

```
EXPER   EQU     FALSE
TOD     EQU     FALSE
EVENT   EQU     FALSE
INTINP  EQU     TRUE
BRKKEY  EQU     FALSE AND INTINP
H37ED   EQU     TRUE AND H37T
```

Illustration 1-A
Original BIOS.ASM Code Segment

```
EXPER   EQU     FALSE
TOD     EQU     TRUE
EVENT   EQU     FALSE
INTINP  EQU     TRUE
BRKKEY  EQU     TRUE AND INTINP
H37ED   EQU     TRUE AND H37T
```

Illustration 1-B
Patched BIOS.ASM code segment with Time Of Day and Break key features activated

If your editor cannot handle the BIOS.ASM file, use the following procedure to break the file down into editable parts. Set up your disk drives as follows. Drive A should contain PIP.COM, 'EDITOR.COM' and space for another copy of BIOS.ASM. Drive B should contain BIOS.ASM. Use the following command to rename the original copy of the BIOS.ASM file.

```
REN B:OLDBIOS.ASM=B:BIOS.ASM
```

Now use the following PIP command to make an editable sized portion of the BIOS.ASM file named EBIOS.ASM.

```
PIP EBIOS.ASM=B:OLDBIOS.ASM[QAND H37T^Z]
```

Note: The ^Z symbol means to hold the control key down while pressing Z. Now use your editor to change the noted FALSE's to TRUE's in the small EBIOS.ASM file. The two lines of code needing to be changed are near the end of the EBIOS.ASM file. The following line will create a complete full size BIOS.ASM file on Drive A with the changes.

```
PIP BIOS.ASM=EBIOS.ASM,B:OLDBIOS.ASM[SH47ED^Z]
```

You now have a BIOS.ASM file with the time and break key feature activated. OLDBIOS.ASM may be deleted from Disk B. The new patched BIOS.ASM should be PIPed to an otherwise blank disk. Make a backup copy of the new BIOS.ASM in case something goes wrong in the procedure later.

Running MAKEBIOS

To install the modified BIOS, you could follow the instructions in the CP/M manual; however, I will show an alternate method. This method is based on Pat Swayne's article "Making Sense Of MAKEBIOS" from the March 1982 edition of REMark.

Set up your disk drives as follows. Drive A should be cold bootable and have the files ASM.COM, STAT.COM, MAKEBIOS .COM, PIP.COM, PREL.COM, SUBMIT.COM and MAKE.SUB. Type in MAKE.SUB using your text editor. Drive B should contain ONLY a COPY of the new patched BIOS.ASM file. This procedure will use the CP/M batch execution facility, SUBMIT. To start, type SUBMIT MAKE and press return. You will be asked by the program to enter your disk drive types. Refer to your CP/M manual if you are not sure of your disk types. Now there will be a LONG wait while SUBMIT is running. When the procedure is completed, the new BIOS.SYS file will be on Drive B and the copy of the BIOS.ASM file will be erased. If you saw assembly errors, there is a problem with the BIOS source code or you ran out of disk space.

MAKE.SUB

```
;COMMENT --- (MAKE.SUB)
MAKEBIOS B:1 B:
ASM BIOS.BBZ
REN B:BIOS.HXØ=B:BIOS.HEX
MAKEBIOS B:2 B:
ASM BIOS.BBZ
REN B:BIOS.HX1=B:BIOS.HEX
ERA B:BIOS.ASM
PREL B:BIOS B:
MAKEBIOS B:3 B:
STAT B:BIOS.SYS $$DIR
```

Installing The New BIOS

This process installs the new BIOS.SYS over the old BIOS.SYS file. Set up your disk drives as follows. Drive A should be cold bootable and have the files STAT.COM, PIP.COM, MOVCPMnn .COM, SYSGEN.COM and CONFIGUR.COM. Note: The 'nn' in MOVCPMnn.COM should be replaced by the drive type number you are using and will boot from. Drive B should be the same Disk B as from the previous step. First, delete the original BIOS on Drive A and move the new BIOS over with the following commands.

```
STAT BIOS.SYS $R/W
ERA BIOS.SYS
PIP A:=B:BIOS.SYS
```

Next, enter the following MOVCPMnn.COM command line using the version of MOVCPM appropiate for your disk drives. (On my system I typed MOVCPM17 * for my H-17 drives.) Then run SYSGEN.

```
MOVCPMmm *
SYSGEN
```

When SYSGEN asks for a source drive, press return. When it asks for a destination, press A. At the next prompt, press return. Reset your computer and perform a cold boot at the next prompt.

Testing The New BIOS

Your computer should have cold booted normally. The sign on messages should be the same as always, except that options T and B should also be displayed. To test the Break Key option, press the break key. The computer should perform a warm boot. Now run CONFIGUR to set all of the operating system parameters back as they should be. See your CP/M manual on how to do this.

At this point, your computer system should be back to normal. You may SYSGEN more disks with the new BIOS.

Finding The Clock/Calendar In Memory

The location of the clock/calendar in memory is not constant with all hardware configurations. The clock/calendar resides in upper memory near the end of the BIOS. The first address of the clock must be found.

I have written the Microsoft BASIC program, FINDMEM.BAS, to automatically locate the correct memory address of the clock on your system. The program finds the last day of the month table in memory and prints the address following the table. That is, the address of the seconds in memory. Enter and run the program to

find the address on your system. When the program tells you the address, write it down. You will need it for future programs.

FINDMEM.BAS

```
0010 REM PROGRAM TO FIND THE START OF THE CLOCK IN
     MEMORY (FINDMEM BAS)
1010 PRINT "WAIT WHILE SEARCHING"
1020 REM SET UP MONTH TABLE AS IT IS IN MEMORY
1030 DIM MON.TABLE% (12)
1040 LET MON.TABLE% (1) = 31
1050 LET MON.TABLE% (2) = 28
1060 LET MON.TABLE% (3) = 31
1070 LET MON.TABLE% (4) = 30
1080 LET MON.TABLE% (5) = 31
1090 LET MON.TABLE% (6) = 30
1100 LET MON TABLE% (7) = 31
1110 LET MON.TABLE% (8) = 31
1120 LET MON.TABLE% (9) = 30
1130 LET MON.TABLE% (10) = 31
1140 LET MON.TABLE% (11) = 30
1150 LET MON.TABLE% (12) = 31
1160 REM SET UP MEMORY TABLE
1170 DIM MEM.TABLE% (12)
1180 REM INITIALIZE VARIABLES
1190 LET SUM.POINTER% = 0
1200 LET MATCH% = 1
1210 REM SEARCH MEMORY FOR START OF MONTH TABLE IN MEMORY
1220 WHILE MATCH% = 1
1230     GOSUB 9000
1240 WEND
1250 REM CALCULATE ACTUAL MEMORY LOCATION
1260 LET SUM.POINTER! = SUM.POINTER%
1270 LET MEM.LOCATION$ = HEX$
     (32767.0 + 12.0 + SUM.POINTER!)
1280 PRINT "THE CLOCK STARTS AT HEX ADDRESS ";
     MEM.LOCATION$
1290 END
9000 REM CHECK MEMORY FOR LOCATION OF MONTH TABLE
9010 LET MATCH% = 0
9020 FOR I% = 1 TO 12
9030     LET MEM.TABLE% (I%) = PEEK
           (32767 + SUM.POINTER% + I%)
9040     IF MEM.TABLE% (I%) <> MON.TABLE% (I%)
           THEN LET MATCH% = 1
9050     IF MATCH% = 1 THEN GOTO 9070
9060 NEXT I%
9070 LET SUM.POINTER% = SUM.POINTER% + 1
9080 RETURN
```

Setting The Time And Date

Now that you found the address of the clock in memory, you need to set it to the correct time and date. The program SETIME .BAS will do it. This is the last step before we write an application program.

Replace the #### portion of the lines in the listing with the hex address from the previous step. Enter and run the program.

The program will prompt you to enter the current month, day, year, hour and minute. The hour should be entered in 24 hour format. (For example 1 PM should be entered as 13.) This program is user friendly, self-prompting and it verifies that the entered data is reasonable. This means, for example, that it will not take a month numbered 13.

Now, the work is done and I am ready to show you how to use the time in a BASIC program that turns your computer into a digital clock/calander.

SETIME.BAS

```
10 REM SET THE CLOCK --- BASIC (SETIME.BAS)
20 DEF FNPOS% (I%) = I% + 31
100 REM CLEAR SCREEN, PRINT PROMPTS
110 PRINT CHR$(27)+"E"
120 PRINT CHR$(27) + "Y" + CHR$(FNPOS%(3)) +
     CHR$(FNPOS%(25)),
130 PRINT "Enter the current date and time "
140 PRINT CHR$(27) + "Y" + CHR$(FNPOS%(5)) +
     CHR$(FNPOS%(30));
150 PRINT "Month  (1-12)"
160 PRINT CHR$(27) + "Y" + CHR$(FNPOS%(6)) +
     CHR$(FNPOS%(30));
170 PRINT "Day    (1-31)"
180 PRINT CHR$(27) + "Y" + CHR$(FNPOS%(7)) +
     CHR$(FNPOS%(30));
190 PRINT "Year   (0-99)"
200 PRINT CHR$(27) + "Y" + CHR$(FNPOS%(9)) +
     CHR$(FNPOS%(30));
210 PRINT "Hour   (0-23)"
220 PRINT CHR$(27) + "Y" + CHR$(FNPOS%(10)) +
     CHR$(FNPOS%(30));
230 PRINT "Minute (0-59)"
300 REM INITIALIZE FIELDS, SECONDS VALID,
     OTHERS INVALID VALUES
310 LET SECOND% = 0
320 LET MINUTE% = 100
330 LET HOUR% = 100
340 LET MONTH% = 100
350 LET DAY% = 100
360 LET YEAR% = 100
400 REM INPUT VALID VALUES
410 WHILE (MONTH% < 1 OR MONTH% > 12)
420   PRINT CHR$(27) + "Y" + CHR$(FNPOS%(5)) +
        CHR$(FNPOS%(45));
430   INPUT MONTH%
440 WEND
450 WHILE (DAY% < 1 OR DAY% > 31)
460   PRINT CHR$(27) + "Y" + CHR$(FNPOS%(6)) +
        CHR$(FNPOS%(45)),
470   INPUT DAY%
480 WEND
490 WHILE (YEAR% < 0 OR YEAR% > 99)
500   PRINT CHR$(27) + "Y" + CHR$(FNPOS%(7)) +
        CHR$(FNPOS%(45));
510   INPUT YEAR%
520 WEND
530 WHILE (HOUR% < 0 OR HOUR% > 23)
540   PRINT CHR$(27) + "Y" + CHR$(FNPOS%(9)) +
        CHR$(FNPOS%(45));
550   INPUT HOUR%
560 WEND
570 WHILE (MINUTE% < 0 OR MINUTE% > 59)
580   PRINT CHR$(27) + "Y" + CHR$(FNPOS%(10)) +
        CHR$(FNPOS%(45));
590   INPUT MINUTE%
600 WEND
700 REM ACTUALLY SET THE TIME
710 REM SUBSTITUTE THE ADDRESS GIVEN BY THE FINDMEM.BAS
720 REM PROGRAM FOR THE SIX OCCURANCES OF #### BELOW.
730 POKE (&H#### + 0), SECOND%
740 POKE (&H#### + 1), MINUTE%
750 POKE (&H#### + 2), HOUR%
760 POKE (&H#### + 3), DAY%
770 POKE (&H#### + 4), MONTH%
780 POKE (&H#### + 5), YEAR%
800 REM CLEAR THE SCREEN
810 PRINT CHR$(27) + "E"
```

Using The Clock/Calendar In An Application

Reading the time and date in from memory is easily accomplished with BASIC's PEEK statement. The PEEK statement inputs the value contained in a memory location into your programs. The hex address given by the FINDMEM.BAS program contains the address of the current second in memory. The addresses of the rest of the clock/calendar features follow consecutively. The next address contains the current minute, followed by the hour, day, month and year. See the CLOCK1.BAS listing for the digital clock BASIC program. Statements 9050 thru 9100 show how to

read the clock/calendar from memory into your program. Remember to substitute the value given by the FINDMEM program for the #### in my listing. I constructed statements 9000 thru 9110 as a routine that may be used in any of your programs. Type in the CLOCKI.BAS program and run it for a final test of the clock/calendar. The program will display a running clock and calendar. It also ticks off the seconds.

Those of you programming in FORTRAN may use the same logic to implement the programs for the compiler. FORTRAN has the ability to locate the PEEK's in a separate subroutine that may be called to input the time and date into your programs.

CLOCKI.BAS

```
10 REM DIGITAL CLOCK PROGRAM --- BASIC (CLOCKI.BAS)
20 DEF FNPOS% (I%) = I% + 31
30 REM CLEAR SCREEN
40 PRINT CHR$(27)+"E"
50 REM INPUT TIME AND DATE
60 GOSUB 9000
70 REM PRESS ANY KEY TO STOP
80 LET A$ = INKEY$
90 IF A$ <> "" THEN END
100 REM IF SECONDS ADVANCED, PRINT THE TIME AND DATE
110 IF OLD.SECOND% = SECOND% THEN GOTO 60
120 PRINT CHR$ (27) + "Y" + CHR$ (FNPOS%(12)) +
      CHR$ (FNPOS%(31));
130 PRINT "TIME "; HOUR%; ":"; MINUTE%; ":"; SECOND%
140 PRINT CHR$ (27) + "Y" + CHR$ (FNPOS%(13)) +
      CHR$ (FNPOS%(31));
150 PRINT "DATE ", MONTH%, "/"; DAY%, "/",
      YEAR%, CHR$ (7)
160 LET OLD.SECOND% = SECOND%
170 GOTO 60
180 REM
9000 REM  INPUTTING THE TIME WITH PEEK'S.
9010 REM  USE THIS TECHNIQUE WITH INTERPRETER BASIC.
9020 REM  SUBSTITUTE THE ADDRESS GIVEN BY THE FINDMEM.BAS
9030 REM  PROGRAM FOR THE SIX OCCURANCES OF #### BELOW
9040 REM  NOTE. HEX NUMBERS MUST BE PRECEDED BY "&H"
9050 LET SECOND% = PEEK (&H#### + 0)
9060 LET MINUTE% = PEEK (&H#### + 1)
9070 LET HOUR% = PEEK (&H#### + 2)
9080 LET DAY% = PEEK (&H#### + 3)
9090 LET MONTH% = PEEK (&H#### + 4)
9100 LET YEAR% = PEEK (&H#### + 5)
9110 RETURN
```

Conclusion

Save all of your source code for this project in case you change your hardware configuration and have to do this again sometime. Keep the SETIME program on the disk that you normally cold boot from. You can CONFIGURe the operating system to run the SETIME program automaticaliy at every cold boot.

Use the 'Software clock' in your programs. It is handy for timing games, date stamping files and date stamping printed output. The current second can be used as a 'Seed' for BASIC's RANDOMIZE statement. Use your imagination with this previously undocumented feature of Heath CP/M-80.

In part two of this article, I will show you how to interface the Software clock to Microsoft COBOL-80. The existing ACPDAT module within the COBOL run-time library will be replaced with a working date/time module. *

Undocumented Features Of Heath/Zenith PC Series Computers

Pat Swayne
HUG Software Engineer

If you own an H/Z-100 PC series computer, or an H/Z-200 Advanced PC series computer, you own a machine that can do some things that other IBM PC compatible computers cannot do. You probably already know about features such as the built-in ROM debugger and the flicker free display, but there are other unique features built into your computer that they did not tell you about. One can only speculate about the reasons why engineers would design features into a product, and then not document them, but at least it gives people like me something to write about. In this article, I will discuss some undocumented key combinations and undocumented video modes, an undocumented ROM debugger command, and an undocumented MS-DOS feature.

Note: The video modes discussed in this article are supported only by a Zenith Z-309 or Z-409 video card or equivalent (such as the video output from an H/Z-138, H/Z-148, or H/Z-158, etc.). The dot filling interlace mode discussed below also works on a Z-329 or Z-429 video card.

Undocumented Key Combinations

A key combination refers to when you press two or more keys together to produce a unique effect for that combination. An example is the Ctrl-Alt-Del combination, which will reset your computer. Most of the undocumented combinations use Ctrl and Alt plus another key. Here are the undocumented combinations, with an explanation of what they do.

Ctrl-Alt-n — This combination switches to video page n-1 (where n is a number). When your computer is in a text screen mode (as opposed to a graphic screen mode), the video circuitry supports 4 or 8 video pages. In the 40 column modes, it supports 8 pages, and in the 80 column modes, it supports 4 pages. Some programs take advantage of this capability in order to rapidly switch the text on the entire screen, and the commands for switching pages within by software are documented in the Z-100 PC Programmer's Reference Manual. But you can also switch pages manually from the keyboard. For example, to switch to page 1, you would press Ctrl-Alt-2, and to switch back to the default page (page 0), you would press Ctrl-Alt-1. A good use of this feature is to switch to page 1, display the files on a disk, and then switch back to page 0 and continue your work. Later, if you want to see the files on the disk again, just switch back to page 1 to see them instantly. The only problem is that if a program issues a command to the BIOS to set the video mode, even if the computer is already in the mode the program is trying to set, all video pages will be cleared.

Ctrl-Alt-F — This combination switches the video output to a dot filling interlace mode. This means that each time the screen is "painted", the scan lines are slightly offset from the positions they occupied the last time the screen was painted. Unfortunately, this does not happen fast enough to really blend in, and the screen appears to flicker if you are using an ordinary display monitor. A long persistence monitor, such as the Zenith ZVM-136 or ZVM-1360, will cause the interlaced scan lines to blend in and have the desired effect. I have been told that some of the monochrome monitors made by non-Heath/Zenith companies have persistences long enough to blend in the scan lines, but I do not know any specific brand names.

Ctrl-Alt-I — This combination switches the video output to a 50 line interlace mode. In this mode, interlacing is used to get twice as much text onto the screen, rather than to smooth out full size characters. This mode works only if the computer is in an 80 column text mode. Video pages are not supported when this feature is enabled, but all BIOS cursor positioning and other functions recognize that the screen has 50 lines, so if a program can be made to know that the screen has 50 lines, it will use all of them.

One program that can be easily made to use all 50 lines is WordStar. WordStar contains a variable in memory that all functions of the program use to determine how many lines there are on the

screen, and if this variable is changed, the whole program will change. You can change the variable by running Winstall, and typing + at the main menu. This will put you in the Custom Modification mode. Type :HITE as the location to patch, and patch the first byte at this location from 18 (hex) to 31 (hex). You can also use DEBUG to make the patch. Just use it to patch address 248 in WS.COM from 18 to 31.

Note: If you have an older H/Z-150 or H/Z-160, this feature may not work properly on your computer. That is because CRT controller ICs were selected from a number of vendors, and the older monitor ROMs are only capable of switching to the 50 line mode correctly only if a Motorola IC is used. You can correct the problem by upgrading to a newer monitor ROM (which may also improve your computer in other ways). The monitor is a two-chip set found at locations U207 and U208. The ICs at these locations will have part numbers 444-229-xx and 444-260-xx written on them. The xx is a revision number, and the latest revision number available as of this writing is 11. Order 444-229-11 and 444-260-11 from the Heath Co. Parts Dept. if the 50 line interlace mode does not work properly on your computer.

Ctrl-Alt-N — This combination turns off either of the interlace modes discussed above, and restores video output to normal.

Ctrl-Caps Lock and Ctrl-Num Lck — These combinations allow you to change the state of Caps Lock or Num Lck without changing the state of the LED on the key. The sequence in which you press the keys is important when you use these combinations. For Ctrl-Caps Lock, you press Ctrl, then Caps Lock, then release Ctrl, then release Caps Lock. Follow a similar procedure for Ctrl-Num Lck.

Undocumented Video Modes

If you write assembly language programs for your PC, then you probably know about the video control interrupt, INT 10H, which is used to set video modes, address the cursor, etc. The Programmer's Reference Manual lists the function codes that are used to access functions in INT 10H, and it lists a function 100 that is not found in non-Heath/Zenith machines, which is used to select the scrolling mode. There are two other functions available that are not listed in the manual. These functions are explained below.

Function Code 101 — Select Interlace Mode. This function provides software control of the interlace modes that were discussed above in the section on undocumented key combinations. The value in the AL register upon entry controls the mode set by this function. If al is 1, the dot filling interlace mode is selected. If al is 2, the 50 line interlace mode is selected. If al is 0, the display is restored to normal (non-interlace) operation.

Function 102 — Select Scrolling Compatibility. This function writes the value of the AL register into location F000:41, which is part of the ROM monitor's scratchpad memory area. You can write a value into that location using any other method and it will have the same effect. However, the location could possibly change with a change in the monitor ROM version, so you should probably use function 102. If the value written to the location is 0, the computer functions normally. If the value is non-zero, the computer appears to duplicate a "bug" found in a real IBM PC that affects scrolling under certain conditions. I do not understand this "bug" fully, but it is one of the reasons why the non-blinking cursor program (NOBLINK) I presented in last month's REMark will not work on a real IBM PC.

When a program issues a line feed character to function 14 of INT 10H and the cursor is at the bottom of the screen, the text will scroll up one line. From what I understand, the ROM is supposed to use the color attribute from the last character on the last line to determine what background color to use to fill in the blank line when the text scrolls up. This is how a Heath/Zenith PC works, but when I run NOBLINK on a real IBM PC, the color of the cursor is used to fill in the blank line. If I send a non-zero value to function 102 on a Heath/Zenith PC, it duplicates the IBM PC's scrolling problem, and will not run NOBLINK correctly.

Undocumented ROM Debugger Command

The built-in ROM debugger (MFM-150, etc.) in Heath/Zenith PCs contains a command not shown on the HELP screen or your manual. It is the X command, and the purpose is to execute a software interrupt. For example, if you enter

```
->X10
```

interrupt 10 (hex) would be executed. The values in the registers as shown by the R command are passed to the interrupt service routine. This command is DANGEROUS and should be used with care. For example, if the registers could contain values that would be interpreted by the INT 13H routine (BIOS disk routine) as a format disk command. If you then entered X13 at the ROM prompt, your disk would be formatted (erased) immediately.

Undocumented MS-DOS Version 3 Control Codes

When you type in a command at the prompt in MS-DOS version 3.xx, you can erase the entire command by typing Control-U. This is a carry-over from Control-X in CP/M, and you may have discovered it already. Another erasure command that you may not have discovered is Control-W. It will erase everything from the cursor to (but not including) the last punctuation mark typed. For example, if you typed

```
DELETE A:AUTOEXEC.BAT
```

and then typed Control-W, the screen would show

```
DELETE A:AUTOEXEC
```

If you typed Control-W again, the screen would show

```
DELETE A.
```

On some releases of MS-DOS version 3, Control-U and Control-W have been patched out. You can restore them by first removing the flags from the file MSDOS.SYS on your system disk using either the FLAGS program from the Programmer's Utility Pack, or the ATTRIB program from HUG disk no. 885-3025-37. Then use DEBUG to patch MSDOS.SYS as follows:

```
-E1DD6
xxxx:1DD6   90.74   90.5E
-E1DDA
xxxx:1DDA   90.74   90.51
```

Then use FLAGS or ATTRIB again to restore the flags on MSDOS.SYS. *

The Fifth Annual International Heath/Zenith Users' Group Conference Review

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It was the second week in August 1986. On our drive up from Columbia, South Carolina, to Chicago we talked about the upcoming weekend. Matthew wondered who his own age he might meet and whether we could find a word processing program he might like. Janet reserved time for one of Arthur Seebach's talks on desktop publishing and one of Janet Hirsch's on graphics for the Z-100. She also mused about the possibility of our getting a second color monitor so we wouldn't have to shuttle our ZVM-135 back and forth between offices. Would it be an extravagance or a necessary? "Somewhere in between the two," I suggested, "but well worth while if the price is right." I had the talks by Mrs. Hirsch and Mr. Seebach on my own list. We both looked forward to seeing old friends, making new ones, and learning what is happening, what will happen, and what just might happen should rumors and gossip prove true. I especially wanted a first look at First Capitol Computer's new *WildFire* modification for the H/Z-150 series.

