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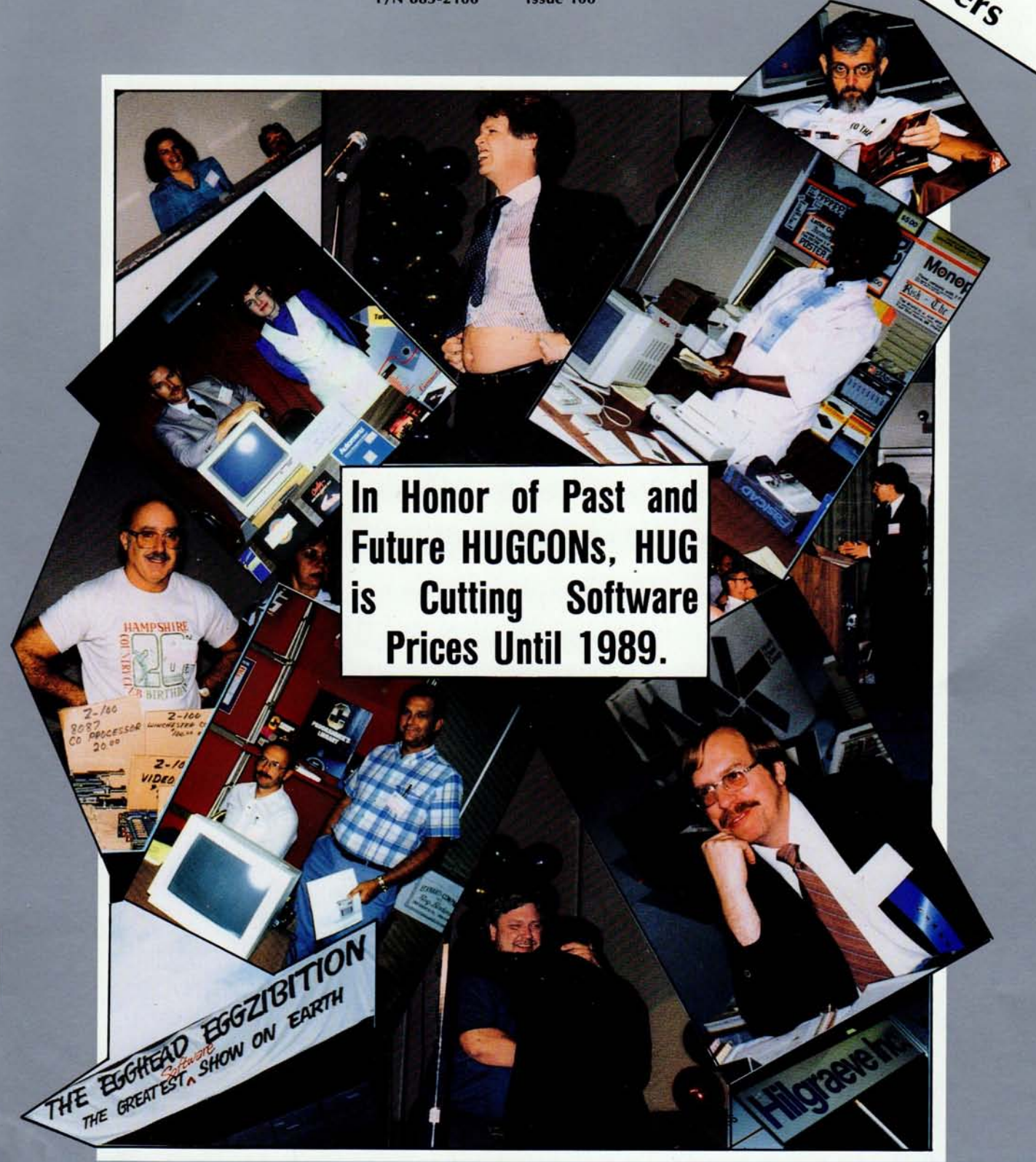
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Issue 106

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M.C.

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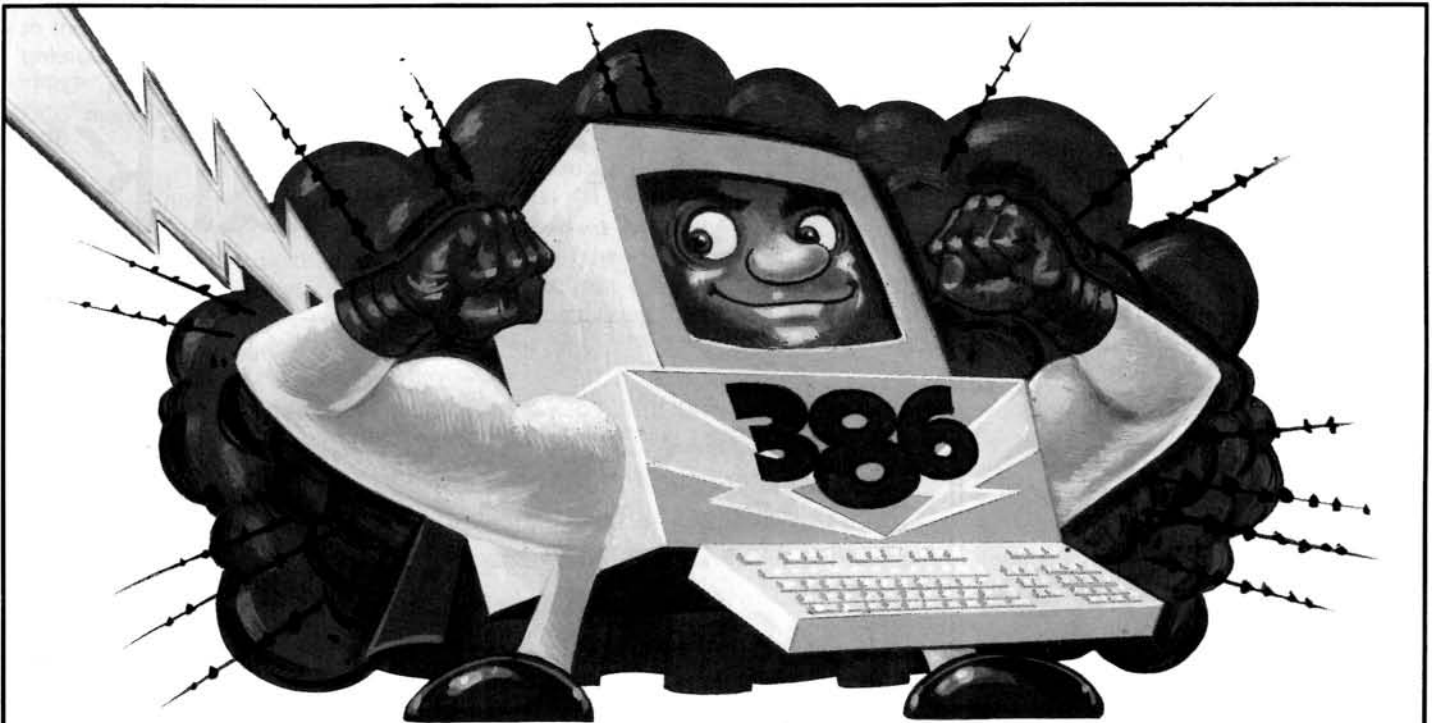
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# BUGGIN' HUG

## ID-4001 Weather Computer

Dear HUG:

Several years ago I purchased the ID-4001 Heath Weather Computer. Shortly afterwards I assembled an H-8 Computer System and then interfaced the two computers. This system has worked well for me. Several weeks ago I began having difficulties in loading the weather program that was only available on cassette. Luckily, I had made a spare tape and have found that the first tape had been used enough to weaken the original signal that was on the tape.

With all the advancements that have been made in the computer field and the people that are writing programs, I was wondering if anyone had rewritten the cassette version of the weather program to be used in a disk drive? Would you happen to know anyone that I might possibly contact to see if this could be done if it has not already? Has Heath Company or any of the many company's that affiliate with it in the line of software, upgraded or designed a program that could be used with the 8-bit computer system and the ID-4001 weather computer?

I would be interested in contacting anyone that may have any knowledge or information along this line of thinking.

Sincerely,

Thomas A. Pernia  
158 Middle Street  
Bath, Maine 04530

## Needs Monitor For Z-100

Dear HUG:

As I watch my ZVM-122 monochrome monitor die, I'm coming to the conclusion that I soon may have two perfectly good Z-100 computers, but no display. Heath, and the Veritechnology store in Denver, are out of the ZVM-122 and its replacement, the ZVM-1230. I've been told that, at approximately \$70 to \$90 to

repair my 122, it really isn't worth it, but I've had no luck finding another good monitor to buy. (I do have an Amdek with which I am less than happy, since the screen is so heavily etched that characters are quite blurry.)

I have tried connecting several types and brands of PC-style monitors to the Z-100's 9-pin port, but have had no success. I was told that I'd need a special ZVM-135-2 cable (\$35) which works with the ZVM-135 color monitor (which seems pretty expensive for such old technology). Unfortunately, all the monitors I've seen have hard-wired power cables, meaning the special cable would have to be spliced in, somehow.

The people at the Heath store in Denver said two things: 1) They had managed to patch a Magnavox monitor to run with the Z-100, and 2) they thought they might be able to change the horizontal scan frequency of one of the IBM-style monitors and splice in the ZVM-135-2 cable so things would work with the Z-100. Both ideas sound very iffy (and expensive).

I also wrote to Herm Brooks at C.D.R. explaining the situation and asking if C.D.R. had any plans to market a modification to the Z-100's video board so that an IBM-style monitor could be used. In a very nice letter, he explained that, while such a modification could be done, it would not be financially practical for C.D.R. to do it, as they expected to drop support for the Z-100 series.

My question, then, is: Does anyone know of a solution to my problem, and if there is a solution, can anyone recommend a good monitor? I'm open to both composite monochrome and color monitors. My Z-100s have the new motherboard and fully-populated video boards.

On a separate topic, I would recommend that Z-100 users not purchase WordPerfect 4.2 for the Z-100. I just did, only to discover that it bears almost no resemblance to the version I use on a PC at work. Several capabilities, such as Alt-key macros, are not available. In addition, on exiting WordPerfect, only the green color plane is restored, leaving my screen at only partial intensity. My polite letter to the company has gone unanswered.

Cheers,

Richard Gugeler  
37 Shadowood Place  
Woodland Park, CO 80863

## Reasons For Renewal

Dear HUG:

I have renewed my subscription to REMark because of the following reasons.

1. Patrick (Pat) Swayne making my Z-100 the true "universal" computer. I run all of the important IBM software, plus 97% of the unimportant stuff.
2. Bill Adney telling me in short, plain English sentences how this machine works so I can use it.
3. The robotic gal with the telephone on her thigh reminding me to keep my head screwed on straight.

Long live Pat, Bill and the Robot. Also, the Z-100.

Paul M. Philp  
1329 Misty Glen Lane  
Dallas, TX 75232

## Microsoft Word Under ZPC

Dear HUG:

Here are some notes for anyone trying to use Microsoft Word Version 3.00 under ZPC on an H/Z-100.

First, you must use the patch supplied in PATCHER.DAT on the ZPC Upgrade disk, also described in REMark, September 1986, and repeated here:

```
Microsoft Word Version 3.00
Insert the disk containing WORD.COM
WORD.COM
674A,0,0
6751,B0
z
```

Next, you must run the program in PC mode 3. It won't run in mode 7 without more patching (you're not likely to want to do that anyway).

If you want to use either the Learn program or the online tutorial help in Word, you must first apply the following patches to LEARN.COM:

```
Microsoft Word Version 3.0 Tutorial
Insert the disk containing LEARN.COM
LEARN.COM
56CA,0,0
56D1,B0
6207,90
620D,90
6210,90
6519,90,90,90,90,90,90,90,90,90,90,90
z
```

Finally, here are a few special key combinations that could be a bit hard to figure out:

1. For an optional hyphen (Ctrl-hyphen), press Ctrl-Shift-hyphen.
2. For a non-breaking hyphen (Ctrl-Shift-hyphen), press Shift-F0, then Ctrl-Shift-hyphen. (Note: in Word 1.9, the keypad minus was used for non-breaking hyphens, but in Word 3.0, it does something else; see (3).)
3. In outline view, to collapse headings (keypad -), press the keypad -. To expand headings (keypad +), press Shift-keypad -. To expand all headings (keypad \*), press Shift-F11. (Note: Collapsing headings will also collapse text but when the headings are expanded again the text stays collapsed. See (4) to expand text.)
4. In outline view to collapse text (Shift-keypad -), press Shift-F0, then keypad -. To expand text (Shift-keypad +), press Shift-F0, then Shift-keypad +.

Happy word processing!

Yours sincerely,

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

### 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 Logi-

mouse) 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 OLD-MOUSE.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 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 Z100'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

### HiSpeed C Library

Dear HUG:

Browsing through the November issue of REMark encouraged me to believe that there may still be some "8-bit" computer users around (What? Maple update for the HDOS?!). and I decided to share my experience with some CP/M software which I came across recently. The piece I shall describe in more detail is the HiSpeed C Library, from Viking C Systems. It converts your C/80 Compiler (from Software Toolworks) into, what seems to me to be, the most complete, versatile and portable C package in the CP/M world today. It requires the Mathpack if you use floats and transcendentals, and it also requires the Microsoft Assembler package of M80 and L80.

The C/80 package had built-in the choice of using the M80 and L80 with supplied

relocatable (.REL) libraries, and it included header files for this approach. One problem is that the C/80's libraries are quite limited. The HiSpeed C Library uses this way of assembly, that is, it uses libraries in .REL format so that a function is included only if needed. When you combine the C/80 files with the HiSpeed Library, you end up with a flawlessly integrated system, with a main header, stdio.h, which directs traffic, plus a dozen other headers to be included as needed. The whole system contains over 300 library functions, most of which are portable. Some are not, mainly because they contain assembly code unique to the CP/M system or code for the H-89 H-19 terminal. The HiSpeed also adds many new math and UNIX style functions. It converts some "unusual" functions of the C/80 library to more standard form. It is hard to see how any new ANSI standard will contain functions not already in the package. Most important, it works without a hitch. I have written programs in BASIC and FORTRAN, but I am a novice in C. Yet, I had no really big problem compiling some C source which was gathering dust because of (up to now) non-portability.

You can buy just the basic disk of libraries in .REL and related files (no source code) plus the manual. That is about 300K. I feel, however, you would be missing much if you did not get also the source code plus some other goodies that come with it. The total package has about 1.4 megabytes!

The manual that comes with it is excellent. It does not waste any words. The best part is, it has an alphabetical listing of the functions, one per page. It lists the function name, summarizes what the function does, and includes a small, self-contained C source example which you can use to see how the function works. To the inexperienced programmer like me, the manual is an invaluable learning tool, worth the price of the whole package.

That is not all. It includes programs for generating portable source code. It also includes several executable or .COM utilities. There is an "Archiver", the best I have seen. It not only lets you put in or take out several similar files in one "drawer", but you can view all or part of a file without exiting the Archiver. I had another one which I hardly ever used because I soon forget what the file name stood for! (When will we ever get rid of the curse of the eight letter title GUESSWHA.T??)

There is a comparator (LEXI) of two files to locate and mark changes in files like in revised manuscripts, sorters and a Key Word Index rotator. Besides the .COM files, there are many utility programs in C source code, ready to assemble. In BASIC and FORTRAN, I felt sure of what I had to deal with, even if I did not know how to go about it. In C, I was pretty much lost. Now, having the HiSpeed makes me feel I have a tool I can use and the possibility of learning how.

I should stop here, were it not for J. Katz's "elephant" story in his "Mainstream Computing" in the November '87 REMark, which reminded me of one problem we "8-bit" users have, that is, lack of a decent, manageable database. Yes, there is (was?) dBASE II, the "elephant". How about a mule, like the PC-file? For my needs which do not require the acres of memory of the PCs, the HUG Autofile was good for filing several hundred journal references. However, I could not selectively extract portions, like authors' names sorted in a particular order, for inclusion elsewhere.

Enter the "Labeler", again from Viking C Systems. The only thing wrong with this database is its name, because it misleads one to think its purpose is to produce mailing labels or something. It does make labels of everything on anything in a flash, but above all, it is a versatile random-file database which accepts records up to about 1.5 Kbytes each. Let me hasten to add that this 1.5K is also misleadingly small, because the author was mindful of the memory limitations of the 8-bits and got around this problem in a couple of very ingenious ways. I shall not get into how it is done. Suffice to say that it can "link" two or even more databases in such a way that items with something in common can be pulled out and put together in a common "report". For example, one can have in a "separate" database the names of authors of an article and the journal, and in another a summary of the article. The advantages are obvious: one database can contain many references of authors' names on one disk and speed through locating the desired ones. Another set of commands brings in quickly the related summaries of the located articles from the "kin" database from another disk. You can do it this way only if you want it so. You have control over the format. The "language" or commands are simple and not many, about two dozen. To repeat, the 1.5K limitation is deceiving, first, because it refers to one record in one

database only and does not include its "kin". Secondly, text written on an editor can be included in a "report" essentially without limit. The software includes manual and both source and object code, and again it is voluminous, over 700K. The files of the Labeler are transferable to other databases, like dBASE II and III, both CP/M and MS-DOS. I should point out that the Labeler is also available for MSDOS.

For those curious, Dr. Grant Gustafson is the main (if not the only) author in Viking C Systems. Some "veterans" may remember his CRASH utility for HDOS and CP/M disks. "Corrupt" disks become quickly "virtuous" and readable, thanks to it. He has also written many other programs for the Heath computers in both HDOS and CP/M, various utilities, printer drivers and others.

When writing for PCs, one can have a column such as W. M. Adney's in REMark, entitled "On The Leading Edge". Recognizing our relative position in the world of fund producing adventures, we "8-bit" users can be more reserved and refer to a one time write-up entitled "On The Delightful Fringes of the CP/M World." It looks like this is what this turned out to be. So, I feel like commenting on two more pieces of software from Spectre Technologies, the REMBRANDT and the PRESTO!

REMBRANDT does just what the advertisement says, it lets you draw anything, flawlessly and easily. Out of curiosity, I unearthed my ED-A-SKETCH of Software Toolworks, HDOS version mind you. My trusty HUG HTOC utility converted an HDOS ED-A-SKETCH picture into CP/M, and REMBRANDT's ED-A-SKETCH conversion utility printed it fine. I still have an MPI99 printer and mentioned it to Spectre. There was no driver then for it, so I was using my Diablo 630 compatible printer. Two or three weeks later, I got for free a new MPI printer driver for the REMBRANDT!

Those who like a desktop utility would like PRESTO! The latest version occupies less memory, about 10K, because the various utilities stay on disk till called for. The Notepad is quite versatile, a miniature word processor. It is through this Notepad that you can create a Rolodex, appointment calendar and other simple databases. I bought it mainly for three reasons. One was access to CP/M com-

Continued on Page 80

# ENABLE

## Its Shorthand joys!

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I am writing this article using the word processing module of ENABLE, PC version 2.00. This is the first time that I have used this version. I wonder how many disk changes I will have to make?

Several years ago, perhaps April, 1966, while I was a student in the Horace C. Rackham School of Graduate Studies at The University of Michigan, I got sidetracked from the content of my dissertation. What intrigued me was that for all the ability we had to compute and print out copious amounts of computer generated statistical analysis there was no computer means of writing it all down in a text report. I reasoned that the Selectric typewriter could be hooked in some way to a driver from the big mainframe. Some IBM technicians came over and said "no problem." They did it. I got my mentor, Professor Larry Flanigan, interested and he wrote Fortran code as I dictated applications. Together we developed text manipulation routines; spelling rules; punctuation; capitalization; and word substitution, a type of self designed shorthand. How was I to know then that the name of this very enjoyable diversion would later become word processing? The Chair of my department in the School of Education was somewhat disappointed in my achieve-

ment since the point of it all was to produce a scholarly treatise on pattern recognition as a function of comparative matrices. Oh, there was more to it than that, but what happened next?

A friend in the Computing Center visited often with me and with Dr. Flanigan and, learning of our work, added some improvements, then got recognition as producing the first dissertation ever written on a computer.

Early in 1985, as I was struggling through the initial release of ENABLE I called The Software Group for help; I have done so many times. The people at TSG are really wonderful and seem to turn themselves inside out to get you on the track. I was so grateful to get going again that I suggested an idea for them. I described word substitution and my experiences with it. They said they thought that was a good idea. In the meantime I buckled down to learn as much as I could about the applications in ENABLE and got spinning along on Macros. The upgrade for Enable came out later and that really turned me loose in the world of Macros. Finally version 2.00 was announced and I gobbled it up because, IT HAS WORD SUBSTITUTION!

But the dem program was so large and business so pressing that I didn't take the time to install it. Two attempts discouraged me. The problem was a simple one as it turns out. I have a Zenith ZF-151-52 equipped with two 360K floppies and the AST Six-Pak+ bringing memory up to 640K. When I turn on the computer each morning, my AUTOEXEC.BAT boots up, reserving 360K as RAM. Well, that leaves too little memory for ENABLE Version 2.00! George Elwood's series of articles about ENABLE, which started in the December 1987 issue of REMark, has inspired me to drag out the program and give it another spin. Yesterday, I learned what the problem was and that it was easily solved. I had to speak harshly to myself, "Just don't set aside the 360K for RAM, dummoX, you're starving ENABLE!"

As a result of a successful run on a short paragraph I decided to do a little musing. It carries me back in memory to that day, years ago, when I wrote a word list and, through a system of sequencing, turned it into a little poem. Imagine that gigantic IBM mainframe chunking out a poem for me. There's something incongruous about that!

I am inspired by those pleasant musings



to present here a list of substitutions that came, as chaos, out of my head.

But before I do that I will write a short macro to help me write the list. By the way, macros that are to be temporary helpers I usually name Esc.

#### Macro Esc.WPM

Macro Code	Documentation
~	:: Tilde means go to begin of next line
{3X} {Right}	:: Move cursor three spaces right
{?}	:: Wait for operator entry
{Up}	:: Must go Up one after <ENTER> is pressed
{&F9}	:: Call for a macro
{Esc}	:: It is named Esc

Now I will type the alphabet in a column then insert a question mark in front of the first three letters. These will become my shorthand symbols. Next, I will use F9, . (point), F7 to mark that column of three question marks, and press F7 once more. This marks the question marks for copying in front of the alphabet column. After the first copy I will remark the six question marks and copy that column in front of the rest of the letters.

Starting one line above the list of letters, I will turn on the macro by pressing ALT/F9 and the name of the macro, which is Esc. It goes to the beginning of the first question mark, leaps past the letter and one space beyond. Then it waits for my entry. When I press <ENTER>, it recycles. I use CTRL/BRK to quit the macro when the list is done.

I'll print out a copy of the list, it doesn't print when it's in the Shorthand frame. Next, I will copy it into the ENABLE Shorthand frame. When displayed in the final version, the Shorthand frame moves to the top of the file. And the FINAL mode does not display the Shorthand frame.

Finally, I will sequence the substitutions by writing some free wheeling stuff with the shorthand symbols liberally sprinkled throughout.

Here goes!

?A Alas, and alack! 'tis but folly  
?B but what good is this?  
?C carefully, cautiously, they advanced, groping their way through the darkness.  
?D do ye na' ken where ye are leading us, laddy?  
?E enough

?F fine weather we're havin'  
?G good  
?H hurry so that we can try this out  
?I I am Daniel S  
?J Jack  
?K kitten  
?L Lirones  
?M my nephew, grand nephew, actually  
?N never, never in all my days!  
?O of course  
?P probably  
?Q quiescent  
?R rambling  
?S S  
?T together at last  
?U united we stand, divided we fall  
?V victory was seized from the jaws of defeat  
?W whoopee, they all cried  
?X Xavier, chief among us  
?Y you are in charge  
?Z zebras, by the hundreds, looking for all the world as if they had been aroused from their sleep and were parading in their striped pajamas  
?ba Bali Hai  
?ca Cats  
?da days on end  
?ea each and every one of us  
?i ?ca

#### A Substitution Hunt

by  
?i ?l

I am ?j . And then there was ?x . Here we are, ?t ?f , he said. Care to go looking for some ?ca ? Well, I hardly knew what to say; I was familiar only with ?ba and certainly this place wasn't ?ba ! Others had gathered around.

Let's go ?r they said. ?Y ! I didn't know where ?x would take us; the last time we ?r for ?da . ?M was with us that time. I vowed then, ?n would I go ?r again! But there was the rowdy crowd, lusting for adventure. ?x ! ?y !

Let's go! O.K. he consented. "Let's go! ?U You coming ?j ?" he said, nodding to me.

"You heard 'em," I said. Then, sarcastically, I'm afraid, " ?Y !" Oh wow, the gang was rarin' . ?w ?x ! ?U

?X led as thru the one sleepy street, little dust devils blowing up from our feet as we tramped eagerly forward. It was growing dark and one, Andrew, fell in beside me.

?a , he said, ?b ? I'm with you ?j ; I always get nervous with ?X around. Then, louder, ?D

?E I said, ?u. I had fallen in with the spirit of the crowd. The tawny, darkening road wound narrower toward the thicket. Now grass grew between the tracks left by Land Rovers. As leaves and vines parted before the advancing troop it got darker and darker.

Andrew grumbled again, " ?A !" How is it, ye always turn into a ?K when ?x is around he chided me.

?C we all ?ea were wondering now if this was what we should be doing. Oh, would we had turned back while still there was time!

That rowdy bunch! They're pretty ?Q now I mused as I thought of describing this in my next letter to ?Ba ! Those in the fore suddenly broke into a run as they advanced on a dimly lit meadow. ?W Oh lord I muttered can it be ?V

And then I saw them! ?Z

While we are waiting for the translation (word substitution) to complete, how do I like ENABLE version 2? Glad, you asked. I was sold on it before. I think this one is wonderful! I'm sorry that I can't set FIND (F9 F T or F5) to find periods at the end of sentences. I wonder what happens to that function when I use it on a period? You see, after I finish checking spelling and all the other space changing things, I like to find all the periods so that I can be sure there are two spaces after the period, preceding the capital letter of the next sentence. Did you notice? I slipped in a neat little rule there: in almost every situation the letter that follows a period is upper case. That FIND period helps me to check that too.

I'm anxious to spend tons of time learning all the ins and outs of every module. This addiction is most agreeable when its ENABLE! Now its time to translate our little story:

#### A Substitution Hunt

by  
Daniel S. Lirones

I am Jack. And then there was Xavier, chief among us. Here we are, together at last!

"Fine weather we're havin'." He spoke cheerily. "Care to go looking for some Cats?"

Well, I hardly knew what to say; I was familiar only with Bali Hai and certainly this place wasn't Bali Hai!

Others had gathered around.

"Let's go ramblin'!" they rumbled. "You are in charge!"

I didn't know where Xavier would take us; the last time we rambled for days on end. My nephew, grand nephew, actually, was with us that time. I vowed then, never, never in all my days would I go rambling again! But there was the rowdy crowd, lusting for adventure.

"Xavier, chief among us!"

"You are in charge!"

"Let's go!"

"O.K.," he consented. "Let's go! United we stand, divided we fall! You coming Jack?" he said, nodding to me.

"You heard 'em," I said. Then sarcastically, I'm afraid, "You're in charge!" Oh, wow! The gang was rarin'. "Whoopee," they all cried. "Xavier, chief among us! United we stand, divided we fall!"

Xavier, chief among us led us thru the one sleepy street; little dust devils blowing up from our feet as our bunch tramped eagerly forward. It was growing dark and one, Andrew, fell in beside me.

"Alas, and alack! 'tis but folly Jack," he said. "But what good is this? I'm with you Jack; I always get nervous with Xavier." Then, louder, "Do ye na' ken where ye are leading us, laddy?"

"Enough," I said, "united we stand, divided we fall." I had fallen in with the spirit of the crowd.

The tawny, darkening road wound narrower toward the thicket. Now grass grew between the tracks left by Land Rovers. As leaves and vines parted before the advancing troop, it got darker and darker. Andrew grumbled again, "Alas, and alack! 'tis but folly!" Then, after a moment, "How is it, ye always turn into a kitten when Xavi-

er, chief among us, is around," he chided me.

Carefully, cautiously, they advanced, groping their way through the darkness. We all, each and every one of us, were wondering now if this was what we should be doing. Oh, would we had turned back while still there was time!

"That rowdy bunch! They're pretty quiescent now," I mused as I thought of describing this in my next letter to Bali Hai! Those in the fore suddenly broke into a run as they advanced on a dimly lit meadow.

"Whoopee!" they all cried.

"Oh lord," I muttered. "Can it be victory was seized from the jaws of defeat?"

And then I saw them! Zebras, by the hundreds, looking for all the world as if they had been aroused from sleep and were parading in striped pajamas.

It takes only the blink of an eye to get the substitutions done. However, you must use the same case for the shorthand in the list as you use in the body. I found that by copying the shorthand as an additional list and having one upper case and the other lower case that things went smoother. You must also keep the symbol, as used in the body, uncomplicated by punctuation. Only the question mark and the symbol may be together; everything else must be a space away.

As for the frustrations of frequent disk changes, well, it's not so bad. The functions that I have performed so far seem to be closely enough related that, once a needed disk is in place, it stays there quite a while. I am going to try a variety of .BAT files for different purposes. For example, one startup that could be called by a batch file is ENABLE (A:,A:,B:,A:,B:),M (where Tutorial and data are used in drive B: and System, Operation, and Utility are used in drive A:). The ,M causes a routine, once called, to stay resident in memory for a longer period. While still volatile, the routine will stay in place until the memory space is needed. I used it with version 1.1 and it helped a lot.

I would like to hear from other users. The news that I'm particularly interested in is low cost improvements in memory so that more of DOS and more of ENABLE's functions are available, as well as some

transparent background programs. Is my only recourse the expense of a hard disk? We shall see.

Now for a final note, this about reformatting these paragraphs before the final printing. There is a routine in version 2 that is accessed by pressing F10 <ENTER> D. It is called Reformat paragraph. To use it, first you must block the words to be included in that paragraph. This is done by positioning the cursor on the first letter, or space preceding the first letter of the section to be included, press F7, reposition the cursor on the last letter, or space following the last letter of the section to be included, then press F7 again. Now use F10 <ENTER> D. The blocked area will tighten, blank spaces, except for single spaces between words or double spaces following periods, will disappear, and the paragraph is formed.

Here is a little helper macro, which I have called P, for Paragraph, that will take the place of most of the keystrokes in reformatting paragraphs. It repeats itself so when you are done with it remember to turn it off by pressing CTRL/BRK.

I use it at the end of the current paragraph. It begins the marking and waits for me to cursor up to the place where I want the paragraph to begin, then I press <ENTER>. The macro does all the rest as I described above. ALT/F7 will clear the marking after you have turned off the macro. Of course, REFORMAT must not be toggled off (F10 E C; the default mode is on) while the macro is used. If REFORMAT is off, all the indents and spaces will be held in the places they were typed.

#### Macro

Code	Documentation
{ ^Left }	:: Move to beginning of last word
{ ^I }	:: Make that whole line flush left
~ -	:: Tilde, <ENTER>, go to begin of next line
{ F3 }	:: Insert a blank line
{ F7 }	:: Begin a mark here
{ ? }	:: Wait for UP cursor to begin of section
{ Up }	:: Must go up one after using <ENTER>
{ F3 }	:: Insert a blank line
{ F7 }	:: Begin a mark here

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# 151 to 286

(or, What To Do With  
Those H-248 Boards  
After You've  
Installed the  
**HUG-386**  
Upgrade)

Pat Swayne  
HUG Software Engineer

**Caution:** The procedure presented in this article involves trace cutting, soldering, and mechanical disassembly and assembly. If you are unfamiliar with these skills, we recommend that you do not attempt this procedure. We also recommend that only persons who built H-151 or H-158 computers from kits (not Z-151 or Z-158 users) attempt the procedure, since they will be more familiar with their computers than non-kit users.

If you have upgraded your H-241 or H-248 computer by installing the HUG-386 Upgrade kit, then you have a fine new high speed computer, but you also have a set of boards just sitting there, doing nothing. If you also have an old H-151 or H-158 sitting around, perhaps you should consider changing it into a homemade version of the Z-286 by installing your old H-241 or H-248 boards in it. After all, all you have to do is replace the backplane and drop in the new boards, right? Well, it is not quite that simple, but it can be done. In this article, I will present the procedure for installing your H-241 or H-248 boards in an H-151 cabinet.

### What You Will Need

In order to install your '241 or '248 board set in an H-151 or H-158 cabinet, you will need to purchase the following items from the Heath Company Parts Dept.

Heath P/N	Description of Item
134-1818	Floppy disk drive cable
134-1894	Keyboard cable
181-7316-10	Z-286 backplane
204-3050	I/O card bracket
204-3081	Floppy/winchester card bracket
204-3104	Keyboard bracket
204-3105	CPU card bracket
442-665	-5 Volt Regulator
21-769	.01 uF Ceramic Capacitor
25-883	47 uF, 35v Electrolytic Capacitor
417-865	MPSA55 Transistor 3 1k-Ohm Resistors
163-0040	101-key Keyboard, or
100-1860-3	84-key Keyboard

If you used your disk controller with the HUG-386 boards, then you will need to purchase another one for use in your

homemade Z-286. There are controller boards available from a number of mail order companies (you must get an AT-compatible floppy/Winchester controller), or you can use any one of these Heath part numbers: 150-218, 150-234, 150-310, 150-330. You can, if you wish, use a non-Zenith keyboard, as long as it is AT-compatible.

### Disassembly

**Note:** If you have a Winchester disk (hard disk) installed in your computer, back up everything on it before you begin this procedure. The AT-style floppy/Winchester controller may not recognize the formatting information placed on the disk by your old PC-style hard disk controller, so it may have to be re-PREPED after you finish the modifications.

Disconnect the power cord before performing any modifications. Remove the cover from your computer, and remove all plug-in circuit boards. Unplug the power supply from the backplane board. Remove the 6 screws that hold in the backplane, and remove it from the cabinet bottom. You will now see that there are 9 stand-offs attached to the cabinet bottom. The center stand-off is improperly positioned for the Z-286 backplane, so use a good pair of pliers to bend it back and forth until it breaks off. Save the broken-off stand-off. Remove the nuts holding down the power supply, and remove the power supply.

### Optional Power Supply Modification.

To provide improved cooling in your computer, you may want to turn the fan around in your power supply so that it blows air out of the cabinet. To turn the fan around, remove the power supply cover and the plate holding the fan. Remove the fan. You will notice that the fan's power wires pass through one of the mounting holes that must be used for mounting when it is turned around. To remove the wires, cut a "slice" in the edge of the mounting hole, just large enough for the wires to pass through. When you re-install the fan, you may have to push some of the components on the power supply circuit board back a bit so that nothing hits the fan blades. Make sure all wires clear the blades also. Give the power supply a brief test run after you reassemble it to make sure that the fan turns freely. Then re-install the power supply in the cabinet.

Having the fan blow out makes a significant difference in cooling efficiency, and may be necessary to prevent overheating. Since I turned my fan around some time ago, I did not have the opportunity to test my homemade Z-286 with the fan in the original configuration. However, if you feel the top of the cabinet of an H-241 (which has the fan blowing in), and the cabinet top of an H-248 (which has the fan blowing out), you will know that what I say is true.

### Backplane Modification

The power supply of an H-151 or H-158 differs from a Z-286 power supply in two important respects. 1) The Z-286 power supply generates a -5 volt supply, whereas the H-151 uses a regulator on the backplane to generate -5 volts from the -12 volt supply. The connector pin that should supply the -5 volts instead carries a signal called PFL (Power Supply Fail). 2) The H-151 supply provides an active low TTL signal called PSG (Power Supply Good) which is used to light an LED on the backplane, but the Z-286 equivalent of this signal, called DCOK (Direct Current OK), is active high, and it is used to perform a power-on reset, not just to light an LED.

The Z-286 backplane can be made to work with an H-151 or H-158 power supply by cutting a couple of traces and adding some components. Position the board so that the back side (solder side) is facing you, with the edge containing the power supply connector towards you. Locate the trace coming from pin 13 of the power supply connector and make a cut at the location shown in Figure 1.

Position the backplane board with the component side up, and locate the DCOK LED. Cut the trace coming from R08, beside the LED, as shown in Figure 2.

Use a solder removal tool or solder removal braid to remove all solder from the holes at component locations Q01, C16, and C17 on the backplane board. Install the regulator at Q01, the 47 uF capacitor at C16, and the .01 uF capacitor at C17.

To provide the DCOK signal required to operate your H-241 or H-248 boards, you must construct the circuit shown in Figure 3. Notice that a reset switch can be added to this circuit, allowing you to perform a hardware reset of your computer. Construct the DCOK circuit using the MPSA55 transistor and three 1k resistors as shown

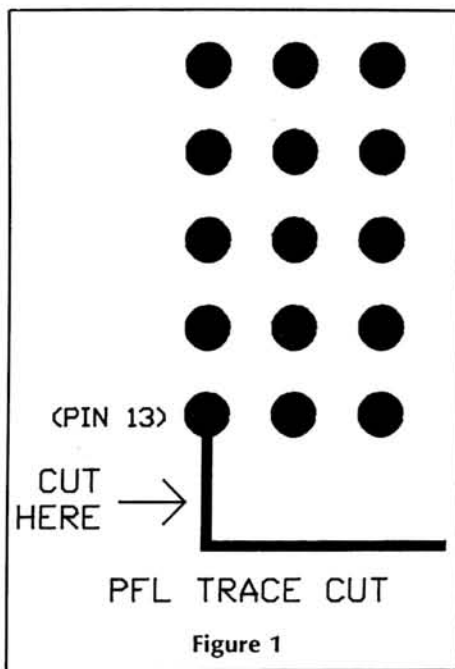


Figure 1

in Figure 4. If you cannot get an MPSA55 transistor, any general purpose PNP transistor will do.

To construct the transistor circuit, orient the board so that the component side is up and the edge with the power supply connector is towards you. Solder the emitter of the transistor to the pad of R06 that is away from you. Solder the collector of the transistor to the pad of R08 that is away from you. Twist the leads at one end of two 1k resistors together and solder them. Solder one of the free ends of these resistors to the pad of R06 where the transistor emitter is connected. Solder the free end of the other resistor to the trace where you made the cut, to the section not connected to R08. Solder the base of the transistor to the twisted wires of the two resistors. Solder one end of the third resistor to the pad of R08 where the transistor collector is connected. Solder the other end to the screw mounting pad that is to the left of R08.

Locate the stand-off that you broke off of the cabinet bottom. File the jagged edge smooth where it was broken off, and mount it to the center hole (facing downward) of the backplane board with a 6-32 X 3/8" screw. Then mount the board to the cabinet bottom with 8 screws.

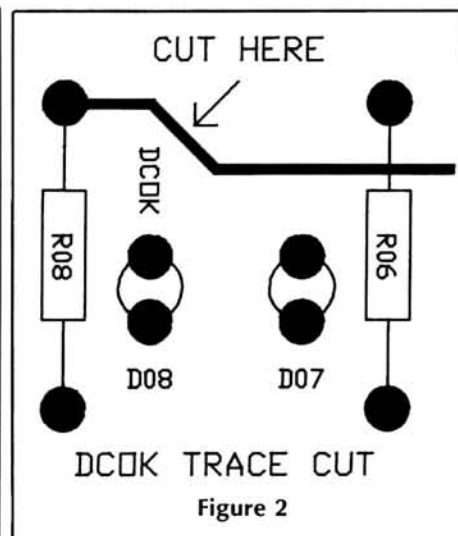
#### Keyboard Cable Installation

Remove the front bezel from your computer. Note which side of the LED in the bezel has the red wire connected to it before you pull the connector off. Pull the

LED wires in through the grommet in the front of the metal cabinet, and position them out of the way. Remove the grommet from the cabinet hole. The keyboard cable will have its own grommet, which will replace the old one. Pass the end of the cable containing the 4-pin connector shell and the solder lug through the cabinet hole, and install the grommet on the cable in the hole. If your computer is an H-151, there will be a card guide mounted to the inside of the cabinet front. Pass the keyboard cable under the card guide, and connect the 4-pin connector to P16 on the backplane. Remove the mounting screw by P16, and mount the solder lug on the keyboard cable at that location.

The keyboard bracket, p/n 204-3014, must be mounted at the left edge of the cabinet front. If you have an H-151, the screws holding the left edge of the card guide can be used to mount the keyboard bracket. If you have an H-158 that does not have a card guide, use two 6-32 X 1/4" screws and two 6-32 nuts to mount the bracket. Connect the keyboard socket at the end of the keyboard cable to the bracket using two 4-40 X 1/4" screws and two 4-40 nuts. Drill a hole in the front bezel so that, when it is installed, the keyboard can be plugged into the socket on the keyboard bracket through the hole.

Locate the 4-pin connector shell on the end of the wires going to the speaker and the old LED connector. Remove the wires from pins 2, 3, and 4 of the shell. To remove the wires, use a scribe to press in



through the slots in the side of the shell on each metal tang that holds the connector at the end of each wire in place. Pull on the wire while you press on the tang, and it will come out. Cut off the connectors at the end of the red and black wires and tape the ends. Install the removed blue wire into pin 2 of the connector shell (you may have to bend out the tang that you pressed in). There are protruding "keys" on the connector shell to prevent it from being installed improperly. Clip off the key by pin 1.

