

The Z-Letter

Newsletter of the CP/M and Z-System community

Number 39

September/October 1995

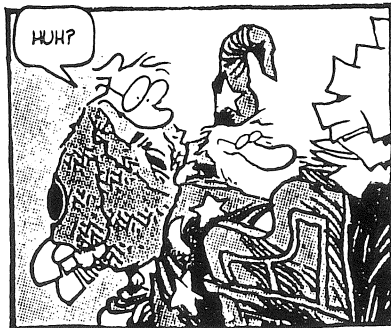
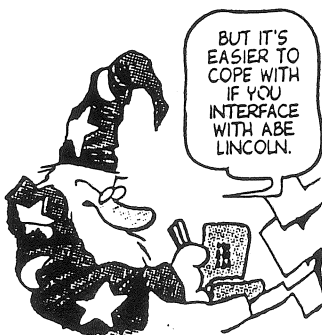
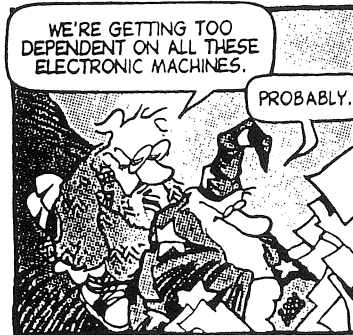
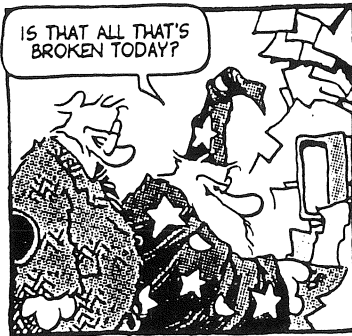
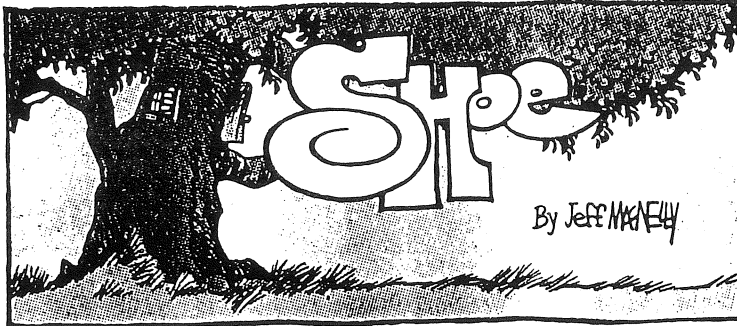


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Welcome to *The Z-Letter*, the newsletter of the CP/M and Z-System community. TZL is copyright © 1995 by David A.J. McGlone, Lambda Software Publishing, 149 West Hilliard Lane, Eugene, Oregon 97404-3057, phone (503) 688-3563, email d.mcglone@genie.geis.com.

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The Z-Letter is indexed as time permits. The index for issues 1-5 appeared in issue 5. Sections of an index for issues 1-34 will appear all this year (issues 35-40).

The Z-Letter is printed by Hypatia Press, 360 West First, Eugene OR 97401, phone (503) 485-0947, and mailed bulk rate.

RANDOM ACCESS

CP/M Calendar for 1996

Lambda will publish a CP/M Calendar for 1996, featuring a CP/M computer or computers each month. The pictures will be black-and-white halftones downloaded from an electronic camera to my printer's Macintosh, which will print the illustrations to paper.

The front of each page will have the picture on top and the calendar page on the bottom, as you would expect. The *back* of the pages will be the long-awaited *Z-Catalog*, which will tell about all the stuff in Lambda's price list, instead of just listing each item and its price. This should answer a lot of the questions I get now. Each page will also have a little bit about the computer or computers in the picture on the other side.

The price of the combined 1996 CP/M Calendar and Z-Catalog is \$3. Order them now to make sure we print enough for everyone in the initial run. Orders will be shipped as soon as the calendar/catalogs are completed.

SB180FX B/P Bios completed

Hal Bower has finished a version of B/P Bios for the Micromint SB180FX, which replaces Malcolm Kemp's XBIOS with all its bugs (though they didn't affect me that much, personally). With this version, SB180FX owners have the same ability to add huge hard disks and use a variety of timestamping protocols as YASBEC, Ampro, and SB180 owners already did.

Hal sent me a copy of his SB180FX implementation, but I've been too busy to play with it. I hope to report on it next issue.

DR Assembler Plus Tools available

Lambda can now offer for sale the product formerly marketed by Digital Research as the DR Assembler Plus Tools. This set of tools includes the MAC macro assembler, RMAC relocating macro assembler, SID debugger, ZSID Z80 debugger, LINK linking editor, LIB library manager, and XREF cross-reference utility, plus all the assembly-language libraries that came with any of the above tools when sold separately. The *Programmer's Utilities Guide* and *SID Reference Manual* are included in this package.

The cost of the DR Assembler Plus Tools is \$60. While customers can still order MAC, RMAC, SID,

ZSID, and the two manuals as separate products, the serious assembly-language programmer can save considerable money by ordering the entire package at once.

Price of *The Z-Letter* increases

Effective immediately, the subscription price of *The Z-Letter* will double, going from \$18 for 12 issues to \$18 per year; *The Z-Letter* is published bi-monthly, so there are 6 issues per year.

I was able to avoid raising the price of this magazine when the postage rates increased, because TZL is mailed at bulk rates, which went up very little. However, the *price of paper* has increased greatly, and continues to increase. Each issue more has to be paid out for paper than the issue before. This price increase should put us ahead of the curve for quite a while.

Back-issue prices will remain the same for now.

Bill Josephson dies

Long-time Eagle Computer Users Group member Bill Josephson died the morning of August 23, 1995. He'd had heart-attack symptoms and had been admitted to the hospital. He died on the operating table while undergoing an angiogram to determine the extent of the blockage.

Bill will be missed by all who knew him. He was a valuable member of ECUG precisely because he was not a nerd or guru. If you threw out a dazzling barrage of technospeak or glossed over something in talking about computers, you could be sure that Bill's hand would go up, asking the questions needed to make matters clear. He would settle for nothing but the clearest English, to the betterment of all.

After I lost my job at Tandem, Bill volunteered his house for ECUG meetings, where they continued to be held until his passing. I haven't heard where ECUG meetings will be held from now on.

Bill is survived by his wife, who was always very gracious about the computer people descending on her house once a month, and two cats. Our sympathies go to them.

New ECUG meeting site

Due to Bill's death, no ECUG meeting was held in September. The October meeting was held at the house of Jack Morse, 1082 West Hill Court,

Cupertino, on the 21st. The November meeting will be on the 11th, from 10 a.m. on. Call Jack at (408) 252-6103 for directions.

Dave Baldwin accepts editorship of *TCJ*

Dave Baldwin will be the editor of *The Computer Journal* as of issue 77, but letters, manuscripts, etc. can be sent to him now; see our RESOURCES section under *The Computer Journal* for his address and phone number. Bill Kibler will still contribute to *TCJ*, but after issue 76 will no longer bear the entire burden of editing and publishing it by himself.

Other publishing projects

I'm going to abuse my privilege as editor and publisher to describe briefly two non-CP/M publishing projects that readers of *The Z-Letter* might find interesting.

