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HUG Adds Laptop Support!

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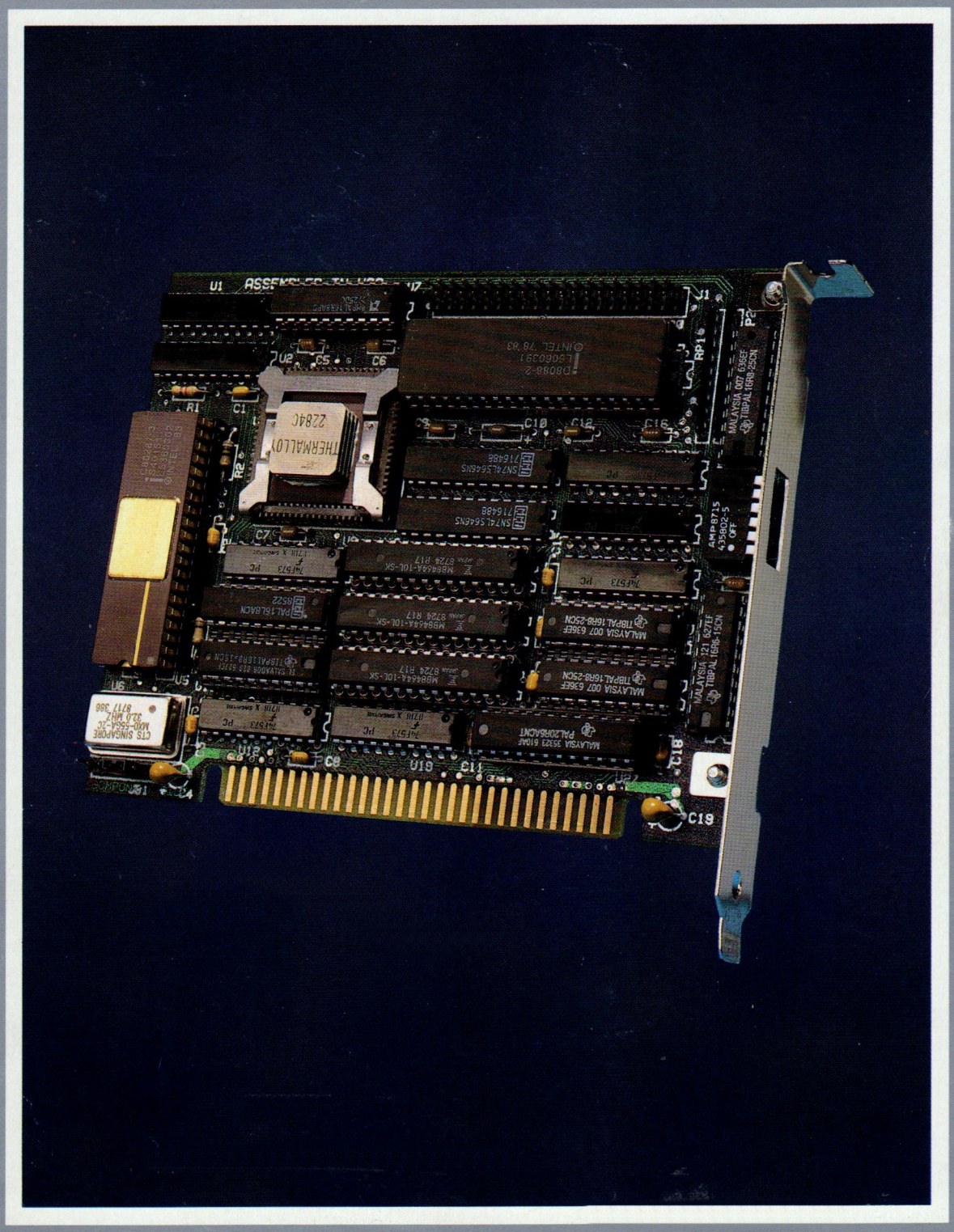

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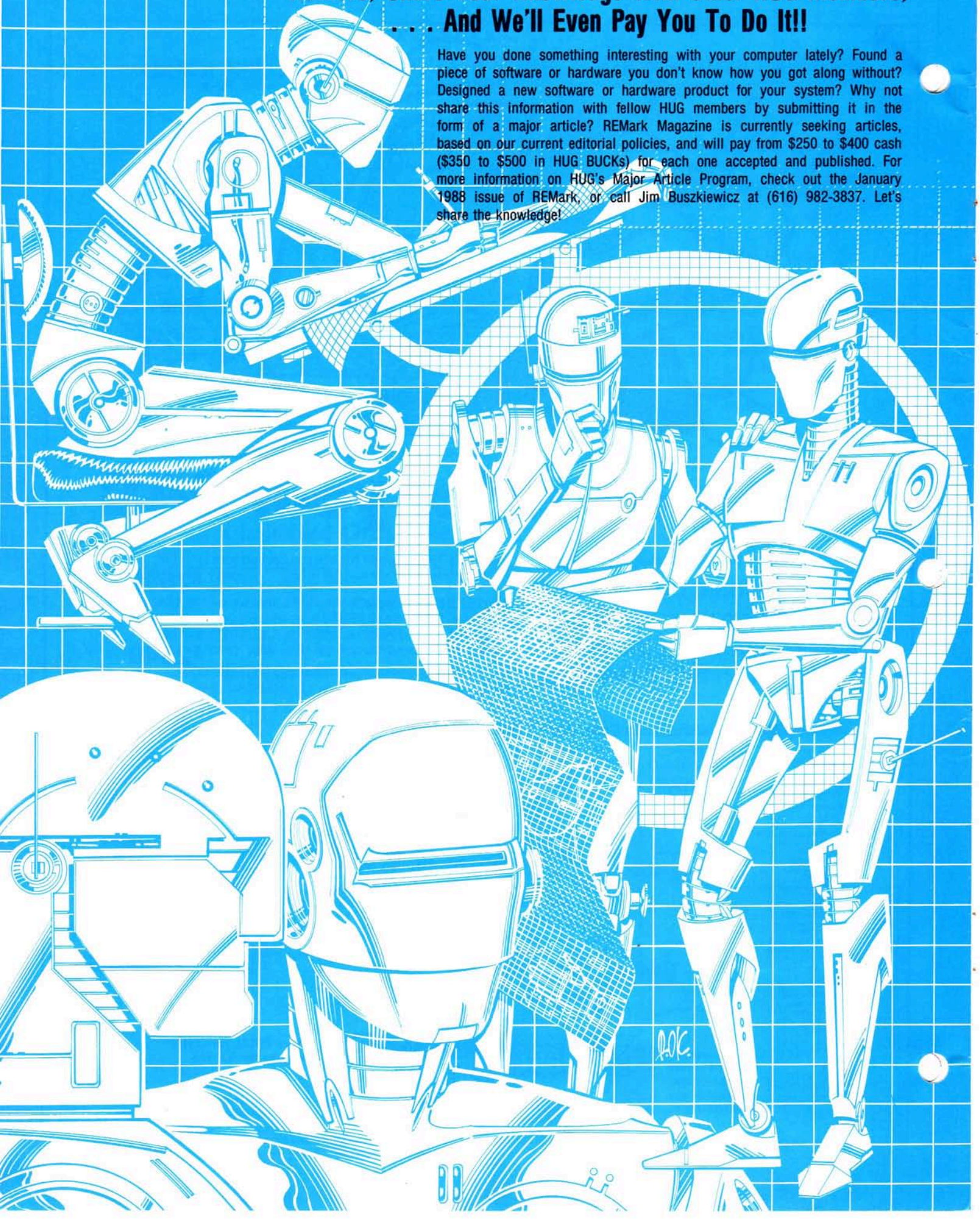
Have you done something interesting with your computer lately? Found a piece of software or hardware you don't know how you got along without? Designed a new software or hardware product for your system? Why not share this information with fellow HUG members by submitting it in the form of a major article? REMark Magazine is currently seeking articles, based on our current editorial policies, and will pay from $250 to $400 cash ($350 to $500 in HUG BUCKs) for each one accepted and published. For more information on HUG's Major Article Program, check out the January 1988 issue of REMark, or call Jim Buszkiewicz at (616) 982-3837. Let's share the knowledge!



On The Cover: The latest offering from PCT is the 286 Express-16 Accelerator Card for PC-, XT-, and many other compatibles. For a review of this board, turn to Page 36.

REMark®

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The other cats get to sing along!

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- *While Dbase (tm) is sorting a large database, you can add up some grocery prices.*
- *While your computer is busy compiling one program, you can work on number base conversions needed for another program.*

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HEPCAT gets along with everyone . . .

HEPCAT supports more video configurations than any other pop-up, and always pops up in the current video mode, rather than forcing the screen into a text mode as other pop-ups do. It also works properly with more programs than any other pop-up. You can pop up HEPCAT over Microsoft Windows (tm) and many other programs that other pop-ups can't work with, and even over some other pop-ups.

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*HEPCAT provides a multi-function floating point calculator and a programmer's binary calculator that work together to do more than the basic four (+, -, *, /). The floating point calculator includes the following built-in functions: powers, pi, factorial, square root, sine, arc sine, cosine, arc cosine, tangent, arc tangent, log (natural and base 10), e^X and 10^X. It also includes the following conversions: degrees-radians, radians-degrees, Celsius-Fahrenheit, Fahrenheit-Celsius, centimeters-inches, inches-centimeters, meters-feet, feet-meters, kilometers-miles, miles-kilometers, grams-ounces, ounces-grams, kilograms-pounds, pounds-kilograms, milliliters-fluid ounces, fluid ounces-milliliters, liters-quarts, quarts-liters. The binary calculator works in these number bases: binary, tetral (base 4), octal, split octal, decimal, and hexadecimal; and it supports these operations: MOD, AND, OR, XOR, SHL, SHR.*

The HEPCAT floating point calculator supports 8 significant digits and can display numbers four ways: floating point, fixed point, scientific notation, and engineering notation. Numbers are handled internally in BCD format to eliminate binary round off errors in addition and subtraction.

HEPCAT eats less . . .

HEPCAT uses less than 16k of memory — less than any other pop-up calculator that we know of. It also uses less than 16k of disk space, so you don't have to worry about where to put it on a small system. The HEPCAT window uses less screen space, too. It shows you more real information than other pop-up calculator displays, but it doesn't waste space by showing you a keypad layout. You already know what your keypad looks like! HEPCAT is easier to learn, too, with commands that make sense.

If you are tired of pop-ups that can only sing solo, give HEPCAT a try. HEPCAT is available from HUG as part no. 885-3045-37 for $35.00. It works on any Z-100 PC, Z-200 PC, or Z-100 (not PC) system and any version of MS-DOS or Z-DOS.

FROM THE CPU...

JIM BUSZKIEWICZ

•HUG SOFTWARE ON 3.5" DISKS
•ADD A 3.5" DRIVE TO A '386
•INVISIBLE RESET SWITCH
•UPCOMING HUGCONS

Let's face it, Laptop computers and 3-1/2" microfloppies are here to stay, and it's about time HUG started offering some support for our battery-powered HUGGIE friends! Here's what we came up with:

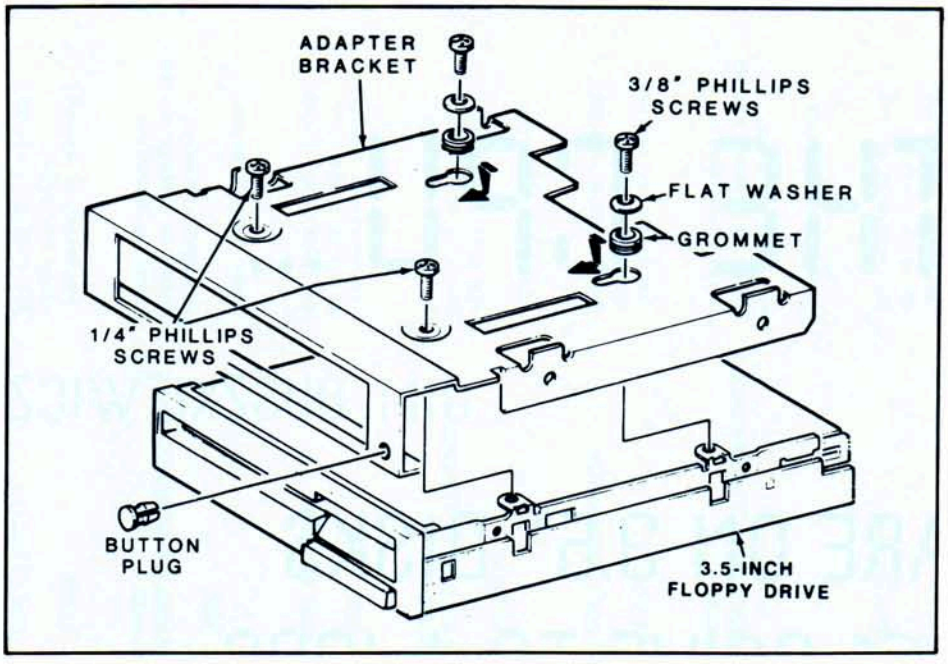
HUG's Software Library is now available on 3-1/2" microfloppy disks. That's right, all of HUG's MS-DOS software can now be purchased on disks that will work directly in your machine! Ordering is easy. Just add '-80' in place of the existing '-37' suffix on any HUG MS-DOS software model number. For example, if you wanted to order HUGMCP, P/N 885-3033-37, on a 3-1/5" disk, just change the part number to 885-3033-80. That's all there is to it, and the price is the same! Remember, your laptop system **is** a PC-Compatible computer, and **any** PC-Compatible software available from us will work!

Some laptop owners may have found themselves with software on 5" disks, and have no way of transferring it over to 3-1/2". If your software is not copy protected, we will supply the microfloppies and transfer the disks for you. Give me a call for more information.

Aside from the two floppy drives being physically reversed, one of the biggest gripes I've always had with IBM AT's, as well as you know whose, is its inability to recognize more than two floppy disk drives. Well, I haven't found a way to cure that silliness yet, but I have managed a way to ease most of the pain (here we go . . . fixing "Monkey See, Monkey Do" again). With 3-1/2" microfloppies becoming more and more popular, I wanted to add one to my H-386, but I didn't want to lose either the 40 or 80 track drives already present. Since my machine had only one Winchester in it (I figured 80 megs was more than enough for me), the extra microfloppy would fit very nicely in the lower right side of the machine. You see, the '386 series has position openings in the front cover for mounting four floppy drives, but in reality, you can only address two of them . . . don't ask!

Two types of drives are available, 720k and 1.4 meg. I installed the later; however, the installation for either is identical. Both drives are available from the Heath Parts Department, and the part numbers are listed at the end of this discussion. You will also need a 3.5-inch to 5.25-inch adapter mounting bracket, as well as some 4-40 and 6-32 hardware. Since the power connectors are different, you will also need a 4-conductor power cable adapter. The last item you will need is a small dpdt (double-pole, double-throw) toggle switch (C&K or AMERICAN brand makes them). This is the type of switch that mounts in a 0.25" hole.

Now, why the switch? Well, I told you that I eased most of the pain, not all. You still can have only two floppy drives on-line at a given time. The switch allows you to select which two. I decided that the 40-track floppy would always be on-line (since it is a standard accepted format), and always be my drive A: (more on this later). Next, I decided that the switch would select between either the 1.2 meg 5.25" floppy, or the 3.5" microfloppy as drive B:. Finally, I physically mounted my 40-track drive A: in the top left side of the machine, and the two drive B:'s on the right side (the way they should have been from day one!). All the drive 'selects' should be set as 'drive 1'. Instead of jumpers, some microfloppy drives have a slide-



Parts you may need to buy from the Heath Parts Department:

P/N	Qty.	Description
151-1039	1	3.5 inch microfloppy (720k) or . . .
151-1005	1	3.5 inch microfloppy (1.4 meg)
250-1280	4	6-32 × 3/8" phillips machine screws
250-1411	2	6-40 × 1/4" phillips machine screws
250-1412	2	4-40 × 3/8" phillips machine screws
73-59	2	Rubber Grommets (used as spacers at the drive rear mounting holes)
253-80	2	Flat Washers
134-1884	1	4-conductor power adapter cable

switch on its side to set the drive 'select'. It should be positioned one detent away from its most foward position.

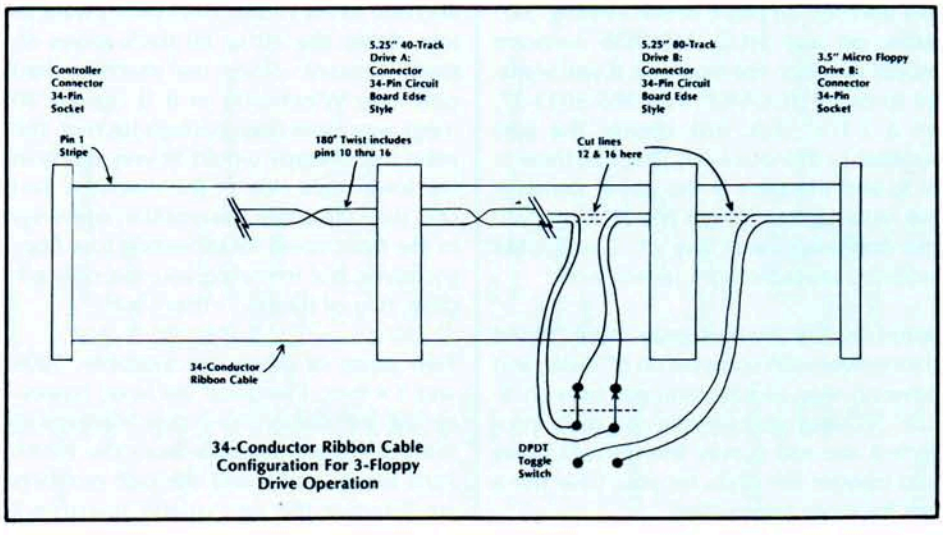
Now comes the hard part . . . the ribbon cable. Unless the cable you have will reach from the controller card to each of the three individual drives, I would suggest making a new one, other than trying to adapt the old one. Adapting the old cable is possible, however, if you're clever (like me). You could possibly retrieve the connectors from the old ribbon cable, if you're careful in removing them, or you can purchase new ones from your local Radio Shack store. Purchasing everything new will still leave your old cable intact in case you royally screw things up with the new cable.

Other than trying to 'tell' you how the cable should be made, I think a drawing can say it better. I will say the following, however: The 180 degree 'twist' in the cable includes lines 10 thru (and including) 16, and **has** to go to drive A:. The switch has to 'switch' lines 12 and 16 between either of the two drive B:'s. Oddly enough, the microfloppy adapter from Heath has a 0.25" hole in the front which will accept the small toggle switch just as if it were meant to be mounted there! The microfloppy drive uses a 34 conductor 'pin' style connector (the same as the one that connects to the controller board) as opposed to a circuit board edge style connector used in standard floppy drives. Even though these connector styles are different, the physical and electrical pin-out connections are identical.

If the computer you're trying to add a 3.5" drive to will not allow three floppy drives due to space limitations, you can replace one of your 5.25" floppy drives with the new 3.5" microfloppies. As mentioned earlier, the pin connections for both drives are the same, only the connectors are different. For a two drive system, just add the new connector to the already existing cable, plug in the the power cable adapter, and you're done! Oh, don't forget to set the drive select switch.

Whether you mount your 3.5" drive in a '241, '248, or '386, you will need a version of the firmware that recognizes this style of drive. Just go through the floppy drive selections in the 'SETUP' menu. If there isn't a selection for 3.5" drives, you'll need a newer version of the firmware. Speaking of 'setting up' that drive, try each of the different drives available under 'SETUP' for the 3.5" drive. I think you'll be surprised. Oh yes, also try using the DISKCOPY program, under MS-DOS 3.2, to copy your 40-track floppy to your 3.5" microfloppy. You're in for another pleasant surprise!

How about an invisible hardware reset switch for the H/Z-386? I don't know why I didn't think of this sooner. I apologize for being so slow. Now answer truthfully; how often do you lock the keyboard on your '386? If you're like the majority of '386 owners, probably never! Why not make use of that unused switch, and turn it into a reset switch? Almost done as easily said! Eliminate the white wire from the terminal on the switch. Leave the black



34-Conductor Ribbon Cable Configuration For 3-Floppy Drive Operation

ground wire connected. Connect a single wire from the N/O (normally open) switch terminal (when the key is in the 'unlocked' position) over to the right terminal of resistor R108 on the backplane circuit board. This side of the resistor is marked: "DC-OK", and is next to the battery. The other side of the resistor is next to a green LED. When the key is used to switch momentarily from unlocked to locked and then back to unlocked, a hard reset will take place! This little 'trick' can be applied to **any** Zenith 'AT' series of computers. The "DC-OK" line is used in each case.

Finally, we have two local HUGCON's this month, one in Seattle, Washington, and one in Crystal City, Virginia (CHUGCON). Since there will be **no** National Conference this year, I urge you to attend the one closest to you; you won't be disappointed! Hope to see you there . . . *

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BUGGIN' HUG

The Laptop Solution

Dear HUG:

I put off purchasing a laptop for quite some time because I did not want to get into the hassle of dealing with two diskette sizes. All of my software was in the 5-1/4" Z-248 format and I wasn't really interested in duplicating everything to 3-1/2" for a portable machine.

As the inevitability of purchasing a laptop became more apparent, I consulted with friends having the same problem and they had all elected to purchase an outboard 5-1/4" drive to be connected to the Z-181. Most of them had problems connecting the third drive, however, because of the special cable required to connect the '181 with an outboard drive. Apparently, Zenith cleverly changed the pinouts to encourage the purchase of their own cable and outboard drive which was "somewhat" higher in price than what could be found on the open market.

Since it is now obvious that the 3-1/2" drive is the drive of the future and because of its advantages (size, capacity, and durability), I considered trying to mount an outboard 3-1/2" drive to my Z-248. This would solve the file transfer problem and would also enable my '248 to use software packages in the new format. After checking into this possibility, I found that the easiest way to mount the 3-1/2" drive was to remove one of my 5-1/4" drives — something I didn't want to do, as I use the two drives to copy files. It appeared that there wasn't any easy solution.

Along comes the utlimate solution — Lap-Link by Traveling Software. I purchased this software package to solve my disk size compatibility problems and ended up greatly expanding the horizons of both systems.

Lap-Link comes packaged with everything you need to copy files from the desktop computer to the laptop computer, including the cable. The cable even has both 25- and 9-pin connectors on each end to alleviate any pin connection compatibility problems.

I connected the cable and within five minutes I had installed the software on both computers. Following the extremely user friendly menu, I was able to transfer files between formats immediately, only glancing at the manual for a few suggestions.

As I began to use the package, I became more and more amazed at its power. Both the manual and the software have been quite well written.

In addition to just copying files with Lap-Link, you can:

- Mark files for batch copying or erasing.
- Choose the order that files and directories are displayed.
- Move through a large directory easily with a tree command.
- Arrange the files on a single computer using the two windows provided.
- Copy only the more recent files.
- Copy hidden files.

I was quite pleased with the Lap-Link package, but nowhere near as happy as I am with the latest release, Lap-Link Plus. This release of the software adds a simple device driver (which can be installed in a few seconds by anyone) which allows me to network the two computers.

When I link the computers (easily done with "Alt-Z"), the two 3-1/2" drives on the portable became drives "E" and "F" accessible by my desktop computer. I can even log onto these drives and run software! The software configures them as "E" and "F" because I have two floppies, a hard drive and a Ramdrive on the desktop machine. It is as if I have added two 3-1/2" drives to my main system in addition to being able to transfer files from one computer to the other. Data moves between the computers at 115,200 baud, a hardly noticeable delay. I can also use the printers attached to my '248 directly from the laptop.

Until two weeks ago, when I used my laptop at home, I used the LCD screen because I did not want to unplug my color monitor from my Z-248 and plug it into the laptop as it was too much of a hassle. I began to wonder if the new A/B switches for the 9-pin serial ports would work with the 9-pin video monitors. Finding an ad in a computer magazine for inexpensive 9-pin cords and a 9-pin A/B switch, I decided to try. After replacing one defective switch, I now can switch my monitor from the desktop to the laptop with the turn of a switch.

Now when I bring my laptop in from the field, I attach the 25-pin serial cable from the desktop and the 9-pin cable from the A/B switch (total time 30 seconds).

With this configuration, I can access the drives and peripherals of each computer using the keyboard of the other. I can also share my monitor with either computer.

Another helpful tip I have found concerning the Z-181 pertains to battery life. While the manual indicates that if you are having problems with short battery life, you should completely discharge the battery twice. I have found that additional performance can be programmed into the battery by removing the battery and connecting a 12-volt auto bulb. I let the bulb drain the battery completely. After doing this twice and recharging for 12 hours, I find that the battery life is optimum.

You can obtain Lap-Link and Lap-Link Plus from Traveling Software, Inc., North Creek Corporate Center, 19310 North Creek Parkway, Bothell, WA 98011, (206) 483-8088.

Larry Ochs
106 Lucas Park Road
Norwich, CT 06360

Praise, Installation, Article Of Interest, And A Request

Dear HUG:

Thanks for: "Reading 48/96 TPI Drives On Your H/Z-100" by C. L. Robertson (REMark, Vol. 8, Issue 10, October 1987, Page 23). I made the BIOS changes and am very, very happy with them. I've come to praise Mr. Robertson, explain my installation, cite another article of interest, and to make a request. First, the installation and praise.

My 1983 vintage Z-100's A: drive died last month and I needed a replacement. I remembered Mr. Robertson's REMark article and thought, "Why not add 96 TPI drives?"

Before I plunked down money, I needed to know if I could do the BIOS modifications? And if I could use DEBUG to modi-

fy FORMAT.COM? Yes, the modifications went well and I could BOOT the system with 48 TPI drives.

Prior to the modification, I noted that Mr. William N. Tavolga wrote in Sextant that BCHRIO.ASM dated 7-30-84 has a bug. He stated that BCHRIO.ASM dated 1-25-85 is free of this bug that causes serial IO problems (Issue 23, July-August 1986, Page 59). I was careful to check my BCHRIO.ASM. It was "good".

With the modifications working at 48 TPI, I ventured $150.00 for two Mitsubishi 96 TPI drives and connected them to my system as drives C: and D:. I BOOTed the new system on my good 48 TPI drive and it recognized my new 96 TPI drives. I was able to FORMAT96. The /9 option on my MSDOS 2.0 yields over 720K! The /s takes some of this away for the system.

I wanted the 96 TPI drives to be internal to my Z-120 and to be identified as A: and B:. To do this, I set the Drive Select on my new 96 TPI drives to DS0 and DS1. To change the controller to BOOT 96 TPI set the controller cards DS1, Section 0, to 1 vice 0 per the Z-100 Technical Manual, Page 6.10. The warm BOOT worked!

To connect my old 48 TPI drive externally, I made a 20 inch cable, $25; connected it to the controller board; routed it through two edge connectors for the internal drives, then over my controller board, and finally, passed it out to a male 34-pin plug on my back panel. My one good 48 TPI drive is now connected to the back panel plug and rests in a separate case, $50.

Despite my unqualified support of this 96 TPI modification, I did experience an annoyance. Mr. Robertson says that, although I cannot AUTO BOOT from any, but the first drive of each type — A:, E: or I: — I should be able to boot from "any one of the eight drives." I cannot. Striking BOOT 2 does not BOOT my 48 TPI drive C:. I get an IO error. Any suggestions?

Finally, Mr. Robertson is thinking about writing an article to add AT drives to replace two 8" drives. I say, please do and thanks again.

Sincerely,

Stephen A. Jacob
103 B. 4th Street
Honolulu, HI 96818

CLE Command Line Editor (For A CP/M 2.2 System)

Dear HUG:

Until recently, both mainframe and micro operating systems have been notoriously unforgiving of the user who makes a mistake while typing input to the system. A command line typically consisting of up to 80 characters must often be retyped in its entirety — all because of one little error. Unfortunately, the longer the command line, the more likely it is to be entered in error. Over the years, this has resulted in untold hours of frustration; there must be a better way.

Ideally, it should be possible to correct errors detected anywhere in a command line before it is processed, and recovery of a command line should be allowed for the correction of errors so the line can be re-entered for processing by the system. The CLE Command Line Editor makes these and other capabilities possible in a simple and straightforward way with minimum impact on already existing system conventions. Three command line buffers have been identified to provide the editing and recovery facilities needed most, with a minimum of space. These buffers hold the current command line, the most recent command line, and a command line selected by the user.

The installation program for the CLE Command Line Editor allows it to be installed anywhere in memory that does not cause a conflict with any other elements of the system. The CLE program operates at a level within the system that allows the editing of both program input and normal command lines. To provide the control needed for cursor positioning and command line recall, the functions of some of the control characters have been extended in a natural fashion. Since the Command Line Editor uses only 8080 instructions, it can be constructed with the ASM assembler supplied with the CP/M system.

When installed, the CLE program communicates intimately with the BDOS code standard in any CP/M 2.2. system. All the functions of the CP/M system are undisturbed by the presence of the Command Line Editor; and since the CCP is unaffected, the CLE program will also work in systems like ZCPR that replace the CCP. A special version of the CLE program with the editor incorporated into the BIOS also exists for the Heath/Zenith 89 computer.

The CLE Command Line Editor is distributed complete with its well commented Assembly Language source, and an automated installation program for installation above or below the BIOS in an existing CP/M system. BIOS.SYS files that include the CLE program for six standard H-89 systems, and a submit file to facilitate inclusion of the CLE program in non-standard systems are also provided. Step-by-step instructions for all forms of installation, and complete documentation of the operation of the CLE Command Line Editor are also distributed with the program.

More descriptive information on the CLE Command Line Editor, and on the earlier Derby CP/M Utilities (SUB/SD/CMP/COPY) is available from the author. The CLE Command Line Editor and its documentation may be ordered for $12.00 (including postage in the U.S.). The Derby CP/M Utilities are also available for $12.00, but both may be ordered together for $22.00. Orders indicating preference of any standard H-89 hard- or soft-sector 48 TPI CP/M disk format should be sent to:

W. S. Derby
P.O. Box 2041
Livermore, CA 94550
(415) 443-1741

Check The Validity Of Your Dates

Dear HUG:

Mr. Pete Crossman's BASIC subroutine to check the validity of dates was most interesting (Buggin' HUG, February '88), however, using the ZBASIC DATE$ function, in conjunction with an error trap, would seem a much simpler way to check reasonably current dates.

The manual for Version 1.1 states that "DATE$ returns a 10 character string in the form of mm-dd-yyyy, where mm is the month (01 to 12), dd is the day (01 to 31), and yyyy is the year (1980 to 2077)." If any of these values are out of range, an "illegal function call" error is generated. Whenever ZBASIC encounters an error, the number assigned to the type of error found is placed in variable ERR, and the line where it occurred is placed in variable

ERL. If no provisions are incorporated in the program to handle an error, the program crashes.

This routine will test the validity of dates between 1980 and 2077:

```
10 ON ERROR GOTO 70
20 NOW$=DATE$
30 LINE INPUT
 "Enter date to be tested (mm-dd-yyyy):
 ";D$
40 DATE$=D$
50 DATE$=NOW$
60 END
70 IF ERR=5 ADN ERL=40 THEN PRINT D$;
   " is an invalid date":RESUME 30
```

Line 10 points to the error trap in line 70. Line 20 saves the current date (NOW$) now in MS-DOS. Line 30 places the date to be tested in string variable D$. Line 40 places D$ in ZBASIC's DATE$ function. If the date is not valid, an illegal function call error (5) is forced, and program execution is directed (by line 10) to line 70, where a message is printed, after which program execution is RESUMEd at line 30 for another try. If the date tested was valid, line 50 restores the currect date (NOW$) to MS-DOS.

As everyone has no doubt noticed, MS-DOS automatically calculates the day of the week for any valid DATE entered. If one knew the address where the day of the week is stored by MS-DOS (I don't), then I suppose it could be captured in a variable with the PEEK command.

Happy 10th Anniversary!

Sincerely,

Jack V. Williams
2912 Idaho Street
Bakersfield, CA 93305

Easy To Customize WordStar Pro V.4

Dear HUG:

I think that the long circumlocution Jim Meyers used in the February issue to deal with the problem of booting WordStar and having it log to another drive or directory unfairly maligns MicroPro International. I have used WordStar in CP/M since the early eighties and am now using WordStar Professional, Release 4. Originally there was INSTALL.COM, now there is WSCHANGE.EXE which is not WINSTALL.EXE. Originally, the customizing information was in the manual, now it is in PATCH.LST on disk.

Using WSCHANGE.EXE is really very easy (much easier than was INSTALL.COM). It is completely menu driven. The manual contained in PATCH.LST is much more comprehensive. Any of the WordStar defaults may be changed and the list includes: Function Keys, Installed Path, Printer Drivers, Printer Port and Baud, and much more. I changed the date display and programmed the P user keys, Q, W, E, R. I also deleted the prompt for the PERSONAL.DCT to be on the logged text file path.

While I am not in any way affiliated with MicroPro, I do believe they should be given credit for providing the end user so many options to customize the program and making it so easy to do.

Sincerely,

Richard J. Greenwood
1131 Talleyrand Road
West Chester, PA 19382-7416

WordPerfect Resets Clock To 2:00 AM

Dear HUG:

There is an inexpensive way to solve the problem of WordPerfect resetting the clock to 2:00 am during boot-up of some Zenith '148s. When I called the dealer to follow up on Ray Haythornthwaite's suggestion (February 1988) to upgrade to a V2.9 PROM, I found out that WordPerfect has published a software fix called NOSHELL. The dealer made me a copy free and it works fine. Presumably, the program is available directly from WordPerfect, too.

On another note, I cannot get WordPerfect's Repeat Performance cursor control program to work on the '148 when SuperKey is also resident (even following the loading instructions for Repeat Performance and SuperKey to the letter). The tone automatically resets to 5576 Hz and I can't get any increase in cursor speed. The program works fine without SuperKey.

WordPerfect claims to be working on the problem, but they haven't been able to come up with a solution yet. Has anyone else had or solved this problem? Could it be related to the VPROM, too?

Sincerely,

Dane VerMerris
2333 Sinclair NE
Grand Rapids, MI 49505

Using The Logitech Mouse With WINDOWS For The Z-100

Dear HUG:

We have developed a patch for WINDOWS for the Z-100 so the Logitech C7 mouse can be used. The patch alters the Microsoft mouse driver that is included with WINDOWS (H/Z part number MS-3063-30). In addition, a short program (LOGIMS) is provided that puts the Logitech mouse into Microsoft emulation mode.

Why The Patch Is Needed

The mouse driver included with WINDOWS is designed for the Microsoft Mouse which emits an 'M' to the serial port when it's plugged in. The driver program looks for the 'M' and if it doesn't find it, exits the program with the message, "No Mouse Found". This "error checking" technique makes sure your mouse is connected when the driver is loaded. Unfortunately, it also prevents you from using devices (like the Logimouse) that can imitate the Microsoft mouse, but don't send the 'M'.

What The Patch Does

The patch changes a conditional jump based on receiving the 'M' to an unconditional jump.

Before running windows, LOGIMS must be run to place Logimouse into the Microsoft compatible mode (LOGIMS simply sends a 'V' to the Logimouse).

The file to be patched is MOUSE.DRV on the WINDOWS setup disk, which is used to install the WINDOWS program. Be sure and save a copy of the original MOUSE.DRV file, perhaps as OLDMOUSE.DRV.

Applying The Patch

Copy DEBUG.COM onto the disk containing MOUSE.DRV and start DEBUG by typing:

```
DEBUG MOUSE.DRV <rtn>
```

Next, search for CMP AL,'M' JZ by typing in the sequence:

```
s 0 L d00 3c 4d 74 <rtn>
```

DEBUG should return an address like CS:07C6. CS may be any value, based on

Continued on Page 54

Build Your Own

Roseann Giegler
Director, Product Support
Condor Computer Corporation
1490 Eisenhower Place
Ann Arbor, MI 48108

Relational database software is one of the most widely selling types of software for the personal computer. People in business, government and education buy thousands of packages each day in the hopes of easily automating office tasks like mailing lists, accounts payable/receivable, inventory and employee records. Unfortunately, few people fully understand how to best use relational database software to streamline their work.

Even in the database industry itself, heated debate continues over what constitutes a truly relational database management system. Purchasers are confused by extravagant claims made by software developers about ease of use and relationality.

To help guide computer novices through this maze, Condor Computer Corporation has just published a practical, easy-to-understand self-teaching course called "Build Your Own: Relational Database Applications." Condor has a significant amount of experience in the industry, having introduced the first relational database software for the personal computer in 1977. In fact, a copy of the original Condor 3 software now resides in the Smithsonian Institution's computer wing.

More than a coursebook, "Build Your Own" comes with a complete working copy of the popular Condor 3 Relational Database Management system, with a capacity of 50 files/50 records, so people can experiment with creating their own databases. The software runs on any IBM PC/XT/AT or compatible, requiring 256K of RAM.

"We wanted to offer a way for people to sample for themselves what's really involved in constructing relational database applications that work for them," explained Condor president Larry Hauptman. "This course is designed for microcomputer students or business people who want a "hands-on" experience in relational database management systems. It's long on practical experience and short on theory."

The concise 242-page coursebook is organized in 12 systematic lessons. Readers progress quickly from an introductory chapter on database terminology to sections on building a dataset; updating records; selecting, projecting and joining records from different datasets; listing and reporting data; and performing mathematical computations. Each lesson concludes with a question and answer review section. A glossary of relevant microcomputer terms is included.

Sue Jakobcic, Education Accounts Manager for Condor, explained that the book grew out of years of designing and teaching Condor 3 courses to users in education, govenment and industry. "We've had over ten years of experience developing coursewares for educators, as well as seminars for business people," she said. "What we've found is that hundreds of educators use Condor 3 to teach the concepts of relational theory, because the software has such a clean, elegant design. That made us realize that Condor 3 is ideally suited for a self-teaching course on relational databases."

Special pricing on Condor 3 coursewares and the full Condor 3 software are available to qualified educators. The full Condor 3 relational database system retails for $495. "Build Your Own" retails for $72.50.

For more information on "Build Your Own: Relational Database Applications" or any Condor product, contact:

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1490 Eisenhower Place
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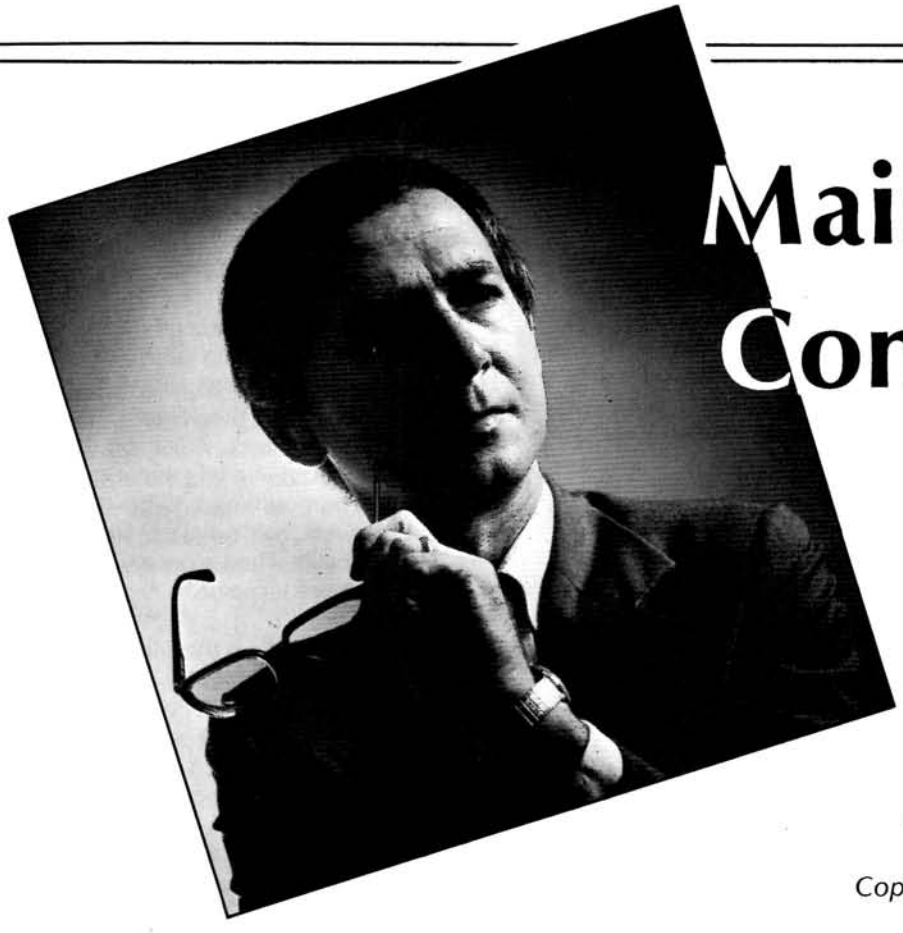

Mainstream Computing

Joseph Katz
103 South Edisto Avenue
Columbia, SC 29205
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About the best thing I can say for deadlines is that on occasion they get me out of even less pleasant work. Janet and Matthew (he turned ten years old a few days ago) have just shooed me into the house so I could work at writing to you while they worked at unloading the car. Only a few minutes ago we returned from the Spring COMDEX — the computer trade show — in Atlanta with the car crammed full of stuff. So there's a good deal to write about. And, besides, I'd much rather do this than unload the car.