All those were valid reasons for travelling several hundred miles to *International HUGCON 86*, the Fifth International Heath/Zenith Users' Group Conference. As usual, the convention was being held at the Hyatt Regency O'Hare Hotel in the complex of hotels clustered around O'Hare International Airport. It's a small metropolis in the Hyatt tradition, glittery and apparently open all night. HUGCON absorbed the Hyatt Regency O'Hare during the weekend of August 15-17. There always seemed to be small groups in the lobby, clustered on the chairs or sofas, talking computers and just about anything else.

When I went to my very first HUGCON, I had feared it would be a gathering of nerds. I wasn't sure I could survive three days of nonstop chatter about bytes, bits, chips, and who knows what else of an electronic nature. Jim Buszkiewicz was who had jollied me into taking the chance. I had, and I was glad I did. What I found then surprised me. These were an extremely intelligent group of people with various interests, orientations, and professions whose common ground for the weekend was Heath and Zenith computers. Casual conversations with strangers in the lobby or the exhibitors' area usually began with the subject of equipment or software. Although the beginnings of conversations could be anticipated, their subsequent directions were not predictable. Often they involved computer problems and solutions and gossip. As often they traced the interests of extraordinary people doing extraordinary things. I had a good time, learned a great deal, and discovered one thing more that decided me to become a regular HUGCON attendee.

What I discovered is that it's easy to repay the cost of a trip to HUGCON from the very real savings on purchases made there. HUGCON is a bargain-hunter's paradise, with prices so low that it's foolish not to go when there's a major purchase impending. This year we got Matthew his word processing program for $5, the *Kids Word Processor* on a public domain disk from Public Brand Software of Indianapolis. Janet got her color monitor for $69.95, a discontinued but quite serviceable ZVM-134 from the Heath Store. I picked up a bunch of things including a ZVM-1240 high resolution monochrome monitor for $69.95 from the Heath Store and the Z-329 card needed to drive it for $99 from First Capitol Computer. By the end of this HUGCON, our room was packed and there wasn't space in the car for everything. Fortunately, we had planned ahead. We had called Gordon and Sheila Bailey (Janet's brother and sister-in-law), who bought a Z-151 and its appurtenances by careful shopping at HUGCON, and in the afterglow of having saved a bundle they volunteered to ship our booty home for us. No, very little of what we bought was impulsive or foolish: nearly everything was what we needed and had planned to buy anyway or when the price was right. The prices most definitely were right — right enough so that our savings more than paid for our trip.

One other realization we had is that the same HUGCON is at least slightly different for every participant. Yours is defined by what you

do, what you see, and who you meet. What we can share, though, are such public events as the Grand Opening and the Dinner, the discussion groups, and the exhibits.

The Grand Opening And The Dinner

HUGCON 86 was grandly opened by Bob Ellerton on Friday evening with the introduction of notables like Jim Buszkiewicz, Debbie Watkins, Nancy Strunk, Pat Swayne, Margaret Bacon, Lori Lerch, Jim Jones, and Herb Friedman, all of whom played significant roles in bringing about this HUGCON. Among Bob's announcements was the news that Bill Parrott had turned over to him disks containing the long-awaited version 3 of H-DOS, which HUG would distribute as a public domain product. The remainder of the evening was divided between one of the wildest auctions I've yet seen and two sensible, informative talks from Heath Company executives, Chas Gilmore and Miles Hoffman.

The first item for bidding was a distinguished piece of HUG memorabilia: the original of the *REMark* logo. I'd thought that the six-sided figure was merely a geometrical device without special significance. Bob explained that the logo in fact was the side panels of three H-8 computers welded together several years ago when a symbol was needed to mark an exhibition booth. Bidding on that historic artifact started at a measly dime and rose quickly to $51, for which it was knocked down to Gene Ramsey.

The first speaker, appropriately, was one of the team that developed the H-8 and helped lead Heath into the computer business, Chas Gilmore, Vice President of New Product Development at Heath Company. He spoke, appropriately, on "HUGCON 1986: Focus on Communications." It was "communications" in the largest sense that he discussed, ranging from the new look in Heathkit manuals through new Heath products to a new Heath magazine.

It's an outreach program. Those new blue-and-white manuals apparently reflect the designer appeal in the latest Heath catalog — friendlier, less forbidding, and "high tech" without being "techie." The new products include a line of Heathkits priced at $50 or under, allowing a novice to try building a useful kit without simultaneously trying either his patience or the family budget. They're the "SK" — for "Starter Kit" — line introduced in the current catalog. Among the first SK offerings of interest to a computer user are the SK-201 telephone and modem surge protector ($14.95), an SK-210 patch board ($14.95) for mating serial devices to the RS-232 port without an expensive breakout box, and an AC "power conductor" ($49.95) that will serve as the switching center for a computer system.

I want them all. None of the three looks forbidding, each meets a real need, and all three *together* cost less than any one of them in comparable fully-assembled units I've priced at local computer stores. You may recall my advice in last month's "Mainstream Computing" to anyone concerned about the possibility of modem damage from a telephone-line surge: buy a modem surge protector for around $90. I hadn't seen Heath's SK line then. Now my advice is to spend $14.95 and the little time it should take to build one instead.

Chas announced a more ambitious and more expensive, but even more rewarding, kitbuilding prospect in the works. There will be an H-248 kit. Anyone strolling past the Rosemont room in the Hyatt O'Hare Regency might have wondered what provoked the burst of loud applause at that moment. It wasn't merely commercial applause. Most of us who are involved with mainstream computers have been pounding on Heath's doors for the 241's big brother. The H/Z-241 is of course the 6MHz AT compatible. It's a hot microcomputer. The H/Z-248 is the 8MHz AT compatible and ought to be even hotter. Unfortunately for us, our federal government has been buying all the 248s made so far. So it's welcome news that we civilians will have a crack at them soon. How soon? I don't know, because Chas didn't say. But soon, I hope.

Soon too will be Heath's new magazine for kit builders, the *Kit Builder's Journal*. It will be informative and bimonthly. If you're interested in writing about building Heathkits, the way to begin your career is with a letter or call to Rick Simpson for information (616/982-3789).

Next on the bill at the Grand Opening was Miles Hoffman, who is in charge of market research for Heath Company. His topic was "Market Research for Heath Company," a topic about which he evidently was well qualified to speak. Miles cascaded statistics and conclusions upon us. From those produced by a 1984 survey he developed a portrait of the "typical HUGgie": 97% male, age 41.8, $40,000 annual family income, and a B.A. or higher. I may have distorted that portrait a bit, but I think I've been reasonably faithful to the good dry humor with which Miles delineated us. We're better educated, better paid, and better looking than most and — besides — we have excellent taste in choosing computers. One most serious point that underlay everything Miles said is that you owe it to yourself and to the rest of us to return completed the questionnaires packaged with your Heath purchases: the company considers them when planning its offerings.

At Saturday's Dinner the Keynote Address was delivered by Lou Frenzel, another member of Heath's original computer design team. He looked back to August 1977 when the first Heath computers were introduced, then moved gradually forward through landmarks such as the start of HUG in 1978, and the time when he helped coin the title *REMark* for our magazine. Where he headed was into the future, beyond the 8088 microprocessor and *PC* and *XT* compatibles, beyond the 80286 and *AT* compatibles, to the immediately-forthcoming generation of the 80386 machines that completely blur the distinction between microcomputers and minicomputers. Risking some predictions, Lou envisioned hardware that would include 1MB RAM chips and would be run by multiuser/multitasking operating systems like UNIX. They would be oriented towards communications in the largest sense: artificial intelligence and expert systems, for preservation and transmission of knowledge; graphics, for dissemination of information; and desktop publishing, for transmuting information into knowledge on which one can base reasonable decisions.

In sharp contrast, the rest of the evening — before and after Lou's talk — was mostly unrefined. It began reasonably enough with the annual recognition awards: Jeff Lines of the St. Louis Heath Users' Group for the First Annual Midwest Hugcon; Ken Smith and Pat Diehl of KRES Engineering as Outstanding Vendor of the Year; Bill Moss, a Lifetime Membership in HUG; and Pat Swayne and Dr. Richard L. Mueller for distinguished contributions to HUG.

Then, Bob Ellerton transformed himself into a version of Monty Hall, Jim Buszkiewicz turned into a big, bearded Don Pardee, and suddenly we were in *Let's Make a Deal*. You may know that television game show in which a contestant drawn at random has a chance to win trash or treasure, and sometimes can transmute trash into treasure by a lucky swap — the deal.

Connie O'Haver and Jan Werner each won top prizes: ensembles of H-241, ZD-200, Z-417-1, Z-409, and ZVM-1330 — two awards of the best microcomputer system currently available. Joe L. Russo won an H-158, HS-317-30, and ZVM-1330. Mary Jane

Ferrell and Arthur Ostrowski each picked up a ZP-150 laptop, and Jane Hesterman tugged away a ZF-171 portable. Jane presumably is now well-equipped to meet an IRS field auditor on equal terms, assuming that said auditor has been supplied with one of the many ZF-171s purchased by IRS. Sharon Willis won an MPI-150 printer. Gregory Schmidt won an IC-4802 50MHz Storage Scope. Billie Davidson had better have an H/Z-100 or might be interested in buying one to go around the *Gemini* board with sound option that he won. And perhaps Billie ought to get to know Wade McKoy, who won a *P-SST* card for the Z-100. Ross Kasten took away a $1,000 gift certificate. Gary Wendt hauled off a leatherbound set of *REMark*. Robert Frye got a box of 100 Dysan floppy diskettes. So did Bonnie Budnick, which may suggest an impending diskette sale from First Capitol Computer. Glenn Davison won only 30 diskettes, but those contained HUG's entire public domain library for compatible computers: a nice prize. Dave McCallister took home a *Robot Banker* made by Radio Shack, presumably not at the same factories that turn out their computers. Jeff Solliday won another Radio Shack product, something called the *Space Voice*. Maybe the voice will inspire Jeff to design a sequel to *WildFire*? Chas Gilmore won something that Buszkiewicz and Ellerton described then, and insist upon continuing to describe, as an "Insulated Line Eliminator." It was Chas's birthday, so I guess he was feeling good and won't send either the Master of Ceremonies or his accomplice off to Siberia. That evening's drama involved the way John Allen came to own a very expensive battery. In fact, John drew the battery on his first turn. He declined the opportunity to make a deal for it, apparently deciding his luck was such that he might do better holding on to the little he had, instead of risking the chance that he might draw something even worse. Pity. The chance he turned down would have brought him a complete H-241 system. It was an incident that sheds new light on the phrase "shocking turn of events." That small battery might be thought to have cost around $4,000.

Can you tell which battery is the $4,000 battery?

The Discussion Groups

Call them "discussion groups," "workshops," "lectures," "talks," or "classes": they're referred to variously and no one term accurately describes them all. Terminology is unimportant, however, because each hour and one-half session took the form thought best by the presenter. As usual they were people doing exciting things of interest to the rest of us. It was, as usual, a broad range of things that covered computers including the Z-100, ZP-150, Z-158, ZF-171, Z-200, and even the Hero 2000. The approaches included programming in assembly language, LISP, ZLOGO, and C. Applications were given equally broad coverage, including desktop publishing, communications, databases, computer-based instrumentation, and computer-aided drafting. There was less breadth in operating systems this year than in the past, probably because the action now involves MS-DOS, XENIX, and local area networks, each of which was the subject of one or more sessions.

Janet Hirsch's "Business Graphics for the H/Z-100" demonstrated — graphically — the astonishing power of Heath/Zenith's mighty 100 for color presentation graphics. Most of us, even we who are involved intimately with IBM compatibles, have recognized the superiority of the Z-100 for graphics. Several of us, including Janet Katz, even have used it for presentation graphics: illustrations, usually in the form of slides, designed to convey information at meetings or on television. A while back, many of us greeted IBM's introduction of the EGA (Extended Graphics Adaptor) as "at last, something a little like Z-100 graphics capabilities" but for much more money.

Janet Hirsch and her husband Richard Hirsch own a design studio in Webster Groves, MO, that specializes in the production of presentation graphics. One result of their work is a software package to do it on the Z-100. The Hirsch's package is now entitled *MR/DR Graphic Design*. It allows use of the Z-100's high-resolution 640 × 480 graphics in interlaced mode, with 92 fill colors, and the Hershey character set. Input can be with Logitech mouse and the Z-100 keyboard or with the keyboard alone, and there is an optional version for use with the Houston Instruments *HIPAD* digitizing pad. Output devices currently include printers compatible with Epson's dot matrix standards and Canon's color inkjet standards.

Despite our familiarity with the Z-100 we were astonished by the rare professional quality of Janet Hirsch's slides and the apparent ease with which they were produced. We most certainly intend keeping up with developments in *MR/DR Graphics Design*. The Z-100 is on the discontinued list now, but the Hirsches have demonstrated that it is by no means obsolete. Incidentally, *MR/DR Graphics Design* was developed with the *Flexi-Graph* graphics support libraries from NOGDC (New Orleans General Data Services) and Micro Doc, who were exhibitors at HUGCON 86.

Arthur Seebach's "DeskTop Publishing, or The Dot Matrix Printer and Beyond" traced printing history from movable types through modern photocomposition. His goal was background to a discussion of what vendors are calling "desktop publishing." By that name, according to my understandings, they really mean something more like desktop printing. It's the production of camera-ready copy or even finished pieces that integrate text with graphics, all of which are designed, keystroked, laid out, and put on paper with a microcomputer and its peripherals. Among the pioneering software packages now available to do this are versions of *TeX* and *Pagemaker* for compatibles.

Those of us with an interest in programming our computers were served admirably at this HUGCON. Peter G. Halverson presented Z-LOGO, a logo dialect published by Colorworks of Tucson, AZ, for both the Z-100 and the Z-150 series. LOGO and its turtle graphics have been used successfully in teaching kids as young as four years old some pretty sophisticated programming concepts. I'd like to try it on Matthew and see what he thinks. The idea is not necessarily to make him a professional programmer, but to further


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both his self-confidence and the crucial concept that nothing human should be alien to him: people start dying the very moment they stop learning. Right? Walt Bilofsky of The Software Toolworks, which publishes a LISP, did a "Thtarting with LISP" to introdooth that litht prothething language, and Bill Parrott hothted some free-for-all thoftware workthops.

Bill Rothman spoke both days on "Device Drivers, TSR Routines, and Device Configuration for MS-DOS" and so did my distinguished colleague Bill Adney on a "Users' View of the New Features of MS-DOS."

The C programming language received, deservedly, broader coverage than any other high-level language — or maybe it's a low-level language — at this HUGCON. Someone fleet of foot and nimble of mind could move from Jack Purdum's "Trouble Spots for the Beginning 'C' Programmer" to Dave Haskell's "Advanced Programming in 'C': Graphics, Utilities, Portability." Jack is the principal of Ecosoft, Inc., which produces the excellent ECO-C88 C compiler I've applauded elsewhere, and the author of several useful texts published by Que Corporation of Indianapolis, IN. Dave probably is best known for *Illustrator*, a graphics program for the Z-100.

One thing I really like about Heath/Zenith users in general and HUG in particular is that we take quiet pride in making computers accessible to novices. There are no dumb questions, only questions that need answers and people who can use a leg up in their learning. Unfortunately, it's not the attitude prevailing outside Heath and Zenith circles. Too often the people temporarily in advance of their brethren try to shroud themselves in the mantle of gurus. I really don't know many people in our crowd who do that — thank Heavens! So HUGCON is a splendid opportunity for new computer users to get that essential boost. Susan Hayes' "Introduction to Computers for the Completely Intimidated" has become an institution at HUGCON, although I suspect Susan herself flinches at any such suggestion. By the way, one of the sights worth travelling to see is Susan in her Software Toolworks uniform. It's a show stopper. Another institution of its kind is Ron Hackney's "Introduction to Computers," which played both days of HUGCON. If you're reading this report as someone who didn't attend HUGCON because it seemed too intimidating, you are making an enormous mistake. Reserve the second weekend in August of next year for HUGCON '87 and join us. We missed you. And, whether you know it yet or not, you missed us.

Since everyone is a beginner at something, there were introductions at other levels too. John Roach, who helps make the Capitol Heath Users' Group one of the enviable microcomputer groups in the country, and one I'm tempted to join for its services even though we live too far away to attend meetings, did an "Introduction to AutoCAD and its Enhancements." Steve Hesterman of Zeducorp and Zeducomp, the Stirling, NJ, firms that I know for *DeZign*, a structured program designer, gave an "Introduction to Local Area Networks." If you have an eye on multiuser/multitasking systems, you should have gone to one of his sessions. You also should have gone to Scott Cutshall's "Introduction to XENIX" whether you were interested in such systems or in the C programming language. From time to time I write in "Mainstream Computing" about my experiences with XENIX on my 158 and I'll be doing more with it on my 241. I'm a user. Scott, with his Zenith information, is an expert. He can talk about Zenith XENIX without losing track of his tongue, a skill I can't master.

Heath people were well represented at HUGCON, the Discussion Groups, or whatever we're calling them now. Pat Swayne took the lid off some nifty undocumented features of the Z-100 and the compatibles in "Z-100 and Z-100 *PC* Secrets Revealed." There was talk about encouraging him to publish those secrets, but until he does I'm sworn to absolute secrecy. No one else who was there will tell you either. You should have been there. Jim Buszkiewicz, on the other hand, probably will tell you everything at any time about "HUG Software... What You're Missing." Jim has me trained now so that when I desperately need a specialized program I look first through my HUG software disks. The funny thing is that I often find what I need, even though I begin by thinking no one has done it. Indeed I have been as brainwashed as everyone else by publicity about IBM *PC* shareware, freeware, and public domain programs. But I'm learning. Jim's *HUGMCP* is the standby modem communications program on all my hard disks, for example. My current delight is a little program that allows text to display on both a CGA monitor and a high resolution monitor simultaneously on my 158: I telephoned Jim to thank him for that one because it has removed an annoying burr from under my saddle. Brian Barnes spoke about "Z-200 Firmware": since Brian wrote much of the firmware for the Z-200 series, his information was straight from the horse's mouth. So were the answers given to hardware questions from the audience by Bob Harris and Rick Simpson: they're from Heath's Technical Consultation Department. (Rick, incidentally, will be responsible for the new *Kit Builder's Journal*, which suggests it will be really useful to novices, as well as old hands.) Jim Lytle, of Heath's Education Department, talked about current and future products in his "Introduction to Computer Based Instrumentation." One of the directions Heath will pursue, according to Chas Gilmore's talk at the Grand Opening, is this new area. John Hubbard, Senior Educational Media Designer at Heath, introduced "HERO 2000," the advanced robot that Matthew believes can be trained to pick up his clothing. "But, son," I respond, "robots don't wear clothing." "Dad, cut it out. You know what I mean."

The experts were present in force to share their knowledge. Matt Gray of Hilgraeve talked formally about his "*HyperACCESS* for the Z-150, Z-170, and Z-240." He also talked about the same subject informally at Hilgraeve's booth on the exhibition floor. Matt is a happy man whose smile broadens with every new review of *HyperACCESS* as probably the best communications program available for *PC* compatibles. I can well understand why: those reviews keep coming from all sides explaining that *HyperACCESS* is to be preferred to *Crosstalk XVI*. By the next HUGCON I suppose we will be able to light Chicago with Matt's smile. Bruce Denton, of D-G Electronics, held a "Hardware 'Bull' Session for Old and New Computer Users" that was so successful everyone wanted a rerun. We had it this year and, I hope, will have it again next year. Gerald Moore, President of Condor, the Ann Arbor firm that makes *Condor* spoke on "Goal Oriented Databases — What To Do Versus How To Do." It's an interesting and usable way to approach the distinction of *Condor*. Gerald's company exhibited at HUGCON, and one product that caught my eye was their new editor. I hope it has the same goal-centered orientation as the database manager. I'll let you know after I've had a chance to see it here.

The Exhibitions

It's a harmless euphemism for "sales booth." Most of us, though, did at least as much looking and questioning as buying. None of the exhibitors mind, though, because — admit it or not — they're enthusiasts as much as vendors. There's little of that finger-twitching one encounters on entering a slick computer store around town. Window shopping is expected and often encouraged.

There's a big, important, reason behind this attitude. For vendors who specialize in Heath and Zenith equipment, the term "goodwill" has real meaning and equally real commercial value. If they make a mistake, they'll go a long way to remedy it — longer, in fact, than seems to make immediate sense. So I've found them to be the very best source of information about products for my computers. I just make sure that if I use one vendor heavily for information about a particular product, I buy that product from that vendor; it's not nice to do otherwise. It's also not awfully smart, I think. The open door that marks a good relationship between seller and buyer can shut from either direction. In general, though, it's acceptable to shop the exhibitor's area at HUGCON before buying. The sport, I find, is knowing when to make the deal.

Computer Support Corporation of Carrollton, TX, had Carole Nelson showing *Diagraph* on a Z-241. *Diagraph* is one of the leading graphics packages for compatibles. Its great strength, I think, is in channeling untrained people so they can produce top-quality graphics. I'd been working with *Diagraph* on the 158 while I waited for my 241 to be repaired, so I thought I knew what to expect of the demonstration. Then I saw it at HUGCON: "What in the world is going on?" Carole had an 80287 numeric coprocessor in the machine so *Diagraph* whipped through its screen displays and an EGA monitor on the machine so the displays were magnificent. *Diagraph* on my 158 was usable but slow, and its screens were pretty good but of about average snazziness. I was most impressed by what I saw of how *Diagraph* is supposed to look: snappy and snazzy in the extreme. I had to be impressed in snatches, though, because the demonstration quickly began attracting people from across the hall. Too bad that *Diagraph* is copy-protected.

Most of the time *WildFire* was the star attraction at Software Wizardry's and First Capitol Computer's booth. It's a modification that *reliably* speeds up the 151 and 161 computers to make them much faster than stock 158s. In addition, they provide a speed switch to go from slow to fast mode and a reset switch for bailing out from computer lockups. An impromptu game of "Let's see if we can break *WildFire*" started almost as soon as the exhibitor's area opened on Friday afternoon. By Sunday afternoon, when HUGCON closed, nobody had put a dent in *WildFire* except some clown who slipped in a suite of benchmarks designed to test an *AT* running at 8MHz with an 80287 numeric coprocessor. On the way home Janet insisted I apologize to Tom Jorgenson for that dirty trick. I would have, except Jeff Solliday — winner of Radio Shack's *Space Voice* and the inventor of *WildFire* — called soon after we got through our front door to say he had figured out what I had done. Jeff's revenge was to boast about trying the same benchmarks with *WildFire* after adding a plain old 8087 numeric coprocessor — and *WildFire* performed *faster* than the souped up *AT*. So much for benchmarks. And so much for fooling around with Jeff Solliday. At least until next year. I do wish, though, that Tom Jorgenson would stop his practice of throwing free software into the crowds from time to time. Someone clobbered me on the back of the head while taking a *Whiz*.