I have completed a *Work-at-Home Directory* of companies that pay people to assemble or finish their products at home, paying them by the lot. There are products that are sewn, beadwork products, painting work, electronic board assembly, mohair cleaning and processing, and lots more. Typically a company will accept two or three lots a week, for a gross payment to the home worker of \$250 to \$400 a week, depending on the company and the product. The Directory is available for \$30 from David McGlone, 149 West Hilliard Lane, Eugene OR 97404-3057.

The girls and I are starting a doll magazine, called *Doll Fun*. I will handle editing, publishing, subscriptions, and finances; the writing staff is Tina Huovinen, Gina Jefferson, Katey Mackie, Maddy Huovinen, and Terry Corona.

There are lots of doll magazines out there, but they're all for adult doll collectors and doll makers. *Doll Fun* is for children who want to *play with* Barbie and other fashion dolls, not for collectors. Each issue will have columns on making doll houses in 1/6 scale, patterns for making clothing, instructions on modeling furniture and accessories, reviews of books and magazines, a column on creative play, and so forth. The target audience is the children, their parents, grandparents, aunts and uncles, etc. *Doll*

Fun will be published 6 times a year; a subscription will be \$18 per year. If enough people send in their subscriptions now, the first issue might be out in time for Christmas.

New CD format agreed to

Never mind the Windows 95 hype; the important news from the electronics industry since last issue is the the new CD format! On Friday, September 15, the leading electronics manufacturers agreed on a compromise between the standards being proposed by Sony and Toshiba.

Today's CDs have a storage capacity of 650 megabytes. The Sony design, called the MMCD, could store 3700 Mb; the Toshiba SD, 5000 Mb. The compromise standard, as yet unnamed, will hold 4700 Mb. Like the current CD, data is stored on one side only. Layers can be added for more capacity, and use of the second side remains a future option.

Oregon's oddest jobs

The Portland newspaper, *The Oregonian*, which also serves as a newspaper for all of Oregon, announced Tuesday, August 22, that it was looking for the oddest jobs in the state. Readers were invited to call a number and leave a message describing their jobs; the oddest were printed in the Labor Day paper.

I called the number and left a message, but supporting users of obsolete computers didn't make the cut.

Reminder: Oregon gets new area code

All of Oregon has been area code 503 for as long as there have been area codes. With multiple phones per household, plus cellular phones, car phones, pagers, faxes, and modems, there are no longer enough 503 numbers. Effective November 5, 1995, the northwestern corner of the state, including Portland, will retain area code 503; the rest of the state, including Eugene, will switch to area code 541. This notice will be repeated in *The Z-Letter* until the change occurs.

See the map and list of prefixes on page 18.

NEXT ISSUE

Bob Vinisky missed the deadline this issue, but he'll be back next time. Issue 40 will also contain the next installment of Tina Huovinen's Spellbinder column, an article on MYZ80 by Maddy Huovinen and Terry Corona, and the complete index for issues 35-40.



SPELLBOUND

Setup, SAVE, and SRECOVER
by Tina Huovinen

Hi! In this installment of our Spellbinder column, we're going right back to basics and starting from the beginning. Past articles about Spellbinder in the Eagle Computer Users Group newsletter and in *The Z-Letter*, including my own first column, have been on customizing Spellbinder for different computers, terminals, and printers. These articles assumed you owned and had read the Spellbinder manuals, and were ready for advanced topics. My column won't assume that. I'll show you some related Spellbinder commands, with maybe a little about macros and customizing, each issue.

Opening the package

Which version of Spellbinder you have, and what manuals you have, depends on when and where you got it. Eagle computers came with the Eagle version of Spellbinder, a large portion of the Eagle manual is devoted to it, and there are special Spellbinder keys on the keyboard. Hewlett-Packard HP 125 and 120 computers came with a version of Spellbinder called WORD/125 or Series 100 Word, with its own manual. Xerox-16/8 computers came with the Xerox version of Spellbinder, a couple of manuals, and the later 16/8s had Spellbinder keys on the keyboard.

If you bought Spellbinder directly from the company that created it, Lexisoft, you got Lexisoft's User's Manual, which was more complete than Eagle's; HP's and Xerox's manuals were based on the Lexisoft manual. For \$30 extra you could also buy the Technical Manual, which is a reference manual for the tables used in customizing Spellbinder. Another \$30 would get you the Macro Manual, which is a guide to MPL, Spellbinder's built-in Macro Programming Language.

Lambda Software Publishing is the only source for Spellbinder today, and if your copy isn't version 53, you should upgrade to it. For one thing, David is the only person offering support for Spellbinder, and he'll only support version 53, and only for those who have bought it from him. For another thing, when you buy Spellbinder from him you get all three of the Lexisoft manuals, plus a fourth manual, *Introduction to Spellbinder*, which he wrote.

Spellbinder is a CP/M program, which means it doesn't automatically read the TCAP to see what terminal you're using, or get printer information from the system. So the first thing you have to do is run CONFIGSB to tell it this stuff. This is just a matter of answering questions and making choices from menus.

Most terminals and computers are listed somewhere in the terminal screen, and the most common printers are listed in the printer screen. Always say NO when it asks if you want to use function keys, because you'll want to set up your own or have someone else set them up for you. Say YES to user guides at first, then go back and reconfigure Spellbinder without them once you've become so familiar with it that you're ignoring them anyway. Say YES to line and column numbering, no matter how experienced you become; this causes Spellbinder to display the current line and column position of the cursor at the top center of your screen.

When CONFIGSB asks you how many drives you have, it's really asking for the number of the highest drive. David's YASBEC, for instance, has three drives, but the right answer is 13! That's because he has a RAM disk which is drive M, and M is the 13th letter of the alphabet. If he didn't have the RAM disk, the right answer would be 6, because his hard disk is partitioned into drives A through D, and his two floppy-disk drives are E and F. F is the 6th letter of the alphabet.

CONFIGSB will also ask you for the clock speed of your computer. Almost all CP/M computers have 4-MHz Z80s, so just hit RETURN for this question. If you have a 2-MHz H89 or Kaypro II, type "20". If you have a 6-MHz Ampro, type "60". For SB180s, SB180FXs, YASBECs, and other machines with Z180 chips, multiply the clock speed by 15 before adding the zero. That is, type "130" for a 9-MHz Z180, or "270" for an 18-MHz Z180.

Typists, start your engines

To run Spellbinder, just type SB and hit return. The first thing you'll see every time is a screen telling you your version and serial number; hit any key to

get past it. You'll then be in the regular edit screen, which is completely empty except for the status line at the top:

```
EDIT                L 0001 C 001 *WORD*
```

Using Spellbinder is easy. You just type, and what you type appears on the screen. Don't hit the RETURN key when you get to the right margin. Spellbinder will automatically go to the next line when you run out of room. If you're in the middle of a word when this happens, the whole word moves to the next line. Hit RETURN only when you want to end a line before the right margin, such as when doing lists or tables, or when you want to start a new paragraph. If you want a blank line between paragraphs, hit RETURN twice.

When you do hit RETURN, Spellbinder shows it with a < symbol. This symbol doesn't print; it just marks the place where you hit RETURN. And don't worry, you can use an actual < character in your text. Just remember that the < you get when you hit the key marked with one is a real character that will print, but the < you get when you hit RETURN is just a place holder.