Of course, you want the Zenith Data Systems news first. It's five new computers: two for the desk and three for the lap. There's lots of other news too, some of which I'll touch on here and flesh out for you later, after I've had the opportunity to see how some things work and whether they're as useful as I think they'll be. Because I was industrious at COMDEX, I'll have even more to tell you about during the next few months. Right now, though, I'm pooped. Trade shows like COMDEX are, for me, a gruelling scouting foray. The idea, for me at least, is to avoid being caught up in too many demonstrations or staged events and to work instead at gathering the most promising stuff — products and information and, sure, more than a tad of gossip — that I can explore at length here. After all, this column is a user's column in which you follow me backstage, behind the glitz and glamorous backdrops of trade shows and ads, to see how things really perform in real use.

Zenith's New Z-286 LP And Z-248/12 Desktop Computers

Both desktop machines are built around the 80286 microprocessor, which may suggest that the reports of its death have been greatly exaggerated. In fact, a ZDS press release has Arthur D. Lambert, Zenith's Vice President of Sales and Marketing, saying that "The 286 market is segmenting into those seeking high utility in a small cabinet and those wanting maximum expansion." Zenith, therefore, pretty clearly seems to be straddling both sides of the fence. You might find it useful to think of the two new desktops as nice refinements of the Z-286 and the Z-248.

The lower end desktop is the Z-286 LP (see Figure 1). Its 80286 runs at 8 MHz with 0 wait states, which Zenith says has the performance of an 11.5 MHz system running with the typical 1 wait state. Weighing in at 17 pounds and measuring 3.9 × 14 × 15 inches, the Z-286 LP is small of foot and light, too. The Z-286 LP Model 40 comes standard with a 40 MB high performance hard disk drive, a high density 1.44 MB 3.5 inch floppy diskette drive, and 1 MB of memory apportioned this way: 640 KB base RAM, 256 KB EMS ("Expanded Memory Specification"), and 128 KB ROM. Up to 6 MB of RAM can be plugged into the main system board using 1 MB SIMMs ("Single In-Line Memory Modules"). Using add-in boards that fit in expansion slots, the machine can hold a total 16 MB of RAM. There are two expansion slots. Price: $3,999.

The higher end desktop is the Z-248/12 (see Figure 2). Its 80286 runs at 12 MHz

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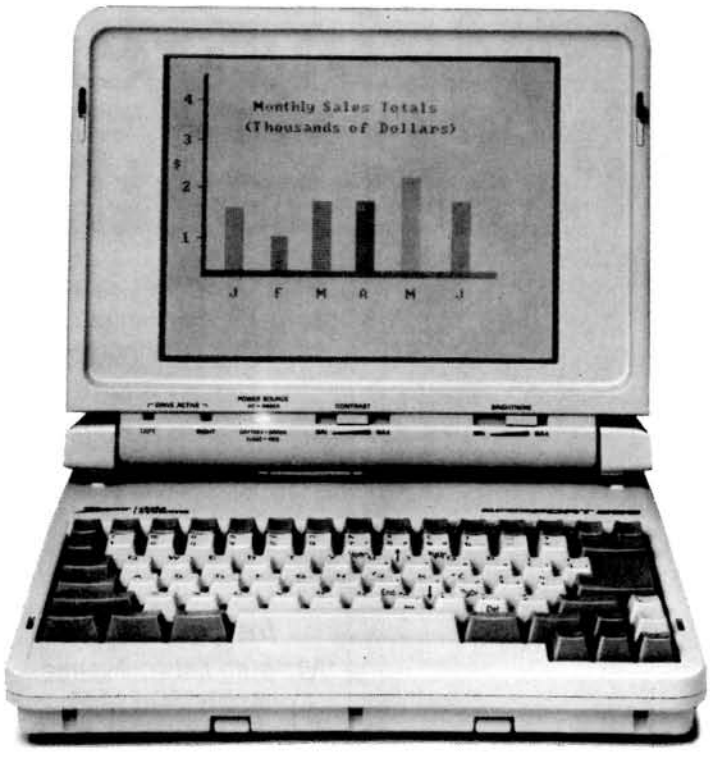
Please address all correspondence to me at 103 South Edisto Avenue, Columbia, SC 29205. I'll try to answer letters accompanied by a self-addressed stamped envelope, but my volume of mail is too heavy for me to promise. I'll assume the right to publish your letter (edited, if I think that appropriate).



SUPERSPORT 286

Zenith Data Systems Portable Computer

Figure 1

with 0 wait states, which Zenith says has the performance of an 18.7 MHz system. There are five models. The Model 1 (available in June 1988) has one 5.25 inch 1.2 MB floppy diskette drive and a combined floppy/ST-506 hard disk controller card, which seems to put this model in the league of a superfast Z-248. The Model 2 (available in July 1988) has one 3.5 inch 1.4 MB floppy diskette drive and a combined floppy/ESDI hard disk controller card. Neither machine comes with a video display adaptor. Each machine costs $2,999. The next three steps up come with the 3.5 inch floppy diskette drive and increasingly larger hard disk drives. $4,799 buys the Model 40 with a 40 MB drive, while $5,499 buys the Model 80 with an 80 MB drive. Both hard disk drives have a 28 ms. access time. Bigger and faster is the Model 160's 160 MB ESDI hard disk drive with an 18 ms. access time. It costs $6,799 and is scheduled to ship in July 1988. All three hard disk models come with a Z-449 640 × 480 video display adaptor card. All five models have five free expansion slots, come with the same kinds of memory as the Z-286 LP, and have space for a total of two full-height and two half-height 5.25" drives.

Both the Z-286 LP and the hard disk models of the Z-248/12 (40, 80, and 160) will be shipped with MS-DOS 3.21 and Microsoft Windows. All the new desktops have a real time clock, two asynchronous serial ports (with male DB 9 connectors), and one parallel port (with a female DB 25 connector).

So say Zenith's press releases distributed at the Spring COMDEX.

Zenith's New sPorty Laptop Computers

The three new laptops each come in different models, but the basic computers are defined by their microprocessors. Don't let the Detroit names confuse you. These machines are pure St. Joe.

At the bottom is the SupersPort with a dual speed (4.77 MHz and 8 MHz) 80C88 same as the Z-183, has 640KB of RAM same as the Z-183, and has a supertwist LCD screen similar to that in the Z-183. The Model 2 has two 720KB 3.5 inch floppy diskette drives, same as the Z-181, for $2,399. For $3,599 there's the Model 20, which has one floppy diskette drive and one 20MB hard disk drive, same as the Z-183. But these two SupersPorts are not merely pushed up reincarnations of the Z-181 and the Z-183: they feature the same cabinet as the SupersPort 286. It's narrower, has its drives on the sides, has its contrast and brightness controls on the screen mounting, and has its battery pack in a detachable housing so a fresh battery can be attached more easily than was true of its predecessors.

In the middle is the SupersPort 286 (available late May 1988) with an 80286 (or 80C286) microprocessor running at 12 MHz with 0 wait states (see Figure 3). There's a Model 20 at $4,999 and a Model 40 at $5,999. Those model numbers of course define the hard disk size in each. There's also a 1.44MB 3.5 inch floppy diskette drive in each.

At the top is the TurbosPort 386 (available late June 1988) with an 80386 microprocessor running at 12 MHz with 0 wait states, 2MB of memory, a 1.44MB 3.5 inch floppy diskette drive, and a new 40MB "Power-Miser" hard disk drive (see Figure 4). It is supposed to have about one-third the power consumption of previous drives. In addition there's a fast-charge NiCad battery that is supposed to charge fully in two hours. Without a modem the TurbosPort 386 costs $7,999 and with an internal 2400 bps modem it costs $8,499.

You must understand that all the above is from Zenith press releases and spec sheets. I could only glance at the available products on display in the Zenith booth.

What's A "Wait State"?

Don't become too restless reading ads for new 18 MHz or 20 MHz computers from other manufacturers when there you sit with an 8 MHz or, now, a 12 MHz Zenith. Your Zenith computer may be as fast, or even faster, than those apparent sizzlers. Remember that one school of contemporary advertising believes in selling the sizzle rather than the steak. Those sizzling numbers refer only to the speed of the microprocessor's clock, measured in millions of cycles per second (MHz), not to the speed at which the microprocessor

TURBOSPORT 386

Zenith Data Systems Portable Computer

Figure 2

actually processes instructions. Your computer is much more than only the microprocessor. Therefore, all the components that support it will affect the microprocessor's real processing speed.

Take the system's memory, for example. Zenith's technical paper, "Effects of Wait States on System Performance," explains that "Normally, it takes the processor two cycles to access memory. The first cycle (T1) is used to prepare the system for the access. The second cycle (T2) allows time for the memory to respond and the access to occur. If the system memory cannot respond during T2, then the processor must wait an additional cycle. Each additional cycle that the processor must wait is referred to as a wait state."

What you need to know, then, is not only the computer's clock speed, but also if it has wait states inserted to slow down a fast microprocessor so it can keep pace with slower support components. Zenith computers have 0 wait states, while many of the advertised sizzlers have 1 wait state. Of course, there are few manufacturers that would boast of a 16 MHz machine in one breath and in the next breath proclaim the addition of 1 wait state that slows performance down to that of an 8 MHz computer running with 0 wait states. The Toshiba 5100, Compaq III, Compaq 286, IBM PS/2 Model 50, IBM PS/2 Model 60, and IBM PS/2 Model 80 all run with 1 wait state, according to Zenith's technical paper.

The reality, according to Zenith, is this. If the Toshiba 5100 running with 1 wait state is considered a 16 MHz computer, then the TurbosPort 386 running at 12 MHz with 0 wait states has a relative speed of 24.7 MHz. If the Compaq 286 running with 1 wait state is considered a 12 MHz computer, then the Z-248/12 running at 12 MHz with 0 wait states has a relative speed of 18.7 MHz.

You get the idea.

Laptop Stuff

If you're wondering about all those laptop computers in Zenith's new line, you might as well wonder about all the laptop computers in every other manufacturer's line. The displays at COMDEX seemed to have almost as many laptops as there were laps in the audience. There even were booths devoted exclusively to laptop clones.

If you don't own a laptop computer, or if you don't own a good one, you just don't

Zenith Data Systems Z-286 LP Personal Computer System

Figure 3

Zenith Data Systems Z-248/12 Personal Computer System

Figure 4

understand how really useful these things are even if you're not an habitue of airport waiting rooms. Right now I'm roughing out the first draft of this column on my Z-183 set on a tea table in our living room while I'm set up in a leather arm chair behind it. When I've finished I'll tote the laptop to my office out back and pipe these immortal words to my Z-248 for the final touches. The piping will take a couple of seconds, thanks to some special programs and cabling I'll be covering at length in the series "How to Get the Most from a Zenith Laptop Computer," which started in the June issue. What I gain is not only more productive time, but also much more pleasant productive time. It's nice to work where I can be part of the family, instead of in isolation from it. Then, after my productive brains run dry for a while, all I do is snap the lid on my Z-183, tuck it out of sight, and swap puns with Matthew.

My colleague Ina Rae Hark has a completely different approach to laptop computing. Her Z-181 is really a tiny desktop computer. She never totes it anywhere. It sits next to her desk in her University office, inconspicuous but handy, with an external 5.25 inch floppy diskette drive connected to it and supplementing the two internal floppy diskette drives. Ina doesn't even own a printer. She takes one of the 5.25 floppies two doors down the hall to one of the ancient IBM PC systems we own for printing.

Mark Eppley won't make a dime from Ina but he'll clean up from all the rest of us laptop owners who are going to buy Battery Watch, the latest product from his Traveling Software, Inc. It's probably the oldest company in the field of laptop support and extensibility. I first heard of Traveling Software soon after the introduction of Radio Shack's Model 100. Traveling Software produced nifty ROM-based software for that ROM-based early laptop and made it more than the primitive machine it really was.

Mark grinned from ear to ear when he asked me at COMDEX, "What's the one thing you want most for your Z-183?" Immediately I answered, "I'd kill for a way to keep track of the time it has left on a battery charge." Immediately he whipped out a thin package, handed it to me, and said, "Here it is: your very own pre-release copy of Battery Watch!" So now I'm a straight man for software vendors.

It's $39.95. If you already own a Z-181 or Z-183, or any of the other major brands of laptop computers, and if you're not Ina Rae Hark, you really do need Battery Watch. As soon as you buy a laptop computer, you must buy Battery Watch. It loads a small TSR ("Terminate and Stay Resident") program configured especially to the laptop's battery power consumption. You set it when the battery is charged and you begin working off it. Then Battery Watch keeps track of the time remaining on that charge. Of course, no program can give your battery a boost, but this program can give you a lift by warning you when it's time to recharge. I don't know another way to do it. No less important to owners of the Z-181 or Z-183, and other computers that run on NiCad batteries, is that Battery Watch has a convenient feature to perform the kind of real deep discharge NiCads need from time to time. Read this month's "How to Get the Most from Your Zenith Laptop Computer" to see why they need it. I'll do a more detailed report of Battery Watch and how it works in a future installment of that series. Right now, though, I thought I'd do you a favor by telling you immediately about its existence.

What you want to do, of course, is pick up a spare ZA-180-21 battery if you own a Z-181 or a spare ZA-180-45 battery if you own a Z-183. That way you can keep a fully-charged backup battery on hand for when Battery Watch tells you the current battery in your machine is about out of current. Don't keel over at my suggestion. I can read as well as you that the Z-181 battery sells for $99 and the Z-183 battery sells for $119. But I also know that HUG has a limited supply of those batteries at prices low enough to make my suggestion not only practical, but pretty nearly imperative. Call HUG right away for more information. I've followed my own advice, by the way, so now I don't worry about my Z-183 running out of juice before I do on a trip.

See you later.

Products

Battery Watch $39.95
Traveling Software, Inc.
North Creek Corporate Center
19310 North Creek Parkway
Bothell, WA 98011
206/483-8088

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On The Leading Edge

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Hard Disk Crash, Computer Viruses, Learning Software, NVELOPE, Power Supplies, Quattro and Mace Utilities, Apple and Microsoft

You would think that, by now, I would have learned about self-fulfilling prophecies, but I haven't. Last month I mentioned the problem that a 4 millisecond uninterruptible power supply would not support my '248 system. A few days after I finished that article, the power supply in my computer went sour. But the initial symptom of that was that my 40 MB hard disk started making funny noises. Some days here at Disaster Central are worse than others.

A New Power Supply

The day started like most others. I fired up my system, and the hard disk began to rev up as usual, but then it sounded like it had just switched to warp drive from impulse power. Hard disk experts would say that it had an "overspeed" problem because it sounded like it was considerably faster than the usual 3600 RPM. After about 8 seconds, a clicking sound began. It went: CLICK — click, click, click; and that repeated several times. Then, the hard disk began to slow down, which seemed to indicate that the "brake" on the drive had been engaged. I immediately turned off the computer at that point.

I won't go into all of the details of my diagnosis of the problem, but I found that the +12 volt line to the system and disk drives was substantially higher (21.74 VDC) than it should have been. So, the first thing to do was get a new power supply, since that voltage was clearly too high. I had supposed that the power supply's overvoltage protection would prevent this kind of problem, but it did not work in this case. Of course, the system would not boot because the DC voltage was clearly out of tolerance. That was easy to spot because the DCOK light on the backplane board failed to light.

I replaced the power supply, and I was lucky because the Fort Worth Heathkit store had one in stock. Before connecting the new power supply to the system, I checked all of the voltages, and all were correct as expected. I fired up the system, and the hard disk came up normally at that point. Everything seemed to be okay, so it was back to work.

While this kind of thing is never planned, it seemed to be the ideal opportunity to check the switching time for a "slow" (4 millisecond) Uninterruptible Power Supply (UPS). I was not too surprised to find that the new power supply in my computer seemed to "fix" the time problem, and a 4 millisecond UPS seemed to switch to internal power fast enough. I concluded that I must have one of the newly designed Zenith power supplies that I mentioned last month.

I know that SOMETHING was changed in this power supply because the fan on it is an "outie" as opposed to an "innie". The old power supply (an "innie") pulled air INto the power supply so that it was exhausted through the front grill. You can tell if you have an "innie" because there is plenty of heat from the front grill that is quite useful to keep your fingers warm in the winter. Jim Buszkiewicz tells me that is one of the features of the original Z-200 systems that is not widely known.

The new power supply is an "outie" which expels hot air OUT of the power supply which means that most of the intake is from the front grill. Moreover, the power supply seems to keep my computer cooler, but that's a subjective judgment since I did not perform any tests. I guess that I won't be able to tell Sue (my

wife) that I have been slaving over a hot computer all day now. Besides, I always thought it was kind of silly to have the hot exhaust air from the system blowing out the FRONT of the computer.

It appears that the PM-450 UPS advertised in the current Heath catalog may indeed be capable of supporting Z-200 and Z-300 systems with the new power supply. Whether or not you have the new power supply in your system is another question, but one clue may be which way the fan blows. If you have an "innie", you probably have an old power supply that is too slow for a 4 millisecond UPS, such as the PM-450, and you may need a fast 1 millisecond unit, such as the Minuteman 300 or 600, to cover power blips. If you have an "outie" power supply, it may be a new one that works fine with a four millisecond UPS, such as the PM-450.

Regardless of what is an old or new power supply, my suggestion from the last article is still true. Discuss your specific needs for a UPS with a dealer, if possible. Since I have not found any way to absolutely identify the new power supply, the only way to be sure if a given UPS works is to try it on your system. If you decide to try a "slower" unit, I suggest that you get some kind of return guarantee in the event that it does not work with your system. Although, my experience with the "outie" power supply suggests that the fan direction may be one indication of a new design, it would be stupid for me to conclude that it is the ONLY one based on my one experience.

Although a new power supply seemed to fix the hard disk problem too, that was just the beginning.

Losing a 40 MB Hard Disk

My hard disk worked just fine for a couple of weeks, and then it started making those strange clicking sounds again when I powered-on the system. As before, the drive went to warp 9, and then began to slow down. When I checked the power supply voltages, all were normal, but I could not bring up the system normally because something in the hard disk was wacko.

Fortunately, I had been expecting this, and I was taking more care to back up my hard disk than I usually do. As it happened, I was also testing the Imager system board on my '248 as a preliminary test before I try it on the '386. So, I had three backups: one using the Imager, one of my standard DSBACKUP backups on floppies, and a third containing copies of various files updated since the last complete hard disk backup. While two completely current hard disk backups are admittedly overkill and is something I don't ordinarily do, I did not lose one single byte (or bit) of data because of the hard disk failure. The hard disk failed on the second day of the month, and I try to make a complete hard disk backup on the first of EVERY month with other backups in the interim.

The loss of my hard disk made me realize that they operate in three standard modes: MFM, RLL, and CBD. Most of today's systems use the MFM (Modified Frequency Modulation) recording mode. The RLL (Run Length Limited) hard disks are becoming more popular because you can generally get more data storage in less space compared with MFM. That is probably the reason that the RLL technique has been used on mainframe hard disks for a considerable number of years.

Although my hard disk normally used the MFM mode, it suddenly switched to the CBD (Crash, Burn, and Die) mode with no warning. It ran normally the day before with no indication of any problems, but it suddenly failed when I powered-on the system that morning. That is, by the way, the common way that you find out your hard disk is bad: one day it works, and the next day it doesn't. Up to this point, the hard disk drive had been quite reliable, and after nearly two years of very heavy use, it still did not have any bad sectors. For those of you interested in the details, it is a 40 MB CDC drive with an access time of 28 milliseconds.

I also have a 21 MB Seagate ST-4026 drive with an access time of 40 ms that currently has 10,240 bytes in bad sectors. Since the cluster size on that disk is 2,048 bytes, there are five clusters marked as having bad sectors. When I originally bought the Seagate drive, it came with two bad sectors, and after two years of heavy use, three more have developed. Those are reasonable numbers, but I have seen drives with 20 or more bad sectors that still function quite normally. I would not usually suspect a serious media problem until the number reached 50 or so.

In any case, I really didn't want to buy a new hard disk aside from the minor limitation that I did not have the money to do so. Even at the best prices I was able to find, a fast 40 MB drive seems to cost $600-700, and it seemed ridiculous to buy a new drive since the media in my old one was still perfect. Fortunately, I found a better and less expensive way to fix the old drive.

For $200 or so, the Dallas Heathkit store has made arrangements to get hard drives reconditioned by a company specializing in that area. The actual cost can be more or less than that depending on exactly what must be done to fix the drive, and I suppose that the primary cost difference is parts required, if any. I understand that the drives are repaired in a "clean room" environment as they should be, and I imagine that labor is the biggest part of the repair charge, as usual. If you have a hard disk that is operating in the CBD mode, you may want to consider checking with John Mitchell at the Dallas store. Depending on the cost of a replacement drive, you may find it is cheaper to have the old one repaired, as I did.

The Imager

Actually, I did not intend to report on the Imager until I had checked it out on my '386, but it was so useful during my hard disk CBD mode, that it deserves honorable mention. During all of the chaos that normally ensues during a hard disk problem, the Imager performed perfectly on my '248.

If you haven't read Joe Katz's report on the "Imager Backup" in the March 1988 issue of REMark (page 51), you have missed an excellent article. And if you need an easy way to backup your hard disk, I think you will find that the Imager is an inexpensive and easy way to perform that dull chore.

If you haven't read Joe's article, I suggest that it is REQUIRED reading before you install the Imager. For those not familiar with the Imager, it consists of a board, cables, and software that helps you back up your hard disk partitions to a regular beta or VHS video cassette recorder (VCR). I installed it in my '248 right after I got the new power supply and before my hard disk went into the CBD mode. That's why I had an extra complete backup of my hard disk, and I checked out the Imager's functions in a REAL recovery situation. I restored the original C and D partitions from the 40 MB drive to two separate 20 MB drives, and the Imager hardware and software worked exactly as it should.

From a cost perspective, the Imager is incredibly cost-effective, especially if you already own a VCR. If you do, you can get the Imager for $195, if you are a HUG member. If you are not a HUG member, the Imager is $295. This, and other HUG specials, can save you considerable money not to mention the usual discounts on Heath and Zenith computer products for HUG members. The moral is: JOIN HUG!

Learning New Software

Although I get many letters on specific computer problems, one minor question appears frequently enough that the answer may help more than a few HUG members. As you know, I have written about a lot of software in the last four and a half years, and I have used much more software than I have written about. Many people have asked: "How do you learn new software?" Everyone has techniques that work best for them, but I'll try to give you some ideas that may help.

Unfortunately, I have observed that many people get frustrated with new software after working with it for an hour or two. That is barely enough time to get it installed and running, let alone becoming proficient with it. A lot of today's software is so sophisticated and complex that it takes many hours of working with it to become proficient and expert in its use. Don't expect to become an expert with one of these packages, like Microsoft Word, in five or ten hours. It takes a lot of reading (the manual) and use to understand how to use the power of this kind of software.

When you begin to learn any new software, the most important point is to READ THE MANUAL. That may seem to be trite advice to some, but my experience is that many people seem to ignore the manual when they are learning new software. Most of today's manuals have reasonably good indexes that can be used to look up the solution to a specific problem. If, for instance, you want to know how to spell check a document, you could look up "spell", "spell checking" or perhaps document. To see if that was reasonable advice, I checked the indexes in four different word processors: Microsoft Word 3.1, WordStar 4.0, WordStar 2000+ version 3, and Samna Word III version 3.0.

The Microsoft Word 3.1 manual has a total of about one column of index entries to "Spell" something including Spell command, Spell disk, Spell program, Spell tools, and Spelling correction. The WordStar 4.0 index has a number of entries for Spelling check. The WordStar 2000+ index includes entries for Spelling correction, and Spelling Correction Menu. And, of course, the Samna Word III manual has no index entry under spelling because you must already know that spell checking is under the "Proof" function activated by the Select key. That was no particular surprise to me, since I think that Samna Word III is the worst word processor I have ever used. Its manual is also poorly organized, and its index is impossible unless you already know what you are looking for.

Well, three out of four isn't too bad. If you read the manual and use the index, you probably won't have too many problems with most software. By the way, I think it is interesting to note that, when Zenith had the ZDS Software Consultation Group, I was told that the answers to over 80% of the questions could be found in the manuals. Perhaps that partly explains why the consultation support was discontinued.

There is another excellent way to learn how to use new software. I have noticed that a lot of the current software contains a tutorial for new users. In some cases, this is a series of lessons in the manual that are included in the various WordStar versions. Some vendors have taken that concept above and beyond the norm. Microsoft and Hilgraeve are two vendors that have.

I have been quite impressed by the software tutorials provided in Microsoft Word (version 3.0 and later) and Hilgraeve's HyperACCESS software. These programs include special Computer-Aided-Instruction (CAI) programs that walk you through the basic program functions.

The CAI tutorial provided with Microsoft Word is far and away the best I have ever seen on a word processor or any integrated software. It is very well designed and even provides an automatic "checklist" so you can see which parts of the tutorial you have been through. Microsoft has even included separate tutorial disks for keyboard or mouse use depending on your system.

Hilgraeve has also done an excellent job on the CAI tutorial included with HyperACCESS. It walks you through samples of the screens and menus, so you will know how to use the program and what to expect. This is particularly helpful to new users who may have never used a communications program before.

It is still important to read the manuals and use the index even if the index is as bad as Samna Word III's. Someone at Samna evidently spotted the lack of a "spell" index entry because that was corrected in Samna+.

But I also use another approach to learning software if there is no CAI tutorial. When I open a new software package, I prepare a "cheat sheet". The first information is how to start the program from the command line, and how to exit the program back to DOS. Then, I go through the "reference" for the software that usually lists all commands in alphabetical order, and I make notes on my cheat sheet for my use.

Since Samna has some really non-standard key functions, the first thing I did was make a note of how to move the cursor. Although the four keypad arrow keys function almost like you would expect, the others do not. For example, the pressing of the Home key moves the cursor forward one word, and Shift-Home moves the key backward one word. The PgUp key moves the cursor forward one sentence, the PgDn key moves the cursor to the next text page (not the display page), and a Shift for those keys moves the cursor backward in a similar way. While that isn't all bad, it is significantly different from all other word processors I have used, and it is extremely difficult to learn if you have used any other word processor.

The Ins key function also works in a strange way that took me a considerable amount of time to get used to. Unlike most other word processors, Samna begins in the default overwrite mode. Although you can easily use the Ins key to enter the Insert mode, Samna displays all kinds of error messages when you try to use the arrow keys in that mode. It's difficult to describe how clumsy I have been in using Samna because my fingers are used to the "standard" keys used in Word and WordStar.

After making notes on how to move the cursor and access the Insert mode, the next step is to figure out basic word processing stuff like a block copy, move, and delete. I won't describe how Samna does that, but it is kind of tricky until you get used to it. Then I proceed to the en-

hanced formatting functions like bolding, underlining, hanging indents, forced page breaks, and so on. As I page through the reference manual, I see that Samna does not do dynamic repagination, so I make a note of the appropriate command for that, too.

I spent a couple of hours making these notes before I even tried to use Samna for writing, and I found that the time was well spent, since I became familiar with the Samna terminology and the basic commands that I use most often. All of my notes are handwritten in pencil, since I don't have the computer power on when I review the manual.

If you take the time to create your own cheat sheet for software before you fire up your computer, I think you will be amazed at how much easier it is to learn the program. For me, this approach makes complex software much easier to learn, because I have already become familiar with its terminology before I even begin to use the program. I have found this trick to be useful whether the software is a word processor, spreadsheet or compiler. I even make notes on how to use simple utilities, such as the Mace NVELOPE program mentioned later in this article.

After learning the basic commands that a program uses, another way to become proficient in its use is to find a book on it. Regardless of how good the program or tutorial is, a book showing practical examples of how to do things is indispensable. If you are learning Microsoft Word, for example, I particularly like Peter Rinearson's book "Word Processing Power with Microsoft Word" (Microsoft Press). If you are trying to learn a programming language, find a book on the subject. No matter how good the documentation is for a program assembler or compiler, you will find it extremely difficult to learn that language from those manuals alone. But if you want a real challenge, try to figure out how to do assembler programming from the manual supplied with the MASM assembler. Unless you have an IQ of 200, I believe that it is impossible. These manuals were intended for reference, not for teaching a beginner how to program in the language.

The NVELOPE Utility

One can use a word processor to create a nice letter, and that is easy to print on any kind of compatible printer. But there always seems to be a hitch when it comes to addressing the envelope, since many word processors don't have an easy way to do so. Rather than spending a lot of time setting up a special way to address an envelope with my word processor, I have found a better way: the NVELOPE utility program from Paul Mace Software.

NVELOPE is a memory-resident (usually) program that includes more than just an envelope addressing function. You can also start NVELOPE in a non-resident mode by entering the NVELOPE/N command. In its memory-resident mode, you can bring it up within your word processor with the default ALT+ hotkey (which can be changed) as shown in Photo 1.

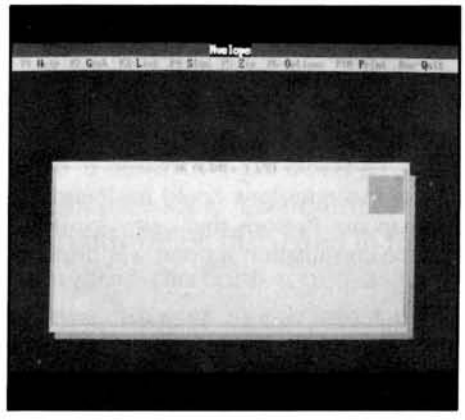

Photo 1
NVELOPE Main Screen

When NVELOPE's main screen is displayed, you can press F2 to "grab" the name and address you have already typed in your letter. You then position the cursor to the beginning of the address, press RETURN, and then move the cursor to include the entire block of the name and address. When you press RETURN a second time, NVELOPE displays that name and address on your envelope display which can be edited again if you wish. If you want to save that name/address, you can press F9 to save it in a small database. All saved names and addresses in your database can be listed with F3 and used again.

The F4 function key changes the size of the "envelope", which can be anything from a small mailing label up to just about any size envelope that will fit in your printer. NVELOPE can print seven sizes of envelopes ranging from 3-5/8" × 6-1/2" to 5" × 11-1/2", and 18 label sizes from 2-3/4" × 1" (3 across) to a 3" × 5" index card. This function also changes the size and shape of the displayed envelope or label so it is easy to see how the information fits on it.

The F5 function key is used to look up a zip code, and a complete zip code database for the United States is included with the program. Once you have displayed the name and address information on NVELOPE's screen, you can print it on an envelope or label with F10. NVELOPE can even print sideways, if necessary, to accommodate laser and other types of printers.

If you want to change some of the options, the F6 key is used for that purpose. NVELOPE will also print your return address in the usual upper left-hand corner of the envelope if you wish or not. The hotkey can be changed, and you can also unload NVELOPE from memory with this function key.

NVELOPE also allows you to enter (and keep) printer setup strings, but I did not find this necessary with my C. Itoh C-310 printer (Epson FX-80 emulation) or my DTC StyleWriter (Diablo emulation). You will need to spend a couple of minutes determining the preferred envelope alignment with your printer, and I used a couple of blank sheets of paper for that purpose. I found it helpful to record the alignment instructions in the NVELOPE manual so I would have a handy reference.

The zip code database included with NVELOPE appears to be quite complete. Since I was raised in Indiana, I checked a number of small towns in that state, and they were all listed in the database. I was surprised to find my hometown of Lebanon, plus others in the area, such as Noblesville, Plainfield, Frankfort, Darlington, and Colfax. This is an extremely helpful feature that will help you get the zip code for just about any city.

All in all, I think that NVELOPE is an extremely useful utility, and it also has some other features that I did not mention. I tested it with WordStar 4.0, WordStar 2000+ version 3.0, and Microsoft Word. It works fine with those word processors, but it does insert a strange graphics character when the ALT+ hotkey is pressed in WordStar 4.0. As far as I can tell, that seems to be a problem with WordStar 4.0 and not NVELOPE, and it is not a serious problem in any case.

I also tested NVELOPE with Samna Word III, and of course, NVELOPE does not work. That was not surprising to me because I have not found one single memory-resident program that works right (or

in most cases, not at all) with Samna. If you like to use memory-resident programs, you will want to choose a word processor other than Samna.

If you write letters to a number of people, NVELOPE is quite useful. And since you can also do a "bulk print" of your database — on labels, for example — I think that NVELOPE would be an extremely easy way to create a large mailing list.

The NVELOPE package consists of two disks and a 27-page manual. The manual is well organized, and a quick scan of the pages will answer most questions. The program works like you would expect, and after you use it once or twice, you probably won't need to refer to the manual at all. NVELOPE performs as expected, and it is a highly recommended utility.

Baker's Dozen

Since I was experimenting with taking pictures of software displayed on my NEC MultiSinc monitor, I also took a picture of the disk information display provided by Baker's Dozen as shown in Photo 2.

Photo 2
Baker's Dozen DISKUTIL Information

I should note that this photo was taken before my hard disk crash, and it reflects the contents of the D partition on the CDC hard disk before the disaster.

As you can see from these photos, I have been experimenting with various photographic techniques for CRT pictures. Although I don't claim to be a photographic expert, I have been working with my camera to learn how to take pictures for my articles. As it turns out, it is easier to take pictures of CRT displays, but I am also working on some other techniques for pictures of hardware. Adding photos to my articles was the "new ideas and techniques" that I mentioned last month. I hope that you find these photos useful.

A User's Perspective on Look and Feel

It appears that the microcomputer industry seems to be more inclined to litigation than it has ever been. The Apple versus Microsoft situation is the latest in the "look and feel" series of lawsuits that I think are ridiculous. This problem is exacerbated by the fact that there seems to be no definitive laws for computer software as to what really constitutes an infringement and what doesn't. This is a very sticky legal question that will not be resolved quickly or easily, but its effects on us users will remain for years to come. In my mind, there are two parts to this question.

The first question is: What can be patented or copyrighted on a user interface with anthing? In this context, "anything" can mean an automobile, a computer or a power tool in your workshop. If I decide to manufacture an automobile, can I get a patent or copyright on my idea to reverse the position of the clutch and accelerator pedal? Can I protect some kind of idea for a new keyboard design for a computer? How about an electric drill with the "trigger switch" on the top instead of its customary position? What if I start a book publishing company and decide to place the title page in the back of the book instead of the front. I admit that these are all silly ideas, but they have one thing in common: all involve something we have learned is customary and traditional for the user interface with these items.

I believe the answer to this question should be based on the common public good, and a user interface for a keyboard design, for example, should not generally be something that is protected. Consider what would have happened if IBM had decided to try to patent or copyright the original PC keyboard with the function keys on the left side. We would only be able to get this kind of keyboard from IBM, and I don't believe that kind of "monopoly" is in the public interest. Although computer software obviously is a different type of animal. I do not believe that general ideas for a user interface should be protected. What would be the currrent state of affairs if pop-up or pull-down menus were somehow protected? Can I protect the idea of "pull-out" menus from the right or left side of the display?

Part of the answer to the software question is the fact that there are many ways to do the same thing. You could write a program in C and I could write one in COBOL that performs the same function and has the exact same display screens, but the programs would obviously be different. As long as there was no question about my copying your code, and in this case, there would not be, I don't believe it is reasonable to protect that user interface or display. In short, I am suggesting that the free enterprise system should be allowed to work. Let users decide if they like your program because it is faster, smaller (in program size), and cheaper to buy than mine.

The second question is: "How does the current litigation affect computer users?" In this case, I don't think it matters if Microsoft or Apple "wins", the outcome of this dispute will clearly affect every microcomputer user where it hurts most — the pocketbook. I think that the Apple position smacks of inhibiting free enterprise and market competition rather than the copyright issue that is being claimed. The essence of our system is based on being able to provide better and similar functional products at lower prices. Evidently, Microsoft has been able to build a similar mousetrap for the PC compatible systems at a lower price, and Apple is afraid that the new Windows will further erode the market for its computers.

It is more than a little unfortunate that the user has been essentially neglected in this situation. Although it is clear that Apple has taken this position based on protecting what they perceive to be their business interests, it is just as clear that this position is not in the best interest of the computer user. It is somewhat ironic that this lawsuit has had precisely the opposite of the intended effect of squashing the development of a visual interface for PC compatible computers. Published reports indicate that the Apple lawsuit has stimulated MORE interest in Microsoft Windows and Presentation Manager, not less.

Regardless of the outcome, it is obvious that the only money makers in this situation will be the attorneys. Although we users will end up paying higher prices no matter who wins; I, for one, wish Microsoft good luck on this one.

Quattro and Mace Utilities

I use the Mace Utilities UNFRAG program to "reorganize" my hard disk periodically,

and I found something interesting during that operation shortly after I finished the Quattro article that appeared in the May 1988 REMark. The UNFRAG program indicated that the main Quattro program, Q.EXE, was position sensitive and could not be moved during the optimization process. I did some experimenting which specifically identified that Q.EXE was causing the problem. I also discovered that the file could be renamed to anything else (e.g., R.EXE), and the UNFRAG program worked just fine. Since I knew that Quattro was not copy-protected, I checked with Paul Mace Software to find out what was happening. I suppose I should have expected that this problem was somehow related to some strange copy-protection scheme.

I learned the UNFRAG program has a special hard-coded exception for a program marketed by Intuit (Company) called Quicken that has a file name of Q.EXE. Quicken is one of the financial management programs that also prints checks. In any case, at least older versions of Quicken have a strange copy-protection scheme that does not tolerate any movement by a disk optimizer program, like Mace UNFRAG, which explains why that file name was hard-coded in the program. I hear rumors that copy-protection has been removed from the latest version of Quicken, but I have not checked that.

Unfortunately, Quattro's main program also has the file name of Q.EXE, so it is treated and displayed just like Quicken by the UNFRAG program. When I found the problem and its solution, I notified Paul Mace Software of the situation, and they explained the cause of the problem to me. Since it is unlikely that either Intuit or Borland will change the file name for their program, the best solution is to rename Quattro's Q.EXE file to another name. My original suggestion to Paul Mace in my letter was to use QU.EXE, but I have since changed to S.EXE with the "S" for spreadsheet to keep the single letter command.