There was a great deal of free or nearly free software available at HUGCON. Fred Pospeschil of Micro Doc gave away to anyone who dropped off the necessary diskettes free copies of a substantial geographical database and software to read it. Mrs. Pospeschil became the unsung heroine of HUGCON 86 because it was she who had the job of copying the seven disks full for each taker. There were many takers. When I saw her on the morning of the second day, she looked absolutely exhausted. She deserves a song of praise. Even more, she deserves a raise. I'm delighted with the database: it's substantial and professional, and the gift was most generous. I was embarrassed to confess that I hadn't seen *FlexiGraph* from Micro Doc and Dave Troendle's New Orleans Data General Services. *FlexiGraph* is a set of sophisticated but easy-to-use library routines for programming graphics on the Z-100 and PC compatibles in several different languages. The possibilities simply cannot be communicated by any description I know how to write. If you are interested to any extent at all in programming graphics on a microcomputer, you simply must evaluate *FlexiGraph*.

What sent me looking was Janet Hirsch's presentation of *MR/DR Graphic Design*, built using *FlexiGraph*. It was so striking, I wanted to see more. Dave Troendle showed me a little more. So did Jack Purdum, Tim Leslie, and the rest of the task force at Ecosoft's booth next door. Ecosoft offers a version of *FlexiGraph* for its *ECO-C88*. It's a $59.95 MS-DOS C compiler package that is accessible to beginners and suitable for advanced programmers. Every time I turn around, it seems, Jack is introducing new features and developments for *ECO-C88* — and every one of them is noteworthy and desirable.

Every vendor had show specials. Newline Software was closing out its last products for the H-89 and some things for the Z-100, gave excellent prices on major products like *The Norton Utilities*, and had a special deal on PC-SIG software, which it is now distributing. Newline's prices were good enough on floppy diskettes so I bought a hundred. Among my remarkably few quirks are the firm convictions that HUGCON is the place to stock up on floppy diskettes and Miriam Campbell is one of the vendors from whom to buy them. So I did. But once again, I did it wrong by not buying enough. I simply can't get it through my head that I really have to stock up: I bought another hundred and fifty from Miriam. Those two hundred and fifty disks won't last this active computing family long. Next year I'll stock up for real.

Steve and Kay Robbins of S&K Technology were demonstrating their *WatchWord* word processing program and their spelling checkers, *Strike* and *The Resident Speller*. At last *WatchWord* is available for the compatibles! If you've never used *WatchWord* on the Z-100, you won't understand that exclamation. If you do use *WatchWord* on the Z-100, you won't need that exclamation. So I guess I've wasted an exclamation point. Of course I have *WatchWord* on my Z-100; of course I now have it for my compatibles; of course I'll be working with it in "Mainstream Computing."

Dave Cheung was showing off the new additions to his *Easy PC* line of modifications to the Z-100. The *Easy PC*, you recall if you own a Z-100, retains the machine's native mode and adds a complete PC-emulation mode. Of course it runs *Flight Simulator* and does all that kind of thing. The *Easy PC* is so sophisticated a product that such questions no longer seem interesting. Now Dave has gone beyond mere emulation. At HUGCON he was showing an *Easy I/O* board that is supposed to give the Easy PC full ability to run *PC* software that depends on access to *PC* hardware such as the serial ports. I was able to squeeze out some time to play with a small network Dave had hung on a Z-100 server using LAN simulation software. He was also talking about an 8087 supplement which he either had released or was about to release.

The floor was stocked well enough so it's difficult to cover everyone. Barry Watzman was frantically setting up to show a *PC* version of *Perks* his desktop program originally released for the Z-100. Public Brand Software had its growing library of *PC* public domain, shareware, and freeware programs. Al Davis was there with the assemblage of parts that always reminds me, fondly, of Canal

Street in New York right after World War II: parts that are inexpensive treasures when you need them, things available nowhere else.

I want to go on and on, and I ought to go on and on. But I can't. I've run out of steam, just as I had at the end of HUGCON itself. We had dinner with Gordon, Sheila, and Laura at a nearby Italian restaurant. Much of the talk of course centered around HUG, HUGCON, and the Baileys' new computer. It turns out that Heath/Zenith computers go well with Shrimp *Fra Diavolo*, a combination I would not have contemplated before but now heartily recommend. That evening Janet, I, and Matthew slept like rocks.

On the way back we chatted from time to time about what we had seen, heard, and done. We had accomplished everything planned on the way up, and more besides. Jeff, of course, called to pull my leg as soon as we walked through our door. Gordon called the next day to say he was impressed with the follow-up treatment he received at his local Heath store. We were home and happy to be back.

We look forward to meeting you at HUGCON '87. ✻

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Roseann M. Giegler
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A Refielding Utility For "MAILPRO"

Thomas Best remarked (in the April, '84, {REMark}) that Clark Systems' "MAILPRO" "is a good basic mailing list package." It can actually be much more than that. I've been using it as my database file manager under HDOS since I purchased it in the Summer of '80. I originally settled on it because it was the cheapest file manager I could find which allowed me to specify fields for my own records. Bonuses while using it were the in-RAM index, random-access file structure for fast access, and access to the source code.

But "MAILPRO" does have some disadvantages. Best addressed a few of these in his aforementioned article ("Bells and Whistles for 'MAILPRO'," pp. 62-3). And I've been making patches to it almost since the day I bought it. However, one of the most serious of these is the inability of the user to alter the fielding in an existing file. It is this problem which I shall address here.

Ideally, there are four different changes that a user should be able to make to the field structure of a "MAILPRO" file. These are: 1) add a completely new field, 2) delete an existing field, 3) change the name of a field, and 4) change the length of a field. The last three could also be combined into a single operation which we might call: 5) replace a field. This would eliminate the aggravation of having to do changes two through four individually! Unfortunately, the shear scale of these operations also eliminates their inclusion in "MAILPRO." I have already run out of memory on my fully-configured H-89 because of file size! The only alternative is an external utility. The accompanying Listing 1 is the source code for this utility.

Some general remarks are in order about the program. First, it was written for HDOS MBASIC ver. 4.82 and "MAILPRO" ver. 127.1; it also assumes an H/Z-19/89 terminal since it makes considerable use of that terminal's escape codes. The source code is reasonably well documented. This includes the variable table at the beginning of the code (which could be omitted if you type in the listing) and the use of REM statements to identify and separate major sections of the code. A debugging subroutine, which assumes a printer, is also included and is toggled on and off by setting the flag, DB, in line 630, to -1 or 0 (true or false, respectively). This routine simply dumps the input record number, input record, and output record to the printer on channel #3. The printer device name is specified in line 1080. The actual operation of the utility is quite straight-forward.

The program is entirely menu-driven and requests other information of the user only when absolutely necessary. However, you, the user, should know roughly what changes you wish beforehand. You should jot down the name of your source file and the name of the output file. This latter is the file with the revised field. To limit possible complications, the program has deliberately been limited to only one change at a time. If you wish multiple changes on a file, you will have to do them sequentially, preserving an "audit trail".

Once you have entered the names of the source and output files, and the program has checked their existence, you are presented with the principal "Function Menu" and an analysis of the source file. The latter tells you the size, in bytes, of each record, how many fields there are per record, the number of records per HDOS sector, and the unused bytes per sector. This information is critical for the economic use of disk storage. The same information is presented for your use in the field change subroutines and a revision displayed, if relevant, for you to verify before the output file is written. These will help you keep your files as frugal of disk storage as possible.

After you have made your choice from the "Function Menu", all of the refield subroutines present you with the names and lengths of the fields in each record of the source file, and except for the field name change routine, redisplays the file statistics. Each field on the display is preceded by a number you use as a menu selection when designating which field you wish to modify. From this point on, you simply plug in information as prompted by the program: new name and length, as necessary for the particular function. Escapes are also present at the beginning and end of each routine in case you change your mind halfway through.

After you have verified new file statistics, the program will begin reading in the source file, changing the fields, and writing the output file. The terminal will continuously display where the program is during the transfer so that you know that activity is actually occurring. Finally, after "MAILPRO"'s .CHA- and .PAR-extensioned files have been written for the new file, you are returned to the "Function Menu".

Although you could modify the file again at this point, the program will simply {overwrite} the output file. So the only valid menu selections are to either exit the program or restart it for new files. If you exercise this latter option, the program will write the name of the old output file to the 25th line as a scratchpad for your reference when doing successive file modifications.

One final note on its use: the program will **not** enter data into any fields you have added or replaced. It has merely filled those fields in the new file with spaces. You will have to edit the file with "MAILPRO" to enter the data you wish.

MPFIELD is quite straight-forward in its use and performance. However, it has one peculiar quirk: it writes the first record of a file twice! This is done with the subroutine call at line 1100. When I originally wrote it, I discovered that the first record of every file was garbaged up with text information from within MBASIC itself. The interpreter appears to be using an area within the end of its own code for the disk file buffers and this ASCII information shows up in the output file. After trying various approaches, my solution was to write the first record twice. I have never seen this occur in any other programs I have written except my two other "MAILPRO" utilities.

So, the editor willing, this will be the first in an erratic series on utilities and modifications for Clark Systems' "MAILPRO". At the moment, the utilities number three, including MPFIELD. Of the remaining two, one converts "MAILPRO"'s random files to sequential and has been used to transfer data from my H-89 to a 16-bit Hewlett-Packard machine. Of course, the latter was able to convert the transferred files to a format it could utilize. The second utility searches for string matches in fields you specify and creates other "MAILPRO" files with the matches it finds. This is useful for splitting oversized files into ones of more manageable proportion while maintaining consistency within each of the smaller files. Another utility in the planning stage will convert "MAILPRO" files to "QUERY!3".

But, as that may be, MPFIELD considerably improves the versatility of "MAILPRO". In fact, it converts this inexpensive mailing list manager into something approaching database file managers costing three to four times as much. I think you will find it as useful as I do.

If you would like to forego all of the typing, plus receive documentation, I would be happy to transfer the ASCII source code and .DOC files for you. All you need do is send me an (formatted) HDOS 40-track hard- or soft-sectored disk, a self-addressed, postage-prepaid mailer, and $2.00 for 125+ sectors of material. If you don't include the mailer or return postage, the transfer charge is $4 to cover the cost of same.

Listing 1

```
10 REMMPFIELD.MBS
20 REM                          by
30 REMKirk L Thompson
40 REMWest Branch, IA
50 REMSeptember, 1983
60 REM
70 REM Copyright (c) 1985 by Kirk L Thompson
80 REM This program is put in the public domain and
       may be freely distributed!
90 REM Commercial distribution is NOT permitted!
100 REM
110 REMVARIABLE TABLE:
120 REM=============================================
130 REMA$General string prompt answer,
                            usually yes or no
140 REMB$Source file dummy string
150 REMB$()Source file FIELD string array
160 REMB%()Source file field lengths
170 REMCSource file FOR/NEXT loop record
                            number
180 REM CD$Cursor down (ESC B)
190 REMCS$Clear screen (ESC E)
200 REM CU$Cursor up (ESC A)
210 REMDBDebug subroutine toggle (see
                            line 570)
220 REMDFField number to be deleted
230 REMEError number
240 REM E25$Enable 25th line (ESC x1 ESC
                            Y8<space>)
250 REMEEL$Erase to end-of-line (ESC K)
260 REMERV$Enter reverse video (ESC p)
270 REMFNumber of field name to change
280 REMF$Function number
290 REMFLField length
300 REMI%Source record location in sector
                            during FIELDing
310 REMIO%Output record location in sector
                            during FIELDing
320 REMJGeneral FOR/NEXT loop index
330 REML1%Source file longest field name
                            length
340 REMN$()Source file field name array
350 REMN%Number of fields/record in
                            source file
360 REMNFNew field length
370 REMNF$Name of new field
380 REMNL()Intermediate field length array
390 REMNL1%Output file longest field name
                            length
400 REMNN$()Output file field name array
410 REMNN%Number of fields/record in
                            output file
420 REMNS%Number of records/sector in
                            output file
430 REMNT%Record length in output file
440 REMO$Dummy string in output FIELDing
450 REMO$()Output file string field array
460 REMO%()Output file field length array
470 REMOF$Output file name
480 REMPA$()Source .PAR file field string
                            array
490 REMPO$()Output .PAR file field string
                            array
500 REMQNumber of records in source/
                            output files (less one)
510 REM RAM$Reset terminal (ESC z)
520 REMRCP$Return to saved cursor position
                            (ESC k)
530 REMRFReplacement field number
540 REMRO0utput file sector number
550 REMRSSource file sector number
560 REMS%Number of records/sector in
                            source file
570 REMSCP$Save cursor position (ESC j)
580 REMSF$Source file name
590 REMT%Record length in source file
600 REM TBTab position
610 REMXRV$Exit reverse video (ESC q)
620 REM
630 CLEAR 1000:DEFINT A-Z:CS$=CHR$(27)+CHR$(69):
    ERV$=CHR$(27)+CHR$(112):@XRV$=CHR$(27)+CHR$(113):
    SCP$=CHR$(27)+CHR$(106):RCP$=CHR$(27)+CHR$(107):@
    EEL$=CHR$(27)+CHR$(75):DB=0
    REM db=debug flag (-1=on, 0=off)
640 CD$=CHR$(27)+CHR$(66):RAM$=CHR$(27)+CHR$(122).
```

```
    E25$=CHR$(27)+"x1"+CHR$(27)@+"Y8 ":
    CU$=CHR$(27)+CHR$(65)
650 PRINT CS$:PRINT:PRINT STRING$(33,32);ERV$;
    "M A I L P R O";XRV$:PRINT:@PRINT STRING$(20,32);
    "F I E L D   C H A N G E   U T I L I T Y"
660 PRINT:PRINT
    DIM N$(12),B%(12),B$(12),0%(12),0$(12),NN$(12),NL(12)
670 REM***get & check source file name***
680 PRINT:INPUT
    "Enter source filename (dvd:fname)[.DAT assumed]--",
    SF$
690 IF INSTR(SF$,".")>0 THEN PRINT ERV$;
    "Extension not allowed!";XRV$:GOTO 680
700 PRINT:PRINT"Is ";ERV$;SF$;XRV$;:INPUT" OK (Y/N)";A$
710 IF LEFT$(A$,1)="N" OR LEFT$(A$,1)="n" THEN 680
720 PRINT:ON ERROR GOTO 2650
730 OPEN"I",#1,SF$+".DAT":CLOSE
740 REM***get & check output file***
750 PRINT:INPUT"
    Enter output file (dvd:fname)[.DAT assumed]--";0F$
760 IF INSTR(0F$,".")>0 THEN PRINT ERV$;
    "Extension not allowed!";XRV$:GOTO 750
770 PRINT:PRINT"Is ";ERV$;0F$;XRV$;.INPUT" OK (Y/N)";A$
780 IF LEFT$(A$,1)="N" OR LEFT$(A$,1)="n" THEN 750
790 PRINT:OPEN"I",#2,0F$+".DAT":CLOSE:PRINT:PRINT ERV$;@
    "File already exists!";XRV$:GOTO 750
800 REM***read source file  CHA &  PAR files***
810 PRINT"Reading source .CHA and  PAR files."
820 OPEN"R",#1,SF$+".PAR"
830 FIELD#1,1 AS PA$(0),2 AS PA$(1),2 AS PA$(2),2
    AS PA$(3),2 AS PA$(4),32 AS PA$(5),16 AS PA$(6),16
    AS PA$(7),16 AS PA$(8)
840 GET#1,1:S%=CVI(PA$(1)):T%=CVI(PA$(2)):N%=CVI(PA$(3)):
    L1%=CVI(PA$(4)):@Q=CVI(PA$(5)):CLOSE:NS%=S%:NT%=T%:
    NN%=N%:NL1%=L1%
850 OPEN"I",#1,SF$+".CHA"
860 FOR J=1 TO N%:LINE INPUT#1,N$(J):NN$(J)=N$(J):
    INPUT#1,B%(J):NL(J)=B%(J):@ NEXT J:CLOSE
870 E=0:REM set error flag to zero
880 REM***display menu & choose function***
890 PRINT CS$
900 PRINT TAB(27)"F U N C T I O N   M E N U"
910 PRINT STRING$(79,61)
920 PRINT TAB(10) "1   .Add field";
    TAB(40)"4....Change field length"
930 PRINT TAB(10) "2 ...Delete field";
    TAB(40)"5   .Replace field"
940 PRINT TAB(10) "3.  .Change field name";TAB(40)@
    "6....Restart program for new files"
950 PRINT TAB(31)"7  ..Exit program"
960 PRINT STRING$(79,61)
970 PRINT:PRINT"Source file   ";ERV$;SF$;XRV$;",
    output file:  ";ERV$;0F$;XRV$
980 PRINT:GOSUB 2860
990 IF E>0 THEN GOSUB 2570
1000 PRINT:INPUT"Enter FUNCTION desired (1 to 7)--";F$
1010 IF VAL(F$)<1 OR VAL(F$)>7 THEN PRINT ERV$,
     "Only 1 to 7!";XRV$:GOTO 1000
1020 IF VAL(F$)=6 THEN PRINT:
     INPUT"Restart program (Y/N)";A$:@
     IF LEFT$(A$,1)="N" OR LEFT$(A$,1)="n"
     THEN 890 ELSE @ PRINT SCP$;E25$;ERV$:
     "Prior output file: ";0F$;XRV$;RCP$:RUN
1030 IF VAL(F$)=7 THEN PRINT:INPUT"Exit program (Y/N)";
     A$:IF LEFT$(A$,1)="N" @ OR LEFT$(A$,1)="n"
     THEN 890 ELSE PRINT RAM$:END
1040 ON VAL(F$) GOSUB 1410,1610,1790,1950,2140
1050 IF E>0 THEN 890
1060 IF LEFT$(A$,1)="N" OR LEFT$(A$,1)="n" THEN 890
1070 PRINT CS$;"Transferring data..."
1080 OPEN"R",#1,SF$+".DAT":OPEN"R",#2,0F$+".DAT":
     IF DB THEN OPEN"0",#3,"LP:"
1090 PRINT:PRINT"Transferring record: ";SCP$
1100 GOSUB 2710
1110 FOR C=0 TO Q:PRINT RCP$;EEL$;C+1,"of";Q+1
1120 REM***set up, field, & read source record***
1130 RS=C\S%+1:I%=C-S%*(RS-1)
1140 FIELD#1,T%*I% AS B$,B%(12) AS B$(12),B%(11)
     AS B$(11),B%(10) AS B$(10),@ B%(9) AS B$(9),B%(8)
     AS B$(8),B%(7) AS B$(7),B%(6) AS B$(6),@ B%(5)
     AS B$(5),B%(4) AS B$(4),B%(3) AS B$(3),B%(2)
     AS B$(2),@ B%(1) AS B$(1)
1150 GET#1,RS
1160 REM***set up & field output record***
1170 RO=C\NS%+1:IO%=C-NS%*(RO-1)
1180 FIELD#2,NT%*IO% AS 0$,0%(12) AS 0$(12),0%(11)
     AS 0$(11),0%(10) AS 0$(10),@ 0%(9) AS 0$(9),0%(8)
     AS 0$(8),0%(7) AS 0$(7),0%(6) AS 0$(6),@ 0%(5)
     AS 0$(5),0%(4) AS 0$(4),0%(3) AS 0$(3),0%(2)
     AS 0$(2),@ 0%(1) AS 0$(1)
1190 REM***assign source record to output record***
1200 FOR J=1 TO NN%:0%(J)=NL(J):LSET 0$(J)=B$(J):NEXT J
1210 IF VAL(F$)=1 THEN LSET 0$(NN%)=SPACE$(NL(NN%))
1220 IF VAL(F$)=2 THEN 0%(DF)=0
1230 IF VAL(F$)=3 THEN
1240 IF VAL(F$)=4 THEN
1250 IF VAL(F$)=5 THEN LSET 0$(RF)=SPACE$(NF)
1260 IF DB THEN GOSUB 2370
1270 PUT#2,RO:REM write output record
1280 NEXT C:CLOSE
1290 REM***open & write output .CHA &  PAR files***
1300 PRINT:PRINT
1310 PRINT"End of data transfer;
     writing output  CHA and .PAR files   "
1320 OPEN"R",#1,0F$+".PAR"
1330 FIELD#1,1 AS P0$(0),2 AS P0$(1),2 AS P0$(2),2
     AS P0$(3),2 AS P0$(4),@ 2 AS P0$(5),16 AS P0$(6),16
     AS P0$(7),16 AS P0$(8)
1340 LSET P0$(0)="C":LSET P0$(1)=MKI$(NS%):
     LSET P0$(2)=MKI$(NT%):@ LSET P0$(3)=MKI$(NN%):
     LSET P0$(4)=MKI$(NL1%):LSET P0$(5)=MKI$(Q)
1350 LSET P0$(6)=0F$+".DAT":LSET P0$(7)=0F$+".PAR":
     LSET P0$(8)=0F$+" CHA"
1360 PUT#1,1:CLOSE
1370 OPEN"0",#1,0F$+".CHA"
1380 FOR J=1 TO NN%:PRINT#1,NN$(J):PRINT#1,NL(J):
     NEXT J:CLOSE
1390 PRINT CHR$(7):GOTO 890:REM forced return to menu
1400 REM
1410 REM***add field subroutine***
1420 REM
1430 IF NN%=12 THEN E=1:GOTO 1590
1440 IF NT%=255 THEN E=2:GOTO 1590
1450 PRINT CS$;"ADD FIELD--"
1460 GOSUB 2460:GOSUB 2860
1470 PRINT:INPUT"Add field (Y/N)";A$
     IF LEFT$(A$,1)="N" OR LEFT$(A$,1)="n" @ THEN 1590
1480 PRINT:INPUT"What is new field name";NF$
1490 PRINT:PRINT
     "What is new field length (1 to";256-NT%;:INPUT")",
     NF
1500 IF (NT%+NF)>256 OR NF<1 THEN PRINT ERV$;"1 to",
     256-NT%;"only!";@ XRV$:GOTO 1490
1510 PRINT:PRINT"New field name is ";ERV$;NF$;XRV$;
     " with length =";@ ERV$;NF;XRV$;
1520 INPUT"(Y/N)";A$:
     IF LEFT$(A$,1)="N" OR LEFT$(A$,1)="n" THEN 1480
1530 PRINT:PRINT"New Record/Field Statistics:"
1540 PRINT TAB(5) "Record size =";NT%+NF,
     "bytes, fields per record =";NN%+1
1550 PRINT TAB(5) "Records per sector =";256\(NT%+NF);@
     ", unused bytes per sector =";
     256-((NT%+NF)*(256\(NT%+NF)))
1560 PRINT:INPUT"Is this OK (Y/N)";A$:
     IF LEFT$(A$,1)="N" OR LEFT$(A$,1)="n" @ THEN 1450
1570 NN%=NN%+1:NN$(NN%)=NF$:NL(NN%)=NF:NT%=NT%+NF:
     NS%=256\NT%
1580 IF NF>NL1% THEN NL1%=NF
1590 RETURN
1600 REM
1610 REM***delete field subroutine***
1620 REM
1630 IF NN%=1 THEN E=3:GOTO 1770
1640 PRINT CS$;"DELETE FIELD--"
1650 GOSUB 2460:GOSUB 2860
1660 PRINT:INPUT"Delete field (Y/N)";A$:
```

```
    IF LEFT$(A$,1)="N" OR LEFT$(A$,1)=@ "n" THEN 1770
1670 PRINT:PRINT
    "Field no  to delete (1 to";NN%;:INPUT")";DF
1680 IF DF<1 OR DF>NN% THEN PRINT ERV$:"1 to";NN%;
    "only!";XRV$:GOTO 1670
1690 PRINT:PRINT"Delete ";ERV$;NN$(DF);XRV$;" field";
    :INPUT" (Y/N)";A$
1700 IF LEFT$(A$,1)="N" OR LEFT$(A$,1)="n" THEN 1670
1710 PRINT:PRINT"New Record/Field Statistics:"
1720 PRINT TAB(5) "Record size =";NT%-NL(DF);
    "bytes, fields per record =";@ NN%-1
1730 PRINT TAB(5) "Records per sector =";
    256\(NT%-NL(DF));@ ", unused bytes per sector =";
    256-((NT%-NL(DF))*(256\(NT%-NL(DF))))
1740 PRINT:INPUT"Is this OK (Y/N)";A$:
    IF LEFT$(A$,1)="N" OR LEFT$(A$,1)="n" @ THEN 1640
1750 NN%=NN%-1:NT%=NT%-B%(DF):NS%=256\NT%
1760 FOR J=DF TO 11:SWAP NN$(J),NN$(J+1).
    SWAP NL(J),NL(J+1):NEXT J
1770 RETURN
1780 REM
1790 REM***change field name subroutine***
1800 REM
1810 PRINT CS$;"CHANGE FIELD NAME--"
1820 GOSUB 2460
1830 PRINT:INPUT"Change field name (Y/N)";A$:
    IF LEFT$(A$,1)="N" OR LEFT$(A$,1)@ ="n" THEN 1930
1840 PRINT:PRINT
    "Which field number to change name of (1 to";NN%;
1850 INPUT")";F:IF F<1 OR F>NN% THEN PRINT ERV$;
    "1 to";NN%;"only!";XRV$:@ GOTO 1840
1860 PRINT:PRINT"Change ";ERV$;NN$(F);XRV$;
    :INPUT" field (Y/N)";A$
1870 IF LEFT$(A$,1)="N" OR LEFT$(A$,1)="n" THEN 1830
1880 PRINT:INPUT"What is new field name";NF$:PRINT
1890 PRINT"Name of new field is ";ERV$;NF$;XRV$;
    :INPUT" (Y/N)";A$
1900 IF LEFT$(A$,1)="N" OR LEFT$(A$,1)="n" THEN 1880
1910 IF LEN(NF$)>NL1% THEN NL1%=LEN(NF$)
1920 NN$(F)=NF$
1930 RETURN
1940 REM
1950 REM***change field length subroutine***
1960 REM
1970 PRINT CS$;"CHANGE FIELD LENGTH--":GOSUB 2460:
    GOSUB 2860
1980 PRINT:INPUT"Change field length (Y/N)";A$
1990 IF LEFT$(A$,1)="N" OR LEFT$(A$,1)="n" THEN 2120
2000 PRINT:PRINT
    "Which field to change length on (1 to";NN%;:INPUT")";
    F
2010 IF F<1 OR F>NN% THEN PRINT ERV$;"1 to";NN%"only!",
    XRV$:GOTO 2000
2020 PRINT:PRINT"Change length of ";ERV$;NN$(F);XRV$;
    :INPUT" field (Y/N)";A$
2030 PRINT:PRINT"What will new length be (1 to";
    256-NT%+NL(F);:INPUT ")";FL
2040 IF (NT%-NL(F)+FL)>256 OR FL<1 THEN PRINT ERV$;
    "Length out of range!";@ XRV$:GOTO 1970
2050 PRINT:PRINT"New field length is";FL,
    :INPUT"(Y/N)";A$
2060 IF LEFT$(A$,1)="N" OR LEFT$(A$,1)="n" THEN 2030
2070 PRINT:PRINT"New Record/Field Statistics:"
2080 PRINT TAB(5) "Record size =";NT%-NL(F)+FL;
    "bytes, fields in record =";@ NN%
2090 PRINT TAB(5) "Records per sector =";
    256\(NT%-NL(F)+FL);@ ", unused bytes per sector =";
    256-((NT%-NL(F)+FL)*(256\(NT%-NL(F)+FL)))
2100 PRINT:INPUT"Is this OK (Y/N)";A$.
    IF LEFT$(A$,1)="N" OR LEFT$(A$,1)="n" @ THEN 1970
2110 NT%=NT%-NL(F)+FL:NL(F)=FL:NS%=256\NT%
2120 RETURN
2130 REM
2140 REM***replace field subroutine***
2150 REM
2160 PRINT CS$;"REPLACE FIELD--"
2170 GOSUB 2460:GOSUB 2860
2180 PRINT:INPUT"Replace field (Y/N)";A$:
    IF LEFT$(A$,1)="N" OR LEFT$(A$,1)@ ="n" THEN 2350
2190 PRINT:PRINT"Number of field to replace (1 to";NN%,
2200 INPUT")";RF:IF RF<1 OR RF>NN% THEN PRINT ERV$;
    "One to";NN%;"only!";XRV$:@ GOTO 2190
2210 PRINT:PRINT"Replace ";ERV$;NN$(RF);XRV$;
    :INPUT" field (Y/N)";A$
2220 IF LEFT$(A$,1)="N" OR LEFT$(A$,1)="n" THEN 2190
2230 PRINT:INPUT"New field name";NF$:PRINT:
    PRINT"New field name is ";ERV$;NF$;@ XRV$;
2240 INPUT" (Y/N)";A$:IF LEFT$(A$,1)="N" OR
    LEFT$(A$,1)="n" THEN 2230
2250 PRINT:PRINT"New field length (1 to";256-NT%+NL(RF);
    .INPUT")";NF
2260 IF (NT%+NF-NL(RF))>256 OR NF<1 THEN PRINT ERV$;
    "1 to";256-NT%+NL(RF);@ "only!";XRV$:GOTO 2250
2270 PRINT:PRINT"New field length is";ERV$;NF;XRV$;
2280 INPUT" (Y/N)";A$:IF LEFT$(A$,1)="N"
    OR LEFT$(A$,1)="n" THEN 2250
2290 PRINT:PRINT"New Record/Field Statistics:"
2300 PRINT TAB(5) "Record size =";NT%-NL(RF)+NF;
    "bytes, fields per record =";@ NN%
2310 PRINT TAB(5) "Records per sector =",
    256\(NT%-NL(RF)+NF);@ ", unused bytes per sector =";
    256-((NT%-NL(RF)+NF)*(256\(NT%-NL(RF)+NF)))
2320 PRINT:INPUT"Is this OK (Y/N)";A$:
    IF LEFT$(A$,1)="N" OR LEFT$(A$,1)="n" @ THEN 2160
2330 NN$(RF)=NF$:IF LEN(NF$)>NL1% THEN NL1%=LEN(NF$)
2340 NT%=NT%-NL(RF)+NF:NL(RF)=NF:NS%=255\NT%
2350 RETURN
2360 REM
2370 REM
    ***debug subroutine--assumes printer on chann. #3***
2380 REM
2390 PRINT#3,"Transferring record #";C+1:PRINT#3,
2400 PRINT#3,"Source record:":FOR J=1 TO N%
2410 PRINT#3,TAB(5) N$(J);TAB(35) B$(J)
2420 NEXT J:PRINT#3,"Output record:":FOR J=1 TO NN%
2430 PRINT#3,TAB(5) NN$(J);TAB(35) O$(J)
2440 NEXT J:PRINT#3,:PRINT#3,:RETURN
2450 REM
2460 REM***display fields subroutine***
2470 REM
2480 PRINT:PRINT TAB(22)
    "FIELDS (LENGTHS) PRESENTLY IN RECORD"
2490 PRINT TAB(15) STRING$(50,61):TB=14
2500 FOR J=1 TO NN%
2510 IF J>(NN%+1)\2 THEN PRINT RCP$;CD$;SCP$;:TB=0
2520 PRINT TAB(TB) J;"...";NN$(J);
    " (";MID$(STR$(NL(J)),2);")" ;
2530 IF J=1 THEN PRINT TAB(40);CU$;SCP$:PRINT ELSE PRINT
2540 NEXT J
2550 PRINT:RETURN
2560 REM
2570 REM***error display***
2580 REM
2590 PRINT ERV$;"ERROR:  ";
2600 IF E=1 THEN PRINT
    "no  of fields already at max  (12)!",
2610 IF E=2 THEN PRINT
    "length of record at max. (256 bytes)!";
2620 IF E=3 THEN PRINT"only  one (1) field in record!";
2630 PRINT XRV$:PRINT:E=0:RETURN
2640 REM
2650 REM***disk file error trap & handler***
2660 REM
2670 IF ERR=53 AND ERL=730 THEN PRINT ERV$;
    "File does not exist!";XRV$:@ RESUME 680:
    REM source file not found error
2680 IF ERR=53 AND ERL=790 THEN RESUME 800:
    REM ouput file not found error
2690 ON ERROR GOTO 0
2700 REM
2710 REM***write subroutine for 1st record only to
    cover file-write bug***
2720 REM
2730 FIELD#1,0 AS B$,B%(12) AS B$(12),B%(11)
    AS B$(11),B%(10) AS B$(10),@ B%(9) AS B$(9),B%(8)
    AS B$(8),B%(7) AS B$(7),B%(6) AS B$(6),@ B%(5)
```

```
     AS B$(5),B%(4) AS B$(4),B%(3) AS B$(3),B%(2)
     AS B$(2),@ B%(1) AS B$(1)
2740 GET#1,1
2750 FIELD#2,Ø AS O$,O%(12) AS O$(12),O%(11)
     AS O$(11),O%(10) AS O$(10),@ O%(9) AS O$(9),O%(8)
     AS O$(8),O%(7) AS O$(7),O%(6) AS O$(6),@ O%(5)
     AS O$(5),O%(4) AS O$(4),O%(3) AS O$(3),O%(2)
     AS O$(2),@ O%(1) AS O$(1)
2760 FOR J=1 TO NN%:O%(J)=NL(J):LSET O$(J)=B$(J):NEXT J
2770 IF VAL(F$)=1 THEN LSET O$(NN%)=SPACE$(NL(NN%))
2780 IF VAL(F$)=2 THEN O%(DF)=Ø
2790 IF VAL(F$)=3 THEN
2800 IF VAL(F$)=4 THEN
2810 IF VAL(F$)=5 THEN LSET O$(RF)=SPACE$(NF)
2820 IF DB THEN GOSUB 2370
2830 PUT#2,1
2840 RETURN
2850 REM
2860 REM***source file statistics subroutine***
2870 REM
2880 PRINT"Record/field Statistics:":PRINT TAB(5)
     "Record size =";T%;@ "bytes, fields per record=";N%
2890 PRINT TAB(5)"Records per sector =";S%:
     ",unused bytes per sector =";@ 256-(T%*S%):PRINT
2900 RETURN
```