You may have noticed when you started that the cursor (the box or underline marking where you are on the screen) was halfway between the top and bottom of the screen, even though the L in the status line said you were on line 1. When you reach the bottom of the screen typing, the text will move up so that your cursor is once again in the middle of the screen. Spellbinder makes these adjustments so that you can see what you've already written. Think of it as having a piece of paper in a typewriter, and being able to see the stuff on the page above where you're typing now.

Moving around in text

Suppose you're typing away, and you notice that you switched two letters and wrote "teh" instead of "the" a couple of paragraphs back. You'll want to fix that as soon as you notice it. Every terminal and computer has *arrow keys*, so called because they have arrows printed on them instead of letters, numbers, or other characters. The Up-Arrow key (the key with the arrow pointing up) moves your cursor up the screen, so you can go back to a previous line. The Down-Arrow key moves your cursor down the screen, the Right-Arrow key moves your cursor to the right, and the Left-Arrow key moves your cursor to the left. Use these keys to go back to your typo, retype it, and return to where you were when you noticed it.

It's important to realize that the Right-Arrow key and the Space bar don't do the same things. The Right-Arrow key moves your cursor without affecting the text it's traveling over. If you use the Space bar to move to the right, you will be replacing the text with spaces, wiping it out as you go.

The Back Space key on your keyboard may or may not be the same as the Left-Arrow key. The Left-Arrow key doesn't change the text it's moving over. On many computers, the Back Space key erases text as it passes over it.

If you use your arrow keys to move to the right of a carriage-return and try to type, Spellbinder will beep at you and flash the message OFF END at the top of the screen. Your screen has 24 full lines of display (on most computers) at all times, but your text doesn't fill every bit of it. The next character of your text after a carriage return is the first character on the next line. If you want to add something to the right of a carriage return, you have to put characters up to that spot by typing, using the Space bar, or using the Tab key. Then you can add your new text and a new carriage return.

Suppose you typed "it's" when you meant "its". The simplest way to get rid of this extra letter is to move your cursor to it with the arrow keys, then rub it out with the Delete key.

What if you typed "its" when you meant "it's"? Now you want to add a character between two letters, which is called inserting a character. Most keyboards don't have an Insert key. If yours does, and Spellbinder has been set up for you, you can use it for the Insert function. Move to the letter sitting in the spot where you want to insert the apostrophe, and hit your Insert key. If you don't have one, use the Spellbinder Insert command, which is Control-E. To type it, hold down the Control key with one finger and tape the "e" key. The message *INSERT* will appear at the top of your screen, to remind you that you're in "insert mode". Your text will split open, with the text from the "s" on moving to the bottom of your screen. Your cursor will stay where it was. Type the apostrophe and hit Insert (Control-E) again. The *INSERT* message will disappear and your text will come back together.

Edit and Command mode

Spellbinder has two "modes", Edit and Command mode. When you're in Spellbinder, you will always be in one mode or the other. The EDIT at the top left of your screen means you're in Edit mode.

Edit mode is what you use when you're typing text such as a letter, term paper, or chapter of a book. All the commands we've seen up to now are

commands to edit text, and they're called *Edit-mode commands* because they work in Edit mode. Let's list them:

Command name	Command	Key to press
Cursor Down	Control-J	Down-Arrow
Cursor Left	Control-H	Left-Arrow
Cursor Right	Control-L	Right-Arrow
Cursor Up	Control-K	Up-Arrow
Delete	Delete	Delete
Insert	Control-E	
Space	Space	Space bar
Tab	Control-I	Tab

There are lots more edit-mode commands, but that's enough for the first time.

Dot commands

Before we leave Edit mode, I want to introduce you to your first dot command. Dot commands are things you type in your text. They don't print on the paper when you print your text. A dot command is on a line by itself, and the very first character is a period, or dot. For example:

```
. rBOOK.001 is the name of this file.
```

This particular dot command is called a REMARK. It's used to put a remark or comment in your text. The remark won't print when you print your text, but it can remind you of something. In this case you could put it at the top of your file to remind you what file name you're saving it under.

Saving your text to a file

Anything you've typed so far exists only in your computer's memory, and will go away when you turn off the power. To make it permanent, you have to save it as a file on a floppy disk or your hard disk.

This is a function of the command mode, so first we need to switch from edit mode to command mode. We do this with the Edit/Command command, Control-Q if your computer or terminal doesn't have a key for it. If you're in edit mode, this command switches you to command mode; if you're in command mode, this command switches you to edit mode. Notice the word EDIT at the top left of your screen switches to COMMAND.

Once in command mode, we use a series of commands to save our work. The T command moves us to the top of our text. Then we type W to open a file for writing. Spellbinder responds by replacing the COMMAND prompt with WRITE FILENAME> ,

which is a request for the name of the file we want to open or create. When we tell it BOOK.001, it writes everything from the position of the cursor to the end of our text into this file; that's why we went to the top of the text first. Finally, we close the write file with the WD command, "Write Done".

You can combine all three of these commands into one by typing T/W/WD at the COMMAND prompt. The Eagle SAVE key does just this when you press it. Everything will work the same.

BAK files

Spellbinder automatically saves the previous version of your text for you. This is not the REDO function of newer word processors, but it can be very handy. The first time you save text to BOOK.001, the file is created. The next time you save it to disk, the previous BOOK.001 is renamed BOOK.BAK, and the new version becomes BOOK.001. Every time you save text to a file name that already exists, the previous version gets its file name extension changed to BAK, and your new version takes over the file name.

The SAVE macro

It can get tiresome typing the name of the write file every time you save text to it, especially if you choose an awkward name. Also, if you mistype it even once, that version of your text will be saved to a different name, which you might not be able to find without checking the directory of your disk.

Both of these annoyances could be avoided if Spellbinder somehow "knew" the file name for your text. Well, it can! Remember that remark we put at the top of our text? We can make Spellbinder read it and use the file name.

Type the following gibberish at the end of your text:

```
:%1 = $3
:%2 = $2
t
mc2
:%A = !
b0
wo/%A
w/wd
f%1-1
mc%2
```

Congratulations! You have just written your first Spellbinder macro! Now move your cursor to the first line of this macro and type W/WD to save this to disk as SAVE.WPM. *Don't* use the T command to move to

the top of your text, because we only want these 10 lines in SAVE.WPM. Once they're stored away, delete them from your BOOK.001 file.

To use this macro, go into command mode and hit your MACRO or LOAD key; if you don't have a key for loading macros, the command is AD. Spellbinder will ask you what macro you want to use. Type SAVE and hit return. That's all there is to it!

Later on, as we explore macro programming, you will learn what these lines mean. For now, here's what happens: Spellbinder notes what line and column your cursor is on. Then it goes to the top of your text, reads the file name from the comment, and saves your text to that file. Then it goes back to the line and column you were on when you loaded the macro.

This macro was created by a company called Computer Resources of Waimea, which sold macros to Spellbinder users. They went out of business years ago, but David wrote to them and got permission for the Eagle Computer Users Group to use, publish, and otherwise give away their macros, which they no longer sell.

Leaving Spellbinder

To get out of Spellbinder, go into command mode and type X for eXit. If you have text in memory when you do this, Spellbinder reminds you to save it first by prompting you with EXIT WITHOUT SAVING WORKSPACE? (Y/N). If you type N, Spellbinder will return to command mode to let you save your text. If you've already done so, just type Y to this question, and back you go to CP/M.