#### Card Modifications

Remove the mounting bracket from the I/O card, and replace it with the taller bracket, p/n 204-3050. Remove the jumper at J304 and either set it aside, or re-install it so that it is on only one of the pins (not connected).

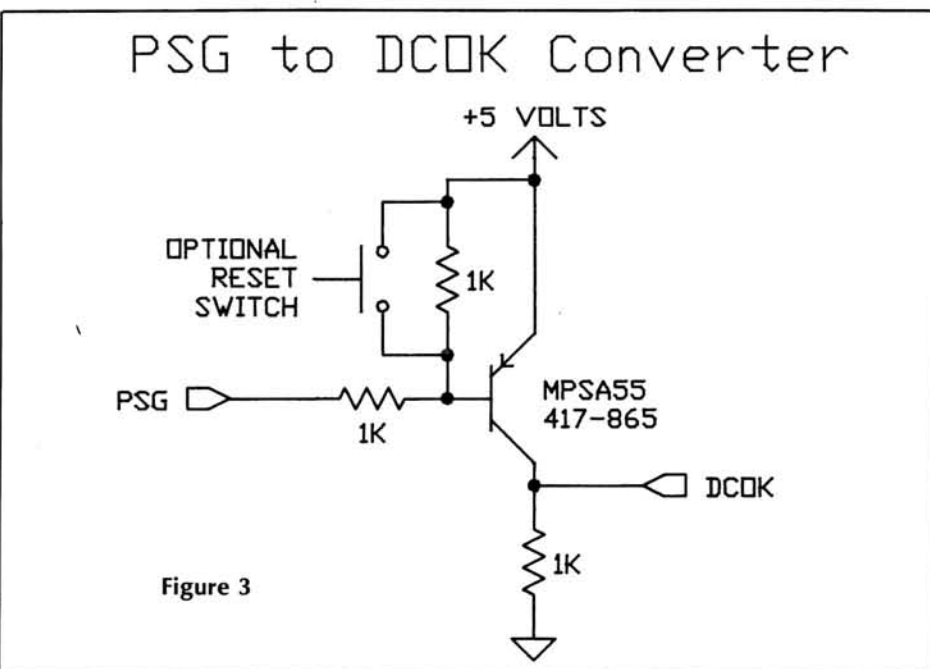


Figure 3

## PSG to DCOK Mod Layout

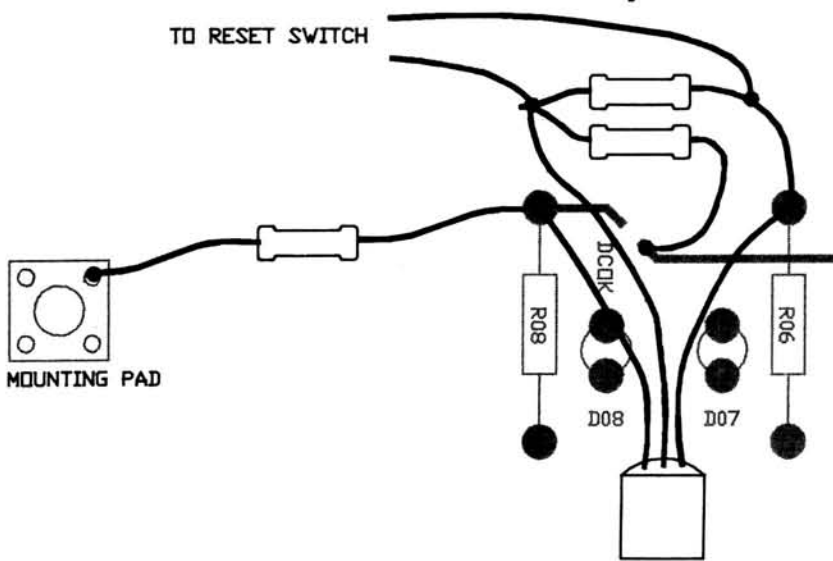


Figure 4

Remove the mounting bracket from the CPU-Memory card, and replace it with the taller bracket, p/n 204-3105.

Remove the mounting bracket from the Floppy/Winchester card, and replace it with the taller bracket, p/n 204-3081. **Note:** The screws that hold the old bracket to your disk controller are metric and will not fit the new bracket, which requires SAE size 4-40 screws. The screws used in the CPU and I/O card brackets are the proper size.

### Disk Drive Modifications

In order for your 360k floppy drives to work properly with an AT-type disk controller, pin 34 at each drive must be dis-

connected from the circuit. If you have Shugart, Panasonic, or Matsushita drives, there will be a small jumper wire by pin 34 on the drive edge connector. Clip this jumper wire in two, and spread the ends so that they will not touch. If you have Mitsubishi drives, you will have to cut the trace going to pin 34 on the edge connector. Pin 34 is the inboard pin on the top side of the edge connector.

Use the new floppy cable (p/n 134-1818) to connect the floppy/Winchester controller to your floppy drives. The Drive Select jumpers should be set to DS2 on all drives if they are Shugart, Panasonic, or Matsushita drives, or DS1 if they are Mitsubishi drives. If you have any other

type of drive, use DS1 if the jumpers are numbered DS0 through DS3, and use DS2 if they are numbered DS1 through DS4. The "twist" in the drive cable takes care of decoding the drives into A and B.

You can use your old Winchester cables if you have a Winchester disk. The DS jumper can remain as it was if you use the old cables.

### Assembly

Install your H-241 or H-248 cards into your Z-286 backplane as follows: floppy/Winchester controller in slot 1, I/O card in slot 2, CPU card in slot 3, Zenith memory cards (if any) in slots 4 and 5, and your video card in slot 8. If you have any other cards that are PC-compatible, they can be installed in any open slot in which they will physically fit, including the Zenith slots (slots 4 and 5). You can install an AT-compatible card in slot 6, or in one of the Zenith slots, if it will physically fit.

Connect the new LED cable coming from the keyboard cable to the bezel LED, making sure that the red wire is in the same position as the red wire on the old LED connector. Then replace the bezel.

After you have assembled your "new" computer, but before you replace the cover, you should inspect everything, and then test it. If it does not start up properly, and all of the red LEDs on the I/O card remain lit, you may have a problem with the DCOK circuit on the backplane board. When you first turn on the computer, the DCOK LED on the backplane should be the last one of the green LEDs to come on, and they should all be lit at that time.



### New Designs

Dear HUG:

A trend has started in REMark, which I feel requires a negative comment. That is the adding of colored designs among the text, such as Pages 7 thru 9, and 76 thru 80 of the August 1988 issue. Page 75 is okay.

These colored designs make the text hard to read and degrades an otherwise fantastic, informative magazine.

Sincerely,

Robert G. Davis, 6856  
661 Delayne Circle  
Layton, UT 84041-1918

*(We have been experimenting with different designs to spruce up the magazine, and have gotten alot of flack about the grid on pages 76 thru 80. I realize those grids were pretty dark over the text. They were supposed to be lighter. The grids on Pages 7 thru 9 though are light enough that their should be no problem in reading them. - Prod. Coord.)*

### More for the Z-100s

Dear HUG:

I have subscribed to REMark and Sextant for most of the '80s. I own an H-100 computer and H-25 printer. These are the

things I hope/wish to read about in your magazine. I do not buy your publication to read about PCs. I can buy any number of magazines that have the extensive resources to do better PC reporting.

Please consider the REAL value that you have to H-8, H-89, and H-100 owners and give us more of what we pay you for.

Robert B. Thorne  
5902 E. 91st Street  
Indianapolis, IN 46250

*(Read on Bob! -Ed.)*



# A Hard Disk Drive For Your H/Z-148

Ray Isenson  
4168 Glenview Drive  
Santa Maria, CA

Twenty and 30 megabyte hard disk drives, complete with controller boards and cables, are being advertised for sale by retail stores for well under \$300. One well known computer store is offering a 10 megabyte drive with controller and cable for \$198. Computer swap meets have at least one vender offering "GAY-RUN-TEED good as new, rebuilt" drives for \$100 and sometimes much less for the 10 megabyte units. Recalling the pricing history of the 5 1/4" half and full height floppy drives and comparing it to what currently is going on with the hard drives; a steep price decline followed by a plateauing and then a gradual increase, it's reasonable to expect that the price of the latter may have about bottomed out. This may be the opportune time to buy one.

From the date of initial acquisition of my HZ-148-42, the eventual installation of a hard disk drive was a foregone conclusion. The primary unknowns were when and for how much. I believed that the latter was the driving function; "when" would be as soon as the budget permitted. Little did I foresee the many technical matters that would crop up, real and imagined, to delay the realization. Never-the-less, a 20 megabyte hard disk drive now is installed and working. The original "B" floppy drive is still available, though it has its own external housing and power supply. The story about getting to that point follows.

Advertisements in REMark and elsewhere offering the HZ-148 with a hard disk drive installed made quite clear that the instal-

lation is possible. Unfortunately, none of the ads indicated anything as to the drive manufacturer or model number, the controller card or the accessory expansion card needed to add any more boards to the -148. (In fact, I could envision a hard disk controller card made especially for the HZ-148 that would mount in place of the ZA-148-2 expansion accessory card.) Some of the older hard disk drives and controller cards were known to be "power hogs". It was obvious that the 65 watt supply in the -148 couldn't handle them. On the other hand, no one local knew how much of the 65 watts was available. The closest HEATH/ZENITH Electronic Center is about 150 miles away. Although the Technical Consultation Department of the HEATH Company, Benton Harbor, is only a "telephone" away, it is pretty tough to expect a sensible answer when you're not sure what question to ask! That summarizes where I stood when hard disk drive prices became irresistible and, I suspect, where some of you stand as of this reading.

A note in the May 1987 issue of *DUP & DUMP*, the San Diego HUG bulletin reported that Rick Simpson had given a paper at the Blossomland HUG (St Joseph, MI) on installing a hard disk drive in the HZ-148. My request for a copy of that paper revealed that Barry Watzman<sup>1</sup>, a long time HZ computer expert, had given the demo. Barry generously responded to my query, noting that they had used a Miniscribe 3425 disk drive, a Western Digital WD-1002-WX1 controller and a HEATH expansion accessory board. He

also reported encountering a few difficulties.

First, the HEATH/ZENITH expansion accessory (part number was not noted) did not function as described. The board and schematic didn't agree and the slots on the board were not functionally the same; the controller would work only when "in a particular one of the two available slots". [I later learned that HEATH had two accessory boards. The ZA-148-2 replaced the ZA-141-1 --- possibly accounting for the schematic discrepancy noted by Barry. The fact that only one of the two slots, that closest to the power supply, was suitable for the controller board was also confirmed later.] Second, Barry wrote of a minor mechanical problem mounting the Western Digital controller using the ZENITH bracket. The smallest screw fitting the bracket hole was too large for the board. Wood shims solved that matter.

With the Watzman letter in hand, I knew enough to start a serious search for the remaining technical unknowns and for the requisite hardware. A written question to the Technical Consulting Group at HEATH resulted in a well thoughtout response from Bob Harris. His letter, relating that HEATH had offered the two different accessory boards, I took to explain the one comment from Barry. Of greater use was information he furnished concerning available power. According to Bob, the average maximum power used by the Z-148-42 is approximately 35 watts, leaving about 30 watts free for any additional ac-

cessory; divided about evenly between +5 and +12 volts.

Barry Watzman had demonstrated that the Miniscribe 3425 disk drive could be used. Unfortunately the widely advertised drive was the Seagate ST-225. The questions were: Could the latter and its attendant controller card be used; how about others available at swapmeets and flea markets? The information retrieval effort turned to visits to computer stores within about a 40 mile radius and telephone contacts beyond that. The intelligence gleaned:

1. Most computer stores (HEATH-ZENITH *OBVIOUSLY* excluded) neither have any technical information available nor are they at all concerned about the fact. They rely on the distributor to give them things that "work together."

2. HARDCARDS (hard disk drives and controllers mounted on a single full length card) require considerably less power than do comparable storage conventional hard disk drives. So much so that somebody suggested the possibility of mounting one in the HZ-148 without removing the B floppy. These units are modestly more expensive than the more conventional hard disk drives but, if one could be used, the savings from not needing an external housing or power supply for the B floppy might offer an acceptable trade-off. Unfortunately because of its thickness and/or length, at least for any I was able to get information on, a HARDCARD could not fit into a -148.

3. The older 10 and 20 megabyte disk drives, those taking 40 or more watts, generally were full rather than half height, thus automatically excluding themselves from consideration for internal mounting on two counts, size and power need. If a really clean 20 megabyte unit were to have been found at a particularly good price, thought might be given to externally mounting the hard disk drive.

4. The Seagate ST-225 drive requires about 28 watts starting power and 14.8 watts running; the Miniscribe, about as much. Unfortunately the load is unbalanced towards 12 volts so the power supply would be overloaded if nothing else were done.

5. If, however, one of the half-height floppies is removed, another 6 watts is made available, also unbalanced towards

the 12 volt source. The total is adequate for the Seagate or a comparable unit.

6. The controller card furnished with the Seagate ST-225's in the Los Angeles area is typically, but not invariably, a Western Digital WX1, the card that Barry Watzman installed. (If you opt to mail order the kit, you would be well advised to verify that the controller is a half-card board and not one of the older full length TTL cards.)

Alternative to the HEATH-ZENITH expansion accessory card, there is a functionally comparable board marketed by Premier Technologies of Irvine, CA. Their PTZ148X offers the same expansion capability but adds a clock/calendar. I tried to get information on it and any other hard disk oriented products while doing my search. They didn't answer their mail even though a Self Addressed Stamped Envelope was included. On that basis, I would be concerned about recommending their products for fear of what would happen in case a problem were to be encountered with it. (I'd be pleased to hear arguments in their favor.)

For a number of reasons, having to do with the way I organize files and back-up data, I felt strongly about retaining both the A and B floppies. It was quite acceptable to have the B floppy mounted and powered externally. The means of accomplishing that end are described below. You may not see the same requirement. If you agree, however, the decision to retain the second floppy needs to be made before installing the hard disk drive to avoid having to disassemble the computer again at some later date and to set a switch and replace the floppy data cable. So much for preliminaries and on to acquiring and installing hardware.

As simple minded as the concept may seem, my next action was the preparing of a detailed list of the hardware that would be needed along with likely sources and, where applicable, alternatives. If there is any chance of having to go to a multitude of vendors to satisfy your needs, the list is an imperative. I planned to buy a hard disk drive, the controller and the cables as a package or a kit only if there was absolutely no better (economically) way. In a similar vein, the enclosure, power supply and data cable needed for the B drive floppy might come from one, two or three sources. The check list was to make sure that one of the smaller items, a cable for example,

wasn't forgotten while shopping at a swapmeet. You might locate a ZA-148-42 or PTZ-148 expansion accessory board at a local HUG meeting or a nearby HZ Electronic Center. My plan envisioned delaying action until I or a friend made the 150 mile trip to the Woodland Hills Center, or if that didn't work to order it by mail from Benton Harbor. Meanwhile "the word was put out" to other computer enthusiasts in the area that a hard disk drive and floppy enclosure were being sought.

The Saturday sport section of *The Los Angeles Times* invariably has 10 or more computer store advertisements listing hard disk drive kits. Your local library or magazine store should have a copy of it. Listed prices are somewhat less than those appearing in the popular computer magazines and it could be well worth your time to investigate them. There are at least two large traveling computer swap meets in California, one in the greater Los Angeles area, the other in the Bay (San Francisco) area. One month the LA meet will be in Orange County, then in Ventura or in Los Angeles County. Every two months or so there's one within 75 miles of my home. I planned to see what it had to offer before I ordered a kit from Los Angeles. Very likely there is a somewhat similar situation not too far from your home.

At one time, floppy drive enclosures and power supplies generally were available at most computer swap meets. For some reason this has been less true in the past year or so. One of the few sources still regularly advertising them is JDR Microdevices<sup>2</sup>, Los Gatos, CA. My plan, if I couldn't find it at a swap meet, was to build one or get it as well as ribbon cables and connectors from JDR.

Two months after receiving the confidence building letter from Barry Watzman, all of the components were in hand. Unexpectedly, a PTZ-148 accessory expansion showed up in the hands of a member of the local HUG as did the lead to a working Miniscribe 3425 that a church was replacing with a larger capacity drive. Aluminum scrap purchased from a truck top manufacturer became the enclosure for the B floppy. The power supply parts were acquired at an amateur radio swap meet along with a neat little metal housing. A Western Digital hard disk controller came by mail order. Should you take on the task of ferreting



out components for a hard disk drive add on, be prepared to be surprised by how easy it turns out to be! Even though one of the low priced kits, the availability of which triggered the entire operation, wasn't used, those prices served to drive down the resale for good used components. Avid computer hobbyists still can do their thing!

Installation of the hard disk drive was straightforward. Having been forewarned by Barry about possible difficulties to be found, they were easily avoided. [See the report of his comments above.] If you assembled your HZ-148 from a kit you should be able to add the hard disk drive with no outside help. For those whose HZ-148 came completely assembled, the following instructional steps ought to be adequate. It is in an outline form for your convenience.

### Installation

1. Disconnect the power line, monitor, line printer, modem, etc.
2. Remove the two black Phillips screws on the rear apron of the computer, gently pry the top cover up at the back and slide it off to the rear.
3. Looking into the computer from the rear, examine the 34 conductor ribbon cable that connects the main circuit board to the floppy disk drives, noting in particular the orientation of the darkly colored cable edge with respect to the board and the floppies. Draw a sketch rather than relying on memory.
4. Unplug the data (34 conductor) and power (4 conductor) cables at the floppy drive(s). Remove the data cable completely only if you plan to replace it with a longer one to remote the B floppy.
5. If applicable, remove the three connectors from the data cable and install them on a new ribbon cable long enough to support the external floppy drive.
6. Examine the drive housing, paying attention to the region on the side away from the power supply where a Phillips screw holds the drive housing to the main computer case. Note the plastic lug on the main case that keeps the drive assembly from sliding back. Remove the screw.
7. A similar screw fastens the drive assembly on the side closest to the power supply. Loosen it two or three turns. Reassembly is easier if this screw is not fully removed.
8. Using a small tool, press the plastic lugs down just enough to allow the drive assembly to slide rearward over them. Do the two sides in turn, jockeying the drive assembly back.
9. Remove the drive assembly by raising it at its rear and slowly working it out the back of the computer.
10. The B drive is that which was closest to the power supply. It is held to the frame with 4 screws. Remove the four and place the drive carefully away.
11. Carefully remove the hard disk driver from it's box, handling it only by the metal frame. Check to insure that the screws that were used for the floppy fit easily in the corresponding holes on the hard drive. They should be 6-32s and not metric screws as are used by Panasonic (if that is the type drive being removed). They will be 6-32s for some floppies, a Mitsubishi drive, for example.
12. Mount the hard disk drive on the drive housing frame and set it aside.
13. If you are changing the number of floppies, i.e., going from 2 to 1, it will be necessary to change a switch setting on the main computer board. If not, ignore this and the next two steps.
14. (See Figure 2.4, page 2.9 of your Z-140 PC Owner's Manual.) Locate the two 10 segment dip switches on the edge of the main board near IC U496. SW403 is the cluster nearest the board edge.
15. The second little toggle from the end closest to U496 is 2/1D. This should be set towards the board edge for 2 drives, away from the edge for 1. (With the switch in the "2" position, the computer will boot and run even though the second drive is not connected. It will crash, however, if the B drive is addressed.)
16. Install the accessory expansion board according to the instructions that come with it.
17. Slide the controller card into the slot on the accessory expansion board that is closest to the power supply. If it is in the way, remove the metal mounting bracket from the controller. Fasten the card in place using small screws. Some putty may also be needed. (Barry Watzman's experience.)
18. If it was removed, reinstall the 34 conductor data cable for the floppy drives.
19. Install the 20 and 34 conductor cables for the hard drive onto the controller board. If you bought the drive, board, and cables as a kit, the connectors will be keyed to go only one way. If you made up your own cables, just remember that the board's pin number 1 goes to the drive's pin number 1
20. Reinstall the drive assembly by reversing the removal procedure. Working from the back of the computer case, tilt the front of the drive assembly slightly down and start it into place. Work the assembly forward until the drive escutcheon plates slide into the openings in the front of the computer and the drives snap into place in front of the retaining lugs. Replace and tighten the two screws.
21. Insert the 20 and 34 conductor cables from the hard disk drive controller and either 4 wire power cable into the rear of the hard disk drive.
22. Insert the 34 conductor data cable from the main board and the other power cable into the floppy drive.
23. Double-check all cables for alignment and secure seating.
24. Replace the computer's top cover, reconnect the keyboard and the monitor and the power lead.

### Formating The Drive

If you acquired the hard disk drive new or from a known source, it likely is already formatted; in which case the first step will be to install your operating system.

1. Boot-up with your master MS/DOS disk in drive A.
2. At the A> prompt enter "FORMAT C:/S/V". This will result in the hard disk surface being formatted, verified, and an operating system installed.
3. Remove the disk from drive A and press "Alt-Ctrl-Del". If all is well, the computer will test drive A for a disk and not finding one will Boot-up on the hard disk drive, "C".

Continued on Page 82

# On The Leading Edge

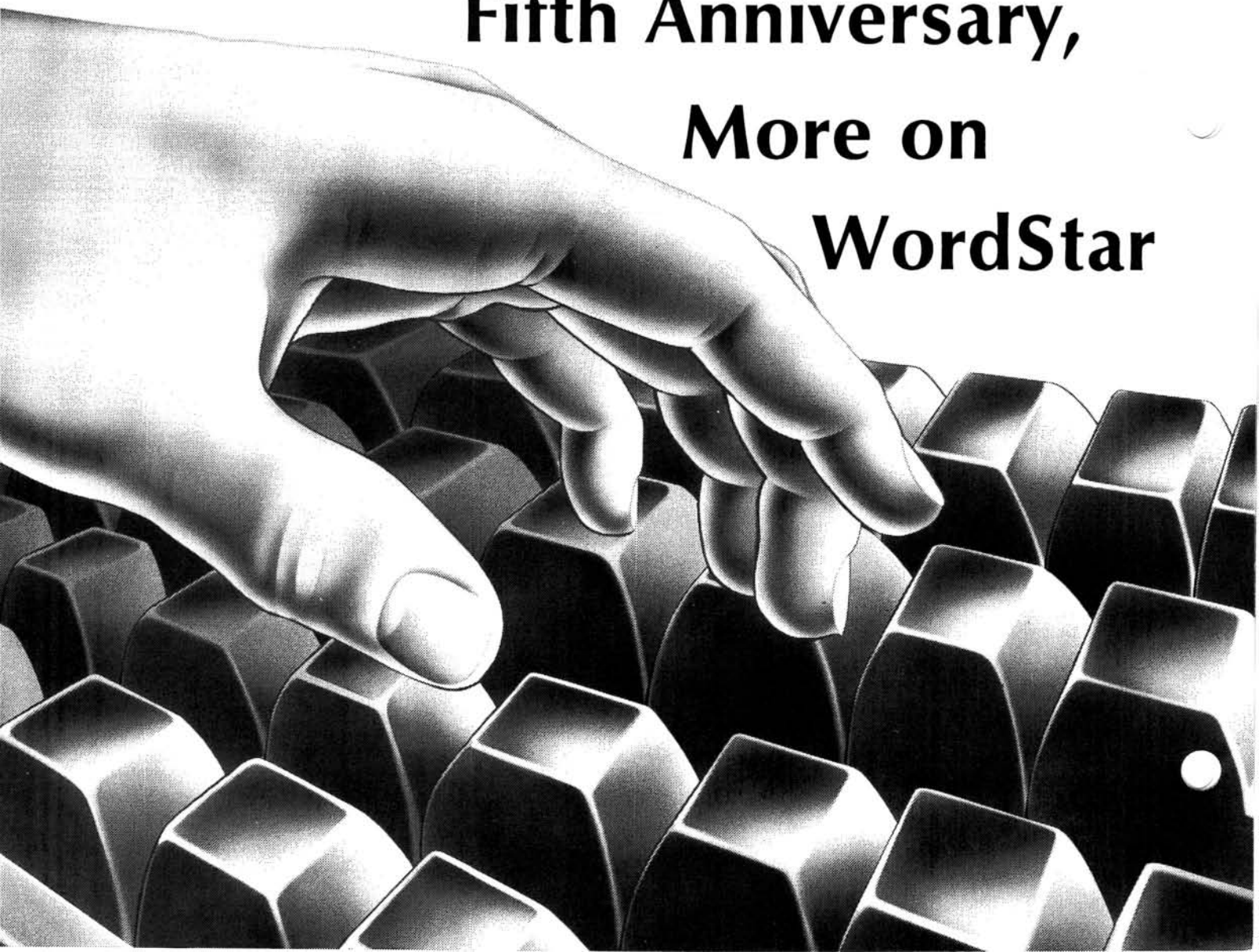
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## **Fifth Anniversary, More on WordStar**



A lot has happened in the last five years, and this month marks the fifth anniversary of my writing articles for REMark. And even though so much has changed so far as microcomputers are concerned, it is truly amazing how many things have stayed the same. It is the sort of situation where "the more things change, the more they stay the same". In looking over my very first REMark article (On the Leading Edge — A New Column) that appeared in the November 1983 issue, I find that many of the ideas presented there are still valid. I find that truly amazing in the fast-paced world of technology and computers. If you were not a HUG member then, don't worry — I will include some of the same paragraphs in this article with some updated thoughts and comments.

But before we get too far along, it is probably worth a few minutes to introduce myself again because we have a lot of new HUG members since I wrote that original article.

My educational background includes a B.S.E.E. degree from Purdue University and an M.B.A. from West Coast University in Los Angeles, California. I have over 20 years' experience in various data processing functions ranging from systems analysis and design to management. And I have also worked for various companies like Honeywell, McDonnell Douglas, Trans-America, and Atlantic Richfield (ARCO). During this time, I have written a half dozen books or courses, as well as nearly 200 articles of one kind or another.

I am currently a Senior Consultant with Total Assets Protection, Inc. (we call it TAP) in Arlington, Texas. TAP provides just about all kinds of services for computer systems ranging from the design/build of major data centers to communications to the analysis and development of information security and disaster recovery programs to protect data. My personal specialty is the analysis and development of information security and disaster recovery programs for large mainframe data centers. As a result of this consulting experience, I have also worked with all major brands of microcomputers and software, as well as a number of Local Area Networks (LANs). This has given me the opportunity to use and compare a lot of computer systems from major manufacturers (including Zenith, IBM, Compaq, and Tandy), add-on boards, and a wide array of word processing, spreadsheet, and database software. Regardless of what hardware I have used, I still think

that the Heath/Zenith systems are the best, and those are the ones that I personally chose to buy. At this point, it seems appropriate to "steal" a few paragraphs from my November 1983 article.

#### Why Choose Heath/Zenith?

"In my opinion, one of the best kept secrets in the microcomputer world today is that the Heath/Zenith family of hardware and software is among the finest available. And I have found that the support in 3 of the local stores [I was in California at the time I wrote this — WMA] was also great . . . even for non-H/Z products. But why choose Heath/Zenith in the first place?

One of the most important things in purchasing any computer is the after sales support [and that is still true]. Since I have spent a few million dollars of company money on computer hardware and software, I spent some time trying to justify my personal microcomputer since I was going to pay for that. As part of that justification, I spent considerable time in various computer stores just trying to understand all of the available hardware and software. In most cases, I came away very frustrated because, although I knew what I wanted, I couldn't find a salesman in most stores who would take the time to discuss the advantages and disadvantages of their systems. Many of the salesmen simply ignored me when they found out that I wasn't going to buy a computer system "today". I also found that I asked too many questions that they couldn't answer. I couldn't help but wonder if I would really be out of luck when I had a problem after the sale!

Since I was already prejudiced toward the purchase of Heathkit, I went there last. I found that John Secor of the Anaheim store was willing and able to intelligently discuss the pros and cons of the various equipment on the market. In fact, he spent about 3 hours with me that first day, and didn't seem offended when I didn't buy anything at that point. Naturally, I purchased the Heathkit equipment (and software) since I was convinced that I would be able to get support after the sale.

And I haven't been disappointed either! It seems to be an unfortunate fact of life that computers and software don't always work the way you expect. I've had some problems, mostly because of something that I did wrong, but I've always received

courteous and prompt assistance in solving the problem, even if it was my fault. That is probably the most important reason for buying your equipment from a reputable supplier."

The original draft of that article was written on my H-89 with a word processor called Magic Wand that was popular for that computer. It was actually "finalized" on my H-100 (or Z-100, if you prefer) using WordStar running under CP/M-85. So much for the past — what about the present?

Since that time, I have purchased an H-100, an H-241 (later converted to a '248), an H-386, and a Z-171 portable. And even though I have used a lot of other hardware during the course of my consulting experience, I remain an unabashed, unapologetic, and generally faithful user of Heath/Zenith computers. During this period, my major criticism of H/Z equipment has been that, in many cases, prices for Zenith hardware are not competitive with those available for other brands. While I was talking to a salesman at one of the local Heath stores, he told me that "you get what you pay for". Even though that is generally true, I STILL think some of the prices are outrageous, and I have commented on them periodically in the last few years. But lest we lose perspective on this, it is interesting to note that most microcomputer users of any particular brand, especially IBM, seem to think that prices are outrageous for their hardware too.

When one stays within the Heath/Zenith computer world, it is also easy to lose perspective about various hardware or software problems associated with a specific brand or model of computer, or DOS or software version. Even H/Z systems have their problems, and I seem to recall a lot of vitriolic criticism directed at Zenith because of some alleged cooling problems with early Z-200 models under some very specific circumstances. If you strictly concentrate on H/Z computers only, it is easy to lose sight of the fact that all hardware manufacturers have problems. For example, some IBM ATs apparently had serious problems with hard disks (they constantly crashed). Even though IBM denied there was a hardware problem, there appeared to be such a widespread problem with AT hard disks that PC Magazine featured one issue's cover and a series of articles which discussed the problem in detail.

It really does not seem to matter whether you have a Chevrolet (or Tandy) or a

Cadillac (or Zenith), chances are that you may have a hardware problem of one kind or another. That may or may not be a hardware design problem, but my experience is that at least one user of any specific brand of hardware WILL have a problem. My experience also suggests that users of Zenith and Compaq computers will have fewer problems than most, but I have not surveyed the entire market.

That pretty much describes why I chose and still choose Heath and Zenith computer equipment. I have used various models, and I think that the H/Z hardware and Zenith MS-DOS are still second to none. One other item of information also appeared in that first article.

### Current Trends

"One of the more interesting subjects today is the answer to the question of: 'Where are we going in data processing'. I specifically used the term 'data processing' instead of microcomputers or computers because they are getting more difficult to separate every day. Ads discussing the interconnection of personal computers to large systems and local area networks are becoming more common.

Microcomputers will continue to be faster, smaller, and more powerful at less cost [Today's '386 desktop systems actually have more computing power than mainframes did 15 years ago]. Large computer system architecture will provide better interfaces for personal computing networks. Microcomputer hardware and software for telecommunications will be faster . . . at least on the order of 4800 baud which is the upper limit for a standard phone line [You can now buy 2400 baud modems]. Some popular add-on hardware will help you obtain these capabilities, and I'll talk about that in a future article.

Software is still the weakest link [In some cases, that's even more true today than it was 5 years ago]. And that means both programs and documentation. Because of the rapid growth of micros, a lot of the software, particularly the documentation, is terrible! We'll be looking at some of the better software in future issues, and what 'user friendly' really means.

Microcomputers which are 'versatile' will be the biggest sellers in the future. Dedicated word processors will be non-existent simply because they're too limited. [Dedicated word processors are not yet

extinct, but they have all but disappeared over the last five years]."

As most of you probably recognize, most of those comments still apply today, and some even more so. Micros have gotten smaller (e.g., laptops), faster, and generally much more powerful. In addition, disk capacities have skyrocketed to the point that there is current discussion about 25 megabyte FLOPPY disks, not to mention the potential of optical disks on the order of 500 MB or so.

Based on my mainframe background, it is interesting to observe that the desktop computer 'history' is amazingly similar. Years ago, mainframe computers used an operating system called DOS (really!), and there was considerable excitement when IBM released a new multi-tasking operating system called MVS. That microcomputers — a better name is desktop computers today — have followed a similar path is interesting but expected. For that reason, I was not at all surprised when the OS/2 operating system was announced for microcomputers. Indeed, one of the most difficult things I had to originally learn about micros was that they could only do one thing at a time. Although that was not unexpected, it took me a while to get used to working on a single task without being able to submit a background job (e.g., a program compile) and not having the computer available until the current task was finished. I also missed the speed of processing of a mainframe, but that has largely been overcome by the speed of the new computers like the Z-386.

All in all, it appears that all of the current trends will continue: faster, smaller, and more powerful systems; higher disk capacities, more memory, and better displays. I hope that software will continue to get better, but maybe the best we can hope for is that it will have fewer bugs. Although I am generally optimistic, I have serious doubts whether we will ever see completely "bug-free" software.

### Moving Right Along . . .

My second article that appeared in the December 1983 issue was called: Trade Your H/Z-89 for an H/Z-100? In that article I discussed the various considerations that I personally thought about when I decided to trade in my H-89 for an H-100. As I've mentioned before, I am still sorry that I did not keep the '89 if only for historical purposes, but it seemed like the

thing to do at the time. Because of that, I still have my '100 with no intention of selling it.

While one can argue the benefits of getting a 'newer' computer, there are some real disadvantages in doing so. Aside from the cost, it can be very difficult to justify a major new computer purchase if the old one does everything you want or need. I think that reason probably explains why a lot of people still have their '89s or even the old H-8s and H-11s. When a computer does what you want and need, is there any real reason to buy another one? I have even followed my own advice because I kept using my '100 for a couple of years after Zenith began producing the PC series computers. The major reason that I used the '100 was simply because it basically performed the tasks that I needed. I jumped directly into the Z-200 series because I felt that was the first significant improvement (primarily speed) over the '100. It seemed silly for me to get a 4.77 MHz 150 when I already had that in the '100, even though I rarely used the 16-bit capability. I basically used the 8-bit CP/M operating system and the appropriate version of WordStar for most of my early writing, including a couple of books. One other motivating factor for my buying a Z-200 was a business reason — I needed a PC compatible computer so that I could write about the hardware and software used on it.

In any case, that's enough of the past — let's continue with the WordStar discussion that we had the last time.

### Back to WordStar

Last time we discussed the basic WordStar E-S-D-X cursor diamond that is used with the CTRL key, and we looked at the basic functions that expand on that as shown in Figure 1.

WER	(Line)(Up)(Page)
AS DF	(Word)(Left Right)(Word)
ZXC	(Line)(Down)(Page)

Figure 1  
The WordStar Line Up/Down  
Scroll Diamond

The basic diamond configuration shown above provides the general features needed to move around in a document. Then we looked at one of the functions of the Quick menu that used the diamond to move the cursor around on the screen as shown in Figure 2.

<code>^QE</code>	(Up) (Top of Screen)
<code>^QS ^QD</code>	(Left Right) (Line)
<code>^QX</code>	(Down) (Bottom of Screen)

**Figure 2**  
**The Basic WordStar**  
**Quick Menu Diamond**

The basic sense of the diamond pattern has again been preserved so that the commands move the cursor in a logical manner on the screen. In addition, the Quick menu has some other functions that can help you quickly move around in a document. Perhaps the most important of these are the Find and Find/Replace commands.

You can use `^QF` to Find a word or group of words in a document, and that seems logical enough. The default is to find or search for an exact match so that the search string is case-sensitive. You can also tell WordStar to ignore any case sensitivity in the search string with an option.

The Find/Replace command is `^QA` which is not so intuitive. I have decided that the designers must have tried to pick the other "end" of the WordStar diamond, but that doesn't have to be correct.

In WordStar version 4.0, you can also activate a four-function calculation feature with `^QM` (for Math). That version also provides a "Goto Page" feature which is implemented with `^QI` — `^QP` was already used to move the cursor to the Previous cursor position. And `^QL` starts the spell checking for the document.

The Quick menu also includes some other commands, and we will look at some of them as we go along. It allows you to move Quickly around in a document, but the Block menu also has some very important commands.

### The WordStar Block Menu

Writing and moving around in a document is fairly easy with the basic diamond commands and the Quick menu, but the Block commands are much more important. All Block commands begin with `^K` which stands for block. At this point, you are probably wondering why the Block commands do not begin with `^B`. I have wondered that too, but the `^B` command is used to "reform" a paragraph when a lot of words have been inserted in the middle. Up to and including version 4, WordStar did not have the capability to

automatically reform a paragraph on screen like many other word processors. The good news is that WordStar version 5 (yes, I just received it) DOES have the automatic paragraph reforming, although you can still do it manually like the old versions if you want.

In any case, the `^B` command is used when you have inserted words in the middle of a line, and that insertion causes the right side of the line to be pushed to the right, sometimes extending beyond the right side of the screen display. In order to bring the sentence or paragraph back within the margins, one simply uses `^B` to reform the paragraph. Like most word processors, WordStar considers a paragraph to be anything up to and including a hard carriage return. I don't know that this explanation logically explains why `^K` is used for the block functions, but at least you know why `^B` is not used for block commands.

One of the primary reasons for using a word processor is the capability to copy, move, and delete large blocks of text in a document. But before you can manipulate the blocks, you must first mark them.

The beginning of the block is marked with a `^KB` and the end of the block is indicated with a `^KK`. When a block is so marked, it appears in reverse video on the screen so that it is easy to see. Then you can use one of the block commands.

To copy a block, you move the cursor to the location where the block is to be copied and press `^KC` for Copy. Or, you can move the block to that new position with `^KV` for move. Perhaps a better way to think of the V in the move command as the "insert mark" used by editors to insert words — that may also explain why the insert mode is toggled off and on with `^V`. Finally, you can delete a marked block with `^KY` which may not seem particularly logical until you remember that `^Y` is used to delete a line from the screen.

Now if you can imagine expanding a block to include the entire document, it is easy to see that the data you are writing to memory can be saved to disk with a block command. Remember that most programs (e.g., word processors and spreadsheets) only write data to memory, and nothing is usually saved to disk until you issue a specific command to do so. Some of today's word processors also have the capability to save data to disk after a certain period of time and/or keystrokes, and

the new WordStar 5 also has that feature. But with most older programs, it pays to save to disk frequently (every 15-30 minutes) so you don't lose too much in the event of a power failure.

As a result of that limitation, I use the `^KS` command to Save the file frequently even though I now have an uninterruptible power supply. In WordStar versions prior to 4.0, you also had to issue to the `^KP` command to return the cursor to the Previous position where you were writing or editing. In 4.0 and later, `^KS` keeps you at the current cursor position.

When you are finished writing a document, you enter the `^KD` command to tell WordStar you are Done. The file is saved and you are returned to the Opening Menu. Or, you can use the `^KX` command to save the file and eXit to the DOS command prompt. You can even decide that you do not want to save the edited file back to disk with the `^KQ` (Quit) command, but you will be prompted that you have changed the file before the program returns to the Opening Menu. One of the particular features that I especially like about WordStar is that it automatically creates a .BAK file when you enter any of the commands that save a file to disk. Even though some of the current word processors have other features that essentially accomplish the same thing, I always feel safer when there is a completely separate backup file on the disk, especially a hard disk.

The Block menu also provides a lot of other features — for example, you can manipulate other files using the erase (`^KJ`), rename (`^KE`), and copy (`^KO`) commands. You can read another file into the current one with the `^KR` command. Or, you can write a marked block to a file using the `^KW` command.

Another neat trick is to use `^K` followed by a number (e.g., `K1`) to "mark" a place in your document. You can move to any other location in the document, and then use the Quick command `^Q1` to return to that marked location. All single-digit numbers can be used, so you can mark up to 10 different locations and move to them quickly.

The Block commands are quite useful, but there is one other special reason for using a word processor — the capability to use various print enhancements, such as bold and underline, in a document. For

that, we need to look at the Print commands.

### The WordStar Print Menu

The WordStar Print commands are activated by the ^P command sequence and many of them are reasonably logical. Assuming that you have correctly configured WordStar to work with your printer, you can activate its capability for boldface type by using the ^PB command. When you use a print enhancement like this, the command is actually a "toggle" — that is, you turn bolding ON with a ^PB and you then must turn it off with another ^PB. If you forget to turn off the print enhancement, the rest of the document will be printed in whatever you forgot to turn off.

It was pretty easy to forget to turn off a print enhancement, and virtually all long-time WordStar users (including me) have had the major part of a document printed in bold or underlined because of a failure to turn off the enhancement. If you have seen any of the FlipFast books, you may appreciate how much paper I went through. I finally solved that problem by getting a color monitor — then, I could have black letters on a white background for a normal font (except for Microsoft Word), blue indicates that bold is on, green indicates that the underline is on, and magenta indicates that italics are on (on an Epson). It is difficult to miss that kind of color change when you are writing something. In fact, that problem was recognized by at least one company because I seem to recall a program that would check for all print enhancement toggles to be turned off after a specified number of words, lines or whatever.

Of course you can use the ^PS to toggle the underScore feature off and on. And WordStar provides a number of other print enhancements like superscripting, subscripting, and strikeout on capable printers. What features you actually have depends on the exact capabilities of your printer. And I think that is directly related to one of the best features of WordStar.