*

HUG NEW PRODUCTS

HUG P/N 885-3039-37
HelpScreen $20.00

Introduction: HelpScreen is a program to create and place in upper video RAM on the H/Z-100 (not PC) computer, useful, user-generated help messages. These messages (help screens) can be requested at any time during the execution of a piece of software.

Requirements: HelpScreen requires 64k video chips and version 2.5 or higher Monitor ROM on an H/Z-100 (not PC). It will run under Z-DOS (MS-DOS ver. 1), or any version of MS-DOS.

The files included on this disk are:

HELPSCRN	.ASM	- Source code for the program
HELPSCRN	.COM	- Executable program
SAMPLE	.HLP	- Example "help screen" file
WORDSTAR	.HLP	- Wordstar "help-screen" file
ZPC	.HLP	- ZPC (PC emulator by Pat Swayne) "help screen" file
README	.DOC	- ASCII program documentation file

Authors: Dennis Myers and George Crawford

Program Content: HelpScreen is a program written to give users of the Zenith H/Z-100 (not PC) computer the ability to create their own "help screens" for any program they wish. The program consists of (1) a small text editor that allows the creation of a "help screen message", (2) a non-resident module that allows the "loading" of a "help screen message" into video RAM, and (3) a resident module that "toggles" video memory whenever the appropriate "toggle key" (either the HELP or SHIFT-HELP) is struck. When this toggle occurs, the program in execution is "interrupted", and the help screen message is instantaneously displayed. When the toggle key is again struck, the interrupted program resumes EXACTLY where it was interrupted from.

Comments: Excellent for complex programs having hundreds of commands (like Wordstar) that you know exist, but don't feel like looking up in the manual.

TABLE C Rating: (9)

HUG P/N 885-8046-37
Assembly Language Utilities $20.00

Introduction: This package includes a variety of utility programs designed to be used with Zenith Data Systems' implementation of both Version 2 and 3 of the Microsoft Disk Operating System (MS-DOS) for Zenith Z-100 series personal computers and IBM PC-compatible (Z-100 PC) personal computers. Most of the programs

TABLE C
Product Rating

10 - Very Good
9 - Good
8 - Average

Rating values 8-10 are based on the ease of use, the programming technique used, and the efficiency of the product.

7 - Has hardware limitations (memory, disk storage, etc.)
6 - Requires special programming technique
5 - Requires additional or special hardware
4 - Requires a printer
3 - Uses the Special Function Keys (f1,f2,f3,etc.)
2 - Program runs in *Real Time
1 - Single-keystroke input
0 - Uses the H19 (H/Z89) escape codes (graphics, reverse video)

Real Time — a program that does not require interactivity with the user. This term usually refers to games that continue to execute with or without the input of the player, e.g. p/n 885-1103 or 885-1211[-37] SEA BATTLE.

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NOTE

The [-37] means the product is available in hard-sector or soft-sector. Remember, when ordering the soft-sectored format, you must include the "-37" after the part number; e.g. 885-1223-37.

Note: All special update offers announced in REMark (i.e. ZPC II update) must be paid by check or money order, payable to the Heath Users' Group. **NO CREDIT CARDS ACCEPTED.** ZPC II contains only one disk. It is a combination of ZPC I and the ZPC Support disk plus added improvements. Thank you.

will work fine on other vendor's versions of MS-DOS (IBM's PC-DOS, for example), although this can't be guaranteed in all cases.

Since the 8088 assembly language source code is provided for the programs in this package, it can be used as a tutorial on assembly language programming. More sophisticated users may wish to study the techniques used in order to apply them in their own programs. Some of the advanced techniques used include terminate-and-stay-resident processing, dynamic memory management, and child process execution.

Requirements: You will need either an H/Z-100 series or H/Z-100 PC series computer and either Version 2 or 3 of the MS-DOS operating system.

If you wish to modify the programs in this package, you will need the Zenith MS-DOS Programmer's Utility Package, or either the Microsoft or IBM Macro Assembler and Linker. All of the assembly language source files included in this package can be assembled using any version of MASM from 1.27 through 4.0

Author: John F. Stetson

Content: In addition, there are several documentation files provided which cover a variety of MS-DOS related topics. These include an overview of the new capabilities in MS-DOS 3.1, problems with the ECHO command, use of the PROMPT command, modifications to the Z-100 MS-DOS BIOS to support the use of up to four 5" 48 and 96 tpi floppy disks, and the following modifications to the MDISK.DVD memory disk device driver supplied with the Zenith MS-DOS Programmer's Utility Pack:

- Modifications to allow MDISK to retain its contents across a warm system reboot.
- Modifications to add a software "LED" graphic symbol which indicates when the memory disk is being accessed, and whether a read or write operation is occurring.
- Modifications to add a disk volume label to the memory disk and to fix various bugs.

README	.DOC	- Documentation file
ASMCOM	.BAT	- Sample .BAT file used to assemble the programs

The following files are Z-100 specific.

KEYS	.ASM	- Display Z-100 function key definitions
KEYS	.COM	- Executable version of KEYS

The following files are designed to be used together as a simple time logging system under MS-DOS. By placing the LOGON.BAT file at the end of your AUTOEXEC.BAT file, you will have the date and time you last powered down displayed. By executing the LOGOFF.BAT file prior to powering down the system, you will have the date and time you last booted the system displayed.

DATETIME	.ASM	- Display system day, date, and time
DATETIME	.COM	- Executable version of DATETIME
LOGON	.BAT	- Display last date/time off system at boot time
LOGOFF	.BAT	- Display last date/time on system at exit time
LOGON	.DAT	- Data file used by .BAT files above
LOGOFF	.DAT	- Data file used by .BAT files above

The following files are designed to be used together to provide an automatic method of rebooting the operating system in such a way that it is free from any device drivers, or terminate-and-stay-resident type programs. This is helpful when testing new versions of these types of programs in order to avoid any possible conflicts.

BOOT	.ASM	- Reboot the operating system
BOOT100	.COM	- Z-100 executable version of BOOT .COM
BOOTPC	.COM	- PC compatible executable version of BOOT.COM
NATIVE	.BAT	- Reboot without device drivers or resident programs
NORMAL	.BAT	- Restore normal system operation after running NATIVE

The following files will run on both Z-100s and PC compatibles.

BEEP	.ASM	- Generate a tone in .BAT files
BEEP	.COM	- Executable version of BEEP
CMD	.ASM	- Execute COMMAND.COM as a child process
CMD	.COM	- Executable version of CMD.COM
CPU	.ASM	- Determine the speed of the CPU chip
CPU100	.COM	- Z-100 executable version of CPU.COM
CPUPC	.COM	- PC compatible executable version of CPU.COM
CRLF	.ASM	- Send CR and LF to console from a .BAT file
CRLF	.COM	- Executable version of CRLF
FF	.ASM	- Send a form feed character to the printer
FF	.COM	- Executable version of FF
MODEM	.ASM	- "Dumb" terminal modem program
MODEM100	.COM	- Z-100 executable version of MODEM .COM
MODEMPC	.COM	- PC compatible executable version of MODEM.COM
PASSWORD	.ASM	- Password protection for hard disk systems
PASSWORD	.DVD	- Executable version of PASSWORD
RAM	.ASM	- Display total RAM, RAM used, and RAM free
RAM	.COM	- Executable version of RAM
RAMFIT	.ASM	- Display or change RAM allocation strategy
RAMFIT	.COM	- Executable version of RAMFIT
RAMLIM	.ASM	- Limit the amount of system RAM
RAMLIM	.COM	- Executable version of RAMLIM
SD	.ASM	- Sorted directory utility program (V5.2)
SD	.DOC	- Documentation file for SD.COM
SD100	.COM	- Z-100 executable version of SD.COM
SDPC	.COM	- PC compatible executable version of SD .COM
SHELL	.ASM	- Execute COMMAND.COM from within programs
SHELL100	.COM	- Z-100 executable version of SHELL .COM
SHELLPC	.COM	- PC compatible executable version of SHELL.COM

Continued on Page 67

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Pascal Directory Sort Routine

Todd Merriman
210 W. Benson Street
Decatur, GA 30030

It would often be ideal to view the disk directory from within a program or application. DISKDIR.CPM (CP/M version) and DISKDIR.MSD (MSDOS version) allow you to add this feature to your Turbo Pascal programs.

This directory sort routine demonstrates the use of system calls with Turbo Pascal. It uses a recursive Quiksort routine to alphabetize the directory entry on a selected disk. Upon entering the routine, the user is prompted: "Directory for disk?". The user will enter a single letter (case is ignored) for the drive to access, or [RETURN] to indicate the default drive. The drive name, current user area (CP/M), and disk space remaining is displayed with an alphabetized directory. Versions for both CP/M-80 and MSDOS/PCDOS accompany this article, and you will notice the directory search routines are similar for the two operating systems. Also notice that I didn't bother calculating the space remaining for MSDOS 1.0, as a system call to do just that was added to the 2.0 release of MSDOS.

The routine could be used as a part of another program or could be used as a stand alone program as in the following:

```
PROGRAM DDISK (INPUT,OUTPUT);

{$I DISKDIR.inc}      { this file contains the routine }

BEGIN
   DIRECTORY;
END.
```