SRECOVER

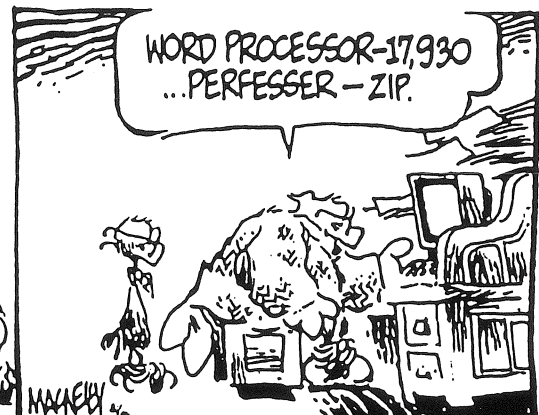
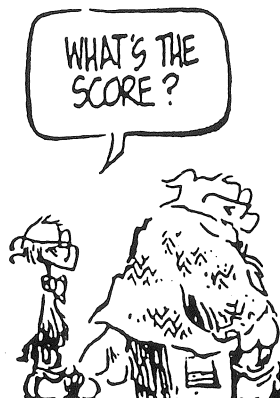
But what if you get in the habit of typing 'Y' when you see that question, and you didn't save your text after all? Oh no!

All is not lost. Your Spellbinder disk contains a program called SRECOVER. Run it by typing SRECOVER at the CP/M prompt. SRECOVER will search your computer's memory for text. If it finds some, it will prompt you for a file name to save it in. Give it a file name like TEMP, so that the last version you saved doesn't get renamed, and the version before that doesn't get erased. In the next installment of this column, we'll show you how to read text from a file into Spellbinder, which you'll need to check how much of your text was recovered by SRECOVER. Some of the text at the beginning or end may have been lost, but SRECOVER generally gets most of it, and often all of it.

Wrapping up

In this column I've introduced you to the edit mode and the command mode. In the edit mode we've learned how Spellbinder acts when you're typing text, and some commands for moving around in text. We've learned how to switch from edit to command mode, and vice versa. In command mode, we learned the T, W, and WD commands, AD to load a macro, and X to get out of Spellbinder. We saw the dot command R for putting a non-printing remark in your text, and the SAVE macro that uses a remark at the beginning of your text to save your text to the right file name automatically. The program SRECOVER can recover most or all of your text from memory if you forget to save it before leaving Spellbinder.

Read this over and over until you understand it, and don't be afraid to play with Spellbinder to practice these commands and learn these concepts. Next issue we'll continue to build on what we learned here with commands to read text from files, print text on your printer, the dot command .C, the MOVEIT macro, and who knows what else. — *Hugs and kisses, Tina*



THE CP/M PC

Part 1: Z80MU

by Gina Jefferson and Katey Mackie

Hello! This is the first installment of a series comparing three different ways to run CP/M programs on a PC. In this one, Katey and I will report the results of our exploration of a CP/M emulator called Z80MU. Next issue, Maddy Huovinen and Terry Corona will do the same for a Z80 emulator called MYZ80. In issue 41, David McGlone and Zener will write about a CP/M program launcher called 22NICE. Finally, in issue 42, David McGlone and David Samson will run a standard set of CP/M programs on some 4-MHz CP/M computers, a 9-MHz Micromint SB180FX Z-System computer, an 18-MHz YASBEC Z-System computer, and a couple of different PCs with different CPUs and different clock speeds. They will then compare the speeds of these programs on these different systems.

Katey and I are close friends of Tina Huovinen. In fact, we sometimes refer to ourselves as the "Three Musketeers". When Tina met David McGlone and got interested in his collection of old computers, Katey and I started hanging out at his place, too. Playing with Z80MU is one way of joining in the fun.

Neither of us is familiar with CP/M. Katey is still in high school and doesn't have a computer of her own, though she can use her father's PC for homework. I'm in college and have a 386 PC.

We tried to do some of the testing on my 386, but that didn't work out. We kept finding files we had forgotten to copy and David's place, and kept needing to ask David questions about CP/M, or Tina questions about Spellbinder. So we ended up starting all over again on David's 286 PC running DRDOS. While my PC will be available to David and David for running speed tests, everything that follows should be assumed to apply to David's PC unless otherwise noted.

Where can you get Z80MU? David suggested we look on the Walnut Creek CP/M CDRom (see RESOURCES for information about the company and the CDRom). There are two versions of Z80MU on the CDRom. Version 3.10 is located in the directory ENTERPRS\CPM\UTILS\S as the file Z80MU310.ZIP, and version 5.2a is found in the directory ZSYS\ZNODE-12\S as Z80MU5.ARC. We used PKUNZIP to unpack the ZIP file, and LHARC to unpack the ARC file, each in a separate directory to avoid confusion between the versions.

Version 3.10

The ARC file for version 3.10 contains Z80MU.EXE, the instructions Z80MU.DOC, and some demo files (820INIT.ASM, COM, CTL, and PRN). There's also a file called Z80MU310.TXT, which lists the files, bugs fixed with this version, etc.

Z80MU was written by Joan Riff for Computerwise Consulting Services, so they could develop Z80 code for embedded systems on their PCs. Version 3.10 is dated March 14, 1986. CCS released version 3.10 to the public domain. That means that this version is public property; anyone may use it, change it, include it in a commercial product, sell it, etc. (This is not the same as a *proprietary* or *commercial* product like Spellbinder, which no one is entitled to use unless he buys it, and buying it or owning it gives you no right to copy it for others, sell it, etc. Nor is it the same as *shareware*, where you can copy the original ARC file freely but may not use it unless you register it, and may not sell it or include it in a commercial product. In a public-domain product all copyright is abandoned and no one may ever copyright the product.)

Version 3.10 is discussed, or reviewed, in the article Z80MU by Robert A. Baumann on pages 203-216 of the October 1986 issue of *Byte* magazine, which we were able to read because David has a complete set of *Byte* from the first issue through December 1988. The DOC file and Mr. Baumann's article give you very complete instructions on how to use version 3.10, and very complete discussion of how it works and what it does. We didn't play with it much, because we concentrated on the later version.

Version 5.2a

This version unpacks into the following set of files:

AUTOEXEC.Z80	2K
DDT.SYM	2K
README.1ST	36K
SETTINGS.COM	2K
TEST.COM	6K
TEST.SYM	8K
Z80MU.EXE	112K
Z80MUDMP.COM	2K
ZCONVERT.EXE	10K

Most users will need only the emulator itself, Z80MU.EXE, and the documentation, README.IST.

The README file makes it clear that this version is *NOT* public-domain, but shareware. Because version 3.10 was public-domain, it quickly became corrupted, with copies everywhere messed up either accidentally, or by viruses, or by other people making changes. CCS also collected a lot of undeserved ill will when people who'd gotten Z80MU free, or by buying it from someone else, expected CCS to spend a lot of time and money adding features, fixing bugs introduced by other people, or doing a lot of support over the phone. Version 5 and later is called "Z80MU Professional". Only the unmodified ZIP file is supposed to be copied, and users are supposed to evaluate it within 14 days. At the end of that time, you should either decide not to use it, or register it with CCS. To register Z80MU, you send your name, address, telephone number, and a registration fee of \$150 to Computerwise Consulting Services, P.O. Box 813, McLean VA 22101. In return you supposedly receive a virus-free copy of the latest version, a printed manual, support if you need it, and notification of updates. I say "supposedly" because this version dates from 1989 and I don't know whether CCS still supports Z80MU. Directory information confirms that CCS still has their 1989 number, (703) 450-7175, but every time we try to call it, it's busy.