### WordStar and Printers

When you install WordStar, you can choose from a wide selection of pre-programmed printers, and the installation is generally painless. But, for one reason or another, I have always ended up with a printer that was generally the same as the available choices, but it was slightly different. For example, I have a DTC Style-

Writer printer that I use for most of my correspondence because it is a daisy-wheel printer. Although this printer is essentially a Brother HR-25, it has significant modifications so that it emulates a Diablo 1630 printer. That's fine, but I also have a cut-sheet feeder, and I have never found any word processor that has a driver that supports a Diablo 1630 WITH a cut-sheet feeder. And WordStar has a special configuration program called WSCCHANGE that allows you to change the specifics of how the program works with your printer.

I also use a C. Itoh C-310 printer that emulates either an Epson FX-80 or an IBM ProPrinter. Although I can always find one or the other on a program's configuration menu, I also have a cut-sheet feeder for this printer too. Again, I was able to select the "standard" printer driver and modify it to support the sheet feeder that is apparently not even available for an FX-80. By the way, most of today's word processors (e.g., Word, Word Perfect, and Sprint) allow that kind of customization, but other programs — such as spreadsheets — do not. In any case, it is nice to know that you can configure a program for your particular printer even if it is not listed on the standard selection menu. Now let's get back to the next menu on the list which is the On-Screen menu.

### The WordStar On-Screen Menu

In versions before 4.0, the On-Screen menu was the last major menu function available, and it was activated by the ^O command. The On-Screen functions generally control various display features like margins, ruler settings and tab stops, word wrap and justification, centering, line spacing, and temporary indents for hanging paragraphs. For the most part, I don't need too many of these features, but I do use the ^OG command a lot for creating hanging paragraphs. Many of the features available in the On-Screen menu are not often needed, but it is nice to know where they can be found on a menu or "help" screen.

Last, but not least, is a new feature that was implemented in version 4 — it is called "Shorthand", but it really allows the use of macros in WordStar.

### The WordStar Shorthand Menu

The Shorthand Menu is activated by the Escape key, and it allows you to create your own macros within WordStar. I have always used a special program to create

my own macros so I don't use this feature as much as I otherwise would. You can use the Shorthand feature to create a macro that contains a complete form letter, a letterhead, a series of WordStar commands or some combination of all those. A nice feature of the Shorthand Menu that I do use is the "ESC @" which gets the system date and inserts it in a document in the form of August 19, 1988.

That generally covers the standard WordStar features, but there is one other thing that was included in version 4 that I have found particularly useful.

### Thesaurus

Until I got WordStar 4, I normally looked up synonyms in a thesaurus like most writers do. Then, I found that the Word Finder software and thesaurus was included in version 4, and it is neat. It is nice to be able to look up synonyms by simply pressing Alt-1, and this particular thesaurus contains synonyms for most words that I look up.

There seems to be a lot of new features in WordStar version 5 that I haven't been able to spend much time with yet, but I think it will be a vast improvement over the current version. It has a spectacular page preview feature, and WordStar finally does windows. I don't know how clean they are, but that is one feature that I have used a lot on Microsoft Word. It is especially important when you are writing any kind of long document, especially a book.

But there is really one spectacular program included with version 5 that solves a particular problem I had. If you remember the September issue, I mentioned that I have used a program called AutoDex for a number of years to manage files on both my CP/M and PC compatible systems. And I was looking for another program with similar capabilities which would also handle subdirectories. Well, someone at MicroPro must have read my mind because a program called ProFinder is included in the latest WordStar release. ProFinder has nearly all of the capabilities that I was looking for, and I think that is a remarkable coincidence. WordStar version 5 also has some other neat features that will be the subject of a future article. For all of you who have written to me, I will still survey your preferences for DOS shells and hard disk managers. At least I hope to get a couple of letters with your preferences even though that article has not been published yet as I write this.

Continued on Page 82

# Turbo Pascal

## Part 1

### Basic Commands

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This is the first article in a series of four written to help people that know very little or nothing about Turbo Pascal. This article is based on Borland's new Turbo Pascal 4.0, so some features may be unavailable in 3.0 or 2.0.

First, I will give you a little bit of background information on Turbo Pascal. Turbo Pascal started in 1984 with Version 1, as one of Borland's first two products, along with SideKick. The base price was \$69 and was part of Borland's offering of inexpensive quality software that was opposite of the high price software of the vendors. Also, Turbo Pascal, unlike the other major software packages, wasn't copy protected. In this first version, programmers had to pay a \$100 fee to use Turbo in production work, which was dropped with Version 2. Until Version 4, Turbo's output files were limited to 64k, and graphics support was for CGA, and only included plotting dots and lines. Many new features were added in Version 4, like the graphics support for VGA and EGA, 43 and 50 line modes for EGA and VGA, the ability to make files larger than 64k and much more.

The next thing I will talk about in this article is the Turbo Pascal 4.0 menu tree system. Turbo's menu tree system consists of a top line menu of five selections: File, Edit, Run, Compile, and Options. When one of the five is selected, a pull-down menu appears below the selection.

The first selection, File, lets you load, save, delete, etc. as long as it has to do with source files. The second selection, Edit, puts you into the editor. This is where you type in the files in the programs below.

The third selection, Run, lets you run your programs inside of Turbo Pascal. You should use this to run the programs listed in this series. This also can be used for troubleshooting.

The fourth selection, Compile, lets you compile your source files to an EXE file for running from DOS. There are many options, such as changing the directory and being able to Make an output file, if you have a lot of little files to be compiled into one big one.

The fifth and last menu selection, Options, lets you set the options that you want, such as screen colors, compiling options, EGA 43-line display, etc.

I've barely talked about the menu system because the manual does such a good job in explaining them. Now let's learn about the language. Type this first program into the editor:

```
program FirstPgm;
begin
WriteLn('This is my first Turbo Pascal program.
end.
```

The first line is optional, which just tells you the program name. Notice every line, except for begin and end, is preceded with a semicolon.

The next line is "begin", which tells the compiler where the code block begins. A code block is any part of the program, or like shown here, the whole program. Code blocks are just another part of the structured qualities of Pascal. As you'll see later, you can use begin for other code blocks, such as in complex statements like if and for. Again, this is a standard Pascal convention.

“Writeln” is the first command we’ll get to, and this writes the string enclosed with single quotes to the screen and skips to the next line. Another version of WriteLn, Write, doesn’t skip to the next line. Notice this is also proceeded with a semi-colon.

The last line, “end.”, is the standard end of the program. This is always the last line of the program.

If typed correctly, this program will print “This is my first Turbo Pascal program.” and exit when run with the “Run” command. Now, we’ll add some variables to the program.

Since Pascal is a structured language, you have to declare your variables as a type. You do this before the “begin” with “Var”. Here’s a program that does that:

```
program VariableUse;
Var a,b,c: integer;
begin
a:=1;
b:=3;
c:=a+b;
WriteLn(a, ' + ',b, ' = ',c);
end.
```

As you see, we first defined the variables we were going to use as integer. Integer is only one of the types that can be defined. Table 1 has a list of types. You can assign values to these using the “:=” like “variable := value;”.

the “Var”. In this example, I define a string and print it:

```
program StringDef;
Var str : string[50];
begin
str := 'This is a string with length of 50';
WriteLn(str);
end;
```

In this program we defined a string named str with a length of 50. Strings can have a length of 1 to 255. They can be defined with a colon equal sign just like the integers and printed with WriteLn.

Now that we know about variables, we’ll now learn about inputting from the keyboard. For this, you use the ReadLn instruction. Here’s a simple file using ReadLn, variables, and WriteLn.

```
program ReadnWrite;
Var a,b,c : integer;
begin
Write(' What is the first number ? ');
ReadLn(a);
Write (' What is the second number ? ');
ReadLn(b);
c:=a+b;
WriteLn(' A + B = ',c);
end.
```

In the variable declaration, we declared a, b, and c as integers. If you entered a value with a decimal point, it would be rounded off to the next whole number. ReadLn is used here to input integers, but may be used to enter any type of variable. Notice Write is used instead of WriteLn so Turbo

should produce a boolean true or false. If the variable types don’t match, you will get a “Type mismatch” error. Also, when using the equal operator, be sure to only use the equal sign instead of the colon equal. An example of an if statement is shown below:

```
if a=7 then begin
WriteLn(' A equals 7. ');
else begin
WriteLn(' A isn t 7. ');
end;
```

When using if, you have to surround the code with begin and end because this is a code block, which is a block of code composed of a declaration area (any variables declared) and a statement area (the WriteLn, in this example). As you’ll see later, blocks of code can be defined as a procedure or function, then be used in the main program many times. The begin and end tells Turbo what to execute and what not to execute. In the above example, the else tells Turbo that the a=7 block is done and the “end;” tells Turbo that the A isn’t 7 block is finished. Just remember, in complex code blocks that require more than one statement, use “begin” and “end;”.

The next conditional statement is case, and it compares the variable you specify against many different cases. Maybe an example will help:

```
case Season of
'Winter': WriteLn('Cold, snowy..');
'Spring': WriteLn('Warmer, rainy..');
'Summer': begin
WriteLn('Hot, dry');
WriteLn('Barely any rain');
end;
'Fall': WriteLn('Cold and dry!');
else
WriteLn('ERROR');
end;
```

In this case block, the string variable Season is compared against four strings that the variable could possibly be, and executes the accompanying code block. Again, if the block is more than one statement you must use the begin and end. In “case”, two periods between two of the possible values adds all the values between the two. For example:

```
case IntegerV of
1 : WriteLn('Uno!');
2..100 : WriteLn('Two to one hundred');
-1..0 : WriteLn('Within -1 to 0');
end;
```

The two periods were used for two of the three possible values. If the variable IntegerV would have been 69, it would

**Table 1  
Turbo Variable Types**

Type	Group	Range
integer	integer	-32768 to 32767
byte	integer	0 to 255
shortint	integer	-128 to 127
word	integer	0 to 65535
longint	integer	-2147483648 to 2147483647
real	real	2.9 * 10 E-39 to 1.7 * 10E38
single	real	1.5 * 10 E-45 to 3.4 * 10E38
double	real	5.0 * 10E-324 to 1.7 * 10E308
char	char	One character #0 to #255
string	string	Length 1-255
boolean	boolean	True to False

There are many variable types, but the group “real” will rarely be used unless in a scientific or mathematical program. I suggest using an 80X87 numerical coprocessor with the “real” group. Now, let’s talk about strings.

Strings are probably the most used variable types, and they are easy to define in

doesn’t skip to the next line for the inputs. Also notice how variables are added with the regular plus sign operator, but the colon equal sign is used.

The next few statements we will talk about are conditional statements, the first of which being if. “If” compares variables and constants (numbers or letters), which



have satisfied the "2..100" criterion, but "103" would not have.

Our next group of statements, the repetitive statements, repeats a code block until a certain condition is satisfied. Our first is the repeat until statement, which repeats a code block until a condition is satisfied. For example:

```
repeat
WriteLn('x isn't -10 yet. ');
x:=x-1;
until x= -10;
```

Repeat doesn't use begin and end because the code block is enclosed at the beginning with "repeat" and at the end with until and the condition. This is the simplest repetitive statement.

The next repetitive statement, while, is the opposite of repeat. While repeats code while a certain condition is still true. This may be equal, not equal, greater than, or less than, or certain combinations. For example:

```
While X > 0 do
begin
ReadLn(Y);
X:=X-Y;
end;
```

Notice the "begin" and "end" encapsulated code block is used again. This code block subtracts Y from X until X equals zero or below. This is actually another simple statement, too.

Our next statement is "for", which is used when the number of repetitions is known. "For" uses a control variable which is incremented and a block starting with a begin and ending with an "end;" is executed. An example of a program using a 'for' that counts from 1 to 100 is:

```
program Countup;
Var b : integer;
begin
for b:=1 to 100 do begin
WriteLn(b);
end;
end.
```

This executes WriteLn which prints the number as the "for loop" increments. When run, this should print the numbers from 1 to 100 on your screen then exit.

Now we'll discuss variables in more detail. As you know, variables can be defined with the "Var" at the beginning of a whole program or a block of a program. In the IBM PC, memory locations often contain special information. In Turbo, you can as-

sign variables to memory positions, so whatever is in the memory position will be in the variable. Any data type can be used, even strings, but the addresses must be unsigned integers. To enter a hex address, add a dollar sign (\$) before the number. You can use the dollar sign anywhere in your Turbo program as long as it proceeds a hex number.

Also, you can have variable arrays, which are many different values under the same basic "index" name, and have one index variable and a number in square brackets "[&]" after it. An example of a dimensional array is:

```
IntNum[3];
```

When defining arrays in the Var, you define like this:

```
Var IntNum[1..5] of integer;
```

This actually defines five variables, IntNum[1] through IntNum[5]. Just accessing an array variable by itself, without the number in brackets, produces a type mismatch error. There can also be arrays with more than one dimension, which are called multidimensional arrays and accessed like this:

```
IntNum[3,7];
```

To define a multidimensional array, just append another set of numbers preceded by a comma in the square brackets. This example defines a variable with the first dimension indexed 1 to 10, and the second dimension indexed 1 to 5.

```
Var Intnum [1..10,1..5] of integer;
```

You don't have to use integer as the variable type, as you can use byte, char, and even strings with lengths of 255. Strings are actually arrays, with the number in brackets being the offset of the string. An example will easily explain this:

```
Var Strng : String[50];
begin
Strng:='This is a string only using 41
characters';
Write(Strng[3]);
Write(String[20]);
Write(String[47]);
end.
```

In the example, the screen would show "il" then a random character, since the real string isn't occupying that byte.

That is everything important about variables that can be used now. In a later arti-

cle, we will talk about pointers. But now, we'll talk about procedures and functions.

One good feature of Pascal is the ability to create procedures and functions. These are code blocks (both declarations and code) separated from the main program and can be called by another procedure and/or function or the main program many times, using less code and time. These are usually short utilities and operations.

When defining a procedure, the basic form for a procedure is this:

```
procedure AddTwo(a,b: integer; var c :
integer);
begin
c:=a+b;
end;
```

Of course, this simple operation can be done quicker in the main program. The first line declares the procedure and the variables used. Remember, the variables declared in the line are local to the procedure only.

Functions can be defined as the same way, with one difference. This function does the same as the procedure above:

```
function AddTwo(a,b : integer) : integer;
begin
AddTwo:=a+b;
end;
```

Functions have an added variable after the parentheses, which defines the type of the output. When defining the output's actual contents, use the name of the function, as shown above. Functions are called like this:

```
Var intvar : integer;
begin
intvar:=AddTwo(3,5);
end.
```

In this example, intvar would equal 8. Doing mathematical functions like this is much easier with functions.

On the first line inside the parentheses, there can be three types of parameters, value, variable, and untyped variable. The first two will only be talked about here. These are the same for procedures and functions. The first, value, is variables passed on to the procedure/function from the calling statement. For example, the calling statement for the above would have three items separated by commas in parentheses, and the first two could be predefined integer variables, or actual

numbers, which are called value parameters.


The second type, variable parameters, is used when the procedure or function is to return data to the calling statement. This is defined inside the parentheses, using Var before the variable name. This is usually passed through a variable, also, like in the program below that uses the procedure shown above, AddTwo:

```
Var xyz,abc,row : integer;
begin
xyz:=3;
abc:=5;
AddTwo(xyz,abc,row);
WriteLn(row);
end;
```

This program should print out 8, and that is the value of the variable row. Variable row in the program corresponds to variable c in the procedure, and it is a variable

parameter.

Well, that's all for the first article. In the next article, we'll talk about standard (included with Turbo Pascal) procedures and functions, more variable types and file I/O. \*



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## Introduction and Rational

The Z148 computer from Heath/Zenith is an entry level, IBM-PC compatible, and now abandoned computer with very limited expansion capabilities. True, there are "expansion" boxes that allow you to stretch the number of "add-ons", but they are not cheap and I wanted everything in one box. When I bought my 148, I got it with one 5 1/4 inch floppy drive and a 30 meg hard disk. At the time, it was sufficient for my needs. The 3 1/2 inch drives were only rumors. Our school district had two computer labs containing about 40 IBM-PC's with two 5 1/4 inch floppies in each. As a teacher, I could work at school or at home with the same disks. Everything was compatible with everything else and I was reasonably happy. Then the school district opened another computer lab using IBM-PS/2's and started replacing the old 'PC's with PS/2's. I could see that soon I would not be able to start work at school and continue it at home with my present equipment. Along came the Trenton Computer Fair with its flea market vendors. A cost of less than \$100 and about four hours time resulted in a three drive Z148. It took some sawing, some tight fitting, and some rearranging of parts but the end product was well worth the effort.

I was concerned about three potential problem areas - space, power consumption, and heat. The space problem I resolved by making some careful measurements. The Z148 power supply is small, so I operated the new drive by connecting it temporarily while it was resting on top of the drive cage before making any modifications to either the drive or the

computer. There were no power problems. In order to tell if there would be any heating problems, I would have to perform the modification.

With two of the three major concerns resolved, I had enough confidence to proceed. The first major decision I had to make was where to put the drive. There is not much room inside the Z148. However, the 3 1/2 inch drives do not need much room. I decided the best place would be under the 5 1/4 inch drive with the right sides of the drives vertically aligned. (See photo 1) The steps below are the ones I used. Please remember that if you perform this modification, you will violate the warranty for your computer and probably the warranty on your new drive. The modification is probably not for the inexperienced hacker. You will need to move a capacitor on the main board so some soldering experience is also neces-

sary. But if you're careful and use common sense and patience, very little can go wrong. (Don't tell Murphy I said that.) Also MS-DOS 3.2 is required to support the 3 1/2 inch drives so if you don't have it, you will have to upgrade. This means you will also need to rework your hard disk with TREECOPY (or some such) and reFORMAT. Enough warning.

## The Modification

1. Remove the cover. Remove the two plastic screws on the back, lift the back of the cover and slide the cover towards the rear.
2. Remove the cables from the drives. Make sure you can remember which ones go where. Mark them with tape if necessary. Also note the pin 1 wires on both ends of each cable. The ribbon cables can easily be reinstalled the wrong way. There



**Photo 1:**  
The new drive fits comfortably and snugly below the 5 1/4 inch floppy drive.

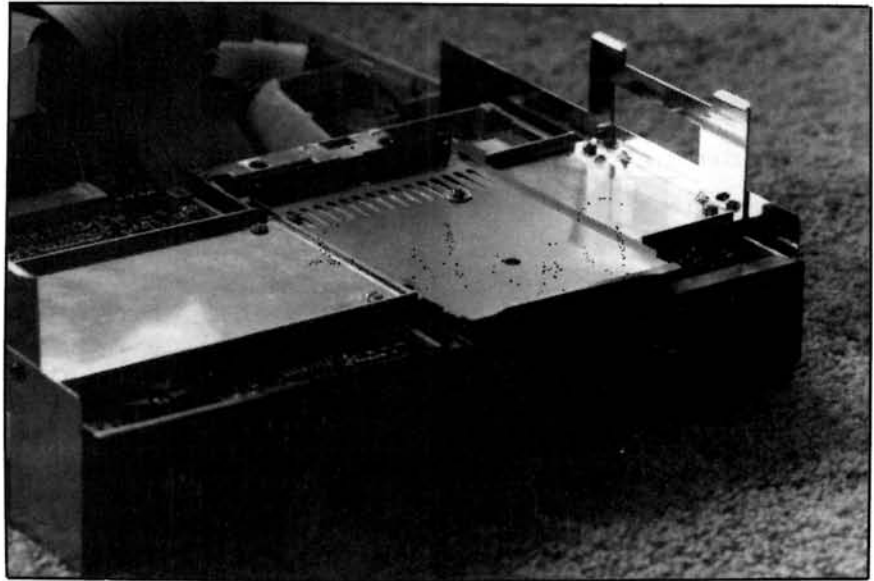
should be a power cable for the drive (4 wire cable), a 34 conductor ribbon cable for each floppy drive, and two ribbon cables for the hard disk.

3. Remove the drive cage and drives from the computer. The drive cage has two screws holding it in place, one on either side. (I have removed and discarded these screws. They are not really necessary.) There are also small plastic tabs and slots holding the cage in place. I suggest starting with the one on the left side of the computer since it is easier to see what you are doing on that side. Near the center of the drive cage on both sides is a plastic tab that must be depressed. (See photo 2) Then the drive cage can be slid towards the rear and up and removed. Do both sides alternately depressing the tabs and gently sliding the cage until it is free. You may also need to lift the rear of the cage so that it clears some plastic parts in the bottom of the case.

4. Remove the top half of the drive cage. There are four sheet metal screws, two on either side. Remove them and lift off the top half.

5. Remove the hard disk. Turn the cage upside down and remove the four screws that hold the hard drive in place.

6. With the floppy and drive cage upside down, decide exactly where you want to mount the new drive and place the drive there. Trace the outside of the new drive on the card cage mounting bracket. The bracket has rounded edges which will need to be cut and flattened. Also mark on the top of the 3 1/2 inch drive the locations of the two mounting screws for



**Photo 3:**

**The drive cage upside-down with the original drives mounted showing the top plate from the new drive, how it's mounted and where the curved metal bracket must be cut.**

the 5 1/4 inch drive that are on the left side (as you are facing the front of the drives with them upside down).

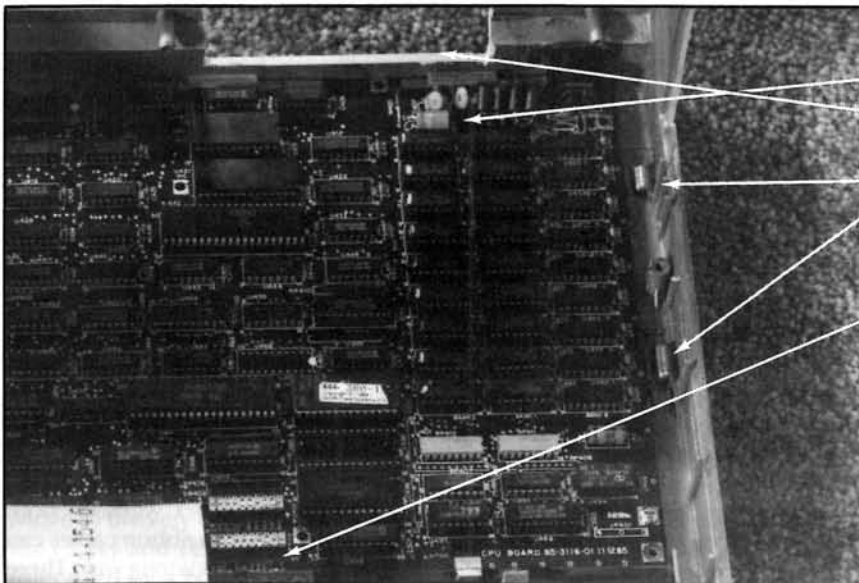
7. Remove the 5 1/4 inch floppy drive by removing the four mounting screws. The mounting bracket should now be bare.

8. With a hacksaw, cut the rounded edges of the mounting bracket at the four places you marked to accept the new drive. With a vise and hammer, flatten these rounded edges between the cuts you made. The new drive will need to be mounted as close to the bracket as possible.

9. There should be a metal cover on the top of the 3 1/2 inch floppy drive. Re-

move it (probably by removing two small screws from the back of the drive. Two screws hold the back of the cover and two metal tabs hold the front of the cover.) Drill the two holes that you previously marked in step 6. Now also locate and drill a third hole that matches the threaded hole in the bottom of the 5 1/4 inch drive. Also drill a hole in the mounting bracket to match this third hole. (I made these holes a little larger than the screws and used flat washers when I mounted the drive just to make alignment easier.)

10. Mount the 5 1/4 inch drive and the metal plate from the 3 1/2 inch drive to opposite sides of the mounting bracket using five screws. I had to use four 1/16"



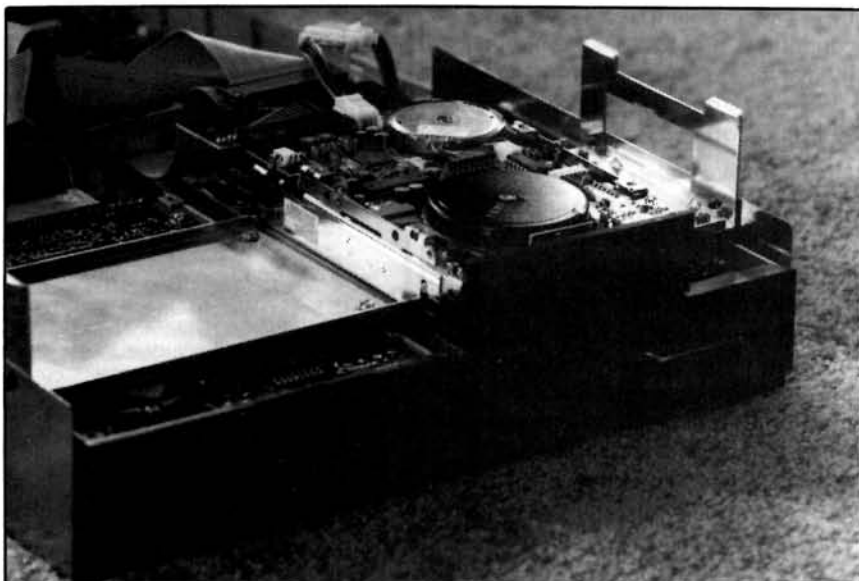
**Photo 2:**

**The capacitor that must be moved.**

**The hole cut to accept the new drive.**

**The tab that must be depressed to release the drive cage.**

**The switch that must be changed to tell the machine you now have 2 floppy drives.**



**Photo 4:**  
The drive cage, upside-down, with the new drive mounted.

spacers between the 5 1/4 inch drive and the mounting bracket to allow the 5 1/4 inch drive to rotate freely. (The 5 1/4 inch drive is mounted exactly as it was originally (except for the spacers) and the 3 1/2 inch drive plate is mounted so that it can accept the new drive later.)

11. Decide if you want your new drive to be A: or B: and select the corresponding jumper switch on the drive. I wanted mine to be B: so I moved the drive select jumper on the 3 1/2 inch drive to DS1. If you want your 3 1/2 inch drive to be drive A: then move the jumper on the 5 1/4 inch drive. Mount the 3 1/2 inch drive to its metal plate. Make sure none of the screws you installed interfere with the operation of the drive. I had to remove the right rear screw because it would not let one of the levers on the 3 1/2 inch drive activate properly.

12. Unplug the keyboard. Remove the main circuit board. It is held in place with one screw (located on the left near the rear of the board) and two plastic tabs (located at the rear of the board). Remove this screw. Gently pull the plastic tabs back and the circuit board up, back, and out.

13. The next step is cutting the front panel for the drive opening. Measure the size of the opening and cut it a little smaller than you need. The material is plastic and cuts fairly easily. I used a hacksaw and a utility knife. I also found it easier, after the cut was started, to remove the blade from the hacksaw and use just the blade. Temporarily install the two mounted floppies

back into the case so that you can see how much more plastic you need to remove from the opening. Then enlarge the opening with the utility knife and a file to allow the drives to fit.

14. Towards the front of the circuit board is an electrolytic capacitor that is mounted vertically and will interfere with the drive. Remove the capacitor and reinstall it laying down at its same location. Be sure to observe the polarity when you reinstall it. I unsoldered and removed the capacitor. Then I soldered wires in the two holes and soldered the capacitor, horizontally, to these wires. The leads of the capacitor are very short so use ex-

treme caution when unsoldering them or you will have to buy another capacitor. Also, don't apply too much heat or pressure to the circuit board or you will peel the copper from the board.

15. Reinstall the circuit board. Move circuit board DIP switch SW403 2/1D to the OFF position. SW403 is the DIP switch located closest the rear edge of the board. The 2/1D switch is probably the second one from the left (as viewed from the front) and the ON/OFF positions are marked on the switch or board.

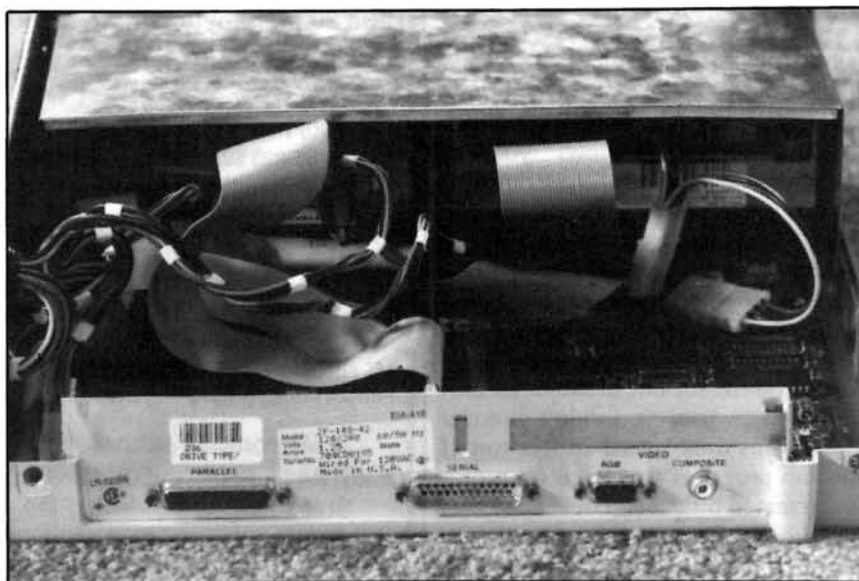
16. Remount the hard disk.

17. Reinstall the top half of the drive cage.

18. Connect the power cable adapter and ribbon cable adapter to the 3 1/2 inch drive. These should come with the drive. These adapters are necessary because the plugs on the 3 1/2 inch drives are different from those on the 5 1/4 inch drive, even though the drives have the same power requirements. Also the data cable plug on the 3 1/2 inch drive is a 34 position computer connector (according to Radio Shack) and the 5 1/4 inch drive uses a 34 conductor card edge connector.

19. Connect a Y power cable to the two floppies.

20. This step requires some maneuvering and some patience. Carefully reinstall the drives into the computer. Make sure the



**Photo 5:**  
The Z148 from the back with the cover removed showing the confusion of cables. The dual connector ribbon cable and the Y power splitter can both be seen on the right.

new drive does not interfere with any of the components of the circuit board. There is not much clearance between them but since most of the chips near the drive are the memory chips, heat should not be a problem.

21. Reinstall the remaining cables. Make sure you reinstall them to the same positions and locations as they were before you removed them. If the floppy drive cable does not have two card edge connectors on it, you will have to install an additional 34 conductor card edge connector to the floppy drive cable. These can be purchased for about \$4 at Radio Shack. Mine had two card edge connectors on it, but they were too close together. If you experience this, I suggest that you remove the one that is not at the end of the cable and replace it with a new one at the proper location. I tried to reuse the old one but found that it would not seat itself properly to the cable at the new location. Some of the pins on the connector became bent and did not cut through the insulation of the cable at the correct place.

22. Now it's time for the smoke test. Turn on the computer and listen for any unusual sounds and sniff for any unusual smells. If you were careful, you should be able to boot and operate the computer as usual. If not, check for any interference between the new drive and the board or between the drives and mounting screws. Another potential problem area are the ribbon cables. These seem to be somewhat temperamental and I had to completely replace the floppy cable.

23. Run DSKSETUP to tell MS-DOS that you have a 3 1/2 inch, 720k drive as drive B:. This is a utility that is included with MS-DOS 3.2 which allows you to configure the parameters of your drives. It performs some of the functions that CONFIGUR used to plus a few more. It is menu driven and very easy to use. You do not need the documentation to run DSKSETUP.

24. Test the capabilities of the drive with format, copy, whatever. I didn't discover any problems until I reached this step. I could run programs that were on a previously created disk and I could copy files to and from the disk but I could not format one. The villain was the ribbon cable. I solved this problem by making and installing a completely new cable. Also, you should probably run the computer and drive for some time to determine if heat is

going to be a problem. After several hours of continuous use, the disks in my 3 1/2 inch drive are no warmer than those from the 5 1/4 inch drive were before I made the modification.

#### If It Doesn't Work!

Check to make sure the cables are installed correctly, the correct cables connected to the correct pins and pushed in all the way. The pin connectors are particularly easy to connect one pin too far in either direction. If you hear strange noises, you should suspect that a lever on a drive or the drive flywheel or some other mechanical part of the drive is rubbing something it shouldn't. A likely suspect would be a screw that you installed is interfering or the drive bracket that you sawed and flattened really wasn't flat.

Check the drive select jumpers on the drives. One of them must be DS0 and the other must be DS1.

#### Wrap Up

In conclusion, the modifications necessary to install a 3 1/2 inch drive in a Z148 are not only functional, but also aesthetically pleasing. The finished product works and the drive looks like it belongs in the machine. \*

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# ORG PLUS 3.0 REVIEWED

**EARL R. ZIMMERMAN JR.**  
169 SPINNING ROAD  
DAYTON, OH 45431

## Introduction

A useful tool in understanding how a business operates is the organizational chart. Organizational charts illustrate the relationships between departments and individuals within each department. In dynamic organizations there are frequent changes to the chart. Changes are necessary to reflect employee turnover, promotions, transfers, and restructuring due to changing environmental conditions. Updating these charts is sheer drudgery, as most graphic programs simply weren't designed to draw these charts in a quick and efficient manner. They were designed to draw line, bar, and pie charts, or variations on them. It was almost easier to take out the trusty old typewriter and type in the names and manually draw lines. If only you could find a program that would draw organizational charts. Well, look no more - Org Plus 3.0 can solve your problem! It is designed specifically to draw organizational charts, however it can be used for other purposes also. You can illustrate work breakdown structures, keep track of numerical data, such as salaries and commissions, and create and print simple reports. If you don't have a business need, but want to track your family tree, Org Plus would be an ideal program to illustrate family relationships.

This program should be of interest to all users of Zenith MS-DOS computers as it will operate flawlessly, and in color, under ZPC. No patches or special hardware is needed. Topics that will be discussed in this article include: minimum requirements, installation and printer/setup procedures, documentation, and major program features.

## Minimum Requirements

Minimum requirements for a 100% IBM compatible Zenith computer include: dual floppy or hard disk drive 320 KB of RAM, MS-DOS 2.0 or higher, and a supported printer or Hewlett-Packard plotter. Org Plus works on a monochrome, CGA, EGA, or VGA monitor.

Minimum requirements for a Zenith 100 series computer include: 768KB of RAM, ZPC 2.00, MS-DOS 2.0 or higher, dual floppy or hard disk drive, monochrome or color monitor, and a supported printer or plotter.

I have also found that Org Plus will support a Logitech C7 Mouse, using the Paul F. Herman Mousepack driver, on a Z-100. I recommend programming the three buttons as follows: left button - F9 key (this is the command menu key), middle button - Return key, and the right button - Escape key or Tab key. When using the driver on a Z-100, make sure you load the driver before entering ZPC. I recommend writing a batch file to make sure the steps are performed in the proper sequence and to save time keying in the button codes and mouse sensitivity settings.

## Installation and Printer/Setup Procedures

**Installation.** Org Plus is easy to install. The program disks contain batch files to support hard disk (FD.BAT) or dual floppy (WORKCOPY.BAT) installation. These files are nothing more than the DOS Copy command. Simply type, "FD" or "WORKCOPY" depending on what type

computer you have. Once the program is copied to the hard disk or working disk type "ORG" at the prompt. The main menu (See Figure 1) will appear. You can then select your printer and set the features to your preference.

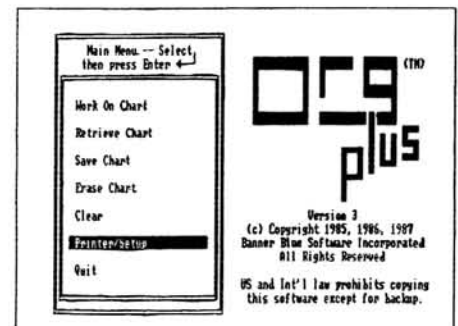


Figure 1  
ORG Plus Main Menu

**Printer/Setup Procedures.** From the main menu you select the Printer/Setup option by typing "P" or use the arrow keys or move the mouse to highlight it. You are then prompted to select the appropriate printer or plotter. Org Plus sup-

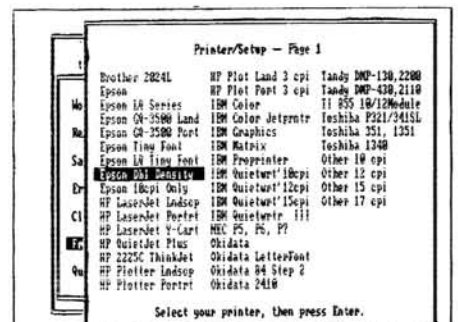


Figure 2  
Supported Printers

ports the printers and settings shown in Figure 2. Detailed information on the HP Laser Jet and "other" printers is contained in a separate README file on the program disk. Additional screens will appear where you select paper size, output ports, and screen colors. In addition, you can customize Org Plus by selecting international money symbols and numbering conventions, and the words you would like to use for Total, Average, and Count, in printed reports.

### Documentation

Documentation for Org Plus is average and needs some improvement. While it offers a good explanation of the program's capabilities and setup and installation procedures, its "tutorial" could use some improvement. The tutorial only covers the most basic operations of how to use the programs. It explains some of the terminology necessary to understand the program and how to build a simple chart and move around in it. You have to read a couple of additional chapters before getting to the advanced features, which really sets the program apart from others. It would be more beneficial to a new user to construct a step-by-step sample chart and gradually incorporate the more advanced features. Overall the program was not too hard to learn. It is

just annoying to have to leaf through several chapters to find what you're looking for.

Org Plus also has limited on-line help capability. You can get help on commands, keys, and work groups by depressing the F1 key. See Figure 3 for an example of a help screen. It also has a README file I mentioned earlier.

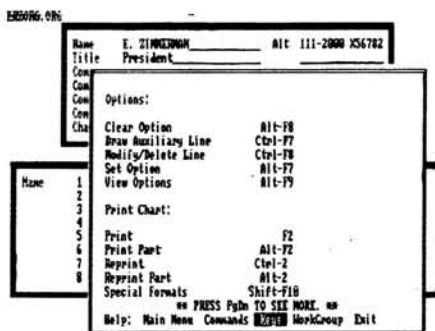


Figure 3  
Help Screen

### Major Program Strong Points and Features

Space won't allow me to cover all the strong points and features of Org Plus, so I'll just highlight the major ones. To help in my explanation I've included some fictitious charts from the ERZ Company (of

which I'm president, naturally). Figure 4 is how my company is organized. The charts and reports are relatively simple and do not reflect the total capability of the program. They are intended to provide a general understanding only.

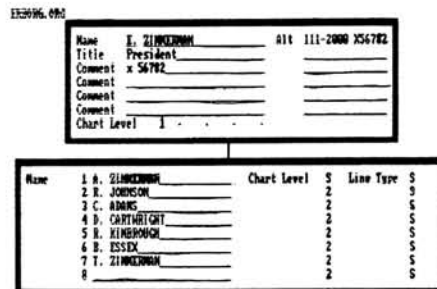


Figure 5  
How Information is Entered

**Ease of Operation.** One feature that sets Org Plus apart from other graphics packages is its ease of operation. It is very easy to enter information and to move between work groups. The program automatically draws and spaces boxes, positions text, and draws connecting lines. All you need to decide is the information to enter, and how you want it displayed.

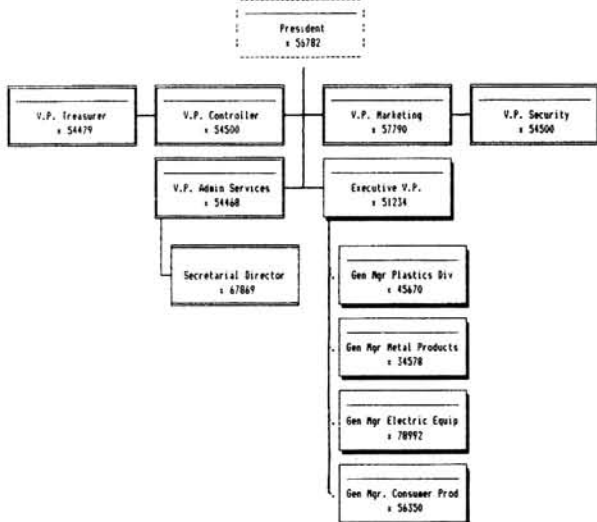
Figure 5 illustrates how data is entered. The top box, with my name in it, is for the manager. Only one person can occupy this box, and he or she is considered to be

Figure 4  
ERZ Organizational Chart

ORGANIZATIONAL CHART ERZ COMPANY  
(AS OF 11 JAN 1988)

This chart shows how you can specify what type of box or lines you desire and how you want them to appear.

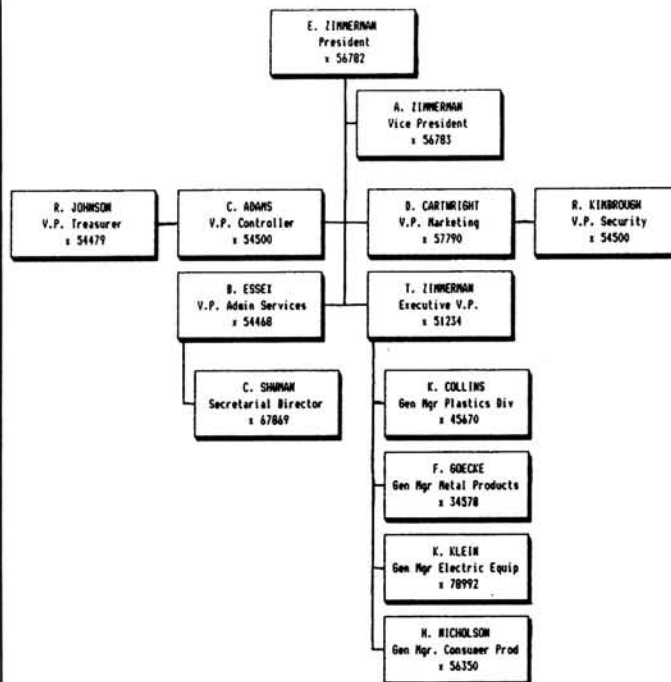
You can also line through names, delete positions, specify if you want dotted or solid lines.