Use it and enjoy!

```
{ ************************************************************************
                          MSDOS version

  This is a general purpose directory sort and display routine
  for use in Turbo Pascal programs.  The main routine is called
  DIRECTORY, and it uses VERSION, DISKSPACE, and SORT
  To use it inside your Pascal program:

  DIRECTORY;

  and the routine will ask you for a drive.  You may enter a single
  character drive specification or [RETURN] to denote default drive.
  The current user and diskspace remaining will be displayed with an
  alphabetically sorted directory

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************************************************************************ }

TYPE
   FCBTYPE =
      RECORD
         EXFCB      : BYTE;
         ZEROFIELD  : ARRAY [0..4] OF BYTE,
         ATTRIBUTE  : BYTE;
         DRIVE      : BYTE;
         FNAME      : ARRAY [0..10] OF CHAR;
         ATTR       : BYTE;
         RESERVED   : ARRAY [0..9] OF BYTE;
         FTIME      : INTEGER;
         FDATE      : INTEGER;
         FALLOC     : INTEGER;
         FSIZE      : ARRAY [0..3] OF BYTE;
      END; { FCBTYPE }

   REGTYPE = RECORD
                AX,BX,CX,DX,BP,DI,SI,DS,ES,FLAGS: INTEGER;
             END; { REGTYPE }

FUNCTION VERSION : REAL;
{ ************************************************************************
  Return the MSDOS version
  ************************************************************************ }
CONST
   GETVERSION     = $30;
```

```
VAR
   REGS : REGTYPE;

BEGIN
   REGS.AX  = GETVERSION SHL 8;
   MSDOS (REGS);
   IF REGS.AX AND $00FF = 0 THEN VERSION := 1.0 + (REGS.AX SHR 8)/100
   ELSE VERSION := REGS.AX AND $00FF + (REGS.AX SHR 8)/100;
END; { VERSION }


FUNCTION DISKSPACE (DR : BYTE;
                    VAR TOT, REM : REAL)   INTEGER;
{  ************************************************************************
   Find the capacity, "TOT", space remaining, "REM", and return the allocation
   block size for the drive "DR" (0 = default, 1 = A, 2 = B, etc.)   This
   function only works for version 2 or greater   Getting the space remaining
   in MSDOS 1.0 is just about as bad the heartbreak of psoriasis!
   ************************************************************************
}
CONST
   GETFREE        = $36;

VAR
   REGS           : REGTYPE;
   I,J            : BYTE;
   ALSIZE         : INTEGER;

BEGIN { DISKSPACE }

   WITH REGS DO
   BEGIN
      REM := 0;
      TOT := 0;
      ALSIZE := 0;
      IF VERSION >= 2.00 THEN                    { version 2.0 method }
      BEGIN
         FILLCHAR (REGS,SIZEOF(REGS),#0);
         AX := GETFREE SHL 8;                    { initialize registers }
         DX := DR AND $00FF;
         MSDOS (REGS);
         IF AX < $7FFF THEN                      { not an error }
         BEGIN
            TOT := (1.0 * DX) * (1.0 * AX) * (1.0 * CX);
            REM := (1.0 * BX) * (1.0 * AX) * (1.0 * CX);
            ALSIZE := CX * AX;
         END;
      END;
   END; { WITH }
   DISKSPACE := ALSIZE;
END; { DISKSPACE }


PROCEDURE DIRECTORY;
{  ************************************************************************
   Display disk directory
   ************************************************************************
}
CONST
   SRCHFIRST      = $11;                   { search for first filename }
   SRCHNEXT       = $12;                   { search for next filename }
   SETDMA         = $1A;                   { set buffer address }
   COLUMNS        = 6;                     { no  directory display columns }
   NUMFILES       = 255;                   { no  of files for sort }

TYPE
   NAMETYPE       = STRING [11];

VAR
   FCB,
   MSFCB          : FCBTYPE;               { our own FCB }
   REGS           : REGTYPE;
   I,
   INDEX,
   FILEBYTES      : INTEGER;
   TOTAL,
   REMAINING      : REAL;
   DISKSPEC       : CHAR;
   J              : BYTE;
   FIRST          : BOOLEAN;
   FNAMES         : ARRAY [0 .NUMFILES] OF NAMETYPE;

{$A-}                                       { must allow recursion }

   PROCEDURE SORT (BOTTOM,TOP: INTEGER);
   {  ************************************************************************
      Common Recursive Quiksort
      ************************************************************************
   }
   VAR
      LOWER_PTR,
      UPPER_PTR        : INTEGER;
      MIDDLE_ELEMENT,
      TEMP             : NAMETYPE;

   BEGIN
      LOWER_PTR := BOTTOM;
      UPPER_PTR :=TOP;
      MIDDLE_ELEMENT := FNAMES[(BOTTOM+TOP) DIV 2];
      REPEAT
         WHILE FNAMES[LOWER_PTR] < MIDDLE_ELEMENT DO
            LOWER_PTR := SUCC (LOWER_PTR);
         WHILE MIDDLE_ELEMENT < FNAMES[UPPER_PTR] DO
            UPPER_PTR := PRED (UPPER_PTR);
         IF LOWER_PTR <= UPPER_PTR THEN
         BEGIN
            TEMP := FNAMES[LOWER_PTR];
            FNAMES[LOWER_PTR] := FNAMES[UPPER_PTR];
            FNAMES[UPPER_PTR] := TEMP;
            LOWER_PTR := SUCC (LOWER_PTR);
            UPPER_PTR := PRED (UPPER_PTR);
         END;
      UNTIL LOWER_PTR > UPPER_PTR;
      IF BOTTOM < UPPER_PTR THEN SORT(BOTTOM,UPPER_PTR);
      IF LOWER_PTR < TOP THEN SORT(LOWER_PTR,TOP);
   END; { SORT }

{  ************************************************************************
}
BEGIN { DIRECTORY }
```

```
FIRST := TRUE;
FILLCHAR (FNAMES,SIZEOF(FNAMES),#0);
LOWVIDEO;
WRITE ('Directory for Disk?');
HIGHVIDEO;
READ (KBD,DISKSPEC);
WRITE (#13);

FILLCHAR (FCB,SIZEOF(FCB),0);                    { initialize the FCB }
FCB.EXFCB := $FF;
FILLCHAR (FCB.FNAME,SIZEOF(FCB.FNAME),'?');
IF DISKSPEC = #13 THEN FCB.DRIVE := 0
ELSE FCB.DRIVE := ORD (UPCASE (DISKSPEC)) - $40;

WRITE ('DIRECTORY - '),                          { print the heading }
LOWVIDEO;
WRITE ('Drive ');
HIGHVIDEO;
IF FCB.DRIVE > 0 THEN
   WRITE (CHR(FCB.DRIVE + $40))
ELSE
   WRITE ('Default');
IF VERSION >= 2.00 THEN                          { display disk space }
BEGIN
   FILEBYTES := DISKSPACE (FCB.DRIVE,TOTAL,REMAINING);
   LOWVIDEO;
   WRITE ('  Space remaining = '),
   HIGHVIDEO;
WRITE ((REMAINING/1000):0:1,'k');
END;
WRITELN;                                         { set up registers }
REGS.AX := SETDMA SHL 8;
REGS.DS := SEG (MSFCB);
REGS.DX := OFS (MSFCB);
MSDOS (REGS);                                    { system call }

INDEX := 0;
REPEAT
   REGS.DS := SEG (FCB);
   REGS.DX := OFS (FCB);
   IF FIRST THEN
   BEGIN                                         { search for first }
      FIRST := FALSE;
      REGS.AX := SRCHFIRST SHL 8;
   END
   ELSE REGS.AX := SRCHNEXT SHL 8;               { search for next }
   MSDOS (REGS);
   IF REGS.AX AND $00FF < $FF THEN
   BEGIN
      FOR I := 1 TO 11 DO
      BEGIN
         FNAMES [INDEX] :=
            FNAMES [INDEX] + MSFCB.FNAME[I-1];
      END; { FOR }
      INDEX := SUCC (INDEX);
   END; { IF }
UNTIL (REGS.AX AND $00FF = $FF) OR (INDEX >= NUMFILES);

SORT (0,INDEX-1);                                { do the sort }
   FOR I := 0 TO INDEX-1 DO                      { display the directory }
   BEGIN
      FOR J := 1 TO 11 DO
      BEGIN
         WRITE (COPY (FNAMES [I],J,1));
         IF J = 8 THEN LOWVIDEO;
      END;
      IF ((I+1) MOD COLUMNS) = 0 THEN WRITELN
      ELSE WRITE ('  ');
      HIGHVIDEO;
   END;
   IF (INDEX MOD COLUMNS) <> 0 THEN WRITELN;
   IF INDEX >= NUMFILES THEN WRITELN (#7,'? Too many files > ',NUMFILES);
END; { DIRECTORY }

{ ************************************************************************
                          CP/M version

   This is a general purpose directory sort and display routine
   for use in Turbo Pascal programs  The main routine is called
   DIRECTORY, and it uses BIT, DISKSPACE, and SORT.
   To use it inside your Pascal program:

   DIRECTORY;

   and the routine will ask you for a drive  You may enter a single
   character drive specification or [RETURN] to denote default drive
   The current user and diskspace remaining will be displayed with an
   alphabetically sorted directory

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   ************************************************************************
}

FUNCTION BIT (POS : BYTE; NUM : INTEGER) : BOOLEAN;
{ ************************************************************************
   Return TRUE for bit set
   ************************************************************************
}
BEGIN
   IF ((NUM SHR (POS AND $F)) AND 1) = 1 THEN BIT := TRUE
   ELSE BIT := FALSE;
END; { BIT }


FUNCTION DISKSPACE : INTEGER;
{ ************************************************************************
   Find space remaining on the disk
   ************************************************************************
}
CONST
   GETDPB         = $1F;                         { BDOS }
   GETALLOC       = $1B;

VAR
   I,J,C          : BYTE,
   TOTAL          : INTEGER,
```

```
   COUNT          : INTEGER;
   BSH            : INTEGER;

BEGIN { DISKSPACE }
   BSH := MEM[BDOSHL(GETDPB)+2];
   TOTAL := 0;
   COUNT := MEM [BDOSHL (GETDPB) + 5];      { maximum blocks }
   FOR I := 0 TO COUNT DIV 8 DO
   BEGIN
      C      := MEM [BDOSHL (GETALLOC) + I] ;
      FOR J := 7 DOWNTO 0 DO
      BEGIN
         IF (I * 8 + 7 - J) <= COUNT THEN
            IF NOT BIT (J,C) THEN TOTAL := SUCC (TOTAL);
      END; { FOR J }
   END; { FOR I }
   DISKSPACE := (TOTAL SHL (BSH - 3)),
END; { DISKSPACE }


PROCEDURE DIRECTORY;
{ ************************************************************************
   Display disk directory
   ************************************************************************
}
CONST
   SRCHFIRST      = $11;                    { search for first filename }
   SRCHNEXT       = $12;                    { search for next filename }
   SETDMA         = $1A;                    { set buffer address }
   GETUSER        = $20;                    { set/get user number }
   GETDISK        = $19;                    { get disk number }
   SELDISK        = $0E;                    { select disk number }
   COLUMNS        = 6;                      { no. directory display columns }
   NUMFILES       = 255;                    { no. of files for sort }

TYPE
   NAMETYPE       = STRING [11];

VAR
   FCB            : ARRAY [0..35] OF BYTE;  { our own FCB }
   BUFF           : ARRAY [0..127] OF BYTE; { search buffer }
   I,CODE,INDEX   : INTEGER;
   DISK           : CHAR;
   CURDISK,                                 { default disk }
   J              : BYTE;
   FIRST          : BOOLEAN;
   FNAMES         : ARRAY [0..NUMFILES] OF NAMETYPE;

{$A-}                                       { must allow recursion }

   PROCEDURE SORT (BOTTOM,TOP: INTEGER);
   { ************************************************************************
      Common Recursive Quiksort
      ************************************************************************
   }
   VAR
      LOWER_PTR,
      UPPER_PTR        : INTEGER;
      MIDDLE_ELEMENT,
      TEMP             : NAMETYPE;
   BEGIN
      LOWER_PTR := BOTTOM;
      UPPER_PTR :=TOP;
      MIDDLE_ELEMENT := FNAMES[(BOTTOM+TOP) DIV 2];
      REPEAT
         WHILE FNAMES[LOWER_PTR] < MIDDLE_ELEMENT DO
            LOWER_PTR := SUCC (LOWER_PTR);
         WHILE MIDDLE_ELEMENT < FNAMES[UPPER_PTR] DO
            UPPER_PTR := PRED (UPPER_PTR);
         IF LOWER_PTR <= UPPER_PTR THEN
         BEGIN
            TEMP := FNAMES[LOWER_PTR],
            FNAMES[LOWER_PTR] := FNAMES[UPPER_PTR],
            FNAMES[UPPER_PTR] := TEMP;
            LOWER_PTR := SUCC (LOWER_PTR);
            UPPER_PTR := PRED (UPPER_PTR);
         END;
      UNTIL LOWER_PTR > UPPER_PTR;
      IF BOTTOM < UPPER_PTR THEN SORT(BOTTOM,UPPER_PTR);
      IF LOWER_PTR < TOP THEN SORT(LOWER_PTR,TOP);
   END; { SORT }

{  ************************************************************************
}
BEGIN { DIRECTORY }
   FIRST := TRUE;
   FILLCHAR (FNAMES,SIZEOF(FNAMES),#0),
   LOWVIDEO;
   WRITE ('Directory for Disk?');
   HIGHVIDEO,
   READ (KBD,DISK);
   WRITE (#13);
   CURDISK := BDOS(GETDISK);
   IF DISK = #13 THEN DISK := CHR (CURDISK + ORD ('A')),
   IF (ORD (UPCASE (DISK)) - ORD ('A') <> CURDISK) THEN
      BDOS (SELDISK,ORD (UPCASE (DISK)) - ORD ('A'));
   WRITE ('DIRECTORY - ');                  { print the heading }
   LOWVIDEO;
   WRITE ('User ');
   HIGHVIDEO;
   WRITE (BDOS(GETUSER,$FF));
   LOWVIDEO;
   WRITE ('  Drive ');
   HIGHVIDEO;
   WRITE (CHR(BDOS(GETDISK) + ORD ('A')));
   LOWVIDEO;
   WRITE ('  Space remaining = ');
   HIGHVIDEO;
   WRITE (DISKSPACE,'k');
   WRITELN;
   BDOS (SETDMA, ADDR(BUFF));
   FCB [0] := 0;                                { initialize FCB }
   FOR I := 1 TO 11 DO FCB[I] := $3F;
   FOR I := 12 TO 35 DO FCB[I] := 0;
   INDEX := 0;
   REPEAT
      IF FIRST THEN                             { search for first }
      BEGIN
         FIRST := FALSE;
         CODE := BDOS (SRCHFIRST, ADDR (FCB));
```

```
END
ELSE CODE := BDOS (SRCHNEXT, ADDR (FCB));                    { search for next }
IF CODE < $FF THEN
BEGIN
   FOR I := 1 TO 11 DO                                       { copy into array }
   BEGIN
      FNAMES [INDEX] :=
         FNAMES [INDEX] + (CHR(MEM [(CODE*32+ADDR(BUFF))+I]));
   END; { FOR }
   INDEX := SUCC (INDEX);
END; { IF }
UNTIL (CODE = $FF) OR (INDEX >= NUMFILES);

SORT (0,INDEX-1);                                            { do the sort }

FOR I := 0 TO INDEX-1 DO                                     { display the directory }
BEGIN
   FOR J := 1 TO 11 DO
   BEGIN
      WRITE (COPY (FNAMES [I],J,1));
      IF J = 8 THEN LOWVIDEO;
   END;
   IF ((I+1) MOD COLUMNS) <> 0 THEN WRITELN;
   IF (ORD (UPCASE (DISK)) - ORD ('A') <> CURDISK) THEN
      ELSE WRITE ('  ');
      HIGHVIDEO;
END;
IF INDEX >= NUMFILES THEN WRITELN (#7,'? Too many files > ',NUMFILES);
END; { DIRECTORY }
```

```
10 ' DSKCAP.BAS   LIST NUMBER OF FILES AND FREE SPACE
                      ON 5" DISKS
12 '                  BASED ON CURRENT CONTENTS OF .RAW FILES
14 ' 2-19-85
16 '
18 CAT$(1)="CATWORK"
20 CAT$(2)="CATMISC"
22 ' Add additional variables for other groups if desired
24 ' and change line 100 to reflect the total
26 '
90 LPRINT TAB(70);DATE$
100 FOR I=1 TO 2
110 PRINT TAB(60);CAT$(I);:LPRINT TAB(60);CAT$(I)
120 OPEN "I",#1,CAT$(I)+".RAW"
130 IF EOF(1) THEN 250
140 INPUT #1,A$
150 IF LEFT$(A$,6)="Volume" THEN 200
160 IF LEFT$(A$,6)="Direct" THEN 190
170 A=INSTR(A$,"File(s)")
180 IF A<>0 THEN 220
190 GOTO 130
200 DSK$=MID$(A$,22)
210 GOTO 130
220 LPRINT DSK$,A$
230 PRINT DSK$,A$
240 GOTO 130
250 CLOSE #1
260 NEXT I
270 SYSTEM
```

*

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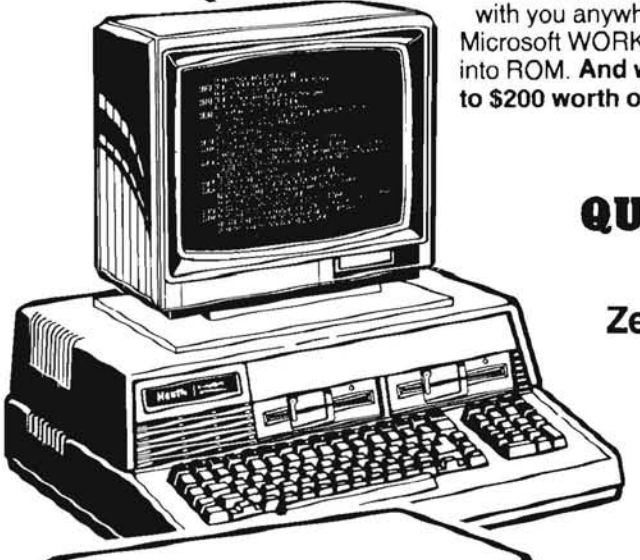

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The "Clone Wars"

Well, Harold, it's been a while since we've had one of our amiable chats. You know, I've always wondered why they called you the H-89. Why not a name? They grind you out on the assembly line like cars, with new models every year, and they have names. Imagine the kind of notoriety you could have had if you had had a name? Something striking and memorable, like Voltan or Mephisto. Certainly has more meaning than Camaro or LTD.

Instead, they pay some guy a lot of money to sit in a stuffy office to create numerical identities for you and your brothers. I suppose that's why I call you Harold. It's a lot more personal than, say, '89, '100, '120, '148, '150, '160 or even '200. Sounds more like the bidding at the local auction house.

I still feel for your health at times. Hold my breath when I first turn on the power waiting for those two audible beeps. But you haven't failed me in five years — except when I played surgeon on a few occasions and cut a wire or blew out a part. It lets me know you're still rarin' to go like the old days.

Little jealous over that "clone" sitting on the other desk? Am I really spending more time with it than I should? Well, you gotta understand that I'm a little curious about what makes him tick.

Yeah! He's kinda sleek and shiny. Moves that screen around like a son of a gun, don't he? He has to do something to merit all that attention the magazines are giving him. But if you'll stop and think about it, you still get to do the big jobs, because I'm more comfortable with the way you operate. I know he's got more keys and dazzling colors like the Saturday morning cartoon shows, but he's not as forgiving as you are.

I'll tell you one thing he doesn't have. And that's class. You've got class, Harold. You were one of the originals. You're a survivor. You outlasted the other guys during the "Clone Wars", and a lot of people show their loyalty toward you. And that's why I still overhaul you every so often. I want you to stay trim and fit. Like those broads in the health spa commercials.

Remember the SUPER RAM 89 stuff I patched into your guts a few months ago? One-megabyte of memory, a clock, and an SCSI hard disk interface? Many of the big boys don't even have one of those yet. Dave Brockman tells me it's called "Scuzzy". Not as elegant sounding as the old "Sassy" interface. So, I'm doing my part to help you keep up with the times. Don't want to you flounder, like the old poet Vincent Starrett once said, to "sit by the waters of calamity and smile at fate."

The "Clone Wars?" I thought I told you about them a while back. People will look back on them in years to come much in the same way as they read about the Peloponnesian Wars. With warped curiosity and a total lack of historical perspective.

The "Clone Wars" were something else. Got real bloody at times. Lots of PR and Marketing types dressed in full battle armor spending millions on color ads. Made some magazines fat and rich, while others starved to death in the hinterlands of obscurity.

Who knows when or where they began. Things happened so fast I sort of lost track of some of the whys and wherefores. But I'll give it a whirl.

There were a lot of armed camps in those days, really spread out in all parts of the country. We had the Heathites (before the Zenithians kidnapped them). The Tandyans in Fort Worth, and the Hewlett-Packards. (I always thought these guys made vintage sports cars.) And then we had the OSI's in Cleveland, mavericks to be sure. There were the Osbornians, the Applefests, and Big Brains, and even a group of space travelers called the Atarians.

And dozens of others that only remain as fragmented images in my memory. As I said, things happened fast. But I think you get the picture, don't you?

They all had one thing in common. They were braggarts and chest beaters about how powerful they were. And vain about the appearance of their displays. Most of them couldn't hold a candle to you, Harold. I know, 'Cause I looked around for a long time before I adopted you.

Anyway, there were these Mad Scientists and Mercenaries in a place called Silicon Valley who saw what a good thing they had stumbled upon. They had created some weapons of the "future". Little things that resembled plastic Lego Blocks with metal feet. When you put a couple of hundred in a box and shook them up, they looked like the water bugs you find under a damp log in your back yard.

These Mercenaries from Silicon Valley (and later, the disciples of Fu Manchu's Dacoits from the Orient), had no scruples. They didn't care who they sold their weapons to. They were like the legendary gun-runners. Sell to all sides was their motto. That way you could still do business with the victors.

There was a lot of jockying over the years (they called it market positioning), and for a while nobody really won or lost. Until the bomb burst.

The Commodorians, who had been skulking around and selling Pets without AKC lineage, suddenly became ferrocious. Led by Trampling Tramiel, they swamped the marketplace with cheap computers that everyone could afford, which they sold on every corner Cigar Counter and Candy Store.

Wiped out the Atarians and the TI's. Burned the Mattels to a crisp. Knocked the Colecos for a loop. And then scattered their parts to electronic wholesalers from Maine to Oregon.

While Trampling Tramiel trounced the competition, the seeds of the destructive "Clone Wars" were budding in the form of the Blue Plague from Boca Raton. These guys had money. Tons of it. Could buy you and me and the whole industry a thousand times over and still have loot to spare.

It became a "Clone" or perish situation. Some hailed it as a victory for standardization. Others said it would be a death-knell to originality and enterprise. It was a little of both.

Suddenly, everyone had to own a Blue Plague — or a "Clone". There was even a little guy on TV who wore baggy pants, a bowler's hat, and a cane, who stumbled around like an inebriated buffoon while he danced and pointed to the Blue Plague. These guys would stop at nothing until everybody went out of business. A lot of scarred victims wound up as Chapter Elevens, if you know what I mean. They either priced you out of the market or sued you if your "Clone" was too Blue. They always won. Their lawyers had dollar signs tattooed on their eyelids.

A moral, you ask? You got me, old bean. There's no moral to this business. I think it relates more to the natural evolution and order of things.

But I gotta tell you, Harold. This business has spawned a new set of problems for a lot of people. Many of them want a "Clone" of their own. And that has created problems on the homefront. All the computer widows are rebelling. They just can't understand why their husbands want to spend big bucks on another system. Who knows where it will end — in the divorce courts or some guys having their throats slit while they sleep? It seems that in some quarters being caught with a new computer is worse than being discovered with one's mistress. Distressing, to say the least.

Can you imagine the stealth and cunning these guys have resorted to in order to finance their new computers? One of my nameless correspondents calls it "wife facing". You have to be human to understand the terror this kind of situation can create.

A guy I know used subtle enticements to persuade his wife to go on frequent spending binges and then plunged the family into debt with a computer, telling his spouse: "I didn't complain about your coats and shoes and seventy-five dollar nail jobs. Don't deny me two measly grand on a simple little computer."

Someone else arranged for a second credit card registered to his business address, so his wife would never see the bills. Another told his wife he had borrowed it from a friend who is off on a long business trip. And a friend up the road told her his company just purchased a ton of them and insisted he learn how to use it if he wants to keep his job.

It boils down to one fact. Tell her anything. But don't tell her the truth. Lying can save your hide.

Well, Harold, that's all the time I have for chatting today. Have to charge up the new "Clone" to convince my wife I have something important to do. Sorry we don't chat as often as we used to, but that's how things go.

What's that about my breaking a promise? No, no, my dear fellow. I didn't renege on my promise to buy another Harold for you to talk to when I'm ignoring you. It's the fault of those guys at the Benton Harbor Body Shop. Ever since they disowned your existence, some of your vital parts are in short supply.

Here. Look at this letter. No CRTs. No drives. Awaiting parts. And so forth. I wouldn't lie to YOU. You don't nag me about the little things like cleaning the yard and removing the cobwebs in the basement. We gotta trust each other to make this relationship work.

HELP! Is anyone in Benton Harbor listening? Where in Hell is my second Harold? *

HUG Price List

The following HUG Price List contains a list of all products in the HUG Software Catalog. For a detailed abstract of these products, refer to the issue of REMark specified.