If you need to use copy-protected programs, I recommend that you never install them on a hard disk. Depending on the copy-protection scheme being used, there is no way to ensure that a backup copy is actually valid, and in many cases, it isn't. Since many copy-protection schemes may not cause any problem indication during the backup process, you may never know that the file is not really backed up until you try to restore and use it. That can occur when your hard disk develops a bad sector in the middle of the copy-protected program, so you take a backup, FORMAT the disk, restore all files, and then find out that the program is not usable. And there are all kinds of other potential problems, such as using an optimizer program, too. These are a couple of the reasons why I do not think copy-protection is a reasonable solution to the software piracy problem.

Powering Down

Since part of my business involves computer consulting, I have recently had a personal experience with computer viruses, and I was amazed that someone would take the time to write this kind of program. I will tell you something about that experience next time with some very specific ways to help you determine if your system has been "infected" or not. That article also includes some ideas on how to keep your system from getting infected.

If you have any questions about anything in this column, be sure to include a self-addressed, stamped envelope (business size preferred) if you would like a personal reply to your question, suggestion or comment.

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XENIX Part Two

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Installation

In my first article, we covered the basic XENIX system. We went over the history of UNIX and XENIX, and how it evolved from the laboratory into the operating system it is today. Also discussed was a comparison of MS-DOS, OS/2, and XENIX. The first article concluded with a very brief discussion of some specific XENIX functions. While Zenith has started shipping OS/2 with their computers, XENIX is also being shipped in growing numbers with the Z-386 based machines, which indicates a growing acceptance of this package. For this reason, if you plan on multitasking operations, XENIX should be considered instead of OS/2.

In the first article, I said that XENIX is a multitasking and multiuser operating system. I thought that I better define these terms before I continue on with the article. A multiuser system is one that uses a common processor called the file server to accomplish many tasks that come from many users connected to the processor via modem, network, or serial ports. A large mainframe computer is a multiuser system, with the users on terminals or microcomputer. Each task is performed in one time slice with each process being completed a little at a time. A multitasking system is like the new OS/2. This means that one processor can complete several tasks requested from the keyboard. Basically this means that you can input one task such as a sort, using dBase III and while this is being completed you can start another task. Although these parallel processes can occur, most people cannot handle too many tasks at one time, as humans think in serial, one thing at a time. With this out of the way, on to the next part.

In this second article, the actual installation of the eighth disk in the XENIX set will be described in detail. The installation will cover Microsoft's XENIX System V offered by Heath/Zenith as part numbers OS-63-80, OS-63-81, and OS-63-82. These packages consist of the Time Sharing System, Development System, and Word Processing and are required to get the most out of XENIX.

To install XENIX on a hard disk you need at least 15 megabytes of storage. On "my" H-386, my father bought a Miniscribe 6053 hard disk which has 44 megabytes of storage and a 28 millisecond access time. The faster access time is a necessity for multitasking systems. The drive is partitioned with 22 megabytes for MS-DOS and 22 for XENIX. In this configuration, the actual access time is less than the 28 msec in the specification. The old faithful Z-100 is connected to the serial port so that files can be transferred back and forth if the password is given.

The Microsoft XENIX Time Sharing package comes on four 1.2 megabyte high-capacity disks. To load, you either need a H/Z-386 with the standard 1.2 megabyte drive or a ZD-12 1.2 megabyte drive for the H/Z-248. As I said earlier, the Microsoft XENIX is a 286 based product but can be used on a 386 based machine, although SCOs 386 based product is faster and uses the entire capability of the machine.

To begin installation of the XENIX operating system (Time Sharing), place the disk marked installation in drive A. Note, if you have already installed MS-DOS on your hard disk and changed the CMOS setup to boot from the hard disk, press Control-Alt-Insert to get to the monitor prompt. Type in "BF0" to boot from the floppy.

The floppy should click four times and display a message like this:

```
XENIX System V/286 Boot
Enter:
hd program
fd program
dos
cf [-c conf file] [device file]
Press enter for default : fd /xenix
:
```

This is the bootstrap loader for the XENIX system. Here you can do a couple of things. From the above screen display, options are presented which you must enter after the ":". You can either load XENIX from the hard disk (if installed) or from the floppy disk (only for installation). You can also boot up DOS, but you must have the DOS partition after the XENIX partition. I put DOS in the first partition and whenever I try to 'dos', I get a 'partition not found' error. In order to boot DOS I must now CTRL/ALT/INSERT and from the monitor prompt type in "BW0:1". You can also select the option for advanced XENIX feature and device drivers (cf). Note, this is the open screen of XENIX when installed. When installed on the hard disk, the default is hd/xenix. During this initial installation, nothing will happen if you don't type <RETURN> or enter a selection. When installed on the hard disk, if nothing is

typed within the first 60 seconds (approximately), the system will automatically load with the selection.

At this prompt ":", just press return. The floppy will load more data and when it is done, the screen will display "Loaded, press Enter to Start". Again press return and the XENIX installation will continue. Then it will display the Microsoft copyright and memory information and say

```
No single-user login present. Entering system maintenance mode
```

and give you a '#' prompt. At this prompt, type "hdinit" which is found in the Installation section of the documentation to install XENIX on a hard disk.

The first display after typing "hdinit" will prompt you for installation sites for the XENIX operating system. These four options are:

1. Dedicate the Entire Disk to XENIX
2. Dedicate the disk to XENIX but leave a gap at the end
3. Dedicate the unused region of the disk to XENIX
4. Install XENIX System V over an existing XENIX system

The first option is if you have a 20 megabyte hard disk or larger and you plan to install XENIX on the entire disk. You must not have partitioned the hard disk before selecting this option, just prepared the disk for normal operation.

The second option is if you want to install XENIX in the first partition and leave space at the end for MS-DOS or another operating system. "Hdinit" will ask you to specify the size of the gap or partition at the end of the disk. Remember you need at least 15 megabytes for XENIX. If this option is selected, the disk will automatically be partitioned.

The third option is if you already have a partition installed for another operating system. You must not have installed anything in the other region of the disk which is to be partitioned for XENIX. This option will only use the unpartitioned space available on the hard disk. Remember, XENIX needs at least 15 megabytes of space.

The fourth option is if you already have an older version of XENIX on the disk. If selected, this option saves all the data files and rewrites all the program files with the new version of XENIX.

After you have selected the option, "hdinit" partitions and creates bad sector tables for the hard disk. If you have a bad sector near the start of XENIX, there may be some error messages. This is okay and should not affect the installation of normal operation of XENIX if it doesn't stop during the process. If it says 'Bad track table overflow' you probably need a new hard disk because there are more bad tracks than can be put in the bad track table.

Next, "hdinit" asks you for the time zone. All the time zones in the U.S. are loaded in the program and you need to specify one. If you are not in the U.S. or in one of the optional time zones, you select '7' and tell the computer the offset of hours from the Greenwich time (ZULU). XENIX uses ZULU time for internal operations and time stamps.

Once these housekeeping tasks have been completed, "hdinit" copies the files from the diskette to the hard disk. This procedure is only for the first disk in the time share package. After it is done it tells you to type 'haltsys' and reset the computer. It is imperative that you type "haltsys"! XENIX keeps many files open, even if it is idle, and this closes all of them. You MUST type "haltsys" every time you shutdown the system or lost files may haunt those who use the system.

When you reboot, you should boot from the hard disk. The XENIX boot program comes up, and again you press return, but this time the display will be "hd /xenix", which is the default value. It will display the normal messages and give you a '#' prompt after pressing <RETURN>.

At this prompt, type "xinstall". The installation program will then ask you the floppy device name. Type "/dev/rfd0" for floppy drive 1 and "/dev/rfd1" for drive 2. Then it will ask you to insert a disk and press "y" until finished. It will prompt you for the next disk in order for this installation procedure. The screen prompt will not specify the disk to be inserted but you should insert them in order. When you have installed all of the disks in the base package, you press 'n' to the screen prompt. To install the software development system type 'xinstall soft', and to install the word processing package type 'xinstall word'. Again install them in order.

When all of the software packages are installed, you must create superuser, who is the "person" who controls the operating system. The superuser creates the login name and initial password for all other users. He also establishes the basic permissions to start the system. Every user has a login name and a password. The login name is public, and is needed for sending mail. The password is secret, and is stored scrambled on the disk. It also is not displayed on the screen during the login processes. This is to prevent somebody from seeing it displayed on the screen. The superuser adds more users, maintains the system, and is the administrator. To create the account, type 'passwd root'. The computer will ask you for a password, then ask you again to make sure you didn't type it in wrong. The password will not echo on the screen. Do not forget this password!

After the superuser has been installed, type 'haltsys'. Reboot XENIX and log on with 'root' as the login name (superuser) and your password. You must now create a normal user. To do this type, 'mkuser'. You can add a demo user to your system or your personal account.

The first thing mkuser asks you is the login name. This is used for mail and for logging in. Then it asks you if you want to use the default group. For small systems, type 'y'. For big systems, you may want to create a new group or groups. Next you enter a password just like you did for the superuser. Lastly, it will ask you the shell type. You enter in a number from 1 to 4 depending on which shell you want. One is the standard shell, 2 is the C-Shell, 3 is the visual shell and 4 is the restricted shell. We talked about the shells in the first article. Then you enter a comment which can be a real name, office, etc. Now you are done.

Because XENIX is a multiuser system, each user receives a directory where all their files are maintained. When the user logs in, he is automatically referred to his directory. Also, some special things can be put in two special files, ".login", ".cshrc" and ".profile". These files specify information about the user such as the mail file, time zone, terminal used, etc. The file ".login" is used with all the shells and is invoked every time the user logs into the system. The other two files, ".cshrc" is only used with the C-Shell and ".profile" is only used with the standard shell, are used as required. The following series of paragraphs explains the "." files.

Each person when first installed gets a default version of each of the files. The

".login" file for the C-Shell in default form looks like this:

```
tset -r# do terminal initializations
set ignoreeof# don t let control-d logout
alias ls "ls -la"
```

I'll now explain the above file to you. The first line sets XENIX up for the features of your terminal. This doesn't mean much and doesn't need to be changed. The next line just tells XENIX that you cannot log out by just typing CONTROL-D. You must type "logout". The next line involves "alias", a feature only used in the C-Shell. This puts a string of commands into one command. For example, when you typeset a file, you must type 4 commands. By typing 'alias typeset "eqn filein | tbl | nroff | lpr'", you replace the string of commands beginning with "eqn" and ending with "lpr" with typeset. Typeset is not on the disk anyplace. It is just a symbol to do the commands. By just typing "alias" you can show all the aliases installed.

The next setup file is the file .cshrc. This is unique to the C-Shell. This is a longer file that has many complex subjects you do not need to worry about at this time. The sample is shown below :

```
#
# Copyright (C) Microsoft Corporation 1984
#
# Example .cshrc file for demonstration C-Shell account.
# Commands here are executed each time csh starts up.
#
set noclobber                              # don t allow '>' to overwrite
set history=20                             # save last 20 commands
set path=(. $home/bin /bin /usr/bin)       # execution search path
set cdpath=(.)                             # directory search path for cd
set prompt=\!%\                            # set prompt string
alias v vi                                 # quick command alias
alias h history                            # quick history alias
alias print 'pr -n \!:* ¦ lpr'             # print command alias
setenv  SHELL   /bin/sh                    # use regular shell for scripts
setenv  TERMCAP /etc/termcap               # terminal data base
set mail=(30 /usr/spool/mail/$LOGNAME)     # mailbox location for csh
setenv MAIL /usr/spool/mail/$LOGNAME       # mailbox location for environment
```

This file contains some shortcuts and safeguards. One safeguard is the first line of the file which doesn't allow the ">" which is an I/O redirection symbol (more in the next article) to overwrite an already existing file. The next file tells the C-Shell to save the last 20 commands which may be executed again if desired. The next line sets the path of execution instead of having to type the path yourself. The next line does about the same, except for directories. The next line sets the prompt. You may change this, and we will later, as an example, in the vi article. The next three lines are shortcuts using alias, which we too will discuss. The next two commands which are "setenv" commands are needed and should not be changed. The last are commands dealing with mail and do not need to be changed.

If you have a multiuser system, you can connect other terminals to the back of the computer through the serial port. Most PCs have only one serial port so you would be limited to one device connected to the system. If you plan to connect several terminals, note I said terminals and I mean either computers or dump terminals, you will require a board that would provide multiple serial ports or a LAN card. The LAN board must have a device driver for XENIX in order to use it. To start using the dumb terminal connected to the internal 9-pin serial port, just type "enable /dev/tty00" at the server and press <RETURN> at the terminal a few times. If you don't get "Login :" or get scrambled characters, you might need to change the baud rate on your terminal. If you are using a computer, you must start from your favorite communication package like PROCOMM or the telecommunication package within ENABLE. Set the baud rate, word length, and stop bits to match the host computer in the

To access XENIX press <RETURN> a few times and type in "enable/dev/tty00" like the dumb terminal above. You will need your login name and password to gain access to the system.

In a multiuser system, you can have one or more printers installed on the system. The installation procedure is easy but we will go over it. To install a printer, first type "/etc/lpinit". Lpinit will first ask you the location of the port. You have a choice of the primary or secondary parallel port, primary or secondary serial port, or the monochrome and printer adapter printer port. Then you must specify a name for the printer. This is not very important in a one printer system, but for more than one printer in the system you must specify the printer name. Then it will ask you the interface program. Just press return for the default which is dumb. If you selected a serial port for the printer, you must select the handshaking, baud rate, parity, word length, and stop bit values. Then lpinit enables the printer and asks you if the printer is the default. In a multiprinter system, if no printer is specified, then the default printer is used.

This covers the installation of XENIX on a microcomputer. The remainder of the articles in this series will cover the other parts of the XENIX system. I hope to be able to review software packages that operate on the XENIX system as I go along as this will show the growing acceptance of XENIX. In a recent issue of Information Weekly, the headline said "UNIX, IBM's New Standard?" UNIX/XENIX has a part to play in the expanding world of computers. As computers grow smaller and at the same time more powerful, UNIX/XENIX will grow and may work out better than OS/2 as an operating system. *

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	M-355 Software Driver	$ 19.00

M-355 runs on AT compatable or special controller only.

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ST-225	21 MEG, 65 MS,	$ 259.00
	With Western Digital Controller & Cables	$ 313.00
ST-138	31 MEG, 28 MS, Auto Park Heads	$ 329.00
	With Western Digital Controller & Cables	$ 383.00
ST-238	31 MEG, 65 MS, RLL	$ 278.00
	With Western Digital RLL Controller & Cables	$ 323.00
ST-251	42 MEG, 28 MS, Auto Park, Software	$ 409.00
	With Western Digital Controller & Cables	$ 468.00
ST-4096	82 MEG, 28 MS, Auto Park, Software.	$ 797.00

V-20 Chips High Speed NEC V-20-8 8088 replacement. These run at up to 8 MEG and are said to increase CPU speed 10- 30%.....Payload $14.75

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ENABLE
Part 8

George P. Elwood
1670 N. Laddie Court
Beavercreek, OH 45432

Advanced Word Processing

In this part eight of the series on ENABLE, I will present comments on advanced word processing. Because of the amount of material to be covered, I will write another in the future on added word processing features. This article will provide details on copying between windows, other ENABLE modules and more advanced features. ENABLE's word processor has many advanced features. It can do almost anything other word processors can do and much more. Like any word processor, you, the user, have to make the decision to change and then make the effort to learn the new system. With ENABLE, most of what you learn in the word processor will carry over to the other modules in ENABLE. I have tried in this series of articles to provide you with a good understanding of the ENABLE word processor. I may continue on with additional points if there is a desire or need by you, the readers. I have received some comments on the series and have answered every one so far. If you have questions, write and I will attempt to answer them for you.

While this series is based on the Z-100 version of ENABLE, I do look at and use the PC version of the product. The Software Group has added a new product to the ENABLE line. The Webster's Proximity Electronics Thesaurus is now available for ENABLE. The on-line dictionary is also from the Proximity/Merriam-Webster company so this product is a natural follow on. Because of the graphics and screen calls, the thesaurus will not work on the Z-100, even with ZPC, but then the Z-100 version of ENABLE will not work with ZPC loaded. The add on program comes in a yellow book type binder with two disks. On these two disks reside 470,000 synonym responses and 40,000 base words. It is recommended that the program be loaded on a hard disk for maximum benefit and the least amount of disk swapping, especially when used with ENABLE. Instructions are provided for installation on a dual disk system.

Loading of the program is straightforward and is menu driven. To install, put the disk in drive A: and type install. The program is installed in its own sub-directory on the hard disk. Once the program is loaded on the hard disk, change to the PRXMTY subdirectory and type "SETUP". From the opening menu select "Add an Environment", and "Thesaurus" on the next menu. From the next screen select "Word Processor" using the cursor keys to highlight the option. The next screen will provide a list of all of the word processors that the Webster's Thesaurus supports. Again using the cursor keys, select ENABLE. Since the thesaurus is a popup application, you must now select the key combination that will bring it up. You then have the option to change your selection. The escape key is set for {ESC}, but can be changed, if desired.

The thesaurus is a TSR program that will take up about 80K of RAM space. During the installation you can select a "DEINSTALL" key to remove it from memory, if necessary. You must select a key sequence because the default is "ALT F10", which is the ENABLE save menu. You then select the screen colors. Pressing {ESC} twice will back you out of the installation procedure. You can go in at any time and change the values you have selected.

The Thesaurus must be loaded before it can be used. If you do not plan to use all of the available, loading should be completed during the initial boot procedure as part of the AUTOEXEC file. After being loaded, move on to ENABLE and load it. While you are generating a document and you wish to use a different word, press your select keystrokes with the cursor under the one you want to change. The thesaurus will overlay the ENABLE word processor if you select "Obscure Text — False" during the installation or text will be deleted if it was set "True". The Thesaurus will present information on the word highlighted. The word being

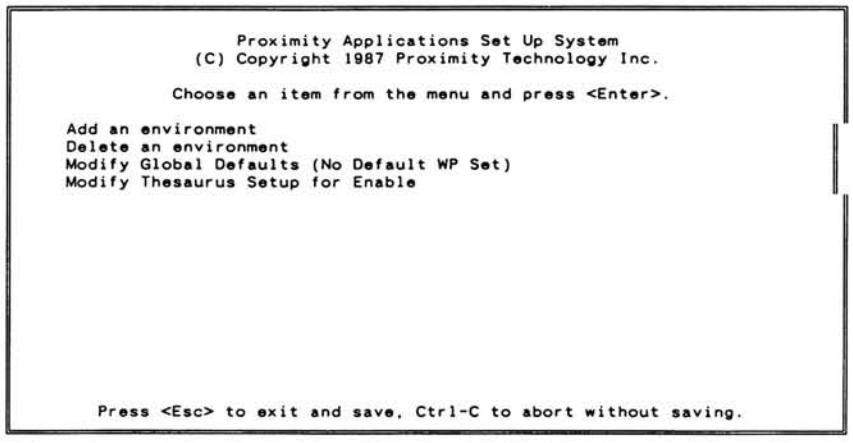


Figure 1
Thesaurus Main Installation Menu

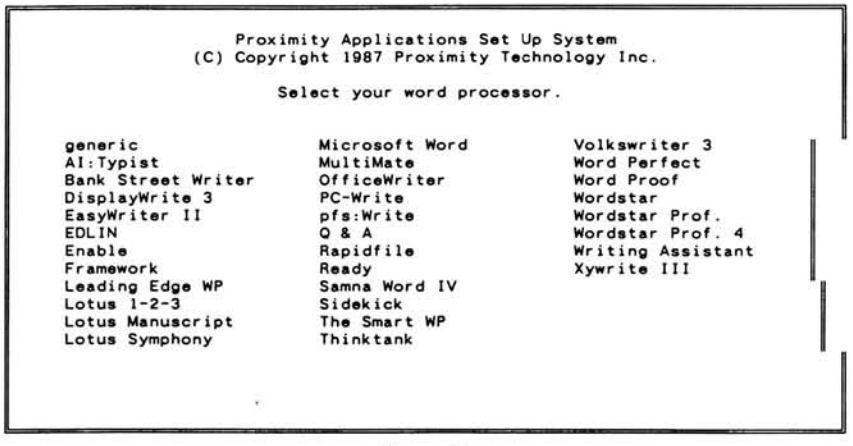


Figure 2
Thesaurus Word Processor Selection List

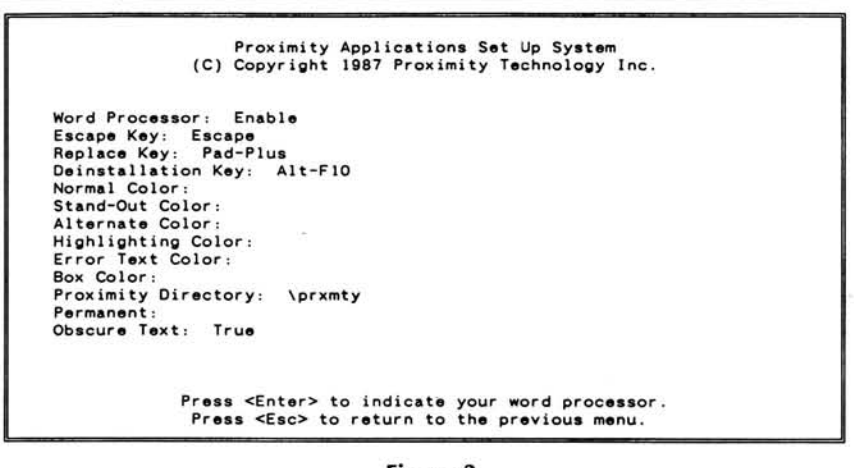


Figure 3
Thesaurus Setup Menu

checked will be displayed on the top line of the Thesaurus as the "Query". Next will be information as to the type of word (i.e., adj, noun, verb, etc.), and the meaning will be displayed. If the word has multiple meanings, highlight one using the cursor and press <RETURN>. A list of synonyms will appear. Using the arrow keys, select one of the synonyms and press <RETURN> and the meanings of the word will be displayed.

By using this cross reference capability, you can ensure the meanings of the selected word are correct. You can also check inflected information (i.e., the tensed spelling) by clearing the "query" input with a "CTRL/X" and typing in the desired word. To place the desired word in the document you are working on, press the keypad "+", which is the default value.

One final capability is to check the spelling of a word. Unlike the ENABLE spell checker, you type the work into the "query" field in the thesaurus. A list of possible spellings will be displayed on the screen. You can then select from this list the word you want to use. You can also use the Thesaurus to check the meaning before inserting it into the document to ensure it is correct. To back out of the Thesaurus, press {ESC}, as necessary.

In article five, Intermediate Word Processing, I said that moving and copying marked text is accomplished in the same manner as blocked text. The correct procedure for copying or moving marked text is to use the word processing menu. After marking the text using "F0 m" (ALT/m for the PC), you must use the copy command on the top line menu. Position the cursor where you want the text to appear and then press "F10 (C)opy (1). Copy (C)hange options (M)arked text (T)his window". The marked text will then be copied or moved to the cursor location. Note: This can also be used to move/copy to another window. If this option is selected, the same screen as "F0 F5" will be copied to another window.

ENABLE has a good block graphics capability in word processing. By using this capability, you can develop straight line boxes and other figures. Your printer must be able to support the IBM line graphics set in order to get output, though. To access the box drawing set, press "F10 (L)ayout (7) Use Special Characters (1) Box drawing set" (F9 O C B for the expert command). When these keystrokes are made, a window is opened on the bottom of the screen with the character displayed. To use the box drawing set your key in the required number/special character (shifted numbers) keys on the keyboard. By keying in these characters, boxes can be designed on the screen. You can type inside the box if it is large enough. As an example, the following box was designed in a few keystrokes. You can use the center character function in ENABLE (F0 F4), if necessary, by using the

center command on every line the box is on. Fairly complex box diagrams can be constructed in this manner. In the newly released "Enable Applications Development Guide", a complete set of figures is provided. This includes the standard figures available in the window and the other figures that can be made using "ALT" and the ASCII number from the keypad. This feature is not available in the Z-100 version.

A second set of characters is available using the secondary character set (F9 O C S). This set includes arrows, blocks and other characters. There are three foreign language sets also available in the same manner. The set includes Greek and special foreign letters with umlauts, etc. These character sets are available using (F9 O C F) for the first set, (F9 O C T) for the second, and (F9 O C G) for the Greek set. These characters will print on the screen like normal characters. Again, they will not print unless your printer supports the IBM graphics set. To turn off the special character sets, you will have to highlight the line if you use the Top Line Menu (F10 L 7 6) because there are no numbers available. The easiest way to turn them off is to use the Expert Command (F9 O C O).

ENABLE supports the automatic insertion of footnotes in your word[1] processing documents. Up[2] to 200 footnotes can be added to a document, with automatic numbering, if desired. To insert a footnote in the text, press "F10 (L)ayout (8) Create a footnote". You will be prompted to put your cursor where you want the footnote and press <RETURN>. You can also use the Expert[3] Command "F9 I CHR N F". The footnote position in the text will be shown using a diamond, a number, and another diamond. The footnotes will be numbered in sequence as you add them, but they will be displayed and numbered in the printed text in order. Using the expert command will automatically enter the number of the footnote, incrementing them with each new one. A space will appear below the created footnote where you can enter whatever you desire as the footnote. After you have completed the footnote, you must use the arrow keys to move back to the text area. If you leave four spaces on the first line text in the footnote, ENABLE will automatically number them. You can add another footnote to flow on to the next page. More about version 2.15 later in this article. Footnotes can be deleted by pressing "SHIFT/DEL LINE" for the Z-100 or "ALT/F3" for the PC.

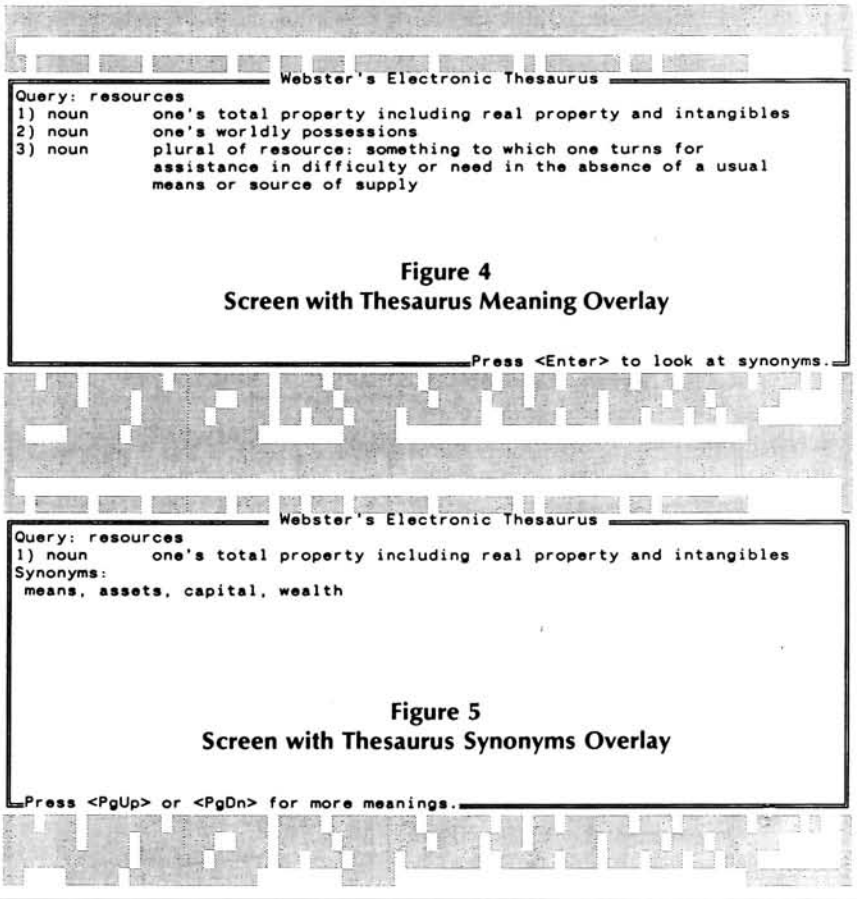


Figure 4
Screen with Thesaurus Meaning Overlay

Figure 5
Screen with Thesaurus Synonyms Overlay

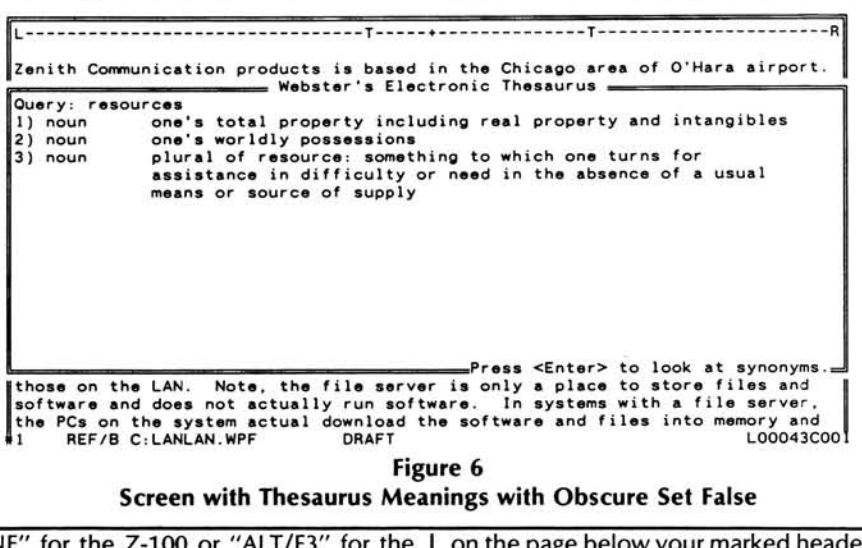


Figure 6
Screen with Thesaurus Meanings with Obscure Set False

In the introduction to ENABLE's word processor, I said that line lengths of over 80 characters can be printed in the headers and footers. If you try to type beyond 80 characters while inside of the header or footer area, ENABLE will word wrap making it impossible to create longer lines. The way to create these long lines and to be able to print them is easy. Start by creating a ruler (F0 F6 or ALT/F6 for the PC) on the page below your marked header or footer area. This is to keep the first established ruler for the area below the ruler. Move the cursor above the header and/or footer area and press F0 F6 to create another ruler. Press "L" in column 1 and then move the right margin to the desired column setting and press "R". You can now create your long header/footers below this new ruler. If you need to have this text compressed, press "F0 C" (ALT/C for PC) in the first column. Use these same keystrokes when you are finished

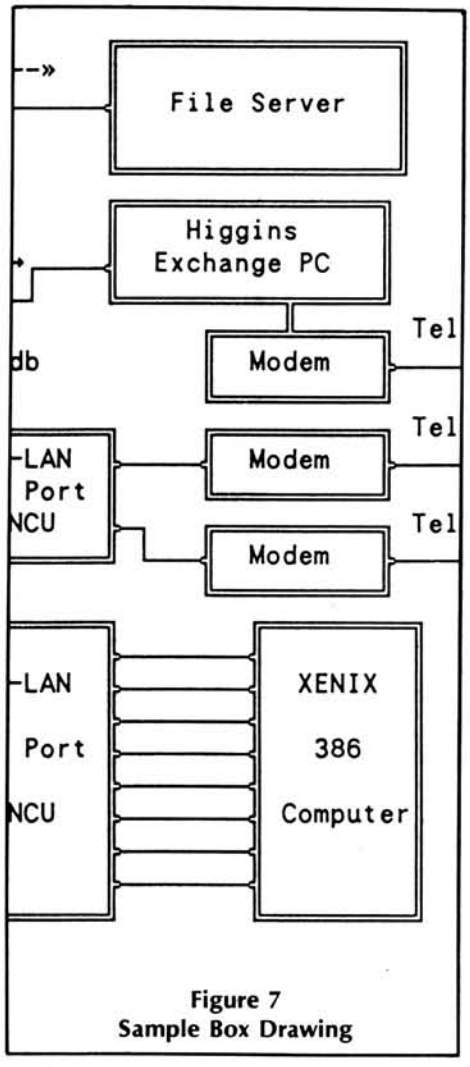


Figure 7
Sample Box Drawing

with the compressed mode. Remember, you can use any of the printer attributes in the headers and footers. When you have completed the header/footer, mark the text for a block move F7 at the start of the text before any of the attribute marks and after the last attribute mark. It is best to start the marking in column one on the line above the text and end it on the line below the text. Now you can move this block inside the header/footer by placing the cursor inside the area in column one and pressing "F0 F8" for a move or "F8" for a copy. You will not be able to edit any text outside the 80 columns permitted in a header or footer. This is why it is better to copy the text and mark a text print to ensure the text is correct and centered correctly.

ENABLE permits you to develop Tables of Contents (TOC) automatically. This capability will result in a separate document with the completed Table of Contents which is included with the document during printing. Again, ENABLE has two methods of inserting these entries, one using the Top Line Menu and using Expert Commands. To create a Table of Contents entry, press "F10 (L)ayout, (9) Table of Content option, (1) Create an entry" or "F9 I CHR T" using the Expert Commands. You are then prompted to position the cursor where you want the entry and then press <RETURN>. A set of lines will appear on the screen labeled "Table of Contents". Move the cursor inside the lines with the arrow keys, space over at least one space and then type your entry. If you press <RETURN> without moving outside the lines with the cursor keys, the second line and any others will be considered added TOC entries and will result in added lines to the final TOC file. The above procedure will provide a basic outline TOC. One problem with manually marking the section and sub-sections is the possibility of marking the section with the wrong number, but then nobody ever makes a mistake. ENABLE can also mark the entries with numbers, letters, or Roman letters based on your selection. To add these automatic numbers, you type in a "U" for unit entries. "C" for chapter entries, "S" for section entries, or "M" fc minor section entries. This letter is type in the first position in the TOC space.

After you have entered all of the TOC entries, the TOC must be compiled. The only way to accomplish this is from the Top Line Menu. Press "F10 (L)ayout (9) Table of Contents options (2) Compile the Table". This will cause ENABLE to look through the document and create another file with the same name but with the extension ".wpt". ENABLE will prompt you if you want periods between the entry and the page number (Yes No) and then present a ruler with tabs setting every five spaces. You can accept this ruler, which is the default ruler, or change them as desired. The page numbers will be automatically added during the compile. You can revise with the file in the word

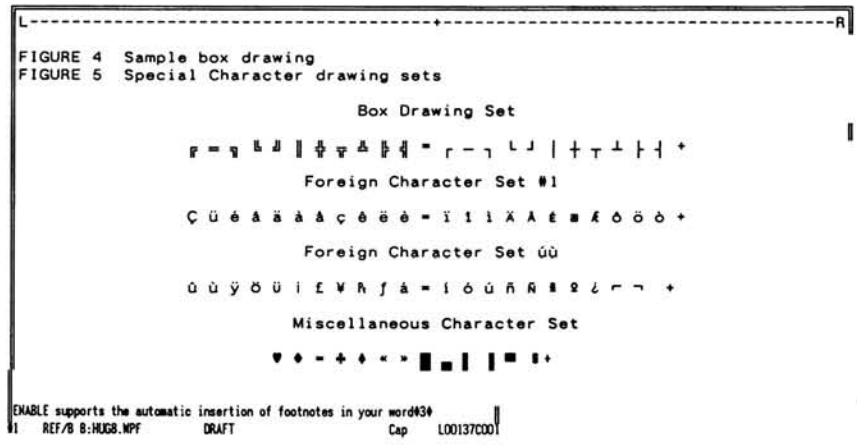


Figure 8
Character Drawing Sets

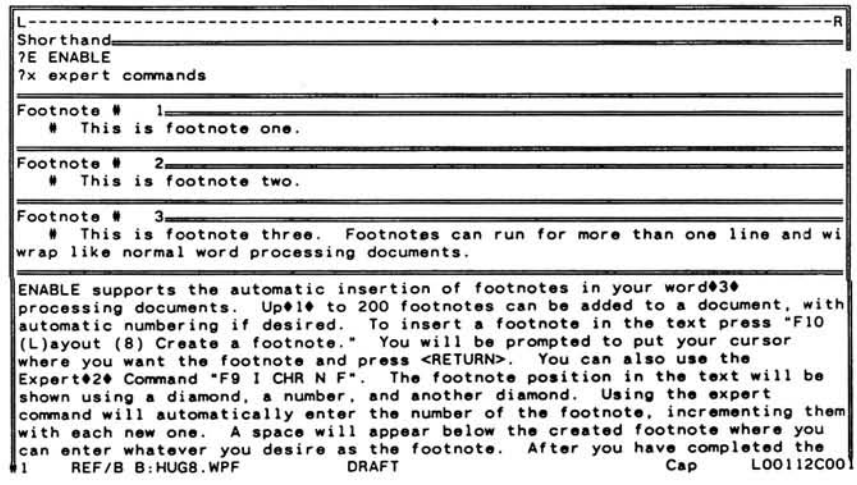


Figure 9
Footnote Displayed in Text

```
L-------------------------------------+-------------------------------------R
the header/footer by placing the cursor inside the area in column one and
pressing "FO F8" for a move or "F8" for a copy.  You will not be able to edit
any text outside the 80 columns permitted in a header of footer.  This is why
it is better to copy the text and mark a text print to ensure the text is
correct and centered correctly.

Table of Contents
test of toc
another test

Table of Contents
U  This is a Unit entry

ENABLE permit you to develop Tables of Contents (TOC) automatically.  This
capability will result in a separate document with the completed Table of
Contents which is included with the document during printing.  Again, ENABLE
has two methods of inserting these entries, one using the top line menu and
using Expert Commands.  To create a table of contents entry, press "F10
(L)ayout, (9) Table of Content option, (1) Create an entry" or "F9 I CHR T"
using the Expert Commands.  You are then prompted to position the cursor where
you want the entry and then press <RETURN>.  A set of lines will appear on the
#1    REF/B C:HUG8.WPF          DRAFT                          Cap     L00197C001
```

Figure 10
Table of Contents Entry in Text with Section Lettering

```
                                XENIA WESTERN

                                 RAILROAD

                              Financial Plan

                            PROJECT DESCRIPTION

1.   Project Description.....1
     1.1  Introduction.....1
     1.2  Proposed Operating Plan.....1
     1.3  Financial Plan.....2

                            FINANCIAL PLAN
                              VOLUME ONE

2.   Financial Plan  Volume One.....1
     2.1  Project Summary.....2
          2.1.1  Proposed System Map.....2
     2.2  Freight.....2
          2.2.1  Freight Car Loading Chart.....3
          2.2.2  Freight Income/Expenses Chart.....3
          2.2.3  Freight Income Chart.....3
          2.2.4  Freight Expenses.....4
     2.3  Dinner Train.....4
          2.3.1  Phoenix Dinner Train Chart.....5
          2.3.2  Dinner Train Income/Expenses Chart.....6
          2.3.3  Dinner Train Income Chart.....6
          2.3.4  Dinner Train Expenses Chart.....6
     2.4  Passenger Excursion.....7
          2.4.1  Passenger Loadings Chart.....7
          2.4.2  Passenger Income/Expenses Chart.....7
          2.4.3  Passenger Excursion Income Chart.....8
          2.4.4  Passenger Excursion Expenses Chart.....8
          2.4.5  Ohio Railroad Museum.....8
     2.5  Funding Requirements.....9
          2.5.1  Capital vs Non-Capital Chart.....9
          2.5.2  Capital Expenses Chart.....11
          2.5.3  Non-Capital Expenses Chart.....11
          2.5.4  Five Year Income/Expenses Chart.....11
     2.6  Company Structure.....12
     2.7  Employees.....12
          2.7.1  Employee Requirement Year One Chart.....13
          2.7.2  Year One Income/Expenses.....13
          2.7.3  Year One Income Chart.....14
          2.7.4  Year One Expenses Chart.....14
          2.7.5  Year One Cash Reserves/Cash Holdings.....14

                                    2
```

Figure 11
Example of Table of Contents from Business Plan

processor by typing in the name including the ".wpt" extension. You can add titles or other things using this procedure. You can print the file using the Top Line Menu by selecting the third option in the TOC options after it has been compiled. To print the file with the document, use the "%INCLUDE" capability of ENABLE. Place this command at the location desired for the TOC. Normally, this would be the beginning of the document and on a separate page. Use the make page break command and create a new page and then as the only line on the page, type starting in the first column, "%INCLUDE hug8.wpt" as an example. When the document prints, ENABLE will include the file "hug8 .wpt" at the location indicated. If you do not want page numbers to be omitted from the file, type in "NP" in the first column of the line above the TOC entry. You can use this same procedure if you do not want a number for any entry in the TOC. It must be entered in capital letters and on the line above the entry. If you do not want a section number for an entry, use the same procedure as used for the page number except the code is "N#". Both of these codes can be added, one after another separated by one space if desired.