This chart also demonstrates you can have more than just a main title for your chart. You can have additional annotations

Figure 6  
Box Styles and Print Option

ORGANIZATIONAL CHART ERZ COMPANY  
(AS OF 11 JAN 1988)





at level 1. The other box is for staff level individuals and the manager's direct subordinates. There is one staff level person (indicated by "S" in the chart level column) and six direct subordinates (indicated by the "2" in chart level column). Some of these level 2 individuals have subordinates (See Figure 4). The level 2 subordinates would be considered level 3 employees. The "S" in the line type column indicates that a solid line will be drawn between the manager and his subordinate. If it was a "D" it would be a dotted line.

A chart can have a maximum of 99 levels and a maximum of 96 subordinates reporting directly to one manager. However, the maximum number of positions one chart can have is limited by your computer's memory. Memory resident programs, such as print spoolers, screen blankers, etc. will decrease the number of positions you can enter in one chart.

It is also very easy to move from one work group to another. Movement is controlled by the function keys. Depressing F6 will cause you to move up a work group, F7 is left, F8 is right, and F10 is down. The majority of commands are performed by depressing the F9 Command Menu Key and selecting what you want to do. There are also various key combinations that can be used to avoid going through all the menu keystrokes. These commands are detailed in the documentation and in the on-line help. See Figure 3 for some of these key combinations.

**Numerous Box Styles and Chart Styles.** Org Plus normally draws boxes with an

unbroken solid line. Other box style include: perspective, shadow, double, asterisk, broken line, top double, or no box at all. Some printers, i.e., the Epson LX-80, print the shadow and perspective boxes identically. Figure 6 illustrates some of the available box styles. You can also include up to seven different chart styles in a single chart. Chart styles include horizontal, stagger, list, boxed list, one column, two column, and four column.

**Various Printing Options.** You have the option of printing to a screen, printer, or disk file. I always print to the screen before printing to a printer. I like to know what the chart will look like. The only problem I have with this option is that you can't view the entire file at once. You must use the Page Up, Page Down, or cursor control keys to move through it. ZPC equivalent keys are on the numeric keyboard. Another concern I have is that you don't know how many printed pages your chart will be prior to printing. This is normally only a problem when you are using 8.5" X 11.5" paper. If your chart is too wide it will print on numerous pages and is unreadable. However, if you select print to printer, Org Plus will let you know how many pages your chart will be. At that time you can abort printing. The standard printing dimensions are 8.5" x 11", 11" x 8.5", 14" x 8.5", and 14" x 11". You are also given the option during your Printer/

ERZ Company Telephone Directory January 1988			
Name	Position	Phone #	
ADAMS, C.	V.P. Controller	111-2000	X54500
CARTWRIGHT, D.	V.P. Marketing	111-2000	X57790
COLLINS, K.	Gen Mgr Plastics Div.	111-2000	X45670
ESSEX, B.	V.P. Adain Services	111-2000	X54468
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KIMBROUGH, R.	V.P. Security	111-2000	X54500
KLEIN, K.	Gen Mgr Electric Equip.	111-2000	X78992
NICHOLSON, H.	Gen Mgr. Consumer Prod.	111-2000	X56350
SHUMAN, C.	Secretarial Director	111-2000	X67869
ZIMMERMAN, A.	Vice President	111-2000	X56783
ZIMMERMAN, E.	President	111-2000	X56782
ZIMMERMAN, T.	Executive V.P.	111-2000	X51234

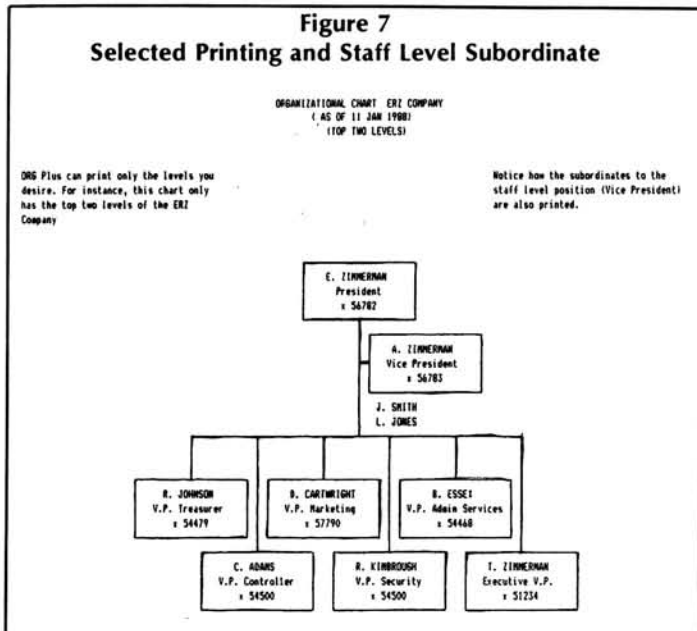
**Figure 8  
Sample Report**

Setup operation to select a paper length of up to 44" x 44".

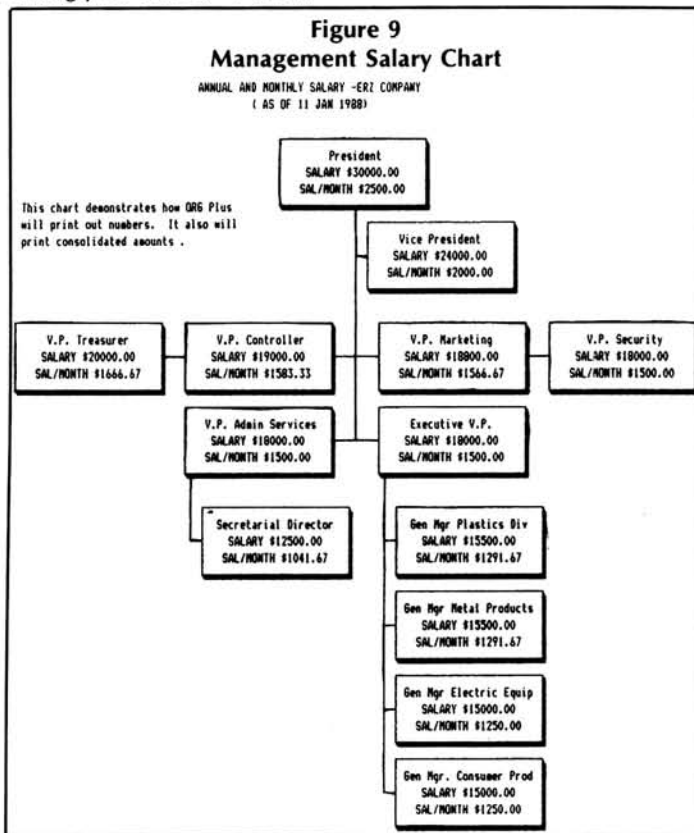
Org Plus also prints charts to disk. This feature allows you to print sideways using Sideways 2 or Sideways 3 by Funk Software. While I haven't tested this feature, the documentation provides instruction on how to save the file and use it with Sideways.

**Advanced Printing Options.** In addition to printing standard charts, Org Plus has some advanced printing features. Features include: ability to print specified portions of a chart, annotation capability, printing of staff level subordinates, hiding positions, and several special printing effects.

**Figure 7  
Selected Printing and Staff Level Subordinate**



**Figure 9  
Management Salary Chart**



Often times there is a need to only print certain levels of an organizational chart. In Figure 7 I printed only the top two levels of my organization. Also, notice that I have included annotations in the corners, in addition to the chart title. Annotations can appear in all four corners.

Org Plus also allows staff level positions to have subordinates. It prints a list of subordinates below the staff level subordinate, such as position box. All you do is enter the name of the subordinate in any of the text fields or in alternate text field 5 or 6. The names must be preceded by a > (greater than symbol). See Figure 7 for an example of this feature.

Hiding positions is also very easy. In Figure 6 I chose not to print the Vice President's position. This was done by placing an "H" (as opposed to an "S") in the chart level field I described earlier.

If you compare Figure 6 to Figure 4 you will notice the names of individuals are either lined out or don't appear at all. The reason for this is that I used some of the special printing effects. Placing a line through the name was done by typing "@" or "@@" signs before the names. The difference between the two is that a single "@" will draw a line from one box end to another, while a double "@" will force a space between the line and the box. Some printers may not pick up the difference between them. In Figure 6, notice that the Secretarial Director box does not have a line where the name formerly appeared. I suppressed the printing by placing a "]" (closed square bracket) before the name.

**Report Generation.** Org Plus also lets you create simple tables or reports from information in the organizational chart. For instance, you can create a telephone directory like the example in Figure 8, or reports that contain financial information. First, you select what fields to use in your report using the Table/Setup command. You then have the option of creating titles and headers for the report, drawing a box around it, filling the spaces between columns with dots, and assigning page numbers. In addition, you can also sort selected fields in ascending or descending order and have a blank space printed before each group.

**Number Management.** With Org Plus you can manage numbers as well as personnel information. By entering numeric data for each position. Since Org Plus knows the relationship between positions, it will calculate such things as the average salary for each branch of an organization, and monthly or yearly salary for the entire organization. It's got what the documentation refers to as a "mini-spreadsheet". Standard spreadsheet features include the use of math operators (X,-,\*,/), automatic or manual recalculation, formatting of amount fields, and the use of standard formulas.

To give you an idea of how numbers are managed, I created the chart in Figure 9. First, using the Amounts/Display command, I entered the yearly salary for each individual. Secondly, using the Formula/Setup command, I entered the formula that would divide the yearly salary by twelve to come up with the monthly salary. I then changed the standard labels

from "A" and "B" to "Salary" and "Sal/Month", using the Amounts/Label command. It was then just a simple matter of using the Amounts/Print Control command to tell Org Plus what fields I wanted printed. You also have the option of printing consolidated figures. For instance, Figure 10 illustrates that the salary for the entire ERZ Company was \$239,300.00 and the monthly salary was \$19,641.67.

EPROMS, 096

Name	I. ZIMMERMAN	Alt	111-2000 354782
Title	President		
Comment	x 56782		
Comment			
Comment			
Chart Level	1		

Name	Amount	Consolidated Amount	
SALARY	\$239300.00	\$239300.00	S
SAL/MONTH	\$19941.67	\$19941.67	S
C	0.00	0.00	S
B	0.00	0.00	S
E	0.00	0.00	S
F	0.00	0.00	S

Press ESC to continue.

**Figure 10**  
Display of Consolidated Amounts

**Conclusion**

Org Plus is worth its price if you are in the market for a program that draws organizational charts. It's simple to create, edit, and print charts. It has an added attraction for the Heath/Zenith user because it operates under ZPC, as well as on IBM compatibles. It's definitely worth checking into.

**Product Discussed**

Org Plus  
Banner Blue  
P.O. Box 7865  
Fremont, CA 94537



# Glitches

Regretfully, there is an oversight on the schematic (Figure 1) on page 37 of the article in the October 1988 issue of REMark — A Bootable EPROM Disk for the H-100.

Pins 1 and 27 of the 27128 EPROMs should be tied to +5 volts, as well as pin 28 (which is shown).

Last month we featured American Cybernetics' MULTI-EDIT, but neglected to give you their address:

American Cybernetics  
1228 North Stadem Drive  
Tempe, AZ 85281  
(602) 968-1945 (Voice)  
(602) 968-1082 (Modem)

# ENABLE

## Part 11

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

# A Tutorial Advanced Word Processing

In this, the eleventh article on ENABLE, the word processor will be revisited for the fourth and last time. As I have said throughout this series, ENABLE has a lot of capability and as an integrated package provides more flexibility than a stand-alone word processor. If you add up the cost of a word processor, spreadsheet, and database, the total cost will be more than a single copy of ENABLE and you still do not have the integration. The \$195 price for the Z-100 version is a real bargain and the Software Group deserves our support for its support of the Z-100. I will agree that once you get used to a word processor, you would rather fight than switch. As a long time WordStar user, this was my first thought, but I hung in and within months felt at home with ENABLE. There was still a learning curve, but as you need new features, the documentation provided the answers, which improved the overall knowledge of the program.

While discussing the Table of Contents and Index functions in the eighth ENABLE article, I discussed the "%INCLUDE" capability. This is one of several embedded commands that are available in ENABLE. All of these commands must start with a percent sign in the first column of text, and then the command without a space. The command must be typed in capital letters, but most will work in either capital

or lower case letters. The functions are displayed on screen, but are not printed. These commands can be used anyplace in the document, including the header and footers with the exception of one function, %DATE.

"%DATE" will place the system date in the header, footer, or document title. Unlike the other embedded commands, it can be put anyplace in these areas. You can use this to put the date on every page of a document in either the header and/or footer. The format for the date is se-

lected on the second page of the top line print menu. Four choices are permitted, Standard (April 5, 1988), Military (5 April 1988), Numerical (3/05/88), or European Numerical (05/03/88). Version 2.15 for the PC will permit the date function to be used anyplace in the document.

"%INCLUDE" will permit you to include any ENABLE word processing document in the document. This was demonstrated in the Table of Contents and Index functions. The document name to be included must be complete, including the

Print Form					
Date picture:	Standard	Military	Numerical	European Numerical	
Should Table of Contents entries be copied into text:	No	Yes			
Select style of Unit of Standard numbers:	1	2=A	3=a	4=I	5=i
Select style of Chapter numbers:	1	2=A	3=a	4=I	5=i
Select style of Section numbers:	1	2=A	3=a	4=I	5=i
Select style of Minor Section numbers:	1	2=A	3=a	4=I	5=i
<p>This option determines the format a date appears in when you use the "%DATE" function in your text. For example:</p> <p>Standard: August 22, 1983      Military: 22 August 1983</p> <p>Numerical: 8/22/83      European Numerical: 22/8/83</p>					
<p>ALT/F2=Print    ALT/F10=Save Form    PgUp=Prev Page    PgDn=NextCap    sc=Exit</p>					

Figure 1  
Date Options in Print Menu

extension. The document will start on the line where the %INCLUDE is located. Note that the last ruler in the included document will govern the rest of the document. If this is not desired, place another ruler immediately following the "%INCLUDE" command. No other disk drive can be named in the "%INCLUDE" command, so make sure that the included document resides on the default drive.

"%PAUSE" will cause the printer to stop until a <RETURN> is pressed. This command can be used to stop a daisy wheel printer to change the print wheel. This command also permits a screen displayed comment, up to one line in length, to be added.

"%LINES" allows you to change the number of lines per inch in a document. This will supersede the setting established in the top line print menu. The command requires that the number of lines per inch be placed immediately after the command separated by one space.

"%CONTROL" is a command that can be used to change printer functions. I have used this command extensively with an ALPS 224 printer in the JX-80 color mode and the QMS Kiss Plus laser printer at work. This command permits the printer control codes to be placed in the document for special effects.

A few years back, while using "WordStar" on an HP Laser Jet (one of the first available in the area), I could not enter the control codes to use all of the capabilities of the printer. The control strings were (are) long and WordStar would not handle them and there was no device driver for laser printers. Using ENABLE's "%CONTROL" function, these control codes can be added to the text without problem. I use a QMS Kiss Plus laser printer which has many features that can be accessed with control codes. It is possible to change the page layout and fonts using these codes. There is a learning curve involved as the printer manual used basic programs to invoke these commands and ENABLE's %CONTROL required them to be a slightly different format.

The other printer that I use is the ALPS 224 which can emulate an Epson JX-80 color printer. By inserting the correct codes, I print labels with each line a different color. I also used control codes to change from standard print size to wide letters and then back again. To use this

function, place the cursor in the first column and type "%CONTROL 27,114,54" and a <RETURN>. The next line of text will then be printed in green using the ALPS 224 printer if the multi-colored ribbon is installed. The word CONTROL must be typed in capital letters and the control codes must be in decimal numbers. REMEMBER to put the code that will return the printer to normal mode by placing the appropriate code on the last line of the document, especially if you are using a laser printer on a network. Using a laser printer on a Local Area Network with ENABLE is easy, but if people fail to return the printer to the default values, you WILL have some comments when you have to reprint something because it came out in landscape mode instead of portrait. Note, you must use the decimal number for numbers or letters required in the control functions. If your printer requires a number "1" after a series of control codes, this number must be the decimal equivalent "49". If you place the number "1" in this location, ENABLE's control function will translate and pass to the printer the code "1" which means start of heading. Note, for the QMS Kiss Plus laser printer, the codes for the changes of print fonts follow this example. The QMS laser gives the example of "<ESC>[Ref#,Orient.;Options s" to control the fonts with the "Ref#" equaling the font selected. The QMS manual gives the example for basic as "LPRINT CHR\$(27);"[7506;0;1s" to output prestige elite type.

Using ENABLE, this command becomes "%CONTROL 27,91,55,53,48,54,115". The order in which you give the commands is also important. If you wish to change fonts and use the landscape mode, you must first invoke the landscape mode and then the new font.

The CONTROL function will not permit you to change font sizes on a line. Whatever the control selected with the CONTROL statement will be carried on starting on the next line and those following until turned off. If you need to change color and size, place both sets of control codes on separate lines above the line where you want it to take effect. Only one control code per line is permitted. It may be possible to use two different control codes on a line to change color of one word as an example if your printer will reverse scroll one line. The line with the color change in typed in normally but the word(s) to be added is left out. On the next line put in the control code for the reverse scroll, then the color change on the next line, then the word on the line following.

Two other embedded commands relate to conditional page breaks. This is a function available in version 2.0 and above. "%PAGES" will start a set of lines of text that must be considered a block and would move the entire block to the next page if a page break should fall after it and before the command "%PAGEE". These

%control 27,114,48	(change to black)
ALL-IN-ONE	
%control 27,114,54	(change to green)
Electronic Messaging	
%control 27,114,53	(change to orange)
Logistic Systems Architects	

**Figure 2**  
Sample of %CONTROL Codes  
for ALPS 224 Color Labels

```
%control 27,91,57,53,48,115
The will print in 16 point letters, 7 CPI.
%control 27,91,57,53,56,115
This will print in 8 point letters, 16.7 CPI.
%control 27,91,51,56,53,115
This will return the font to the default PICA 10 CPI
```

**Figure 3**  
QMS Kiss Plus Laser Commands  
Using ENABLE

conditional page breaks will help to preserve the thought being developed on one page that could be lost in a move.

Like most other full function word processors, ENABLE will permit you to develop and print form letters. Like WordStar, this is called the Mail Merge feature. Because ENABLE is an integrated package, the database function is used to develop the mail merge files. As part of ENABLE's files are several that can be used as baseline material for developing the mail merge letter. The files mail.dbf, mail.\$bf, mailin.\$if, letter.tsg, and label.tsg should be copied to your working disk in order to make them available for mail merge as a default file.

As part of the mail merge capability of ENABLE is the included mail list program. From the list of files that are necessary, it is clear that the database is used to provide a source for the information in the mail merge module. From the main menu, press (U)se system, (W)ord processor, (M)ail merge, (B)uild list. You are prompted for the name of the mail list.

ENABLE provides a basic database and input form using files "Mail" and "Mailin", which must be available on the system someplace. Normally, they are loaded in the user file directory. When the "build list" option is selected, ENABLE will automatically load "mail" as the default database name and "mailin" as the default input form. This same list is used in the boiler plate letter that will be discussed below. The data is entered in the form and saved using the "F5 F10 Q" command, which then returns you to the mail merge menu. Page 90 in the ENABLE word processing menu (V2.0) provides information on the fields in this form as to length and input requirements. The input form uses the database commands to move backward or forward through the list.

One of the files provided in the ENABLE package is the label generation report. The file "label.tsg" must be available on the work disk along with "mail.dbf". The "label.tsg" is a database report that will generate 1.5 inch high labels on paper. Before this program can be used, it must be modified by removing the comments. To modify this basic report form, select "(1) Label layout" from the mail merge menu. ENABLE will use a macro to call the word processor where you will do the actual modification. You can also use the word processor directly by requesting the

file "label.tsg". The file has instructions for making the file usable, which only involves removing about 14 lines of text. You should then save this file to a NEW NAME so that the basic program is still intact. Note, you should not remove the spaces in the ".if" clauses in the program as they provide spacing if lines are deleted because of the ".if" statements. If you have a very basic requirement, you can modify the program to use only what you need. I use a three line report to output to name, street, and city, state and zip code. To do this you must modify the report program and change the print form to reflect a page length of 1.0 inches and change the top and bottom margins.

In the "enable applications development guide" is a program to print sheets of labels. This program would be of use if you are using a laser printer that can not use continuous form paper. Once you have modified the label program and have returned to the mail merge menu, select

(M)erge/Print to output the labels to the printer. If you use the word processor directly, you can open a window to load the database module into it. By selecting Report from the database main menu, you can run the modified label file to screen and see how it looks. If there is a problem, press "F0/up arrow" (ALT/up arrow for the PC) and you will return to the word processor where you can modify the problem, save it, and return to the database window and run it again. Once the report is complete you can return to the mail merge menu to run it or run it from the database.

To start, work from the main menu and select (U)se system, (W)ord processing, and (M)ail merge. From the next menu select (L)etter and (R)evise. You are now prompted for the name of an existing letter. Using the ENABLE letter as the example, type in "Letter.TSG". Note, you must have copied this letter or have it available on the system someplace, and must in-

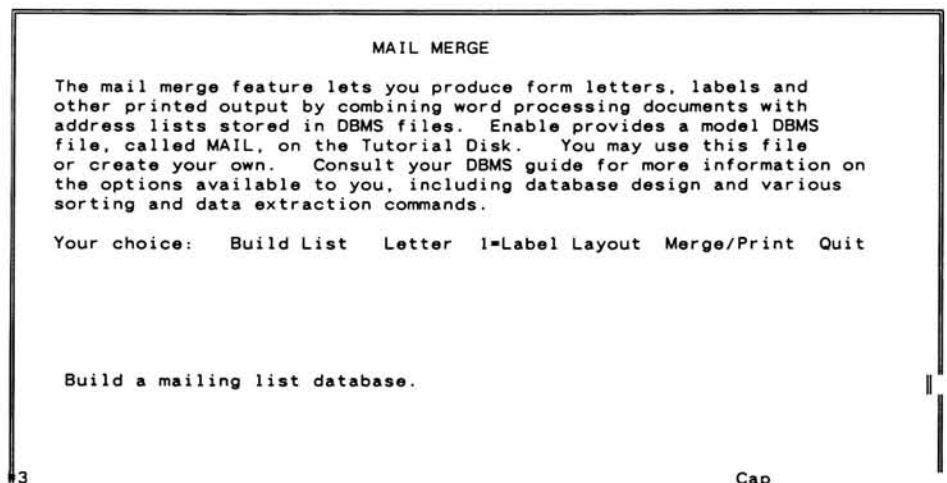


Figure 4  
Mail Merge Menu

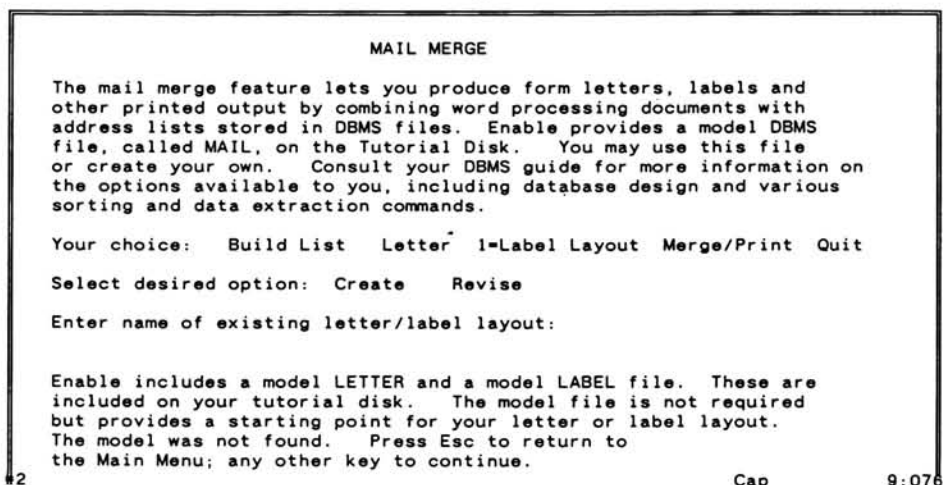


Figure 5  
Build List Menu

MAIL LIST INPUT FORM

LAST NAME:  FIRST NAME:  MI:

COMPANY:

TITLE:

SALUTATION:

STREET:

CITY:  STATE:  ZIP:

PHONE:  EXT:

COMMENTS:

1. MAIL Records ....0 Rd ....0 Sel ....0 CuCap A:067

**Figure 6**  
List Input Form

bottom and the inputting of data is the same as the database. When you have completed the data input, press "F5 F10 Q" and you are returned to the mail merge menu.

The ENABLE default forms are just a starting point; used as examples to develop application tailored to your needs. As part of the railroad I have talked about, I developed a form and database covering the 30 road crossings. Using the mail merge capability, I outputted the report which was used to survey the crossings to determine reconstruction costs.

The next prompt is for the input form. Again, you can use the ENABLE default form, "MAILIN" or develop your own.

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

**Figure 7**  
Sample Label Output

clude the ".TSG" extension as it does not have the normal ".WPF" extension. ENABLE will now use a macro to get the letter and display it on the screen. You can use this letter as a starting point in developing your own mail merge letter. Note that the database fields are defined inside of brackets which is like the dot command reports used in the database report function. These will be explained in greater detail in a future article.

To use this letter, you must delete the box at the end and type in your own letter. When you are complete, save the letter, BUT save it to another name. Press F0 F10 (C)hange <RETURN> <RETURN> (N)ew name and then type in the name you have decided on. If you do a normal save, the letter will be saved under the name "LETTER.TSG" which will destroy your working copy of the ENABLE "LETTER.TSG" file. This letter is now your boilerplate which is the core of the program.

Having completed the letter, you are returned to the mail merge menu. From here, select the (B)uild list option. This will present the options for the database that contains the information needed to fill out the letter. Again, using the ENABLE example, "MAIL" will be displayed as the mail list name. If you have another database list, this is where you would insert it. Make sure that you indicate the

MAIL MERGE

The mail merge feature lets you produce form letters, labels and other printed output by combining word processing documents with address lists stored in DBMS files. Enable provides a model DBMS file, called MAIL, on the Tutorial Disk. You may use this file or create your own. Consult your DBMS guide for more information on the options available to you, including database design and various sorting and data extraction commands.

Your choice: Build List Letter l=Label Layout Merge/Print Quit

Enter the mail list name:[MAIL]

Enter the name of the mail list input form:[MAILIN]

The mail list name provided with Enable is shown above. If you wish to use this mail list then press [←]  
Otherwise, enter the name of the mail list you wish to create.  
(NOTE: Consult the DBMS guide for the procedure for designing your own mail list).

Cap A:066

**Figure 8**  
Mail Merge Letter Menu

```
.body

.reformat on
.if [initial=" "]
[FIRSTNAME] [LASTNAME]
.else
[FIRSTNAME] [INITIAL]. [LASTNAME]
.endif
.if [title=" "]
.else
[TITLE]
.endif
.if [company=" "]
[STREET]
[CITY], [STATE{2}] [ZIP]

.else
[COMPANY]
[STREET]
[CITY], [STATE{2}] [ZIP]
.endif

Dear [SALUTATION]:
```

Use this document as the starting point for creating your mail merge letter. Delete this box before creating your letter.

**Figure 9**  
ENABLE's Boilerplate Letter

From these two inputs, the interaction with the database is seen. After providing the input form name, ENABLE will open a window in the database for the input of data for the boilerplate letter. The same record accounting is displayed on the drive and directory of either the "MAIL" file or your file.

After completing a letter and entering data in the database, it is time to print the letters. From the mail merge menu select "(M)erge/Print". ENABLE will again place the default letter and database as the response to the prompts. Change as necessary, but for this example select the defaults. The Software Group has left the results of the macros displayed on the screen so you can watch the process necessary to print the letters. The letters are printed from the database report function. After the letters are printed, press "ESC" and you will be returned to the mail merge menu. Press (Q)uit and you will be returned to the ENABLE main menu.

The integration capability of ENABLE permits the moving of data from one module into other modules easily. During the development of the business plan described in article nine, a summary book was written with graphs included. This procedure was accomplished easily using ENABLE with a minimum of keystrokes. You must have the spreadsheet and graphs you wish to use completed before the transfer is possible. Type your document like any word processing work. When you wish to enter data from a spreadsheet, you must open a window and put the spreadsheet in it. To open the window, press "F9 W O" which is the expert command. This can also be completed from the top line menu (F10 (M)CM, (1) Files (1) Open windows). This will present the ENABLE opening menu.

Select the spreadsheet option for this example (U S R ? <RETURN>). The second window will then contain the spreadsheet and saved graphs while the word processing document is in window one. From the spreadsheet, the data on the projected monthly freight car loadings is to be presented in the word processing document. Return to the word processing window "F0 " for the Z-100 or "ALT/" for the PC. To copy between windows, use the keystrokes "F0 F5" (ALT/F5 for the PC). This will open the interwindow copy option menu. All open windows will be displayed on this screen. Use the cursor keys

```

----- XENIA WESTERN RAILROAD -----
----- COMPANY -----
----- Highway Crossing Information/Inspection -----

DATE: [date]

Road Name: [road] City/Township: [citytown]
Highway Approach: NORTH [approach] EAST [viseano] Feet WEST [viseano] Feet
Visibility EAST [viseano] Feet SOUTH [approach] EAST [viseano] Feet
Highway Approach: SOUTH [approach] EAST 0 Feet WEST 0 Feet
Visibility EAST 0 Feet WEST 0 Feet
Maximum Speed EAST [maxspeast] MPH WEST [maxspdwest] MPH
Normal Speed EAST [normspeast] MPH WEST [normspdwest] MPH
Distance from next East Xing: [disteast] Feet
Distance from next West Xing: [distwest] Feet
Timing EAST [timeast] Seconds WEST [timewest] Seconds
Detection Distance EAST [detdiseast] Feet WEST [detdiswest] Feet
Type Detection Circuit
Turnout in Circuit [turnout]
Battery Condition:

Type Crossing Protection

Crossing Bucks [xbucks]
Flashers [flasher] Number [flashnumbr] Type [flashtype]
Bell [bell]
Gates [gates] Arm Length [armlength]

REMARKS: [remark]

Type Crossing Protection

Crossing Bucks Yes
Flashers Yes Number 4 Type pole
Bell No
Gates No Arm Length 0

REMARKS:

```

Figure 10  
Crossing Output Report and Sample

to highlight the window which you wish to use. With the spreadsheet selected, the default option is to copy all of the cells to the word processing document. For this example, move the cursor to cell A7 and press the period twice to lock this cell. Then, move the cursor to cell B18. The cells between A7 and B18 will be highlighted. When you press <RETURN> the highlighted cells will be copied to the word processing document where the cursor was last located. This is now part of the document and can be worked in any of the normal ways. If you change numbers in the columns, you can use the word processing calculation capability to provide the new sum. As a review, move the cursor to the top left corner of the column of numbers and press "F7". Move the cursor to the bottom right corner and press "SHIFT/F7" which will highlight the column. Move the cursor below the column where you want the sum to appear and press "F9 M +".

The old saying that a picture is worth a thousand words is now brought into play. While the data provides the necessary data, a picture provides the impact that is required, especially in a summary report. To move the graph from the spreadsheet to the report, it must be displayed in a window.

Select the spreadsheet by pressing "F0" or "ALT/" for the PC. Select the graph from the spreadsheet top line menu and select or build the graph you wish to use. The graph "CARLDG" from the ninth article will be used.

Once the graph is displayed, return to the word processing window by pressing F0/ up arrow. Place the cursor where you want the graph to be placed and press "F0 F5" to get to the interwindow copy option window. Three windows will be displayed at this time, the word processing document, the spreadsheet, and the

graph. Select the graph by highlighting with the cursor and pressing <RETURN>. The graph will be displayed with the prompt (Copy pending, press ALT/F5 to copy or {ESC} to return) displayed on the status screen. Press F0 F5 and the graph will be copied into the document starting from the cursor. When the graph is inserted, the screen display will not be very good. To display the graph, you must select the graphics mode. Press "F10 (M)CM (3) Screen (4) Graphics" and the display will show the graph. A comment line will appear with the main heading of the graph shown inside. You can now type around the graph, if you desire.

### Xenia Western Railroad

Some printers will not print the graph correctly in the document. My OKI 92 will not print the entire graph on the paper because the printer driver is for the OKI 92 and 93. The 93 is a wide carriage printer and so the graph is printed in the wide mode with the resulting loss of the right side. To overcome this problem, EN-ABLE permits you to change the size of the graph to fit the page. You can also use this capability to fit graphs into half a page. To shrink the graph window, move to the graph window again. Press F10 and a pull down window will appear on the top right side of the screen. Press "(M)odify (S)hrink" to reduce the size of the chart from this menu. Then, using the arrow keys, you can move the borders of the display to the size needed. When you are reducing the size of the chart, the part outside of the window will be removed. When you are finished with the changes, press {ESC} to return to the basic chart. Press {ESC} again to return to the chart menu, and press (D)isplay again

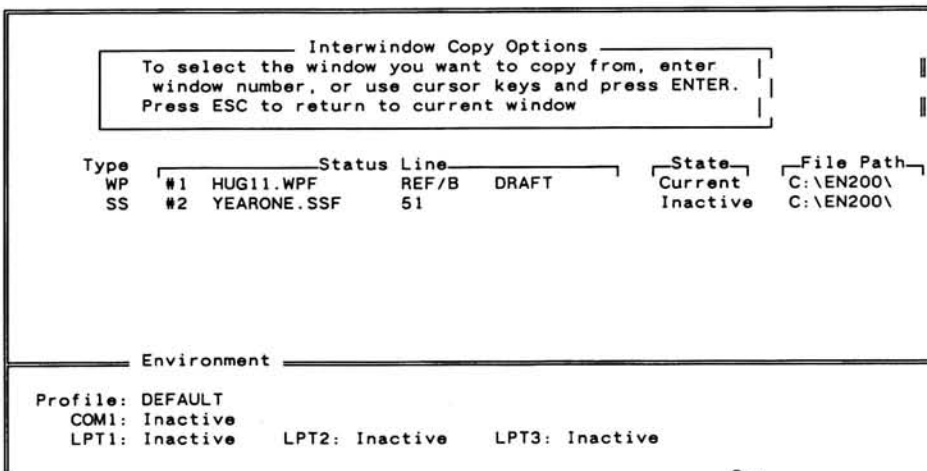
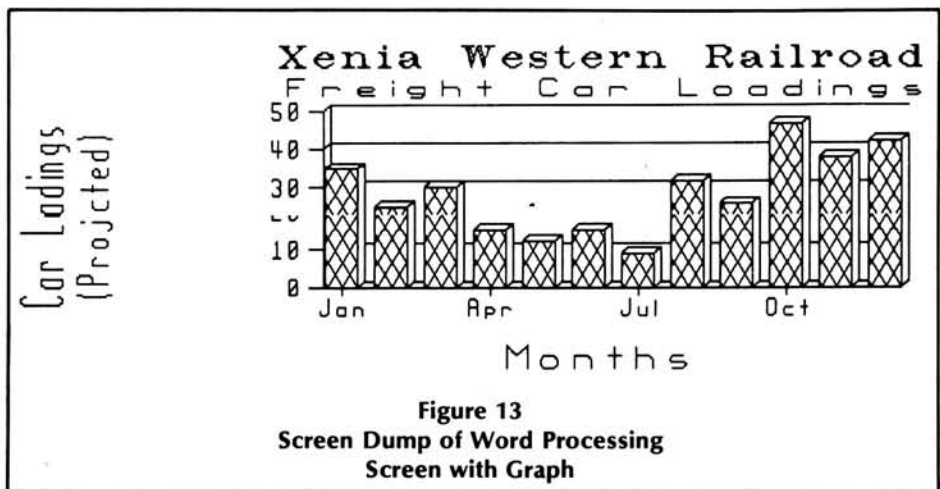
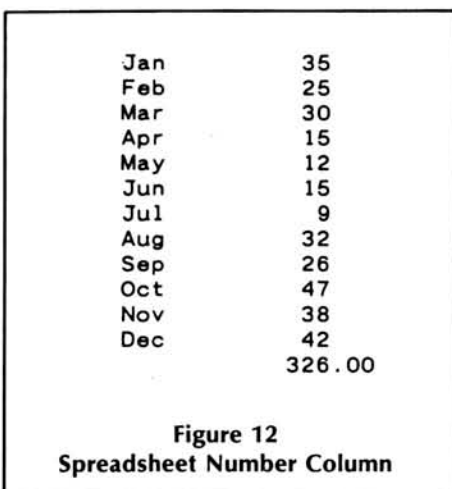


Figure 11  
Interwindow Copy Option Menu





to redraw the chart to the size you have created. You can now press "F0/ up arrow" to return to the word processing document. To copy the chart move the cursor to the location where you want it and use the procedure listed above.

### Xenia Western Railroad

Because of the way graphics are handled, it is necessary to type text using the cursor keys to move around the screen to position the start of each line. As long as you do not overrun the end of the line, you should have no problems. Note that the line spacing changes to 8 lines per inch so that the text is close together. This is because ENABLE puts the printer in the graphics mode which requires the closer spacing, at least with my Okidata 92 dot matrix printer and the QMS Kiss Plus laser printer. The printed graph is smaller than displayed on the screen, so typing over it may require some work if the task is to point to something on the graph. If you use the graph full size, it can be handled as a block of text. As such, it can be moved, deleted, or copied just like any other block of text.

The last module we will transfer from is the database. Again the database window must be opened before the transfer can

occur. Press "F9 W O" to get to the ENABLE main menu display. From there press "U D I" to select the database main command menu. From here select (D)isplay. Using the database Display menu, select the fields that will provide you with enough information to identify the record you wish to select. You can use the index and where clause to further define the records you wish to move. You now have the option to copy all of the displayed records or to mark those you wish to transfer. After you select the records or if you

decide to copy all of them press <RETURN>. ENABLE will now display a modified version of the display menu where you can select the fields you wish to transfer and their order. Pressing <RETURN> will copy the selected records to the word processing document. Note that the database field names or the names input for the report form will be copied with the selected fields as titles. Once copied, this information can be moved, copied, or whatever using the word processing commands.

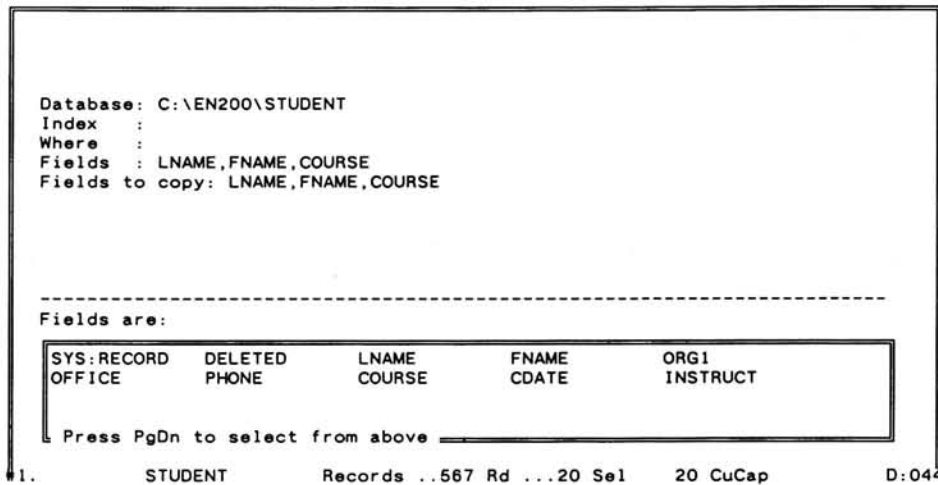


Figure 16  
Field Selection Menu

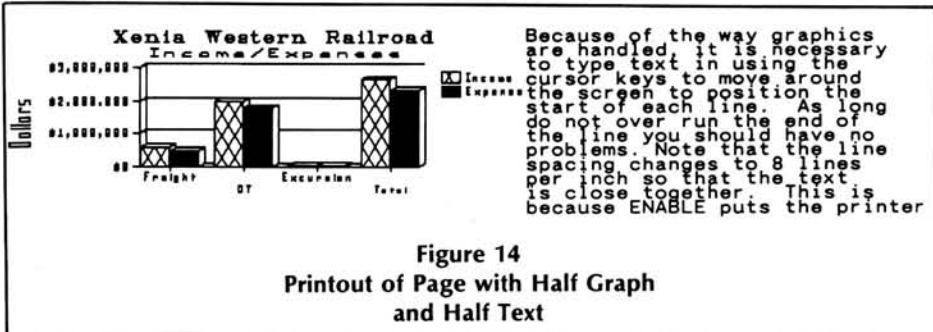


Figure 14  
Printout of Page with Half Graph  
and Half Text

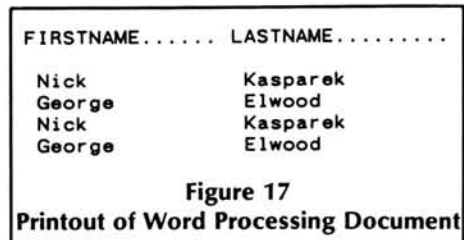


Figure 17  
Printout of Word Processing Document

That finishes this article on word processing. I hope that you have developed a feeling for ENABLE and its word processing. There may be other word processors, but when you consider the total capability of the ENABLE package, you will find that it is a real bargain for those of you with a Z-100. The next time we visit the word processor will be to discuss the features of 2.15 or 3.0 in detail.