Starting Z80MU

To run the emulator, you just type Z80MU. When Z80MU starts, it executes the commands in the file AUTOEXEC.Z80:

```

;
; This is a sample AUTOEXEC.Z80 file.
; Tailor it to your own preferences,
; or delete it entirely.
;
set_bdos min
set_cpmecho off
set_cpmlist lpt1
set_cpmpun com1
set_cpmrdr com1
set_cpu z80
set_fake off
set_illop fault
set_iobase 400
set_mask on
set_source z80
set_term h19
set_vars on
coldboot

```

These are most of the Z80MU commands for setting up your environment, and these values and choices seem to work well on David's PC. Most of them are too technical (e.g., SET_FAKE) or too obvious (SET_CPMLIST) to explain here. SET_CPMECHO controls whether stuff that goes to the screen is echoed to the printer. ON means it's echoed, OFF means it isn't. (In CP/M you toggle between these two states by typing Control-P.) SET_CPU Z80 is the standard Z80MU emulation of a Z80 chip, but if your PC has a V20 or V30 chip, SET_CPU 8080 can be used to send 8080 instructions directly to the chip, replacing software emulation of a chip with running the actual instructions on a chip that understands them. SET_TERM accepts the parameters H19, TELEVIDEO, OSBORNE, KAYPRO, or RAW. OSBORNE and KAYPRO are useful if the only copy you have of a program is pre-configured for one of those machines. RAW displays everything, even control codes. Since David's YASBEC and SB180FX both have TeleVideo terminals, and the software we used to try out Z80MU is all configured for them, we changed the SET_TERM line to TELEVIDEO.

If David's PC had a color monitor, we could use the SET_COLORS command to assign different colors for normal text, highlighted text, inverse-video text, and warning text. If we were using Z80MU a lot, the SET_CPMPATH command would set up a path of MS-DOS directories for Z80MU to search for CP/M COM files. SET_KEY sets PC function keys to Z80MU commands, but not for CP/M programs. That is, you could set up a function key to invoke Spellbinder by having it emit SB when you hit it; but you can't use SET_KEY to set up function keys for you to use when you're in Spellbinder itself. SET_SNOW turns on software suppression of flicker in badly-designed CGA monitors, though it slows down the screen. It has no use with a monochrome monitor, and good CGA monitors control flicker in their hardware.

The COLDBOOT command resets and restarts the CP/M environment, same as pressing the reset button. It may be considered the reset button of your virtual CP/M computer.

Once Z80MU has executed the AUTOEXEC.Z80 file, it displays its prompt

```
Z80 C>
```

and waits for your commands. You can't tell from this prompt what directory you're in, but you can be sure you're running Z80MU.

The debugger

Z80MU was written so that CCS could create Z80 code on their PCs, and it reflects this origin by having

a built-in debugger. You start it with the `DEBUG` command. The debugger's full-screen display shows the registers of the virtual Z80, the stack, the breakpoints, and the code in memory, starting at address 0100. Listing the debugger's functions and commands would take up too much space for this article.

The command `ARGS command-tail` is used to pass parameters to a program in memory and being debugged.

To restart a program stopped with a Control-Break, just type `GO`. David says that the Z-System and some CP/M systems have a `GO` command which re-executes the last transient program, which is still in memory. This is very similar.

The disassembler

Z80MU also has a built-in disassembler, invoked with the `DISSAM` command. The `COMMENT` command lets you assign a comment to a memory address. The comment will appear whenever the address is examined. `FORMAT` tells the disassembler what type of data goes at a given address. It's *NOT* a floppy-disk formatting command! The `RESOURCE` command generates source code for a given range of memory, based on the current symbol table. `SET_SOURCE` determines whether the source code generated is in 8080 or Z80 mnemonics. `SYMGEN` goes through a given memory range and makes symbol-table label entries for any unlabeled locations. `SYMLIST` writes the symbol table to a file. `SYMZAP` clears the symbol table.

PC commands

Z80MU emulates CP/M 2.2 running on a Zilog Z80 CPU; it emulates both the chip and the operating system. Just the same, it is a PC program itself. This dual identity gives it some nice features. For instance, everything you do while running Z80MU can be saved to an output file using standard MS-DOS (or on David's PC, DRDOS) redirection. If you type `Z80MU >SESSION`, for instance, everything that appears on your screen while you run Z80MU will be saved in the file `SESSION`.

Though Z80MU lets you run CP/M programs, you're still running them on a PC. `CD` or `CHDIR` lets you move between MS-DOS directories without having to leave Z80MU, use the MS-DOS `CD` or `CHDIR` command, and re-enter Z80MU. Similarly, the `MD` and `MKDIR` commands create a directory, and the `RD` and `RMDIR` commands delete a directory. `CLS` clears the screen.

`EDIT` runs a PC word-processor from Z80MU, and

passes parameters to it. You choose the word-processor with the `SET_EDITOR` command. For instance, if you wanted to use the CP/M version of Spellbinder, you would just type `SB`. This will always invoke the CP/M version, not the PC version. To run the PC version from Z80MU, your `AUTOEXEC.Z80` would contain the command `SET_EDITOR SB`. After that, typing `EDIT` would run the PC version of Spellbinder.

Some Z80MU commands actually load MS-DOS' `COMMAND.COM` and run MS-DOS commands. `COPY` runs the PC `COPY` command. `DEL`, `DELETE`, `ERA`, and `ERASE` are synonyms for the PC `DEL` command. Typing `DIR` or `STAT` runs the PC `DIR` command. `REN` and `RENAME` run the PC renaming commands. If you use `REN`, you must use CP/M's right-to-left syntax (`REN NEWFILE=OLDFILE`). `RENAME` uses left-to-right syntax (`RENAME OLDFILE NEWFILE`).

These commands give you direct access to the PC's hard disk and floppy-disk drives. Any CP/M directory or copy programs you use will work only within the current directory. We didn't try running Z80MU with an alternate `COMMAND.COM` such as `4DOS`.

In the course of running some programs under Z80MU, Katey discovered that you can use the Up-arrow key to bring back your last command to run again. In fact, the entire MS-DOS command history function set can be used in Z80MU, including editing the command with the left arrow, back space, insert and delete keys.

Leaving Z80MU

The `DOS` command lets you run an MS-DOS program from Z80MU. For example, `DOS CDIR /MM2 F:` lets me use `22DISK` to look at the directory of a 96-tpi double-sided disk from David's YASBEC on the high-density drive of his PC. If you type `DOS` without specifying a program for it to run, you get an MS-DOS prompt and can run as many commands as you like. Typing `EXIT` at that prompt will return you to Z80MU.

To end your session in Z80MU, just type `QUIT`.

Other commands

Some CP/M programs must have a plain vanilla CP/M CCP to run. The CCP command loads a simple CCP-like interface in place of Z80MU's more elaborate command processor. You can load the "CCP" and have it run the program that needs it in one command; for example, `CCP FRED` would make the "CCP" run the program "FRED" as soon as it's loaded.