One final capability for TOC is to have the entry copied into the text. This saves you from having to retype the entry into the document. This is done through the Top Line Menu's (P)rint options on the second page. There you select TOC entries to be copied into the document. When you select this option, a second prompt permits you to have the section number also printed. The remainder of the print second page relates to the type numbering you want in the TOC.

As a companion to the Table of Contents, ENABLE permits the creation and inclusion of indexes. Like TOC, indexing is easily completed and helps to make the final document a complete unit with a minimum of effort. Indexing, like TOC, can be accomplished using the expert commands or the Top Line Menu. Like the TOC, the index for a document is a separate file with the same name and an extension of ".wpi". This file can also be edited if necessary. To create an index entry, position the cursor on the first character of the word to be entered and press "FO X" or "ALT/X" for the PC. Press "SHIFT/FO W" (CTRL/W for the PC) to mark a word or group of words. The same marking symbols used to mark text are used for the index (i.e., C for character, W for

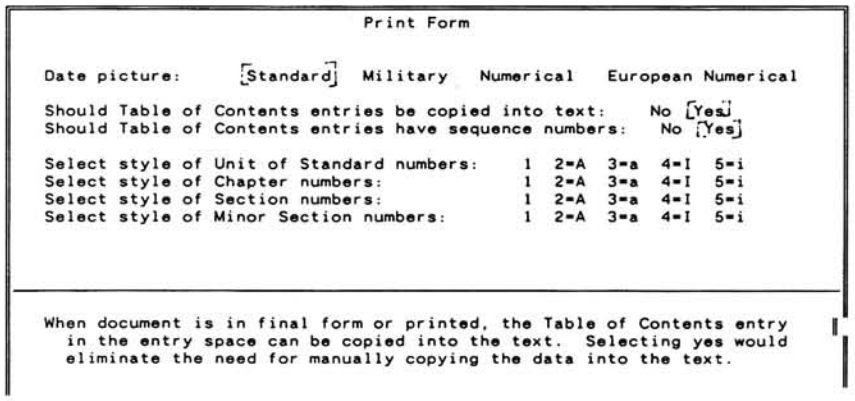


Figure 12
Top Line Menu Print Second Page

word, L for line, or S for sentence). Once you have marked the text for the index, press "F0 X" to turn off the index marking. Note, in the Z-100 version, the characters, or word(s) are not highlighted (bug?), while in the PC version they are. If you have an index entry that does not fit the word or group of words, you can enter a "better" description by using the Top Line Menu. This "better" description is limited to one line. Press "F10 (L)ayout (O) Index Option (1) Create an entry". This will result in a set of lines to appear on the screen like in the TOC section. You can then enter the item for the index. Once you have completed all index entries, return to the Top Line Menu for the index options and select "(2) Compile the index". ENABLE will then prompt you if you want periods between the entry and the page numbers and present the default ruler with tabs. Once you have accepted the choices, ENABLE reads through the document and creates the index file. Like the TOC, you can revise this file with the word processor. If you revise the document or add more entries, you can recompile the index file. This can also be accomplished for the TOC. The index file is printed with the main document in the same manner as the TOC using the "%INCLUDE" command. Another use for the Top Line Menu index option create command is to build subheadings under the main topic entry. This is accomplished by typing in the main heading, a semicolon, and then the sub-heading. Multiple sub-headings may be added, each separated by a semicolon. To delete an index entry, you must place the word processor in the normal mode and clear the index marking. Press "F0 N" or ALT/N for the PC, and position the cursor on the marked entry to be deleted and press "SHIFT/F0 W" (CRTL/W) to clear the word or use the appropriate marker command if it is not a word. On the Z-100 version that does not highlight the marked index word, this may be difficult. To clear these entries, you may have to clear entire paragraphs using "SHIFT/F0 P".

"F10 (L)ayout (A) Shorthand (1) Create entry" or expert command "F9 ICHR N S". This will open a set of lines in the document. Moving between the lines, type a "?" in the first position, then the letter or number which will stand for the string, a space and the string. This string may be longer than one line if necessary. You can add as many of these shorthand areas with the arrow keys and start to type as normal. To use these shorthand entries, type a "?". When you are finished with the entries, move the cursor out of the shorthand area with the arrow keys and start to type as normal. To use these shorthand entries, type a "?" and the shorthand entry in the text instead of the long string. When you are complete with the document or as much as you plan on doing before printing, you must compile the shorthand entries. Press "F10 (L)ayout (A) Shorthand options (2) Compile the abbreviations". ENABLE will then read through the document and replace all of the shorthand entries with the shorthand

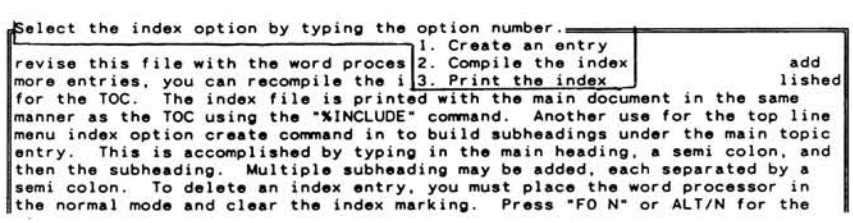


Figure 13
Index Entry Using Top Line Menu Creating

As part of ENABLE's advanced features is the shorthand capability, how many times have you been working on a document and have to type the same entry time after time. You could use the copy command, but that is limited to one group of words. Using ENABLE's shorthand you can make as many entries as there are keys. To create this shorthand entry, both the Top Line Menu and expert commands can be used. To create the entry, press

embedded	7
expert	6
expert commands	5
have	5
math	6
printer	8
shorthand	6
subheadings	6
table of contents	5
Tables of Contents	4

Figure 14
Example of Index for HUG8

strings then represent. For long, repeated strings this will save a lot of time during the typing, especially if you are the normal hunt and peck typer. The shorthand entries can have any of ENABLE's attributes (i.e., bold, underlining, italics, etc.). If these attributes are to be used, they must be entered with the shorthand string.

Part of ENABLE's word processing capability comes from the spreadsheet math functions. It is possible to perform math calculations in a word processing document. The functions permitted are addition, subtraction, multiplication, division, and raising to powers. Versions through 1.15 only support these math functions in normal text fashion. To use this function, type the entire sequence on one line with no spaces between the number or operators. When you are done, press "F9 +" with the cursor immediately to the right of the expression. The numbers will be calculated with the result replacing the numbers. Do not include a dollar sign in the expression as this is used to terminate the

```
L----------------------------------+----------------------------------R
Shorthand
?E ENABLE
?x expert commands

To create the entry press "F10 (L)ayout (A) Shorthand (1) Create entry" or
?x "F9 ICHR N S". This will open a set of line in the document.  Moving
between the lines, type a "?" in the first position then the letter or number
which will stand for the string, a space and the string.  This string may be
longer than one line if necessary.  You can add as many of these shorthand
entries in this space as long as the first character on the line is a "?".
When you are finished with the entries move the cursor out of the shorthand
area with the arrow keys and start to type as normal.  To use these shorthand
entries, type a "?" and the shorthand entry in the text instead of the long
string.  When you are complete with the document or as much as you plan on
doing before printing, you much compile the shorthand entries.  Press "F10
(L)ayout (A) Shorthand options (2) Compile the abbreviations".  ?E will then
read through the document and replace all of the shorthand entries with the
shorthand strings then represent.  For long, repeated strings this will save a
lot of time during the typing, especially if you are the normal hunt and peck
typer.  The shorthand entries can have  any of the ENABLE's attributes, i.e.,
bold, underlining, italics, etc.  If these attributes are to be used, they
must be entered with the shorthand string.
#1    REF/B B:HUG8.WPF          DRAFT                    Cap     L00249C017
```

ENABLE's Shorthand Entry Space

Shorthand Entry in Text

between windows, including the other modules of ENABLE. The next article will cover the ENABLE spreadsheet graphics. The 3-D graphics package for PCs only, Perspective and Perspective II, the new color upgrade will be covered depending on the space available.

Z-100 ENABLE Version 2.0	$195.00
$5.00 S/H	
PC ENABLE Version 2.0	$695
Thesaurus	49.95
Perspective II	89.95
ENABLE Applications Development Guide	29.95
+S/H	
Disk for above	19.95
+S/H	

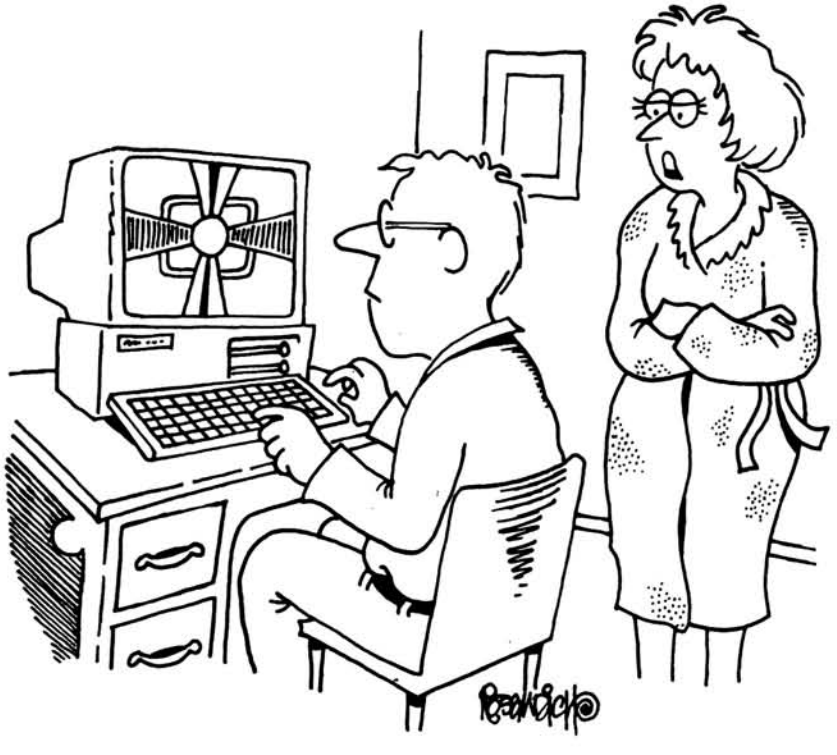
The Software Group
Northway Ten Executive Park
Ballston Lake, NY 12019
(518) 877-8236 *

function, along with a space or period. The cursor must be under the last number on the right side of the function. In version 2.0 and higher, this math function has been made more practical with the capability of doing column calculations. In the original capability, the numbers were replaced by the result while in the column mode, the numbers remain untouched. To use this function in ENABLE, type in the columnar numbers you wish to use in the document. Position the cursor at the top left corner and press "F7". Move the cursor to the bottom right corner and press "SHIFT/F7" which will result in the block being highlighted. Move the cursor to the location where you want the sum to appear and press "F9 M +". This capability is only for addition and is displayed below.

567	$568798
236	534467
237	234598
345	479819
-----	-------
1,385	1,817,682

Note that the result has commas added and the smaller number is carried to two decimal places. This capability provides a means to do simple additions in your word processing documents without having to open a window and move to the spreadsheet, or to use "Sidekick" or one of the other TSR programs.

This completes the eighth article in the ENABLE series. I will revisit word processing one more time to show how to copy



"I THINK IT'S TRYING TO TELL YOU IT'S TIME FOR BED."

about 10 seconds or so, and then turn on the power again. There is no cure or possibility for recovering any data that was not already saved to disk when this is done.

Zenith Boot Commands

Once of the nice features about Heath and Zenith computers is that you can retain control of which drive contains a bootable DOS disk and tell the computer to boot from that drive. If you have a computer with two floppy disk drives, this feature allows you to boot the computer from drive B instead of drive A. This feature is part of the Zenith ROM firmware.

The easiest way to use this feature is to first let your system boot up in the normal way when you turn the power on. When you see the DOS command prompt, use the CTRL-ALT-INS (notice this is the INS key, not the DEL key) key sequence to access the ROM Monitor program, and you will see a prompt similar to:

```
MFM-150 Monitor, version 2.3B
Memory Size: 640 K
Enter "?" for help
->_
```

Notice the cursor follows the "->" prompt indicating that you can enter a command. Since most of the Zenith PC compatible desktop computers allow up to four disk drives — two floppies and two hard disks — there are four possible commands you can enter that are summarized in Figure 3.

Command	Description
BF0	Boot floppy disk in drive A (drive 0)
BF1	Boot floppy disk in drive B (drive 1)
BW0	Boot 1st winchester hard disk (drive 0)
BW1	Boot 2nd winchester hard disk (drive 1)

Figure 3
Zenith Boot Commands

Although these boot commands are shown in capital letters, lowercase letters (e.g., bf0) will also work. Be sure that you actually have a bootable disk in the floppy or hard disk boot drive before you press the RETURN key to execute the command; otherwise, you will get an error message. You can also get a help listing of all ROM commands that can be used in your system by typing a question mark (?) followed by a RETURN.

Why would you want to know about this boot feature? One reason is that you may have your system set up to automatically boot from a hard disk, and there may be an occasional need to boot from a floppy, such as when you run the Disk Diagnostics programs supplied with your computer. Another reason is that you may find that your boot drive will not function correctly because of a mechanical problem with the drive. If you know about these boot commands, you can boot from any valid disk drive in your system.

Booting a Computer

A final historical note about booting a system may be of interest to you. The term that originated many years ago was the "bootstrap loader" program because it was used to start a computer — to pull it up by its bootstraps. The original bootstrap loader was actually a maze of electronic components and wires that effectively constituted a "program" because there was no such thing as an Integrated Circuit or ROM in those days.

Over the years, the term has been shortened to boot loader which still refers to the program used to initialize, load, and start a computer operating system. Unfortunately, I have noticed that many people are not aware that the term "boot" is specific to starting the operating system on a computer, such as DOS, OS/2 or Xenix. I have even seen some documentation that talks about "booting" an application program, such as a word processor. That is wrong. Since the boot loader has nothing whatever to do with starting a program other than the operating system, a discussion of "booting a word processor" or any other program does not make sense and is technically wrong. Although there is no need to be an expert on the technical details of what happens, it is useful to know how programs work in your computer.

The obvious starting point is when you type a command — any command — on the command line and press the RETURN key. Then, DOS finds the command on disk (an external command) or in memory (an internal command). For example, let's say you typed the FORMAT command, and DOS found the FORMAT.COM file on the disk. When DOS finds the program, DOS loads the program into memory. Once the program is loaded into memory, then, and only then, does the FORMAT program begin execution. Like FORMAT, many programs display a sign-on message with information like the version number followed by special prompts or display screens. And program execution continues until you exit back to the DOS command prompt. There are two points here that are useful to know since it explains how DOS works with the command line and the programs that you use.

The most important point is that a program must ALWAYS be loaded into memory by DOS before it can be executed. Although it is customary to say that one "executes" a program by typing a command on the DOS command line and pressing RETURN, it is usually "understood" that program execution does not really begin until the program is loaded into memory. That also explains why the internal DOS commands seem to work much faster than the external commands — DOS searches memory, finds the command, and executes it. There is no waiting while DOS loads the program into memory, which always occurs for the external commands.

The second point is that, once the program is loaded into memory, it works with data that is also stored in memory. When you type lines on a word processor, those lines of data ONLY exist in memory until you take some specific action to store that data on a disk, which is usually done with a "save" command. For that reason, it is best to develop the habit of not powering off your computer until you see the DOS command prompt. Most programs will not return to the command prompt before prompting you that all data in memory has not been saved to disk.

So what is the correct term to use when you start a program? Many of the so-called power users seem to prefer "executing a program", although I see nothing wrong with "starting a program" or "running a program". For example, I could say that I booted the computer and ran the Microsoft Word program, or started the Microsoft Word program, or executed the Microsoft Word program.

This article has included a number of computer terms and terminology that are commonly used in discussions and documentation. Like any subject or hobby, computers have their own unique "language" that must be learned, and sometimes knowledge of these basic terms is assumed in a lot of the manuals. You can read just about any article on computer hardware or software, and you will see at least one of the terms that I have men-

The 80286 is located under the heat sink (the metal part with fins) in the picture, but the unit I received does not have the heat sink. Apparently, the board in the picture (which was provided by PCT) is a prototype containing a standard 80286, which would run hotter and require some kind of heat dissipation.

Installing The Express-16

The manual included with the 286 Express-16 includes detailed step-by-step instructions for three popular PCs from IBM, Compaq, and Leading Edge. Although instructions for a Heath or Zenith computer are not shown, installation is so simple that you should be able to loosely follow the instructions for an IBM PC. Just be aware that the Zenith Z-150 series machines (except for the Z-157) do not have a motherboard, and the 8088 is on a plug-in card. Another difference affecting the H/Z-158 only is that it does not have a switch to indicate the presence of an 8087 co-processor (it determines the presence electronically). On the H/Z-151 and Z-159, the switch affecting the co-processor is SW-101 switch 1 (the switches are numbered starting with 0).

It should be possible to install the Express-16 in a Z-157, and perhaps in an H/Z-148 or Z-138 (with an expansion adapter installed). I am not familiar enough with those machines to provide any help with the procedure, though. In the case of the H/Z-148 or Z-138, there is the possibility of excess drain on the power supply, since these models were not designed for much expansion capability.

To install the Express-16, you must first remove the 8088 processor from your CPU card and plug it into a socket on the Express-16 board. One end of a cable that is provided connects to some pins on the Express-16 card, and the other end plugs into the 8088 socket on your CPU card. If you have an 80287, you must install it in the 80287 socket on the Express-16 card, and you must also install either an actual 8087 or a "dummy" 8087 provided with the Express-16 in the 8087 socket on your CPU card. The 8087 switch on your CPU card (if it has one) should be set to OFF if you have either an 8087, 80287, or both installed.

On a Z-150 series computer, it is a good idea to remove the CPU card and then replace it after the 8088 has been transferred to the Express-16 card and the cable has been connected. You should fold the cable so that it will lie flat across the tops of any boards between the CPU and Express-16 before you re-install the cards. I installed my Express-16 into a Z-159, and placed it in a slot outboard (farther from the power supply) from the CPU card. Figure 1 shows how I folded the cable connecting the two boards.

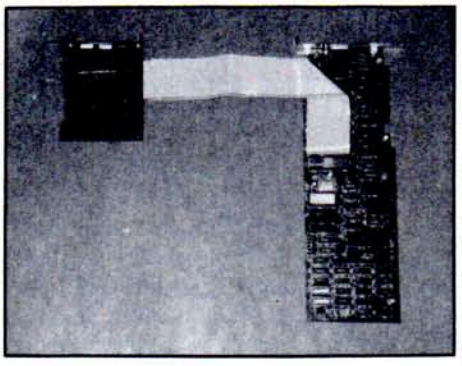


Figure 1

On the Express-16 card are six switches and a jumper that must be set before you install it. Three of the switches are used to set the amount of memory that you want to be cached, and should normally be set equal to the amount of standard memory (exclusive of expanded memory) that you have. Two of the switches are described as "unused" in the manual, and the remaining one is used with the jumper to set the operating speed of your 80287 co-processor (5, 6, 8, or 10 MHz), and can be ignored if you do not have one.

I received a preliminary instruction manual with the card, and they sent me a printed one a few days later. These two manuals disagreed concerning the switch and jumper settings for the co-processor speed. After I had installed the board, I made some measurements with a frequency counter and found that neither manual was correct. Based on my findings, here are the correct settings for the 12 and 16 MHz versions of the 286 Express.

80287 Type	80287 Speed	12 MHz Card	16 MHz Card
80287-3	5 MHz	4 to 5 ON	1 to 2 ON
80287-6	6 MHz	5 to 6 OFF	1 to 2 ON
80287-8	8 MHz	2 to 3 ON	5 to 6 OFF
80287-10	10 MHZ	2 to 3 ON	2 to 3 ON

After you replace your CPU card and install the Express-16 in a vacant slot, your computer should function exactly as it did before you installed the Express-16. The Express-16 does not "turn on" until it is activated with the software provided with it. There are only a few troubleshooting steps provided in the manual for you to try if your system does not boot after installation, but a toll-free phone number for technical support is provided if you cannot resolve any problems.

Operation

The 286 Express-16 is controlled by software, and three programs for controlling it are provided on an included disk. These programs are DEMO, a demonstration program that lets you see the difference in speed the accelerator makes; EXPRESS .SYS, a device driver that can turn on the Express-16 at boot-up; and PCT.EXE, a program that allows you to manually control the Express-16 and check on which mode it is running in. If you have MS-DOS version 3 or above, you can also use PCT.EXE as the device driver (instead of EXPRESS.SYS), so that you only need to add one new program to your system disk. Either device driver can be set so that you can switch processors and enable or disable memory caching via "hot keys". They also monitor the Ctrl-Alt-Del key combination to ensure that the system is operating on the 8088 when you re-boot.

With the PCT.EXE program, you can switch processors and turn memory caching on or off using command line entries. You can also have the program report on which processor is active, the state of memory caching, and the presence or absence of a co-processor (8087 or 80287) for either processor (8088 or 80286).

Performance

When I first installed the 286 Express-16 in my system, it would work normally for a

Cache Memory
The Magic of the 286 Express-16

The one specification of the 286 Express-16 accelerator that impresses people the most is the 16 MHz processor speed, but its speed advantage is due mainly to the cache memory system employed on the board. It is a proprietary system called a "byte level cache", and here is a brief explanation of how it works.

The 16k of cache memory is mapped so that its address space overlaps each 16k of system memory, as shown in this chart:

```
¦ cache mem. ¦ cache mem. ¦ etc. -->
Øk ------------------------------->
¦    16k     ¦    16k     ¦ etc. -->
¦    system memory (to 64Ø k) ----->
¦
```

Each byte in the cache memory can be individually mapped to any one of the 16k "pages" of system memory. For example, the first byte could be mapped to the first 16k page, and the second byte could be mapped to the third page. There are three 8k by 8 bit memory ICs on the Express-16 board. Two of these are used for the 16k of cache memory space, and the third one holds address and flag bits. When the 80286 accesses a memory location, the highest 6 bits of the 20-bit address are placed in the third IC, using bits 1 through 13 as an address, which corresponds to the word address of the byte being accessed, relative to its 16k page. (Since 16k bytes is equal to 8k words, you can store all of the word addresses of the 16k cache memory in one 8K IC.) The 6 high bits indicate which 16k page the byte is in. The other two bits in each byte of the third IC are used to hold flags indicating which byte of the word (high, low, or both) is being accessed. The data read from or written to the byte being accessed is placed in the 16k cache at an address relative to its address in the 16k page in real memory.

Each time the 80286 accesses memory to read a byte or word of data, the external hardware on the board compares the memory address with the bits in the appropriate memory location in the address and flag IC. If the bits match and the appropriate flag(s) are set, the hardware causes the data to be read from cache memory instead of system memory.

When a program is running, it may execute a loop repeatedly to do a job, which could be reading a file from the disk or performing a math calculation. If the loop consists of 16k or less bytes, regardless of how those 16k bytes are actually distributed in system memory (they could be scattered all over), it will be executed the second and succeeding times entirely in cache memory. Since much of the work a computer does is done in loops, the 80286 processor is able to perform many of its memory accesses using cache memory, and is therefore freed from the constraints of an 8-bit memory path and slower memory ICs.

The only problem with the cache memory system is that it may conflict with some expanded memory (EMS, EEMS, and LIM 4.0) systems. There will be a conflict if the system uses some of the cached memory space (normally, all of MS-DOS' standard memory) as a "window" to the expanded memory. To solve this problem, a specification called GACD (Generic Accelerator Card Driver) has been developed. The device drivers supplied with the Express-16 support this specificaton, and if the driver supplied with your expanded memory card also supports it, there will be no conflict.

about half an hour, and then the system would halt with a parity error message on the screen. The problem turned out to be a V20 processor that I had installed in place of the 8088 previously. When I returned the 8088 to the system, the Express-16 worked normally. I am not sure if my particular V20 was at fault, or if the Express-16 just will not work with one. I phoned PCT, and their representative indicated that feedback they have had from users was inconclusive about the V20. I would suggest that if you have one, and you have problems after installing an Express-16 card, that you replace it with an 8088.

I performed a number of benchmark tests on the system to determine the effectiveness of the accelerator card, and made comparisons with a Z-248 and, in some cases, an H-386. Before I report on the results of my tests, I will take the time for some explanations that may help you understand the results better.

The 8088 processor used in Z-150 series computers is a 16-bit processor internally, but it is an 8-bit processor externally. In other words, when it reads from or writes to memory, it does it 8 bits at a time. The 80286 processor is a true 16-bit processor. It reads and writes data 16 bits at a time, so when it is installed in a system with a 16-bit wide data path, it can run faster than an 8088 even if the clock speeds are the same.

The data path, or "bus" on an IBM PC-compatible computer is 8 bits wide, so any card that you plug into the bus can only access other parts of the system, including memory, 8 bits at a time. That is true for accelerator cards, as well as other kinds of cards. You can put a 16-bit processor on the card, but you must add external circuitry to it so that it can work with an 8-bit data path. If it sounds to you like this would slow the 16-bit processor down, you are correct. Without something to compensate for the logic overhead, plus the wait states that must be inserted to allow the faster processor access your "slow" memory, the accelerator card may actually run slower than the native processor. One of my benchmark tests illustrates this.

On the 286 Express-16 card, the compensation for the data path conversion delay is in the form of "cache" memory. This is memory that has a data path as wide as the processor's, and it is fast enough so that the processor can access it at its full clock speed with no wait states. The board contains special logic that places a copy of each byte of memory that the 80286 processor accesses into the cache memory. If the processor must read memory from an address it accessed previously, it can usually read from the cache rather than having to access the system memory. Since processors do much of their work by executing loops of some kind or other, a high percentage of the processor's memory accesses will be from cache memory. See the accompanying sidebar "Cache Memory, the Magic of the 286 Express-16" for more information.

The number of wait states that the Express-16 uses when it accesses the host system's memory is determined by the clock speed of the native processor. Therefore, if you have a dual speed computer, such as the H/Z-158 or Z-159, the Express-16 will run faster if your computer is set to the higher speed, even while it is running on its own processor. All of my tests were done with the Z-159 set to 8 MHz.

People who sell high speed computers and accelerator cards often indicate the Norton SI index for their product. SI is a little program that comes with the Norton Utilities package, and it is supposed to indicate, among other things, the speed of your computer relative to the original IBM PC. The reason why people who sell computers like SI so much is that it gives an inflated result if the processor is anything other than an 8088. For example, a Z-159 with an 8 MHz 8088 has an SI rating of 1.6, but if you replace the 8088 with a V20, you get 2.9 and sometimes 3.0. The V20 is really not that much faster. But in any case, here are the Norton SI ratings for the Express-16 and some other systems. (IBM PC = 1.0, equivalent to 100%.)

Norton SI ratings

System	Rating
Z-159 w/8MHz 8088 active	1.6
Z-159 w/Express-16 active	15.3
H-248	9.2
H-386	18.7

For those who are unfamiliar with Heath computers, the H-248 is an 8 MHz 80286 computer with zero wait state memory. The H-386 is a 16 MHz 80386 (32-bit) computer with variable wait states (memory paging system). The H-386 used is these tests also had a Z-525 high speed cache memory card installed.

A more realistic speed index can be obtained by using the Info command in the PC Tools program from Central Point Software. Here are the PC Tools Info results for the same four machines. (IBM PC = 100. Ratings are in percent.)

PC Tools Info ratings

System	Rating
Z-159 w/8MHz 8088 active	160
Z-159 w/Express-16 active	655
H-248	460
H-386	780

Notice that the PC Tools Info ratings reports that the Express-16 is about 6 and one-half times faster than an IBM PC, while SI reports that it is 15.3 times faster. (You can also see that the ratings for the 8 MHz 8088 are the same.) Now you know why advertisers like the SI ratings.

I ran one other rating program on these computers that I wrote myself. It is a simple 3-line BASIC program:

```
10 PRINT TIME$
20 FOR I=1 TO 50000:NEXT I
30 PRINT TIME$
```

As simple as this program is, when you run it with a BASIC interpreter, such as GW-BASIC, it can give an accurate comparison of the speed of different computers engaged in a purely computational task. That is because, since GW-BASIC is an interpreter, it must go through quite a bit of rigmarole just to execute the program, and because the loop calculations are done using floating point arithmetic.

When you run the program, it prints the time on the screen twice by the time it is done. When you subtract the first time printed from the second, you get the amount of time it took to execute the loop. Here are the timings for our four systems (all tests done with GW-BASIC version 2.15).

TIME.BAS Timings

System	Time (sec.)
Z-159 w/4.77MHz 8088 active	63
Z-159 w/8MHz 8088 activ e	36
Z-159 w/Express-16 active	8
Z-159 w/Express-16 active,	

and memory cache off	44
H-248	12
H-386	6

Notice that when I ran the test with the Express-16 active, but with the memory cache off, it actually took longer than the native 8 MHz 8088 processor. This shows the importance of the cache memory, and supports my previous observations about how the accelerator card accesses the system memory path.

In the real world, most jobs that you do with a computer are not purely computational, and involve accessing peripherals (drives, video, etc.), as well as computation. So I did some real "jobs" with the computers and timed the results. The first job was to assemble the source code for the HUG program HADES (HUG Absolute Disk Editing System) using MASM version 4.0. This is a job that requires quite a bit of disk accessing. Here are the results.

Source Code Assembly	**Time (sec)**
Z-159 w/8MHz 8088 active	84.4
Z-159 w/Express-16 active	31.7
H-248	27.1
H-386	14.1

These results point out the effect a peripheral (the hard disk drive, in this case) can have on execution speed for a particular job. The H-386 used has a high speed 80 MB disk drive. The H-248 and Z-159 both somewhat slower 20 MB drives of similar speed, but the H-248 accesses its disk drive controller via a 16-bit wide data path, while the Z-159 must use an 8-bit data path.

The second job I did was to have AutoCAD (a drafting program) load and draw one of the sample drawings that comes with the package (a Space Shuttle). Since AutoCAD can make use of a co-processor if you have one, I did the tests with and without the co-processor for all systems except the H-386.

AutoCAD Drawing	**Time (sec)**
Z-159 w/8088 no co-processor	58.8
Z-159 w/8088 and 8087	24.8
Z-159 w/Express-16, no co-processor	19.6
Z-159 w/Express-16 and 80287	14.5
H-248, no co-processor	22.8
H-248 and 80287	13.6
H-386, no co-processor	11.6

It is interesting to note that the Express-16 was a little faster than the H-248 without a co-processor, and slower than it with the co-processor. I do not have an explanation for those differences. Notice, however, that the 8087 made a dramatic improvement over the 8088 speed, while the 80287 made relatively less of an improvement in the 80286 speed. The probable reasons for this are that the 8087 is more closely mated to the 8088 than the 80287 is to the 80286, and that the software was written for compatibility with both co-processors, and does not take full advantage of the 80287.

Evaluation

My opinion of the 286 Express-16 after performing these tests and generally noticing the performance of my computer with it installed is that it really works. It provides real 286 performance at much less than the cost of a new computer. Although a real 16 MHz zero wait state 286 machine (if such exists) would probably run circles around it, it can certainly keep up with an 8 MHz H-248.

On the negative side, it does not provide you with features of "real" 80286 computers, such as the ability to use 1.2 megabyte floppy drives or extended (as opposed to expanded) memory. You can't run OS/2 or XENIX on the Express-16. But its intended purpose is to give you more speed, and it does that job well.

Another minus, at least to those of us who are into the technical side of computers, is that it does not come with schematics, block diagrams, or other technical information. However, the PCT consultants seem willing to provide technical explanations if you need them. The information in the sidebar on cache memory is the result of a phone call to PCT. John Vasbinder, their Vice President for Quality Assurance and Customer Support, put me in touch with one of their engineers, who explained their cache memory system in detail.

If you have been thinking of getting a new computer just because yours is not fast enough, you should consider adding a 286 Express-16 instead. The special price that PCT is featuring for Heath/Zenith users makes it an especially attractive alternative.

Special Prices And Other PCT Products

During the months of July and August, PC Technologies is offering special prices on the 286 Express-16 and other products to Heath and Zenith users. All you have to do is mention their add in this issue of RE-Mark when you call (number listed below). The special price on the 286 Express-16 is $495. These other products are also on sale:

- The 286 Express, with an 8 MHz 80286 and 16k of cache memory, $275.
- The 286 Express-12, with a 12 MHz 80286 and 16k of cache memory, $395.
- The 286 RAMracer, which combines a 286 Express (8 MHz) and up to 2 megabytes of EEMS/LIM 4.0 expansion memory. With zero k installed, $345.
- The RAMpartner, an EEMS/LIM 4.0 memory expansion board that holds up to 2 megabytes of memory, $150 with zero k installed.

Review Nutshell

286 Express-16 Accelerator Card
PC Technologies Inc.
704 Airport Blvd.
Ann Arbor, MI 48108
800-821-3086 or 313-996-9690
(sales only)

Processor:
16 MHz 80C286 (CMOS 80286).
On-Board Memory:
16k cache, 0 wait states.
Host Memory Wait States
Variable, based on host processor speed.
Co-processors Supported:
8087 in 8088 mode
80287 in 80286 mode
Processor and Cache Control:
Software controlled, using command line entries or optional "hot keys".
Cost:
$495 during July and August to Heath/Zenith users.

Trademarks

286 Express-16 is a trademark of PC Technologies Inc. MASM and MS-DOS are trademarks of Microsoft Corporation. IBM and IBM PC are trademarks of International Business Machines Corporation. AutoCAD is a trademark of Autodesk, Inc. *

HUG NEW PRODUCTS

10 – Very Good
9 – Good
8 – Average

TABLE C
Product Rating

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

7 – 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/Z-89) 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., 885-1103 or 885-1211[-37] SEA BATTLE.

ORDERING INFORMATION

For VISA and MasterCard phone; telephone Heath/Zenith Users' Group directly at (616) 982-3838. Have the part number(s), description, and quantity ready for quick processing. VISA and MasterCard require minimum $10.00 order. By mail, send your order, plus 10% postage/handling ($1.00 minimum, $5.00 maximum) to: Heath/Zenith Users' Group, P.O. Box 217, Benton Harbor, MI 49022-0217. Orders may be placed, by mail only, using your Heath Revolving Charge account. Purchase orders are also accepted by phone or mail. No C.O.D.s accepted.

Questions or problems regarding HUG software or REMark magazine should be directed to HUG at (616) 982-3463.

NOTES

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).

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.

HUG P/N 885-3050-37
MS-DOS/Z-DOS
Magazine Database System
MAGBASE $25.00

MAGBASE is a database system designed specifically for keeping track of magazine articles. It was produced to create a database of REMark articles, but it can be used for any magazine. MAGBASE allows you to keep track of each article by title, author, date, volume and issue numbers, and up to 64 classifications. The title can be up to 80 characters, so you can include a brief description for articles that have criptic titles. You can search for articles by title (or any portion of a title), author, date, or classification. When you search by classification, you can search for more than one. (For example, you can search for Review articles about word processors.) You can sort the articles found in a search by title, author, or date, and you can view them on the screen or print them out.

MAGBASE comes with a database of the year 1987 of REMark magazine. All articles, including "Buggin' HUG" letters, are included in the database.

COMING SOON!! We are planning to create a database of all REMark articles from day 1. This database will be available as a separate HUG product. We are also planning to produce an 8-bit CP/M and perhaps an HDOS version of MAGBASE.

Requirements: MAGBASE will run on any PC-compatible or Z-100 (not PC) computer and any version of MS-DOS or Z-DOS. It requires 64k of free memory, and can be used with only one disk drive. It will support a database file up to 8 megabytes or the size of your disk, whichever is smaller. Each article entry occupies 128 bytes, which means that 2400 articles will fit in 300k of disk space.

The MAGBASE disk contains these files:

README	.DOC
MAGBASE	.DOC
MAGBASE	.COM
COLOR	.COM
MAGBASE	.ASM
COLOR	.ASM
REMARK	.CLS
REMARK	.DAT

MAGBASE.DOC — This file contains the instructions for using MAGBASE. Instructions specific to the REMark database, and instructions for creating your own magazine database are included.

MAGBASE.COM — This is the MAGBASE magazine database program.

COLOR.COM — This program allows you to set the foreground and background colors on your screen. MAGBASE was designed to use whatever text colors exist on the screen, so if you prefer something other than black and white, you can set it up with COLOR before you run MAGBASE.

MAGBASE.ASM, COLOR.ASM — The assembly source code for the above programs. MAGBASE was coded in efficient assembly language for maximum speed in searching for articles. It contains the same Shell-Metzner sort routine used in D .COM (HUG disk 885-6011-37) for extremely fast sorts.

Continued on Page 53

The following HUG Price List contains a list of all products in the HUG Software Catalog and Software Catalog Update #1. For a detailed abstract of these products, refer to the HUG Software Catalog, Software Catalog Update #1, or previous issues of REMark.