ENABLE  
Z-100 Version \$195.00  
ENABLE Applications Development Guide \$ 29.95  
ENABLE Applications Development Guide Disk \$ 19.95  
The Software Group  
Northway Ten Executive Park  
Ballston Lake, NY 12019  
(518) 877-8600

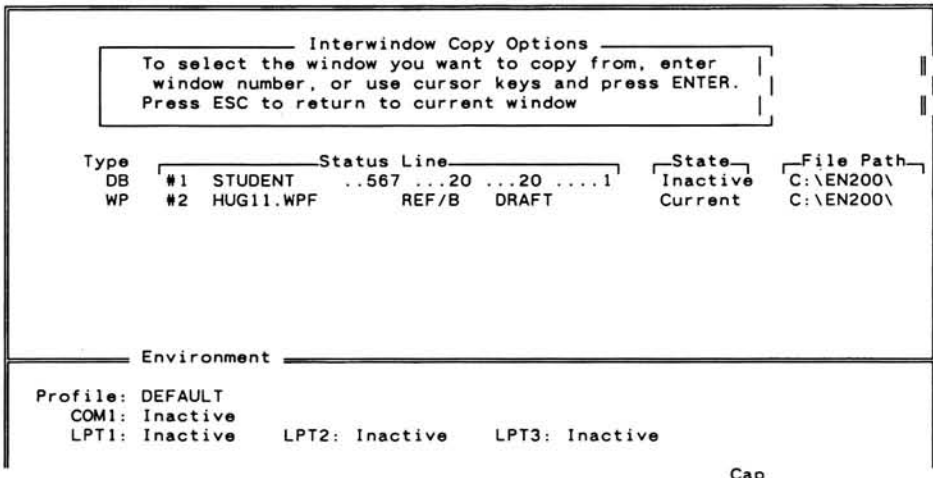


Figure 15  
Copy Window with Database Shown

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

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
		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
MAGBASE	885-1249-37	CPM	MAGAZINE DATABASE		25.00
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 FS	885-1126	HDOS	UTILITY		20.00
VARIETY PACKAGE	885-1135-37	HDOS	UTILITY & GAMES		20.00
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

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 II	885-3049-37	MSDOS	PRINTER PLOTTING UTILITY	25.00
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	MSDOS	GAME	10.00
ASSEMBLY LANGUAGE UTILITIES	885-8046	MSDOS	UTILITY	20.00
BOTH SIDES PRINTER UTILITY	885-3048	MSDOS	UTILITY	20.00
CXREF	885-3051	MSDOS	UTILITY	17.00
DEBUG SUPPORT UTILITIES	885-3038	MSDOS	UTILITY	20.00
DPATH	885-8039	MSDOS	UTILITY	20.00
HADES	885-3040	MSDOS	UTILITY	40.00
HELP	885-8040	MSDOS	UTILITY	20.00
HEPCAT	885-3045	MSDOS	UTILITY	35.00
HUG BACKGROUND PRINT SPOOLER	885-3029	MSDOS	UTILITY	20.00
HUG EDITOR	885-3012	MSDOS	TEXT PROCESSOR	20.00
HUG MENU SYSTEM	885-3020	MSDOS	UTILITY	20.00
HUG SOFTWARE CATALOG UPDATE #1	885-4501	VARIOUS	PROD 1983 THRU 1985	9.75
HUGMCP	885-3033	MSDOS	COMMUNICATION	40.00
HUGPBBS SOURCE LISTING	885-3028	MSDOS	COMMUNICATION	60.00
HUGPBBS	885-3027	MSDOS	COMMUNICATION	40.00
ICT 8080 TO 8088 TRANSLATOR	885-3024	MSDOS	UTILITY	20.00
MAGBASE	885-3050	VARIOUS	MAGAZINE DATABASE	25.00
MATT	885-8045	MSDOS	MATRIX UTILITY	20.00
MISCELLANEOUS UTILITIES	885-3025	MSDOS	UTILITIES	20.00
PS's PC & Z100 UTILITIES	885-3052	MSDOS	UTILITY	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	MSDOS	UTILITY	30.00
UTILITIES II	885-3014	MSDOS	UTILITY	20.00

#### PC Compatibles

ACCOUNTING SYSTEM	885-8049	MSDOS	BUSINESS	20.00
CARDCAT	885-6006	MSDOS	CATALOGING SYSTEM	20.00
CHEAPCALC	885-6004	MSDOS	SPREADSHEET	20.00
CP/EMULATOR II & ZEMULATOR	885-6002	MSDOS	CPM & Z100 EMULATORS	20.00
DUNGEONS & DRAGONS	885-6007	MSDOS	GAME	20.00
EZPLOT II	885-6013	MSDOS	PRINTER PLOTTING UTILITY	25.00
GRADE	885-8037	MSDOS	GRADE BOOK	20.00
HAM HELP	885-6010	MSDOS	AMATEUR RADIO	20.00
KEYMAP	885-6001	MSDOS	UTILITY	20.00
LASERWRITER CONNECTION	885-8050	MSDOS	PRINTER UTILITY	40.00
PS's PC UTILITIES	885-6011	MSDOS	UTILITIES	20.00
SCREEN SAVER PLUS	885-6009	MSDOS	UTILITIES	20.00
SKYVIEWS	885-6005	MSDOS	ASTRONOMY UTILITY	20.00
TCSPELL	885-8044	MSDOS	SPELLING CHECKER	20.00
ULTRA RTTY	885-6012	MSDOS	AMATEUR RADIO	20.00

Magazines everywhere, and no way to reference the wealth of information they hold? Not anymore! Now there's **MAGBASE**; a database designed specifically for referencing magazine articles. Don't let those one-hundred-and-some back issues of REMark, or C Users Journal, or Veterinary Medicine, (or any magazine) gather dust, use **MAGBASE**, and find that article you read two years ago! **MAGBASE** is available for **MSDOS HUG P/N 885-3050** or **CP/M (P/N 885-1249-[27])**.

Why didn't somebody think of this sooner! Books and magazines are printed on both sides of the page, why not listings from your computer's printer? With HUG's **"Both Sides"** printer utility, now you can send your printer's output to both sides of the page; properly positioned, and page numbered! Cut your paper usage, and binder space usage in half! Order HUG's **"Both Sides"** printer utility today. **Both Sides** is available for MSDOS and is **HUG P/N 885-3048**.

**LAPTOP OWNERS . . .** don't feel left out! All of HUG's MSDOS software is available on 3-1/2" micro-floppies too! When ordering, just add a "-80" to the 7-digit HUG part number. For the standard 5-1/4" floppy, just add a "-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.

**\*\*\* ZENITH SOFTWARE FOR THE \*\*\*  
Z-100 SERIES COMPUTERS**

PART NUMBER	DESCRIPTION	LIST PRICE	SALE PRICE
MS-463-1	Z-Basic (16 bit)	\$175.00	\$12.00
MS-463-7	Multiplan	\$195.00	\$12.00
MS-253-1	Basic-80 (8-bit)	\$175.00	\$12.00
CD-483-2	Condor File Manager	\$299.00	\$12.00
LT-Z100	All 4 Listed Above	\$819.00	\$40.00

**\*\*\* SOFTWARE FOR IBM \*\*\*  
COMPATIBLE COMPUTERS**

PART NUMBER	DESCRIPTION	LIST PRICE	SALE PRICE
MS-5063-30	Microsoft Windows	\$99.00	\$24.00
NU-413	Norton Utilities Adv.	\$150.00	\$99.00
WP-528	WORDPERFECT 5.0	\$495.00	\$259.00
BO-290	QUATTRO	\$195.00	\$159.00
LO-311	LOTUS 123	499.00	\$359.00

**\*\*\* ZENITH LAPTOP COMPUTERS \*\*\***

<b>SUPERPORT 184-1</b>	2 3 1/2" Floppy Drives, 640K RAM	\$1899.00
<b>SUPERPORT 184-2</b>	3 1/2" Floppy, 20 Meg Hard Disk, 640K RAM	\$2497.00
<b>SUPERPORT 286-20</b>	12/8 MHz, 80288 CPU, 3 1/2" Floppy, 20 MEG Hard Disk	\$3492.00

**\*\*\* VIDEO MONITORS \*\*\***

ZCM-1490	ZENITH Color Flat Screen VGA	\$718.00
MA2565	SAMSUNG Amber TTL 720x350	\$89.00
MA2571	SAMSUNG White TTL 720x350	\$90.00
CW4644	SAMSUNG Color RGB 640x200	\$274.00
CM4531	SAMSUNG Color EGA 640x350	\$389.00
CN4551	SAMSUNG Multi-sync VGA 800x560	\$489.00

**\*\*\* UPGRADE ACCESSORIES FOR \*\*\*  
ZENITH PC COMPUTERS**

**SmartWatch from FBE Research** Installs in ROM Socket on CPU Board in Zenith computer series Z-100/138/148/150/160. This clock/calender contains a ten year battery and keeps your computer informed of both time and date at each boot-up. Instructions and software included. **\$38.00**

**Z-150 Series Hard Disk Drive Kit** Includes new generation High Speed (28 MS) Seagate Drive with Auto Park heads. Each kit is complete with controller card, cables, hardware and instructions to mount the Hard Disk under your two floppy drives in the Z-150 series computers. 32 MEG ST-138/150 Kit **\$383.00**

**Z-148 Hard Disk Drive Kit** Includes the Hard Disk Drive and controller in the kit above plus the PTZ-148 Expansion card described below. Each kit includes all cables, hardware and instructions required to replace one floppy drive with a high speed low power Hard Disk Drive. 32 MEG ST-138/PTZ-148 Kit **\$459.00**

**INTERNAL MODEM** Fully Hayes compatible (software included)  
1200/300 baud **\$94.00**  
2400/1200/300 baud **\$159.00**

**EXTERNAL MODEM** Fully Hayes compatible (software included)  
1200/300 baud **\$137.00**  
2400/1200/300 baud **\$199.00**

**ZENITH KEYBOARDS** These were used in a training class but function like new. For some unknown reason, most have a few light scratches near the Zenith label.  
AT (Z-200 Series). A bargain at **\$24.50**

**PTZ-148 Expansion Card** adds 2 IBM expansion slots **\$79.00**  
with SMARTWATCH clock/calender. **\$114.00**

**VCE 150 Video Eliminator for Z-150**  
Allows use of EGA or any video card. **\$45.00**

**\*\*\* UPGRADE ACCESSORIES FOR \*\*\*  
Z-100 SERIES COMPUTERS**

**High Density 1.2 Meg Drives.** External floppy drive set-up complete with drive, power supply, case and cable. Ready to connect to your 8" floppy controller  
Single Drive Unit **\$52.00** Dual Drive Unit **\$369.00**  
Bare Drive and Cable for internal mount **\$154.00**

**SmartWatch by FBE Research.** If you don't have a clock for your Z-100, get this one. More details under Z-150 upgrade listings **\$38.00**

**Gemini Emulator Board.** Makes the Z-100 compatible with the IBM PC library of programs. **\$432.00**

**UCI EASY PC.** IBM PC Emulator. Makes your Z-100 IBM Software Compatible. Full 8 MEG operation, color graphics and audio compatible.  
Retail \$899.00 Payload **\$477.00**

**UCI Easy87.** Add an 8087 Numeric Coprocessor. \$69.00 for the board without an 8087 Chip. With 5 MEG 8087 **\$188.00** or with 8 MEG 8087 installed **\$234.00**

**ZMF100A by FBE Research.** A modification package which allows 256K chips to be used on the old-style motherboard to reach 788K. Simple assembly with no soldering or trace cutting. Compatible with Easy PC and Gemini Emulator. **\$60.00**  
Requires 27 of the 256K RAM chips to complete the kit.

**UCI Memory Upgrade Pal Chip Set** For the Z-100's with the newer motherboard part number 181-4918 or greater. This chip set allows the installation of 256K RAM chips on the motherboard. With the addition of 27 256K RAM chips, a total memory of 788K is obtained. PAL Chip Set **\$64.00**

**UCI Memory Upgrade Card** We recommend this one highly. The board has sockets for up to 2 MEG of RAM. With no RAM installed **\$288.00**. Add \$35.00 for EasyDrive RAM Drive Software if desired. Either 64K or 256K RAM chips may be used to complete this kit.

**UCI EASY-I/O** S-100 board that provides IBM PC communications port compatibility with your EasyPC. EasyIO-1, One Serial Port \$81.00. EasyIO-2, Two Serial Ports, One Game Port, Clock-Calender **\$127.00**

**UCI EasyWin** Winchester Drive Systems at reasonable prices. Complete Hard Disk Systems for mounting inside your Z-100. Systems complete with Seagate Drives, 21 MEG \$598.00, 31 MEG \$634. System without Drive **\$317.00**

**CDR Z-100 Speed Module** Run your Z-100 Computer at 7.5 MHz. Installs easily with no soldering. Externally switchable between Speed and Normal mode. Payload **\$44.00**

**\*\*\* FLOPPY DISK DRIVES \*\*\***

MITSUBISHI MF501	5.25" 48 TPI DS/DD 320K/360K	\$95.00
MITSUBISHI MF504	5.25" High Density 360K/1.2 MEG	\$124.00
MITSUBISHI M-353	3.5" in 5.25" frame 720K	\$103.00
MITSUBISHI M-355	3.5" in 5.25" frame 1.44 MEG	\$139.00
	M-355 Software Driver	\$19.00

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

**\*\*\* SEAGATE HARD DISK DRIVES \*\*\***

ST-225	21 MEG, 65 MS, With Western Digital Controller & Cables	\$259.00 \$313.00
ST-138	31 MEG, 28 MS, Auto Park Heads With Western Digital Controller & Cables	\$329.00 \$383.00
ST-238	31 MEG, 65 MS, RLL With Western Digital RLL Controller & Cables	\$278.00 \$323.00
ST-251	42 MEG, 40 MS, Auto Park, Software With Western Digital Controller & Cables	\$384.00 \$438.00
ST-251-1	42 MEG, 28 MS, Auto Park, Software With Western Digital Controller & Cables	\$465.00 \$519.00
ST-4096	82 MEG, 28 MS, Auto Park, Software.	\$697.00

**\*\*\* BUILD YOUR OWN CLONE \*\*\***

Kit includes DTK 8088 Motherboard, 150 watt power supply, one each, serial, parallel and game ports, Phoenix BIOS, clock/calender, 4.77/10 MHz CPU, 256K RAM expandable to one MEG, 101 key Keyboard, front panel mounted TURBO and reset buttons, one 380K floppy drive and detailed assembly instructions. **\$479.00**

Video card is required. Purchase one to match your monitor(sold separately)

Video card TTL	\$43.00
CGA	\$39.00
EGA	\$135.00
VGA	\$265.00

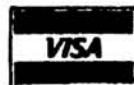
**OPTIONS:**

ST-138 30 MEG Hard Disk/Controller and cables add	\$369.00
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# ForeWord

*Jack W. Bazhaw*  
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Bellingham, WA 98225

In a previous article (Heavy Metal, September, 1987 *REMark*) I discussed using an inexpensive dot-matrix printer to achieve letter-quality printing. Since that was written in late 1986, some major changes have occurred with laser printers; they are affordable.

Laser printers once conjured up images of stacks of thousand dollar bills. But in 1987 that began to change. List prices of several laser printers are now under \$2000. That is still a big bundle yet no longer multiples of what I had paid for the computer to drive the printer. Psychologically, having the cost approximate the computer cost was the mental breakpoint to affordability.

Now let me think: If I take my bonus plus that nice birthday present Dad sent and add a couple of freelance fees, Egad! it's paid for. Suddenly the cart was before the horse. I realized a laser printer lay within my grasp but did not know which one to get.

Back issues of weekly and monthly computer publications were scoured for

printer reviews. Besides initial cost, there were some other factors that were entering into consideration: Emulation; life-cycle cost; repairability; second-source availability; software support.

Almost all the lower cost (it's amazing how quickly one's point of reference can change) laser printers offered emulation of the Hewlett-Packard LaserJet printer. With some, it was an extra cost hardware option while others built the emulation in at no extra cost. Unfortunately, some of the reviews indicated the emulation was not always fully successful. I had already experienced a degree of emulation problems. My present dot-matrix printer claimed to emulate the IBMd Graphics printer; just try and draw a double-line box with it, you get single line boxes instead.

A life-cycle cost comparison in one review showed the HPd LaserJet II was the leader, despite the apparent extra cost of replacing the drum with the toner. In the long run, supplies would cost more than the printer; saving just a penny a page could return the cost of the printer. Some

manufacturers gave the impression that after some 180,000 pages, the printer is discarded. HP indicated anything that broke or wore out was replaceable.

My office uses quite a few pieces of HP electronic equipment, most of which operates 24-hours a day. The stamina of the equipment has always been impressive and parts, even for rather old equipment, are readily available.

One major cost would be replacements for the toner and drum. Several companies were offering HP replacement cartridges at discount prices. Presumably, such supplies for other printers were available from the manufacturer or dealers at full list price. The memory expansion boards for the HP were also available at discount, as was the printer itself.

Of all the software I use or know about, I found if it offered laser printer support it always included the HP LaserJet series.

After using HP equipment at work for so many years and always being impressed by its performance it was quite a thrill to

even consider buying an HP printer, much less actually making the purchase. Kind of like buying your first Mercedes.

Being a dyed-in-the-wool mail-order purchaser, the order was placed as soon as the decision to go with the HP LaserJet II was firm. The agony of waiting almost a week for UPS to do their thing was tempered by the savings of \$200 in sales tax. With that money in my pocket, I purchased a copy of Laser Fonts from SoftCraft. My update to Microsoft Word 4.0 had included a discount offer for this program which I felt would be very useful.

Now I must digress for a moment. William Adney has raked Microsoft over the coals in the October and November 1987 issues of *REMark* about Word 3.1 and 4.0. Now it is obvious from his comments in the October issue that he is a devout Wordstar fan. His description of WordStar 4.0 sounds like a used car salesman: This model comes with four tires, an engine and new for this year, a handle on EACH door. I get the impression WordStar can be less than perfect and still be great, but Word had best be perfect to be just acceptable. I am in constant contact with five different word processors (six if you include EDLIN, but it hardly counts). I find none of them best for all my needs, including Word. The one that is most WordStar like, I use only because it must be used. I call it "WordStar like" because it requires commands like ^BB to mark the start of a block, cursor to the end of the block, ^BN to mark the end, then ^BY to delete the block, for example. Now to me that is work. Easier for me to point the mouse, click and drag, then thump the delete key. The bottom line being all word processors have limitations, so pick the one that fits you best for the job at hand.

Putting the LaserJet together once it arrived took only a few minutes. Everything was well thoughtout, even for the novice user. Finding a home for it was more of a challenge. Until recently, all of the computer, including printer, was in a roll top desk. Push the keyboard in, shut the mouse drawer, pull the roll top down and nothing is left to show the existence of the computer except a yard of software manuals and hundreds of disks. The LaserJet, although small for a laser printer, was never going to fit in the desk. It now resides on top of a stereo speaker, joining the manuals and disks as mute evidence of the computer.

Printing outside of a word processor with the LaserJet has proved to be more of a challenge than anticipated. My favorite print program has been a .COM file that put a header with file name, creation date and time and page number at the top of each page. Unfortunately, unbeknown to the print routine, the LaserJet puts the last couple of lines on a separate page. The old standby, "type filename > prn" usually misses the first line or two since the LaserJet does not print within a 8" border around the page. The DOS print command works reasonably well, but I miss the header information. Perhaps I'll find my problem has a simple cure once I spend some time thrashing it about.

Budget limits prevented purchasing any font cartridges with the printer. The soft fonts that were provided with the program Laser Fonts have proved quite useful even with no memory expansion in the printer. In the basic printer, about 395K of RAM is available for the document and downloaded fonts. The Laser Font set takes about 285K of RAM. A page with "heavy" formatting might use about 60K, leaving room for some more fonts.

The soft fonts are more versatile than the cartridge based fonts and less expensive. Their drawbacks are they require time to download and take up printer RAM. The latter does not appear to be too much of a problem unless graphic printing is required.

The time problem could be a burden. With my stock H/Z-150 PC, it takes around 7 minutes to load the Laser Fonts font package. I modified my autoexec.bat file to include a routine to ask if the download should occur or not. Once downloaded, the fonts remain as long as the printer is powered. Routinely, the fonts are downloaded first thing and the printer is left on until no possible need exists.

Version 4.0 of Word has simplified the selection of fonts, along with other improvements. Font selection can be made with the function keys in addition to the ESC-F-C-Shift-Tab-Tab-Tab keystrokes of version 3.1. If you have a document with many font changes, this short cut is a real improvement.

The function keys are much more useful now, with all keys supporting Ctrl, Shift and Alt key shift combinations. Previously, only the Shift combination was sup-

ported and not with all keys.

Another feature new to Word in 4.0 is revision marks or "redlining". This function allows you to include a vertical line in the margin to denote changes. My first attempt to use this feature resulted in this line printing as a tiny "x". Checking the character sets available in the printer, I surmised changing the default to the IBM-PC set instead of the Roman-8 that would correct the problem. The LCD readout and front panel switches make such changes very simple, but, alas, it did not cure the problem. A call to Microsoft indicated I was on the right track, except the print driver did a reset, which resulted in the Roman-8 character set returning to use.

Microsoft advised that the cure was to modify the printer driver to use the IBM-PC character set. With the utility MAKEPRD, the print driver can be converted to an ASCII file. This file can be edited and then MAKEPRD used to convert the modified ASCII file back into the binary printer driver file.

The "hppccour" driver is used if no cartridges or soft fonts are present in the LaserJet. In this driver file, the first "beginmod" line should have the 8Q replaced with 10U. The second "endmod" line should have the 8U replaced with 10U. With these modifications completed, run MAKEPRD again to rebuild the binary driver file and your redline function should work correctly.

To modify the driver, make sure you have MAKEPRD.EXE and HPPCCOUR.PRD in the current directory and type:

```
makeprd /t hppccour.prd hppccour.doc
```

This will create the file hppccour.doc which should be loaded into your favorite text editor. Make the two changes indicated, save the file and exit. Be sure you save the file as an ASCII file and not a word processor formatted file. With Word, set "formatted" to "No" when you use the Transfer Save command. Then, at the DOS prompt, type:

```
makeprd /p hppccour.prd hppccour.doc
```

Note the only change in the command line is the switch "/t" or "/p". You could rename the .prd file if you desired to avoid confusion with the original version. To do so, just change hppccour.prd in the

above line to the new filename. Be sure and keep the .prd extension.

Complete instructions on using MAKEPRD are included in a separate printer information manual furnished with Word.

Later, when I started using the Laser Fonts program I found redlining worked as advertised with no modifications to SoftCraft's printer driver.

Two other powerful features just added to Word are "style by example" and macros.

If you have used Word's style sheets before, you know how powerful they can be, but it has been necessary to prepare them "in the blind". It was not possible to see what you had until the style was completed on the sheet and attached to the document. Now it is possible to prepare style sheets by doing the styling in the document and then creating the style sheet.

To prepare a style sheet by example, just format your text the way you want it to appear. Double check your style when critical work is involved by highlighting the text and printing just the selection (under Print Options, set the "range" to "Selection"). Then press ALT-F10 and record the key code, usage, etc., to create the style in the style sheet.

Just one of the macros furnished with the 4.0 update was worth the cost of the update to me. Have you ever created a document in several files and wanted to print all the files with correct page numbering? That used to be a real pain with versions prior to 4.0. Each file had to be paginated with the ending page number noted to carry forward into the next file. With the macro "chainprint.mac" the whole business is automated. The only preparation prior to running the macro is to create an ASCII file with the names of the files to be printed in the desired order of printing.

With my first try I attempted to be clever and prepare the list of files with a "dir \*.doc > print.me" command, since there were some 15 files to list. Starting the macro produced an error message right off the bat. I knew the dir command was not going to misspell the file names; that was one reason I created the file with the redirection command. About the third time I examined the file the problem

dawned on me. DOS did a beautiful job of lining up the file names by padding with spaces. Padding with spaces! Those are illegal characters for file names! After removing the spaces, the macro ran beautifully, producing 60 pages of correctly numbered text one cup of coffee later.

A few observations on some secondary benefits of the laser printer. No more ragged edges. No more tearing paper apart and sometimes ruining a completed document. No more piles of perforations for the kids to toss about. No more wasted sheets just to get the printout out of the printer. No more waking the kids up with late night printing -- boy, is it quiet. And Fast. In 20 seconds the first page of this article will be laying in the out tray; 70 seconds for all 5 pages.

The LaserJet II does not support PostScript. This is not a problem for me since running a page composition program on an H/Z-150 PC would be an exercise in frustration. It is my understanding, however, that HP will have available support for PostScript in the future (real soon now?).

Word has always had excellent support for multiple windows, either in the same or different documents. It is a feature I have found quite useful. Microsoft has added the ability to "zoom" the selected window to full screen and back again with a function key. This is much faster than

dragging the window with the mouse, particularly with three or more open windows, and gives the full screen over to the window.

Drawing lines used to be a tedious process. To speed the process up, I had created a file with different types of boxes in it and then used the window feature to cut and paste what I needed. Now Word can put a box around a paragraph automatically, or lines above, below or to the side. In addition, the cursor keys can be switched to draw lines as you move the cursor around the screen. You have a selection of characters with which to draw.

Most operations seem faster in 4.0, plus, they added the ability to use the function keys to switch between graphics and the faster text display without exiting and restarting. Although not as speedy, I find I prefer the graphics screen when used with the mouse. Using the text screen, the mouse cursor jumps between character positions rather than the gliding motion in the graphics display. Amazingly, Borland's Turbo Lightening is not fazed by the change in mid-stream between the graphics and text displays.

I've touched on just some of the changes that version 4.0 brings to Word. With a new printer and what feels like a new word processor it's like a new ball game -- I wonder if a '386 will fit in an 8088 socket?



**WARNING!**

Dear HUG:

I would like to issue an immediate warning to all owners of Z-241s. Your CMOS memory backup battery is about to poop out. This also applies to all owners of Z-200s sometime in the future. Before this happens, you should immediately enter SETUP (hit <Ctrl><Alt><Ins>, then type SETUP <CR>) and record by hand in your owner's manual the information you find on the screen. Your battery may go and this memory will be erased. Do you remember the configuration you entered years ago and never saw again? I didn't. Try guessing which hard disk configuration is the right one, hoping that a mistake will not wipe out your disk. A minute spent now will be well spent, I assure you.

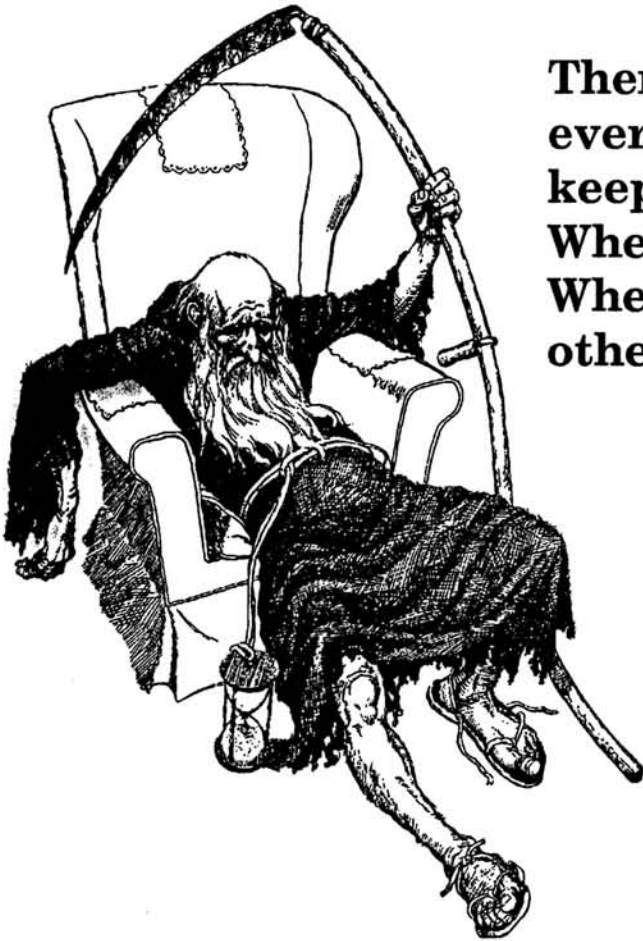
Also, now is the time to try to find a battery supplier. Why such a crazy battery as a 3.9 Li AA sized zinger was selected is beyond me. When mine went, the voltage was

down to 0.39 volts. It would seem that a standard "C" cell (1.5 V) would work, then. Oh, well, no hope for it now, but I assure you that if you find one of these weirdos, you will do so by blind luck. Radio Shack and all other electronic stores in Orange County, California, never saw one before. Only the House of Batteries, a store specializing in batteries, had even heard of the manufacturer and they still couldn't cross match it. The Heathkit store in Anaheim does not have one in stock and who knows how long it will take to order one. The cost is \$11.00! I am writing this letter with my Z-100. Meanwhile, I have a perfectly good Z-241 sitting around like its Nissan counterpart with a dead battery while I use the Chevy. Anyone have a set of jumper cables?

Yours truly,

William G. Nabor  
27172 Huerta Street  
Mission Viejo, CA 92962





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# How to Get the Most from a Zenith Laptop Computer

*by Joseph Katz*

*Part 5. You need outerwear to protect hardware and software in transit. Berithcase, Rota-Lux, and Rota-Tough—all from Jensen Tools—provide maximum protection.*

**Y**ou need a bag or case for traveling with your laptop computer. Although Zenith Data Systems builds its laptop computers to be exceptionally rugged, every microcomputer is a complex electromechanical device that must be protected from the inevitable hazards of transportation. Dirt, rain, bumps, bashes, ashes, topples, drinks, gum, kids, meddlers, thieves, and fools are only the short list of threats to a laptop computer. Don't omit yourself from that list: familiarity breeds contempt soon after the novelty of traveling with a laptop computer wears off. For infrequent short trips, almost any kind of protective container is better than none at all. On longer trips or when you often move your computer short distances, you'll find it well worth your while to get the right bag or case for your own needs. A "bag" is soft and flexible, a "case" is hard and rigid. The latter usually gives more protection than the former and usually is heavier too.

What you need depends entirely on which Zenith laptop computer you use, how you use it, where you use it, how you get it there, and how often you get it there. In short you won't find any case or bag that fits all computers—even all Zenith laptop



*Figure 1. Berith Activeware's Berithcase ready to travel.*

computers—and all circumstances equally well. Analyze your own circumstances carefully. You may find that you do more than one kind of traveling with your laptop computer and therefore would benefit from

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Figure 2. Jensen Tools' version of the Berithcase.

having the right kind of case or bag for each.

The first factor to keep in mind is which Zenith laptop computer you use: the bag or case must have enough room in it to carry at least the computer itself. Use the dimensions in Table 1 as a guide. Tackle the next two factors together: how you use the computer and where you use it. If you commute with your computer from home to office only, you likely won't need to carry more than the computer itself. Invest in a duplicate AC adapter and anything else you need at both locations, and leave one at each. A few dollars can buy you freedom from lugging the unnecessary every day. If, however, you have to travel various places with everything you need to compute, make sure to lay out those things on a flat surface and measure. A good approach is to consider it additional space—additional to space for the computer itself. That's the way many bags and cases are constructed: the computer, and maybe its AC adapter, are assigned one area; a printer or other sizable unit is assigned another; and every-

thing else is stowed in another area or other areas. Measure your goods in those groups and be careful to segregate things that shouldn't bump. Next consider how and how often you transport your equipment. You'll worry less about weight and bulk (the two often go together) if you travel by personal car instead of public vehicle. Think your way through each step of a typical journey before you decide whether to buy a case or bag: remember that you'll have to lug your own stuff at least some times when traveling by plane or train. Do you want to? Everytime you travel? I haven't mentioned the matter of appearance, because it's so personal, but you might want to be mindful of how your choice of bag or case will affect the impression you make.

For your benefit I've assembled several first-class products for different situations. My opinion, after digging through a mass of indifferent stuff often sold for transporting laptop computers, is that these bags and cases are among the very best of their kinds today regardless of price. Some are in fact

modestly priced but well made for their task. Others are pricey but may please you with value that makes them well worth the money. I think that if you choose from among these for what you need, you probably won't be disappointed.

We start with three offerings that provide the most protection. Jensen Tools' Rota-Lux and Rota-Tough are cases: you can toss them into the trunk of a car or check them as baggage on a plane or train. Berith Activeware's Berithcase (pronounced "Burreethcase") is, despite its name, a bag. But as the name implies, it's designed to be a totable that provides exceptional protection for its contents.

All three are available from Jensen Tools Inc., a company that has a good reputation for providing the highest quality tools and cases by direct mail. Jensen pays the cost of shipping your order, so the prices I've listed here really are the prices you pay currently, and guarantees to refund your money if you're not completely satisfied. These are the priciest containers I've seen so far for traveling with Zenith laptop computers, but I think they're worth the price.

#### Berith Activeware's Berithcase bag

Berith Jacobsen both designs and manufactures a line of laptop computer bags of the kind and quality you'd expect to find in a store like Abercrombie & Fitch. Same orientation towards precise functionality, same reverence for quality, same attitude about price being of least concern. It's no surprise, therefore, to find her Berithcases featured as the bags of choice in current Jensen Tools catalogs.

The Berithcase you want for a Zenith laptop computer in the Z-180 or sPort series is Catalog Number 363B005 and costs \$149 from Jensen Tools. Buy it from Berith Activeware, Berith's own company, as Catalog Number BC-IV5 instead and the cost will be \$159 for the same bag with a different foam insert. We'll get to the insert soon.

The Berithcase is the most expensive laptop computer bag I've seen so far. And it's absolutely worth the price if you have to pack as if you're going on computer safari. This Berithcase is so substantial that it nearly blurs the distinction between bag and case. With the Berithcase you can tote just about everything you'll need for self sufficiency in laptop computing, be surprisingly comfortable as you do it, and even look stylish. It's good theater as well as good computing. No part of the Berithcase, however, is vulgar show. Even a

**Table 1**  
**Dimensions of Zenith's Laptop Computers**

COMPUTER	DIMENSIONS
Z-171	13" W × 9.5" H × 6.1" D
ZP-150	13" W × 1.87" H × 11" D
Z-181	13.5" W × 11.75" H × 3.5" D
Z-183, SupersPort	13.9" W × 13.4" H × 3.45" D
SupersPort 286	12.2" W × 12.3" H × 3.07" D
TurbosPort 386	13.25" W × 14.75" H × 4.75" D

glance at the photograph in Figure 1 shows you what I mean.

Internally the bag is 17-1/2 inches wide, 13-1/2 inches high, and 5 inches deep. Those are pretty generous dimensions for a bag that winds up snugging the computer. The bag closes with a dual-talon zipper but, as you can see from the photograph in Figure 2 here, it opens from the side instead of the top. What you don't see from either of the photographs here is that the zipper actually continues down around the bottom of the bag: the bottom and top therefore close to enfold the computer and give it solidly-padded protection all around. There's also no vulnerable region anywhere, not even an unpadded area around the zipper, which is where the computer can suffer from hits in some bags.

What you do see in Figure 2 is the version of Berithcase sold by Jensen. Order from Berith Activeware and instead of the foam liner on two sides you get a foam crate that slips next to the computer on one side, supporting it that way. Inside the crate goes the AC adapter, its power cabling, and maybe some computer trifles you need for survival. A host of other things—diskettes, papers, manuals, a portable modem, screwdriver, and more—can go in the zippered affair you see in the photograph. It's a removable portfolio that snaps inside the top. Outside the top is an expandable pocket that holds any of these printers: Diconix, Axonix, Brother M1109, Hewlett-Packard ThinkJet. The printer is trapped inside by a generous flap that's belted down and secured with a Fastex closure.

The color, as you see in Figure 1, is Darth Vader black. It's stark, striking, and elegant. Two nylon web belts are sewn down both sides and around the bottom, to cradle the bag and distribute its weight through the pair of handles they form on the top. One handle has a tubular support sewn in. Sewn on the other is a flap that closes with heavy-duty Velcro. The flap wraps around both handles, forming a keeper that secures them together and a comfortable pad with sufficient rigidity so the handle doesn't cut into your hand. Set the Berithcase down—empty, partially loaded, or packed to capacity—and it adjusts itself to resist tipping. Pick the Berithcase up and you too will resist tipping: the load is well balanced, and the bag's design is such that your feeling of control actually increases the more you pack inside. Weight increases pressure on the belting, which produces even tighter cradling of the contents. There's also a nylon web shoulder strap. You mightn't need it except



Figure 3. An open and shut case: Jensen's Rota-Lux.

on long treks with a fully-laden bag, so it can be snugged close to the top of the bag as you see in both photographs, Figure 1 and Figure 2.

Expect the Berithcase to be virtually indestructible. Its outer fabric is Propex Ballistic nylon, used in the manufacture of bulletproof vests, to resist puncture and abrasion. You'll find it easy to maintain the Darth Vader appearance. Between the outer fabric and the nylon lining inside is a semirigid "armor" liner, then a layer of soft padding.

If this description of the Berithcase gives you the impression of near fanatic attention to detail and completely fanatic striving for absolutely high quality, you have the right impression. It's really a remarkable performance by a designer who has thought things through and controlled the manufacturing process to effect her will. With your Zenith laptop computer in its Berithcase, you're unmistakably the chief hunter and couldn't possibly be confused for a native bearer.



Figure 4. The document pallet in Jensen's Rota-Lux.

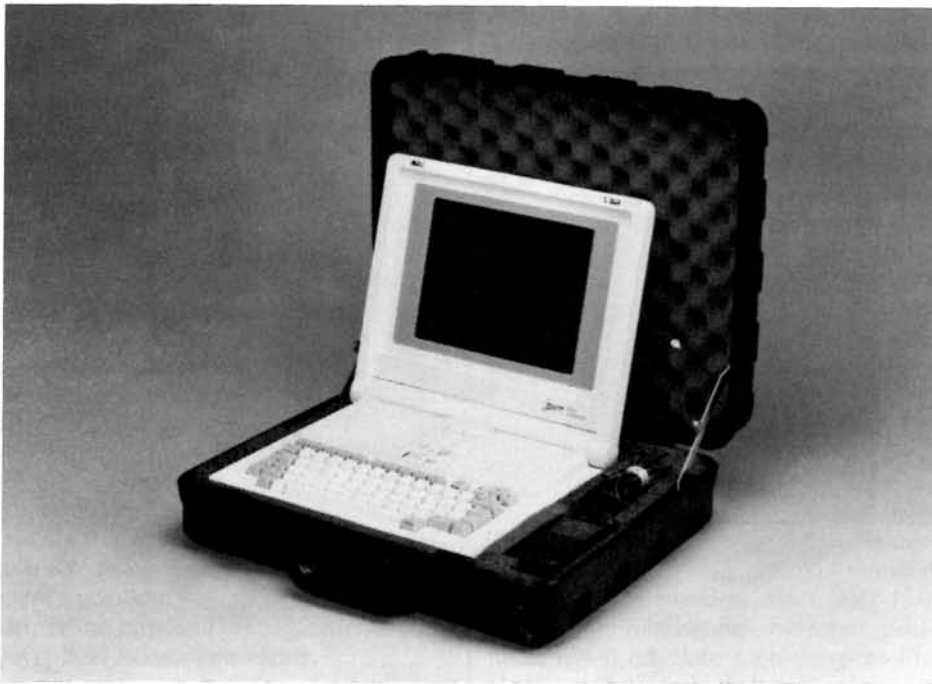


Figure 5. Jensen's Rota-Tough for the Z-180 series.

### Jensen Tools' Rota-Lux case

There's nothing else like the Rota-Lux Laptop Computer Case from Jensen Tools you see in Figure 3. No competition. Nothing even close. The Rota-Lux (Catalog Number 377B510) for \$179 holds a Zenith ZP-150, Zenith Z-181, or one of the Zenith sPort series (without the battery slice) together with tools and documentation in absolute maximum protection. Note that the Rota-Lux will not hold a Zenith Z-183. If you own a Z-183, or if you have one of the other Zenith laptop computers (except a Z-171) and want similar protection but don't need to transport tools and documentation, look at Jensen Tools' Rota-Tough Laptop Computer Case instead. I describe it next. These Rota-Lux and Rota-Tough cases are the quintessential case.

The Rota-Lux's jet black, pebble-finished shell is made of rotationally-molded durable polyethylene: hit it, drop it, use it as a seat, or even stand on it, and the contents are unaffected. Corners of the Rota-Lux are extra thick and its perimeter is ribbed to withstand impacts that crack or shatter lesser containers at these highly vulnerable regions. Sides are reinforced with thick ribs. They also serve as gliders for ease in sliding the case around in back of a station wagon or on the beds of other vehicles. When the case is closed, an epoxy-coated aluminum tongue and groove valence seals it against damp and dirt. When the case is open, it's secured that way by a pair of ball-bearing lid stays that latch in place. A full-length piano hinge

holds the top and bottom securely, allowing it to open smoothly.