The PATCH command is included so that SUBMIT files can insert data into memory. You can patch memory from the keyboard more easily using the debugger.

SAVE stores memory in a disk file, just like the CP/M SAVE command. SPEED loads a test program and attempts to determine how fast Z80MU runs a program compared to a Z80. The results look loony at first, but they're in Hz, not MHz. On David's 286, for instance, SPEED rates Z80MU at 1756007 Hz, or 1.76 MHz. We'll see how that agrees with the benchmarking in part IV of this series in issue 42.

SUBMIT is a batch-file processor that takes commands from a file, one line at a time, and executes them. TYPE displays a file on the screen, like CP/M's TYPE command, only fancier. Z80MU's TYPE command stops at the end of each screenful of text, and you can specify "ambiguous file names", such as *.ASM.

VERSION displays the screen you see when Z80MU starts up, with the copyright information, how to register, etc. I wonder what this command does in a registered copy?

Running the WARMBOOT command is the same as typing Control-C on a CP/M computer. WRITE copies CP/M memory to a disk file. This is similar to SAVE, but the syntax and file format are different.

Online help!

As you can see, Z80MU has a lot of commands! Don't worry about forgetting what they are, what they do, or what syntax they use, because help is at hand. In fact, typing HELP displays a window that lists all the commands and prompts you to select one. Then it tells you about the one you selected.

If you want information on a particular command, you can skip the list and the prompt by including the command name after HELP; HELP CCP, for instance, will open a window and tell you all about the CCP command.

Actually running programs

We ran Spellbinder, FILT, David's subscription data-base program for *The Z-Letter*, LPascal, and NZCOM.

We copied an unconfigured Spellbinder to our Z80MU test directory and ran CONFIGSB to set it up for a TeleVideo terminal and laser printer. Tina showed us how to do this, since Katey and I never saw Spellbinder before. Then we watched while Tina wrote a sentence, saved it in the hold buffer, unsaved it 25 times with the command 25U, ran a search command to put in some carriage returns every 5

sentences, and saved the file to disk. She cleared memory, read the file back from disk, used the MOVEIT macro to insert spaces before each line, saved THAT to disk, cleared memory again, read the file back from disk, and printed it out on the laser printer. Spellbinder seems to work just fine under Z80MU.

Next we copied a letter from David's YASBEC to the PC, and used FILT to change it from Spellbinder text to ASCII text, that is, to put a carriage return and line feed at the end of every line. That worked, too.

Running the data-base program required us to copy DB.COM, CUSTOMER.DAT, CUSTOMER.KEY, TZLSUBS.DAT, and TZLSUBS.KEY from the YASBEC. CUSTOMER.DAT is pretty large. Once these files were copied, we typed DB to run the program, and had trouble immediately. The program expects to find the data and key files on drive B, which on the YASBEC is a partition of the hard disk. On the PC, drive B is a 48-tpi 5¼" floppy-disk drive.

So before we could see how the program worked, we needed to recompile it with the file locations changed. David downloaded the source files for us to copy to the PC, and LPascal to compile them with. All we had to change was the lines in DBCONST.INC where the files are defined as 'B:CUSTOMER.DAT', etc. We just deleted the B: in front of each of the file names, then ran the compiler while David watched. The first compilation died because the files with David's data-base routines weren't on the PC. So we copied them and tried again. This time there were no errors; David commented that the compilation looked slow to him, but we'll see when he and Dave Samson run some timed tests.

Once the data-base program was recompiled, we played with it. It works fine, but the graphics aren't quite right. The TeleVideo emulation is for a TVI 950, but the SB180FX has a 950 terminal and the program looks the same on it as it does on the YASBEC. Under Z80MU, however, what should have been box corners, etc. were capital letters. Also, in the message "So-and-so has never received The Z-Letter", "The Z-Letter" is highlighted instead of being underlined. Apparently the TeleVideo screen emulation does not extend to accepting TeleVideo graphics commands, or displaying things the same way a TeleVideo terminal does.

Our last experiment was to copy the NZCOM disks to our test directory and try to run Z-System on top of Z80MU. MKZCM worked fine. Then we had to copy the NZCOM files to a PC 3½" floppy disk, because the NZCOM loader wants to get things from drive A, which on David's PC is a 3½" floppy-disk drive.

When we ran NZCOM again, it crashed with the

Z80MU message "Unsupported BIOS call #12/0CH, RET to DC77H (see 'SET_FAKE' command)". After reading the HELP message for SET_FAKE, we typed SET_FAKE ON and ran NZCOM again. This time it crashed with the message "HALT encountered at FFB0H". We conclude that it will take someone who knows more about NZCOM and Z80MU than we do, to get NZCOM running in Z80MU.

Conclusion

Z80MU appears to run most CP/M applications without problems. Applications written to use TeleVideo graphics will probably have to be changed to use PC graphics instead. System enhancements like NZCOM are more dicey.

You can run Z80MU at any time, from anywhere on your PC if it's on your path, and it will let you run CP/M programs from anywhere it they're located on your CPMPATH. We confined it to a test directory only so we could erase it more easily afterwards, and to eliminate confusion caused by CP/M and PC programs with the same name. That last part was unnecessary, because Z80MU will not run PC programs except the ones it's designed to load and run with specific commands.

We had a lot of fun playing with David's computers, and we want to thank David for finding stuff for us and Tina for helping with Spellbinder. Evaluation of Z80MU as compared with 22NICE and MYZ80, as well as timed tests of program execution by all three programs, will appear in issue 42.

PERSONAL ADS

COMPUTERS FOR SALE OR TRADE

Each one in working condition, price \$50 plus shipping, unless otherwise specified. Two Eagle III computers, each with two 784K disk drives, \$75 plus shipping. One Eagle II computer. Two TeleVideo 802 computers. One TeleVideo 803 computer. One TeleVideo TPC-1 portable computer. One Epson QX-10 computer. Five Kaypro computers, all with double-sided 390K floppy-disk drives; some 4s, some New 2s, some 2X. One Morrow MD-2 computer; terminal not included. One Morrow MD-3 computer; terminal not included. One Xerox 820 computer with dual 8" drive units. Two TRS-80 Model II computers, one SSDD 8" floppy-disk drive each. Five NorthStar Horizon computers, condition unknown, \$20 plus shipping; wood and steel covers available. Other computers come and go all the time; let me know what you're looking for. Will trade for comparable computers not in my collection. Contact David McGlone, phone (503) 688-3563.

WANTED!

Will buy, or trade spare computer parts, books, manuals, software for the following items: **Boot disks:** Altos 8000 with hard disk, DEC VT180, Maxicom D/L with hard disk, Sanyo 2000, Sharp 5500, 5600, 5631, Sharp YX-3500, Systel 3, Telcom ECD 4000EX (3½"), TRS-80 Model II/12/16/6000 CP/M 3.0, Zeus 3X with hard disk. **Hardware:** Three (3) NorthStar Advantage hard-disk controller cards; three (3) TeleVideo hard-disk controller cards, Zenith Z-100 data separator card. **Software:** Any version of UniForm other than UniForm-PC and the CP/M versions listed in the price list at the back of this magazine. Contact David A.J. McGlone, (503) 688-3563.