Part Number	Description of Product	Selling Price	Vol. Issue

HDOS HARDCOPY SOFTWARE

885-1008	Volume I Documentation	9.00	
885-1013	Volume II Documentation	12.00	
885-1015	Volume III Documentation	9.00	
885-1037	Volume IV Documentation	12.00	8
885-1058	Volume V Documentation	12.00	

MISCELLANEOUS HDOS COLLECTIONS

885-1032	Disk V H8/H9	18.00	8
885-1044-[37]	Disk VI H8/H89	18.00	
885-1064-[37]	Disk IX H8/H89 Disk	18.00	
885-1066-[37]	Disk X H8/H89	18.00	10
885-1069	Disk XIII Misc H8/H89	18.00	
885-1135-[37]	HDOS Variety Pkg.	20.00	76

GAMES

HDOS

885-1010	Adventure Disk H8/H89	10.00	4
885-1029-[37]	Disk II Games 1 H8/H89	18.00	8
885-1030-[37]	Disk III Games 2 H8/H89	18.00	8
885-1031	Disk IV MUSIC H8 Only	20.00	25
885-1067-[37]	Disk XI H8/H19/H89 Games	18.00	12
885-1068	Disk XII MBASIC Graphic Games	18.00	10
885-1088-[37]	Disk XVII MBASIC Graph. Games	20.00	14
885-1093-[37]	D&D H8/H89 Disk	20.00	16
885-1096-[37]	MBASIC Action Games H8/H89	20.00	18
885-1103	Sea Battle HDOS H19/H8/H89	20.00	20
885-1111-[37]	HDOS MBASIC Games H8/H89	20.00	23
885-1112-[37]	HDOS Graphic Games H8/H89	20.00	23
885-1113-[37]	HDOS Action Games H8/H89	20.00	23
885-1114	H8 Color Raiders & Goop	20.00	23
885-1124	HUGMAN & Movie Animation Pkg	20.00	41
885-1125	MAZEMADNESS	20.00	41
885-1130	Star Battle	20.00	45
885-1133-[37]	HDOS Games Collection I	20.00	59
885-6009-[37]	HDOS & CP/M Galactic Warrior	20.00	32
885-8022	HDOS SHAPES	16.00	45
885-8026	HDOS Space Drop	16.00	49
885-8032-[37]	HDOS Castle	20.00	59

CP/M

885-1206-[37]	CP/M Games Disk	20.00	11
885-1209-[37]	CP/M MBASIC D&D	20.00	19
885-1211-[37]	CP/M Sea Battle	20.00	20
885-1220-[37]	CP/M Action Games	20.00	32
885-1222-[37]	CP/M Adventure	10.00	35
885-1227-[37]	CP/M Casino Games	20.00	38
885-1228-[37]	CP/M Fast Action Games	20.00	39
885-1236-[37]	CP/M Fun Disk I	20.00	55
885-1248-[37]	CP/M Fun Disk II	35.00	69

ZDOS

885-3004-37	ZDOS ZBASIC Graphic Games	20.00	37
885-3009-37	ZDOS ZBASIC D&D	20.00	50
885-3011-37	ZDOS ZBASIC Games Disk	20.00	52
885-3017-37	ZDOS Contest Games Disk	25.00	58
885-8042-37	ZDOS/MSDOS Poker Party	20.00	77

UTILITIES

HDOS

885-1022-[37]	HUG Editor (ED) Disk H8/H89	20.00	20
885-1025	Runoff Disk H8/H89	35.00	
885-1060-[37]	Disk VII H8/H89	18.00	
885-1061	TMI Load H8 ONLY Disk	18.00	
885-1062-[37]	Disk VIII H8/H89 (2 Disks)	25.00	
885-1063	Floating Point Disk H8/H89	18.00	
885-1065	Fix Point Package H8/H89 Disk	18.00	10
885-1075	HDOS Support Package H8/H89	60.00	
885-1077	TXTCON/BASCON H8/H89	18.00	
885-1079-[37]	HDOS Page Editor	25.00	15
885-1080	EDITX H8/H19/H89 Disk	20.00	
885-1082	Programs for Printers H8/H89	20.00	
885-1083-[37]	Disk XVI Misc H8/H89	20.00	11
885-1089-[37]	Disk XVIII Misc H8/H89	20.00	20
885-1090-[37]	Disk XIX Utilities H8/H89	20.00	22
885-1092-[37]	Relocating Debug Tool H8/H89	30.00	14
885-1098	H8 Color Graphics ASM	20.00	19
885-1099	H8 Color Graphics Tiny PASCAL	20.00	19
885-1105	HDOS Device Drivers H8/H89	20.00	24
885-1116	HDOS Z80 Debugging Tool	20.00	27
885-1119-[37]	BHBASIC Support	20.00	29
885-1120-[37]	HDOS 'WHEW' Utilities	20.00	33
885-1121	HDOS Hard Sec Sup Pkg 2 Disks	30.00	37
885-1123	XMET Robot Cross Assembler	20.00	40
885-1126	HDOS Utilities by PS:	20.00	42
885-1127-[37]	HDOS Soft Sector Support Pkg	30.00	45
885-1128-[37]	HDOS DISKVIEW	16.00	46
885-1129-[37]	HDOS CVT Color Video Terminal	20.00	46
885-8001	SE (Screen Editor)	25.00	28
885-8003	BHTOMB	25.00	28
885-8004	UDUMP	35.00	28
885-8006	HDOS SUBMIT	20.00	31
885-8007	EZITRANS.	30.00	30
885-8015	HDOS TEXTSET Formatter	30.00	42
885-8017	HDOS Programmers Helper	16.00	42
885-8024	HDOS BHBASIC Utilities Disk	16.00	46

CP/M

885-1210-[37]	CP/M ED (same as 885-1022)	20.00	20
885-1212-[37]	CP/M Utilities H8/H89	20.00	21
885-1213-[37]	CP/M Disk Utilities H8/H89	20.00	22
885-1217-[37]	HUG Disk Duplication Utilities	20.00	26
885-1223-[37]	HRUN HDOS Emulator 3 Disks	40.00	37
885-1225-[37]	CP/M Disk Dump & Edit Utility	30.00	40
885-1226-[37]	CP/M Utilities by PS:	20.00	40
885-1229-[37]	XMET Robot Cross Assembler	20.00	40
885-1230-[37]	CP/M Function Key Mapper	20.00	42
885-1231-[37]	Cross Ref Utilities for MBASIC	20.00	43
885-1232-[37]	CP/M Color Video Terminal	20.00	46
885-1235-37	CP/M COPYDOS	20.00	54
885-1237-[37]	CP/M Utilities	20.00	55
885-1245-37	CP/M-85 KEYMAP	20.00	63
885-1246[-37]	CP/M HUG File Manager & Utilities	20.00	64
885-1247-37	CP/M-85 HUG Bkgrd Print Spooler	20.00	67
885-5001-37	CP/M-86 KEYMAP	20.00	51
885-5002-37	CP/M-86 HUG Editor	20.00	52
885-5003-37	CP/M-86 Utilities by PS:	20.00	54
885-5008-37	CP/M 8080 To 8088 Trans. & HFM	20.00	64
885-5009-37	CP/M-86 HUG Bkgrd Print Spool	20.00	66
885-8018-[37]	CP/M Fast Eddy & Big Eddy	20.00	43
885-8019-[37]	DOCUMAT and DOCULIST	20.00	43
885-8025-37	CP/M-85/86 Fast Eddy	20.00	49

ZDOS/MSDOS

885-3005-37	ZDOS Etchdump	20.00	39
885-3007-37	ZDOS CP/EMulator	20.00	47
885-3008-37	ZDOS Utilities	20.00	47
885-3010-37	ZDOS Keymap	20.00	51
885-3022-37	ZDOS/MSDOS Useful Programs I	30.00	63
885-3023-37	ZDOS/MSDOS EZPLOT	20.00	63
885-3026-37	MSDOS SMALL C Compiler	25.00	65
885-3031-37	ZDOS/MSDOS Graphics	20.00	69
885-3037-37	MSDOS Z-100 PC Emulator II	60.00	76
885-8029-37	ZDOS Fast Eddy	20.00	53
885-8035-37	MSDOS DOCUMAT and DOCULIST	20.00	70
885-8041-37	ZDOS/MSDOS Orbits	25.00	75

H/Z100 ZDOS/MSDOS - H/Z150 PC MSDOS

885-3012-37§§	ZDOS HUG Editor	20.00	52
885-3014-37§§	ZDOS/MSDOS Utilities II	20.00	54
885-3016-37§	ZDOS/MSDOS Adventure	10.00	57
885-3020-37§	MSDOS HUG Menu System	20.00	62
885-3021-37§§	ZDOS/MSDOS Cardcat	20.00	63
885-3024-37§	ZDOS/MSDOS 8080 To 8088 Trans	20.00	64
885-3025-37§§	ZDOS/MSDOS Misc. Utilities	20.00	64
885-3029-37§§	ZDOS/MSDOS HUG Bg. Print Spool	20.00	66
885-3035-37§§	MSDOS SPELL5 & SPELL5F	20.00	72
885-3038-37§	ZDOS/MSDOS DEBUG Support Util	20.00	77
885-8039-37§§	MSDOS DPATH	20.00	74
885-8040-37§§	MSDOS HELP Programs	20.00	74
885-8045-37§§	MSDOS MATT	20.00	80

§ All program files run on both

§§ Program files run partially on both

PC/IBM COMPATIBLE

885-6001-37	MSDOS Keymapper	20.00	59
885-6002-37	CP/EMulator II & ZEMulator	20.00	59
885-6003-37	MSDOS EZPLOT	20.00	65
885-6004-37	MSDOS CheapCalc	20.00	67
885-6005-37	MSDOS Skyviews	20.00	67
885-6006-37	MSDOS Cardcat	20.00	69
885-6007-37	MSDOS DND (Dung. & Dragons)	20.00	70
885-6009-37	MSDOS Screen Saver Plus	20.00	76
885-8033-37	MSDOS Fast Edit	20.00	62
885-8037-37	MSDOS Grade	20.00	70
885-8044-37	MSDOS TCSpell	20.00	79

PROGRAMMING LANGUAGES

HDOS

885-1038-[37]	Wise on Disk H8/H89	18.00	
885-1042-[37]	PILOT on Disk H8/H89	19.00	
885-1059	FOCAL-8 H8/H89 Disk	25.00	13
885-1078-[37]	HDOS Z80 Assembler	25.00	21
885-1085	PILOT Documentation	9.00	
885-1086-[37]	Tiny HDOS PASCAL H8/H89	20.00	13
885-1094	HDOS Fig-Forth H8/H89	40.00	18
885-1132-[37]	HDOS Tiny BASIC Compiler	25.00	59
885-1134	HDOS SMALL-C Compiler	30.00	63

CP/M

885-1208-[37]	CP/M Fig-Forth H8/H89 2 Disks	40.00	18
885-1215-[37]	CP/M BASIC-E	20.00	26

BUSINESS, FINANCE AND EDUCATION

HDOS

885-1047	Stocks H8/H89 Disk	18.00	
885-1048	Personal Account H8/H89 Disk	18.00	
885-1049	Income Tax Records H8/H89 Disk	18.00	
885-1055-[37]	MBASIC Inventory Disk H8/H89	30.00	
885-1056	MBASIC Mail List	30.00	
885-1070	Disk XIV Home Fin H8/H89	18.00	
885-1071-[37]	MBASIC SmBusPk H8/H19/H89	75.00	17
885-1091-[37]	Grade/Score Keeping H8/H89	30.00	14
885-1097-[37]	MBASIC Quiz Disk H8/H89	20.00	18
885-1118-[37]	MBASIC Payroll	60.00	30
885-1131-[37]	HDOS CheapCalc	20.00	47
885-8010	HDOS Checkoff	25.00	32
885-8021	HDOS Student's Statistics Pkg	20.00	44
885-8027	HDOS SciCalc	20.00	50

CP/M

885-1218-[37]	CP/M MBASIC Payroll	60.00	31
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885-1239-[37]	Spread Sht. Contest Disk I	20.00	
885-1240-[37]	Spread Sht. Contest Disk II	20.00	
885-1241-[37]	Spread Sht. Contest Disk III	20.00	
885-1242-[37]	Spread Sht. Contest Disk IV	20.00	
885-1243-[37]	Spread Sht. Contest Disk V	20.00	
885-1244-[37]	Spread Sht. Contest Disk VI	20.00	
885-8011-[37]	CP/M Checkoff	25.00	32
885-8036-[37]	CP/M Grade	20.00	70

ZDOS/MSDOS H/Z100 ONLY

885-3006-37	ZDOS CheapCalc	20.00	47
885-3013-37	ZDOS Checkbook Manager	20.00	54
885-3018-37	ZDOS Contest Spreadsheet Disk	25.00	58
885-8028-37	ZDOS SciCalc	20.00	50
885-8030-37	ZDOS Mathflash	20.00	55
885-8043-37	MSDOS Calc	20.00	80

Continued on Page 83

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Faster Disk Access

Part 2

Pat Swayne
HUG Software Engineer

In last August's issue of REMark, I presented an article on how to make your disk access faster under Heath/Zenith MS-DOS. For PC-type computers, I presented two ways to make your access faster. One was to use DEBUG to shorten some delay values in memory. The other was to run a small program presented in the article that would locate where the delay values were stored on your disk and patch them. I have learned that there are some releases of MS-DOS that the program will not work properly on. Rather than trying to collect all of the various releases of MS-DOS and find out what the differences are, I decided to present a third way to increase your disk access speed. I wrote a little program which, rather than trying to locate and patch the existing disk table, just changes the table pointer so that it points to a new disk parameter table, with shortened delay values.

If you type in and run the following BASIC code, it will create my program, called FASTDSK.COM.

```
10 REM THIS PROGRAM CREATES FASTDSK.COM
20 DEFINT A-I:OPEN "O",1,"FASTDSK.COM
30 S=0:S1 = 2412 :FOR I=1 TO 27
40 READ B:S=S+B:PRINT #1,CHR$(B);
50 NEXT I:IF S<>S1 THEN PRINT "TYPING ERROR!":END
60 CLOSE #1:LOCATE 23,1.PRINT "DONE!":SYSTEM
70 DATA 235,12,144,223,2,37,2,9,42,255
80 DATA 80,246,0,1,186,3,1,184,30,37
90 DATA 205.33,186,14,1,205.39
```

To use FASTDSK.COM, copy it to your system disk, and type

```
FASTDSK
```

at the system prompt, and hit Return. FASTDSK will install a new disk table, and leave it in memory until you reset and re-boot your computer. To automatically install FASTDSK when you boot, put a line to run it in your AUTOEXEC.BAT file.

Below is the source code to FASTDSK.COM.

```
        PAGE    ,132
;       FASTDSK -- DISK TABLE RE-LOCATOR
;       THIS PROGRAM POINTS YOUR DISK TABLE VECTOR
;       TO A NEW TABLE, FOR FASTER ACCESS.
;
;       BY P  SWAYNE, HUG SOFTWARE ENGINEER  12-SEP-86

CODE    SEGMENT
        ASSUME  CS:CODE,DS:CODE,ES:CODE,SS:CODE
        ORG     100H

START:  JMP     SETUP

;       HERE IS THE DISK PARAMETER TABLE
;       DO NOT CHANGE THE VALUES BELOW

DDATA   DB      0DFH,2,25H,2,9,2AH,0FFH,50H,0F6H

;       CHANGE THESE VALUES IF YOU WISH

HEAD    DB      0               ;HEAD SETTLE TIME
MOTOR   DB      1               ;MOTOR STARTUP TIME

SETUP:  MOV     DX,OFFSET DDATA ;POINT TO DISK DATA
        MOV     AX,251EH        ;SET VECTOR FOR INT  1EH
        INT     21H             ;SET NEW VECTOR
        MOV     DX,OFFSET SETUP ;POINT PAST RESIDENT CODE
        INT     27H             ;EXIT WITH DATA RESIDENT

CODE    ENDS
        END     START
```

Continued from Page 55

SPEEDUP	.ASM	- Console speed-up utility program
SPEED100	.COM	- Z-100 executable version of SPEEDUP .COM
SPEEDPC	.COM	- PC compatible executable version of SPEEDUP.COM
WAIT	.ASM	- Conditionally pause .BAT file execution
WAIT	.COM	- Executable version of WAIT

The following files provide useful information on several Zenith MS-DOS related topics.

MSDOS31	.DOC	- Overview of new capabilities in MS-DOS 3.1
ECHO	.DOC	- Problems with the MS-DOS ECHO command
PROMPT	.DOC	- Use of the MS-DOS PROMPT command
Z100BIOS	.DOC	- Modifications to the Z-100 MS-DOS BIOS
MDISK1	.DOC	- 1st file of modifications to MDISK.DVD
MDISK2	.DOC	- 2nd file of modifications to MDISK.DVD
MDISK3	.DOC	- 3rd file of modifications to MDISK.DVD

Comments: Most of these utility programs were written to fill a need that existed; Microsoft has a tendency to only superficially document the complex internal capabilities offered by MS-DOS; much effort and experimentation is required to make some of these capabilities actually work! In addition, many of the capabilities inherent at the MS-DOS system call level are often not brought out into the end-user command language; this package shows how to write your own programs to use these features.

TABLE C Rating: (10)

A Sound Holiday Offer...

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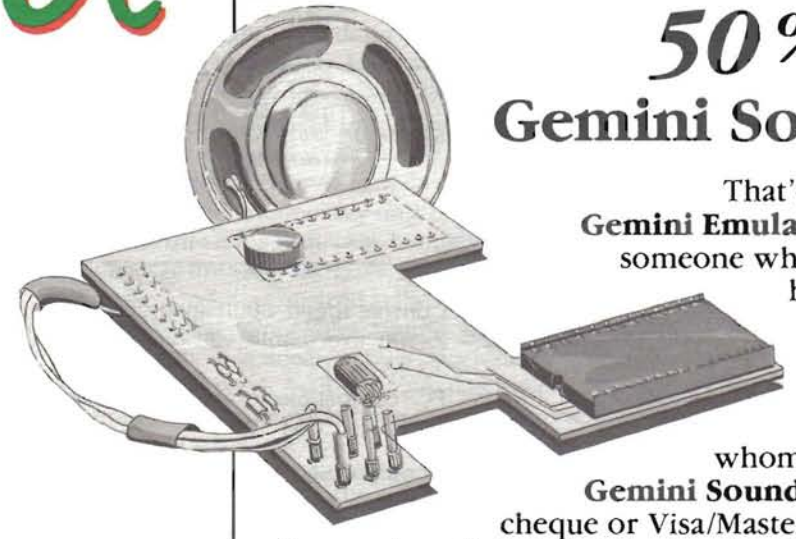

That's right . . . if you've got a **Gemini Emulator Board,** or you know someone who does, we have a special holiday offer for you. Just write us or phone our toll-free number and give the name and full address of the person to whom we should send the new **Gemini Sound Board,** along with your cheque or Visa/MasterCard number and expiry date, and we'll deliver it in time for Christmas. You'll pay only **$14.95** — plus $3.00 for shipping — compared to the regular price of **$29.95.**

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ZPC Update #11

Pat Swayne
HUG Software Engineer

This is the eleventh in a series of articles in support of ZPC, a program that allows you to run IBM PC software on H/Z-100 (dual processor) computers. ZPC is available from HUG as part no. 885-3037-37. In this article, which will be brief, I will discuss the ZPC Hardware Support circuit, and present patches for QuickBASIC version 2.

ZHS Solution

The solution to the problems with the ZHS circuit in the last issue appears to be a wait state generator on the port 60 section of the circuit. However, if you built the original circuit, and the modifications presented in the September issue, and your circuit seems to work, the only thing I would suggest is that you replace the 74AS30 or 74S30 that was installed as per the September modifications with the original 74LS30. The reason is that the 74AS30 or 74S30 is so fast that the circuit can decode glitches if the sINP signal comes at a time when the address lines are not stable. Such a glitch caused a few files to be erased on a partition of my hard disk.

If the ZHSTST program presented in the September issue reports "8259's slow" with a 74LS30 in the circuit, you will need a wait state generator. I will try to come up with a simple one for the next ZPC Update article. Meanwhile, those who are working on commercial versions of the board, such as Scottie Systems (see ad in this issue), have been made aware of all the problems I have encountered, and they should have boards that work.

If you have slow 8259 chips, you may be able to fix the problem by selecting faster ones. In the September issue, I reported that I got one Z-100 to work by replacing NEC 8259s with Intel 8259s. This does not mean that all NEC 8259s are slow. They make different versions with different speed specifications, as do other manufacturers. Don't pay good money for new 8259 chips unless you know the specifications of the chips you are getting.

QuickBASIC Version 2.0

QuickBASIC Version 2.0 will not run properly under ZPC because of the way it handles the keyboard. It can be patched to partially work, so that at least you can compile programs with it. However, all keys will not work, so you cannot use the internal editor. You will have to write your programs with another editor, then load them into QuickBASIC for compiling. Unlike QuickBASIC version 1, the compiled programs themselves will run under ZPC without any patches.

To patch QuickBASIC, add the following lines to your PATCHER .DAT file.

```
Microsoft QuickBASIC v 2.0
Insert the disk containing QB.EXE
QB,EXE
7C63,CD,90,3C,B8,74,12
A6C5,90,90,90,90,90,90,90,90,90,90,90
A6E4,90,90,90,90,90,90,90,90,90,90,90
A74B,90,90,90,90,90,90,90,90,90,90,90
z
```

Patch QuickBASIC using the instructions for PATCHER that are provided with ZPC.

ZPC Upgrade Coming

I have worked some improvements to ZPC Version 2, and will be releasing these improvements as an upgrade disk, which will probably be ready next month. This disk will include a program that will automatically patch your ZPC.COM and bring it up to date. Included in the improvements are keyboard handling changes that cause QuickBASIC and other difficult programs to work correctly. This will NOT be a trade-in upgrade. It will just be an additional disk to purchase if you want to upgrade your ZPC Version 2.

Meanwhile, if you are still using ZPC version 1 (885-3030-37), you can upgrade to ZPC Version 2 by sending in your original disk and $20.00 to Heath/Zenith Users' Group, Attn: Nancy Strunk, Hilltop Road, St. Joseph, MI 49085. If you have both ZPC version 1 and the ZPC Support Disk (885-3034-37), send both disks in and $15.00. Both of these disks are made obsolete by ZPC Version 2. ✱

Related Products

Jim Buszkiewicz
HUG Software Developer

***NOTE:** The following information was gathered from vendors' material. The products have not been tested nor are they endorsed by HUG. We are not responsible for errors in descriptions or prices.*

Paul F. Herman Inc., publisher of the best-selling DOODLER Graphics Package for the H/Z-100 computer, announced a major update to the program today. The new version, named DOODLER V, will run on IBM-PC compatible machines, as well as the standard H/Z-100.

DOODLER V is a sophisticated pixel-based drawing program which can be used for designing and printing all types of graphic designs. The program supports both high-res monochrome and low-res color graphics on PC compatibles, and 8 color high-res graphics on the H/Z-100. Picture data and character fonts are transportable between PCs and the H/Z-100, making the program a good choice for Z-100 owners looking to convert to a PC compatible in the future.

The DOODLER V Graphics Package includes a custom font editor, and print drivers for well over 100 printers, and Paul F. Herman Inc. guarantees to provide support for any graphics-capable printer used with the package.

DOODLER V Graphics Package is available at Heath/Zenith Computer and Electronics Centers nationwide, or may be ordered direct from Paul F. Herman Inc. List Price is $99.00. For more information, contact Paul F. Herman, at (813) 376-5457, or write to: Software Graphics Tools, 3620 Amazon Drive, New Port Richey, FL 33553.

For all you 8-bit die hards (H8, H/Z-89/90 owners), **Wheeler Associates Limited** announces ZCPR3-IN. This product installs ZCPR3 on your system quickly for less than ten dollars! ZCPR3-IN uses a mix of custom, as well as public domain software to do the installation. Complete installation takes only an hour or two. ZCPR3-IN comes with a detailed 12 page manual that leads you step-by-step through a simple procedure. If you like Heath manuals, you'll love this one! System requirements include an H/Z-89/90 (H8 should work, but not tested), CP/M 2.2.03 or .04, and a soft-sector disk controller (hard-sector version is still being tested at the time of this writing). Two drives are best, but one will work. The Digital Research MAC Assembler is required to assemble ZCPR3. You get everything else you need, including ZCPR3 code. ZCPR3-IN with manual is $9.95 + $2.00 shipping. Also available is a ZCPR3 Utilities Disk for $7.95 + $1.25 shipping. For more information or to order, write to: Wheeler Associates, Limited, P.O. Box 9512, Alexandria, VA 22304, or call (703) 751-6168.

Hogware Company has announced a unique new product for the Heath/Zenith H/Z-100 . . . SHOWOFF, a high resolution graphics editor. SHOWOFF was originally created for use by graphic designers and now is being released for sale to the Heath/Zenith community. This is the first graphics editor to combine hi-res (640 × 480) with professional quality text, full range of color and movement with a mouse. SHOWOFF will enable the user to create attractive graphics of all types . . . illustrations, as well as business graphics. The real strength of SHOWOFF lies in its most popular features, high resolution, 92 different fill colors, 92 patterns, and the Hershey Character set including 25 different text styles. Additionally, SHOWOFF supports the use of a mouse which makes it easy to do free-hand drawing and move around the screen. SHOWOFF, aimed at the business user, is available alone, or with the Logitech C7 mouse. Versions are also available for use with digitizing pads. The current price of SHOWOFF alone is $79, and with the Logitech Mouse, $169. A demo disk is available for $3. For more information, contact: Hogware Company, 470 Belleview, St. Louis, MO 63119, or call (314) 962-7833.

HUG Club Update

Anyone interested in forming a **QC HUG** in the Rock Island-Davenport area contact Griff Ferrell at (309) 788-4357.

The **San Diego HUG** now meets at 7:30 pm — same location.

The new contact person for **DENHUG (Denver)** is Rob Chapman. Phone number: (303) 377-3228. BBS (303) 331-0982.