Of course you'll want to lock any case such as this. Because it's tough enough for checked baggage on a plane, you want to be able to leave it unwatched without worrying that someone can get inside quickly and remove your expensive goods. The Rota-Lux has a combination lock in addition to key locks on the two latches. Those three locks should dissuade even a determined thief who can't make off with the case but wants its contents.

Internally the Rota-Lux measures 17-3/4 inches wide, 12-3/4 inches high, and 7 inches deep, spacious enough to hold any of Zenith's laptop computers except the Z-171 and the Z-183. There are layers of dense polyurethane foam inserts you can cut with a razor blade, X-Acto knife, or utility knife to fit your computer, AC adapter, portable modem, and other things you want snugged inside. A hinged, foam-padded separator snaps on top to hold them down. In the lid of the case is a reversible pallet with tool pouches on one side and a document pouch on the other.

Of course you won't want to carry a fully-laden Rota-Lux by hand on sporty jaunts around town. It's not made for that. What it's made for is maximum protection of a working toolset centered around a laptop computer. For that purpose, I haven't found anything like Jensen Tools' Rota-Lux case.

### Jensen Tools' Rota-Tough case

Nor have I seen anything else like this new offering. It gives all the protection of Jensen Tools' formidable Rota-Lux case without the space or overhead for carrying a toolset. In fact when you want maximum protection specifically for a Zenith Z-181 or Z-183 laptop computer and its AC adapter, Jensen Tool's Rota-Tough case (Catalog Number 377B363) is the obvious choice.

This \$129 case is designed and made especially for the Z-181 and Z-183, so it harbors no compromises. Look at the photograph in Figure 6 and you'll see a fitted case made for those Zenith laptop computers. Internally the Rota-Tough measures 17-3/4 inches wide, 14-1/2 inches high, and 5 inches deep. The bottom has a polyurethane foam insert die cut to hold the computer and the adapter. (A foam strip adjusts for the Z-181 or Z-183.) Convoluted foam lining in the top of the case comes down to hold its contents firmly in place.

Just as in Jensen's Rota-Lux case, there's a piano hinge on the back and latching ball-bearing stays on the sides. There are two outside latches with key locks to secure the case. Otherwise the construction of Jensen Tools' Rota-Tough Laptop Computer Case for the Z-180 series is the same as in its larger Rota-Lux case.

Although you wouldn't want to tote its big brother around town, you could sport the Rota-Tough. It's a handful, but it looks a bit like a hi tech attache case and it does offer maximum protection. Its handle is the paradigm. What you see is its leather covering, which provides durable comfort. What you don't see is the tubular steel handle itself, which provides security and stability. Nice, and tough.

*Next: A selection of good Zenith laptop computer bags at prices as low as \$39.*

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Berithcase (BCIV-5). \$159.  
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 303/744-8156



---

---

# A Light Tap . . .

## Without a Sledgehammer



**Don Keller**

1330 Eden Valley Road  
Port Angeles, WA 98362

A few feet from where I sit punching away at the keyboard, there's a bench and a toolbox with a modest collection of woodworking tools. Some had a price tag that made me cringe a little. All are beautiful. But my favorites are a set of three mallets that didn't cost a cent. I cut them out of a tree trunk with an axe and a drawknife. I could replace all three of them with a "more powerful" fifty dollar sledgehammer from the hardware store, but those home made wooden mallets are much better for driving chisels and carving tools. Your computer works the same way; a bit of your spare time and thought spent on keying in a program from time to time can save considerable money and provide you with tools better suited to your own tasks.

A case in point is the little black book, the one program nearly all computer buyers assume will immediately demonstrate just how useful their new machines really are. One of those big classy database packages ought to do the trick. It will too, but like a sledgehammer, it's hard to pick up. Programs of that kind are large and expensive, as well as time consuming to learn and use. A simple screen editor can generate an address book type of database with greater ease and convenience than most database managers. There is no sort facility, but if you're offended by entries out of alphabetical sequence, you can probably be relied on to insert them in

that order in the first place. If that's not good enough, a separate sort utility will work. A small editor runs into its first significant snag when you want to extract a data entry from a file and put it someplace where you can use it.

When my own little black book grew to a cumbersome size, I wrote CUTPAR. (It works kind of like a cutting horse; but instead of cutting cows out of a herd, it cuts paragraphs out of a text file.) CUTPAR was written in C/80 and was designed to work with PIE and TEXT, all from The Software Toolworks. However, it should work with virtually any text handling system that writes an ASCII file and any reasonably complete implementation of C. Some compilers might require syntax changes in the CUTPAR source file. This is a very general utility program that simply identifies a paragraph as a block of text distinct from its neighbors because it is preceded and followed by at least one blank line. CUTPAR looks in the paragraph for the search string you specified and if it's there, writes that block to the standard output which is your terminal screen by default. You can use command line redirection to write the paragraph to a file or to your line printer.

### The Operating Manual

CUTPAR reads the file you want to search from the standard input. By default, that's

the terminal keyboard — an unlikely place to look for a database, but command line redirection lets you specify any file as the input. Suppose you want to search a file named `scratch.pad` and find a paragraph that contains the word, 'doodle.'

```
cutpar <scratch.pad doodle
```

will write the paragraph in `scratch.pad` containing 'doodle' — if there is such a paragraph — to the terminal screen. The search continues to the End Of File. If there are eighteen dozen paragraphs containing 'doodle,' you'll get lots of output.

```
cutpar <scratch.pad >scratch.bak doodle
```

will create a file named `scratch.bak` and put the output there. If there is already a `scratch.bak` file, this one will replace it. The left arrow or 'less than' character means 'read input from' and the right arrow or 'greater than' character means 'write output to.' File names can include a disk drive specification as in 'b:scratch.pad' or 'sy1:scratch.bak' depending on the drive identification scheme your operating system uses. On the later versions of MS-DOS, file names can be full path names like '/bin/usr/harry/notes/scratch.pad' or whatever it takes to get down the directory tree to the file you want to search.

```
cutpar <scratch.pad  
"more than one word"
```

If the search string includes white space, it must be enclosed in double quotation marks. Otherwise, CUTPAR thinks each word is a separate argument, becomes confused and exits to the operating system in a fit of petulance. Whether the search string is one word or several, CUTPAR ignores case. MS-DOS, HDOS and CP/M convert lowercase letters in the command line to uppercase making it impossible for a program that gets its input from the command line to discriminate on the basis of case. CUTPAR deals with this problem by using two paragraph buffers. It fills one with the original text and fills the other with a copy, converting lowercase to upper in the process. The comparison is made on the uppercase buffer and if a match is found, The original paragraph buffer is written to the output.

### LBBM — Little Black Book Manager

It's easy to write a database — Little Black Book — for CUTPAR; just type names and addresses into an ordinary text file with your editor. Leave at least one blank line between each entry in your database. Now that also implies that entries cannot contain blank lines. However, any character at all anywhere on a line keeps it from being blank. Since I use the combination of PIE, TEXT, and SPELL for word processing I mark "blank" lines within entries with TEXT's comment symbol. (dot, backslash, double quote; beginning in column one.) TEXT also recognizes a backslash, double quote anywhere to the right of the first column. That means the rest of the line is a comment. This is a pretty fine distinction until you've tried it, but the significant difference between the two comment symbols, as far as CUTPAR is concerned, is this: If you have a dot, backslash, double quote sequence beginning in column one, TEXT will not print the line, nor will it print a newline character. If you have a backslash, double quote pair anywhere on a line — but not preceded by any other characters — TEXT will issue a new line, resulting in a blank line in the printout. The PIE and TEXT combination seemed like the best choice for a CUTPAR working example because there are versions for MS-DOS, HDOS and CP/M. You may have to do a little tinkering to devise a method that works with other editing systems. On mine, entries look something like this:

```
Harvey Wallbanger      \"    bartender at the club
123 Skid Road          \"    knows everybody
Port Angeles, WA 98362
.\" area code 206, 000-0000
```

Even a small entry like this one suggests a number of search possibilities. If the specified search string is "Harvey Wallbanger" or Harvey's phone number, CUTPAR will almost certainly turn up this entry the first time. But more general searches can be made. 'Wallbanger' will pick out all the people named Wallbanger in the database. 'bar' will list all the bars and bartenders, "Skid Road" will find everybody who lives there, '98362' locates everybody in that zip code, and '206' will zero in on anyone with a phone in that area code. Further, any search key you might want to invent can be included as a comment in any entry. If I want to write a letter to Mr. Wallbanger, I use CUTPAR to extract his name and address from my database, named book.dat, and write it to a new file that will become the letter when the letterhead and date have been inserted at the top and the body of the letter added below. The comments and phone number are kept out of the letter by TEXT's comment symbols. CUTPAR also turns your database into a handy phone book. Enter a name as the search string and you get the entire entry for that name, including the phone number. It also works as a reverse phone directory. If you see a phone number, but no name in some document, you can use the number as the search string and find out if it belongs to anyone in your database.

When you do a search for a zip code or a town name, the output is a specialized mailing list for that area. Add the key word 'luscious' as a comment to appropriate entries in your database, do a search on that key word, and the output is a real 'classic Little Black Book.

### Inside the Black Box

The program listing that accompanies this article is downright anticlimactic — it's so small. As a matter of fact, I have another version of CUTPAR with plenty of bells and whistles. It's twelve times as big as this one and about as handy as installing a floor safe in your pocket to carry your change. After wasting a couple of days developing that monster, I remembered something that used to appear now and then in REMark some time ago: KISS. It stands for Keep It Simple, Stupid. I took a long hard look at the stuff I was writing in light of what the program really needed to

do and stripped it down to the skinny little thing you see here.

CUTPAR gets all the parameters it needs from the command line so it doesn't need routines to open and close files. The only error condition it checks is the absence of a search string (or the presence of too many command line arguments) and if that error occurs, it just exits to the operating system. Disk file errors are handled by the operating system. That means CUTPAR doesn't need the ability to write error messages or space to store them.

```
#include <stdio.h>
```

About all CUTPAR needs from this file in my system is the definition of EOF, the end-of-file constant value. In my case, it's -1, but it could be something else on your setup. Whatever it is, you'll have to let this source file know about it. It might already be defined in a header file you use or you might have to define it yourself.

```
#define PBSIZE 16384
```

This is the size of the paragraph buffers the program will assign dynamically when it executes. 16384 bytes or 16K. If you have plenty of memory, you could make this number larger. Still, 16K is a pretty good sized paragraph.

```
main(argc, argv)
int argc;
char *argv[];
{
```

Here is where the program takes delivery of command line arguments. argc is the argument count — beginning at 0. argv is an array of pointers to char arrays that contain the arguments. argv[0] represents the program name (CUTPAR in this case), but on many systems, trying to read argv[0] yields only garbage. argv[1] points to the beginning of the first argument and argv[argc] points to a null byte the compiler put there to identify the end of the argument list.

```
char *parbuf;
char *pf;
char *bufup;
char *pu;
```

There are two buffers in use and these are the pointers to them. Each buffer gets two pointers because we need to be able to move a pointer through each buffer and, at the same time, keep track of the starting addresses of both buffers.

```
if (argc != 2) exit(0);
```

CUTPAR will only accept one argument on the command line, no more and no less. The program name is argv[0], the argument is argv[1], and the terminating null byte is argv[2]. Therefore, with one argument, argc will equal 2. If it's not 2, CUTPAR exits to the operating system.

```
parbuf = sbrk(PBSIZE);
bufup = sbrk(PBSIZE);
```

parbuf and bufup have been declared as pointers to characters. Now, the sbrk function assigns PBSIZE bytes to each buffer and we end up with the address of the start of one buffer in parbuf and the address of the start of the other buffer in bufup. (sbrk or something like it should be supplied with your C compiler.)

while (1) { begins a potentially infinite loop.

```
pf = parbuf;
pu = bufup;
```

parbuf and bufup will continue to store the start addresses of the buffers. pf and pu copy those start addresses every time the loop begins an iteration. In the body of the loop, pf and pu can be incremented as needed to access the contents of the buffers.

while (1) { begins an inner loop which is also potentially infinite.

```
if((*pf = getchar()) == EOF) exit(0);
```

\*pf = getchar() gets a byte from the standard input and stores it at the address pointed to by pf. When we get to the end of the file we're searching, CUTPAR exits to the operating system.

```
*pu = toupper(*pf);
```

The content of the byte at the address currently stored in pu becomes a copy of the content of the byte at the address currently stored in pf; except if it's a lowercase letter, it gets converted to uppercase by the toupper function. That means that as we reiterate this inner loop, the parbuf buffer is filled with a paragraph exactly like the one in the source file we're searching and the bufup buffer is filled with one just like it, except it's all uppercase. Non-alphabetic characters are not converted. You should have a toupper function in the library that came with your compiler.

```
if (*pu == '\n') *pu = ' ';
```

Every newline character in the uppercase buffer is changed to a space so that

CUTPAR can search across lines for a multiword search string.

```
if (*pf == '\n' && *(pf - 1) == '\n')
    break;
```

If we're reading a newline now and the last character we read was also a newline, we've just found a blank line and must have reached the end of the paragraph so we'll break out of the inner loop. Otherwise...

```
++f;
++pu;
```

increments both pointers and takes us around the inner loop again.

```
*pu = pf = '\0';
```

This changes the blank line to a terminating null byte in both buffers. Now the rest of the program can tell where the buffers end.

```
if (index(bufup, argv[1]) >= 0) }
```

The index function — which should be in your C library — finds out if the command

line argument is a substring of the uppercase buffer. And if it is...

```
pf = parbuf;
```

The moving pointer is set to the beginning of the original text buffer.

```
while (*pf) putchar(*pf++);
```

The original paragraph, with case preserved, is written to the standard output. As long as the byte pointed to by pf doesn't contain the terminating null, putchar(\*pf++) writes out whatever \*pf contains and increments pf to deal with another byte on the next iteration of this single line while loop. Putchar is a standard library function.

```
putchar('\n');
```

A blank line is tacked onto the end of the output here in case more paragraphs are matched and written. That way, they'll still look like separate paragraphs in the output.

```
/*      cutpar.c      read from standard input, find paragraphs that
 *                  contain search string supplied on command line
 *                  and write them to the standard output.
 *                  (cutpar ignores case)
 *
 *                  typical use:
 *
 *                  cutpar <infile >outfile "search string"
 *
 *                  if the search string contains no white space, quotes
 *                  are not needed.
 */
#include <stdio.h>      /* may or may not be needed on your system */
/* in any case, be sure EOF (end of file) */
/* is defined for your system */

#define PBSIZE 16384    /* 16K in paragraph buffers */

main(argc, argv)
int argc;
char *argv[];
{
    char *parbuf;      /* pointer to paragraph buffer */
    char *pf;          /* moving pointer to fill buffer */
    char *bufup;       /* upper case buffer */
    char *pu;          /* and its moving pointer */

    if (argc != 2) exit(0);

    parbuf = sbrk(PBSIZE);
    bufup = sbrk(PBSIZE);

    while (1) {
        pf = parbuf;
        pu = bufup;
        while (1) {
            if ((*pf = getchar()) == EOF) exit(0);
            *pu = toupper(*pf);
            if (*pu == '\n') *pu = ' ';
            if (*pf == '\n' && *(pf - 1) == '\n') break;
            ++pf;
            ++pu;
        }
    }
}
```

The first of these three right braces closes the compound statement following that last if test. The middle brace ends the outer while loop, and the bottom brace is the end of the program.

When compiled, assembled and linked, the resulting executable program is two kilobytes in size — not large at all. If yours is not that small, don't worry about it. It probably just means your system is bigger than mine and whoever wrote your compiler figured you could afford more overhead. \*

~~~~~  
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# A Bootable EPROM Disk for the H-100

## Part 2

**Robert F. Hassard**

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This is the second of a three part series on construction and installation of an EPROM Board that is bootable. In the first part, I discussed the construction and initial test of the board. This part will cover the software necessary to make it work. And the last part will cover the modification of the H-100 System ROM so that it will boot automatically.

With respect to the software, the main idea is to populate the board. This will be done using a modified MDISK, loading that disk with the desired files, then transferring the entire MDISK to a floppy file, and finally transferring that file into eight EPROMs. Since the first file that goes in is IO.SYS, we will first cover the modification of IO.SYS which is required so that the system will be able to read the EPROM board.

You probably already know that modifying IO.SYS is no picnic. In this project, we will have to create a new device driver to be named BEDISK.ASM. In addition, we must modify BDSKTB.ASM, BDSK.ASM, DSK.ASM, DEFDSK.ASM, BBLKDEV.ASM, and INIT.ASM. The procedure for

modifying BIOS, which is described in the manuals, requires a hard disk to hold all of the required files. So I will outline a procedure that will work with floppies.

To start out, format eight blank disks, using FORMAT/9/S. As you format these, name them IOBSE, IO1, IO2, IO3, IO4, IOLINK, REVIO, and IOMMDISK. There will be room on these disks if you want to include some of your favorite utilities, such as CHKDSK, D, and SEE. Also, you may like to have PRINT on IOBSE.

Refer to Figure 1 and copy all of the listed files to the appropriate disk. Of course, you must have the Programmers' Utility Pack to do this. It might be best to copy directly from your backups of the distribution disks. Be sure to get every single file, or else you will have trouble assembling.

We will start out by modifying DEFDSK.ASM. Using disk IOBSE, type the command BSE DEFDSK.ASM. There are only two changes to make — both are additions. First find MAXDSKW and immediately after it insert:

```
MAXDSKB EQU 9 ; Maximum BEDISK (8)
```

Now find DSK\_TZ217, and immediately after it insert:

```
DSK_TBED EQU DSK_TZ217+1 ; BEDISK
```

Copy the modified DEFDSK.ASM to disks IO1, IO2, IO3, & IO4.

The second step will be to modify BBLKDEV.ASM. Use disk IOBSE. Call up BSE and follow the instructions contained in Figure 2.

The third step will be to create BEDISK.ASM. To do this, we will use a framework of BDSK217.ASM combined with DSK217.ASM. By using this framework we can be certain that the result is compatible with all the other files and procedures. This may seem like a long way around, but the advantage is that it provides a base for understanding.

Using IOBSE, combine BDSK217.ASM and DSK217.ASM by means of the command:

```
COPY BDSK217.ASM+DSK217.ASM BEDISK.ASM
```

To conserve space on the disk, delete BDSK217.ASM and DSK217.ASM. Next,

Figure 1

IO1	IO2	IO3	IO4
MASM.EXE	MASM.EXE	MASM.EXE	MASM.EXE
BIOS.ASM	BCLOCK.ASM	BDSK217.ASM	BFL.ASM
PBE.ASM	BDSK207.ASM	DSK217.ASM	PARMS.ASM
BDEV.ASM	DSK207.ASM	BCHR.ASM	VER.ASM
BCHRDEV.ASM	PARMS.ASM	PARMS.ASM	DEFASCII.ASM
PARMS.ASM	DEFASCII.ASM	DEFASCII.ASM	DEFCHR.ASM
VER.ASM	DEFCHR.ASM	DEFCHR.ASM	DEFCONFG.ASM
DEFASCII.ASM	DEFCONFG.ASM	DEFCONFG.ASM	DEFDOSI.ASM
DEFCHR.ASM	DEFDEV.ASM	DEFDEV.ASM	DEFDIR.ASM
DEFCONFG.ASM	DEFDOSI.ASM	DEFDOSI.ASM	DEFEP2.ASM
DEFDEV.ASM	DEFEVN.ASM	DEFEP2.ASM	DEFFMT.ASM
DEFDOSI.ASM	DEFIPAGE.ASM	DEFEVN.ASM	DEFIPAGE.ASM
DEFFMT.ASM	DEF8253.ASM	DEVIPAGE.ASM	DEFMS.ASM
DEFIPAGE.ASM	DEF8259A.ASM	DEFMTR.ASM	DEFMTR.ASM
DEFMS.ASM	DEFSBC.ASM	DEF6821.ASM	DEF6821.ASM
DEFMTR.ASM	DEFZ207.ASM	DEF6845.ASM	DEF8253.ASM
DEFSBC.ASM	DEFZ217.ASM	DEF8259A.ASM	DEF8259A.ASM
DEF6821.ASM	MACLIB.ASM	DEFSBC.ASM	DEFSBC.ASM
DEF8259A.ASM		DEFZ207.ASM	DEFZ207.ASM
DEFZ207.ASM		DEFZ217.ASM	DEFZ217.ASM
DEFZ217.ASM		MACLIB.ASM	MACLIB.ASM
MACLIB.ASM		BCHRIO.ASM	

IOBSE	IOLINK	REVIO	IOMMDISK
BSE.EXE	LINK.EXE	ATTRIB.COM	DEBUG.COM
BBLKDEV.ASM	EXE2BIN.EXE	(or)	LINK.EXE
BDSKTB.ASM	SYSINIT.OBJ	FLAGS.COM	EXE2BIN.EXE
BINIT.ASM	SYSIMES.OBJ	CONFIGUR.COM	CHKDSK.COM
BDSK.ASM		DEBUG.COM	FC.EXE
DSK.ASM		DAE.COM	
DEFDSK.ASM			
BDSK217.ASM			
DSK217.ASM			
BIOSL			
MDISK.ASM			

refer to Figure 3 for instructions for modifying BEDISK.ASM into the desired result.

The fourth modification will be to BDSKTB.ASM. Using disk IOBSE and BSE call up BDSKTB.ASM. We will add a ninth table to be called DISK8. But first make an entry following "LAST MODIFIED:" as follows:

```
; MODIFIED (date) to support BEDISK
```

Drop down approximately 27 lines to DW OFFSET DISK7, and immediately following it insert:

```
DW OFFSET DISK8
```

Using the F4 key, copy table DISK0 into Text Register A. There are 56 lines in the table. Be sure to get them all.

Move to the very end of BDSKTB and with the F5 key add Text Register A to the end (preceded by a blank line).

Next, use the F7 and F8 keys to change every occurrence of DISK0 (in the new table just created) to DISK8.

Finally, revise the following data:

```
DSK_TYPE IS DSK_TBED ; BEDISK
```

Everything down to, but NOT including DSK\_BPS, should be changed to: DB 0. DSK\_BPS should remain as DW 512.

Change everything from there to DSK\_DELAY to: DW 0. Change both DSK\_DELAY and DSK\_LDELAY to 4 DSK\_PORT is changed to 00CEH.

The next two are DB 0, and then a DW 4. Change DSK\_NAME to 'I'. Now copy the modified BDSKTB.ASM to disk IO2.

The fifth step is to modify DSK.ASM. Again, use disk IOBSE. This will be a simple modification, designed to cause a

jump to BEDISK. Use BSE to call up DSK.ASM.

17 lines from the end, find the remark:

```
; Check if drive type valid
```

Immediately after this remark, add a blank line and then the following four lines:

```
CMP BYTE PTR DSK_TYPE[SI],DSK_TBED ; BEDISK?
JNE D0D2 ; Nope
JMP NEAR PTR BEDISK ; Yes, dispatch it
D0D2:
```

That's all there is to it? No, it isn't! We must also modify BDSK.ASM. So again using BSE, call up BDSK.ASM. Find the long list of Externals. The last one is:

```
EXTRN DISK_FUN:BYTE
```

Immediately ahead of this line, insert the following line:

```
EXTRN BEDISK:NEAR
```

Now we can proceed. Copy both BDSK.ASM and DSK.ASM to disk IO2. Using disk IO2 and MASM, assemble just BDSK. With such simple changes, you should have no errors on the first try.

The sixth and final modification is to BINIT.ASM. For instructions for modifying BINIT refer to Figure 4.

After the above files were created or revised, they should have been copied to other disks as follows:

```
DEFDSK.ASM to IO1, IO2, IO3, AND IO4
BEDISK.ASM to IO3
BDSKTB.ASM to IO2
BBLKDEV.ASM to IO1
BDSK.ASM to IO2
DSK.ASM to IO2
BINIT.ASM to IO4
```

The next step is to assemble the ASM files using MASM. The files marked with an \* should already have been assembled. On IO1 run MASM for BIOS, PBE, BDEV, BBLKDEV\*, and BCHRDEV. On IO2 run MASM for BCLOCK, BDSK\*, and BDSK207. On IO3 run MASM for BDSK217, BEDISK\*, and BCHR. On IO4 run MASM for BFL, and BINIT\*.

When running MASM enter ; on the line for LST files so as to skip it and all else. Place IOLINK in drive B: and as you finish all of the assemblies on each disk use the command COPY \*.OBJ B: so as to move all of the assembled OBJ files onto the LINK disk. Repeat this process with IO2, IO3, and IO4. You will now have all of the BIOS OBJ files in IOLINK. There is one

**Figure 2**  
**Revisions to BBLKDEV.ASM**

1. Find MIN\_\_SEC. Just ahead of it insert:

```

;      Modified (date) to support BEDISK Board

```

2. Find DSK0\_INIT and on the next line change MAXDSKW to MAXDSKB.

3. Drop down 20 lines to: MOV AL,SRH\_UNIT[BX]. Immediately following add these five lines:

```

      CMP     AL,MAXDSKW      ; Is it BEDISK?
      JNE     DSK0_MCHK2     ; If no, skip
      MOV     CMC_STAT[BX],CMCS_NOC ; Show no media changed
      JMP     DSK0_MCK1      ; and then leave
DSK0_MCHK2:

```

4. Move down 160 lines to the label DSK0\_\_BPB: and then move down to the fifth line of code which is:

```

      MOV     DI,CS:WORD PTR DSK_TPTR[DI]

```

Immediately following that line insert a blank line and then the following two lines:

```

      CMP     BYTE PTR SRH_UNIT[BX],MAXDSKW ; Is it BEDISK?
      JE      DSK0_BED       ; If yes, go do it

```

5. Drop down 18 lines and find:

```

      JMP     NEAR PTR DSK0_BP2

```

Immediately after this add a blank line and then the following three lines:

```

DSK0_BED:
      MOV     SI,OFFSET BPBBED
      JMP     NEAR PTR DSK0_BP2

```

6. Move down 326 lines to the label BPB0. Use the F4 key to transfer all 18 lines of BPB0 to Text Register A. BPB0 is the first table in the BPB tables. Now move to the end of the BPB9 table and following it (just ahead of: DSKPR DB DSKPR\_\_SIZE DUP(?) ) use the F5 key to copy out Text Register A. (Or, if you prefer, copy all 18 lines of BPB0 manually.) Now use the F7 and F8 keys to change all occurrences of BPB0 (in the new table) to BPBBED. The final step is to revise the parameters in BPBBED to the following:

```

BPB_SECSZ  DW  512 (no change)
BPB_SPAU   DB  1 (no change)
BPB_RES    DW  1 (no change)
BPB_NFATS  DB  1
BPB_DIRENTS DW 32
BPB_SECS   DW  256
BPB_MBYTE  DB  0
BPB_FATSECS DW 1 (no change)

```

7. Copy the modified BBLKDEV.ASM to disk IO1. Then assemble it to learn whether you made any mistakes. If yes, retrace the above to find and correct them.

more important thing to do — you must modify BIOSL. Use disk IOBSE and BSE to add "BEDISK+" immediately after "BDSK 217+". Then copy the modified BIOSL to the IOLINK disk.

The proper command to link the files is LINK @BIOSL. If everything has fallen together properly, you will have a BIOS.EXE file. Run EXE2BIN with the command EXE2BIN BIOS BIOS.COM. You will be asked to provide a Base Segment. The required answer is 0040. You need only type in simply 40. This completes the creation of a revised IO.SYS, only it is still named BIOS.COM.

Place REVIO in drive A: and switch to drive A:. Run the ATTRIB file with the command ATTRIB IO.SYS. This will strip all attribute flags from IO.SYS so that it will be visible and can be written over. Copy the revised IO.SYS by using the following command: COPY B:BIOS.COM A:IO.SYS. One important thing to remember about the revised IO.SYS. It will still support all floppy disk operations, as well as the BEDISK Board. However, the old IO.SYS will NOT support the BEDISK Board. One more thing.

If you have applied Pat Swayne's fixes on page 40 of the December 1984 issue of REMark, they are now wiped out, and you will have to do it again. The addresses will have changed, so you will have to search for the code. One final caution, you will have to reconfigur — it is especially important to do this before the revised IO.SYS is copied to the board a little further on.

Be sure to save your old IO.SYS where you can find it, in case you ever want to back out of this whole thing.

If the first byte of the TEST EPROM that is now on your board is 0EBH, and if you reboot REVIO, you should be able to give the command DIR I: and get an intelligent response.

The next step is to load the board. This first requires the preparation of a Modified MDISK. To do this, place IOBSE in drive A: and rename MDISK.ASM to MMDISK. Using this new name is important because you will NOT want to try to use MMDISK for any purpose other than this project. Using BSE.EXE revise MMDISK.ASM as follows:

First at the beginning insert a remark line:

```

; Modified (date) for use in loading a
BEDISK Board

```

**Figure 3**  
**Creation of BEDISK.ASM**

At this point, you have concatenated BDSK217.ASM and DSK217.ASM to form the foundation for BEDISK.ASM. Modifying the foundation BEDISK.ASM to obtain the final BEDISK.ASM will be a long task. We will start at the top and work our way down line-by-line. To help you be sure that you don't miss a change, I will number each step. One thing to keep in mind — we are starting with two ASM files concatenated into one. When we get to the start of the second file, all of the second opening legend will be deleted.

1. Find the TITLE line (14th line down) and change it to:

```
TITLE BEDISK - Driver routine for BEDISK Board
```

If you are using BSE, and you should be, line 25 of your screen will display the line number as Lin: 14/. From here on, we will be using that feature of BSE.

2. Drop down to line 40, which is INCLUDE MACLIB.ASM. Delete that line and the next five lines. You will now have, beginning at line 39:

```
INCLUDE DEFDSK.ASM
```

```
.LIST
```

3. Move to new line 47/ which should be EXTRN DSK\_BUF:NEAR. Delete that line and the next 123 lines through to, but NOT including, BDSK217 PROC NEAR. Change this one line to the following two lines:

```
PUBLIC BEDISK  
BEDISK PROC NEAR
```

4. Move to line 103/ which is the label DSKWFST:. The following three lines are:

```
MOV AX,DSKST_NIERR ; (remark)  
STC ; (remark)  
RET ; (remark)
```

These three lines will be used many times. If you are experienced with BSE, use the F4 key to copy these three lines to Text Register A. WARNING: These three lines must remain following the label DSKWFST:. DON'T use Shift F4.

5. Move to line 124/ which follows the label DSKWFV:. Delete these two lines (124 & 125) and use the F5 key to insert the contents of Text Register A. You should have:

```
DSKWFV: MOV AX,DSKST_NIERR  
STC  
RET
```

If you are afraid to use this procedure (the function keys), then just manually copy from the three lines that follow the label DSKWFST:

6. New line 133/ is: PUBLIC ASSNFLG, ASNFL2. Delete this line and the next four lines (including two blank lines).
7. Line 133/ should now be the label DSKWASN:. Starting with line 134/, delete 226 lines down to, and including, HASH ENDP. Use the F5 key to insert Text Register A (or manually copy the three lines which follow the label DSKWFST:). You should by now be getting the picture that every command is not implemented. This is almost true. Only two commands will actually be implemented: DSKWFRD & DSKWPRD.
8. Move to line 152/ which should be the label DSKWFRD:. Delete the five lines that follow. Following the label DSKWPRD:, delete the first three lines. You should have remaining:

```
DSKWFRD:  
DSKWPRD: JMP SHORT DSKWRDWR
```

9. Move to line 171/, the label DSKWPWR:. Delete the four lines of code that follows and the four lines of code that follows the label DSKWFWR:. You will now have the two labels remaining:

```
DSKWPWR:  
DSKWFWR:
```

Following these two labels, use the F5 key to insert Text Register A (or manually copy the three lines following DSKWFST:).

10. Now down to new line 181/ which is the label DSKWRDWR:. Delete the first line that follows the label and substitute:

```
PUSH DI ; Save registers  
PUSH ES
```

Skip a line down to 185/ and delete 140 lines down to, and including, DSKWRDWR3: You should have remaining:

```
DSKWRDWR: PUSH DI  
PUSH ES  
MOV AX,WORD PTR ES:DSKPR_SECTOR[BX]
```

Immediately following this, insert the following code:

```
XOR CH,CH ; Reset to zero  
MOV CL,BYTE PTR ES:DSKPR_COUNT[BX]  
MOV DX,WORD PTR ES:DSKPR_BUFF+2[BX]  
MOV DI,WORD PTR ES:DSKPR_BUFF[BX]  
MOV ES,DX ; Buffer segment  
MOV DX,WORD PTR DSK_PORT[SI] ; Board address
```

```

        CLD
        PUSH    AX                ; Save logical sect #
        XOR     AL,AL             ; Set to sector 0
        OUT     DX,AL
        IN      AL,DX            ; Get first byte of Board
        CMP     AL,0EBH          ; Is it correct?
        POP     AX                ; Restore logical sect #
        JE      DSKWBRD1         ; If first byte OK, move on
        MOV     AX,DSKST_NDERR    ; Else flag error
        STC
        RET

DSKWBRD1:
        PUSH    CX                ; Save sector count
        OUT     DX,AL             ; Tell Board what sector
        PUSH    AX                ; Save sector #
        MOV     CX,512           ; Sector size

DSKWBRD2:
        IN      AL,DX            ; Get data
        STOSB                    ; Put it into buffer
        LOOP   DSKWBRD2         ; Get entire sector
        POP     AX                ; Restore sector #
        INC     AL                ; Move to next sector
        POP     CX                ; Restore sector count
        LOOP   DSKWBRD1         ; Get all sectors
        POP     ES
        MOV     WORD PTR ES:DSKPR_BUFF[BX],DI
        POP     DI

```

The next two lines should be:

```

        XOR     AX,AX
        RET

```

11. Move to line 280/, ; DSKW\_\_RETRY. Delete 120 lines down to, and including, the line: PFLAG DB 0.

12. Change BDSK217 ENDP to:

```

BEDISK ENDP

```

Add the following two lines:

```

BIOS_SEG      ENDS
               END

```

And that does it. Copy BEDISK.ASM to disk IO3 and assemble it. Correct any errors and reassemble. Repeat until you've got it right.

Figure 5 contains a program named BEDPREP.ASM. The next step is to create this, using BSE.EXE, on the IOBSE disk, assemble it and LINK it. There is sufficient space in IO1, or IO2, or IO3, or IO4 for this purpose, as well as for creating MMDISK.DVD. And IOLINK has lots of room. BEDPREP must be an EXE type file because it contains the LOADER file.

WARNING!!! In the following steps, you must have your original IO.SYS on disk IOMMMDISK because the new modified IO.SYS will conflict with MMDISK at this point. Place disk REVIO which has the new modified IO.SYS in drive B: and copy it from there when ready to do so (or if you have a one disk system, use the appropriate procedure). At this point, MMDISK is drive I:. Later on BEDISK will be drive I:.

Place BEDPREP.EXE on the IOMMMDISK disk. Then boot the IOMMMDISK disk so as to load MMDISK into memory. Now run BEDPREP. You may now load the MMDISK with the files that you want to have in the EPROMs. However, it is very important that IO.SYS be the first file copied to MMDISK (drive I:). Be sure that IO.SYS has been configured. You may want to run CONFIGUR beforehand and make a note of how it was. The next file to copy should be MSDOS.SYS. You may find that you may not copy a hidden file, so use ATTRIB to unhide it. After IO.SYS and MSDOS.SYS have been copied to drive I:, use ATTRIB to hide them: ATTRIB I:\*.SYS RHS. IMPORTANT — IO.SYS MUST be the first file loaded and MSDOS.SYS MUST be the second file loaded.

The header starts at MDISK LABEL NEAR. The last entry is the name, following DVH\_NAME. Change the name to MMDISK\*. Be sure the DB, including the 1, is exactly eight bytes.

In MDISK\_\_BPB change the DW 0 to:

```

DW      1          ; One reserved sector

```

Move down to MD\_\_INIT4: Change MOV AX,MDISK\_\_START to ADD AX,MDISK\_\_START. In front of this changed line and following PUSH ES, insert the following three lines:

```

MOV     AX,MDISK__BPB+BPB_RES
MOV     CX,5          ; *512
SHL     AX,CL

```

Move down a long ways to DRIVE\_\_MSG. In the message, insert an M before MDISK so that it says MMDISK. A short way down

find MD\_\_DIRS. Change the DW 64 to DW 32. The next code is MD\_\_FATSECS LABEL WORD. Change the DW 2 to DW 1.

Some versions of MDISK.ASM have a VOL\_\_LABEL. If yours does, change the volume label to 'MMDISK V1.0'. It must be exactly eleven characters counting the space. You may change the date if you wish, though it is hardly necessary for this one time use.

Now use IO1 to assemble MMDISK (IO1 has the necessary INCLUDE files). Copy MMDISK.OBJ to IOMMMDISK and then LINK it. With EXE2BIN convert it to a DVD file. Using BSE, modify the CONFIG.SYS file on the IOMMMDISK disk to include the following command:

```

DEVICE=MMDISK.DVD SIZE=128 START=8000

```

Now you are ready to load COMMAND.COM, ALTCHAR.SYS, and CONFIG.SYS. Be careful that CONFIG.SYS is compatible with the EPROM Board. You may also want to consider an AUTOEXEC.BAT. If you do, be sure that it is absolutely correct because to change it will be a laborious process.

When loading the remainder of the files of your choice, be mindful that there are a limited number of sectors available, yet you want to use every one of them. CHKDSK will tell you how much space is left. If you try to overload MMDISK, you will get a DISK IS FULL error message. Figure 6 shows the files that I have placed on my board, as well as the contents of AUTOEXEC.BAT and CONFIG.SYS.

The fully loaded MMDISK is to be saved to a file for use in transferring to EPROMs.

**Figure 4**  
**Revisions to BINIT.ASM**

At the outset, just ahead of INCLUDE PARM.SAS, enter:

```
; Modified (date) to support BEDISK Board
```

1. Find BINITC1C: and immediately following it insert these two lines of code:

```
CMP BYTE PTR LDR_HDR+FMT_SEL,0 ; BEDISK Board?
JNE BINITC1CA ; If not, skip message
```

2. The next three lines of instruction code have been nullified by placing semicolons (;) at the extreme left margin. Activate these three lines by removing the left margin semicolons. Important — do not disturb the semicolons that precede the comments.

3. Immediately following the three lines of code activated in step 2. above, insert the following label:

```
BINITC1CA:
```

4. Now drop down to two lines below the label BINITFX: Between MOV AH,AL and CMP AL,-1 insert a new label as follows:

```
BINITFX1:
```

You should now have:

```
MOV AH,AL
BINITFX1:
CMP AL,-1
```

Just ahead of the new label BINITFX1: insert the following four lines:

```
CMP AL,0 ; Boot from BEDISK?
JNE BINITFX1 ; If no, then skip
MOV BYTE PTR BDRIVE,MAXDSKW
JMP SHORT BINITC1H9
```

5. Now we go way down to almost the end to ROMMESGL. Between ROMMESGL and the comment line that follows, insert the following:

```
SMESGL DB CC_CR,CC_LF
DB 'BEDISK is installed as Drive I:'
DB CC_CR,CC_LF
SMESGLB = (OFFSET $) - (OFFSET SMESGL)
```

This completes the modifications to BINIT.ASM. Copy BINIT.ASM to IO4 and then assemble it in order to find out whether there are mistakes. If so, correct them.

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Figure 5

PAGE 60,96  
 TITLE BEDPREP.ASM  
 SUBTTL R. F. Hassard - January 1988

```
; PROGRAM TO PREPARE Bootable EPROM Hard Disk Board
; The Boot LOADER portion of this program is a
; reconstruction of a disassembly of the Boot Loader
; contained on the MS-DOS Distribution Disk.
; For no particular reason I have retained
; its integrity as much as possible. To me some
; of this code is arcana.
; To use this program, a modified MDISK must first
; be activated using DEVICE=MMDISK.DVD SIZE=128 START=8000
; in CONFIG.SYS.
; This program will then prepare the MMDISK for
; copying on desired files and then recording the MMDISK
; onto a disk file for transfer to EPROMs.
; The above is performed by the operator, the
; following is executed by BEDPREP:
; 1. Copy the LOADER into Sector 0
; 2. Prepare the FAT Sector
; 3. Set the DIR Sector to all E5s
; 4. Set all Data Sectors to all E5s
; 5. Reset the first byte of each DIR
;    entry to 0
; 6. Place Disk Label in proper Dir entry.
```

```
IO_SEG SEGMENT AT 0040H
      ORG 0
REL_IO LABEL FAR
IO_SEG ENDS
```

```
LDR_SEG SEGMENT AT 1400H
      ORG 0438H
REL_LDR LABEL FAR
LDR_SEG ENDS
```

```
MTR_SEG SEGMENT AT 0FE01H
      ORG 0019H
MTR_SCRT LABEL FAR
MTR_SEG ENDS
```

```
PSTACK SEGMENT
      DW 100 DUP(?)
STK_TOP LABEL WORD
PSTACK ENDS
```

```
PCODE SEGMENT
      ASSUME CS:PCODE,DS:PCODE,ES:PCODE,SS:PSTACK
      ORG 0
```

```
START: MOV AX,PCODE
      MOV DS,AX
      MOV AX,PSTACK
      MOV SS,AX
      MOV SP,OFFSET STK_TOP
      MOV CX,512 ; Loader size
      MOV AX,8000H ;MDISK Segment address
      MOV ES,AX
      MOV DI,0 ;Start of Sector 0
      MOV SI,OFFSET LOADER
      CLD
      REP MOVSB ;Transfer LOADER
      MOV AL,0F8H ;continue with FAT
      STOSB
      MOV AL,0FFH
      STOSB
      STOSB
      STOSB
      MOV AL,0
      MOV CX,380
      REP STOSB
      MOV AL,0E5H
      MOV CX,129
      REP STOSB
      MOV AX,8040H ;Now E5 rest of board
```