BOOKS FOR SALE

Even after keeping two copies each, the following titles are extra in the quantities listed: *CP/M and the Personal Computer*, 1. *CP/M Bible*, 1. *CP/M Handbook with MP/M*, 1. *CP/M Primer*, 7. *dBase II User Guide*, 3. *Everyman's Data Base Primer*, 1. *Inside CP/M*, 1. *Kaypro User's Handbook*, 1. *The MBASIC Handbook*, 2. *Oh! Pascal!* (Second Edition), 1. *Osborne CP/M User Guide*, 3. *The Perfect Manual for the Kaypro II*, 2. *Problem Solving and Structured Programming in Pascal*, 1. *The Programmer's CP/M Handbook*, 4. *Programming the Z80*, 1. *Soul of CP/M*, 1. *Starting Forth*, 1. *Using CP/M*, 5. *Using dBase II*, 3. *Z80 and 8080 Assembly Language Programming*, 1. *Z80 Assembly Language Programming (Leventhal)*, 3. *The Z80 Microcomputer Handbook*, 3. *Z80 Users Manual*, 1. Will sell for \$15 each, or \$10 each if you buy four or more. Will also trade for any not listed here if I don't have two copies already, especially *CP/M Solutions* and *CP/M Techniques* by Barbier. Please help me lighten the load in my file cabinets! Contact David A.J. McGlone, (503) 688-3563.

MECHANICAL CALCULATOR FOR SALE

Lightning portable adding machine, "Mfgd. by Lightning Adding Machine Sales Co., Los Angeles 7, Calif, U.S.A." circa 1935-1955. No zip code, trademark, copyright symbol, or patent information anywhere in package (indication of age). Complete cardboard box in fair condition, 7-wheel calculator 12" x 2.5" in like-new condition. Metal, felt backing, 13 ounces. Bakelite (!) desk holder in mint condition, 11 ounces. Complete documentation. Calculator does addition and subtraction, up to 7 digits. Metal stylus missing, all else present. Make offer, \$200 minimum, to David A.J. McGlone, (503) 688-3563.

NorthStar Horizon for sale

S-100 system, two hard-sectored floppy-disk drives, Qume terminal, Okidata printer, \$50 for the lot. Contact Ron Davis, (415) 647-2982.

HELP!

Need a copy of the MicroSphere SUPERSPEED installation manual for the Kaypro 4 '84 and 2X models. Looking for jumper connections on the 74LS373 chip and PIO. Also want to buy Kaypro memorabilia. George Kleiser, P.O. Box 752, Duson LA 70529.

TRS-80 Model I, III, IV hardware wanted

... Such as the screen printer, voice synthesizers, etc. Also various versions of DOS for the above computers and other software. Please call (916) 383-0726 collect, or write to Charles Doughty, Box 60550, Sacramento CA 95860-0550.

Books wanted

Looking for *Perfectly Serious, an Indepth Look at Perfect Writer*, by Kristine Farry. Also another one by Beverly Howard. Already have the PeopleTalk manual, not useful. Would like to have something on WordStar 4 besides the user manual, too. Contact George Kleiser, P.O. Box 752, Duson LA 70529.

Hardware and information wanted

Technical information, mounting hardware, and power supply needed for Shugart SA 400 and SA 400L 5¼" floppy-disk drives. For use in TRS-80 Model III computer. Earl W. Ladendorf, 208 S. Columbia Street, New Auburn WI 54757, phone (715) 237-2633.

Kaypro 2 for sale

Good working condition, with SWP board installed (runs early MS-DOS software, or may be used as 1-Mb RAM disk) and 5-MHz CPU. Also included: Kaypro daisy-wheel printer, Carrying case for computer, CP/M system disks, all software in Perfect series, some WordStar, BASIC, other CP/M programs, some issues of *Micro Cornucopia*, and many diskettes. Would like to find a good home for all as I have gone completely to MS-DOS. Robert C. Bates, 321 Hillsmere Drive, Annapolis MD 21403, phone (410) 267-7684, CompuServe 75447,1515.

S-100 manuals wanted

I need manuals for the following S-100 hardware: ASC 5¼" hard-disk controller, CPS 32K memory, Pickles & Trout IEEE-488 interface, PMMI MM-103-9 300-baud modem, QT clock/calendar, RCTC 1-Mb dynamic memory board kit, Seals 16K memory, Seiko extender board with logic probe, Simpliway VDB-A video board, TDL Z16 16K memory. Rlee H. Peters, 1600A North Sierra View, Ridgecrest CA 93555-2438, phone (619) 446-4825.

Printer for sale

Brand new dot-matrix printer, Laser 192E, including manual and some paper. \$75 plus shipping if purchaser lives outside Eugene, Oregon. Call Ed Orth, (503) 688-2288 or (541) 688-2288.

Xerox 820-II computer for sale

Complete system with all manuals and software, dual 5¼" floppy-disk drive unit and dual 8" floppy-disk drive unit. \$50 plus shipping. Richard D. Gill, P.O. Box 372, Sunol CA 94586-0372, phone (510) 862-0425.

LETTERS

YASBEC development

September 13, 1995

Dear David,

I saw in #38 of *The Z-Letter* that you now have a YASBEC. I thought I'd let you know that Fred Emmert and I also have YASBECs down here.

Our YASBECs are running at 18 MHz, using 16-MHz Z180s, with 0 wait states. They have 1 Mb of CMOS RAM using the memory expansion board, which gives us a 924K battery-backed RAM disk.

Although we started with Hal Bower's B/P Bios, I couldn't leave well enough alone and wrote n/BIOS, a smaller and faster modular BIOS for both the YASBECs and my Ampros, based on an experimental and unreleased Ampro BIOS by Joe Wright. Since the required memory was already

allocated but unused, the BIOS banks the disk drivers and reloads the CCP from a copy in banked memory on warm boot, rather than from a file or disk. Then I went one step further and wrote a loader for the operating system that allowed me to boot a basic banked system directly from EPROM, which then runs a full NBLITZed NZCOM system as STARTUP (NBLITZ is a version of NZBLITZ that can automatically handle n/BIOS banking). Once the terminal and hard disk do their power-on self tests, the cold boot only takes about 2 seconds, including loading the full NZCOM system and setting the clock.

Ampro uses drive E as a foreign format drive. I kept that idea and expanded on it, standardizing all my hard-disk partition and drive E sizes to 8 Mb. This allows me to map as drive E any hard disk

partition on the YASBEC (SCSI ID 6) or my 8-MHz Ampro (SCSI ID 7), both connected to the same SCSI cable. Simple SCSI-NET! The only hitch so far is with the SCSI terminations. Both systems have only one termination rather than two. That part works fine. But if both systems are connected and you only turn one on, it won't access the SCSI bus correctly. I suspect I'll eventually solve that using active terminations.

In any event, please feel free to use us as a YASBEC resource. We sure do love 'em!