The new address for **NOHUG (New Orleans)** is 5305 Janice Avenue, Kenner, LA 70062. Don Berkowicz is the contact person. Phone number: (504) 455-3583. They meet the 2nd Thursday of each month at 7:30 pm at the HEC. Have a newsletter and 24 hr. BBS (504) 467-0996. Their membership is now 60+.

SLHUG (St. Louis) now meets at 7:00 pm — same day and place. Also have 24 hr. BBS (314) 291-1854.

Buffalo Users' Group now meets at 7:30 pm — same day and place.

The **Dayton Group** now meets once a month for all computer users. They meet the 3rd Thursday at 4:15 pm at Flt Dyn Lab, Bldg. 146, Room 203E.

The contact person for both the **Frazer** and **Philadelphia Users' Groups** is Colin C. McGowan. Phone number: (215) 387-5572. The correct mailing address for the Philadelphia club is P.O. Box 8184, Philadelphia, PA 19101-8184.

New address for the **Pacific Northwest HUG** is 54 Glacier Key, Bellevue, WA 98006. New contact person is Dave Banks at (206) 747-2322.

How To Disable Prt Sc

Pat Swayne
HUG Software Engineer

On a PC-type computer, if you hold down a Shift key, and press the Prt Sc key, a copy of the text on your screen is sent to your printer. Unfortunately, if you don't have a printer connected to your computer at the time, your machine will lock up, requiring a reset. A number of people have asked me if there is a way to disable Shift-Prt Sc so that accidentally striking it has no effect. In the past, I have told them to run CONFIGUR, and map their LPT device to a COM port, and then configure the COM port to 9600 baud and no handshaking. This will cause the screen characters to be dumped to the COM port, and it will not lock up, since there is no handshaking.

I now have developed a simpler procedure by creating a little program that disables Shift-Prt Sc. If you type in and run the following BASIC program, it will create NOPRTSC.COM.

```
10 REM THIS PROGRAM CREATES NOPRTSC.COM
20 DEFINT A-I:OPEN "O",1,"NOPRTSC.COM
30 S=0:S1 = 1677 :FOR I=1 TO 17
40 READ B:S=S+B:PRINT #1,CHR$(B);
50 NEXT I:IF S<>S1 THEN PRINT "TYPING ERROR!":END
60 CLOSE #1:LOCATE 23,1:PRINT "DONE!":SYSTEM
70 DATA 235,2,144,207,186,3,1,184,5,37
80 DATA 205,33,186,4,1,205,39
```

The assembly source code for NOPRTSC.COM is listed at the end of this article. To use it, copy NOPRTSC.COM to your system disk, and type

```
NOPRTSC
```

at the system prompt, and hit RETURN. This will disable Shift-Prt Sc until you reset and re-boot your computer. You can place a command to run NOPRTSC in your AUTOEXEC.BAT file, if you wish.

If you load a graphic screen print utility after you run NOPRTSC, it will still work in the graphic modes, but screen printing will be disabled in the text modes.

Below is the source code for NOPRTSC.COM

```
        PAGE    ,132
;       NOPRTSC -- SHIFT-PRT SC DISABLER
;
;       BY P. SWAYNE, HUG SOFTWARE ENGINEER  12-SEP-86

CODE    SEGMENT
        ASSUME  CS:CODE,DS:CODE,ES:CODE,SS:CODE
        ORG     100H

START:  JMP     SETUP           ;SET UP PROGRAM

PSCRET: IRET                    ;POINT PRT SC TO THIS

SETUP:  MOV     DX,OFFSET PSCRET ;POINT TO INT  RETURN
        MOV     AX,2523H        ;INSTALL INT  23 VECTOR
        INT     21H
        MOV     DX,OFFSET SETUP ;POINT PAST RES. CODE
        INT     27H             ;EXIT, LEAVING IRET HERE

CODE    ENDS
        END     START
```


"Have Your Computer Talk To Ours!"
"HUGPBBS is on line, 24 hours a day, with over 10 megabytes of free software available for downloading. There's software for every Heath/Zenith operating system, with the majority being for MSDOS, and specifically the Heath/Zenith PC compatible computer systems. Also included is software for HDOS, CP/M, and MSDOS for the H/Z-100 computer system. In addition to this software is a message base through which you can exchange information with other HUG members. Have your computer call (616) 982-3956, 'The Heath Users' Group Personal Bulletin Board System', and make connection at 300, 1200, or 2400 baud. Type a carriage return several times get my attention. Registration requires that you supply your human's first name, last name, HUG ID number, and some sort of secret password (up to 16 characters). Alternatively, your human can call Jim Buszkiewicz at HUG, and register via voice connection at (616) 982-3837. Call today! All it takes is a computer, modem, and a phone call for your computer to talk to ours!"
MoC

On The Leading Edge

William M. Adney
P.O. Box 531655
Grand Prairie, TX 75053-1655

Z-100 Windows, PC Watchword, Modems, Device Drivers, Blinking Cursor, Ecosoft C, HUGCON 86

How quickly the years go by! This month is the third anniversary of my column in REMark, although I actually wrote the first column about three and a half years ago. But it does seem appropriate to reflect on some of the things that have happened in the last three years.

There have obviously been many changes in computer equipment in general — some improvements and some things not so good. Software has changed significantly and again, not all of the changes have been for the good of the computer user.

Perhaps my biggest regret in this time has been the fact that I decided to trade-in my H-89 for the H-100. Although the reasons for that seemed good at the time (See "Trade Your H/Z-89 for an H/Z-100?" in December 1983 REMark), it is clear that I would have been wiser to keep the H-89 for many reasons. As usual, twenty-twenty hindsight is MUCH better than foresight.

I think that one of the most interesting facts is that when I began writing for REMark, HUG had a membership base of about 17,000. In just three short years, that has grown to over 30,000. No matter how you cut it, a one hundred percent growth for an organization in just three years is REMarkable!

The biggest equipment change during this period has obviously been the Heath/Zenith commitment to the PC-compatible computers. Whether this is good or bad depends on your perspective. From a business view, the choice was clear. Today, there are over three million Zenith clones from one manufacturer (IBM) alone. Current estimates are that there are SIX million PCs and compatibles in the hands of users. And although many of us don't believe that the PC-level technology is the best available, the hard fact is that is where the action is. It is more than a little unfortunate that some really excellent microcomputers, like the H/Z-100 series, have been relatively neglected because of the "IBM standard". More on that in future articles.

PC Compatibility Revisited

We have looked at three ways to add PC compatibility to the H/Z-100 series over the last year: the Gemini Emulator Board (January 1986), the Easy PC (June 1986), and HUG's ZPC (July 1986). Would you believe that there is now a fourth option? The long-awaited Z-100 Windows has arrived, and it provides a modest level of PC compatibility for our system. We'll take a look at some of the hardware and software requirements plus a few other goodies.

Z-100 Windows — The Hardware

According to the documentation, Z-100 Windows requires a minimum of two floppy disk drives, MS-DOS version 2 or later, and a minimum of 256K memory. Although Windows will clearly run in that configuration, I don't recommend it — it's too slow and cumbersome. As far as I'm concerned, the minimum configuration is a hard disk and the maximum amount of memory in the Z-100 — 768K. A color monitor, like the CM-1000 that I mentioned last month, allows you to appreciate some of the features of Windows (like keeping them separate) that you can't really "see" too well on a monochrome monitor. And a mouse would be a good idea too. More on that in a minute.

Z-100 Windows — The Software

Windows comes with five disks: Setup, Build, Printer Drivers, Fonts, and Desktop Applications. It's not a small application, which is the reason that I believe a hard disk is a requirement. Not only that, running Windows on a floppy disk system is just plain slow, not to mention the problem of building up your arm muscles because of the disk swapping.

Customizing Z-100 Windows for your system is quite easy and is completely menu driven. Although Windows was clearly intended for PC compatible printers, Zenith has thoughtfully included a "TTY driver" so that we can print "text" information on

printers like the H/Z-25/125. If you have a printer that supports the IBM graphics, you can configure Windows to print just about anything on the screen. Printers with more limited capabilities, like my H-25 (or a letter quality printer), must use the TTY driver since they don't have some of the graphics.

Since Z-100 Windows provides a level of PC compatibility for our systems, it should come as no surprise that some of the keys have been remapped in a way similar to the other emulators. The Windows documentation calls these remapped keys "virtual keys". Listing 1 provides a cross reference to the new virtual keys.

The Windows Desktop Applications software provides an alternative to some of today's desktop utility packages. Eight "accessories" are provided in the standard package.

The Notepad is precisely that. It allows you to make short (or even long) notes. Not too much new there in terms of desktop accessories.

The Cardfile can be used to record whatever information is appropriate. The most obvious use is for names and addresses, and with the next application, you can also use the Cardfile to "automatically" dial your phone.

The Terminal application is essentially a setup for a modem for the automatic dialing for the Cardfile.

No desktop accessory package would be complete without a calendar to schedule your many appointments, and Calendar provides that capability.

The Calculator application is another popular feature of most desktop utilities, and Windows has that too.

And if you want to see a Clock (analog type with hands), a quick command to Windows will display that.

When you get tired after spending a long day at your computer, Windows also provides two games: Reversi and Puzzle.

If you're curious as to what some of the Z-100 Windows displays look like, you might want to review Joe Katz's article in the May 1986 issue of REMark. He has a few pictures of some of the Windows displays. All of that may or may not be interesting, but let's take a look at the level of PC compatibility that Z-100 Windows provides.

Running PC Software Under Z-100 Windows

As you might expect, the Z-100 support of PC support has some distinct limitations. You might even correctly guess that the problem is far greater than an "emulator" like Z-100 Windows can cope with, and you would be right. Let's take a look at some background.

IBM has defined something called well-behaved software. That really means software which uses the standard DOS and ROM-BIOS system functions. How do you KNOW in advance whether software is well-behaved or not? You don't. In many cases, you will not know whether PC software is well-behaved or not unless you try it. It's interesting to note that Borland's popular SideKick has been reported in several places as the most ill-behaved software available. Aside from that, many games, especially the copy-protected ones, rate quite high as ill-behaved programs. You might expect to find that virtually all ill-behaved programs will not run under Windows. There is at least one exception to that that I have found. I would not expect to find any PC communications packages that would run under Z-100 Windows due to the hardware in the Z-100.

The good news is that many PC software packages are well-behaved and will run under Z-100 Windows. Excluding the communications packages, I think that all other PC software advertised in the current Heathkit catalog will run satisfactorily under Windows, but I haven't tried them all. Until more information is available, be sure to test any prospective application under the Z-100 Windows BEFORE you buy it. I suspect that we'll find some surprises in terms of software that is not well-behaved.

My Opinion Of Z-100 Windows

In general, it's a nice package. In particular, it provides a modest level of PC compatibility for your '100 as I mentioned before. Although I do like Windows, it's difficult to become as enthusiastic about it as I have been about some other products. Why? I don't think that Windows by itself is sufficient because it will be incredibly slow on a floppy disk system. Like most programs of its type, it is a memory and disk space hog. In my opinion, you should have the maximum memory (768K) and a hard disk unless you enjoy disk swapping. I don't. It's difficult to tell about speed since my '100 is currently running at 8 mhz, although I suspect that there would also be an additional time penalty for slower systems. I've seen Windows run on an IBM PC floppy disk system, and it is NOT very responsive.

As far as the software itself, I think Zenith did a nice job on it, and I have no complaints about Windows. I suspect that it must have been a real turkey to get running on the '100, and it's a tribute to ZDS that they were finally able to get it running. It has many of the desktop utilities that seem to be quite popular today, so that might be enough of a reason to buy it. And since you get a level of PC compatibility in the deal, you might find it even a better deal. Subject to having a fairly well equipped '100 system, it's a recommended program.

The HUG Convention

As usual, I enjoyed the HUG Convention this year. It was certainly worthwhile in several respects. All of my presentations on version 3 of MS-DOS were pretty well attended, and I had a lot of fun giving them.

Of particular interest to me was the fact that Dr. Jack Purdum, President of Ecosoft, Inc. was there with his Eco-C88 C compiler and a few other goodies. He is also the author of several books on C which I have found extremely helpful. In fact, I recommended his book, the "C Programming Guide" several years ago in this column. I also have his "C Programmer's Library" and "C Self-Study Guide". Although I have more than a few reference books on C, I actually LEARNED C from the "C Programming Guide". If you have any interest in C, I still highly recommend these books.

Although I really haven't had much chance to "beat up" the Eco-C88 compiler, my initial reaction is that it probably is the first compiler you should buy. For many people, it may be the last one they ever need. I will resist using the words "rich" and "robust" to describe the compiler since I have never cared for those terms even though they seem to be associated with Unix related software. But the Eco-C88 compiler is a full featured compiler for a VERY reasonable price - $59.95. Even my modest preliminary look at the compiler would seem to indicate that it will be highly recommended based on price versus features. More about that in my article about programming languages. We'll talk about why I absolutely detest BASIC even though I taught it at the University of

Texas at Arlington (UTA). And why C is my personal choice for a primary programming language.

There were two other new products of particular interest to me: PC WatchWord and PC Perks. Many of you may recall my article in the July 1985 REMark "Watching WatchWord Work Words", and you may remember that I was quite impressed with the Z-100 version. We'll take a look at the PC WatchWord in just a minute.

One of the problems with having several presentations is that you don't always get to do all of the things that you had planned. I wanted to get a chance to talk to Barry Watzman about his new PC Perks, but I was never able to find him when I had some free time. The "regular" Perks for the Z-100 works great and there have been some enhancements since I reported on it in the August 1985 REMark. I did see a quick demo of PC Perks, but I didn't have time to look at it closely. As most of you know, Barry is known for quality work in whatever he does, so I would bet that PC Perks is every bit as good as the Z-100 version.

Steve Robbins finally relented and has done a nice implementation of WatchWord for the PC series computers. I guess that enough of us have bugged him about doing it, or so he tells me.

PC WatchWord

As I mentioned last year, WatchWord is a combination word processor and editor. For those of you who missed last year's review of the Z-100 version (July 1985), most of these comments apply to both the Z-100 and PC versions.

One of the biggest problems with word processors today is the fact that many of them are awkward and unable to generate a straight ASCII file, such as is required for a batch file (e.g. AUTOEXEC.BAT) or a configuration file (i.e. CONFIG.SYS). And if you do any programming in any language that does not have a "built-in" editor, you will probably need to buy two software packages: a word processor and an editor for programming. If you want to drive yourself quietly (or not so quietly) nuts, try writing an assembler program with Microsoft Word. It may be an excellent word processor, but it's a real stinko as a programming editor.

The advantage of WatchWord is that you have both an editor and a word processor. WatchWord is a WYSIWYG (pronounced whizzy-wig) editor — What You See Is What You Get. It can be used quite effectively for programming, and it is full featured enough to be the only word processor that most people will ever need.

Both WatchWord versions make effective use of the function keys on each computer — a nice feature. In addition, the PC WatchWord allows you to enter and exit the Command Mode (for PRINT, SAVE, QUIT or whatever) by pressing F10. The keypad keys perform their labeled functions plus a few more.

Ever want to edit a file in hex code? WatchWord can do that too. Although I have been "assured" by any number of people that they have NEVER deleted something by "mistake", I suppose that you won't be interested to know that WatchWord has an "undelete" function. Since I know that most of you don't make those kind of mistakes (I KNOW I don't! — well, not often anyway), I won't discuss that neat feature.

WatchWord has a WWCONFIG command that allows you to modify all of the function keys to "move" the commands around if you don't like the current setting. And of course you can also perform a custom printer definition just in case there isn't a defined setup for your printer. And reasonable use of "dot" commands (spelled out — not cryptic) completes the printer capability.

As you can see, WatchWord has any number of limitations: can be used as a programming editor, is a powerful word processor, can edit hex, WYSIWYG editing, undelete functions, changeable function key/command configuration, ability to customize for any printer (even laser printers), macro capability, reasonable use of function keys, horizontal scrolling for text wider than the CRT, supports color/monochrome/MDA, split screen capability, easy to use, and includes a function key template. Based on these clearly limited features (pardon me while I remove tongue from cheek), I trust you will agree that $100 is a VERY reasonable price for such a powerful "editor".

But be prepared. Both WatchWord versions are designed and intended to be used as high performance software. And don't forget the Resident Spellers or Strike (PC series only) for spell checking. In case you haven't seen Strike, it's a neat little program by itself. It is included with the PC Resident Speller by the way. Strike is a dynamic spelling checker (memory resident) which checks spelling AS YOU TYPE using a word processor. If you want a high performance editor and spell checking, all of these programs are HIGHLY recommended.

Dear Dr. Katz

One of the advantages of having two Contributing Editors in a magazine is that you can get different perspectives on the same issue. I was able to meet and talk to Joe Katz for a short time at the HUG Convention, but unfortunately we didn't have time to really discuss much. It should be no surprise that we will not agree on everything, and indeed, I disagree with the idea of an internal modem (August 1986) under ANY circumstances. Joe's "Rule Two" (page 12) stated that "Always go with an external modem instead of an internal modem". He cited four reasons for that which are certainly valid in my mind: use of an expansion slot, harder to install an internal modem, smaller and perhaps less capable and reliable, and difficult or impossible to move to another computer.

When I began my presentations at the HUG Convention, I asked about the types of computers that the attendees had. It was surprising to note how many had both a '100 and a PC series computer. Lots of luck moving an S-100 card to an H/Z-148 or vice versa. That is the particular reason that I bought an external modem for my '100. I "knew" that I would get a PC compatible "someday", and I was trying to plan ahead. But Joe already mentioned that and the other good reasons.

My real disagreement with the consideration of an internal modem is based on a problem that a friend had. It was a "surge" of some kind, and it's not clear whether it came in through the power line or the telephone line. The bottom line was that it cost him $75.00 to have the burned out modem repaired at the factory. What if that surge came through the telephone line to an internal modem? Good Grief! And took some of the computer internal hardware with it! Like I said, it's not clear where the surge originated, but I don't like to take chances. I'd much rather spend a small amount of money repairing an external modem than replacing some of the boards in a computer.

While I have no doubts that the ZOOM/Modem is an excellent performer as Joe said, it will be a long time before I use one in my systems. Perhaps at least one moral of the story is be sure to have a REAL surge protector on ALL of your computer equipment.

Stopping The Blinking Cursor

My thanks to all of you who sent letters about how to stop the blinking, underline cursor on the PC series computers. The letters were uniform in their response: It's impossible. Several people mentioned that they had obtained this information from local PC "experts" and "gurus". My local "experts" said the same thing. Perhaps I slightly loaded the dice when I wrote that because I knew in advance that it WAS possible — I just didn't know how to do it.

Well, when something is impossible, it's time to call out the "Big Gun". Although sometimes the impossible takes a little longer, that wasn't true in this case. Some of you have probably figured out that I called our own Pat Swayne (THE Big Gun) for a solution to the problem. That was the end of July. Pat gave me a copy of the "NO-BLINK" program on disk at the HUG Convention two weeks later. He said the "impossible" took a few days. Now I have a "regular" block cursor on my '241 that does not blink. He told me that he would write this up for REMark, so you may have already seen his article by the time you read this.

My '241

There have been some interesting reports in several places about "cooling problems" in the '241. All I can say about that is: "Here we go again!" Why, you may well ask, would I say that? Simple. There were lots of articles about "cooling problems" in the old H-89s, but I never had a problem with mine. I was never convinced that it was a "design problem" as some people said — I thought it more likely that some homebrew modifications or marginal components (original) caused the problem.

I've had my '241 for a few months now, and it is fairly well equipped with two hard disks and the Zenith memory expansion board to 640K. Although I worked the daylights out of it for last month's article, I had no problem.

Apparently, the issue is that the cooling fan pumps air into the computer instead of exhausting it out. My '241 operates that way. According to the InfoWorld article, Zenith said there was an issue with the initial Z-200 production due to some power consuming add-on boards that would cause the system to overheat, but that problem has been fixed and was never a widespread one. Since no mention was made of the same problem in kits, I assume that it was corrected in the kit version too, since I haven't had any problems with mine. In order to verify that, I checked with both of my local Heathkit stores (Fort Worth and Dallas), and neither one has had any overheating problems with either kits or assembled '200s.

Based on that and previous experience, I think one should view this kind of "problem" report with some skepticism. Perhaps the system(s) in question had 12 cards (the maximum) and two hard disks — there has not been any report that I've seen mentioning the exact hardware configuration. Perhaps it had unusual cards that generated a lot of heat. And it's always possible that a unit tested good at the factory and later failed for other reasons such as poor air circulation due to physical location.

Even more interesting is the suggestion that reversing the fan in the power supply helps alleviate or totally eliminate the problem. That's not a bad idea for another reason. I wondered why I felt like I was slaving over a hot computer all day when I was doing the testing for last month's article. In fact I was slaving over a hot computer because the hot air was being exhausted from the front vents of the computer onto my fingers. Although that may be an excellent way to keep your fingers warm in the winter, I think that I'll probably reverse the fan for that reason. I'm still not convinced that there really is a heat problem, but time will tell. According to that same InfoWorld article, the latest Z-200s have the fan set up as an exhaust unit, so I can't imagine that there should be too many problems with that.

Device Drivers

In the interests of continuing the "general information series", I thought it might be a good idea to take a look at device drivers. If you have looked through the MS-DOS documentation, you have probably seen some reference to device drivers. So, let's look at some background.

Version 2 (and later) of MS-DOS provided many new features and commands for MS-DOS. Among these new features was the DEVICE DRIVER. Simply stated, the DEVICE DRIVER is a software interface between the operating system (e.g. DOS in one form or another) and the physical devices that the operating system must deal with.

What Is A Device Driver?

In the standard MS-DOS (and its derivatives such as PC-DOS) environment, ALL input and output functions are performed by transferring information between devices — hence the name DEVICE DRIVER. The DEVICE DRIVER is the basic program that allows the operating system to communicate with all physical devices connected to the system. This includes such items as the keyboard, CRT, disk drives (and their associated disk controllers), printers, modems, and related physical items. These are obviously hardware items and since they can be identified as such, they are also called PHYSICAL DEVICES.

LOGICAL DEVICES, on the other hand, are those that are specifically defined in the operating system. A generic MS-DOS operating system would be found to have several standard device drivers which can be accessed by a user. These are:

CON — The system console device — normally includes both the keyboard and a CRT.

AUX (COM1) — An auxiliary device usually connected to a serial port. In the Z-100, AUX refers to the serial port physically connected to J2. When discussing an IBM PC and compatibles, this is the same as COM1, the first serial device.

PRN (LPT1) — A system printer usually connected to a parallel port. For the Z-100, this refers to the parallel port physically connected to J3. When discussing an IBM PC and compatibles, this is the same as LPT1.

NUL — A null device that allows output to be directed to it, but that output is discarded by the operating system. The NUL device is essentially a "big bit bucket in the sky." It is primarily useful in some of the programming commands such as MASM, LINK or CREF when you don't want a listing to be printed or written to disk.

CLOCK$ — A clock device that can be accessed and maintained by the operating system.

For various reasons, some microcomputer manufacturers have defined additional device drivers for their hardware. Zenith, for example, has defined the following for the Z-100 computers:

LST — A system listing device (i.e. a printer) usually connected to the first serial port. In the case of the Z-100, this refers to the serial port physically connected to J1. Users should be aware that print

output can be directed to this port with Zenith's CONFIGUR command.

IBM PCs and compatibles may have additional ports if special add-on cards are installed. Standard equipment on an IBM PC includes only the parallel port defined as PRN or LPT1 as described above. A serial asynchronous port, may be added at extra cost to provide AUX (or COM1) serial communications, such as is required for a modem. The Zenith IBM PC compatibles (herein referred to as the Z-150) includes the AUX serial port as standard equipment at no additional cost.