HUG Price List

PRODUCT NAME	PART NUMBER	OPERATING SYSTEM	DESCRIPTION	PRICE
H8 — H/Z-89/90				
ACCOUNTING SYSTEM	885-8047-37	CPM	BUSINESS	20.00
ACTION GAMES	885-1220-[37]	CPM	GAME	20.00
ADVENTURE	885-1010	HDOS	GAME	10.00
ASCIRITY	885-1238-[37]	CPM	AMATEUR RADIO	20.00
AUTOFILE (Z80 ONLY)	885-1110	HDOS	DBMS	30.00
BHBASIC SUPPORT PACKAGE	885-1119-[37]	HDOS	UTILITY	20.00
CASTLE	885-8032-[37]	HDOS	ENTERTAINMENT	20.00
CHEAPCALC	885-1131-[37]	HDOS	SPREADSHEET	20.00
CHECKOFF	885-8010	HDOS	CHECKBOOK SOFTWARE	25.00
DEVICE DRIVERS	885-1105	HDOS	UTILITY	20.00
DISK UTILITIES	885-1213-[37]	CPM	UTILITY	20.00
DUNGEONS & DRAGONS	885-1093-[37]	HDOS	GAME	20.00
FLOATING POINT PACKAGE	885-1063	HDOS	UTILITY	18.00
GALACTIC WARRIORS	885-8009-[37]	HDOS	GAME	20.00
GALACTIC WARRIORS	885-8009-[37]	CPM	GAME	20.00
GAMES 1	885-1029-[37]	HDOS	GAMES	18.00
HARD SECTOR SUPPORT PACKAGE	885-1121	HDOS	UTILITY	30.00
HDOS PROGRAMMERS HELPER	885-8017	HDOS	UTILITY	16.00
HOME FINANCE	885-1070	HDOS	BUSINESS	18.00
HUG DISK DUPLICATION UTILITIES	885-1217-[37]	CPM	UTILITY	20.00
HUG SOFTWARE CATALOG	885-4500	VARIOUS	PRODUCTS THRU 1982	9.75
HUGMAN & MOVIE ANIMATION	885-1124	HDOS	ENTERTAINMENT	20.00
INFO. SYSTEM AND TEL. & MAIL SYSTEM	885-1108-[37]	HDOS	DBMS	30.00
LOGBOOK	885-1107-[37]	HDOS	AMATEUR RADIO	30.00
MAPLE	885-8005	HDOS	COMMUNICATION	35.00
MAPLE	885-8012-[37]	CPM	COMMUNICATION	35.00
MICRONET CONNECTION	885-1122-[37]	HDOS	COMMUNICATION	20.00
MISCELLANEOUS UTILITIES	885-1089-[37]	HDOS	UTILITY	20.00
MORSE CODE TRANSCEIVER	885-8016	HDOS	AMATEUR RADIO	20.00
MORSE CODE TRANSCEIVER	885-8031-[37]	CPM	AMATEUR RADIO	20.00
PAGE EDITOR	885-1079-[37]	HDOS	UTILITY	25.00
PROGRAMS FOR PRINTERS	885-1082	HDOS	UTILITY	20.00
REMARK VOL 1 ISSUES 1-13	885-4001	N/A	1978 TO DECEMBER 1980	20.00
RUNOFF	885-1025	HDOS	TEXT PROCESSOR	35.00
SCICALC	885-8027	HDOS	UTILITY	20.00
SMALL BUSINESS PACKAGE	885-1071-[37]	HDOS	BUSINESS	75.00
SMALL-C COMPILER	885-1134	HDOS	LANGUAGE	30.00
SOFT SECTOR SUPPORT PACKAGE	885-1127-[37]	HDOS	UTILITY	20.00
STUDENT'S STATISTICS PACKAGE	885-8021	HDOS	EDUCATION	20.00
SUBMIT (Z80 ONLY)	885-8006	HDOS	UTILITY	20.00
TERM & HTOC	885-1207-[37]	CPM	COMMUNICATION & UTILITY	20.00
TINY BASIC COMPILER	885-1132-[37]	HDOS	LANGUAGE	25.00
TINY PASCAL	885-1086-[37]	HDOS	LANGUAGE	20.00
UDUMP	885-8004	HDOS	UTILITY	35.00
UTILITIES	885-1212-[37]	CPM	UTILITY	20.00
UTILITIES BY PS	885-1126	HDOS	UTILITY	20.00
VARIETY PACKAGE	885-1135-[37]	HDOS	UTILITY & GAMES	20.00
VOLUME I	885-1008	N/A	SOFTWARE LISTINGS	9.00
VOLUME II	**SOLD OUT**		SOFTWARE LISTINGS	12.00
VOLUME III			SOFTWARE LISTINGS	9.00
VOLUME IV	885-1037	N/A	SOFTWARE LISTINGS	12.00
WATZMAN ROM SOURCE & DOC	885-1221-[37]	CPM	H19 FIRMWARE	30.00
WATZMAN ROM	885-4600	N/A	H19 FIRMWARE	45.00
WHEW UTILITIES	885-1120-[37]	HDOS	UTILITY	20.00
XMET ROBOT X-ASSEMBLER	885-1229-[37]	CPM	UTILITY	20.00
Z80 ASSEMBLER	885-1078-[37]	HDOS	UTILITY	25.00
Z80 DEBUGGING TOOL (ALDT)	885-1116	HDOS	UTILITY	20.00
H8 — H/Z-89/90 — H/Z-100 (Not PC)				
ADVENTURE	885-1222-[37]	CPM	GAME	10.00
BASIC-E	885-1215-[37]	CPM	LANGUAGE	20.00
CASSINO GAMES	885-1227-[37]	CPM	GAME	20.00
CHEAPCALC	885-1233-[37]	CPM	SPREADSHEET	20.00
CHECKOFF	885-8011-[37]	CPM	CHECKBOOK SOFTWARE	25.00
COPYDOS	885-1235-37	CPM	UTILITY	20.00
DISK DUMP & EDIT UTILITY	885-1225-[37]	CPM	UTILITY	30.00
DUNGEONS & DRAGONS	885-1209-[37]	CPM	GAMES	20.00
FAST ACTION GAMES	885-1228-[37]	CPM	GAME	20.00
FUN DISK I	885-1236-[37]	CPM	GAMES	20.00
FUN DISK II	885-1248-[37]	CPM	GAMES	35.00
GAMES DISK	885-1206-[37]	CPM	GAMES	20.00
GRADE	885-8036-[37]	CPM	GRADE BOOK	20.00
HRUN	885-1223-[37]	CPM	HDOS EMULATOR	40.00
HUG FILE MANAGER & UTILITIES	885-1246-[37]	CPM	UTILITY	20.00
HUG SOFTWARE CATALOG UPDATE #1	885-4501	VARIOUS	PRODUCTS 1983 THRU 1985	9.75
KEYMAP CPM-80	885-1230-[37]	CPM	UTILITY	20.00
MBASIC PAYROLL	885-1218-[37]	CPM	BUSINESS	60.00
MICRONET CONNECTION	885-1224-[37]	CPM	COMMUNICATION	16.00
NAVPROGSEVEN	885-1219-[37]	CPM	FLIGHT UTILITY	20.00
REMARK VOL 3 ISSUES 24-35	885-4003	N/A	1982	20.00
REMARK VOL 4 ISSUES 36-47	885-4004	N/A	1983	20.00
REMARK VOL 5 ISSUES 48-59	885-4005	N/A	1984	25.00
REMARK VOL 6 ISSUES 60-71	885-4006	N/A	1985	25.00
REMARK VOL 7 ISSUES 72-83	885-4007	N/A	1986	25.00

Make the no-hassle connection with your modem today! ***HUGMCP*** doesn't give you long menus to sift through like some modem packages do. With *HUGMCP*, *YOU'RE* always in control, not the software. Order ***HUG P/N 885-3033-37*** today, and see if it isn't the easiest-to-use modem software available. Joe Katz says it was so easy to use, he didn't even need to look at the manual. "It's the only modem software that I use, and I'm in charge of both HUG bulletin boards!" says Jim Buszkiewicz. *HUGMCP* runs on ANY Heath/Zenith computer that's capable of running MS-DOS!

HEPCAT is here! *HEPCAT* is here! *HEPCAT* is here! So what is *HEPCAT*, you may ask? Why it's just another Pat Swayne SUPER-UTILITY. *HEPCAT* is an acronym for *HUG Engineer's and Programmer's CAlculation Tool*. Just what we don't need, another memory resident calculator, right? Wrong! With *HEPCAT*, you can throw away the rest and use the best. *HEPCAT* only uses two partial lines on your screen, and best of all, does NOT cause existing programs to stop executing! That means, while your computer is grinding numbers internally, you can be grinding them externally. Order ***HUG P/N 885-3045-37.***

Can't remember how to use the MS-DOS 'COPY' command? Forget the exact command line format for 'ASGNPART'. Too far to go for the MS-DOS manuals on the shelf on the other side of the room? Why not just type 'HELP' on the keyboard? You say it comes back with "Bad command or file name"? It wouldn't if you had HUG's ***HELP*** program. With *HELP* installed on your hard disk, all you need to do is type 'HELP' for a complete list of MS-DOS commands and transients along with a brief explanation of how each command works, as well as the format for its use. *HELP*, ***HUG P/N 885-8040-37***, works on *ALL* Heath/Zenith computers that run MS-DOS!

PRODUCT NAME	PART NUMBER	OPERATING SYSTEM	DESCRIPTION	PRICE
SEA BATTLE	885-1211-[37]	CPM	GAME	20.00
UTILITIES BY PS	885-1226-[37]	CPM	UTILITY	20.00
UTILITIES	885-1237-[37]	CPM	UTILITY	20.00
X-REFERENCE UTILITIES FOR MBASIC	885-1231-[37]	CPM	UTILITY	20.00
ZTERM	885-3003-[37]	CPM	COMMUNICATION	20.00
H/Z-100 (Not PC) Only				
ACCOUNTING SYSTEM	885-8048-37	MSDOS	BUSINESS	20.00
CALC	885-8043-37	MSDOS	UTILITY	20.00
CARDCAT	885-3021-37	MSDOS	BUSINESS	20.00
CHEAPCALC	885-3006-37	MSDOS	SPREADSHEET	20.00
CHECKBOOK MANAGER	885-3013-37	MSDOS	BUSINESS	20.00
CP/EMULATOR	885-3007-37	MSDOS	CPM EMULATOR	20.00
DBZ	885-8034-37	MSDOS	DBMS	25.00
ETCHDUMP	885-3005-37	MSDOS	UTILITY	20.00
EZPLOT	885-3023-37	MSDOS	PRINTER PLOTTING UTILITY	20.00
GAMES CONTEST PACKAGE	885-3017-37	MSDOS	GAMES	25.00
GAMES PACKAGE II	885-3044-37	MSDOS	GAMES	25.00
GRAPHICS	885-3031-37	MSDOS	ENTERTAINMENT	20.00
HELPSCREEN	885-3039-37	MSDOS	UTILITY	20.00
HUG BACKGROUND PRINT SPOOLER	885-1247-37	CPM	UTILITY	20.00
KEYMAC	885-3046-37	MSDOS	UTILITY	20.00
KEYMAP	885-3010-37	MSDOS	UTILITY	20.00
KEYMAP CPM-85	885-1245-37	CPM	UTILITY	20.00
MAPLE	885-8023-37	CPM	COMMUNICATION	35.00
MATHFLASH	885-8030-37	MSDOS	EDUCATION	20.00
ORBITS	885-8041-37	MSDOS	EDUCATION	25.00
POKER PARTY	885-8042-37	MSDOS	ENTERTAINMENT	20.00
SCICALC	885-8028-37	MSDOS	UTILITY	20.00
SKYVIEWS	885-3015-37	MSDOS	ASTRONOMY UTILITY	20.00
SMALL-C COMPILER	885-3026-37	MSDOS	LANGUAGE	30.00
SPELL5	885-3035-37	MSDOS	SPELLING CHECKER	20.00
SPREADSHEET CONTEST PACKAGE	885-3017-37	MSDOS	VARIOUS SPREADSHEETS	25.00
TREE-ID	885-3036-37	MSDOS	TREE IDENTIFIER	20.00
USEFUL PROGRAMS I	885-3022-37	MSDOS	UTILITIES	30.00
UTILITIES	885-3008-37	MSDOS	UTILITY	20.00
Z100 WORDSTAR CONNECTION	885-3047-37	MSDOS	UTILITY	20.00
ZBASIC DUNGEONS & DRAGONS	885-3009-37	MSDOS	GAME	20.00
ZBASIC GRAPHIC GAMES	885-3004-37	MSDOS	GAMES	20.00
ZBASIC GAMES	885-3011-37	MSDOS	GAMES	20.00
ZPC II	885-3037-37	MSDOS	PC EMULATOR	60.00
ZPC UPGRADE DISK	885-3042-37	MSDOS	UTILITY	20.00
H/Z-100 And PC Compatibles				
ADVENTURE	885-3016-37	MSDOS	GAME	10.00
ASSEMBLY LANGUAGE UTILITIES	885-8046-37	MSDOS	UTILITY	20.00
BOTH SIDES PRINTER UTILITY	885-3048-37	MSDOS	UTILITY	20.00
DEBUG SUPPORT UTILITIES	885-3038-37	MSDOS	UTILITY	20.00
DPATH	885-8039-37	MSDOS	UTILITY	20.00
HADES	885-3040-37	MSDOS	UTILITY	40.00
HELP	885-8040-37	MSDOS	CAI	20.00
HEPCAT	885-3045-37	MSDOS	UTILITY	35.00
HUG BACKGROUND PRINT SPOOLER	885-3029-37	MSDOS	UTILITY	20.00
HUG EDITOR	885-3012-37	MSDOS	TEXT PROCESSOR	20.00
HUG MENU SYSTEM	885-3020-37	MSDOS	UTILITY	20.00
HUG SOFTWARE CATALOG UPDATE #1	885-4501	VARIOUS	PROD 1983 THRU 1985	9.75
HUGMCP	885-3033-37	MSDOS	COMMUNICATION	40.00
HUGPBBS SOURCE LISTING	885-3028-37	MSDOS	COMMUNICATION	60.00
HUGPBBS	885-3027-37	MSDOS	COMMUNICATION	40.00
ICT 8080 TO 8088 TRANSLATOR	885-3024-37	MSDOS	UTILITY	20.00
MATT	885-8045-37	MSDOS	MATRIX UTILITY	20.00
MISCELLANEOUS UTILITIES	885-3025-37	MSDOS	UTILITIES	20.00
REMARK VOL 5 ISSUES 48-59	885-4005	N/A	1984	25.00
REMARK VOL 6 ISSUES 60-71	885-4006	N/A	1985	25.00
REMARK VOL 7 ISSUES 72-83	885-4007	N/A	1986	25.00
REMARK VOL 8 ISSUES 84-95	885-4008	N/A	1987	25.00
SCREEN DUMP	885-3043-37	MSDOS	UTILITY	30.00
UTILITIES II	885-3014-37	MSDOS	UTILITY	20.00
PC Compatibles				
ACCOUNTING SYSTEM	885-8049-37	MSDOS	BUSINESS	20.00
CARDCAT	885-6006-37	MSDOS	CATALOGING SYSTEM	20.00
CHEAPCALC	885-6004-37	MSDOS	SPREADSHEET	20.00
CP/EMULATOR II & ZEMULATOR	885-6002-37	MSDOS	CPM & Z100 EMULATORS	20.00
DUNGEONS & DRAGONS	885-6007-37	MSDOS	GAME	20.00
EZPLOT	885-6003-37	MSDOS	PRINTER PLOTTING UTILITY	20.00
GRADE	885-8037-37	MSDOS	GRADE BOOK	20.00
HAM HELP	885-6010-37	MSDOS	AMATEUR RADIO	20.00
KEYMAP	885-6001-37	MSDOS	UTILITY	20.00
LASERWRITER CONNECTION	885-8050-37	MSDOS	PRINTER UTILITY	40.00
PS's PC UTILITIES	885-6011-37	MSDOS	UTILITIES	20.00
SCREEN SAVER PLUS	885-6009-37	MSDOS	UTILITIES	20.00
SKYVIEWS	885-6005-37	MSDOS	ASTRONOMY UTILITY	20.00
TCSPELL	885-8044-37	MSDOS	SPELLING CHECKER	20.00
ULTRA RTTY	885-6012-37	MSDOS	AMATEUR RADIO	20.00

You've got a screen full of important technical data that would be nearly impossible to memorize, and you already have writer's cramps from the last screen full. With ***SCREENDUMP*** from HUG, you can reproduce a complete video screen on a dot matrix printer, including both text and graphics without having to exit the current program. *SCREENDUMP* supports most of the more popular dot matrix printers, including the newer 24-pin and laser jet models. The latest version of *SCREENDUMP* is ***HUG P/N 885-3043-37.***

"Thank Heaven for *HADES*!" That's what a lot of MS-DOS users are saying when ***HADES*** rescues a file that just got accidentally erased. Erased file recovery is only a small part of the capabilities of this program. *HADES* is *HUG's Absolute Disk Editing System*. Within the realms of MS-DOS, *HADES* allows you to directly edit any part of any disk. Directories, files, file attributes. FATS: nothing can hide from you when you use *HADES*. *HADES* works on *ANY* computer that can run MS-DOS version 2 or greater. Order ***HUG P/N 885-3040-37*** today!

Want to keep your H/Z-100? Want to run a lot of that good PC compatible software out there? Don't want to buy a PC compatible though? Then get ***ZPC II, HUG P/N 885-3037-37***, and the ***ZPC II upgrade disk, HUG P/N 885-3042-37.***

ORDERING INFORMATION

For VISA and MasterCard phone orders, telephone the Heath Users' Group directly at (616) 982-3838. Have the part number(s), descriptions, and quantity ready for quick processing. By mail, send your order, plus 10% postage and handling ($1.00 minimum charge, up to a maximum of $5.00) to: Heath Users' Group, P.O. Box 217, Benton Harbor, MI 49022-0217. VISA and MasterCard require minimum $10.00 order. No C.O.D.s accepted.

Questions regarding your subscription? Call Margaret Bacon at (616)982-3463.

POWERING UP

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

Powering-Up Your System

Now that you have a comfortable and efficient place to work with your system as discussed in the last article, it is time to begin working with the system. This article will help you get started with some of the basics that you need to know after you power-up your computer. As we go along, you will also learn a little about how the computer works from a user perspective, and some basic computer terms will also be introduced with definitions. When a new computer term is first used, it will be shown in capital letters with its definition. Let's begin by looking at three of the most common computer terms.

Hardware, Software, and Firmware

Many computer definitions and terms tend to be academic and difficult to understand. Therefore, I will use a "working definition" which will be technically accurate, but may not include some of the very subtle intricacies of the term. Two of the very common terms — software and hardware — will be used throughout this series, so we will start with those definitions.

HARDWARE is a term that describes all of the physical equipment used in the computer system. It includes all physical components of the system, such as the keyboard, disk drives, CRT monitor, printer, modem, mouse, and all connecting cables. All of these components are connected to a central "box" which contains a power supply, disk drives, memory boards, and other hardware required by the computer.

This central box is usually referred to as the CENTRAL PROCESSING UNIT, or CPU for short, and it may also be called the System Unit because it contains all of the basic system components. For purposes of these articles, I will use the term CPU to refer to this hardware component of the system.

SOFTWARE is a term that includes all of the programs and the documentation associated with a computer system. Programs are typically distributed on floppy disks that are available in all kinds of sizes. User manuals and program documentation are also identified as software so that

a "software package" usually includes the programs (on one or more floppy disks), as well as the documentation that explains how to use it. All computers, including small pocket calculators or the computer in your car, require some kind of program (i.e., software) in order to function.

As you work with your computer system, you will find one other term that is nearly impossible to avoid: firmware. FIRMWARE is typically a unit of hardware, such as the so-called microcomputer chip or Integrated Circuit (called an IC), which has been programmed and contains software. Actually, firmware is a special kind of memory chip used to record a software program that can only be read by the computer. For that reason, firmware is usually referred to as Read-Only Memory, or ROM for short, since it can only be read by a computer system. Programs are actually copied to a ROM using a special technique, such as ultraviolet light, which essentially "burns" the program into the memory circuits of the ROM. Once a program is burned into a ROM, you (and your computer) cannot accidentally erase it, which makes it ideal for storing unique kinds of information or programs. Virtually every computer (mainframes to micros) on the market has firmware in one form or another.

Thanks for the Memory

Your computer contains several ROMs that are used for various purposes that you will learn about in these articles. But there is one other kind of memory that is used all of the time by the computer. It may be referred to as CONVENTIONAL MEMORY, SYSTEM MEMORY, MAIN MEMORY, RANDOM ACCESS MEMORY (RAM) or just plain old MEMORY. Most documentation refers to this kind of memory as RAM in order to differentiate it from ROM.

RANDOM ACCESS MEMORY (RAM) can be written to, as well as read by, the computer. Once data is recorded (i.e., written) in RAM, a computer program keeps track of the memory location (called an address) where that data is stored so that the computer can find it again. Since data may generally be stored and found anywhere in memory at random, it is called random access memory. Most of today's microcomputers actually use something called Dynamic RAM (DRAM) even though it is usually just called RAM or memory.

The different kinds of memory are important to a computer because they are used for different purposes in different ways. Each kind of memory has a specific function, and there are other types of memory that can be used in a computer. We will look at expanded and extended memory in another article, but now let's begin by powering-up the computer.

Powering-Up the System

When you power-up your computer system, a number of processes are automatically started, and you can't begin to actually use the computer until all of these processes have been completed. Each and every one of these processes is controlled by a PROGRAM which is just an extremely detailed list of instructions telling the computer exactly what to do next.

When a computer is turned on, a special program in the System ROM begins. The System ROM (sometimes called a Monitor ROM) contains a number of special "programs" that are used to control various computer operations during the start-up. For most PC compatible computers, the first program begins (executes) a test that checks basic computer hardware (such as memory) and is usually called a Power-On Self Test or POST. If the POST is successful, then control is transferred to another ROM program called the boot loader.

The boot loader is a short, simple program that essentially instructs the computer to read a very special kind of program, generally called an Operating System, from some kind of recording media, usually a floppy or hard disk. If you have a floppy disk system, a disk containing the operating system programs must be inserted into a disk drive as described in the manual. When the computer is booted, the operating system is read (loaded) into the system memory (RAM), and when this loading process is complete, you will usually see a message on the CRT indicating the specific operating system followed by a prompt to enter the current date and time. The date is entered in the standard Gregorian mm/dd/yy format, and the time is entered in the hh:mm format based on a 24-hour clock. After the current date and time are entered, you will see a display similar to the following:

```
A>_
```

The "A" in the SYSTEM PROMPT tells you the letter of the current disk drive. In this case, you are "logged on to" floppy disk drive A which is sometimes called the boot drive or the default drive. The underline character (_) indicates the CURSOR that shows where the next character typed on the keyboard will be displayed on your CRT monitor.

When the system prompt appears, your computer is ready to respond to your commands that are typed on that line. At this point, the operating system has been loaded into the computer's memory, and you can command the system to perform various kinds of work. That is all well and good, but why is an operating system required in the first place?

What Does an Operating System Do?

The primary function of an operating system is to allow users and programmers to conveniently access a computer system's resources. Resources, in this context, simply means the keyboard, memory, disk drives, CRT (cathode ray tube) or monitor, printers, etc. As an example, pressing the "A" key on the keyboard results in the display of an "A" on the CRT. The computer hardware and the operating system take care of interpreting the electrical signals from the keyboard and translating them into video display form. Operating systems also provide special features which aid the programmer who develops application software. In short, operating systems take care all of the details of the resource management and use of the microcomputer system.

Most of today's microcomputer systems use the Disk Operating System or DOS that was developed by the Microsoft Corporation and licensed to various microcomputer manufacturers, such as Zenith and IBM. Most of these DOS versions are essentially the same although they may have different names. If you want to be specific when referring to a certain manufacturer's Disk Operating System, it is common to refer to IBM's DOS as PC-DOS (for the Personal Computer) and other MS-DOS versions by their manufacturer, such as Zenith MS-DOS. Since all of the various manufacturers obtained the original "programs" from Microsoft, I will usually use the generic term "DOS" to refer to any PC compatible operating system.

As you go through these articles, you will learn more about the DOS and how it works with your computer. One of the DOS functions is to manage disk drives.

Disk Drives and Drive Letters

All disk drives have a letter identifier beginning with the letter A. The first floppy drive is called the A drive, and a second floppy drive is usually assigned drive letter B. If you have a hard disk, it is typically assigned as drive letter C. Even if you only have one floppy disk in your system, the first hard disk is still called drive C because B is usually reserved as a floppy drive letter.

When you boot a computer, the operating system is read from a disk drive as mentioned earlier in this article. If you have a floppy disk system, a disk containing DOS must be inserted into drive A before the boot sequence begins to load the operating system. For a Zenith hard disk system, the ROM on the hard disk controller indicates that a hard disk is installed so that the computer is booted directly from the hard disk as drive C.

The current drive letter is displayed as part of the system prompt, and you can change that by entering a new drive letter followed by a colon (:). For a system with two floppy drives, you can change the current drive to drive B as follows:

```
A>B: (Press the RETURN or ENTER key)
B>_
```

Before you change the current drive, be sure that you have a disk in the drive or DOS will display an error message. You change it back again by using the same procedure. By the way, all commands, such as the above, will be shown in capital letters, although DOS will accept most commands in either upper or lower case letters. In general, DOS converts all letters on a command line following the system prompt to upper case before processing a command.

It is important to note the drive letter displayed at the system prompt because DOS makes certain assumptions for commands that you can use in your system as you will see later. But before we begin looking at commands, it is important to have a general understanding of what a disk really contains. From a user perspective, a disk contains something called a file.

What Is a File?

A FILE can be simply defined as a collection of related data. It can be a small, single-page letter stored on a disk by a word processor or it may be a large name and address data file stored by a database program. Or it can be the actual program used by your computer. Regardless of what data a file contains, each file in a computer system must have a name.

File Names

A file name (two words) in a DOS-based microcomputer consists of a *filename* (one word) and a file type or extension. For that reason, it is useful and descriptive to discuss a file name in its most general form of ÷*filename.typ*÷. As you might expect, there are certain rules that must be followed when you want to name a file.

The ÷*filename*÷ part of the file name can be from one to eight alphabetic or numeric (alphanumeric) characters. Although a file can be named H, it is not very descriptive of the contents of the file. A better name might be HUG88-01.LTR indicating the first letter written to HUG in 1988. A ÷*filename*÷ is always required by DOS even if it consists of only one letter or number. Although DOS will accept other special characters in a file name, I recommend that you only use letters, numbers, and a hyphen (-), if necessary. The reason for that suggestion is that some software does not accept all of the same characters that DOS allows. And it is easier to remember this combination.

The file type or file extension is not generally required by DOS for data files (i.e., letters, etc.), but some programs automatically add a file type anyway. For example, Microsoft Word (a word processor) automatically adds the file type of "DOC". If the file type is used, it must be from one to three alphanumeric characters and has the same restrictions as the ÷*filename*÷.

Some file types are reserved for special purposes. For example, DOS recognizes special file types of COM, EXE, and BAT. Other file types are generally used for other special purposes in various programming languages even though they are not specifically recognized or reserved by DOS. It is customary to use the ASM file type for assembler programs, C for C programs, BAS for BASIC programs, and PAS for PASCAL programs.

When both a *filename* and a file type are used to identify a file, a period (.) separates the two. Since you will need to name files in your system, you will find it extremely helpful to develop some kind of standard naming convention for your files to help you locate and identify them. To help you with this sometimes tricky task, I will describe the convention that I use to name nearly all of my data files.

The first three letters of the *filename* identify the organization, individual or purpose of the file. The remaining five characters are used for the year the file was "created" or "scheduled", followed by a hyphen (-) and a two character "sequence" number. For example, this article is found in a file in my system named POW88-07 because it is the "POWERING UP" column scheduled for the July 1988 issue of REMark. My other column scheduled for the same issue is called REM88-07. When I write a book, it is written in chapters, and I generally use a book title followed by the chapter number, such as OS2-01, OS2-02, and so on. Introductory material, such as the Table of Contents, is assigned as OS2-00. The general scheme for this file naming convention is shown as Figure 1.

A *filename* is in the form of:

IIIyy-nn

where:
III = initials of organization or individual
yy = year created or scheduled (e.g. 89)
nn = sequence number beginning with 01

Figure 1
File Naming Convention

When I write letters or other things, I still follow the same general rules, except that the first three characters are the individual's initials or related to the name of the organization. For example, the first letter written to HUG in 1988 is called HUG88-01. In general, I do not use a file type for my files since most of them are created with the WordStar word processor. Most of the other software I have creates a specific file type anyway, so that I can easily identify a WordStar file by the absence of any file type. This scheme for developing a file name may seem a little strange at first until you consider how you find out what file names are found on a disk. In the next article, you will see how this kind of file naming convention is quite useful.

The Disk Directory

Every disk contains a directory of the file names contained on that disk. Among

other things, the directory contains the 11 character file name in the form of "filenametype" without the period (.). The directory also contains the "starting location" of the data for that file on the disk.

The directory is really just a list of the file names on the disk volume. It is truly a "Table of Contents" of that disk and is used just like the Table of Contents for this magazine. It contains the article title, some other information, like the author's name, and the beginning page of that article in the magazine. Similarly, a disk directory contains the file name, some other information, like date and time the file was created or last updated, and the starting location of that file on the disk. Because of the similarity, it is no accident that mainframe computers generally use the term "Volume Table of Contents", or VTOC, instead of the term "disk directory". Now that you know about the disk directory, how can you use it?

The DIR Command

The DIR command is probably the most frequently used DOS command, because it lists all the file names on a disk drive. For example, the following command:

```
C>DIR
```

might display something like the display shown in Figure 2:

```
 Volume in drive C is PART-0-1
 Directory of  C:\

COMMAND  COM     23948   9-04-87   2:37p
--HS241M DID      1152  12-08-86   2:12a
@@SCREEN DSB      4000   4-22-88   7:55a
AUTOEXEC BAT       259   4-22-88   6:59a
CONFIG   SYS       104   3-24-88   6:49a
LD       EXE     10742   8-01-87   8:26a
        6 File(s)   1609728 bytes free
```

Figure 2
Sample DIR Display

This DIR display shows all files with the filename, file type, size of the file, and the date and time the file was created or last updated. The last line in the file shows the total number of files listed and the number of bytes free (i.e., remaining) on the disk. For our purposes, the number of bytes is roughly equivalent to characters of storage space.

You can also enter a drive specification with the DIR command, such as:

```
C>DIR A:
```

Notice that the drive specification is just a drive letter followed by a colon (:), and the colon is REQUIRED for a drive specification. If you just enterd the "DIR A" command, DOS would just attempt to display the directory information for a file called A, not all of the files on drive A.

The drive specification is an optional entry for the DIR command. If a drive specification is not entered, then the DIR command will list files on the current (default) drive as indicated by the letter for the command prompt — drive C, in this example. For those of you thinking about subdirectories at this point, that will be covered in the next article.

If you have followed the instructions in the Zenith manual for creating DOS (bootable) disks for your computer, then you probably have a lot of programs on your disks that you will never use. They take up a lot of space on the disk, and most of you will never have any reason to use some of them. There is also one DOS program that is so dangerous that I don't use it because there are better ways. Let's get rid of these useless programs with the DEL command.

The DEL Command

The DEL command is used to delete or ERASE a file from a disk. Because the data is not actually erased from the disk, it is possible to "undelete" the file and recover the data. Utility programs are available for this purpose, and I generally recommend the Mace Utilities package because it includes a number of utilities, including UNDELETE, that are useful for all computer users. Another package that has similar capabilities is the Norton Utilities package. If you are just beginning to use a computer, I strongly recommend that you buy a utility package that has a program for recovering erased files. There are a lot of ways to make mistakes, and I suggest buying one of these utility packages before you need it.

When you have made a copy of the DOS distribution disks to use in your system, you can use the DEL command as follows:

```
A>DEL RECOVER.COM          (Press RETURN)
A>DEL SELECT.COM
```

The RECOVER program is the single most dangerous program provided with DOS. Don't ever use it unless you have the technical knowledge of what it does and how it does it. You won't need the SELECT program either unless you are setting up a computer to use with a non-US keyboard outside of the United States.

As you can see, the DEL command is generally followed by the file name that you want to delete. Although there are other options that will be discussed in the next article, this is the safest.

Now that you basically know how to find out what files are on a disk using the DIR command and how to delete unwanted files with the DEL command, let's take a look at some of the special characteristics of DOS commands.

Categories of DOS Commands

There are two general categories of commands that can be executed by your computer system. The first category, which is by far the largest and most common, is a command in a program file found on a disk drive. Examples of these files would include FORMAT.COM, SORT .EXE, and AUTOEXEC.BAT. In general, these commands are executed by typing in the *filename* only (not the file type) followed by other command-line information, such as a drive letter or a file name. The AUTOEXEC.BAT file is a special file name that we will look at in the article on batch files.

Programs with the COM, EXE, and BAT file type live on a disk where they can be easily identified. Since they are separate from the files loaded when DOS was booted, they are called external commands. EXTERNAL COMMANDS are stored on disk as separate files (i.e., programs) and must be loaded into memory before they can be executed. I prefer to think of these commands as "disk resident" because I believe that more accurately describes them, but most of today's documentation uses the "external" term. Virtually all applications software — word processors, spreadsheets, databases, and others — falls into the external command category.

The second category includes commands which are part of the files loaded when DOS was booted, and they are called INTERNAL (or built-in) commands for that reason. These commands are not stored as separate files on a disk, like FORMAT and SORT. Internal commands may be executed at any command prompt for the system regardless of the current drive because they were loaded into memory

when DOS was booted. DIR and DEL are examples of internal commands.

There is one very special file that must exist on a disk used to boot your system. It is called the Command Interpreter, and it has a file name of COMMAND.COM. The purpose of the Command Interpreter is to act as the interface between the computer user and the system. It is responsible for interpreting all commands given at the system prompt and passing the appropriate information to the DOS system and other application programs. The COMMAND.COM program file is one of the files loaded into memory when DOS is booted, and all of the internal DOS commands, such as DIR, are actually contained in this file.

How DOS Looks for Commands

One important fact you need to know is that all programs must be loaded into a computer's memory before they can be executed or run. It doesn't matter whether the program is part of DOS or part of an application program, such as a word processor — it still must be loaded into memory before you can "use" it. But before a program can be loaded into memory, the computer must find it first.

When you enter a command on the command line, DOS begins a search to match the command name that you typed. If you enter an internal command, such as DIR, DOS finds an immediate match for that because the DIR command is already loaded into memory as part of the COMMAND.COM file. It is also important to note that DOS stops searching when it finds the FIRST exact match for the command. When DOS found the DIR command in memory, it stopped searching and displayed the specified list of files. But what if you had entered the DIRX command?

Since DIRX was not found in memory as an internal command, DOS begins to search the current disk drive, shown by the drive letter in the command prompt, for the DIRX command. At this point, DOS assumes that you have typed an external command that must be found on the current disk drive, and it begins looking for a file name of DIRX.COM. If it finds that filename, it loads the program into memory and executes the command; otherwise, DOS looks for a file name of DIRX.EXE. It if finds the EXE file, it loads the program into memory and executes that command; otherwise, it looks for a file name of DIRX.BAT. If it finds that batch file, it loads the file and begins execution. But if that file is not found, DOS will display an "Invalid command or file name" error message, which means that DOS could not find a match for the command on the current disk drive.

Two important points are illustrated by this. First, DOS always looks for a match with an internal command before anything else. If there is no matching internal command, then DOS begins searching for an external command.

The second important point is that DOS always searches for external commands on the current disk drive by looking for a match of the file type of COM, EXE, and BAT in that exact order. If an exact match for the command with those file types is not found on the current disk drive, then an error message is displayed. There are a number of ways that you can tell DOS where to find the program.

The first way is to tell DOS what disk drive the external program is on, and this is done by preceding the command with a drive specification. For example, let's assume your current drive was B, and you wanted to execute the WordStar program (WS.COM) that was located on the disk in drive A. Then, you could enter:

```
B>A:WS
```

The A: drive specification tells DOS to look on drive A for an external command with a COM, EXE or BAT file type. Because WS.COM was found, DOS stopped searching and loaded the program into memory for use.

There are other ways that you can tell DOS how to search for external commands, and you will see these in the next article on subdirectories.

Using a Computer System

Although a computer can help you do a lot of things more efficiently, one of the hazards is that a computer only does what you and a program tell it to do. When your computer system is up and running, there are a number of things that you must know. One of the most important is knowing how and when to boot a computer.

Virtually all computers have a way to restart the boot loader program. For a PC compatible system, you will use the CTRL-ALT-DEL key sequence on the computer keyboard. When you see a key sequence in that form, it means press and hold the CTRL and ALT keys, and momentarily press the DEL key. Knowing when to use this key sequence is even more important than knowing what it is because you can cause serious problems by indiscriminately rebooting the system. After teaching several thousand students how to use personal computers over the last few years, I have found that more people have more problems by rebooting the system at the wrong time. The most serious problem is that you can lose all or part of a file that represents a lot of work and time. Here's how to avoid the problem.

NEVER reboot a computer system, except when the command prompt is displayed, if you can possibly avoid it. Nearly all of today's programs have some kind of "exit" command that allows you to return to the DOS command prompt — use it. When you get a new software package, read the manual to see how to start the software, and how to get back to the command prompt.

The reason why you should never reboot a computer while you are running an application program (e.g., a word processor) is that data is only stored in memory until you execute a command to save that data to disk. If you reboot the computer before you save data to disk, it is impossible to recover that data from memory without a lot of highly technical knowledge. Even with that knowledge, it is a very difficult and "iffy" possibility at best.

There is only one time that you should reboot the computer while running an application program. Sometimes programs have defects (called bugs) where the programmer did not provide instructions for certain conditions or command combinations. When this occurs, you will usually find that the program will not respond to any character, command or function key on the keyboard. This is usually called a system "freeze" or "hang". In these situations, any data not already saved to disk is already lost, so the only thing to do is reboot the system.

In some cases, the program bug causes such a serious problem that the system will not even respond to the CTRL-ALT-DEL sequence. That is usually called a "hard freeze" because you have totally lost keyboard control, and the only cure for that is to power-off the system, wait

about 10 seconds or so, and then turn on the power again. There is no cure or possibility for recovering any data that was not already saved to disk when this is done.

Zenith Boot Commands

Once of the nice features about Heath and Zenith computers is that you can retain control of which drive contains a bootable DOS disk and tell the computer to boot from that drive. If you have a computer with two floppy disk drives, this feature allows you to boot the computer from drive B instead of drive A. This feature is part of the Zenith ROM firmware.

The easiest way to use this feature is to first let your system boot up in the normal way when you turn the power on. When you see the DOS command prompt, use the CTRL-ALT-INS (notice this is the INS key, not the DEL key) key sequence to access the ROM Monitor program, and you will see a prompt similar to:

```
MFM-150 Monitor, version 2.3B
Memory Size: 640 K
Enter "?" for help
->_
```

Notice the cursor follows the "->" prompt indicating that you can enter a command. Since most of the Zenith PC compatible desktop computers allow up to four disk drives — two floppies and two hard disks — there are four possible commands you can enter that are summarized in Figure 3.

Command	Description
BF0	Boot floppy disk in drive A (drive 0)
BF1	Boot floppy disk in drive B (drive 1)
BW0	Boot 1st winchester hard disk (drive 0)
BW1	Boot 2nd winchester hard disk (drive 1)

Figure 3
Zenith Boot Commands

Although these boot commands are shown in capital letters, lowercase letters (e.g., bf0) will also work. Be sure that you actually have a bootable disk in the floppy or hard disk boot drive before you press the RETURN key to execute the command; otherwise, you will get an error message. You can also get a help listing of all ROM commands that can be used in your system by typing a question mark (?) followed by a RETURN.

Why would you want to know about this boot feature? One reason is that you may have your system set up to automatically boot from a hard disk, and there may be an occasional need to boot from a floppy, such as when you run the Disk Diagnostics programs supplied with your computer. Another reason is that you may find that your boot drive will not function correctly because of a mechanical problem with the drive. If you know about these boot commands, you can boot from any valid disk drive in your system.

Booting a Computer

A final historical note about booting a system may be of interest to you. The term that originated many years ago was the "bootstrap loader" program because it was used to start a computer — to pull it up by its bootstraps. The original bootstrap loader was actually a maze of electronic components and wires that effectively constituted a "program" because there was no such thing as an Integrated Circuit or ROM in those days.

Over the years, the term has been shortened to boot loader which still refers to the program used to initialize, load, and start a computer operating system. Unfortunately, I have noticed that many people are not aware that the term "boot" is specific to starting the operating system on a computer, such as DOS, OS/2 or Xenix. I have even seen some documentation that talks about "booting" an application program, such as a word processor. That is wrong. Since the boot loader has nothing whatever to do with starting a program other than the operating system, a discussion of "booting a word processor" or any other program does not make sense and is technically wrong. Although there is no need to be an expert on the technical details of what happens, it is useful to know how programs work in your computer.

The obvious starting point is when you type a command — any command — on the command line and press the RETURN key. Then, DOS finds the command on disk (an external command) or in memory (an internal command). For example, let's say you typed the FORMAT command, and DOS found the FORMAT.COM file on the disk. When DOS finds the program, DOS loads the program into memory. Once the program is loaded into memory, then, and only then, does the FORMAT program begin execution. Like FORMAT, many programs display a sign-on message with information like the version number followed by special prompts or display screens. And program execution continues until you exit back to the DOS command prompt. There are two points here that are useful to know since it explains how DOS works with the command line and the programs that you use.

The most important point is that a program must ALWAYS be loaded into memory by DOS before it can be executed. Although it is customary to say that one "executes" a program by typing a command on the DOS command line and pressing RETURN, it is usually "understood" that program execution does not really begin until the program is loaded into memory. That also explains why the internal DOS commands seem to work much faster than the external commands — DOS searches memory, finds the command, and executes it. There is no waiting while DOS loads the program into memory, which always occurs for the external commands.