```
MOV ES,AX
MOV DI,0
MOV AX,0E5E5H
MOV CX,07F00H
REP STOSW
MOV AX,9020H
MOV ES,AX
MOV DI,0
MOV AX,0E5E5H
MOV CX,07F00H
REP STOSW
MOV AX,8040H ;Prepare Directory
MOV ES,AX
MOV DI,0
MOV AL,0
MOV CX,32
PREPD: STOSB
      ADD DI,31
      LOOP PREPD
      MOV DI,128
      MOV SI,OFFSET BRD_LABEL
      MOV CX,32
      REP MOVSB
      MOV AX,4C00H ;finished
      INT 21H

BRD_LABEL DB 'EPROM HDISK',8,0,0,0,0,0,0,0
          DB 0,0,0,0,60H,28H,10H,0,0,0,0,0,0

      ORG 0400H

LOADER: JMP BEGIN
FMT_VER DB 2
FMT_SECS DW 512 ;Sector size (bytes)
FMT_CLF DB 1 ;Cluster factor
FMT_NRS DW 1 ;Number of reserved sectors
FMT_FATS DB 1 ;Number of FATs
FMT_DIRS DW 32 ;Number of directory entries
FMT_NPS DW 256 ;Number of physical sectors
FMT_SHFT DB 9 ;Shift count
FMT_SPT DB 9 ;Sectors/Track
FMT_DATA DW 4 ;Data area sector #
FMT_CLST DB 0 ;Shift count
FMT_DIR DW 2 ;Directory area sector #
FMT_FLG DB 8 ;Flag byte, DSK_FLG
FMT_SEL DB 0 ;Select byte, DSK_SEL
FMT_PORT DW 0CEH ;Port address
FMT_DATE DW 108FH ;Apr. 15, 1988
          DB 9,2CH,1CH,63H,0 ;?
FMT_SIZE DB 0

BEGIN: PUSH CS ;Relocate loader
      POP DS
      MOV AX,1400H
      MOV ES,AX
      MOV CX,3C00H
      MOV SI,0400H
      MOV DI,SI
      CLD
      REP MOVSB
      JMP FAR PTR REL_LDR ;Do it

BEGN_AGN:
      MOV AX,CS ;Prepare to load IO.SYS
      MOV DS,AX
      XOR BX,BX
      MOV ES,BX
      MOV ES,ES:0[03FEH] ;Get data segment
      MOV BL,ES:0[9] ;Get port address
      MOV FMT_PORT,BX
      MOV BL,ES:0[005AH] ;Select byte
      OR FMT_SEL,BL
      MOV ES,AX
      MOV AL,8
      OUT 0FCH,AL ;Memory Control Latch
      MOV BX,FMT_DIR
      MOV CL,FMT_SHFT
      SHL BX,CL ;Multiply by sector size
```

```

TEST      JNZ      PTR_FMT_SEL,4
BGN01    CMP      PTR_FMT_CLST,2
JGE      BGN01
CALL     I_P5
TEST     AL,8
JZ       BGN01
NOP
NOP
NOP
NOP
NOP
NOP
NOP
OR
MOV      BYTE_PTR_FMT_FLG,0CH
CX,11
SI,[BX+0400H] ;Locate IO.SYS
DI,OFFSET IOSYS_MSG
CMP      CMPBS
JNZ      BGN02 ;Exit if no match
MOV      AX,[BX+041AH] ;Get start sector
SUB      AX,2
MOV      CL,FMT_CLST
SHL      AX,CL
ADD      AX,FMT_DATA
MOV      LOG_SECT_NR,AX
MOV      AX,[BX+041CH] ;Get file size
MOV      CX,FMT_SECS
DEC      CX
ADD      AX,CX
MOV      CL,FMT_SHFT
SHR      AX,CL
MOV      NR_SECTORS,AX
MOV      BX,OFFSET DATA_SECT
MOV      AL,2
CALL     READ_BOARD
JC       BGN03
MOV      AX,CS
ADD      AX,0040H
MOV      DS,AX
JMP      FAR_PTR_REL_IO
BGN02:   MOV      BX,OFFSET NOSYS_MSG
MOV      CH,13
JMP      SHORT BGN04
BGN03:   MOV      BX,OFFSET ERROR_MSG
MOV      CH,13
MOV      AL,[BX]
PUSH     BX
PUSH     CX
CALL     FAR_PTR_MTR_SCRPT
POP      CX
POP      BX
INC      BX
DEC      CH
JNZ      BGN04
BGN04:   MOV      AL,0
SHORT   BGN05
BGN05:   MOV      DB,'IO SYS'
MOV      DB,'0DH,0AH','No System'

```

;Preserve integrity

```

ERROR_MSG DB 0DH,0AH,'I/O error',0DH,0AH
DATA_SECT DB 0
LOG_SECT_NR DW 0
NR_SECTORS DW 0
NR_SECTORS DW 0
NR_SECTORS DW 0040H

READ_BOARD:
PUSH     ES
MOV      AX,ES:[BX+1] ;Logical sector #
MOV      CX,ES:[BX+3] ;# of sectors
MOV      DX,FMT_PORT
LES      DI,ES:[BX+5] ;starts at 0
CLD
CLI
RBRD1:   OUT      DX,AL ;Set sector address
PUSH     CX
PUSH     AX
MOV      CX,FMT_SECS ;Get data
IN       AL,DX ;Store it
LOOP     RBRD2 ;Do entire sector
POP      AX ;Move to next sector
INC      AL
POP      CX
LOOP     RBRD1 ;Do all sectors
POP      ES
CLC
RET
DB 0FFH,0FFH
;This program requires that the same
;Port Address be used as on the Pseudo
;Bootable Hard Disk board, as in the
;BIOS revision, and as in the Monitor
;revision.
DB 36 DUP(0FFH)
PCODE   ENDS
END      START

```

With my DUMBURNER, only one long file is required. The DUMBURNER software tells me when to remove an EPROM and put the next one in. However, on the third EPROM I ran into trouble, which meant that I had to go back to square one. So I recommend an alternate method using eight 16Kbyte files using eight names such as: BEDU0.DOC, BEDU1.DOC, BEDU2.DOC, etc. DEBUG is used to save to disk. Call up DEBUG and proceed as follows:

Use the R command to revise BX to 0000 and CX to 4000. Use the Name command to give the file a name. e.g., -NBEDU0.DOC. There should be ample room on IOMMDISK for all eight files.

Use the Write command as follows: -W8000:0. MMDISK will now be transferred to a disk file. The successive Write commands will be as follows:

```

-W8000:0 for U0
-W8400:0 for U1
-W8800:0 for U2
-W8C00:0 for U3
-W9000:0 for U4
-W9400:0 for U5
-W9800:0 for U6
-W9C00:0 for U7

```



After burning the EPROMs, install them and cross your fingers. You may use DAE.COM or BEDDMP from the first part of this article to examine the contents of the Board. But to BOOT it requires one more EPROM. A modification of the H-100 monitor. This will be covered in the last article of this series. In the meantime, boot a disk with the modified IO.SYS and type DIR I:. If that works, then try running one of the programs on the BEDISK. If they work, your board works.

You may still use the normal MDISK with BEDISK. However, you must place it and the appropriate CONFIG.SYS on a floppy disk which has the new modified IO.SYS. You will have to use manual Boot to boot this disk. When you do, MDISK will be installed as Drive J:.

One more thought. If you do NOT have a hard disk, you may shorten the modified IO.SYS significantly by disabling the DSK-217 driver. It is not necessary to do this, but if you do want to do it, here's how. Using BSE, modify BDSK217.ASM as follows:

Near the end of the BDSK217 find the following line:

```
INCLUDE DSK217.ASM
```

Disable this line by placing a semicolon at the left margin so that you have:

```
; INCLUDE DSK217.ASM
```

Now insert the following four lines immediately after the above disabled line:

```
BDSK217:
      MOV     AX,DSKST_NIERR
      STC
      RET
```

The next line will be:

```
BDSK217 ENDP
```

Following that insert:

```
      PUBLIC ASSNFLG,ASNFL2
ASSNFLG DB      0
ASNFL2  DB      0
```

This completes the software presentation for your BEDISK Board. In the final part

of this series I will cover the revision of the H-100 Monitor, which is necessary in order to be able to have an automatic boot. In the meantime, you may use your board at any time for access to your favorite programs, provided that the floppy disk which you are calling from contains the revised IO.SYS. Sometimes, immediately after using the new IO.SYS, a cold BOOT will give you an error message and the monitor HAND prompt. Not to worry, Press B, then press F1, then press RETURN and the BOOT will proceed. \*

.....  
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 .....

Figure 6  
Contents of BEDISK Board

IO	SYS	Hidden file	
MSDOS	SYS	Hidden file	
ALTCHAR	SYS	Hidden file	
CONFIG	SYS	34	
AUTOEXEC	BAT	91	
COMMAND	COM	16421	
D	COM	5439	885-8046
SEE	COM	3399	885-3014
GC1000	COM	750	
SCRNCLK	COM	439	885-3014
SIGNON	COM	954	
ZPC	COM	16275	885-3037
PC	COM	511	885-3037
Z100	COM	39	885-3037
CHKDSK	COM	6468	
PRINT	COM	6288	
TYPERS	COM	762	885-3025
ATTRIB	COM	669	885-3025
DEBUG	COM	12474	
DUMP	EXE	11136	
DAE	COM	9197	Computech
SYS	COM	922	

```
AUTOEXEC.BAT          CONFIG.SYS

VERIFY ON              BUFFERS=15
PATH I:\;A:\;B:\      FILES=10
SET COMSPEC=I:\COMMAND.COM  BREAK=ON
GC1000
SCRNCLK
SIGNON
D
A:
```

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LQ-2550,	132 Col,	500/167cps	\$1099

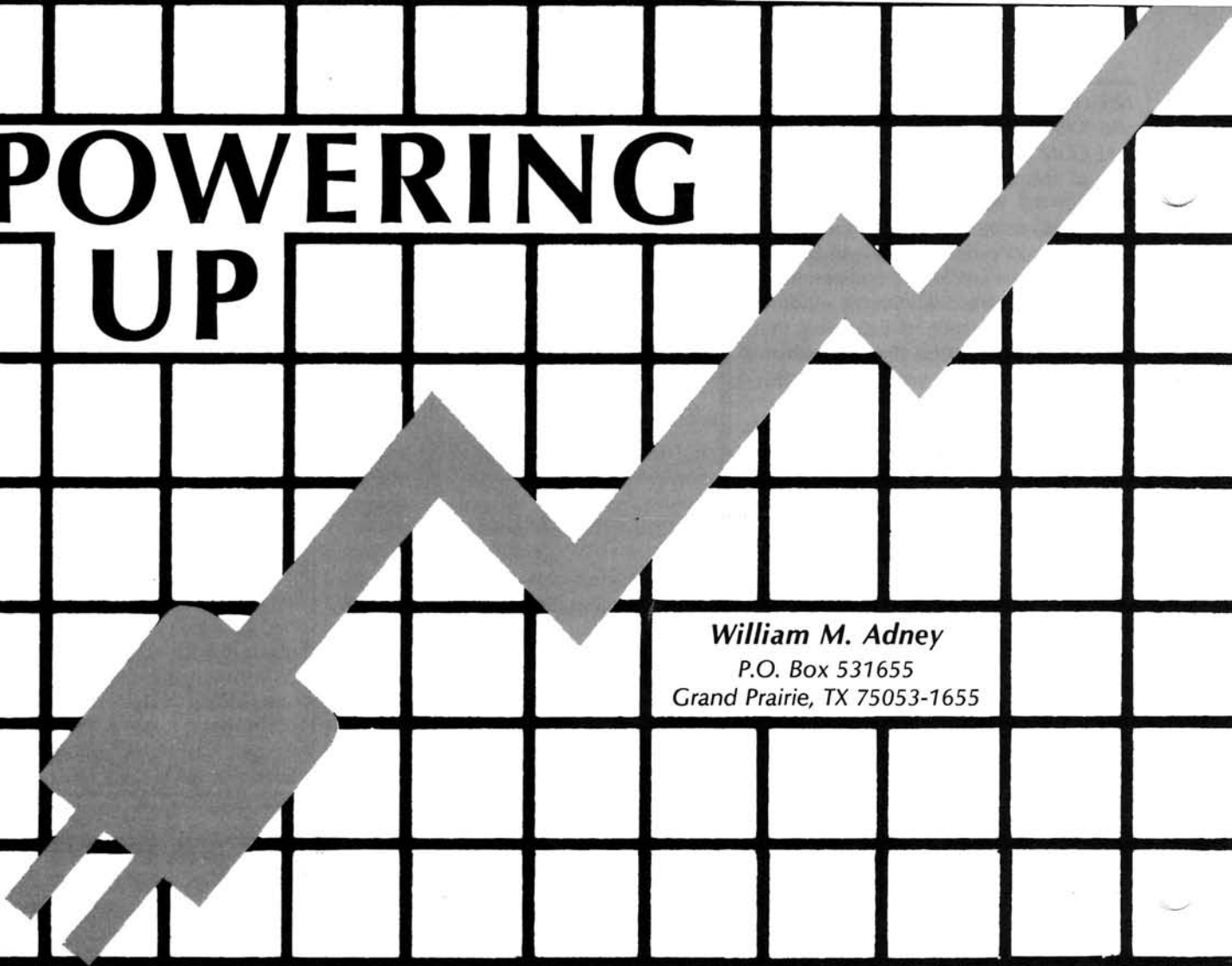
### High Speed Data Processing Printer

DFX-5000,	9Pin,	132Col,	533/80cps	\$1845
-----------	-------	---------	-----------	--------



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# POWERING UP



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

## Connecting Peripherals to Your Computer

Getting a new peripheral — a printer, modem or mouse — connected to and working with your computer can be a trying experience for both new and experienced computer users. There are an incredible number of connectors, cables, ports, and other hardware details that you must know in order to get the peripheral working correctly. And of course you must also know some of the software tricks required to get the new peripheral working properly. In this article, you will see how to use both hardware and software tricks to get a peripheral up and running on your system.

Before we get too involved in the hardware and software strategies, we need to understand some of the common terms

and terminology that you will see during the process of getting the peripheral to work.

### Definitions and Terminology

First of all, we need to know that a PERIPHERAL is a general term that includes the input, output, and data storage devices (i.e., hardware) which are directly connected to the computer. This includes printers, modems, plotters, disk drives, tape drives, and other system-related hardware. From a technical perspective, this definition also includes the CRT display, the keyboard, and additional (i.e., add-on) system memory; but these items are customarily considered part of the "system" in a microcomputer. Similarly,

disk drives are also considered part of the system since they are normally enclosed in the system unit. For purposes of this article, we will use the term "peripheral" to mean something that is plugged into a serial or parallel port that typically is found on the back of the system unit box.

What is a port? A PORT is just a special communications "connection" (called an address) that a computer uses to read from or write to system hardware. Your computer "talks" to the keyboard, CRT, disk drives, printers, and other system hardware by using a port address. Your computer has special kinds of ports that are used for specific purposes. In general, there are three kinds of ports.

The port associated with the keyboard is usually thought of as an Input port because the computer READS data from the keyboard and converts it to characters that you see on the CRT display. Similarly, the port associated with the CRT is considered an Output port because the computer WRITES data to the display. And the port associated with the disk drives is considered an Input/Output (I/O) port because the computer can READ data from and WRITE data to a disk. The specific characteristics for each type of port — input, output, and I/O — are essential to an understanding of peripheral connections and are the foundation for the successful use of I/O Redirection that will be discussed in the next article.

Although a port is technically defined as an “address” for computer purposes, it is much easier to think of a port as a physical connection to the computer. For our purposes, a port can be physically found in the form of those strange looking plugs, or connectors, on the back of your computer. Ports come in all kinds of shapes and sizes. For example, the keyboard port on a standard PC compatible computer is a round, 5-pin connector. You will also have at least one (possibly two) video ports, each of which has a different kind of connector which is used for various kinds of CRT displays. For the most part, you will not need a detailed knowledge of these ports, but you should be aware that they exist.

Before we leave the discussion of ports, there is one other thing that you need to know about them. Sometimes you will want to add new hardware to your system that plugs directly into the main board (called the motherboard) inside your computer. This may include something like an “internal” modem or a “bus” mouse. Although these internal units have some advantages, each must be installed according to the manufacturer’s directions, and there are so many differences in these units that it is nearly impossible to cover all possible situations. We will discuss some of the more important aspects of installing these internal units later in this article. For now, we will assume that you have a more common external peripheral — a printer or a modem — that you want to connect to your system, and there is one other thing you must know.

### Serial and Parallel Ports

When you buy some peripherals, particularly a printer, you need to know whether

you want a serial or parallel unit. In many cases, you can buy a printer that has both a serial and a parallel connection, but it seems to be more common that you must make a choice between a serial or parallel unit. Which kind of “connection” (usually called an interface) should you buy?

When you have a choice, I usually recommend a parallel printer for at least the reason that it is less expensive than a serial printer or one that has both types of connections. Another good reason for buying a parallel printer is to keep the serial port available for other peripherals that generally are only available for a serial port — such as a mouse or a modem. Now let’s take a look at the differences between parallel and serial ports.

A PARALLEL PORT or device transmits or receives the bits that make up a “character” (byte) simultaneously or in parallel. For our purposes, remember that a byte (i.e., character) is made up of 8 bits (pieces). Therefore, 8 bits comprising a character are transmitted on 8 separate physical “lines” from the computer to the peripheral (e.g., a printer). The bits comprising each character flow through the lines in parallel so that all eight bits for each character arrive at the printer at the same time.

Most common printers are connected to the parallel port in a computer, and that is one reason it is a good idea to have a general understanding of what is happening. Parallel ports are usually referred to as LPT followed by a number. The LPT is an abbreviation for the term “Line Printer” which is typically connected to a parallel port. Since most computers only have a single parallel port, it is normally identified as LPT1. Other peripherals, such as a modem, are normally connected to a serial port.

A SERIAL PORT or device transmits or receives a “character” sequentially or serially on a single line. That is, each character (8 bits) is transmitted bit-by-bit in a series on the connecting line. One character follows another in groups of 8 bits. Because each character is transmitted one-by-one on a single line, the receiving device must be capable of receiving the characters at the same speed they are transmitted by the computer.

Because of this type of transmission, serial devices may generally not be able to send or receive data as fast as a similar parallel device. Serial ports are usually referred to

as COM followed by a number. COM is an abbreviation for the term “Communications” and is easy to remember if you know that a modem is typically connected to a serial port. Since most of today’s computers only have a single serial port, it is normally identified as COM1. You can add additional serial or parallel ports (e.g., COM2 or LPT2) by getting a special card for your system that has those ports.

The speed of transmission on a serial line is usually (but inaccurately) called baud rate — a better description is really Bits Per Second (BPS). Common baud rates for many serial devices range from 300 to 2400 baud (or bits per second). In order to successfully use many serial devices, you must make sure that your computer is sending at the proper baud rate for that printer, mouse, modem or other device. Failure to be sure of this will probably result in your printing garbage on a printer, and we’ll look at some commands that will help you set up your system later.

The original IBM PC only had one standard port — a parallel port that was normally used for a printer. If you wanted to use a serial port, you had to buy an optional card — called an Asynchronous Communications Adapter — for use with a mouse or modem. Most of today’s computers have two connectors on the back of the system unit: one is a parallel port and the other is a serial port. In most cases, these connectors are shaped like the letter “D” and are called D-connectors.

### The Physical Connectors

Photo 1 shows the back panel of a Z-200 system. In the middle of the photo, notice that there are two D-shaped connectors. The top one is a 9-pin connector, usually called a DB-9, that is defined as the serial port. The bottom is a 25-pin connector, usually called a DB-25, that is used for the parallel port.



Photo 1  
Z-200 Back Panel

As you can see, there are four panels that are "used" on the back of my Z-200. From left to right, the first is the I/O card with the serial and parallel port connectors. Then there is a Vega EGA card, an Imager card (for tape backup to a VCR), and a hardware reset switch that Jim Buszkiewicz described in a REMark article some time ago.

Although it is easy to differentiate the serial from the parallel port on the Z-200 system because of the connector sizes, some computers have two DB-25 connectors. If you have this situation, it is best to refer to your computer hardware or operator's manual to figure out which connector is serial and which is parallel. You may also need to know whether you need a male or female connector for the connection to the back of your computer.

If you carefully examine the I/O board's connectors in Photo 1, you will be able to see that the top connector (the DB-9 serial port) has some male pins that "plug into" a corresponding size female socket. The bottom connector (the DB-25 parallel port) is a female socket for a corresponding size male connector. Before you buy a peripheral, you should make a note of which connector (and its size) you have for the serial or parallel port on the back of your computer in case the dealer is not familiar with your exact system.

In this instance, the DB-9 serial connector on the back of the computer is a male so we need a DB-9 female on the computer end of the cable. The other end of the serial cable should have a connector that corresponds to the proper size (usually a DB-25) and type (i.e., male or female) for the peripheral, such as a modem.

On the other hand, the DB-25 parallel connector is a female so we need a DB-25 male on the computer end of the cable. As before, the other end of the parallel cable should have a connector that can be connected to the printer.

### Cables and Peripherals

If you are not interested in the electrical details for all of the different kinds of cables that are available, I strongly recommend that you buy a ready-made cable whenever you buy a peripheral, such as a printer or a modem. Most computer dealers stock standard cables for the peripherals they sell, and you will generally not have problems if you get the appropriate cable for your computer when you buy

the peripheral. Unfortunately, you may still find a few sales people in some computer stores — particularly discount outlets — who are not familiar with your specific computer or the cable requirements of the peripheral that you buy.

If you find yourself in this situation, you will need to know a lot more about cables and connectors. Do you want a shielded or unshielded cable? How long a cable do you need? Do you want a serial or parallel cable — that is, do you want a 9-wire or 25-wire cable? What kind of connector do you need for each end: DB-9, DB-25 or Centronics? Is it a printer cable or a modem cable? And if you cannot find the exact cable you need, what other options do you have? Let's take a look at some of these details and options.

### Shielded Versus Unshielded Cable

Shielded cable is slightly more expensive than unshielded cable, but I always recommend using it. Remember that a cable is used to send electrical signals to the peripheral; and a long, unshielded cable can act like a transmitting antenna for these signals. This can cause various kinds of interference that produce problems in radio (e.g., "static") or television reception (e.g., "snow"). Although this may not seem to be particularly important to you, a neighbor may have a radio or TV problem caused by you, and the Federal Communications Commission (FCC) can actually give you a "ticket" and require you to correct the interference problem. This kind of problem is usually referred to as Radio Frequency Interference (RFI). By the way, it is interesting to note that virtually all microcomputers and their peripherals must have some kind of FCC testing and certification that they meet a certain RFI standard before they can be sold. Oddly enough, there is no similar requirement for cables. But there is a better reason that applies to you on a more personal level.

A long, unshielded cable can act as both a transmitting antenna, as well as a RECEIVING antenna. In other words, that cable can receive unwanted signals from external sources, such as any electrical motor on a refrigerator or air conditioner. And these unwanted, external signals can be strong enough to disrupt the existing signals in your cable to the extent that a printer may print garbage. Although this is admittedly an extreme case that does not often happen, I know of one situation where a nearby electrical arc welder gen-

erated such strong interference that a printer always printed garbage until a shielded cable was installed.

Although the cost of shielded cable may be about 10% more than unshielded cable, I think it is well worth the cost. It helps prevent, or at least minimize, problems with external signals interfering with your system, and you won't be causing interference with a neighbor's radio or TV either.

### Cable Types

There are generally two types of cable you can find: ribbon cable and regular (i.e., round) cable. Ribbon cable is the flat kind, usually gray in color, that is used to connect disk drives inside your computer. Since the wires in the ribbon cable are shielded by the metal in the computer case, there is no problem with interference.

While ribbon cable is quite adequate for connections inside a shielded metal case, I do not recommend using them for any external peripheral connections because of the lack of shielding. The flat construction of this cable makes it even more vulnerable to the various kinds of interference previously discussed.

I strongly recommend using the round cable for connecting external peripherals to your computer because even unshielded round cable is better than the ribbon cable in terms of interference problems.

### Cable Length

How long a cable do you need? The best advice is to keep the cable as short as possible because longer cables reduce the magnitude of the electrical signals because they have to travel further. Moreover, shorter cables reduce the "antenna" length so that any potential interference problems are minimized, if not eliminated.

How long is too long? I have successfully used cables of nearly 25 feet for a serial unit. I currently use 10 foot cables for my parallel printers with no problems although I have seen a recommendation that a parallel cable should be no longer than 6 feet. In all cases, I use high-quality shielded cable for the connections, but you can help avoid potential problems by using short cables. Shorter cables are less expensive too.

There is one trick in selecting the cable length that can save you some money in the long run — that is, buy a short (e.g., 3-5 foot) cable with the appropriate number of wires and connectors (for the peripheral and the computer) on each end. Since you may need a longer cable for your system, then buy a complete 25-wire “extension” cable (e.g., 10 foot) with a male and female. The money-saving advantage is that you can use the extension cable for both serial and parallel devices.

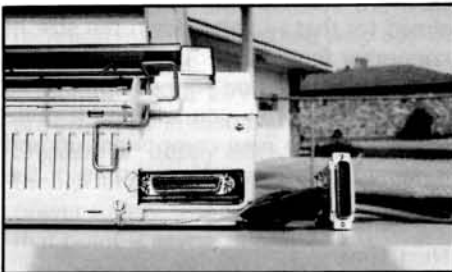
### 9- or 25-Wire Cable

How many wires you need in a cable depends on whether you are going to use it to connect a serial or parallel device to your computer. In virtually all cases, a 9-wire cable is totally adequate to connect just about any serial device — a mouse, modem or whatever — to a PC compatible computer. When you need a serial cable, all you need is a 9-wire cable that has the appropriate size (i.e., DB-9 or DB-25) and type (i.e., male or female) on each end. Cables for connecting parallel devices are different.

Most parallel devices that you want to connect to your computer require an absolute minimum of 18 wires (including ground but not the shield), so you will generally find standard parallel cables that contain 20 wires or 25 wires. Given a choice, I usually buy the 25-wire cables in case I want to change the connectors, but it really does not matter unless you think you might want to modify the cable. Now let’s take a more detailed look at the various kinds of connectors that you will probably find.

### Cable Connectors

Although there are various ways of dealing with the connector problem, your best bet is to buy a standard cable with exactly the right type and size connectors for your system and peripheral. Let’s take



**Photo 2**  
Parallel Printer with  
Centronics Connector

a look at some of the possible configurations that you may need.

If you buy a printer that requires a parallel connection, you will need to have a matching cable as shown in Photo 2.

The cable connector closest to the printer is the standard 36-pin Centronics male plug that is typically used on this kind of parallel device. Notice the male DB-25 connector that plugs into the corresponding socket on the back of the Z-200 shown in Photo 1.

Connecting a serial device to a Z-200 to the DB-9 connector can be a little tricky because of the size difference, but most computer stores sell a short cable that can be used to “convert” the DB-9 size to a standard DB-25 connector as shown in Photo 3.



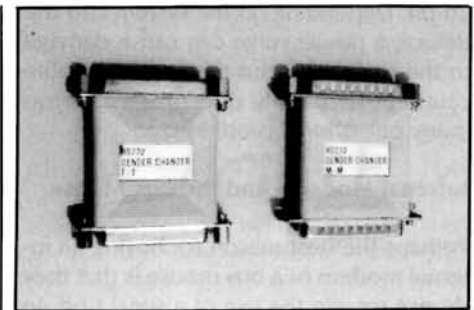
**Photo 3**  
DB-9 to DB-25 Cable for Z-200

The small DB-9 connector is a female so that it can be plugged into the serial port on the back of the Z-200 as shown in Photo 1. The DB-25 male connector can then be plugged into the corresponding connector from the peripheral. Notice that not all pins have been inserted on the DB-25 connector. This is typical for a serial cable because only a maximum of 9 pins are required for a serial device.

Although it is easy to identify the serial and parallel port connections on a Z-200 computer, you may have a computer that has the DB-25 connectors for both the serial and parallel ports. In that case, refer to your operations manual to determine which is which.

If you have been looking closely at these photographs, you will note that the Z-200’s serial adapter cable has a DB-25-male connector and the I/O board’s parallel port has a DB-25 female connector. But when you try to connect various peripherals to your system, or when you get a new system, Adney’s Adage states that you will end up trying to connect two male or two female DB-25s. What to do?

Fortunately, you can buy a special connector — called a gender changer — as shown in Photo 4.



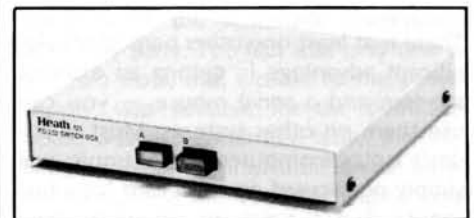
**Photo 4**  
Gender Changers

These connectors have two male DB-25 connectors or two female DB-25 connectors that easily solve the cable problem. Although you can also buy cables with the same kind of connectors at each end, a gender changer is cheaper and it keeps the total cable length shorter.

Most of these ideas will help you solve the problem of physically connecting a device to your system, but sometimes you will find that you need to connect two devices to a single port, such as a modem and a mouse. You could buy a card for your computer with a second serial port, but there is a less expensive way.

### A-B Boxes

Photo 5 shows a typical A-B box that can be used to connect two devices to a single port on your system.



**Photo 5**  
Typical A-B Box

On the back of the A-B box, there are usually three DB-25 connectors — one for the connection to the computer, one for the “A” connection (e.g., a mouse), and one for the “B” connection (e.g., a modem). If you look around, you can find A-B boxes that will allow as many as four devices to be connected to a single port on your computer.

If you need an A-B box, a couple of words of advice are in order. First, be sure that it will switch ALL 25 lines — some only are intended to switch 9 lines on a serial port. And second, be sure to only switch the lines when both the computer and the connected device (e.g., modem) are turn-

ed off. Depending on the system and the device, a power surge can cause damage to the peripheral, but this is a reasonable caution that usually does not cause too many operational problems.

### Internal Modems and the Bus Mouse

Perhaps the best reason for buying an internal modem or a bus mouse is that they do not require the use of a serial port. In general, an internal modem card that plugs into the PC's motherboard is less expensive since it uses the computer's power supply. And a bus mouse is usually more expensive than a serial mouse because of the extra card required. If you are considering buying one of these peripherals, I recommend that you consider getting an external modem and a serial mouse.

Perhaps the most important reason for that recommendation is that an external modem and a serial mouse are the easiest to connect to the system. When I say the easiest to connect, I mean that you don't have to have a lot of technical knowledge to successfully get them working on your system. If you select an internal modem or a bus mouse, you may need to become familiar with the mysterious hardware feature called IRQs (Interrupt Requests), and this can be a trying experience in attempting to troubleshoot a problem when something doesn't work.

There is at least one other particularly significant advantage in getting an external modem and a serial mouse — you can use them on other systems. Most of today's laptop computers, for example, will simply not accept an extra card for a bus mouse, but a serial mouse works fine. And an external modem can generally be connected to ANY computer system, including a laptop, but an internal modem will generally only work with one general type of computer. For example, an internal modem that works in a PC compatible computer cannot be used in the IBM PS/2 computer systems.

For that reason, an external modem and a serial mouse will generally save you money in the long run, especially if you decide to get another computer. I have used my external modem with five different computer systems: an H-89, a Z-100, a Z-200, a Z-386, and a Z-171. And I can switch the serial mouse to three systems: the Z-200, Z-386, and the Z-171. The only real disadvantage of using an external modem and a serial mouse is that you will probably

want to get an A-B box to connect them to a single serial port. Now that you know all about the various kinds of hardware cables and configurations, we need to look at some commands you need to know to make peripherals work properly.

### The CONFIGUR Command

In order to help you set up your system with various peripherals, Zenith has included the CONFIGUR command in all current MS-DOS releases. CONFIGUR is an external command that helps you set up the parallel and serial ports in your system. It is menu-driven so that it will prompt you for any information needed to set up the configuration.

Current versions of Zenith MS-DOS are already set up at the factory to work correctly with a parallel printer. In general, you will probably not need the CONFIGUR command to set up a modem because many of the communications packages provide their own setup commands as part of the installation. But if you have a serial printer, you will need to check your printer manual for the information required to run the CONFIGUR command.

Now that all the the physical connections have been made, and CONFIGUR has been set up for a serial printer if necessary, the next thing to do is see if the printer works.

### The PRINT Command

PRINT is an external command that is only used to print ASCII files on the system printer. It is important to note that this command may not work correctly if you attempt to use it to print files created by many word processors and virtually all spreadsheets. If the TYPE command correctly displays a file on the CRT, then the PRINT command will probably print the file correctly on your printer. The basic syntax for the PRINT command is shown in Figure 1.

```
PRINT [d:][\path]atn[/p]
PRINT/T
```

**Figure 1**  
**PRINT Command Syntax**

The PRINT command is easy to use. For example, if you wanted to print all of the batch files (\*.BAT) files in the current directory on the current drive, you could type:

```
A:\=>PRINT *.BAT
```

Or you could print a single file with a command like:

```
A:\=>PRINT AUTOEXEC.BAT
```

Whenever a PRINT command is entered for the first time following a system boot, you will see a prompt like:

```
Name of list device [PRN]:
```

To start printing, all you need to do is press RETURN, and the default device for the printer will be installed. Current DOS versions use a print queue (list of files) that retains the command information (e.g., the file name) so that you can enter other commands while you are waiting for a file to be printed. You can see the list of files in the print queue by simply entering the PRINT command by itself. You can also use the PRINT/T command to Terminate printing and delete all files from the print queue. Some printers will not stop printing immediately after PRINT/T is entered because they have a small amount of memory that contains some of the data to be printed.

Current DOS versions have a wide variety of parameters that can be used with the PRINT command, but some of the more important ones are shown in Figure 2.

These parameters are supported in nearly all DOS versions of the PRINT command, but you should check the manual for your specific version to be sure that the command syntax is as shown above. In addition, you will find other parameters supported by current DOS versions that have not been shown here.

Connecting a peripheral to your system need not be a particularly difficult or trying experience if you use the ideas presented in this article. When you decide to buy a new peripheral, you will find that it is generally much easier to buy a parallel printer, an external modem, and a serial mouse for the reasons discussed. And when you buy something new, it is best to also buy a cable that is designed for that unit at the same time. If you plan ahead for that — write down the size of connector (e.g., DB-9 or DB-25) and the kind of connector on your computer (i.e., male or female) — you will find it quite easy to get the new component up and running because you know some of the tricks.

### Next Time

We will look at how to write and use batch files, including AUTOEXEC.BAT,

Continued on Page 80

# Implementing 5.25" Drives on Z-180 Series Laptop Computers

**Dennis L. Myers**  
**709 Gila Trail**  
**Temple, TX 76504**

The newest generation of Laptop Portable Computers (the Z-180 series) by Zenith are winners. They combine true PC compatibility with excellent video display in a compact machine. Being compact, they come equipped with two 3.5" disk drives. A connector for attaching up to two separate 5.25" drives is present on the Z-180 machines, but the drive system Zenith offers for use with this connector comes with Zenith's usual inflated price tag for peripheral devices . . . nearly \$400.00 for a single drive in a free-standing case with power supply, cable not included! PC-compatible 5.25" drives with case and power supply are available mail-order for about one third to one half the cost of the Zenith system.

It would seem simple to use any standard 360k DSDD 5.25" (IBM-PC compatible) disk drive with Z-180 series computers since they have floppy disk drive connectors, but Zenith has complicated the situation by using a non-standard physical interface between the computer and the drives. Also, not all Zenith Z-180 series machines have identical external floppy disk connectors. The Z-180 series consists of three distinct models. The first 180 series laptop was named Z-181, and had model number ZFL-181-92. This unit had a 25-pin sub-miniature connector for external drives, but no connector to access the system buss. The machine ran at 4.7 meg. Zenith upgraded this model in the fall of 1987, implementing a dual clock

speed of 4.7 or 8 meg, and adding access to the system buss to connect an external 20 meg hard disk (which is also overpriced and has a non-standard interface). The new model is ZFL-181-93, but it is still named Z-181. In order to make room for a 50-pin ultra-miniature buss connector, the external drive connector has been changed to a 20-pin ultra-miniature connector. In addition to its ultra-miniature connectors for external floppy and hard disks, the updated model differs from the early model by the configuration switches on the bottom of the machine under a rubber plug. The early version has 5 DIP switches, the later version 6 — the added switch chooses the clock speed. Zenith also offers a version of the Z-181 with an internal hard disk (model #ZWL-183-93) which it calls model Z-183. It reportedly also has an ultra-miniature connector for attaching an external floppy disk drive.

This article describes making a custom cable or adaptor cable that allows using non-Zenith 5.25" drives with the updated model Z-181 laptop computer. The Zenith cable (part #HCA-77) to connect the updated Z-181 to the Zenith external 5.25" drive system costs \$50.00, and is available only through Heath/Zenith. Zenith chose to terminate this cable in a 37-pin double-row connector, instead of the 34-slot card edge connector normally used to mate to the disk drive itself. Thus, in order to connect a non-Zenith drive

system to the updated Z-181, a custom cable must be constructed if the Zenith cable is not used. If the Zenith cable is used, an adaptor cable must be constructed to be able to connect the Zenith cable to the disk drive itself.

Since Zenith only lists one disk drive unit (model #ZA-181-8) for use with all Z-180 series machines (new and old Z-181's and the Z-183), it would appear that all Zenith cables terminate with the same 37-pin connector present on the drive. Therefore, owners of the early Z-181 may be able to connect a non-Zenith drive by using the cable sold by Zenith for their machines (part #HCA-76) and building the adaptor cable described below. However, the adaptor cable has only been tested on the updated Z-181 machine. Zenith states in their catalog that the updated Z-181 and the Z-183 use the same cable and external drive, so a custom cable or cable adaptor constructed for the Z-181 should work on the Z-183.

The major problem with making a custom cable or an adaptor for the Z-181 is knowing the correct pin-outs to use. The only service manual currently in press for the Z-180 series describes the early Z-181 model. Zenith was no help. I was finally able to put together the information needed by calling the trusty old computer hardware information line at Heath; reading the hardware manual for the Z-100 computers (which use the same 5.25"

\*\*\*\*\*

\* BUILDING THE CABLES DESCRIBED REQUIRES CAREFUL \*  
 \* SOLDERING AND THE ABILITY TO READ CONNECTOR PIN \*  
 \* LOCATIONS CORRECTLY. IMPROPER CONSTRUCTION COULD \*  
 \* DAMAGE THE EXTERNAL DRIVE, THE COMPUTER, OR BOTH. NO \*  
 \* RESPONSIBILITY FOR THE CORRECTNESS OF THE SUPPLIED \*  
 \* TABLES IS ASSUMED BY HEATH/ZENITH, REMARK, OR THE \*  
 \* AUTHOR. THE DISK DRIVES USED MUST BE PIN COMPATIBLE \*  
 \* WITH THE STANDARD 360k DRIVES IN IBM PC COMPATIBLE \*  
 \* COMPUTERS. (The most common full-height IBM drive is \*  
 \* TANDON model TM-100). \*  
 \*\*\*\*\*

drives as the PC); and mapping the connections on the standard Zenith cable using an ohmmeter.

I strongly suggest making an adaptor for use with the Zenith HA-87 cable instead of making a complete custom cable. I did make up my own cable at first, but it is difficult. The 20-pin ultra-miniature connector used to plug into the back of the Z-181 is tiny, and unbelievably hard to solder or press fit (it accepts 30 gauge wire). Also, the Zenith cable is shielded and grounded. The unshielded, ungrounded ribbon cable I constructed was associated with sporadic access errors. The output lines of the Z-180 computers are limited to five volts, and I suspect disk I/O is sensitive (as is other serial I/O devices such as a mouse) to this marginal voltage situation. Instructions for constructing a custom cable are at the end of this article for those interested, but, again, I advise against it.

Making an adaptor cable to connect the Zenith cable to a non-Zenith drive is not difficult. Start with a standard 34-wire flat ribbon cable. Crimp on a 34-pin card edge connector (or two if you plan to use two drives). Pre-fab cables are readily available, or there may be a cable on the drive you plan to use already. If you make your own, be sure the colored wire is mated to pin one on the card edge connector(s) to conform to standard disk drive cables. Cut the cable to length, keeping it as short as possible (extending one foot or so outside the drive) since it will not be shielded. Separate the wires on the free end of the cable (still in their insulation) for about three inches back. CAREFULLY identify and cut off any wire not listed in Table 1 as being used for the 37-pin connector. You will need a 37-pin female double-row connector and shell, which are commonly available through electronic supply houses (Radio Shack does not stock them). Strip and connect the remaining wires from the ribbon cable to 37-pin connector, using Table 1. Check

your work several times. The card edge connector(s) and the 37-pin connector should have pin numbers embossed on them, but it is still easy to make a mistake.

After constructing the adaptor cable, plug it into the Zenith cable. Use an ohmmeter or a continuity tester to be certain all connections are correct and solid between the 20-pin connector of the Zenith cable and the disk drive card edge connector(s) of the adaptor cable. (Insert a piece of stripped wire in the ultra-miniature connector slots in order to touch the probe tip.) Check everything twice! Pictures 1 and 2 show details of the two cables.

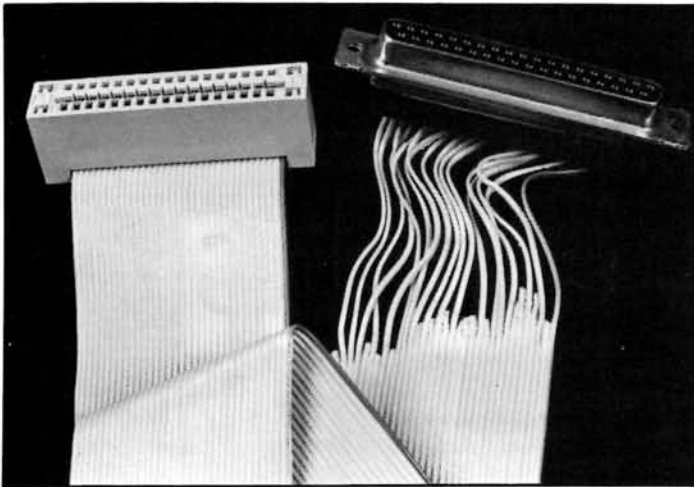
All that is left to do is configure the 5.25" drive itself. The drive must have a resistor terminator pack installed. (If two drives are being installed, a terminator only is placed in one of the drives . . . the drive farthest from the computer on the cable). You must also set the Drive Select (DS) jumper on each drive. Even though the operating system on the Z-181 logically "sees" the external drives as drive C and D, they are physically connected as (external) drives 0 and 1 on the drives themselves. Most drives will have a configuration jumper pinset similar to the diagram in Figure 2. Make the drive you wish to be the C drive DS0 and the D drive DS1. Some drives may have different pins, and you will have to find out how to configure a drive as 0 or 1 on the drive. I also jumpered the HS pins, since Heath has always said to do so for the 5.25" drives on its H-89 and Z-100 computers. The HS jumper energizes the drive head solenoid when the SELECT line becomes active. Most 5.25" drives do not have a head solenoid, but if one does, it must be configured as to when to energize . . . either with drive selection or when the motor turns on (HM). On drives without sole-

**Table 1**  
**Z-181 External Floppy Disk Drive Pinouts**

20-Pin Connector on Back of Z-181	37-Pin Double-Row Adapting Connect.	34-Pin Disk Drive Card Edge Connect.
PIN	PIN	PIN
1	not connected	
2	18	32 Side 1 Select
3	17	30 Read Data
4	21	1 (GND)
5	16	28 Write Protect
6	15	26 Track 0
7	6	8 Index/Sector
8	14	24 Write Gate
9	13	22 Write Data
10	25	9 (GND)
11	12	20 Step
12	23	5 (GND)
13	11	18 Direction Sel
14	7	10 Drive Sel 0
15	8	12 Drive Sel 1
16	10	16 Motor On
17	not connected	
18	not connected	
19	32	23 (GND)
20	36	31 (GND)
	26	3 (GND)

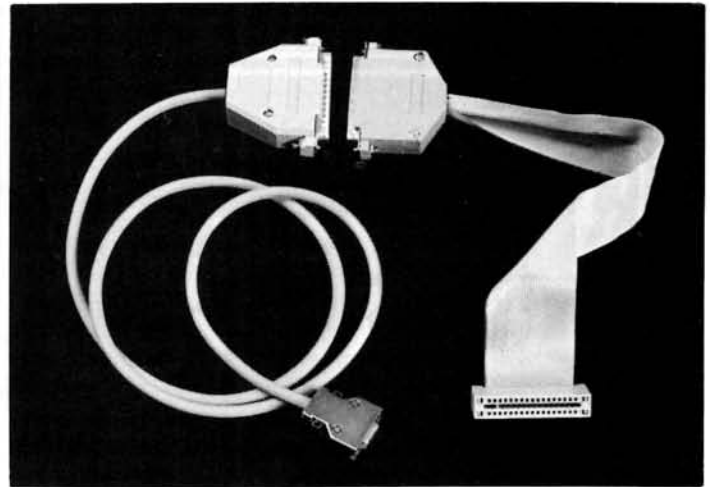
(Note: Pin 26 is tied to shield of Zenith cable . . . it does NOT connect to the Z-181 pinout.)





Picture 1

**Detail of Adaptor Cable.** The colored wire on one edge of the ribbon cable mates to pin 1 of the card edge connector. Unused wires are trimmed off close to the 37-pin female connector.



Picture 2

**Complete Cables.** The Zenith cable on the left has an ultra-miniature connector for coupling to the Z-181. The adaptor cable on the right mates to the 37-pin male connector on the far end of the Zenith cable, and terminates in a card edge connector for coupling to the disk drive.

noids, jumpering HS or HM will do nothing good or bad.

Finally, set the configuration switches under the rubber plug on the bottom of the Z-181 correctly for the presence of one or two external drives. The owner's manual has this information. Plug the Zenith cable into the Z-181, and connect the card edge connector(s) to the disk drive(s) (if it is not keyed, be certain the connector is inserted correctly . . . it is possible to install it backwards). Turn everything on and boot up. Place a blank 5.25" disk in the drive, and enter `FORMAT C:` on the keyboard. The disk should format perfectly. If so, you now have access to all your old disks! If not, review all the steps above.

#### Instruction on Making a Custom Cable

To make a complete custom cable, you will need an ultra-miniature connector. One is available through Digi-Key Corporation (they have a 1-800 phone number) for about \$15.00. You will need a discrete wire female 20-pin connector (part # H120F) and an EMI shell (part # H920H). Use the pinouts in Table 1 to correctly

wire the connector via a cable to a card edge connector. The numbering system for the 20-pin connector is shown in Figure 1. Neither the connector pins on the back of the Z-181 or the pin slots on the female connector itself are marked. Remember that pin slot 1 of the female connector will be on the opposite end as pin 1 on the Z-181 if looked at face-on side-by-side! Note that the connections for the 37-pin adaptor connector are NOT used, and should not be confused with the

pinouts necessary on the disk drive end of the cable. If you construct a custom cable using 34-wire ribbon cable, you may have the same problems I had with erratic operation . . . Zenith shielded and grounded their cable for a reason. You should use shielded cable, and ground the shielding at the disk drive card edge connector. (Odd-numbered pins from 1 to 33 on the disk drive edge connector are grounds.) \*

\*

**Figure 1**  
Pin Numbering of Z-181 20-pin ultra-miniature connector (viewed from back of machine)