Besides the standard ports described above, PCs and compatibles may have the following additional ports if additional hardware interface cards are purchased:

COM2 — The second serial device connected. See the standard AUX (COM1) device above for additional information.

LPT2 — The second parallel device connected. See the standard PRN (LPT1) device above for additional information.

LPT3 — The second parallel device connected. See the standard PRN (LPT1) device above for additional information.

Flavors Of Device Drivers

All manufacturers of microcomputers provide default device drivers as part of the operating system. The default device drivers are contained in the code for the Basic Input Output System — normally referred to as the BIOS. Manufacturers develop this code to support the hardware that they supply to the users. In a generic MS-DOS system, this is normally a hidden system file called IO .SYS. For IBM PCs and compatibles, this is part of a similar file, called IBMIO.COM, and the ROM BIOS.

We have already reviewed some of the default device drivers for some microcomputers. These device drivers provide the operating system interface to CHARACTER (or serial) type devices such as the console (and keyboard), modems, serial printers, and so on. It is also significant to note that FCB's (File Control Blocks) or file handles can be opened to perform I/O on character devices.

But I have already noted that device drivers are used by the operating system to communicate with disk drives — these are known as BLOCK device drivers since they transfer a block of data (normally 512 bytes at a time — note that is the same as the standard disk sector size in MS-DOS). Block device drivers cannot be opened directly through an FCB or file handle. They are "mapped" to drive letters using a table located in memory when MS-DOS is originally booted.

This, by the way, is the reason that Zenith Data Systems originally provided the MAP command with their Z-DOS and MS-DOS operating systems. PC-DOS, from version 2 on, has provided the ASSIGN command which did the same thing. Both MAP and ASSIGN changed the "memory" tables which defined the correspondence between the hardware assigned (performed through a "programming" plug or switch physically located on the disk drive) and the drive letter.

One important characteristic of block device drivers is that they are responsible for one or more disk drives or physical units. If the FIRST block device driver is responsible for four units (drives 0-3 or letters A, B, C, and D), the position of the driver in the list of drivers determines which units correspond to which drive letters.

To demonstrate this principle, let's look at an example. It is a fact that the Z-100 computer will support a maximum of two 5.25" drives, two 8" drives, and four hard disk partitions. We might therefore guess that the first two block device drivers support the two 5.25" units (drives 0-1 with letters A and B), the next drivers in the list support the two 8" units (8" drives 0-1 with letters C and D), and the four hard disk partitions (with letters E, F, G, and H). This is an important concept since it explains why the Z-100 memory disk driver (known as MDISK.DVD, MDISK.SYS or VDISK.SYS) may install itself as drive I (on a hard disk system) — the last drive in the sequence since it may be installed by the user. PCs and compatibles use the same concept — A and B are floppy drives, and C is a hard disk or virtual disk depending on the system.

For those of us interested in the technical limitations on the block device drivers, I will note that the theoretical limit for addressable devices is a maximum of 63. That begins with the capital letter "A" through "Z", then goes to "[", "\", "]", and so on in the standard ASCII sequence. Lots of luck if you like a drive named "^"! I hope that your memory is good in terms of remembering which disk is on what drive . . .

To summarize, device drivers are provided in two flavors: character device drivers which provide character-by-character data transfer and block device drivers that transfer data in blocks of 512 bytes. For practical purposes, it is sufficient to recognize that block device drivers allow the operating system to communicate with disk drives whether they are floppies, hard disks or memory disks. Character device drivers essentially perform all other interfaces required between the operating system and the physical computer hardware. Next time we'll take a look at the usual device drivers supplied with MS-DOS — ANSI.SYS and VDISK.SYS.

Closing REMarks

Since next month is Christmas time, I will talk about some suggestions for gifts from various sources. A nice program to backup your hard disk that is inexpensive, reliable, and fast is one idea. A super little utility program that will end up on everyone's "must have" list is another. And we'll even take a look at a program that might be from the netherworld.

We won't neglect the hardware side of your system since I'll mention a few ideas for that too. I'll be glad to answer any questions about information in this article if you send enclose a stamped, self-addressed envelope with your letter.

Products Discussed

Software

MS-DOS Version 3	
PC only (OS-63-31)	$150.00
Z-100 only (OS-63-30)	150.00
Programmer's Utility Pack (CB-3163-30)	150.00

Hardware

Advanced Personal Computer (HS-241)	$2499.00
Monochrome/Color Video Card (Z-409)	239.00
20MB Winchester (ZD-200)	1499.00
40MB Winchester (ZD-400)	2499.00
H-100 Desktop Computer (HS-1108-41)	999.00

Heath/Zenith Computer Centers
Heath Company Parts Department
Hilltop Road
St. Joseph, MI 49085
(800) 253-7057 (Heath Catalog orders only)

Eco-C88 C Compiler (MS-DOS)	$ 59.59
Flexi-Graph (Graphics Support)	39.95
Librarian	29.95
C Library Source ($10.00 if ordered with C-88)	20.00
Developer's Library (All source)	50.00
ISAM Library ($15.00 if ordered with C-88)	30.00
CED C Program Editor (PC only)	29.95
C Self-Study Guide (Purdum) (+ $2.00 shipping)	17.00
C Programming Guide (Purdum) (+ $2.00 shipping)	20.00
C Programmer's Library (Purdum) (+ $2.00 shipping)	22.00

Ecosoft, Inc.
6413 N. College Ave.
Indianapolis, IN 46220
Orders only: (800) 952-0472
Technical Support: (317) 255-6476

WatchWord (Z-100 Only)	$100.00
Resident Speller (Z-100 MS-DOS)	100.00
PC WatchWord (PC Series)	99.95
PC Resident Speller (PC Series)	99.95
Strike (PC Series)	29.95

S & K Technology
4610 Spotted Oak Woods
San Antonio, TX 78249
(512) 492-3384

Listing 1
Z-100 Windows Virtual Keys

Z-100 Key	PC Equivalent Key
FAST REPEAT	ALT
SHIFT-F12	PrtSc
LINE FEED	SCROLL LOCK
DCHR	Del
DELETE	NUM LOCK
. (keypad)	Del
0 (keypad)	Ins
1 (keypad)	End
3 (keypad)	PGDN
5 (keypad)	5 (keypad) - Clear function
9 (keypad)	PGUP

*

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Continued from Page 10

non-document mode. Don't put a carriage return at the end of the line!

2b. To write the code to the PRN device, use "COPY 9600 .CMD=PRN".

Sincerely,

Milton H. Bank, II
P.O. Box 8668, NPS Station
Monterey, CA 93943

Devoted To Beginners

Dear HUG:

I would like to see a series of articles in REMark devoted to the beginnning computer operator. There have been a great many articles in past and current issues which are far too technical, and are mainly slanted to areas other than the above. Although I belong to a HUG, they are too far away for me to attend most of their meetings and training sessions. I enjoy reading REMark, and generally do so from cover to cover. However, much that I read is far too technical for me to understand. Then too, I would like to learn to use my computer, rather than to learn how to modify it or to add additional peripherals. I live in a remote area, and while I have purchased books supposedly devoted to "How to Use", they seldom are.

There are tutorial disks available for other hardware, but I have never heard of such for the H/Z-89 or H/Z-100. Perhaps someone out there in Huggie Land could compose a series of articles slanted to the operation and use, and write it in plain English.

Thank you.

Very truly yours,

Errett L. Allen
P.O. Box 580
Oakhurst, CA 93644

Adney's EasyPC Review

Dear HUG:

I read William Adney's review of the EasyPC in the June REMark with great interest. Obviously, the time lag between writing and publication makes it impossible to keep readers up to date on the latest developments — particularly when they are as far away as Guam! (APO SF 96334 is Guam.) If my experience is typical, and I believe it is, UCI will install the capacitor and the ROM which caused the bulk of the problems he mentioned free of charge, with a short turn around time. As he pointed out, their after purchase support is outstanding. By the way, so is H/Z's decision to support three products which allow Z-100 users to run PC software.

I was particularly interested in his comments entitled, "Upgrading Your H/Z-100". I agree that the HA-108 kit price of $249.95 is high. It may reflect the volatility of the market, or marketing philosophy. But I did not have to spend nearly that much to upgrade mine; I purchased the chips I needed on an individual basis from four different vendors, including Heath.

I have been able to get my Z-100 (equipped with UCI's EasyPC and 2 MB memory board, dual floppies, and the old motherboard) to operate reliably at 8 MHz in both the Z-100 and IBM PC modes by making the following changes:

Socket	Old	New
U110	PAL16L8	16L8ANC
U126	74LS244	74F244
U128	74LS257	74F257
U132	74LS373	74ALS373
*U133	74S373	74AS373
U146	74LS257	74F257
U153	74LS280	74S280
U155	74LS00	74AS00
U162	74LS244	74ALS244
U163	74LS244	74ALS244
U166	74ALS04	74ALS1004
U180	74LS367	74F367
U181	74LS244	74ALS244
U195	74LS240	74ALS240
*U198	74S373	74ALS373
U200	74LS368	8T98
U208	8259AP	8259A-2
U209	8259AP	8259A-2
U214	74LS244	74ALS244
U220	74LS04	74ALS04
U221	74LS32	74ALS1032
*U227	74S373	74ALS373
U234	74ALS74	74S74
U241	74LS244	74ALS244

Dr. Cheung of UCI Corporation advised me to make most of the changes; some are included with UCI's speed module kit, and others are part of the HA-108 kit. I put the 74S373's in sockets U133, U198, and U227 last year to solve some disk I/O problems,; I decided to leave well enough alone and did not make the changes suggested. UCI upgraded my EasyPC with a capacitor which enabled me to use a V-20. Performance was still erratic until I replaced my CDR speed module with UCI's version. Prior to making the above changes, the UCI module would not work, but it does now! Using CPU.COM to measure clockspeed, I have obtained the following results: Z-100 mode = 7.96 - 8.09 MHz, and IBM PC mode = 8.84 - 9.64 MHz.

Hopefully, UCI will soon provide software to allow use of the memory above 704K as ramdrive(s).

All the IBM software I've tried so far runs well. On the Z-100 side, GENIE seems to be erratic. Anyone know of a fix?

Sincerely,

John Luongo
Box 2125
APO SF 96334

An Injustice Has Been Done

Dear HUG:

I can no longer remain silent on a great injustice. Mr. William Adney's articles on IBM emulation using the Z-100 computer misrepresents the present facts on two of the three approaches available.

I began the quest for acceptable levels of IBM PC emulation for the Z-100 with the HUG ZPC in July '85, and with the GEMINI board in September of 1985 when it was first introduced in the 5 MHz configuration. I had just incorporated Pat Swayne's H208, 768k memory mod on my low profile Z-110 using 256k memory chips as described in the July '85 issue of REMark for the old motherboard, when ZPC and the GEMINI were released.

When I first installed the GEMINI in my computer, it failed to work at 5 MHz. I began calling, first to GEMINI, then to Pat Swayne at HUG to find out what was wrong. No one had an answer, but we finally surmised that the July '85 REMark mod was not compatible with the GEMINI board. I then made arrangements to swap my old motherboard for the latest configuration Z-100 motherboard from our local Heath/Zenith Electronics Center. This board was configured with the H208A kit and the CDR speed module set up for 5 MHz on the CDR module and 8 MHz on the motherboard. The GEMINI board ran, SOMETIMES. The serial ports J1 (COM2) and J2 (COM1) were inoperative. In addition, the computer had a decided tendency to lock up (at least once an hour). Calls to GEMINI were unproductive as to what was causing the problem. Several new boards were sent by GEMINI over a period of several months, including the new 8 MHz version. Although the condition on lockups was reduced to a lockup every 4 hours or so, the serial ports remained inoperative and GEMINI was of no help in finding the problem. Since the parallel port was OK, I continued to use the GEMINI board till February '86. The screen response was very slow, even at 8 MHz in the GEMINI PC mode. Floppy disk I/O was even slower! IBM programs that made use of graphics were terrible. I wrote a letter to DEL Systems (parent company of GEMINI) in February '86 requesting assistance, but never received an answer. After nine months of fighting the GEMINI problem, I gave up. Thank goodness the Heath/Zenith store was willing to exchange the GEMINI board for the UCI EasyPC system in May '86.

Before I get to the EasyPC story, let me just mention that I have also followed and participated in the ZPC software emulator written and supported by Pat Swayne, from the beginning. He has done a magnificent job over the past year of growing this product to its present state of maturity. I must admit that trying to find patch locations compatible with ZPC for IBM programs has been frustrating and time consuming, but it did work much better than the GEMINI board. At LEAST I had access to the serial ports! I have not built the S100 (ZHS) compatibility board that Pat offered in the April '86 issue of REMark, but am confident that ZPC 2 and the hardware interface are very good. The only complaint about ZPC, beyond the patch location issue, is the slow screen (slower than GEMINI) output, even at 8 MHz. The ZPC emulator is far and away the best "bang for the buck", but takes a lot of effort and compatibility is less complete (at present).

Now let me tell you about the REAL success story, the EasyPC emulator. The PC 250 from Heath (EasyPC system) was well documented and relatively easy to install. The description of the installation by William Adney in the June issue of REMark is reasonably accurate, although the damage he incurred was unnecessary. The EasyPC system board has numerous cutouts that provide visual access to ALL pins that insert in the Z-100 motherboard from the EasyPC system board. Care and following instructions would have prevented the damage that Mr. Adney incurred. The system that I received had ROM version 1.61 installed. My Z-100 now contained a 10 MEG hard drive and two half-height floppy drives; one a 48 track and the other a 96 track. Bringing the EasyPC emulator on line was simple and without a single problem, including the hard disk portion. The result of software testing brought a WOW! from me. Screen, disk I/O and program functions are faster by far than the IBM PC and a little faster than the Z-158 running at 8 MHz. So far I have not found any software that won't run on the emulator.

Two problems were found during benchmark testing. The first was that keystrokes were being missed while running Microsoft's Flight Simulator. A call to UCI in Ohio quickly solved this problem. U241 on the motherboard had been changed from a 74ALS244 to a 74S244 as part of the Heath documentation on the EasyPC installation. This was a Heath error and the original chip (part of the H208A 8 MHz mod) had to be reinstalled. This cured the problem and Flight Simulator runs perfectly now. The next problem was discovered while running Borland's REFLEX database software, which runs in the high resolution PC graphics mode. When the block cursor is moved around the REFLEX screen, it occasionally left pixels turned on which would eventually clutter up the screen. This didn't happen until the computer was hot (about an hour of operation from a cold start). A call to UCI quickly fixed this problem also. U76 on the EasyPC video board was changed from a 74ALS244 to a 74S244 (which was available from the previous problem; thanks Heath!). Next I purchased a detailed operation manual, including theory of operation, on the EasyPC for $15.00 from UCI (eat your heart out GEMINI owners!).

At the same time UCI sent me an EPROM ROM BIOS ver 1.64 chip, free. I am now running two 30 MEG Seagate hard drives internal and the 48 and 96 track floppies outboard. In addition, for $10.00 Dr. Cheung of UCI modified the MSDOS 3.0 IOSYS (Heath version) to support 96 and 48 track drives, the same as my Z-100 mode under MSDOS 2.0. A UCI daughter board has also been added to carry the 8087 numeric coprocessor to the EasyPC system board. There is only one remaining problem as of the date of this letter, and that is the COM2 (J2) port will not support most modem programs because they bypass ROM BIOS and directly address the hardware. Both serial ports communicate properly from the computer to the peripheral equipment, but the opposite is not true. Printers work just fine, modems won't. This same problem exists on the GEMINI, but try to get them to tell you! Modem program modification or use of a special version of Hilgraeve's HYPERACCESS for the PC (give them a call) will circumvent this small problem. UCI can also provide you with other options to resolve this issue if you call them.

In summary, I am ecstatic, thrilled and exceedingly happy with the operation of the EasyPC emulator, and the support provided by UCI Corporation. My rating on emulators for the Z-100, based on performance is as follows:

1. Z-100 with EasyPC emulator 9.5 on 10 scale
2. Z-100 with ZPC emulator 8.0 on 10 scale
3. Z-100 with GEMINI emulator 6.5 on 10 scale

My wife of 33 years knows nothing about computers, but has watched my frustrations with the quest for the Holy Grail of IBM compatibility and agrees with the above ratings (She pays the telephone bill also). For those on a limited budget, the HUG ZPC emulator is great, but be prepared to work patches for compatibility. My brand new (originally purchased 1983) version of the Z-100 with EasyPC emulator is still the most versatile personal computer around today. I'm sure the Z-100 is approaching the end of it's life cycle, but it is still a great machine!

Mr. Adney's articles in REMark has hurt the EasyPC system because of its negative tone and admitted personal bias. Had he tested the GEMINI at the time I did (in its introductory stages), perhaps he could have done the same for it. I suggest he try the EasyPC with the latest ROM configuration, plus the other fixes that are now in place. The results should be the same as mine. He would also find the technical support from UCI is superior to that from GEMINI. The UCI EasyPC hardware approach is superior to the hardware/firmware solutions of GEMINI and software of ZPC, albeit at a higher price. Elegance is fine in art, music and women (please forgive the sexist remark), but performance is the measure in my computers and EasyPC provides loads of it.

For the benefit of those Huggies who have been scared away by the Adney articles, I have been working with all of the solutions over a years period of time and hundreds of hours of use, and EasyPC is the optimum approach to IBM compatibility for the Z-100 at this point in time. Try it, you'll love it.

Sincerely yours,

Charles E. Wiley
2 Lauri Drive
Florham Park, NJ 07932

Prospect Of Typing A Large Set Of Numbers Forbidding

Dear HUG:

M.D. Holmberg's article in the July issue of REMark provides the source code for a program, BLINK.ASM, which addresses video memory on the H/Z-100. The table in the right column of page 51 is used in converting the number of the physical scan lines to an address in video memory.

Some of us find the prospect of typing a set of numbers that big as forbidding. Fortunately, this particular batch has a simple pattern which can be re-expressed by the following macro:

```
;
x     equ     -1
z     equ     -1
      rept     25
x=x+1
            rept 9
z=z+1
                  ife x+z
addrtbl     dw    0
                  endif
                  if x+z
      dw    128*(16*x+z)
                  endif
            endm
z=z-9
      endm
;
```

Sincerely,

Vern Reisenleiter
5216 Franconia Road
Alexandria, VA 22310

CodeWorks Publication

Dear HUG:

For HUGgers who are BASIC users (both the very inexperienced and experienced alike) and are interested in a bimonthly periodical, void of ads and entirely devoted to BASIC programs and solid learning experiences, write or call:

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Tacoma, WA 98409
(206) 475-2219

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Cordially,

John R. Miller
401 Tiffany Drive
Regency Park
Anderson, SC 29621

Device Drivers And The April 1986 Article On 96 TPI Drives

Dear HUG:

There is a device driver available for the Z-150 series machines that will enable reading/writing and formatting foreign disk formats. It is called Uniform and is sold by MicroSolutions of DeKalb, IL 60115.

I have been using this device driver for about a month now on my Z-158 without any problems. I use it to let my Z-89s have a disk format in common with my Z-158 and Z-100. (Z-90 soft-sectored.)

MicroSolutions claims that this device driver will also support 80 track 5-1/4" drives, 8" drives, and 3-1/2" drives (with the proper disk controller hardware).

Happy Computing,

R. Bliss
7700 Clarks Lake Road
Chelsea, MI 48118

"Rewinds" For Printer Ribbons

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Flat Rock, NC 28731
(704) 692-3612 or (704) 692-8020

Cordially,

John R. Miller
401 Tiffany Drive
Regency Park
Anderson, SC 29621

"Super RAM"

Dear HUG:

I read with interest Peter Ruber's article on the CDR Super RAM as I have recently bought this board with the HDOS driver for use as a RAM disk.

The Super RAM is an excellent product and I am very satisfied with it. However, the CDR HDOS driver (version 1.07) contains a rather serious bug.

If the system is booted from any drive other than SY0: and files are then copied between physical drives (SX1: to SX0: for example), the CDR HDOS driver apparently destroys the disk directories and the dreaded "Disk Structure Corrupt" message appears.

CDR has identified the problem and promised me a corrected version of the HDOS driver.

I am writing this letter to save someone else the frustration and grief caused by the destruction of a valuable disk. As far as I know CDR does not have a fix for this problem yet and I have not seen anything in Heath related publications warning users of this problem.

Sincerely,

A. P. Stumpf
507 E. Palm Street
Litchfield Pk, AZ 85340

Continued from Page 65

Part Number	Description of Product	Selling Price	Vol. Issue
DATA BASE MANAGEMENT SYSTEMS			
HDOS			
885-1107-[37]	HDOS Data Base System H8/H89	30.00	23
885-1108-[37]	HDOS MBASIC Data Base Sys.	30.00	23
885-1109-[37]	HDOS Retriever ASM (3 Disks)	40.00	23
885-1110	HDOS Autofile (2 Disks)	30.00	23
885-1115-[37]	HDOS Navigational Program	20.00	25
885-8006	Farm Accounting System	45.00	30
CP/M			
885-1219-[37]	CP/M Navigational Program	20.00	31
MSDOS			
885-6006-37	MSDOS NAVPROG	20.00	73
885-8034-37	DBZ-A Database For The Z100	25.00	69
AMATEUR RADIO			
HDOS			
885-8016	Morse Code Transceiver Ver 2.0	20.00	42
CP/M			
885-1214-[37]	CP/M MBASIC Log Book (64k)	30.00	23
885-1234-[37]	CP/M Ham Help	20.00	49
885-1238-[37]	CP/M Ascirity	20.00	57
885-8020-[37]	CP/M RF Comp. Aided Design	30.00	44
885-8031-[37]	CP/M Morse Code Transceiver	20.00	57
MSDOS			
885-8038-37	MSDOS RFCAD Ver. 3.50	30.00	73
COMMUNICATION			
HDOS			
885-1122-[37]	HDOS MicroNET Connection	16.00	37
885-8005	MAPLE (Modem Appl. Effector)	35.00	29
CP/M			
885-1207-[37]	CP/M TERM & HTOC	20.00	26
885-1224-[37]	CP/M MicroNET Connection	16.00	37
885-3003-[37]	CP/M ZTERM (Z100 Modem Pkg)	20.00	34
885-5004-37	CP/M-86 TERM86 and DSKED	20.00	56
885-5005-37	CP/M-86 16 Bit MicroNET Conn.	16.00	61
885-5006-37	CP/M-86 HUGPBBS	40.00	62
885-5007-37	CP/M-86 HUGPBBS Source List.	60.00	62
885-8012-[37]	CP/M MAPLE (Modem Program)	35.00	34
885-8023-37	CP/M-85 MAPLE	35.00	45
MSDOS H/Z100 - H/Z150 PC			
885-3019-37	ZDOS 16 Bit MicroNET Connect.	16.00	61
885-3027-37	MSDOS HUG PBBS	40.00	66
885-3028-37	MSDOS HUG PBBS Source Listing	60.00	66
885-3033-37	MSDOS HUG MCP	40.00	71
MISCELLANEOUS			
885-0004	HUG Binder	5.75	
885-1221-[37]	Watzman ROM Source Code/Doc	30.00	33
885-4001	REMark Vol. I Issues 1-13	20.00	
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885-4003	REMark Vol. III Issues 24-35	20.00	
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885-4005	REMark Vol. V Issues 48-59	25.00	
885-4006	REMark Vol. VI Issues 60-71	25.00	
885-4500	HUG Software Catalog	9.75	
885-4501	HUG Software Catalog Update #1	9.75	
885-4600	Watzman/HUG ROM	45.00	41
885-4700	HUG Bulletin Board Handbook	5.00	50
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885-3036-37	MSDOS TREE-ID	20.00	77

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