The second point is that, once the program is loaded into memory, it works with data that is also stored in memory. When you type lines on a word processor, those lines of data ONLY exist in memory until you take some specific action to store that data on a disk, which is usually done with a "save" command. For that reason, it is best to develop the habit of not powering off your computer until you see the DOS command prompt. Most programs will not return to the command prompt before prompting you that all data in memory has not been saved to disk.

So what is the correct term to use when you start a program? Many of the so-called power users seem to prefer "executing a program", although I see nothing wrong with "starting a program" or "running a program". For example, I could say that I booted the computer and ran the Microsoft Word program, or started the Microsoft Word program, or executed the Microsoft Word program.

This article has included a number of computer terms and terminology that are commonly used in discussions and documentation. Like any subject or hobby, computers have their own unique "language" that must be learned, and sometimes knowledge of these basic terms is assumed in a lot of the manuals. You can read just about any article on computer hardware or software, and you will see at least one of the terms that I have men-

tioned here. Most articles, and many manuals, do not have a glossary of terms that are assumed to be "common" knowledge, and I hope this article helps your understanding of these terms.

Next Time

The disk directory is an important part of computer operation, and there is one other feature related to this that can be helpful in operating your computer. Subdirectories can be useful for organizing data, and you will see how to use them next time. In addition, you will also see how to use the PROMPT and PATH commands to help you use your system more efficiently.

If you have any questions about anything in this column, be sure to include a self-addressed, stamped envelope (business size preferred) if you would like a personal reply to your question, suggestion or comment.

Products Discussed

MACE Utilities Paul Mace Software, Inc. 400 Williamson Way Ashland, OR 97520 (800) 523-0258 (Orders only)	$ 99.00
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Z205 Upgrade Kit to use 256K's creating 1MB RAMDISK,
wiring required, $44, $359 w/27 RAM, $459 w/36 RAM
Z-150/160 640/704K Upgrade PAL, $19, w/18 RAM, $229
1.2MB using PAL & 5 banks 256K with RAMDISK software
as reviewed by REMark 8/86, $569, $359 w/3 banks 256K's,
$44 w/no RAM, specify system memory of 640 or 704K.
Z-148 PAL to utilize 704K instead of 640K, $19, $229 w/18
Z-171 Upgrade to 1MB w/RAMDISK, $79, w/18 RAM, $289
Z-200 Memory Board, 1.5MB/2 serial/parallel/game,
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80287-3, Math chip for Z-200, 6mhz, $169, 8mhz, $239

HARD DISK UPGRADES for Z-100 - CDR's 317 SCSI
interface card, $329, with SCSI 20MB drive, $599
40MB/40ms, $849, 60MB/40ms, $899
UCI's EasyWIN interface card $239, with WD/20MB $529,
WD-RLL/30MB $549, WD-RLL/60MB/40ms $849
HIGH DENSITY CONTROLLER RLL card for PC clones, $79
w/30MB hard disk, $319, w/60MB/40ms, $549

OTHER PRODUCTS:
V-20 by NEC for faster 8088 execution, 8mhz version, $12.
Z-100 speed-up kit, 7.5mhz by CDR, $39
8mhz by UCI, 2 daughter boards, switch, many upgrade
chips, specify old or new motherboard, $135
CLOCKS - SMARTWATCH ROM socket plug-in for Z-100
& PC's, $35, add $2 for Z-100 spacers.
1.2MB 5-1/4" floppy drive, $119, cable for Z-100, $29
3.5" floppy drives, 720K, $99, 1.4MB, $129
2400 baud US Robotics PC internal modem, $149
2400 baud Anchor Patriot ext. modem, "HAYES", $159
1200 baud no frills internal or external Weltec modem, $59
DOTS PERFECT-ROM Upgrade for Epson FX/JX, $59
Z150 Video Board removal kit incl. ROM compression,
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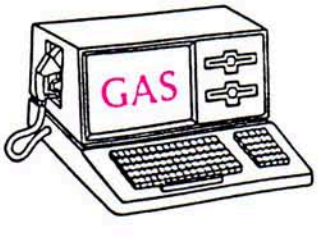

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A Peek at Unix

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Lately, almost every hardware vendor has brought out a machine using the Intel 80386 processor. Although these computers will run MS-DOS for an operating system, using DOS with a '386 is like using an America's Cup 12-Meter boat in your swimming pool. DOS will not bring out the potential of the '386 chip.

There is a new operating system promised for the '386 that will use the talents of the new chip. It will be available Real Soon Now.

However, there is currently on the market an operating system for the '386 which WILL allow you to use the chip more fully than DOS. This operating system is called Unix. Do you want your whole office using the machine, each in their own program and maybe a couple of C language program compilers running in the background? Then Unix will do it for you and do it today.

Unix was developed by AT&T at Bell Labs many years ago. And that may explain why the system is not as widespread as it could be. My experience in attempting to acquire an AT&T PC compatible (before getting my H/Z-150) indicated it would take a very determined customer to actually make a purchase.

There are several flavors of Unix running around, the latest being Version V. Kind of like DOS and version 2.0, 3.2 etc.

If you are familiar with DOS, then you already have a nodding acquaintance with Unix. The concepts of full path names, redirection, piping, batch files, command and environmental parameters are concepts present in both systems.

Hold your hat though, because where DOS fits on two floppies with room to spare, Unix will consume 10 or 15 megabytes of your hard disk space. Remember that Unix was designed as a multi-user, multi-task operating system whereas DOS was designed for the single user running one task. Say good-bye though to running a two floppy-drive machine under Unix. It's doubtful that anyone would ever want a '386 machine without a fixed disk, so this requirement is not a real problem.

As would be expected with a system that requires several megabytes, there are a lot of features. We are going to take a look at only a few of them.

Unix, like DOS, reads several files when the system is booted. With these files you can customize the system to fit your needs. Its multi-user system has the concept of "superuser", a supernumerary among all users. Root is its name, control is its game. Root can go into the password protected space of other users and do things no ordinary user can. In most systems, only the system administrator would be allowed access to root.

Certain tasks are done automatically by the system. For example, once a day a file named calendar in each users space is examined to see if a reminder of a task to be done needs to be mailed to that user. Never again do you need to forget your anniversary, girlfriend's birthday or whatever.

Do you want a certain report run from your database Monday morning before the staff meeting? Write a shell script, which is similar to a DOS batch file, to perform the task, then make an entry in a file called crontab (for chronological table, I assume) to tell the computer when to run the task. Of course, you have to leave the machine running -- it will not turn itself on.

Add a streaming tape drive and you can automatically backup your important data files with assistance from crontab. In fact, if you are running your office with the machine, a back-up system is almost mandatory.

A history of your commands (outside of application programs) is maintained, so to repeat a command you used is a very simple operation. The command may be even modified and added to when repeated. Most system commands utilize flags on the command line to select options present in the command, somewhat like the switches DOS uses. For example, the command to list files under DOS is dir and the available switches are /p and /w. The command under Unix is ls or ls7 and flags may be set to sort the list (by name or creation date), show file size and creation date/time, indicate sub-directories with a slash (/) and executable files with an asterisk. It is also possible to create an

alias for commands. Suppose you like to frequently list your files in alphabetical order, including the owner, size, permissions granted, and creation date/time. Instead of always having to type ls7 -alF you can create an alias and shorten the command to LL (for Long Listing).

Legal file names under Unix may be longer than with DOS, allowing more meaningful names. Any file may be made executable without resorting to restrictions on the file name. DOS requires such files to have a three letter extension (.com, .exe or .bat). Under Unix, all files have a series of permissions that allow three sets of users to read, write or execute that file. The first set of users is the owner of the files. The system administrator can then set up the other two sets of users to include/exclude others as desired.

Each user on your machine will have a sub-directory for their exclusive use. In turn, they can sub-divide their space as they desire. With password protection at login and proper permissions set by the system, no one else, other than root, can access their files. Even root can be locked out by encrypting a file.

Did you like EDLIN, the text editor that came with DOS? Probably not. Unix comes with choices. There is ED (or rather ed as Unix, unlike DOS, is case sensitive) which is a line orientated editor. The full screen editor is called vi and is quite powerful. I find it best for such things as language programming or writing shell scripts rather than complex word processing.

There is an electronic mail system not only for everyone on your machine but it can be expanded to include other machines running Unix which can be accessed with a dial-up modem. Ascii and non-ascii files may be exchanged.

The shell script language is more powerful than the limited commands available in the DOS batch language. Not surprisingly, it bears a slight resemblance to C, the language Unix is written in. One of your first tasks with shell scripts probably will be to insulate the average user from the operating system.

One of the strengths of Unix is a large number of utilities are included with the system. Many more than are available under DOS. These utilities may be combined in shell scripts to perform some very powerful tasks without having to become a programmer in a high level language. There are available on the market, utilities to run under DOS that mimic some of the Unix utilities so these functions are available to DOS users.

Of course, the language of choice for things beyond shell scripts, either because of complexity or the desire for speed of execution, is C. Pascal compilers are also available.

It is possible to run some MS-DOS programs under the Unix operating system. In this case DOS would be run as a task under Unix.

All this sounds good you say, so what are the drawbacks? As mentioned earlier the size of the system makes a hard disk mandatory. At least one megabyte of RAM is needed for just a couple of users to avoid noticeable slowdowns. It is complicated. Files and directories with mysterious hieroglyphic names abound. The documentation for Unix makes DOS documentation read like a grade school primer.

Somewhere closeby, you had better keep a Unix guru handy. Because just when you think you have figured something out, a new situation will arise and you will feel like you are starting all over again. For example, you write a shell script to produce that Monday morning report. You've tested it out and it works as desired. Now all you need to do is add one line to crontab so it will run the program and have the report ready for you when you get to work. Surprise! It doesn't work. Eventually you discover your print driver is failing. A check of cronlog shows it's not finding files because it can not find the environmental variable the driver needs. Yes, this happened to me and my guru said that he has been unable to get the driver to work either. Cron, which runs crontab (or is it vice versa?) doesn't know all that much about the system. Just enough to get it by. So he suggested a substitute.

The system keeps track of a lot of things going on with the machine. Cronlog, for example, keeps track of what happens when cron executes the commands in crontab. The transfer of data from your machine to another is also monitored and logged. Even the times users log on and log off is logged. Surprisingly, this file is not called loglog.

So how does Unix appear to the user? Assuming your system is up and running (how you get there is a whole other story) in multi-user mode, you will see on your screen something like:

```
login:
```

You need to type in your login name (you get that from the whole other story previously mentioned). Since this is your first time at login, there probably is no password for you or it was given to you. Depending upon how your system has been set up, there could be a fair amount of information presented to you at login. News bulletins, a list of other logged on users, and your fortune are typical.

Your first task after logging in should be to assign yourself a password. In order to see if you have any electronic mail on the machine, type mail.

Only a few files will show in your login directory since you have not yet done anything . What files are there will be to set up certain initial parameters and not be data or program files. Two learning aids will probably be available. Type learn to start a training session on Unix. Not sure how to use a command? Type man and the command name and the built-in manual entries will appear on your screen, describing the command. Unfortunately, this is the same information, presented in the same manner, that appears in the written documentation. Precise prose, but until you know what it is saying, you can not tell what it means.

If you plan on writing any shell scripts or modifying any existing ASCII files it would be a good idea to start learning the text editor vi. Of course, you can use any editor on the system that will produce ASCII files but vi is normally provided with the Unix system just as edlin comes with DOS. Fortunately, vi is a much superior editor to edlin.

Presumably, you have some application software to run that you can learn. As you go along you may find you want to write some scripts to make your job easier or more error free.

Be sure and check out what aliases are available to you. Your system administrator (or dealer) has probably set several up already. Type alias and a list of them should appear on screen. It's a good chance that the first one will be that you

can substitute an "A" instead of typing "alias". You can create your own alias list by modifying a file that appears in your space. In this fashion, you can customize the system to minimize your typing for those things you do often or find the command difficult to remember; I can handle LL a lot easier than ls7 -alF. One alias I found useful to create, I called LLR for Long Listing Reversed. LLR is actually ls7 -alFt which puts the files in reverse order of their time stamp. This puts the file I just modified at the start of the list.

But, don't get carried away on setting up your alias list. If more than three commands are needed, you probably should be writing a shell script instead of an alias.

Put your electronic secretary to work. Into you calendar file put all those dates that you do not want to forget along with a brief message of what you are reminding yourself about. The day before the date you will receive your reminder message by mail; plus one on the date. If the date falls on a weekend or Monday, you get the first notice on Friday.

As you can see, Unix offers a lot more features than DOS in addition to supporting many users running different tasks at the same time. Unix is available now to utilize the horsepower of the 80386 chip. If the new DOS is better, you can always change over when it arrives. *

Continued from Page 41

REMARK.CLS — This file contains the classifications used in the REMark database. The classifications are stored bitwise in the actual database file (64 classifications in 8 bytes), and the text for each classification is stored in this file.

REMARK.DAT — This is the database containing information on all articles from the 1987 issues of REMark.

Program Author: Patrick Swayne, HUG Software Engineer

TABLE C Rating: 10

*

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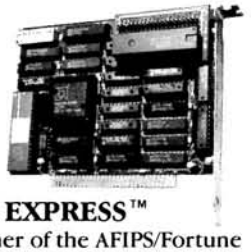

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Continued from Page 12

your Z-100's configuration. Use DEBUG's Enter command to change the byte at CS:07C8 as follows:

```
ECS:07c8 <rtn> EB <rtn>
```

This will change the '74' byte (jump, if zero) to 'EB' (jump unconditionally). Then save the modified file and exit DEBUG by typing:

```
W <rtn>
Q <rtn>
```

Place the new version of MOUSE.DRV on the setup disk and perform the normal WINDOWS installation procedure using the SETUP program included with WINDOWS.

Using The Patched WINDOWS

1. The Z-100's J2 port should be configured with CONFIGUR as the AUX device for 1200 baud, 1 stop bit, no parity, and 8 bit words.
2. Logimouse MUST be plugged into the J2 port before running LOGIMS.
3. Type LOGIMS <rtn> and then run WINDOWS as instructed.

LOGIMS

```
;This is the source code for LOGIMS.COM
;Assemble with MASM, then LINK, and
   EXE2BIN it.
;LOGIMS - Send V to Logimouse to put
   into Microsoft format
;
BIOS    SEGMENT AT 40H
        ORG     18      ;OUTPUT CHAR IN AL
BIOS_AUXOUT LABEL FAR   ; TO AUX DEVICE
                        - SEE BAUXIO.ASM
BIOS ENDS
;
CODE    SEGMENT PARA PUBLIC 'CODE'
        ASSUME CS:CODE, DS:CODE, SS:CODE
        ORG     100H
;
START:
        MOV AL,'V'
        CALL BIOS_AUXOUT
        INT 20H
;
CODE    ENDS
        END  START
```

Alternatively, LOGIMS.COM may be created with DEBUG by typing the following:

```
DEBUG <rtn>
A <rtn>
MOV AL,56 <rtn>
CALL 0040:0012 <rtn>
INT 20 <rtn>
<rtn>
N LOGIMS.COM <rtn>
RCX <rtn>
9 <rtn>
W <rtn>
Q <rtn>
```

Rich Hirsch
HOGWARE Company
470 Belleview
St. Louis, MO 63119
(314) 962-7833

Error In TREECOPY And A Bug In MS-DOS' V.3 PUP

Dear HUG:

First of all, there is a typing error in my letter about TREECOPY which appeared in the February REMark (p.6) in the instructions for fixing the bug in TREECOPY.COM, the first line (a1006) is incorrect — it should read a100c. The error was mine, and I apologize for any difficulties it may have caused.

Second, I have come across another bug in the MS-DOS Version 3 Programmer's Utility Pack, this time in program LS. My copy of LS.COM (version 3.00; the file is dated 9-19-85 at 8:46 am, and is 2062 bytes long) does not recognize dates after 31 December 1987. In other words, the dates of files created in 1988 are displayed (using LS's /X switch) as if the files were created in 1980. I have developed a patch for this bug. (At the same time, I made another minor correction to the code to bring the volume label switch into agreement with the manual and the online help.)

If your copy of LS has the same problem, you can fix it as follows. First, make a copy of LS.COM to modify. Then, type DEBUG LS.COM, and then U 06BB 06D8 (followed by a return, as for all DEBUG commands). You should see:

```
AND   AL,07
ADD   AL,50
MOV   DI,06DF
CALL  07CA
CMP   BYTE PTR [06D9],30
JNZ   06D1
MOV   BYTE PTR [06D9],20
MOV   DX,06D9
MOV   AH,09
INT   21
RET
```

As a further check, type D 06D9 06E3, and you should see the characters "xx/xx/xx $" in the right-hand part of the screen. This code is where the dates are generated for the "/X" output display. (If your copy is not identical to mine, but has the same bug, you may find a similar code fragment at a slightly different address.) The "AND AL,07" instruction is the culprit; get rid of it and the date error will go away. You can do this by typing E 06BB 90 90 (and return). The corrected program will report dates properly, at least until 31 December 1999 (the fix required to make it work correctly after then is more complicated than a simple patch).

The other flaw I chose to correct at the same time was a discrepancy between the documentation (both in the manual and in the online help you get when you type "LS ?") and the program. The documentation claims that the switch used to display only the volume label is "/L", but the program recognizes "/V" instead. Here you have a couple of choices — you can change the program to match the documentation, or vice versa. If you choose to change the program, there will be a side effect — the character used to indicate the volume label in the "/X" display will also change from "V" to "L". If you prefer the "V", then you can change the manual with a pen, and the online help message by typing E 0329 56 (and return). If you choose, as I did, to change the program to respond to "/L", then first type D 03DB 03EA to verify the location of the switch codes. You should see the characters "A.D.V.S.H.R.X.." in the right-hand portion of the display. Now type E 03E0 4C to change the V to L.

Once you have made these changes, write them out by typing W (and return), and then exit DEBUG by typing Q. If all went well, your new copy of LS.COM should be fixed; make sure you test it before replacing your working copy.

Yours sincerely,

Richard L. Ferch
1267 Marvgrove Circle
Ottawa, Ontario
CANADA K2C 2E1

Math Checker

Dear HUG:

"Here is my Math homework. Could you check it for me, Dad?" said my son as he handed me three sheets of paper. Each sheet had numbers on both sides! It's 10:30 PM, Playboy was just tuned in on the satellite, and I was ready to relax.

"Long division," I said, "I haven't done that in 30 years, or was it 35?" My boy snickered and walked away.

Continued on Page 60

FINALLY!

An Enhanced Video Card For The H/Z-161 PC!

Joe Pannon
P.O. Box 2392
Renton, WA 98056

When it comes to video board upgrades, owners of the Model H/Z-161 PC, Heath/Zenith's first portable IBM compatible, have been out of luck. While its desktop twin, the '151 PC had plenty of choices among the newer EGA and multimode video boards to replace the original Zenith CGA card, no board maker seems to recognize the special video upgrade requirements of portables, such as that of the luggable '161 PC.

Many of you, who are familiar with the virtual identical nature of the '151 and '161 models, might be wondering: what's the big deal? Why can't we just use the same replacement video cards in our '161s that our fellow 'Huggies' use in their desktop '151s? Well, as a matter of fact, we can, and many of us have, but at a price: we have to give up our built-in, 9" composite monitors. You see, besides supplying the video signals to external monitors, the original Z-309A video card provides an additional function: through a special header connector, it feeds the video and sync signals to the internal monochrome monitor. While the Z-309 video card does this added duty admirably well, it also makes the card practically irreplaceable, for it is nearly impossible to find another enhanced video card that would duplicate this function; it's just too specific to the '161 PC.

If you are one of those '161 PC owners willing to 'down-grade' that old workhorse to the boring life of a desktop PC, giving up the internal monitor may not be much of an issue with you. For the rest of the '161 Fan Club this is no trivial matter: a video upgrade worthy of consideration must keep the internal monitor functional, or we stay with the old CGA. It's just that simple or, as you will see, that difficult!

Search For A Solution

It was around the Summer of '86 when I was struck by the video upgrade urge the first time. Chief responsibility for this should be born by the Heath User's Group's Special Interest Group (HUG SIG) on CompuServe that carried a large number of messages on the subject at the time. HUG SIG is an excellent resource for solving special problems with Heath/Zenith products, so naturally I figured that some 'Huggie' out there just might know of an EGA video card addressing the special needs of the '161. Even if there is no such card in existence, I was hoping that by 'floating' a new product idea, some third-party supplier of H/Z enhancement products may get inspired by it and decide to produce something to fill this obvious need. Though offering the product idea 'free of any royalty payments', there were still no takers. The best tips I could get were to forget the internal monitor and convert to full-time desktop mode. Discouraged, I dropped the whole video upgrade idea. To tell the truth, one reason why I gave up on the idea so readily was the rather unique way the video upgrade had to be performed on the '151 and '161 PCs. Due to their design, you couldn't just replace the original Z-309 video cards in these PCs with third-party boards. The only option existing at the time was to disable the original ZDS video card with the ZCA-6 Heath kit. This meant using up another scarce expansion slot — an idea I found rather uninspiring.

The picture changed in the early months of '87 with the introduction of 'video card eliminator' products, such as Dante Bencivengo's VMM150 and FBE Research's RM-150 PROM. With these products there was no longer an expansion slot penalty involved in a video upgrade, so it became an even more attractive proposition than before. My renewed urge to upgrade was further fueled by the rapidly falling prices of EGA cards, which, besides EGA, offered an increasing number of the newer video modes. Now that the video card market was really heating up, I felt it was again time to visit CompuServe.

The Lucky Break

The tip that eventually led to solving my video upgrade problem came from a Canadian Huggie, Dale Paus of Scarborough, Ontario. He recalled that the EGA Wonder card, produced in his town by ATI, might have a separate composite video circuitry meant for an internal monitor. He even offered to find out more about it by visiting the ATI offices on his way to work. Though I've heard about the EGA Wonder before and have been intrigued by ATI's claim of 'any software on any monitor', I took that claim with a grain of salt until Dale mentioned it on the HUG SIG.

While waiting for Dale's report on his findings, I visited a nearby computer store that carried the EGA Wonder card and asked to see the video board and read its Operation Manual for spec details. And there it was! The video board did indeed have a four-pin header connector to provide composite video signal for the IBM Portable PC. There was only one problem: the internal monitor circuitry of the '161 was designed to be fed with separate video and sync signals. My initial enthusiasm, though thoroughly shaken, was not completely gone, because, after re-reading the '161 video specs from the service manual I kept since building the PC from kit, there seemed to be a slight chance that EGA Wonder could be adapted to provide the video signals needed. Not being an electronics expert, I couldn't be sure, however. Fortunately, good old Dale Paus, who seemed to know a great deal more about hardware than I, came to the rescue again in follow-up HUG SIG 'meetings' on CompuServe. He thought it should not be too difficult to design a sync separator circuit board that would 'bridge the gap' between the EGA Wonder composite output and the video input required by my PC's internal monitor. However, building kit computers by following instructions is one thing, designing IC boards is quite another: it was time to consult the experts!

Enter Dave Brockman . . .

What do you do if you live in the Seattle area and need this type of help? You call Dave Brockman — that's what you do! Dave is well known to most HUG members through the excellent products of his company, FBE Research. Fortunately, he is also very approachable.

I met Dave at the monthly meetings of the Pacific Northwest HUG in the Seattle Heath store where he'd been a popular participant. It was during the break of one of such meetings, long before I knew about the EGA Wonder card, that I mentioned my video upgrade idea for the '161 PC. Dave was not 'biting', however. "There just aren't enough '161s out there to make such a project feasible", he said. I mentioned the idea a few more times on successive PNHUG meetings, but he could not be moved.

Months later, after receiving the tip on EGA Wonder from Dale Paus, I contacted Dave Brockman again with the new information. This time Dave was definitely interested. Fortunately, he was also less busy than usual. He immediately remarked that, constructing a small sync separator IC board was definitely a possibility, but he would have to study the diagram of the video deflection/driver circuits to be sure about it. "If all else fails", he said, "you could always decide on 'radical surgery': replace the original Zenith internal monitor with a true composite monitor that could receive its video signal directly from EGA Wonder, without any conversion."

Confident now that one way or another, I'll get the desired video upgrade for my '161, I ordered the ATI video card from a mail order house. I have also obtained Dante Bencivengo's VMM150 'Zenith Video Card Eliminator' daughter board. Yes, I know: it was not quite consistent to buy Dante's Video Card Eliminator when Dave has a similar product, the RM-150 PROM, that is not only less expensive, but in some respects, is a more 'elegant' solution to the same problem. However, if you knew how often I like to upgrade the ROM chips in my PC, you would understand why I opted for Dante's design.

By now, Dave's professional curiosity sufficiently aroused, he offered to 'take a crack' at a prototype design of a sync separator circuit if I could leave my '161 with him for a week or so. Needless to say it was an offer I could not refuse, and delivered my PC to him in record time!

In less than a week, I heard the news I'd been waiting for: Dave completed the project, and he was pretty impressed with the capabilities of the ATI video board. I could hardly wait to pick up the PC and see it for myself.

Putting It All Together

Preliminary tests conducted with an ATI-supplied program showed EGA Wonder working with the PC's internal monitor 'as advertised': besides CGA, it could emulate EGA, IBM monochrome (MDA), Hercules and a special 132-column video mode. These results looked good enough to convince me that I could proceed with the final adjustments before a more exhaustive series of tests.

First, the size of the display needed a slight increase with the horizontal and vertical size adjustment screws on the video deflection board in order to make the display on the 9" monitor about the same size it was before. Then, it was time to try out the 'slot-saving' feature of Dante Bencivengo's VMM150 daughter board. To do this, I removed the original Zenith memory board (containing the parallel printer port) from its slot and then replaced its standard-size back panel (bracket) with a longer one that came with the VMM150 package. The longer bracket now allowed me to insert the memory card into the same slot where the original Zenith video card was before. The 'transplant operation' went smoothly, though — in the hope that Dante reads this — I'd like to see some minor improvement in future versions of Dante's Video Card Eliminator kit. The memory card is a good inch shorter than the Z-309A video card it replaces. This means that the front end of the shorter card does not reach its card guide and thus lack some desirable, though not essential support. Perhaps an inexpensive plastic card extension that could easily be screwed to the front end of the memory card would be all that is needed. While at it, Dante might also consider a minor modification in the new card bracket so that it could be screwed to the memory card at as many points as the original shorter bracket. I think these minor enhancements would provide the firm support other PC boards have.

And now a few words about Dave Brockman's sync separator circuit board . . . As I mentioned earlier, I am no electronics expert, so don't expect to see its circuit diagram here. Besides, the purpose of this article is to show how to go about getting together the components needed to upgrading your PC's video, and not how to build those components.

The sync separator circuit is built on a 2" × 3" 'bread board'. It has two header con-

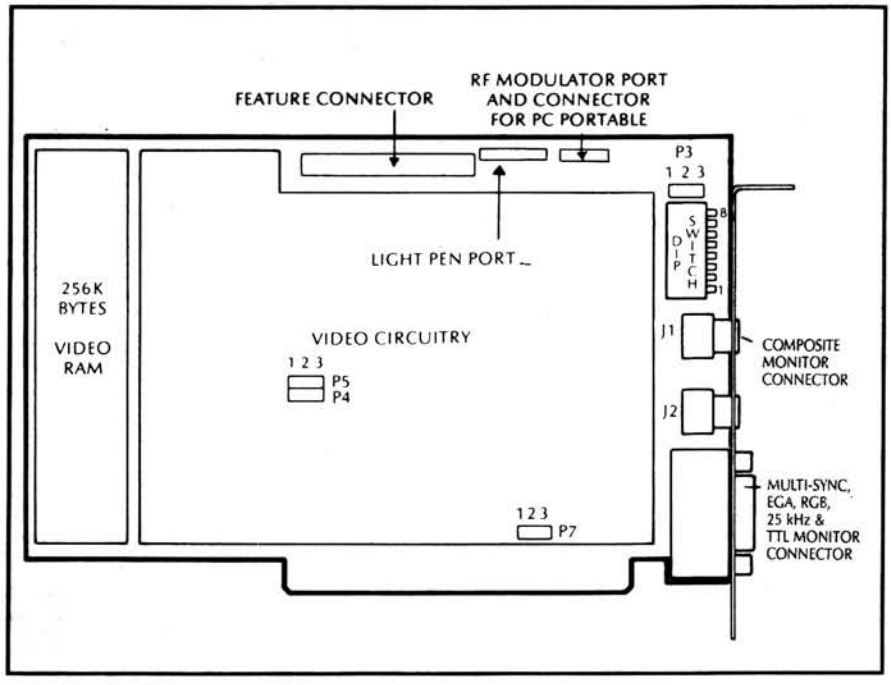
nectors: one for composite video input, and one for sync-separated output. On the input side, the IC board is connected to the composite video header connector of the EGA Wonder card with 6" leads. On the output side, the 10-pin header connector is identical to the one on the Z-309A video card, making the card 'plug-compatible' with leads of the video deflection board.

A completely satisfactory 'final resting place' has not yet been found for the small IC board. Suspending the circuit board from the ATI card — piggy back style — is not feasible due to the relatively short length of the deflection board leads. Until a better solution is found, the board is loosely supported from its leads in the space between the power supply and the first PC board. Perhaps in its production version a firmer support could be provided by mounting it on the rear metal cover of the PC in the same area. Needed clearance from the cover could be maintained by mounting the board with the type of screws used to attach DB-25 type connectors to the PC's serial port.

There are two additional header connectors on ATI's half-size board: a feature connector for Compaq portables, and one for light pen. For external monitors, there are two RCA Video Jacks (composite video), and an IBM-standard 9-pin D shell connector (direct drive video). The board's DIP switches are accessible through an opening in the card's rear bracket, so there is no need to open the PC to change video configuration. This version of the card, designated as the Enhanced EGA Wonder, comes with 256K bytes of video RAM and the familiar set of four Chips and Technologies VLSI video chips found on many of the newer high resolution multi-mode video boards, so no surprises there. The unique properties of EGA Wonder, making it worthy of our investigation, are to be found in the ATI-designed areas: both hardware (incl. firmware) and software.

Gearing Up For The Tests

The box of my '161 finally closed, the external monitor attached, I was ready for some serious testing, this time with my Mitsubishi Diamond Scan monitor. The Diamond Scan is similar in capabilities to NEC's Multi-Sync monitor, being able to auto-detect a number of video modes in the 15.6 to 35 kHz horizontal, and 45 to 75 Hz vertical frequency ranges. Its resolution in the RGB TTL/Analog mode is 800 × 560 pixels of size .31 mm, just the maximum resolution that the EGA Wonder can support. Having worked with both the NEC Multi-Sync and the Mitsubishi Diamond Scan monitors, I prefer the latter for its richness of colors and for some of the extras that the NEC monitor lacks, such as its ability to emulate the IBM Monochrome display monitor. It even has an input jack for NTSC composite video from VCR, TV tuners, etc. that can be superimposed, if you wish, with RGB analog signal input. There was only one more thing to do before boot-up: 'tell' EGA Wonder, via rear panel DIP switch settings, what type of monitor I was going to use. I configured the switches to Multi-Sync setting.



The block diagram of the EGA Wonder showing its major features and their approximate locations on the board.

Other monitor types supported are: EGA, RGB Color, TTL Monochrome, 25 kHz Color, Composite (PC Portable) and Compaq Internal Monitor. DIP switch settings for PC Portable Composite and the RGB Color monitor are identical.

Selectable video defaults are: MDA, CGA (40 × 25), CGA (80 × 25), Normal and Enhanced EGA. One of the eight switches is used to enable or disable enhanced EGA Wonder features. When these features are disabled, the card is identical to the IBM EGA on the hardware level, in features, capabilities and limitations. The default video modes are also selectable after boot-up with software that comes with the card. One of the enhanced features is the special 132-column video. Device drivers to exploit it with popular software (Lotus, etc.) are also provided by ATI. VGA modes 11 (640 × 480, 2 colors) and 12 (same res., but 16 colors) are also supported on Multi-Sync or compatible monitors, as are 752 × 410 and 800 × 560 resolutions in 16 colors from a palette of 64.

The First Disappointment

I have just received the Version 4 upgrade of Microsoft WORD, and one of the major benefits I expected to receive from EGA Wonder was to get better displays for my favorite word processor. I was already thoroughly impressed with this new version of WORD, but running it with CGA display adapter did no justice to its real capabilities. As I figured, Microsoft WORD and EGA Wonder were made for each other! That was an expectation on which EGA Wonder did not deliver, however, at least not right away.

The problem didn't show up immediately, for I started WORD with the '/I' option, that would bring up the last document in text mode. Everything worked fine until I pressed the <Alt-F9> key combination to switch WORD into graphics mode. Then, the roof fell in! The screen would fill up with some strange Greek-looking characters, and the keyboard seemed to lock up. I had to reboot.

I wondered if I could run WORD in graphics mode by starting it that way. So, I tried

to run WORD again, but this time with the command line option '/g' to force it immediately into graphics mode. Results? The same strange characters filling up the screen, but now I discovered that by pressing the <Esc> key, followed by the 'Q' key, I could exit WORD even though the <Esc> would not bring up the Command Menu on the bottom of the screen so I could see what I was doing. Well, at least I didn't have to reboot after each experiment to try to make it work. Some progress!

Before blaming ATI for the incompatibilities, I decided to 'bounce off' this experience on other Microsoft WORD users. What better way to do that than through the Microsoft SIG on CompuServe? As I anticipated, that SIG being one of the busiest on the network, I had my answer within a few days. As it turned out, I was not alone with my experience. It was shared by other users of the Microsoft WORD — EGA Wonder combo as well, regardless of the computer brand used. Some of them already had the problem solved by upgrading the 'buggy' EGA BIOS ROM with a newer version from ATI. Armed with this information, I called ATI. My call was immediately transferred to a pleasantly knowledgeable tech support rep who acknowledged the problem I had with Microsoft WORD and my version of the EGA BIOS (3.04). To fix the problem, I was offered version 3.07 of the BIOS chip — free of charge — to be received by mail.

After several weeks went by without receiving the promised BIOS ROM, despite repeated calls to ATI, I decided on a new ploy. When I called ATI again, I told their rep that I was writing a review of EGA Wonder for the national magazine of the Heath/Zenith Users' Group, and I was afraid that they would be rather unhappy with the conclusion of my review. That did the trick! The tech rep immediately offered to send me another BIOS upgrade that was even more current than the one originally promised: version 3.08, with additional VGA video support. This time ATI really delivered: the new EGA BIOS ROM chip was in my hands the following day via Overnight Express. It's amazing how much a prospective published review can accomplish! Now I understand why so many people like to write reviews.

Testing With External Monitor

Replacing the old EGA BIOS chip was easy and the results were immediately evident following the boot-up: screen displays were noticeably faster. But what I was most interested in, of course, was: how it would work with Microsoft WORD. In a word: perfectly! I tried every video mode supported by WORD and EGA Wonder passed the tests with flying colors.

Next, I tried to implement the 132-column video on Lotus 1-2-3. The instruction that came with EGA Wonder on how to do it were clearly written and the installation was easy. The 132-column display worked as claimed. The only thing I didn't like much about it may be Lotus' fault: it took much longer to page through a spreadsheet, both horizontally and vertically, than in 80-column mode.

The most exhaustive testing was still to come: I reserved this task for my favorite EGA graphics software, the EGA PAINT 2005 by RIX SoftWorks. The EGA PAINT is the only EGA graphics program I have that can be configured not only to the standard 16-color 640 × 350 resolution, but various others, up to the maximum of 800 × 600 pixels that can only be displayed on high-end Multi-Sync type monitors. Other possible resolution types are: 640 × 200, 640 × 480 and 752 × 410, all in 16 colors. The latter resolution was the highest I could use with my Mitsubishi monitor, and that also happened to be the one giving approximately the same aspect ratio as the standard 640 × 350 EGA mode. Once again, EGA Wonder performed flawlessly.

One especially nice design feature of EGA Wonder is the way it protects the internal monitor from burn-out, while producing all that high res. video for the external monitor: it simply shuts it off. The only way to send video for the internal monitor is by 'telling' EGA Wonder — through DIP switch settings — that an IBM RGB color or composite monitor is connected to it. This is the only time when both the internal and the external monitors are operational.

More Testing With The Internal Monitor

Satisfied with Wonder's performance so far, I still needed additional testing with displays produced on the 9" internal monochrome monitor. Up until now, I only tested it with the ATI-supplied programs, not exactly an objective test. The next series of tests required reconfiguring Wonder's DIP switches to a CGA-type monitor while the PC was powered off. So, how does the new display compare to the old Z-309A-generated video? The difference between the two displays is quite noticeable. The characters generated by EGA Wonder are taller than those I was used to before. This has the same effect on the display as the 8 lines/inch print has on paper: denser, but tolerable. On the other hand, the characters themselves look less dense, and therefore, are harder to read. They remind me of the single-dot character fonts one could get from the original Z-309A card with a certain video jumper setting.

Another peculiar thing I noticed was that the display size tended to change slightly with brightness control. Turning up the brightness would cause an increase, dimming a shrinkage. I don't quite understand the reason for this, but it's not a major problem. All in all, however, the Z-309A-generated video was noticeably better on the internal monitor than the EGA Wonder generated CGA display. That's one score for Zenith! But wait! — the ATI card has not played its Ace yet . . .

The Wonder Of EGA Wonder

The real power of EGA Wonder is its ability to make a low or medium resolution monitor, such as 16 kHz CGA or composite monitor, behave like a high resolution EGA monitor, capable of handling software written not only for the EGA standard, but for MDA, Hercules, and a special 132-column display. Now that's quite a mouthful! But how is it done? After all, the RGB and Composite monitors are designed to display 200 rows of pixels 60 times a second, while the EGA and Hercules resolutions are 350 rows (lines). The trick EGA Wonder employs to accomplish this is interlacing. ATI's Wonder card scans the 200-line screen twice in succession, creating the effect of a 400-line monitor. As a consequence, the total EGA image is only displayed 30 times per second, half the rate of displaying CGA images. The lower refresh cycle may cause a flickering effect for the eyes that can be minimized with long persistent phosphor monitors, or by using anti-glare and polarized screen filters. Indeed, the flickering effect is noticeable when in the higher resolution modes, but thanks to the relative long persistence of the 9" screen, it's tolerable.

To change the video modes after boot-up, one must execute the ATI-supplied 'SuperSwitch' program, SMS. When executed without any command line parameters, the program displays a small menu

for selecting the desired video option. After a while, I found it more convenient to bypass the menu by specifying options on the command line. You can also use the SMS SuperSwitch program to enable or disable screen blanking.

Further tests proved that by emulating EGA, the ATI card could 'fool' both Microsoft WORD and the EGA PAINT program. I could even display WORDS's 43-line screens, both in text and graphics mode, though the quality of the display in combination with the flickering makes that mode impractical for regular use. Just as WORD, EGA PAINT ran without problem when configured for standard EGA resolution. It, of course, showed colors as 16 distinct shades of gray. Thus satisfied, I concluded my testing.

Conclusion

The displays generated on the internal monitor by the original Zenith video board are definitely better than the CGA video produced by EGA Wonder. If you don't have an external monitor, or your '161 is used primarily in the portable mode (as it was meant to be), then EGA Wonder is not for you. On the other hand, if you use your PC as I do, mostly with an external monitor in the desktop mode, and only occasionally lug it around, than you won't mind occasionally staring at a somewhat inferior monochrome display for the pleasure of enjoying enhanced video displays most of the time on your external EGA monitor. It's like having your cake and eat it, too.

The EGA Wonder, though not explicitly designed to support the Zenith transportable computer, is the next best thing to providing '161 owners with a chance to upgrade their computers to the EGA standard without giving up the use of the internal monitor. The only thing you need that is not yet available on the market is a commercial version of the sync separator IC board that Dave Brockman constructed for this project. However, he assured me that his FBE Research Company could produce the board commercially if sufficient interest would warrant it. Dave figures the break-even production quantity to be about 50 and its price around 40 to 50 dollars, but he doubts that there would be sufficient interest among the '161 owners for such a product. If I am a typical '161 owner, I think Dave is too pessimistic in his assessment, but it's up to you to prove him wrong.