```

1 (top) 19
-----
-----
2-----20

```

**Figure 2**  
Configuration pinsets for typical 360k DSDD drives (back of circuit board, component side up)

```

*****
(13 pin (8 pin (8 pin
plug) plug) plug)
-----
XXXXXXXXX
(terminator pack)
-----
87654321
: : : : :
(8 pin config.
pinset)
-----
TO CONFIGURE DRIVE-- PINSET DEFINITIONS
1. place jumper on pins 1 1-HS
2. place jumper on pins 2 2-DS0
to make drive the C drive 3-DS1
3. place jumper on pins 3 4-DS2
to make drive the D drive 5-DS3
4. Do NOT jumper any other pins 6-MUX
7-
8-HM
-----
Other useful data:
1. seek time - 6ms
2. settle time - 15ms

```

# Getting Started With . . . DBASE

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If you have a business, hobby, or a busy home to run, database software can be invaluable. In fact, today's database management software (DBMS) is nothing short of remarkable when compared to some of the alternative ways of managing data with your computer.

A database management package is a piece of software that lets you collect, manipulate, and report on data — pieces of information about your business, hobby, family, or almost any activity. From a very simplified standpoint, picture a database program as the electronic equivalent to a filing cabinet which stores the data and the clerk responsible for maintaining the files and retrieving information.

Database software comes in a variety of forms. File managers, the simplest type of DBMS, are little more than electronic index card systems, with limited storage and data manipulation abilities. Relational databases, as well as some other models, are the other extreme — highly sophisticated software that provides from simple to complex information management tasks. The tradeoff in power is added initial cost and the complexity of fine-tuning the system to suit your needs.

To make them easier to operate, the sophisticated DBMS packages usually have two separate, but related, components — procedural and non-procedural languages. The non-procedural language utilizes short simple commands, from one word to single sentences, which perform fundamental, but not necessarily simple, tasks. More complex functions, however, can be performed utilizing the software's procedural language, a full-fledged pro-

gramming environment that can perform complete applications.

Anyone can create and manipulate database applications using non-procedural commands. However, stay away from the procedural languages until you've mastered the more fundamental commands and concepts. Once you have, you'll see that the DBMS languages are usually simpler and more powerful than other high-level programming languages.

What does all this have to do with solving business and other data management problems? Well, using the right DBMS, even at the non-procedural level, you can quickly and easily construct applications that would require thousands of lines of COBOL, BASIC, or other code. A non-programmer can set up a database, manipulate and control data, and produce reports in just minutes. The programmer, on the other hand, can use the procedural end of the system to develop complete applications in just a fraction of the time normally required.

In this article, you will use the family of DBMS software called DBASE to construct and use a database application. DBASE comes in versions including DBASE II, DBASE III, and DBASE III+ (DBASE IV is expected soon), but the basic concepts and methods are the same. I'll use DBASE III+ here, but the same techniques can be applied to any version of this popular program.

As usual, the Getting Started method will be used. You'll learn how to use the program in short easy to understand steps that complete an entire, yet simple, application.

You will be constructing a database to handle a common problem, inventory management. Whether business inventory, your hobby collection, or family furniture and belongings, records must be kept and reported. This particular inventory application is for a small business that sells a number of items.

## Preparing the Database

Even though the non-procedural language is simple to use, a little preparation is needed before you actually start the software. You must start by giving your database some structure, getting an understanding of what it will contain and how you plan to use it.

Let's begin by comparing it to a manual system in an index box. The box contains all of the information about our inventory so we'll call it the file. Inside the file are individual index cards, one card for each type of item in the inventory. We'll call the cards records. So a hardware store, for example, may have one card — a record — listing claw hammers, another for medium sandpaper. On each card are a number of items, something like this card for claw hammers:

name of inventory item:	claw hammer
stock number:	CH102
quantity on hand:	25
cost of the item:	1.56
reorder point:	12
vendor number:	55
markup:	.25

Each of these items is called a field. So a file contains records, and records contain fields.

Let's now take the fields one step further. In this example, we have two types of fields, character and numeric. Character fields, such as the name and stock number, can contain letters as well as numbers. Numeric fields, on the other hand, such as quantity, cost, and markup can only be numbers. These are used to perform mathematical operations.

When you plan your database, you must start off knowing:

1. The fields you want to include in each record.
2. The type of field: character or numeric, for example.
3. The size of the field: how many characters or numbers will make up the field itself, including decimal places.

There are other types of fields available with DBASE, such as logical, date and memo, depending on the version you're using. But these two are enough for *Getting Started*.

This view of the database is called the data structure, which for our inventory might appear like this:

Name	Type	Size	Sample
Name	Character	15	EGA Monitor
Stocknum	Character	5	MC374
Quantity	Number	3, no decimal	12
Cost	Number	6, two decimal	125.98
Reorder	Number	3, no decimal	2
Vendor	Number	2, no decimal	26
Markup	Number	4, two decimal	0.35

The size of decimal numbers include the decimal point. So a 6 digit number with two decimal places, like cost, can be up to \$999.99, the point itself counting as one of the spaces.

This database contains records with 7 fields, for a total of 39 characters. The number of fields and total size of the record allowed depends on the version of DBASE you're using.

Keep in mind that the fields are customized to your own application. For example, here's a possible record for a clothing store:

Item	Jacket
Model	LS763
Color	Blue
Size	38
Make	After 6

Cost	34.50
Quantity	100
Reorder	50
Markup	0.50

A hobby database may appear:

Sport	Basketball
Star	Johnson
Team	76ers
League	NBA
Age	1
Condition	E
Cost	1.50
Quantity	2

Or a home database like this:

Film	Predator
Form	VHS
Type	Drama
Rating	R
Length	55
Location	Den
Color	Y

Now with our database designed, let's start DBASE. As usual, I'm assuming you have a legal copy of the program. These's little installation required for DBASE, except some early copy protected versions that had to be installed in a hard disk, if

you had one, in a certain way. With Dbase III+ you'll need two disks, System Disk 1 and 2. Earlier versions require just one main program disk.

1. Start your computer.
2. If you have a hard disk, log onto the directory containing Dbase. If you have floppy disks, place the DBASE program disk in drive A. With Dbase III+, put the Dbase System Disk #1 in drive A.
3. Type DBASE, then press Return. You'll see a screen showing a copyright message. Press Return once again. If you're using floppy disks with DBASE III+, you'll see a message to insert System Disk 2. Remove the disk in drive A and insert DBASE System Disk 2, then press Return.

Once DBASE is loaded, the Assist screen appears (Figure 1). This is a menu-driven

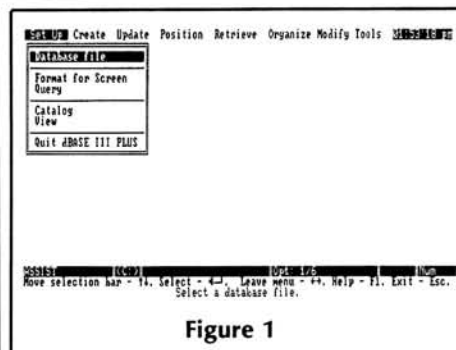


Figure 1

aid, complete with pull-down menus, to using DBASE III+ that's not available in earlier versions. To make this article compatible with other versions of DBASE, we'll go to the "dot prompt" level where you directly enter non-procedural commands. If the Assist menu appears, press ESC.

The dot on the screen is the DBASE prompt, letting you know that it is ready to accept commands. Always make sure the dot prompt appears. Below the dot is the command line that shows the status of your database and keyboard. Prompts and help messages will appear below the command line.

Now we'll take this in four easy steps:

1. Create and define a database.
2. Add data.
3. Retrieve data.
4. Edit data

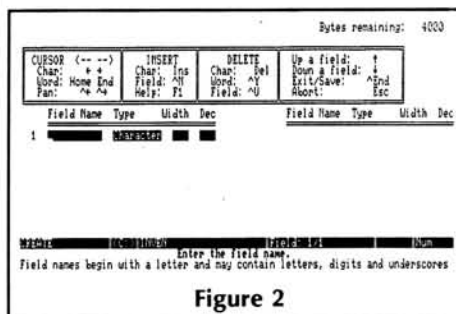


Figure 2

### Creating a Database

Follow these steps to create a database.

1. At the dot prompt, type CREATE INVEN, then press Return. The screen will appear as in Figure 2. Commands, by the way, can be entered in upper or lower case characters.

Before continuing, take a moment to look at the screen. The command line shows the default drive and the name of the database being created. The

message Field: 1/1 means that the cursor is on the first of only one field. Below the command line are prompts letting you know what DBASE is expecting or brief error messages if you make an improper entry.

On top of the screen is a brief help menu displaying the keystrokes available, and the amount of characters left for the record. Using DBASE III+, a record can be as large as 4000 characters.

In this screen, you enter the name, type, and size of all fields in the database, now called INVEN. Keep in mind that the screen will appear slightly different depending on the version of DBASE you have.

2. Type Name, then press Return. The cursor moved to the next column where you designated the type of the field. The default type is Character.
3. Press Return to accept the default character type, and to move the cursor to the length field.
4. Type 15, then press Return to move to the next field definition. The byte counter changes to 3985.

If you notice a mistake after pressing return, use the directional arrows to move up to the previous field. Make your corrections, then press the down arrow key.

5. Now enter the field for the stock number.
  - a. Type STOCKNUM, then press Return.
  - b. Press Return to accept the default character type.
  - c. Type 5, then press Return.

Even though this field represents the stock number, we're using a character type because both letters and numbers will be used.

6. Enter the field for quantity, a numeric type.
  - a. Type QUANTITY, then press Return.
  - b. Type N, for numeric. Do not press Return. The word, numeric, appears in the type column and the cursor moves to the width prompt.
  - c. Type 3, then press Return. Since this is a numeric field, the cursor moves to the decimal column.
  - d. Press Return since there are no decimals in this field.

7. Now in the same manner, enter the data for the remaining fields. Do so carefully, making sure the cursor did

not automatically move to the next column before you press Return. The fields will look like this:

```
Cost          Numeric      6  2
Reorder       Numeric      3  0
Vendor        Numeric      2  0
Markup        Numeric      4  2
```

When you press Return after the Markup decimal column, the cursor will move to the name area in the 8th field. Just press Return instead of entering a name to signify you're done defining the database.

You'll see the message:

```
Press Enter to confirm, any other key
to resume
```

8. Press Return to see the message:
 

```
Input data records now? (Y/N)
```
9. Press N for now. We'll add data in a moment.

So far you've created a database, as yet blank, called INVEN. The database contains seven fields and is stored on the disk as INVEN.DBF. You could exit DBASE now (using the QUIT command) and return at any time to enter records.

### Entering Records

Now that the database is created, let's add data. Follow these steps. The dot prompt should be on the screen.

1. Type USE INVEN, then press Return. The USE command informs DBASE that any commands to follow will pertain to the database named, in this case INVEN. If you later want to use another database (to add or recall data from it, for example), you must issue the Use command followed by the database name.
2. Type APPEND, then press Return. The Append command allows you to add data to a data file and the screen appears as shown in Figure 3, complete with command line and keystroke summary. Append allows full screen editing so you can use the arrow keys to move and edit any field.

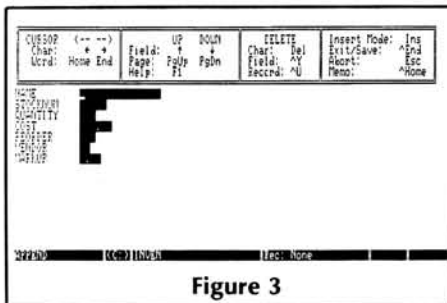


Figure 3

Notice that the command line has the message Rec: None. This means that the screen displayed is for the first record of the new database. The record number is important because data that you enter becomes associated with it. In this case, each of these records will be numbered consecutively as you enter them. Later, you'll see how to change the order of the records by sorting the data.

3. Enter data into the first record.
  - a. Type VGA Monitor, then press Return.
  - b. Type VG374. DO NOT press Return after the entry since when you fill a field, DBASE beeps and automatically moves the cursor to the next field.
  - c. Type 12, then press Return.
  - d. Type 207.87. You heard a beep when you typed the decimal point because DBASE already had inserted it for you. You could have entered the same field by typing 12598.
  - e. Type 2, then press Return.
  - f. Type 25, then press Return.
  - g. Type .50 but DO NOT press return. (Only press Return after the final entry if it is not filled. You'll see why in a moment.)

Since you filled up the last field, DBASE ended the entry for that record and displayed a blank screen for the next record. The command line shows Rec: EOF/1 meaning that you are at the end of a file that contains only one record; you're about to enter the second.

4. Now using the same techniques, enter data for two more records. You'll see the record number change. Here's the data.

```
Record 2
Name          CGA Monitor
Stocknum      CG174
Quantity      10
Cost          95.98
Reorder       2
Vendor        26
Markup        0.45
```

```
Record 3
Name          EGA Monitor
Stocknum      EG257
Quantity      7
Cost          198.55
Reorder       1
Vendor        26
Markup        0.50
```

- After you enter the markup for the third record, the screen displays a blank fourth record. Just press Return. This ends the append function and redisplay the dot prompt at the bottom of the screen.

This is important to remember. Let's say, for example, that while adding the first record, you entered the markup field and pressed Return, thinking you were ending that field. DBASE would have gone to the next record automatically then, assuming the Return was meant to end the Append command. If that ever happens, just enter Append at the dot prompt again, then continue where you left off.

### Saving Databases

DBASE automatically stores your data on the disk. You do not have to issue any type of save or write command. Unfortunately, the operating system may buffer data, writing it onto the disk when the buffer gets full. To guarantee that your information is safely stored on the disk, always exit DBASE using the QUIT command. Don't just pull out your disk or turn the computer off while still in the program, or it is possible some data may be lost. To exit DBASE, enter QUIT at the dot prompt, then wait until the DOS drive prompt appears before shutting down the system.

### Displaying Records

Before going onto editing your data (such as updating or deleting records), let's take a look at how information from your database can be displayed using the List command.

- Type LIST, then press Return. You'll see a listing of the records in your database, as in Figure 4, with the record number preceding the data. Because each record is only 39 characters, all of the fields will fit on one line across the screen. Records longer than the screen, however, will be broken up onto several lines on the screen.

Record#	NAME	STOCK#	QUANTITY	COST	REORDER	VENDOR	MARKUP
1	VGA Monitor	VG374	12	237.87	2	25	0.50
2	CGA Monitor	CG174	10	95.98	2	26	0.45
3	EGA Monitor	EG257	7	138.55	1	26	0.90

Figure 4

The list command is a powerful way to retrieve and display records on the screen. LIST by itself displays the entire database. But you can list specific fields by following the command with

the fields you wish to see, separated by commas, such as LIST NAME, QUANTITY. Try that now.

- Type LIST NAME, QUANTITY, then press Return.

You can also select records that meet some search criteria with the FOR command, such as LIST FOR NAME = "EGA Monitor" or LIST FOR QUANTITY < REORDER. The FOR command can also list specific fields, such as in LIST NAME, VENDOR FOR QUANTITY < REORDER.

More complex criteria can be selected using the .AND. or .OR. operators as in

```
LIST FOR NAME ="EGA Monitor" .OR.
      NAME = "CGA Monitor"
```

```
LIST FOR NAME ="EGA Monitor" .AND.
      VENDOR = 26
```

(The periods surrounding .AND. and .OR. are part of the DBASE syntax and are required.)

Finally, to produce a printed copy of any listing, end the LIST command with the words TO PRINT:

```
LIST NAME, COST TO PRINT
```

Just make sure your printer is turned on and ready.

When using the FOR command, just keep a few details in mind:

- Enclose search characters, but not numbers, in quotation marks.
- Select the proper operator, AND or OR. For instance, this search would find no matches

```
LIST FOR NAME ="EGA Monitor" .AND.
      NAME = "CGA Monitor"
```

Do you see why? It is because no record can have a name that's both EGA Monitor and CGA Monitor at the same time.

- Character searches are case sensitive, so the command

```
LIST FOR NAME = "EGA MONITOR"
```

will locate no records (you'll just get the dot prompt back again) if the name was entered as EGA Monitor.

- Character searches will locate partial matches based on leading charac-

ters. Say you had two additional records with the names EGA Paint and EGA Board. The command

```
LIST FOR NAME = "EGA"
```

would display these records along with EGA Monitor.

- Try some of the list commands now.
  - Type LIST FOR QUANTITY < REORDER, then press Return to see items that must be reordered.
  - Type LIST FOR NAME = "EGA" .and. VENDOR = 26, then press Return for a complex search.

How you want to recall data will determine the fields you define. For example, if you might want to search for all monitors, regardless of type, construct your dataset with another field called TYPE. Enter "Monitor" as the name, then EGA, CGA, VGA, etc. as the type. Locate all monitors with the command LIST FOR NAME = "Monitor". Locate VGA monitors with LIST FOR NAME = "Monitor" .and. TYPE = "VGA". Locate all EGA hardware and software with LIST FOR TYPE = "EGA".

### Mathematical Functions

One of the powers of DBASE is its ability to perform math on numeric fields. You can take advantage of this with commands such as LIST NAME, QUANTITY\*COST to see the total value of your inventory; LIST NAME, VENDOR, QUANTITY-REORDER to see how far you are away from reorder points; or LIST NAME, COST+(COST\*MARKUP) to display the retail price of your items after the markup is added.

You can also use the functions SUM, COUNT, and AVERAGE. Here are some examples:

SUM QUANTITY reports the total of the quantity fields

COUNT FOR VENDOR = 26 returns the number of records with 26 as the vendor code

AVERAGE COST computes the average of the cost fields

### Editing and Maintaining Databases

Whenever you want to add new records just give the APPEND command. (Remember to USE the database first if you're

just starting.) But, alas, things are always changing around us. Information in your records may change, or records might have to be deleted. DBASE provides a full set of commands for maintaining your data. In this lesson, you'll learn how to use the EDIT and LOCATE commands.

As you entered records, the record number appeared on the screen and in the command line. If you know the number of the record you want to edit, just use the Edit command. Here's how.

1. Type EDIT 1, then press Return. The first record will appear on the screen just as it looked when you first entered it. You can use the cursor or editing keys shown in the help window to make any changes to the record.

Notice that the command line shows the prompt Rec: 1/3, meaning that this is the first of three records in the file.

2. Press the down arrow key twice to reach the Quantity field.
3. Type 3, then press Return. With numeric fields you do not have to delete the data already in the field; just enter the new data and move onto a new field.
4. Press the up arrow key twice to move up to the Stocknum field.

When you edit character fields, you are in the otype mode where new characters entered replace existing ones. Unlike numeric fields, however, any original characters not replaced will remain in the field.

5. Type XX, then press Return. The last three characters were unchanged; the field is now XX374.

All of the editing keystrokes are shown in the help window on top of the screen. You can use backspace and DEL to delete characters, or Ctrl-Y to quickly erase the entire field. If you press the INS key, you'll be placed in the insert mode where new characters you type do not replace existing ones, which shift over to make room.

6. Press PgDn to display and edit the next record, number 2. The record counter in the command line changes to Rec: 2/3.

To edit a previous record (if there are any), press PgUp. Moving on to a new

record automatically saves the current one.

7. Press the down arrow key four times to reach the Reorder field.
8. Type 15, then press Return.
9. Press Ctrl-End (hold down the CTRL key while you press END). This saves the edited record and returns to the dot prompt.

So much for editing if you know the record number. If you don't, you could always LIST the database looking for the record you want, then make a note of the record number. Or, you could use Locate.

10. Type LOCATE FOR VENDOR = 26, then press Return.

The screen shows Record = 2, indicating that the first record found with vendor 26 is record number 2.

11. Type Edit, then press Return. Record 2 appears even though you didn't enter EDIT 2. That's because the record was "pointed to" by the Locate command.
12. Press Ctrl-End as if you've made some change to the record and are now done with it.
13. Type CONT (short for Continue), then press Return. The screen shows Record = 3, the next record meeting the LOCATE criteria last entered.

14. Type Edit, then press Return to display and edit that record.

15. Press Ctrl-Q. This command exits the edit screen without making any changes to the displayed record. Use this if you edit a record, then change your mind.

If DBASE can't locate a record meeting the locate criteria, it will display the message End of LOCATE scope.

### Deleting Records

There are two ways to delete records, from the edit function or the dot prompt. If you're editing a record, press Ctrl-U. The word DEL appears in the command line, but the record remains on the screen for now.

From the dot prompt, delete records with the DELETE RECORD command.

1. Type Delete Record 2, then press Return. The message "1 record deleted" will appear.

2. Type List, then press Return. Notice that the record is still listed, but there is an asterisk following the record number. This means that the record is "marked" for deletion, but not yet physically removed from the file. You'll do that now.

First, if you decide you don't really want to delete a marked record, enter the command Recall All. The asterisks will be removed.

3. Type Pack, then press Return. The message "2 records copied" appears meaning that the marked record has now been removed. Once the database is packed, you can no longer Recall deleted records — they're gone for good.

4. Type List, then press Return. With the original second record gone, the last record moved into its spot.

If you want to delete an entire class of records, combine the delete command with FOR criteria, as in DELETE FOR VENDOR = 26. To delete all of the records, but maintain the database itself, enter DELETE ALL, then PACK.

### Sorting Data

Finally, let's see how the records can be sorted. This is a more complex command, but one that can be quite useful. The general syntax is:

```
SORT ON field-name TO new-database-name
```

The sort command rearranges the records in either numeric or alphabetic order, depending on the type of field, and places them in a new database. The original file is not effected. Since the records are rearranged, they will have different record numbers than in the original file.

1. Type SORT ON NAME TO PRODUCT, then press Return. The dot prompt will reappear after the records have been rearranged and placed into a database called Product. That database has the same structure and records as INVEN, but they are now in a different order.

2. Type List, then press Return. Wait a minute, the records are still in the original

order, with VGA before EGA. That's because you are still using the INVEN database.

3. Type Use Product, then press Return.
4. Type List, then press Return. EGA now comes before VGA, the sorted order.

You can use any field for sorting, just remember to use the new database if you want to list the records in sorted order. If you try to sort into a database that already exists, such as resorting INVEN into Product again, you'll see a message like

```
product.dbf already exists, overwrite  
it? (Y/N)
```

Press Y, if you want to replace Product with the new sort or N to stop the process.

### Indexing

Sorting can be a powerful tool, but it has its disadvantages. For one thing, you're making an entire copy of your original database, doubling the space occupied on your disk. And since they are two unrelated files, editing performed on one

will not effect the other. So unless you resort after you append or edit data, one file will not be up-to-date. You can overcome these disadvantages by using an index rather than a sort. The syntax here is:

```
INDEX ON field-name TO new-database-name
```

Instead of duplicating all of the data, a special index file is created. You could create an index for our sample file with a command like

```
INDEX ON NAME TO NAMEDX
```

A file called NAMEDX.NDX will be added to your disk. To use the index, enter

```
USE INVEN INDEX NAMEDX
```

For small databases, the index file may be as long as the file itself. But if you have a large file with a good number of fields, the index file is quite smaller than a corresponding sort. However, the greatest advantage is that the file and index are now related. If you append, edit, or delete records, the associated index is changed also. So you always have a current index to work with. Just remember that the index is only updated if you use your database as shown above. If you just en-

ter Use Inven, for example, the index will remain unchanged as you edit records. You'd then have to index the file all over again — using the old index would result in error messages and warnings.

For now, type QUIT, then press Return.

With software like DBASE III+ you'll be able to create and use a database without programming. Just carefully define your database before you start. Even this sample inventory database could be used effectively.

Once you've mastered the basics, I'd suggest you learn how to use the Report command for creating attractive columnar data reports. Then when you're ready, if ever, delve into the procedural language to see some of the real power of DBASE.

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**.



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Parameter	Description
/C:n	N is the number of copies to be printed. Default is 1. Values are 1-255.
/F	Formfeed is sent at the end of a file. Default is to not send a formfeed after a file is printed.
/L:n	Left margin is set to column n. Default is 0.
/P:n	Page length is set to n lines. Default is 66.
/R:n	Right margin is set to column n. Default is 132.

**Figure 2**  
**Print Command Parameters**

and how to define an appropriate CONFIG.SYS file in the next article. Batch file processing with useful examples will be

used to illustrate basic batch file concepts. Also explained are the commonly needed FILES=, BUFFERS=, and DE-

VICE= commands for the CONFIG.SYS file.

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**

A-B Switch Box Kit (PMK-121) \$49.95  
Heath/Zenith Computer Centers  
Heath Company  
Hilltop Road  
St. Joseph, MI 49085 \*

Continued from Page 10

{?} ;; Wait for UP cursor to begin of section  
{Up} ;; Must go up one after using <ENTER>  
{F7} ;; Place final mark here

{Up} ;; Go up one  
{F3} ;; Insert a blank line  
{F10} ;; Begin call and <ENTER> for routine that  
~ ;; will Reformat section into a paragraph

D{?} ;; then wait for operator decision before  
{&F9} ;; restarting this macro  
P ;; named P.WPM \*

Continued from Page 7

mands while in programs without this facility. The second was key mapping. I like my trusty HUG KEYMAP, but I did not want to have both in memory at the same time, just to have access to CP/M. The third was the Programmer's calculator, which has the basic functions for decimal, hex and related calculations.

To conclude, not everything may be perfect even in the world of 8-bits, but almost so. Keep on pounding merrily on your 8-bit-Dinos (surnamed Saur?) friends! If Jim is not allergic to dust, he may uncover some more "archaeological finds" for us!

**Products Discussed**

(Prices to my knowledge, at this writing)

HiSpeed C Library:

- a) Reference manual with object code on disks appr. \$30.00\*
- b) Source code archives and utility sources on disks appr. \$20.00\*

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\*Prices are approximate, +- a few dollars, depending on disk format.

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P/N 885-1230-[37] \$20.00 + S/H

HTOC in Utilities  
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Sincerely,

Alkis J. Sophianopoulos  
2994 McCully Drive, N.E.  
Atlanta, GA 30345

**New Designs**

Dear HUG:

A trend has started in REMark, which I feel requires a negative comment. That is the

adding of colored designs among the text, such as Pages 7 thru 9, and 76 thru 80 of the August 1988 issue. Page 75 is okay.

These colored designs make the text hard to read and degrades an otherwise fantastic, informative magazine.

Sincerely,

Robert G. Davis, 6856  
661 Delayne Circle  
Layton, UT 84041-1918

*(We have been experimenting with different designs to spruce up the magazine, and have gotten alot of flack about the grid on pages 76 thru 80 of the August '88 issue. I realize those grids were pretty dark over the text. They were supposed to be lighter. The grids on Pages 7 thru 9 though are light enough that their should be no problem in reading them. -Prod. Coord.)* \*



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26-\$11.40	27-\$11.80	28-\$12.20	29-\$12.60	30-\$13.00
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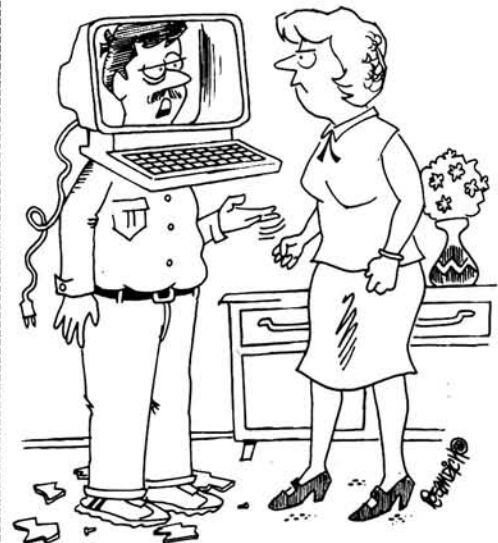
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"I TAKE IT YOU'RE TIRED OF MY DEVOTION TO THIS COMPUTER."

Continued from Page 17

In the event your hard disk drive has an unknown history, it would be wise to run "PREP" prior to formatting. See your MS/DOS manual for details as to why and how.

In conclusion, upgrading the HEATH-ZENITH "Entry Level" (HAH!) PC to a hard disk capability is neither difficult nor to be feared. Having done it, the proud owner has one more slot on the accessory expansion board for another upgrade. I'm saving mine until there is a combined "hi-resolution" color graphics adapter and an I/O port for a CD player for my "ultimate" system.

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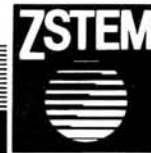
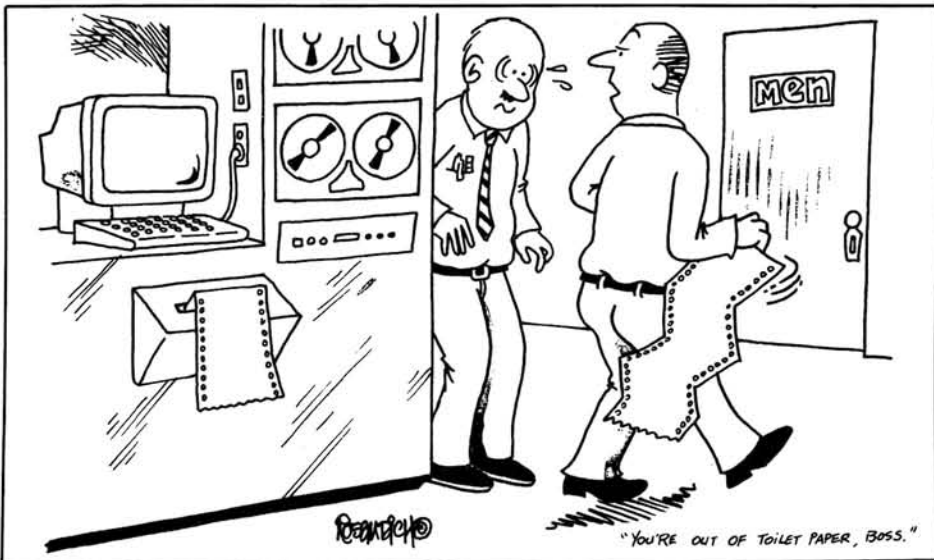
110 Knowles Drive  
Los Gatos, CA 95030

Continued from Page 22

### Powering Down

Christmas is next month, and I will follow my usual practice of providing some gift ideas for you and your Santa Claus. It looks like I may not be able to limit the cost of the ideas to under \$100 as I have in the past. Inflation takes its toll I guess. At some point, I may try something different for the December issue, but many of you have written to me saying that you like that idea. I always appreciate a letter from you so that I know what you are interested in.

If you have any questions about anything in this column, or about Heath/Zenith systems in general, be sure to include a self-addressed, stamped envelope (business size preferred) if you would like a



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# Announcement!

## HUG MEMBERS ONLY!!

The HUG-386 and HUG-386-C upgrade kits will be available shortly. Wheelin' Dealin' Jim has managed a super-fantastic deal on these two products for Heath Users' Group members who originally purchased an H-241 or H-248; **one-thousand two-hundred dollars** off the regular purchase price! That's right! If you originally purchased an H-241 or H-248, and you're a HUG member, you can get \$1200.00 off the regular retail price of either of these two upgrade kits!

The HUG-386 and HUG-386-C are upgrade kits that let you upgrade your H-241 or H-248 series computers up to a full H-386. Now, how do you determine which upgrade kit to buy? The H-386-C includes a dual winchester/floppy controller, while the H-386 does not include any disk controller. Since the old H-241 controller is not '386 compatible, you'll probably want the "C" model if you're upgrading a '241. If you're upgrading a '248, your decision will depend on whether you need a new dual controller or not.

Here are the three ways you can order your upgrade:

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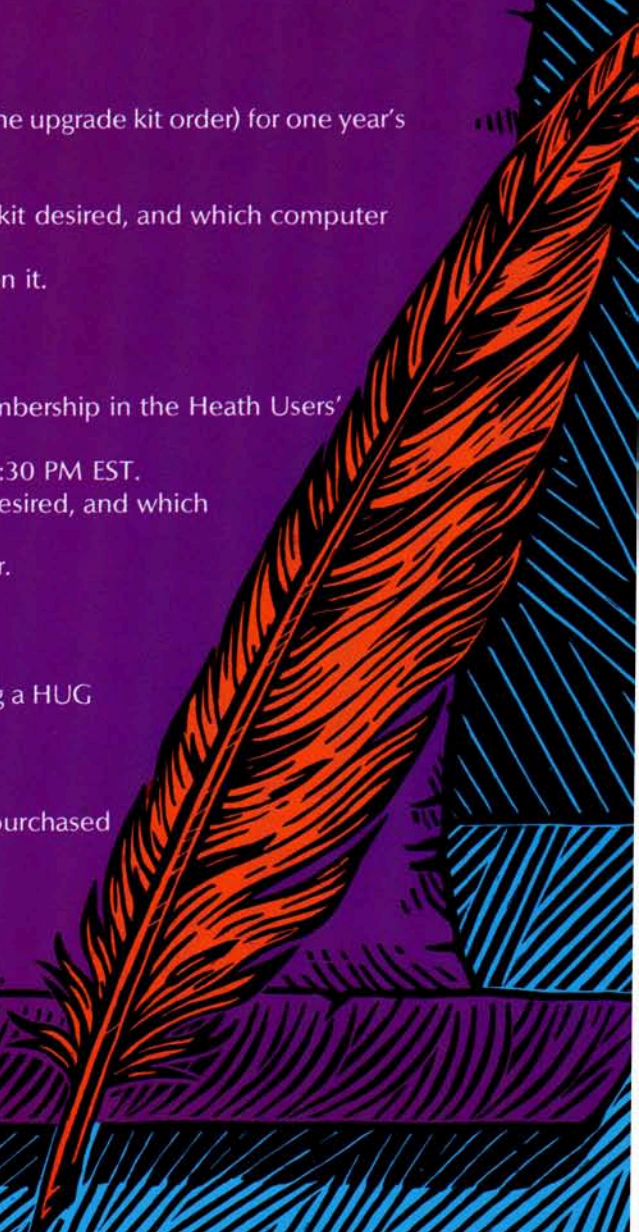
- Non-HUG members *can* order by including payment (with the upgrade kit order) for one year's membership in the Heath Users' Group.
- All orders should be submitted to the Heath Users' Group.
- Each order must indicate the model number of the upgrade kit desired, and which computer kit it was purchased for.
- Each order must have the persons HUG ID number written on it.

### Phone-In Orders

- Non-HUG members *can* order by first ordering a one year's membership in the Heath Users' Group.
- All orders must be phoned in to (616) 982-3838 from 8 AM to 4:30 PM EST.
- Each order must indicate the model number of the upgrade kit desired, and which computer kit it was purchased for.
- The person ordering must supply his/her current HUG ID number.

### Heath/Zenith Computer Store Sales

- Non-HUG members *can* purchase an upgrade kit by first purchasing a HUG membership from the store.
- Orders for the upgrade kit can be taken in the normal fashion.
- Each order must have the buyer's HUG ID number on it.
- Each order should indicate which computer kit the upgrade was purchased for.



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