The cost of an entire video upgrade looks quite attractive right now, because of a recent drop in price of the ATI card. I was able to buy the Wonder card for only $185 through mail order. To implement the '161 video upgrade, you also have to get either the Heath ZCA-6 Video RAM Disable Option kit, or one of the video card eliminator products from FBE Research or Dante Bencivengo. Whichever you choose, it shouldn't cost you more than another $50. Assuming the maximum cost of the Sync Separator board from FBE, the whole video upgrade could be procured for under $300. Not a bad deal, not bad at all!

It looks as if finally a low-cost solution to the '161 PC video upgrade problem has been found. What this affords us all is obvious: more choice without sacrificing expansion slots. What may not be as obvious is the satisfaction found in completing a project using the most valuable resource we in the Heath/Zenith user community have: HUG SIG. Without it, this enterprise would never have been attempted.

Products Discussed

Enhanced EGA Wonder
ATI Technologies, Inc.
3761 Victoria Park Ave.
Scarborough, Ontario
Canada M1W 3S2
(416) 756-0711

ZCA-6 Video RAM Disable Option Kit
Heath Company
Benton Harbor, MI 49022
(Available through Heath/Zenith Computers & Electronics stores)

RM-150 PROM
FBE Research Company, Inc.
P.O. Box 68234
Seattle, WA 98168
(206) 246-9815

VMM150 Video Card Eliminator
Dante Bencivengo
P.O. Box 234
Wyandotte, MI 48192

Diamond Scan Color Monitor
Model AUM-1371A
Mitsubishi Electronics
991 Knox Street
Torrance, CA 90502
(800) 556-1234, Ext. 54

Microsoft WORD, Version 4.0
Microsoft Corporation
Box 97017
Redmond, WA 98073-9717
(206) 882-8088

EGA Paint 2005
RIX SoftWorks Inc.
18552 MacArthur Blvd., Ste. 375
Irvine, CA 92715
(714) 476-8266

*

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Sound familiar? My boy is eleven, makes straight A's in math, and I have to check his math?

"Use the calculator, I'll even show you how," said I. "Darn!" I thought to myself, it shows the answer, but not the remainder. The result of 9435 divided by 78 is 120.961538. Let's see, if I multiply the .961538 by 78 that should give me the remainder. Yep, the answer is 74.999964 or 75 as a remainder.

My boy's head tilted to the side. Like a dog responding to the squeal I make by sucking my hand, so I knew this would take time. Miss December was talking about her childhood and my boy had to leave the room soon.

He has to show the work on the sheet, so I knew he had done the required pencil work.

"I'll write a program tomorrow, now go to bed."

In the morning I showed him how to create a basic program that did the division just like a calculator. Right down to the same decimal remainder!

"I'll write a program at work, just check the big number for now," I said.

Being a 'Hardware' person, I know enough BASIC to be dangerous. I have to admit that it only took twenty minutes to come up with a simple program to do just what I needed.

I know good programmers are out there. They could write the program to be faster and more efficient, but I haven't seen any like this yet. Hopefully, someone already has a better program, and after seeing mine, won't be embarrassed now to submit theirs.

```
10 CLS              'Clear the screen
20 INPUT "What is the big number ";A
                   'Should be clear to all
30 INPUT "What is the divisor ";B
                   '    Ditto
31 PRINT:PRINT:PRINT:PRINT
                   'Lets make some space
35 IF A<B THEN PRINT
   "Sorry, does not compute!":GOTO 90
                   'This is for Murphy!
40 C=A-B            'KISS
50 D=D+1
       'Division is multiple subtracting
55 A=C         'This is a must
60 IF A < B THEN 80 ' This is the stopper
70 GOTO 40
       'B must still be bigger than A
80 PRINT "The answer is ";D;"
   with a remainder of ";A
                   'How about that!
81 PRINT:PRINT:PRINT:PRINT:
                  'Same as line 31
90 PRINT:INPUT "Hit Return when ready
   or 9 to stop";Z    'Here's a way out
100 IF Z=9 THEN END ELSE CLEAR:GOTO 10
       'All good programs have an ending
```

Sure, For-Next loops could be used in lines 31 and 81. I evolved through the stage of using PRINT one line after another. Then learned to use PRINT:PRINT:PRINT. A programmer showed me the

FOR I = 1 to 10:PRINT:NEXT. Then, finally direct cursor addressing, but that's another story.

Fancy direct screen addressing, colors and bells could be added, but who has the time? I just enjoy the free time we now have together, not checking home work.

Larry Bollman
Heath Technical Consultant

Smooth Operation Of WordStar In Directories

Dear HUG:

I read your letter in Buggin' HUG (February REMark), and can identify closely with your attempts to make WordStar operate smoothly with MS-DOS directories. There are several solutions to your problem that are much easier than the route you chose.

Perhaps the easiest approach is to upgrade to WordStar version 4.0, which is being used for this letter, in which directories are fully supported, and in which the main program file "remembers" where its dictionaries and overlays are stored. But that costs money.

You've discovered the use of the MS-DOS SUBSTitute command allowing you to create pseudo-drives out of your document sub-directories, and in combination with batch files and an appropriate PATH statement, you have the wherewithal to invoke WordStar anywhere and log into any directory specified as a pseudo-drive. Yeah, it works . . . but have you ever wanted to bring up WordStar someplace that isn't defined as a pseudo-directory, such as root (so you could make a quick change to AUTOEXEC.BAT), or any other place?

The fundamental problem you must overcome is the shortcoming in the MS-DOS PATH command that only looks for *.COM, *.EXE, and *.BAT files. PC-DOS version 3.30 overcomes this restriction with the new APPEND command which will find all files for you. And yes, your Z-148 will run PC-DOS 3.30 rather nicely, though I'm partial to Zenith implementations and prefer to stay with MS-DOS 3.20 from them. Fortunately, there is another much less expensive way to have your cake and eat it, too.

Arborsoft Systems, Inc. developed a product called SEARCH (not to be confused by the MS-DOS command of that name), which in 1984 could be licensed for a whopping $15. I found a copy on an electronic bulletin board, and would expect any active users' group (also the HUG Bulletin Board) to have a copy of it available. Otherwise, and hopefully, they are still active, you could write directly to them for their latest version:

Arborsoft Systems, Inc.
P.O. Box 4599
Ann Arbor, MI 48106

SEARCH.COM operates in place of, or in conjunction with, the PATH statement. On my system, WordStar program files and dictionaries are all in one sub-directory two echelons below root. Whereas my PATH statement is quite similar to yours (although I include drive letters so they continue to work when logged to other drives), I also include this line in my AUTOEXEC.BAT file:

```
SEARCH C:XWORDXWORDSTAR
```

A small chunk of memory (about 4K) is committed to SEARCH, which is a memory resident program. Then, I can invoke WordStar from simply any drive or directory at any time. SEARCH does not permit you to change directories from within WordStar, but that is a very minor inconvenience related to WordStar not SEARCH. I use WordStar in lieu of EDLIN for batch files, dBASE programming (automatically invoked by dBASE), and certain document preparation where ASCII text files are required. And there's nothing like the surprise on a friend's face when you log onto a floppy drive and simply enter 'WS' <CR> to start editing on what is obviously a blank, formatted diskette.

I'm glad that this capability is being added to MS-DOS/PC-DOS where it should have been all along, but it may be some time

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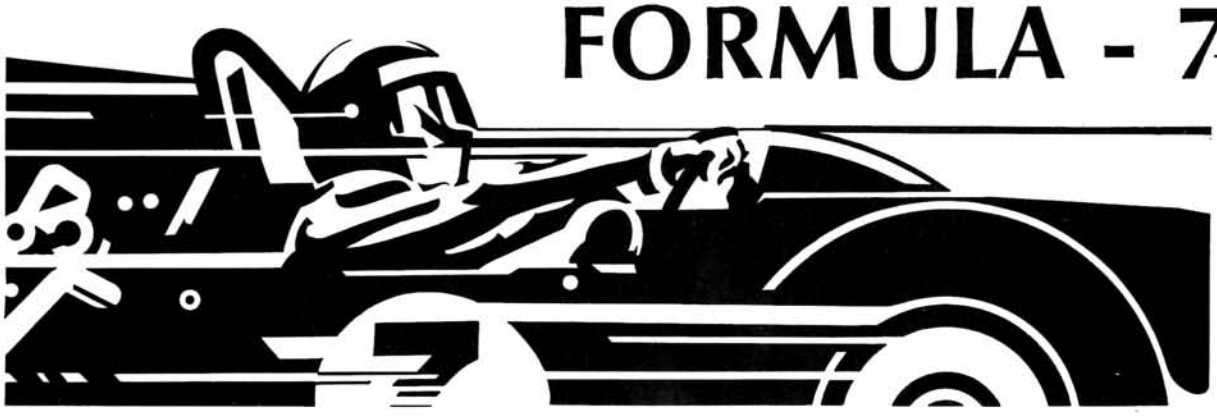
THE FORTRAN FORMULA - 7



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Wheeler Associates, Ltd.
P. O. Box 9512
Alexandria, VA 22304
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It has been a while since the last article in this series appeared. Illness and a son's wedding will do that. However, all is now well, and we're ready to proceed with making more, and more useful FORTRAN programs.

To all those who wrote with suggestions and comments on this series, my sincere thanks. FORTRAN is far from a "dead language," as your interest and the large amount of code still being written in it attests. In this article, I'll give you a road map of the next several articles in the series, which will once again be appearing at regular intervals. But first, let's take a few paragraphs to revisit sources of FORTRAN.

FORTRAN Is Where You Find It

In the past couple of years or so, any question as to whether the IBM PC architecture would become the new industry standard has been erased. The proliferation of clones, especially the enthusiastic choice of Zenith PC-compatibles by such customers as colleges and the U.S. military, has been good news for Heath/Zenith users. With the issue of computer architecture settled, FORTRAN compilers for MS-DOS have been improved. Prices for compilers have dropped, and more vendors have entered the marketplace with FORTRAN compilers. My original assessment of the compiler marketplace is now sadly out of date.

FORTRAN compilers that will run on Heath/Zenith IBM-compatibles under MS-DOS are available from Heath/Zenith (catalog number MS-5063-2, $195.00) and from several mail-order software vendors. The latter regularly advertise in magazines like Byte, and the Microsoft compiler runs about $195-$225 from them.

This good news for PC-compatible users has been bad news for those who (like me) prefer the older 8-bit machines that they still haven't totally mastered. In the space of a few months, support for the CP/M users dried up. I have received many letters asking for sources of FORTRAN compilers to run under CP/M. Until recently, I had no good news for those writers.

But, one man's misfortune is often another man's gain. No doubt, you have heard of the ill-fated Osborne Computer Corporation. Osborne succumbed to hypergrowth, but it didn't go quietly. The company filed for protection under Chapter 11 of the bankruptcy laws and attempted to get started again with a new product line and a revised marketing strategy. It didn't work, and the last of Osborne's assets -- including their inventory -- were sold at auction.

So what? This is a Heath-Zenith magazine, right? Well, dear reader, here is where the plot thickens.

Osborne sold quite a lot of computers in its heyday (on the order of 110,000), and it engaged in the development and licensing of a considerable variety of software for them. Osbornes were originaliy sold with a software package that included CP/M, WordStar, MBASIC, CBASIC, and SuperCalc. A lot of additional software was also available, but the machine's parent company didn't last long enough for much of it to be sold. The users, after all, were still learning how to use the stuff that came with their machine.

One of the packages licensed for the Osborne was the Microsoft FORTRAN com-

piler. It didn't sell too well for the reasons discussed, and lots of copies were auctioned off with the other items of Osborne's inventory. It may not seem so, but this is good news for Huggies. H-8's and H-89's can read Osborne disk formats (more about this in a minute), and the compiler requires only plain vanilla CP/M -- just what is found on the Heath machines -- to run.

OK. Where can you buy the compiler? Both of the following dealers assure me they have ample stocks of the Microsoft FORTRAN compiler (FORTRAN-80):

Central Computer Products
330 Central Avenue
Fillmore, CA 93015
(805) 524-4189
Item #02 FORC, $189.00

Public Domain Software Company
33 Gold Street L3
New York, NY 10038
(212) 732-2565
Item FORTRAN-80, $39.00

I have dealt with both of these companies and found them to be reputable. Both will convert the software from the Osborne format to Heath H-89 format for a small added fee. I have no connection with either of them except as a customer.

Now that you have the compiler on Osborne disks, what can you do with it? If you have a friend with an Osborne, simply hook up the two computer's RS-232 ports and transfer all the FORTRAN files from the Osborne to the Heathkit using one of the many communications programs available, such as MODEM, Kermit, or MEX. The only major criterion is that the communications program allows you to transfer 8-bit binary files. Programs like ZTERM and MLINK, which transfer only ASCII characters, can't be used here.

If you don't have a friend with an Osborne, then you can purchase a program which will allow your Heath/Zenith machine to read the Osborne disks directly. One such program is Emulate, available from Analytical Products, 20663 Avenue 352, Woodlake, CA 93286, telephone (209) 564-3687. Emulate allows the H89 to read and write a variety of "foreign" disk formats, including the Osborne 1 format.

Or, you can do it yourself. Sextant magazine carried an article in Issue 18 (September/October, 1985) that describes a program named FOREIGN.COM, which allows Heath CP/M 2.2.03 to read Osborne disks directly. The program code is included in the article. If you take the time to enter and assemble this program, you'll be amply rewarded, as a whole new source of CP/M software will be open to you. Back issues of Sextant are available from the publisher at 716 E Street, S.E., Washington, DC 20003.

Clearly, the supply of 8-bit compilers won't last forever, so it would probably be a good idea to get one before too much longer. If you are just getting started in this computing business, you may want to consider buying a used H-89 and a FORTRAN compiler. It's lots cheaper than a new computer, and you can gain valuable experience that will help shape your understanding of this aspect of programming. FORTRAN was born in an age when memory was expensive and programmers were cheap, so it provides lots of ways to manage memory variables. You don't need 640K of memory to use FORTRAN.

Once you have set up FORTRAN on your machine, whatever type it is, the rest of this series is for you. It doesn't matter what computer or operating system you are using, FORTRAN's power and benefits are now yours. To start on the right foot with FORTRAN, now might be a good time to review the previous installments of this series.

What Went Wrong Last Time

The code described in "The FORTRAN Formula - 6" contains an error which it should not have. In Figure 1 of "The FORTRAN Formula - 6" there is a function which won't work in all versions of FORTRAN.

```
      FUNCTION AVGM (ARRAY, LENGTH)
      DIMENSION ARRAY(60)
      SUM = 0.0
      DO 3000 J=1,LENGTH
3000  SUM = SUM + ARRAY(J)
      AVGM = SUM/FLOAT(LENGTH)
      RETURN
      END
```

Figure 1.
An incorrect FUNCTION to fill an array.

The defective code is shown in Figure 1. This function wants to pass the name of the array to replace the dummy variable ARRAY. But the name of an array is a string, and FORTRAN-66 (the version used in the 8-bit world) has no way to do this as shown. Thus, this function will not work. It will fill an array with data as described, but the array must be named ARRAY.

We will examine in future articles how to work easily with strings in FORTRAN. For now, review the functioning of this code, realizing that the correct code to fill an array named ARRAY is as shown in Figure 2.

```
      FUNCTION AVGM (LENGTH)
      DIMENSION ARRAY(60)
      SUM = 0.0
      DO 3000 J=1,LENGTH
3000  SUM = SUM + ARRAY(J)
      AVGM = SUM/FLOAT(LENGTH)
      RETURN
      END
```

Figure 2.
A correct FUNCTION to fill ARRAY.

If you need to, reread "The FORTRAN Formula-6" for the detailed discussion of how this function performs, and for the explanation of the dimensioning of the array. This is a good example of how not considering all the possible uses of something can lead to troubles later on.

Carelessness Costs

Much has been written about the need for precision in programming. That need is essential, no matter how many fancy tools you have available to help you write programs. The code below (Figure 3) is taken from a true example, which might be called "The most expensive code error in history."

```
      DO 10 I=1.3
        [executable code here]
10 CONTINUE
```

Figure 3.
Erroneous FORTRAN code segment.

What's wrong here? What will FORTRAN do with this code segment? As a clue, remember that FORTRAN ignores spaces.

The error in this code is that the DO statement should read

```
DO 10 I=1,3
```

The comma that was intended has been mistakenly replaced by a period in the actual code. But the compiler doesn't know what was meant, it only knows what was written. What will happen here is that the

compiler will, when encountering what was meant to be a DO statement, define a floating variable named DO10I and assign it the value 1.3. It will then execute the code between this statement and the CONTINUE. Once. It will then pass on to the code after the CONTINUE. Those things that were to have been done three times will, in fact, be done only once.

This particular error occurred in the code used to program the navigation of one of NASA's Venus probes. As a result of the failure of the loop to execute three times, the probe missed Venus and disappeared into deep space. Total cost of the software error? Tens of millions of dollars. Precision counts in any language, not merely FORTRAN, so the attention to detail you learn here will serve you well wherever it is applied.

Where We're Headed

We're just about through with the basics of FORTRAN. That's good, because it is always the first, needed parts of most lessons that are the most boring. In upcoming installations of this series, we are going to look into how to use FORTRAN to get real solutions to real problems. Along the way, we'll study the following topics (and some others, as well):

• Using arrays to handle data (we are about halfway there now)

• File structure and compatibility with other programs and languages. If FORTRAN is to be truly useful to you, you want to be able to read and write files that other systems can read and write without difficulty.

• Handling string data. As you have seen, FORTRAN wasn't built to make string processing easy. We'll see how to do it.

• Subroutines and functions are powerful features of FORTRAN. We'll learn how to use them to make our job easier, and how to make them re-usable from one program to another. After all, how many times do you want to write the same program segment?

• We will look at how to build and use screens and printed reports using FORTRAN. Automation doesn't do you much good if it is hard to get information into the system or if the output has to be read with a ruler and a red pencil.

• While looking at these features of the language, we will continue to apply them to our stock market study. At the end, we'll have a working, practical market analyzer.

• A picture is worth a thousand words, especially when dealing with large amounts of numerical data. So we will look at how to make FORTRAN draw graphs to display our data. And we'll do it without spending hundreds of dollars for add-on graphics boards. Also, we'll look at ways to make these graphs on printers, so that a permanent record can be made if you want one.

• Interfacing to other programs is important if we are to make maximum use of this language. We'll look at some ways to do it with minimum muss and fuss, using FORTRAN to read files created in other languages, and also to write files that can be read by other languages.

• There are front-end processors that add features to FORTRAN that make it easier to write and also easier to use. The best known of these is called RATFOR (for RATional FORTRAN). It is inexpensive, available, and it works. We'll see how it can make life easier.

FORTRAN can't do everything, any more than any other language can. But it does lots of things very well. If you need to process numbers in your work, FORTRAN is about the best language going, and there is lots of free code available for the asking to solve many complex scientific and engineering problems. We'll look at some sources for these programs, and how to check them out when you get them.

It has been said that FORTRAN is no longer useful because it is "old" and cannot be used for structured programming. Nothing could be further from the truth. As we progress in our study of this fine language, we are going to see how to make our code structured and easy to read. It isn't difficult to do, and you'll find that if you do it, you won't wonder what this or that piece of the program does when you look at it a few months from now. *

FBE

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■ ***Maximize Your Z-100***

ZMF100A: Put 256K RAM chips on "old" motherboard (p/n 181-4917 or less, board 85-2653 only). Expand to 768K. No soldering. Without RAM chips. $65.

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■ ***Z-171 Memory Expansion***

MegaRAM-171: Put 256K RAM chips on memory card. Get 640K memory plus 384K RAM disk. Without RAM chips. $69.95.

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H89PIP Parallel Interface: One printer port; one I/O port. Printer driver software incl. (specify opr. system, media and printer). H89PIP $50. Printer Cable $24.

Spooldisk 89: Electronic disk/printer interface/spooler. Right-side installation. $125.

SLOT4 Bus Expander: Adds expansion slot to the right-side bus. $39.

■ ***H/Z-150 Stuff*** (Not for '157, 158, or '159)

LIM150: 640K RAM plus 512K of simulated Lotus-Intel-Microsoft v3.2 EMS expanded memory. Installs on H/Z-150/160 memory card. No soldering. Requires forty-five 256K RAM chips (not included). $49.95.

MegaRAM-150: 512K RAM disk plus regular memory. Installs on H/Z-150/160 memory card. No soldering. Use MegaRAM-150 for 704K main memory or MegaRAM-150 T for 640K main memory and EGA compatibility. MegaRAM-150 or MegaRAM-150 T. Without RAM chips $49.95.

ZP640 PLUS PAL: Allows expansion to 640K or 704K by adding two banks of 256K RAM chips (not included) to memory card. $19.95 for the first one, $9.50 thereafter.

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Capital Heath/Zenith Users' Group

Announces Major User Conference

The Capital Heath/Zenith Users' Group (CHUG) has announced its Seventh Annual International Microcomputer Conference and Exposition, CHUGCON '88. The conference and exposition will be held at the Hyatt Regency Hotel in Crystal City, Virginia on Friday July 29 and Saturday July 30.

CHUGCON is a successful, well attended conference, allowing microcomputer users and hobbyists to see the products currently being discussed in trade journals and user group meetings. Tutorial sessions, scheduled throughout the conference, assist both new and experienced users in understanding the strengths and weaknesses of the latest products.

Over 120 booth areas are expected to be filled for the exposition. Attendees will have continuous access to the vendor area from 9:00 AM to 5:00 PM on Friday and Saturday. A banquet will be held Saturday evening, starting at 7:00 PM. Vendors will be permitted to sell their products from the booths. Attendees can expect to receive significant discounts from standard store prices.

One of the more "fun" aspects of CHUGCON is the hourly door prize drawings. The same advanced products that draw crowds have been contributed, by their vendors, to be given away. Every registered attendee has the chance of walking home with free hardware or software. A champagne tour, as well as other sight-seeing activities, have been planned for convention attendees.

Entry to the conference and exposition will cost $5.00 at the door. However, many local stores and computer related businesses will be distributing passes to their customers. CHUG is actively soliciting the involvement of local business people in "spreading the word".

Special assistance has been arranged for the hearing impaired. Advance registration forms will allow the conference management to assure sufficient aides for attendees.

A computer bulletin board system is available to answer inquiries, or to request free conference passes. It may be reached by calling (202) 797-7236 (metro DC) or (703) 339-9856.

For further information, contact CHUGCON at:

P.O. Box 16406
Arlington, VA 22215
(703) 339-9857

Getting Started With WordPerfect

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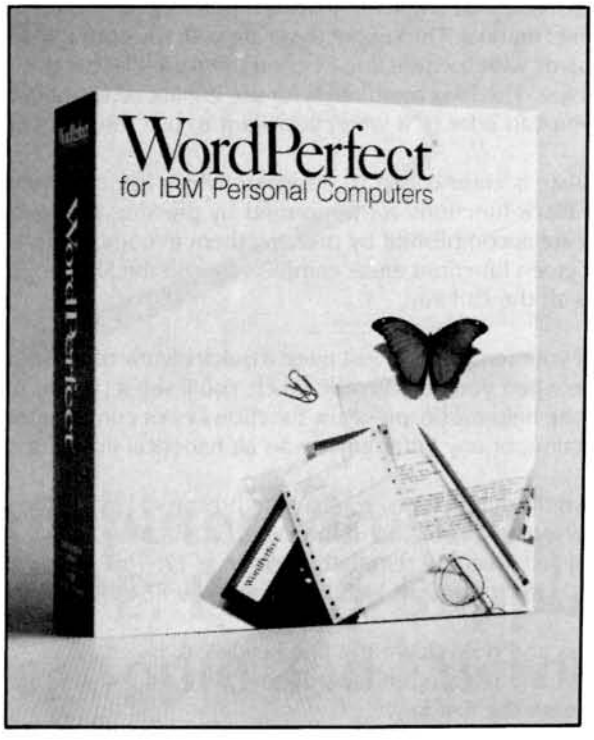

For the average computer owner, word processing may be the most useful software package to purchase and learn. So it is no wonder that word processors are some of the most popular programs on the market.

If you are a student or business person, a word processor can save you hours of work and trouble. In fact, once you've learned how to use your computer for word processing you'll probably never use a typewriter again.

The history of word processing hardware and software is an interesting story since it parallels the changing nature of the computer industry. But the word processor you'll learn how to use in this article -- WordPerfect -- is so powerful that I want to devote as much time as possible to it. In addition, I'll defer slightly from the step-by-step pattern used in my other Getting Started articles. There's just too many useful things even a beginner user can use to include in steps.

WordPerfect is now in its fifth major release, with Version 5 just recently going on sale. Chances are you have either version 4.2, the last current release, or you plan to upgrade to version 5. If you have a laser or a high quality dot matrix printer it is definitely worth the upgrade.

As with all articles in the Getting Started series, I'm assuming you have the software package available and that you're a pretty new user. This article describes the newest release, version 5.0.

Word Processing

If you are new to computer word processing, keep a few points in mind to ease the transition. At one level, typing on the computer is no different than using a typewriter. The letter, number, spacebar, tab, and shift keys perform the exact same functions as those on a typewriter. So if you ever used a typewriter you already know how to use the most important parts of a word processor. For simple let-

Table 1
Special Keys

TAB	(with two opposite pointing arrows) is next to the letter Q on the left side of the keyboard. Use this key just like the TAB key on a typewriter.
SHIFT	(there are two shift keys) on opposite sides of the keyboard. You can press either of the two shift keys when needed.
RETURN	(on the right of the keyboard has the left point arrow with a little hook) is used to end paragraphs or insert blank lines into the text.
BACKSPACE	(left pointing arrow near the top of the keyboard) is used to delete unwanted characters.
ESC	is used to repeat characters and commands automatically.
INS	(the Insert key) switches between the Insert and Typeover modes. In the Insert mode, existing characters will move over to make room for new ones. In the Typeover mode, new characters will replace existing ones.
DEL	is used to erase characters from the screen.
ALT	(the Alternate key) is used with the function keys described later.
CTRL	(the Control key) is also used with the function keys.

Table 2
Using Function Keys

Your computer may have 10 or 12 special functions keys, labelled F1 to F10 or F12. They are either on the left side of the keyboard or above the top row.

WordPerfect has "programmed" these keys to perform complex tasks quickly and easily. You received two templates describing these function keys with your WordPerfect manual. The square template with the cutout in the middle is designed for keyboards with the function keys on the right. Place it over the keys and refer to it as you type. The long template is for the enhanced keyboard -- place it above the keys so you can refer to it when you want to use the function keys.

The template is color coded to designate which key combinations performs which function. Black functions are performed by pressing the function key itself. Other functions are accomplished by pressing them in combination with the Alt, Shift, or Ctrl keys: green functions are accomplished with the Shift key, blue with the Alt key, and red with the Ctrl key.

If you lost your template, or just need a quick review of functions, press F3 (the Help key) twice when you're in WordPerfect. You'll see a picture of the template. Once you're in the help mode, press any function key or combination to see a description of its function, or any letter key for an alphabetical listing of commands.

To perform these functions, you have to press two keys at the same time. For example, if you see an instruction in the WordPerfect manual that says to press the Print key, you'll see it on the template in green at F7. This means that you should press and HOLD down the Shift key; then press the F7 key. The sequence is this:

1. Press and hold down the first key listed.
2. Press and release the second key.
3. Release the first key.

In this article, I'll refer to all functions by their keystrokes, such as Shift-F7.

Other key combinations used to perform certain functions must be pressed in sequence, one after the other. In this article I'll separate those with blank spaces. For instance, if an instruction says to press F7 N N, this means you should:

1. Press and release the F7 key.
2. Press N.
3. Press N a second time.

While this might seem difficult to learn, you'll find they become almost automatic after a little use.

Table 3
WordPerfect Default Settings

Page size:	8 1/2 by 11 inches
Top and bottom margins:	1 inch
Left and right margins:	1 inch
Spacing:	Single, 6 lines per inch
Tab stops:	every half-inch
Justification:	on
(when printed not shown on the screen)	
Page numbers:	none

ters and other documents you only have to know basic typing techniques and the few special keystrokes to print and save your document. (Table 1 lists some special keys that you'll find on the computer keyboard and how to use them. Table 2 shows how to use the function keys.)

Even if you only learn the most simple editing and formatting techniques, which can be done quickly, you'll still save a great deal of time compared to the old fashioned typewriter. That's because WordPerfect, like most word processors, automatically starts with a set of default values for page size and margins. If you want to use the default values, listed in Table 3, then you just start the program and type.

That's the point of this Getting Started article. You'll learn how to use WordPerfect for basic typing tasks in the shortest time possible.

Installing WordPerfect

WordPerfect requires no special setup beyond designating which printer you're using. You do this from within the program itself so you don't need any special installation instructions. Version 5.0 does come with a program called Install. But this only copies the program from your floppy disks to a hard disk, if you have one. If you don't have a hard disk, just make a copy of the programs for your own safekeeping — the Install program won't be of any use to you. If you have a hard disk, run the Install program or copy all of your floppy disks onto a directory of your hard disk.

Starting WordPerfect

To start WordPerfect with a hard disk, follow these steps:

1. Turn on your computer, respond to the date and time prompts if they appear.

2. Log onto the WordPerfect subdirectory (Install names it WP50) with the command CD\WP50 (or whatever you named your subdirectory).

3. Type WP and press Return to start WordPerfect.

To start WordPerfect with a floppy disk system, follow these steps:

1. Insert a DOS disk in your computer, turn the computer on, and respond to the date and time prompts if they appear.

2. Place the WordPerfect 1 (if you have 5 1/4" drives) or WordPerfect Program disk (3 1/2" drives) in drive A.

3. Place a blank formatted disk in drive B to store your documents.

4. Type **B:** then press Return to log onto drive B.

5. Type **A:WP**, then press Return.

If you have 5 1/4 inch disks, in a moment you'll see the message

```
Insert diskette labeled ''WP 2   and press
any key
```

Remove the WordPerfect 1 disk from drive A and insert the WordPerfect 2 disk.

Close the disk drive latch then press any key.

You'll see an almost blank screen except for a status line on the bottom looking like this:

```
Doc 1 Pg 1 Ln 1'' Pos 1
```

The status line shows you the position of the *cursor*, a small blinking line showing where the next characters you type will appear. When you first start WordPerfect, the cursor is in the first document (you can work on two at a time), page one, one inch from the top of the page and one inch from the left.

Now let's try typing.

1. Press the TAB key to indent the first line of the paragraph.

2. Type the following sentence, *but do not press the Return key at the end of the line, just keep typing.*

Word Processing provides capabilities far beyond those of a typewriter.

Notice that when the cursor reached the right edge of the screen it automatically moved to the next line. This is called *word wrap*. WordPerfect senses when the word you're typing will not fit on the line and moves it to the next. Press the Return key only to *end paragraphs and insert blank lines.*

3. Press the Return key twice -- once to end the paragraph and again to insert a blank line.

4. Now type the following sentence.

You can edit and format text on the screen then print it when ready.

Cursor Movement

As you typed the two paragraphs above, the characters were entered at the position of the cursor. If you move the cursor, then, you can enter characters anywhere in the document. You move the cursor by using the directional arrow keys in the numeric keypad on the right of the keyboard.

First, check that the characters Pos on the status line are not blinking. If they are, press the Num Lock key once. When Pos is blinking these keys act as regular number keys. When they are not blinking, they are the cursor movement keys.

When you press any of the arrow keys -- right, left, up, or down -- the cursor moves in that direction. Hold the key down to move more than one step at a time.

You can also move in larger blocks as explained in table 4.

Table 4
Cursor Movement Functions

Moving Down	
Home Home Down Arrow	Moves the cursor to the end of the document.
PgDn	Moves the cursor to the top of the next page in the document.
Home Down Arrow	Moves the cursor to the bottom of the screen or, if already there, displays the next 24 lines of text.
Ctrl-Home Down Arrow	Moves the cursor to the bottom of the current page.
Moving Up	
Home Home Up Arrow	Moves the cursor to the top of the document.
PgUp	Moves the cursor to the top of the previous page.
Home Up Arrow	Moves the cursor to the top of the screen or, if already there, displays the previous 24 lines of text.
Ctrl-Home Up Arrow	Moves the cursor to the top of the current page.
Moving Left	
Home Left Arrow	Move the cursor to the left edge of the screen.
ESC n Left Arrow	Moves the cursor n characters to the left.
Moving Right	
END	This key moves the cursor to the end of the end of the current line.
Home Right Arrow	Moves the cursor to the right edge of the screen.

Editing

You insert new characters within existing text by simply moving the cursor to the point of insertion and typing. Usually, the new characters will be inserted between existing ones. The words to the right of the cursor will move over (and down, if necessary) to make room for the new ones. This is the default insert mode.

WordPerfect also has a typeover mode. In this mode, the new characters replace the existing ones. That is, each new character takes the place of the one already there. To enter the typeover mode, press the Ins key, and **Typeover** appears on the status line. Now one character will be deleted for every one you type. (Just press Ins again to return to the insert mode.)

Table 5
Keystroke Summary

Boldface	F6
Clear Screen	F7 N N
Help	F3
Indent Both	Shift-F4
Indent Left	F4
Print page	Shift-F7 2
Print document	Shift-F7 1
Recall Text	Shift-F10
Save and Exit	F7 Y
Save	F10
Underline	F8

Next to inserting, the most common editing function is deleting characters. Use the Backspace key to delete characters to the left of the cursor. To erase several characters, hold the Backspace key down. Press the Del key to erase the character at the cursor position. To delete several

characters to the right of the cursor, hold the Del key down.

Press Ctrl-Backspace to delete the word on which the cursor is placed. Press Ctrl-End to delete the current line, from the cursor to the right margin.

To delete all of the current page, from the cursor position down, press Ctrl-PgDn then Y to the message **Delete Remainder of Page? (Y/N) N** that appears on the status line. (Press N or Return if you change your mind.)

To delete from the cursor position to the start of the word, press Home Backspace (one after the other, not together). If the cursor is between words you'll delete the word on the left. If the cursor is in a word, press Home Del to delete from the cursor position to the end of the word. If the cursor is between words this will not erase the word to the right, only the cursor position.

If you change your mind *after* deleting text, press F1, the Cancel command. You'll see the prompt

```
Undelete 1 Restore; 2 Previous Deletion:0
```

on the status line and the last characters deleted will reappear highlighted at the position of the cursor. Press 1 to restore the deleted text at that location on the screen or 2 to see the text you deleted previously.WordPerfect "remembers" the last three deletions made. Press F1 to show the last deletion, then 2 to reveal the one before, and 2 again to show the deletion before that. Whatever text is highlighted will be restored when you press 1 at the undelete prompt.

Use the Undelete command to quickly move words or phrases. Delete the text, then move the cursor to the location where you want the text to appear and press F1 1.

Saving Documents

Let's save the text on the screen before going any further. There are two ways to save documents. One method (the F10 key) is used to save the document then continue working on it. The other method (the F7 key) is used to save the document and exit WordPerfect, save the document then clear the screen to begin another, or just clear the screen without saving the text on the screen.

Keep in mind that with all of these methods, the cursor can be anywhere in the document. Let's save the document and clear the screen. You'll recall the document later.

1. Press F7 to display the prompt **Save Document? (Y/N) Yes.**

2. Press Y to display the prompt **Document to be Saved:.**

3. **Type LETTER** (or some other document name up to 8 characters -- no spaces allowed).

4. Press Return to store the completed letter on the disk. After the letter is saved, the prompt displays **Exit WP? (Y/N) No.**

5. Press N to clear the screen and remain in WordPerfect.

```
Print

     1 - Full Document
     2 - Page
     3 - Document on Disk
     4 - Control Printer
     5 - Type Through
     6 - View Document
     7 - Initialize Printer

Options

     S - Select Printer
     B - Binding                          0"
     N - Number of Copies                 1
     G - Graphics Quality                 Medium
     T - Text Quality                     High




Selection: 0
```

Figure 1

If you want to clear the screen without saving the document, press F7 N. Then press N to remain in WordPerfect, or Y to exit. You can also save a document by pressing F10. Continue as in step 2 but the Exit prompt will not appear.

By the way, once you've saved (and named) a document, its name will automatically appear at the prompt shown in step 2. Press the Return key to save the document using the same name or enter a new one. If a file already exist with that name, you'll see the prompt **Replace (document-name)? (Y/N) No.** Enter Y to save the edited version of the document or N if you want to rename it.

Selecting A Printer

The first time you use WordPerfect to print a document, you must designate, or select, a printer. You don't have to do this every time you print, just the first time. You'll need your disks labelled Printer. If you have a 5 1/4" system, you'll have four of these, labelled Printer 1 to Printer 4. With 3 1/2 inch systems you'll have three disks -- labelled Printer 1/Printer 2, Printer 3, and Printer 4.

1. Place any one of your Printer disks in drive A (hard disk systems) or drive B (floppy disks).

2. Press Shift-F7. You'll see the print menu shown in Figure 1.

3. Press S, for Select Printer. The screen changes to the Print: Printer Selection menu.

```
Select Printer: Additional Printers

Printer files not found

     Use the Other Disk option to specify a directory for the printer
     files.  Continue to use this option until you find the disk with the
     printer you want.




1 Select; 2 Other Disk; 3 Help; 4 List Printer Files; N Name Search: 1
```

Figure 2

4. Press 2 to select Additional Printers.

You'll see the message shown in Figure 2.

5. Press 2 to select the Other Disk option, type the drive letter holding your printer disk (A: or B:) then press Return. You'll see a list of printers that WordPerfect has been made to work with. You must select your own printer from the list.

6. Press the down arrow key. As you press the key, each printer name will become highlighted. When you reach the bottom of the screen, the list will "scroll" off the top to display more printers at the bottom. You can press the up arrow key to redisplay any names that have scrolled off the top.

7. Press the up or down arrow keys to highlight your printer's name.

If you don't see your printer's name even after scrolling the entire list, remove the Printer disk from the drive and insert another Printer disk. Follow steps 5, 6, and 7 until you can select your printer.

8. Press Return when your printer's name is highlighted. You'll see the prompt

```
Printer Filename: (your printer s name)
.PRS
```

```
Printer Helps and Hints:  Epson FX-80

High Quality print is extremely slow but will micro-space and right justify
up to 1/120th of an inch.  If you do not require this high quality we
suggest that you use medium or draft quality. Both of these qualities will
be much quicker.
------------------------------------------------------------------------
In the medium or draft modes there will be a slight round off error in
spacing when using 8.5 CPI and 17 CPI.  This is because micro-spacing is
not used.  There will also be a problem right justifying in medium or draft
modes.  The horizontal movement of these modes is 1/10 which creates an
"all or nothing" situation (either there is a space between words or there
is not).  We suggest that the hyphenation zone is decreased or that right
justification is turned off.
------------------------------------------------------------------------
The paper feed lever on the printer must be set to friction mode to ensure
correct positioning of graphics and attributes.
------------------------------------------------------------------------
When defining forms we suggest a top offset of about -.94"**.  This setting
will enable correct top / bottom margin settings in WordPerfect while the
paper perforation is aligned with the tear-bar on the printer.
  **  This number may vary due to personal preferences.

Press Exit to quit, Cursor Keys for More Text, Switch for Sheet Feeder Help
```

Figure 3

```
Select Printer: Edit
        Filename                        EPFX80.PRS
    1 - Name                            Epson FX-80
    2 - Port                            LPT1:
    3 - Sheet Feeder                    None
    4 - Forms
    5 - Cartridges and Fonts
    6 - Initial Font                    10 CPI
    7 - Path for Downloadable
          Fonts and Printer
          Command Files

Selection: 0
```

Figure 4

9. Press Return. You'll see the message

```
Updating font:
```

in the status line followed by a font number while WordPerfect loads the appropriate printer codes onto your disk.

The Printer Helps and Hints screen will then appear, as shown in Figure 3. (Don't worry if no Helps or Hints appear for your printer.) Read the screen then press F7.

After the file is loaded, you'll see the Printer Selection: Edit menu (Figure 4).

```
Select Printer: Forms
                                                Orient Init              Offset
Form type                  Size                 P L    Pres Location  Top     Side

Standard                   8.5" x 11"           Y N    Y    Contin    0"      0"
[ALL OTHERS]               Width ≤ 15"          Y N    N    Contin    0"      0"

If the requested form is not available, then printing stops and WordPerfect
waits for a form to be inserted in the ALL OTHERS location.  If the requested
form is larger than the ALL OTHERS form, the width is set to the maximum width.

1 Add; 2 Delete; 3 Edit: 3
```

Figure 5

You have to check out two options on this menu: the type of paper feed you're using and the port you're printer is attached to.

10. Press 4 to select the Forms option. The screen (Figure 5) displays a list of forms already defined for your printer. Look at the line starting with Standard, under the column marked Location. If it says "Contin" then WordPerfect assumes you're using continuous feed paper and it won't stop to let you insert individual sheets into the printer -- Manual feed.

If the location is correct, then skip to step 15.

11. Press 3 for Edit to display the Printer Selection: Forms edit menu.

12. Press 4 for the location option to display the prompt line

```
Location: 1 Continuous; 2 Bin Number; 3
Manual: 0
```

13. Press the number corresponding to the paper source.

14. Press F7 to display the Printer Selection: Forms menu.

15. Press F7 to redisplay the Edit menu.

Look at the Port option. This refers to the port where your printer is attached to your computer. LPT 1 refers to a standard parallel printer port, the most common in use with PCs. Chances are you're using a printer attached to that port. If you have a parallel printer and the port listed on the menu says LPT 1, then just press Return

and skip to step 18. If you have a serial printer and the port says COM 1 then press Return and skip to step 18.

16. Press 2 to select the Port option and display the prompt

```
Port: 1 LPT 1; 2 LPT 2; 3 LPT 3; 4 COM 1; 5 COM
2; 6 COM 3; 7 COM 4; 8 Other: 0
```

17. Press the number corresponding to your printer's port.

18. Press F7 to display the Print: Printer Selection menu. The printer you just defined is now added to the list, although it is not yet selected.

19. Press Return to select the printer and display the Print menu.

20. Press F7 again to return to the document.

Recalling Documents

Now that you've selected a printer, let's recall the document and print it. You don't have to save a document in order to print it. We just did it here to show you how documents are saved and recalled.

1. Press Shift-F10 to see the prompt **Document to be retrieved.**

2. Type **Letter** (or some other document name) then press Return. The document is recalled from the disk and displayed on the screen.

Printing Documents

To print your document, press Shift-F7 1. To print just the page in which the cursor is located, press Shift-F7 2.

Formatting Text

Now that you know how to type, print, and save a document, let's review some of the most common formatting tasks.

Underlining

To underline text as you type, press F8, type the text you want underlined, then press F8 again. To underline text you've already typed, you must first mark the text as a block. To do this, place the cursor at one end of the text then press Alt-F4 (the words **Block on** appear on the status line). Move the cursor to the other end of the text then press F8 once.

Boldface

To boldface, follow the same method as underlining but press the F6 key instead of F8.

Indenting

To indent an entire paragraph, press the F4 key. Each time you press F4 the paragraph will indent another half-inch from the left margin.

To indent a paragraph from both the left and right margins, press Shift-F4 for each half-inch indentation.

Exit WordPerfect

Finally, press F7 N Y to exit WordPerfect without resaving the document on the screen. The printer designation you made will be recorded on your disk so you don't have to perform those steps again when you want to print.

Keep in mind that WordPerfect is a rather sophisticated word processing program that contains capabilities far beyond the scope of this article. It can be used in the business and academic worlds, as well as the home, for both small and large projects. Once you're comfortable with the basics, review the WordPerfect Workbook that came with Version 5.0 or pick up a good book in any bookstore. I recommend either *ABC's of WordPerfect* or *WordPerfect Tips and Tricks,* both published by Sybex Computer Books and written by me. *

"GEORGE, USE THE TYPEWRITER KEYES."

How to Get the Most from a Zenith Laptop Computer

by Joseph Katz

Part 2: An instruction manual for ZCOM, the file transfer program that comes with Zenith's MSDOS. Here are the undocumented commands and features that make the program more useful.

You have half the software you need for simple file transfers between your laptop computer and a desktop computer with an incompatible diskette drive if your Z-180 laptop computer came with Version 3.21 or higher of Zenith's own MSDOS.

With that version Zenith began including its own basic file transfer program, ZCOM. But since ZCOM communicates only with ZCOM, you'll need a copy of the program on the other computer too. The way to get it, of course, is to buy another copy of Zenith's MSDOS Version 3.21 or higher—on 5.75-inch floppy diskettes if the other computer does not have at least one 3.5-inch drive.

Before you do anything you might like to know that ZCOM has two advantages and several disadvantages over commercial file transfer software packages such as Travelling Software's LapLink, LapLink Plus, and DeskLink, and White Crane Systems' The Brooklyn Bridge.

The biggest advantage, of course, is that ZCOM is "free"—if you have the two copies you need. Another advantage is that it can be used to transfer files between two computers over the standard telephone network—if each computer has a modem and one computer can be spared for the longer time it takes to transfer files at the relatively slow speeds supported by modems.

In fact the chief disadvantages of ZCOM begin with its relative slowness—both in executing commands and in the top effective transfer speed. Nor does ZCOM have some useful features found in commercial packages: it's relatively Spartan compared with them. One big advantage that your money brings from the commercial packages is a complete file transfer kit, including the cables you'll need to link two computers directly together.

But if you have the cables, the requisite two copies of ZCOM, and only occasional need for file transfers between your Z-180 laptop computer and another computer, you should find ZCOM useful.

You should find it even more useful with the instructions here. Look under ZCOM in Chapter 3 of the MSDOS *User's Guide* and you'll find a command summary. If you need an on-the-spot abbreviated summary of the ZCOM command set, run the program with the command `ZCOM ?` to get a reminder similar to Figure 1.

Setting up for ZCOM

Make sure that there is a copy of ZCOM.EXE on each computer and that the

How to use ZCOM

A Checklist

The ZCOM instructions here are organized in the following order, which makes this contents list a handy checklist of the steps to follow in using ZCOM:

1. Set up for ZCOM
2.. Make the connection
   a. Make a direct connection (with cables), *or*
   b. Make a dialup connection (with modems)
3. After the connection is made
4. Set the optimal speed for a direct connection
5. Make the file transfers
6. Conclude the ZCOM session

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Address all correspondence to Dr. Joseph Katz, 103 South Edisto Avenue, Columbia, South Carolina 29205.

```
ZCOM provides serial communications between two computers

Usage: ZCOM ?
       ZCOM [/2]
       ZCOM SERVER [/2][/M][/P]

One and only one computer must be running ZCOM SERVER.
The other computer is then used to perform any of the followi
commands:

Receive (filespec) = Receive files from server
Transmit (filespec)= Send files to server
Files[(filespec)] = Get list of files on server
Baud [(nnnn)]      = Set local and server baud rates
Scan               = Scan common baud rates for server
Password           = Send password to server
Connect (string)   = Connect to modem, dial string
Disconnect         = Disconnect from modem.
Quit               = Terminate local (server stays active)
Abort              = Terminate both local and server
LDrv [(pathname)]  = Print/Change server default drive
CDir [(drive)]     = Print/Change server default directory
```

Figure 1. ZCOM's help summarizes the remote's commands.

two computers are connected properly. With ZCOM you can connect them *directly* (with a null modem cable plugged into the COM1: or COM2: serial port on each computer) or *indirectly* (through the telephone system, with an Hayes-compatible modem plugged into each computer). The indirect method is often referred to as a "dialup connection" because it can use the standard telephone network. Run ZCOM on each computer in the way that informs ZCOM of the role that computer is to play in the file transfer, which serial port to use on that computer, and whether the connection is direct or dialup.

No matter which method you use, one computer must play the role of *host* (ZCOM and the *User's Guide* call it the "Server") and the other must play the role of remote (ZCOM and the MSDOS *User's Guide* call it the "User"). Each computer's role makes a real difference because the host cannot be controlled in *any* way except by the remote while ZCOM is running: the host computer is the complete slave to the remote computer and the only keystroke the host will recognize from its own keyboard is the signal to terminate, a press of the ESC key. (Note that ZCOM may take a few moments to terminate after the ESC key is pressed. Be patient.)

Figures 2 and 3 show both sides of the same direct connect session. Note that the commands are highlighted here by boxes and that those on the remote side are undocumented abbreviations revealed in the sidebar.

Establishing a direct connection

Use the appropriate null modem cable to connect the RS-232C port on your Z-180 laptop computer to an RS-232C port on the other computer.

ZCOM can communicate through either the COM1 or COM2 serial port on either or both computers. Because the standard equipment on IBM compatible computers is only the COM1 serial port, ZCOM defaults to the use of COM1 unless the next parameter in the command line is "/2." The command ZCOM /2 designates the remote communicating at its COM2 port. The command ZCOM SERVER /2 designates the host communicating at its COM2 port. Note that you will not want to use the command ZCOM /2 or ZCOM SERVER /2 on the Z-180 laptop computer: it has only a COM1 serial port, so the command to use on your laptop computer is either ZCOM (if it's to be the remote) or ZCOM SERVER (if it's to be the host).

Establishing a dialup connection

ZCOM works with Zenith's optional internal modem or with any external modem that is fully Hayes compatible. If you're using Zenith's optional internal modem, follow its instructions for connecting the computer to the telephone line. If you're using an external modem, connect the modem to the computer with a standard modem cable and then connect the modem to the telephone system by any appropriate method. When the necessary connections are complete for your modem, power it on. Zenith's optional internal modem must be powered on with the command MODE MODEM ON before you run ZCOM. Most external modems have a switch (such as a toggle switch on the back of the Hayes Smartmodems, or a pushbutton switch on the front of the U.S. Robotics 212-A)that must be set to power on the modem. Some external modems (such as Touchbase Systems' Worldport) have no switch but power on automatically when ZCOM needs them on. Know how your modem behaves.

In a dialup connection, ZCOM will initialize the modem to auto answer at 300 Baud. It therefore will answer *every* incoming call, voice as well as computer. (You therefore might not want to use ZCOM on a telephone line dialled into by the general public: a voice call will be answered with

```
C>ZCOM
                ZCOM Version 1.14
Copyright(C) 1986, Zenith Data Systems Corporation

*S
Baud rate set to 9600.
Baud rate set to 19200.
Baud rate set to 38400.
Baud rate set to 57600.
Baud rate set to 1200.
Scan for SERVER completed.
*B 38400
Baud rate set to 38400.
*R BLITZ.PCX
Receiving file BLITZ.PCX
*T C:\IBM\LTR64.XYW
Sending file C:\IBM\LTR64.XYW.
*A
Are you sure? (Y/N) Y

C>
```

Figure 2. The remote end of a direct connection at COM1.

the high-pitched sound of the modem's carrier.) If both the host and remote computers have modems capable of communicating at a speed faster than 300 Baud, the remote computer can establish the faster speed common to both systems.

A dialup connection is initiated on the host computer with the command ZCOM SERVER /M if the modem is on the COM1 port and with the command ZCOM SERVER /2 /M if the modem is on the COM2 serial port. You most certainly should not use ZCOM on any telephone line without instructing it to require a password before it allows the remote computer access to your host computer. Add " /P" to the end of the command with which you run ZCOM: ZCOM SERVER /M /P or ZCOM SERVER /2 /M /P. Then ZCOM will prompt you to enter the password you want required of the remote, and then it will prompt you to enter the same password again "for verification." You must type the password exactly the same way each time, and capitalization counts.

Note, however, that ZCOM will accept even the press of the ENTER key as both the password and the verification. Make your password more of a challenge than that. Remember that the Z-180 laptop computer is a bestseller and, therefore, ZCOM is prevalent enough so you can't believe in exclusivity as a substitute for the very least you should do to protect your system. The very least you should do to protect the host system is to require a password whenever your computer is connected to a live modem and a live telephone line.

Undocumented ZCOM command shortcuts

An undocumented feature of ZCOM is that it will accept some abbreviations for commands. These abbreviations can help you save time.

ABORT	A
BAUD	B
CDRV	CD
CONNECT	CO
DISCONNECT	D
FILES	F
LDRV	L
SCAN	S
TRANSMIT	T
RECEIVE	R
QUIT	Q

You do nothing special in the ZCOM command line on the remote for a dialup connection. If the host has been instructed to require a password, the remote will be asked for it before being allowed to "log on" to the host—to give it any commands at all. The host operator in a dialup connection has the absolute responsibility to inform any remote operators not only of the password but also of how precisely how to enter it.

After the connection is established

In either a direct connection or a dialup connection, ZCOM on the remote computer informs the user of its readiness to accept commands by displaying an "*" prompt. You can get a reminder of the valid commands, similar to that in Figure 1, by typing a question mark ("?") whenever you see that prompt. Remember that no command may be entered into the host computer once ZCOM is running on it, except the command to abort: ESC.

Just as soon as ZCOM is running on the remote computer in a dialup connection, the operator of the remote computer should use the Baud command to establish the speed at which the dialup session should proceed: the command is BAUD SPEED, with "SPEED" replaced by the Baud rate at which the connection should be established. Remember that the 300 Baud rate to which the host modem was initialized is only the initial rate, the one at which the modem will operate when the modem first answers the telephone. The remote establishes the subsequent speed by the speed at which it makes the connection to the host: ZCOM on the host will adjust the modem at that end of the connection. It may be useful to recall that Hayes compatible modems rated for 1200 Baud usually support 300 Baud also, and Hayes compatible modems rated for 2400 Baud usually support 300 Baud and 1200 Baud also. Many Hayes compatible modems support intermediate speeds as well, but normally you will want to use the modem's fastest speed unless the telephone system is too noisy at the moment for error free transmission at that speed. Often you can get a better connection by simply replacing the call. If not, drop down to the next highest speed supported by your modem. Continue that process until the connection is good enough for reliable communications.

```
C>ZCOM SERVER /2

                ZCOM Version 1.14
Copyright(C) 1986, Zenith Data Systems Corporation

Entering SERVER mode...

Current SERVER Directory = C:\PBRUSH

Baud rate set to 1200.
Baud rate set to 38400.
Sending file C:\PBRUSH\BLITZ.PCX.
Receiving file LTR64.XYW.

SERVER session terminated by remote.

C>
```

Figure 3. The host end of a direct connection at COM2.

In a dialup connection, the next step on the remote computer is to dial the call with the command CONNECT 1112223333: substitute the area code of the remote computer for the digits "111," the exchange for the digits "222," and the number for the digits "3333." If your telephone line uses pulse dialling instead of tone dialling, prefix the telephone number with the letter "P:" CONNECT P111222333. (Always try tone dialling on an unfamiliar telephone line before you decide it supports tone dialling only. Sometimes you may be pleasantly surprised.) Note that there are at least two useful undocumented features of the CONNECT command: if the outgoing telephone system requires a prefix for connection to an outside line, you can begin the telephone number with that prefix; if the outgoing system requires pauses, you may indicate them where needed by inserting a comma (",") for each.

Set the optimal speed for a direct connection

You can't change the Baud rate between two computers in a dialup connection after communications begins, but you can and should change the communication speed in a direct connection to the highest useful Baud rate possible for that session. ZCOM itself can be set for up to 115200 Baud. That top speed may not be reliable on all combinations of equipment, however. You will have to experiment. (Remember that all commands are issued by the remote computer, even commands that affect the host computer only: the host is always the remote's slave.)

Setting the communications speed in a direct connection is a two step process. First, use the SCAN command to have ZCOM automatically establish an initial Baud rate: it will step through the standard speeds until it finds one to which the server responds. When the two computers are communicating at the speed established by SCAN, chances are that the Baud rate set will be slower than the optimal communications speed for the two computers. The optimal speed is the fastest speed possible at which the two computers can transfer files reliably. By all means try 115200 Baud, but if there is no communication at that speed, or if the file transfers prove inaccurate, set the Baud rate lower and try again. Keep trying until the file transfers are absolutely accurate.

Here's a quick and dirty check on the accuracy of file transfers. Make your first file transfer a longish text file, then use a word processing program or the MSDOS TYPE command to read the last few paragraphs of the transferred file. If it's garbled or incomplete, reduce the Baud rate. Don't be disappointed to discover that the optimal speed with ZCOM may be as low as 38400 Baud. Don't trust high speed transfers of binary files, such as programs, with ZCOM until you have established the optimal speed. A quick and dirty check of them is to make sure that the file sizes are the same in the directories of the host and remote computers.

Proceeding with the transfers

You send files from the remote to the host with the TRANSMIT command, and you get files from the host to the remote with the RECEIVE command. Use valid pathnames with either command unless you want to transmit to or receive from the host's current drive and directory. Remember that these commands are issued from the remote computer to the host computer, so the pathnames are those on the host and not the remote.

ZCOM defaults to the path (the drive and its subdirectory) from which it is run on both the host and remote computers. You cannot change the path on the remote computer: all files received by it will be downloaded, therefore, to the path from which you run ZCOM. But you can, and likely will, change the path on the host computer as the file transfers proceed. For one reason, you'll likely get tired of using a pathname whenever you want to receive or transmit a file. For another reason, you'll want to use ZCOM's Files command to list the contents of the host's current directory: FILES is a simple equivalent of the MSDOS DIR command. To change host directories, the command is the same as that which you use in MSDOS for the same purpose: CDIR. To change to a different host drive, the command is LDRV. You cannot switch the host drive and directory at the same time: use LDRIV first, then CDIR.

For a list of undocumented abbreviated versions of the commands you can use in place of the full command on the remote computer, see the sidebar entitled "Undocumented ZCOM command shortcuts."

Concluding the session

It is good practice—especially in a dialup connection—for the remote computer to terminate a ZCOM session in a manner satisfactory to the host computer as well as the remote computer. The remote computer should terminate a dialup session with the QUIT command if the host should await another dialup call. But terminate with the ABORT command if you want to conclude ZCOM on the host so it cannot answer another dialup call. That way you guard the safety of an unattended host computer against unauthorized or unscheduled callers who happen to own ZCOM too.

*

Please let us know 3-4 weeks in advance, so you won't miss a single issue of REMark!

MOVING?

Continued from Page 60

before you choose to upgrade to that level. Until then, I hope this information will be of some use to you. And I'm happy to be able to share this with you, since Buggin' HUG has often been a source of help to me.

Enjoy your Z-148, and please pass on a bit of help to someone in the future. Best regards . . .

LTC Varon Mullis
SUSLAK
APO San Francisco 96204

Patch For MASM V4.0 Problem . . .

Dear HUG:

In the September issue of REMark, I mentioned that a patch was available for a MASM V4.0 problem dealing with multiple end-of-file characters that are on INCLUDE files. Since that note appeared, I have received a number of requests for the patch. I am including the patch here for the benefit of all HUG members who have MASM V4.0.

The patch should always be made first to a copy of MASM.EXE, then, and only then, should it be made your production version. Also please note that changes cannot be made to files loaded with the "EXE" extension, so your copy of MASM.EXE has to be renamed with another extension first. The Symbolic Debug Utility, SYMDEB, is used for the patch.

```
COPY MASM.EXE MASM.SAV
REN MASM.EXE MASM.FIX
SYMDEB MASM.FIX
-A 72B8          (assemble code at 72B8)
```

Please note that the segment and offset values are put out by the debugger and all you have to do is enter the assembly code to the right of the segment/offset addresses.

```
1476:72B8      MOV   BX,[09D6]
1476:72BC      MOV   BYTE PTR [01C0],00
1476:72C1      JMP   7539
1476:72C4      LES   DX,[BX+06]
1476:72C7      INC   BYTE PTR [01C0]
1476:72CB      JMP   7542
1476:72CE      CMP   BYTE PTR [SI-01],1A
1476:72D2      JZ   72D7
1476:72D4      JMP   7574
1476:72D7      DEC   SI
1476:72D8      JMP   72CE
1476:72DA            <RETURN> by itself
-A 7535

1476:7535      JMP   72B8
1476:7538 <RETURN> by itself
-A 753F

1476:753F      JMP   72C4
1476:7542            <RETURN> by itself
-A 756D

1476:756D      JMP   72CE
1476:7570            <RETURN> by itself
-W                (writing 14E3E bytes)
-Q                              (quit)

REN MASM.FIX MASM.EXE
```

Now try it. If you have a problem, start the whole procedure over; possibly a HEX number was entered incorrectly in one of the jump instructions. Good Luck . . .

Rich Mueller, Ph.D.
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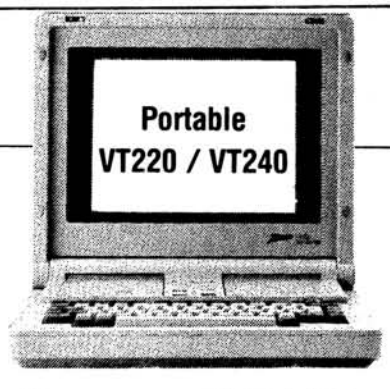

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Setting Border Colors On The H/Z-158

I was asked recently at work about putting a border around the display of the IBM computers in our Manufacturing Engineering area. The ladies wanted to be able to change the color at will to any of the ones available. So I sat down, thought about it, and came up with this result.

The program takes a command line parameter in the form of a color name and converts it to the number used by the Color Select Register to set the border color. It compares the color name input as a parameter with a list of legal values in memory and selects the number of the two that match. The number is then output to the Color Select Register port which sets the new border color, then the program terminates. The program traps incorrectly spelled color names and the lack of a parameter on the command line.

The first four lines after the label START: check to see if a parameter was entered on the command line. If more than 1 character was entered after the program name, the program will attempt to use those characters as a color name. If 1 or no characters were entered, an error message is printed and the program is terminated.

Next, the program cycles through the 16 colors, checking for a match with the colors in the list. The first four lines of each color group force the program to use the longer of the two strings, the parameter or the color name from the list, as the length to check the strings to. This makes sure that any extra characters entered or left off the color name are taken into account. The next lines simply compare the two strings byte by byte, and if they match, control transfers to the FOUND routine. If they don't match, control continues with the next color check.

If no match was found after all color names have been compared, the program will print an error message and return to DOS.

If a match was found, the color code number is retrieved from memory and sent to the Color Select Register. The program then terminates with the new border color displayed.

To assemble and run the program requires the MASM assembler, LINK linker, and EXE2BIN converter. Follow the steps below:

Type in the program with the name BORDER.ASM. Save it in the same directory as your assembly work files.

Type: MASM BORDER;
LINK BORDER; (ignore the stack error message)
EXE2BIN BORDER BORDER.COM
Delete the BORDER.EXE and BORDER.OBJ files.

You now have an executable program file on disk with the name BORDER.COM. Just type BORDER color name, and you're off and running. The program can be put in your AUTOEXEC.BAT file so it will be run on boot-up to set your favorite border color.

Mike McClellan
19851 25 th Avenue, NE #221
Seattle, WA 98155

```
TITLE -- BORDER.ASM - Change the color of the screen border

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;       Invoke the program by typing 'BORDER color-name' on the
;       MSDOS command line.  Don't use the quotes and BORDER can
;       be in upper or lower case.

;       The color-name must be in one of the following formats to
;       be recognized by the program:
;          Black          Blue
;          Green          Cyan
;          Red            Magenta
;          Brown          LightGray
;          DarkGray       LightBlue
;          LightGreen     LightCyan
;          LightRed       LightMagenta
;          Yellow         White

;       Any spelling or combination of upper and lower case letters
;       other than that listed above will abort the program with an
;       error message.

;       The user will also be warned if he does not enter a color name
;       parameter on the command line.

CODE    SEGMENT
        ASSUME CS:CODE, DS:CODE, SS:CODE, ES:CODE

BUFFER  EQU     80h                     ;start of command line parameter area

        ORG     100h                    ;start address of .COM programs

START:
        xor     ch,ch                   ;clear high byte of CX
        mov     bx, BUFFER
        mov     dl, [bx]                ;get length of parameter
        cmp     dl, 1                   ;if no parameters, illegal
        jg      BLACK                   ;at least something typed, anyway
        mov     ah, 09h                 ;print error message
        mov     dx, OFFSET PARM_ERR     ;point to message
        int     21h
        jmp     EXIT                    ;return to DOS

BLACK:
        mov     cl, COLOR_BLACK         ;get length of string
        cmp     dl, cl                  ;which is longer -
        jle     BLACK1                  ; parameter or string?
        mov     cl, dl
BLACK1:
        mov     si, BUFFER + 1                  ;point to parameter
        mov     di, OFFSET COLOR_BLACK + 1      ;point to compare string
        repe    cmpsb                           ;are they the same?
        jne     BLUE
        jmp     FOUND                           ;found a color match

BLUE:
        mov     cl, COLOR_BLUE          ;get length of string
        cmp     dl, cl                  ;which is longer -
        jle     BLUE1                   ; parameter or string?
        mov     cl, dl
BLUE1:
        mov     si, BUFFER + 1                  ;point to parameter
        mov     di, OFFSET COLOR_BLUE + 1       ;point to compare string
        repe    cmpsb                           ;are they the same?
        jne     GREEN
        jmp     FOUND                           ;found a color match

GREEN:
        mov     cl, COLOR_GREEN         ;get length of string
        cmp     dl, cl                  ;which is longer -
        jle     GREEN1                  ; parameter or string?
        mov     cl, dl
GREEN1:
        mov     si, BUFFER + 1                  ;point to parameter
        mov     di, OFFSET COLOR_GREEN + 1      ;point to compare string
        repe    cmpsb                           ;are they the same?
        jne     CYAN
        jmp     FOUND                           ;found a color match

CYAN:
        mov     cl, COLOR_CYAN          ;get length of string
        cmp     dl, cl                  ;which is longer -
        jle     CYAN1                   ; parameter or string?
        mov     cl, dl
CYAN1:
        mov     si, BUFFER + 1                  ;point to parameter
        mov     di, OFFSET COLOR_CYAN + 1       ;point to compare string
        repe    cmpsb                           ;are they the same?
        jne     RED
        jmp     FOUND                           ;found a color match

RED:
        mov     cl, COLOR_RED           ;get length of string
        cmp     dl, cl                  ;which is longer -
        jle     RED1                    ; parameter or string?
        mov     cl, dl
RED1:
        mov     si, BUFFER + 1                  ;point to parameter
        mov     di, OFFSET COLOR_RED + 1        ;point to compare string
        repe    cmpsb                           ;are they the same?
        jne     MAGENTA
        jmp     FOUND                           ;found a color match

MAGENTA:
        mov     cl, COLOR_MAGENTA               ;get length of string
        cmp     dl, cl                          ;which is longer -
        jle     MAGENTA1                        ; parameter or string?
        mov     cl, dl
MAGENTA1:
        mov     si, BUFFER + 1                  ;point to parameter
        mov     di, OFFSET COLOR_MAGENTA + 1    ;point to compare string
        repe    cmpsb                           ;are they the same?
        jne     BROWN
        jmp     FOUND                           ;found a color match

BROWN:
        mov     cl, COLOR_BROWN                 ;get length of string
```

```
        cmp     dl, cl                          ;which is longer -
        jle     BROWN1                          ; parameter or string?
        mov     cl, dl
BROWN1:
        mov     si, BUFFER + 1                  ;point to parameter
        mov     di, OFFSET COLOR_BROWN + 1      ;point to compare string
        repe    cmpsb                           ;are they the same?
        jne     LIGHT_GRAY
        jmp     FOUND                           ;found a color match

LIGHT_GRAY:
        mov     cl, COLOR_LIGHTGRAY             ;get length of string
        cmp     dl, cl                          ;which is longer -
        jle     LIGHT_GRAY1                     ; parameter or string?
        mov     cl, dl
LIGHT_GRAY1:
        mov     si, BUFFER + 1                  ;point to parameter
        mov     di, OFFSET COLOR_LIGHTGRAY + 1  ;point to compare string
        repe    cmpsb                           ;are they the same?
        jne     DARK_GRAY
        jmp     FOUND                           ;found a color match

DARK_GRAY:
        mov     cl, COLOR_DARKGRAY              ;get length of string
        cmp     dl, cl                          ;which is longer -
        jle     DARK_GRAY1                      ; parameter or string?
        mov     cl, dl
DARK_GRAY1:
        mov     si, BUFFER + 1                  ;point to parameter
        mov     di, OFFSET COLOR_DARKGRAY + !   ;point to compare string
        repe    cmpsb                           ;are they the same?
        jne     LIGHT_BLUE
        jmp     FOUND                           ;found a color match

LIGHT_BLUE:
        mov     cl, COLOR_LIGHTBLUE             ;get length of string
        cmp     dl, cl                          ;which is longer -
        jle     LIGHT_BLUE1                     ; parameter or string?
        mov     cl, dl
LIGHT_BLUE1:
        mov     si, BUFFER + 1                  ;point to parameter
        mov     di, OFFSET COLOR_LIGHTBLUE + 1  ;point to compare string
        repe    cmpsb                           are they the same?
        jne     LIGHT_GREEN
        jmp     FOUND                           ;found a color match

LIGHT_GREEN:
        mov     cl, COLOR_LIGHTGREEN            ;get length of string
        cmp     dl, cl                          ;which is longer -
        jle     LIGHT_GREEN1                    ; parameter or string?
        mov     cl, dl
LIGHT_GREEN1:
        mov     si, BUFFER + 1                  ;point to parameter
        mov     di, OFFSET COLOR_LIGHTGREEN +1  ;point to compare string
        repe    cmpsb                           ;are they the same?
        jne     LIGHT_CYAN
        jmp     FOUND                           ;found a color match

LIGHT_CYAN:
        mov     cl, COLOR_LIGHTCYAN             ;get length of string
        cmp     dl, cl                          ;which is longer -
        jle     LIGHT_CYAN1                     ; parameter or string?
        mov     cl, dl
LIGHT_CYAN1:
        mov     si, BUFFER + 1                  ;point to parameter
        mov     di, OFFSET COLOR_LIGHTCYAN + 1  ;point to compare string
        repe    cmpsb                           ;are they the same?
        jne     LIGHT_RED
        jmp     FOUND                           ;found a color match

LIGHT_RED:
        mov     cl, COLOR_LIGHTRED              ;get length of string
        cmp     dl, cl                          ;which is longer -
        jle     LIGHT_RED1                      ; parameter or string?
        mov     cl, dl
LIGHT_RED1:
        mov     si, BUFFER + 1                  ;point to parameter
        mov     di, OFFSET COLOR_LIGHTRED + 1   ;point to compare string
        repe    cmpsb                           ;are they the same?
        jne     LIGHT_MAGENTA
        jmp     FOUND                           ;found a color match

LIGHT_MAGENTA:
        mov     cl, COLOR_LIGHTMAGENTA          ;get length of string
        cmp     dl, cl                          ;which is longer -
        jle     LIGHT_MAGENTA1                  ; parameter or string?
        mov     cl, dl
LIGHT_MAGENTA1:
        mov     si, BUFFER + 1                  ;point to parameter
        mov     di, OFFSET COLOR_LIGHTMAGENTA+1 ;point to compare string
        repe    cmpsb                           ;are they the same?
        jne     YELLOW
        jmp     FOUND                           ;found a color match

YELLOW:
        mov     cl, COLOR_YELLOW                ;get length of string
        cmp     dl, cl                          ;which is longer -
        jle     YELLOW1                         ; parameter or string?
        mov     cl, dl
YELLOW1:
        mov     si, BUFFER + 1                  ;point to parameter
        mov     di, OFFSET COLOR_YELLOW + 1     ;point to compare string
        repe    cmpsb                           ;are they the same?
        jne     WHITE
        jmp     FOUND                           ;found a color match

WHITE:
        mov     cl, COLOR_WHITE                 ;get length of string
        cmp     dl, cl                          ;which is longer -
        jle     WHITE1                          ; parameter or string?
        mov     cl, dl
WHITE1:
        mov     si, BUFFER + 1                  ;point to parameter
        mov     di, OFFSET COLOR_WHITE + 1      ;point to compare string
        repe    cmpsb                           ;are they the same?
        jne     NOT_FOUND
        jmp     FOUND                           ;found a color match
```

```
; A match with a legal color name was not found. Print an
; error message and return to DOS.
NOT_FOUND:
        mov     dx, OFFSET ERR_MSG          ;point to error message
        mov     ah, 09h                     ;output string
        int     21h
        jmp     EXIT                        ;go back to DOS

; A match was found for a color name, change the border now
FOUND:
        xor     ah,ah                       ;clear high byte
        mov     al, [di]                    ;get color code
        mov     dx, 3D9h                    ;point to color select reg
        out     dx, ax                      ;set new border color

EXIT:
        mov     ah, 4Ch                     ;exit program,
        int     21h                         ;return to DOS

; A list of legal color name lengths, color names and color codes to be
; passed to the Color Select Register.
COLOR_BLACK         DB                  06, ' Black', 00
COLOR_BLUE          DB                  05, ' Blue', 01
COLOR_GREEN         DB                  06, ' Green', 02
COLOR_CYAN          DB                  05, ' Cyan', 03
COLOR_RED           DB                  04, ' Red', 04
COLOR_MAGENTA       DB                  08, ' Magenta', 05
COLOR_BROWN         DB                  06, ' Brown', 06
COLOR_LIGHTGRAY     DB                  10, ' LightGray', 07
COLOR_DARKGRAY      DB                  09, ' DarkGray', 08
COLOR_LIGHTBLUE     DB                  10, ' LightBlue', 09
COLOR_LIGHTGREEN    DB                  11, ' LightGreen', 0Ah
COLOR_LIGHTCYAN     DB                  10, ' LightCyan', 0Bh
COLOR_LIGHTRED      DB                  09, ' LightRed', 0Ch
COLOR_LIGHTMAGENTA  DB                  13, ' LightMagenta', 0Dh
COLOR_YELLOW        DB                  07, ' Yellow', 0Eh
COLOR_WHITE         DB                  06, ' White', 0Fh

; If the user types an illegal color name, this message appears
ERR_MSG             DB      07h, 'The color specified on the command line is not'
                    DB      ' a legal color name.', 0Dh, 0Ah, '$'

; If the user fails to enter a color name on the command line, this
; message appears
PARM_ERR            DB      07h, 'You must specify a parameter on the command'
                    DB      ' line when invoking the Border', 0Dh, 0Ah
                    DB      'program.', 0Dh, 0Ah, '$'

CODE    ENDS
        END             START
```

*

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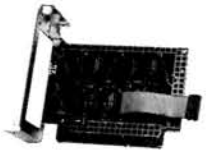

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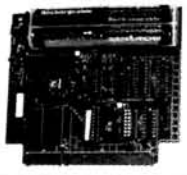

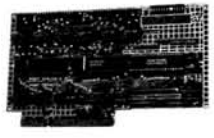

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Making ZDIR Colorful

Mike McClellan
19851 25th Avenue, NE #221
Seattle, WA 98155

I recently upgraded my H-100 from the old monitor ROM and ZDOS to the latest version ROM and MSDOS 3.1. I wanted to make sure I could take advantage of them before they were all sold out at my local Heath/Zenith store. I have two internal 5" floppies and two external 5" floppies attached to the 8" port on the Z-207 controller card. The external floppies are 1.2M byte drives. With the rapid proliferation of programs, and the large number of files that can be stored on the 1.2M drives, being able to use the directory features of MSDOS was becoming more and more a necessity. Hence the upgrade.

As I set up the new software system, I noticed the Zenith-supplied disk directory lister, ZDIR. I tried it and liked it immediately. But there is one feature of it that I don't like — it is only set up for a black and white screen display. I like to have the screen in green to ease the strain on my eyes (I use the ZVM-135 color monitor). So I didn't use the program for a while because of that. But I liked its features and display so much that I had to find a way around the color problem. I did, so I thought I would share it with any others that like color screens and ZDIR's display.

I used DEBUG to scroll through the code for ZDIR looking for the places where it writes to the screen to see if I could find how the color is set to white. The code occurs in ten places for different parts of the ZDIR display. What it does is move a number from zero to seven into the AL register and call a subroutine that uses the Escape sequence '1BmX30$' to set the color of the display. The 1B is the hex code for the escape character and the m is the ZDOS/MSDOS escape code for changing the screen color. The X is the foreground color and is determined (by ZDIR) by adding an ASCII 30h to the code at the locations specified below. The 30 designates a black background. For those who don't have ZDOS or the MSDOS Programmer's Utility Pack, the following are the color numbers used:

0 - Black	1 - Blue
2 - Red	3 - Magenta
4 - Green	5 - Cyan
6 - Yellow	7 - White

To change any of the locations to a different color follow the steps below:

1. Make a copy of ZDIR.COM and use the copy for experimenting!
2. Put a disk with DEBUG on it in the default drive and type:
   DEBUG ZDIR.COM (put a drive letter in front of ZDIR.COM if it is not on the default drive.)
3. Once the DEBUG prompt (a -) appears you are ready to change the color numbers.

The xxxx in the following discussion refers to a segment number which will probably be different from computer to computer, but has no bearing on our discussion.

Location	Item Affected
xxxx:0639	The words 'Directory of' in the title line.
xxxx:067E	The color of the display after ZDIR is done.
xxxx:0A6A	The color of the drive letter and directory on the title line (default red, color 2).
xxxx:0A75	The phrase "on 'date' of" in the title line.
xxxx:0A89	The color of the time in the title line (default blue, color 1).
xxxx:0A91	The color of the directory listing itself.
xxxx:0C48	The color of the disk space used numbers, and memory used numbers (default red, color 2).
xxxx:0C57	The color of the total disk space and total memory space available (default yellow, color 6).
xxxx:0C66	The color of the dashes in

the totals line (default green, color 4).

xxxx:0C71 The color of the free disk space and free memory space numbers (default green, color 4).

xxxx:0C80 The color of the phrase 'free. Memory' and the last word, 'free.', in the totals line.

Any of the locations above that do not have a default color in the right hand column are defaulted to white, color 7. All of the user entries in the following steps can be in upper or lower case.

4. To change any of the above locations, type 'ecs:any of the 4 digit hex numbers from the list above' and press RETURN.
5. The following display will appear: xxxx:the same 4 digit hex number from step 4 yy.
6. The yy is the current color number for the display. Type the color number you want from 01 to 07, then press RETURN.
7. Repeat steps 4 through 6 for all display items you want to change.
8. Press the W key to save the changes to disk, then press the Q key to exit DEBUG.
9. Run the ZDIR program and it should come up in the colors you chose.
10. Copy the modified ZDIR program to any or all of your working disks, but DO NOT copy it to the ZDOS/MSDOS distribution disk.

To change the background color, it is necessary to change the 30 in the escape sequence at location xxxx:0CB8 to a 31 through 37. In this case, you are manually adding a 30h to a number from the color list above.

I have put the ZDIR command in a batch file that I call SD.BAT (to keep it the same as a similar one on my H-158) and call it up like this: SD drive. The batch file is just a one line file like this: Xzdir %1:/t/a. The drive letter (don't put in the colon) used as a parameter on the command line is put in place of the percent sign when the batch file is executed. The /t switch sorts the directory by file extension, then by file name within each type of extension. The /a switch lists directories and hidden files. The forward slash in front of zdir lets me use the command from within a sub-directory. That way I only have to have ZDIR.COM in the root directory of each disk. So, if I'm in a sub-directory on drive C:, I type 'XSD C', and the batch file lists the sub-directory.

I hope this is useful to others who would like to take advantage of the H/Z-100's colorful screen possibilities. Also, many kudos to Zenith for providing an excellent utility to go with the standard DOS.

*

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