Regards,
Terry Hazen
21460 Bear Creek Road
Los Gatos CA 95030-8210
(408) 354-7188

Your SCSI-NET sounds interesting. I could connect my SB180FX and my YASBEC as you've done your Ampro and YASBEC. But I'd hate to limit my hard-disk partitions to 8 Mb on the YASBEC. After living with that limit since my first hard-disk computer, an Eagle IV, it's wonderful to have an 80-Mb hard disk on my YASBEC divided into four 20-Mb drives! — DAJM

Z-Node 6 information

10 September 1995

Dear Dave,

Thank you for the sample copy #38 of *The Z-Letter*. On page 14, I saw the letter from Jay Sage concerning the Z-Nodes. The Z-Node list is out of date and doesn't reflect the change to Z-Node 6, Drexel Hill North Star RCP/M and BBS. Please publish in *The Z-Letter* our new phone number and sysop:

Z-Node 6, Drexel Hill North Star RCP/M and BBS
New number (215) 535-0344
On-site sysop Mike Finn
Remote sysops: Bruce Morgen, Sheldon Isaac
2400/1200/300 8-N-1 FREE ACCESS
No download ratios for regular users

Michael C. Finn
4537 Almond Street
Philadelphia PA 19137-1715

Wil Schuemann is compiling a new list of Z-Nodes. He'll send it to me when it's done so I can publish it here. Meanwhile, thanks for the update. — DAJM

RESOURCES

Hal Bower writes, sells, and supports B/PBios, the most advanced CP/M-compatible operating system today. Presently it's available for the Ampro Little Board, the Micromint SB180, and the YASBEC. The cost is \$69.95 plus \$3 shipping and handling. Hal Bower, 7914 Redglobe Court, Severn MD 21144-1048, phone (410) 551-5922. [2/95]

Lee Bradley sells My-Z-Demo, a package for running CP/M or the Z-System on a PC. The high-density 3½" disk contains Simeon Cran's My-Z80, the shareware version of Sydex' 22DISK, 170 utilities, and copious documentation files. Send \$10 to Lee R. Bradley, 24 East Cedar Street, Newington CT 06111-2534, phone (203) 666-3139. [2/95]

The Computer Journal covers all small computer systems, including CP/M. Published 6 times a year. Free sample issue available. Subscription is \$24/year surface, \$34 air, \$44/2 years surface, \$64 air, in the US. In Canada and Mexico, \$32, \$34, \$60, \$64 respectively. Elsewhere \$34, \$44, \$64, \$84 respectively. Dave Baldwin, 6619 Westbrook Drive, Citrus Heights CA 95621, (916) 722-3877. [9/95]

Corvatek sells KEY-UP, a keyboard interface for

IBM-style keyboards. The DM-1 for Big Boards, DM-2 for Xerox 820, DM-3 for Kaypro, DM-4 for Franklin, DM-5 for ASCII Universal, DM-6 for Apple II are each \$129. Inquire for other models and custom key definitions and applications. Corvatek, 561 N.W. Van Buren St., Corvallis OR 97330, phone (503) 752-4833. [2/95]

dieHard, the Flyer for 8-bit Commodore computers, including the Plus/4, VIC-20, PET, C16, C64, and C128, is published bimonthly. A single copy is \$3.95 US and Canada, \$4.95 all other countries. Subscription is \$16.97/year US, \$20.97 Canada, \$24.97 all other countries. Subscriptions to the *Spinner*, a disk of the software in each issue, joint Flyer/Spinner subscriptions, and back issues are available; see the magazine for this information. Send orders to LynnCarthy Industries, Inc., 816 West Bannock, Suite 502, Boise ID 83702-5850, phone (208) 383-0300. [2/95]

Discus Distribution Services, Inc. sells Digital Research products, including its many operating systems. Their price for CP/M is \$150. They also offer CBASIC (\$600), FORTRAN-77 (\$350), and Pascal/MT+ (\$600). 16600 Meridian Road, Salinas CA

93907, (408) 663-6966. [2/95]

Elliam Associates sells disks of public-domain software and commercial software for most CP/M computers, including the Amstrad PCW. For a 100+ page catalog, send \$8.50 plus \$3.00 shipping and handling to Elliam Associates, P.O. Box 2664, Atascadero CA 93423, or phone (805) 466-8440. [2/95]

Herbert R. Johnson is "Dr. S-100". He supports S-100 bus computers, including NorthStar, Compupro, Cromemco, IMSAI, and Vector. He can sell you S-100 boards, manuals, books, etc. Write to him at P.O. Box CN-5256 #105, Princeton NJ 08543, e-mail hjohnson@pluto.njcc.com, phone (609) 771-1503. [2/95]

Lambda Software Publishing publishes this magazine; see our price list in the back.

Microcomputer Mail-Order Library of books, manuals, and periodicals relating to microcomputers in general, and Heath/Zenith systems in particular, will loan you any item for 4 weeks for a handling fee plus postage. The price is deliberately low to encourage people to learn more about their computers. Inevitably, some items will be lost in the mail or not returned. Donations of printed material would therefore be greatly appreciated! For details, a list of available items, or to borrow material, write to Library c/o Lee A. Hart, 4209 France Avenue North, Robbinsdale MN 55422, phone (612) 533-3226 [2/95]

Micromint makes and sells the SB180 and SB180LO computers. These are 9-MHz HD64180/Z180 single-board computers with 256K RAM. The SB180 is the size of a 3½" disk drive, costs \$299 (\$195 each 100 quantity), or \$399 with ZCPR, ZRDOS, BIOS and ROM sources. The SB180LO is the size of a 5¼" disk drive, has SCSI, costs \$329 (\$295 each 100 quantity), or \$429 with ZCPR, ZRDOS, BIOS and ROM sources, Z-System utilities. The SB180FXMME 2-Mb memory-expansion board, populated with 256K, costs \$319. Micromint, Inc., 4 Park Street, Vernon CT 06066. Technical Assistance, (203) 871-6170. To order, (800) 635-3355. [2/95]

MicroSolutions makes several products of interest to our community. UniForm-PC costs more (\$69.95) and knows fewer formats than 22DISK (see Sydex, below), but includes a few formats 22DISK doesn't. MicroSolutions also sells the CompatiCard IV, which lets a PC use 4 floppy-disk drives (including 8" drives) for \$95. MicroSolutions Computer Products, 132 W. Lincoln Hwy, DeKalb IL

60115, phone (815) 756-3411. [2/95]

David Morrison deals in Xerox 820, 820-II, and 16/8 computers, software, and manuals. P.O. Box 1911, Mishawaka IN 46546-1911, phone (219) 257-0193. [5/95]

Morrow Atlanta Users Group is a national Morrow computer user group. Membership is \$15 per year, which includes technical support and a subscription to their bimonthly newsletter, *Mor-Atlanta News*. Send membership checks to David McDonald, 5461 E. Wind Drive, Lilburn GA 30247, phone (404) 381-1384. Send articles for *Mor-Atlanta News* to Harold Arnovitz, 1259 Kittredge Court NE, Atlanta GA 30329; or upload them to (404) 634-1612. You can also upload them to the group's BBS, (510) 654-3798; leave a message to Editor. [2/95]

Rondell Systems services and repairs all kinds of computers. Call Ron Reymore at (503) 981-8617, or write to him at 9993 Broadacres Road NE, Hubbard OR 97032. [2/95]

Sage Microsystems East, selling and supporting the best in 8-bit software. NZ-COM, Z3PLUS, XBIOS, 4DOS, DSD, BackGrounder ii, ZSDOS/ZDDOS, DosDisk, JetFind, ZMATE, BDS C, ZMAC, MEX-Plus and MEX-Pack. Next-day shipping of most products with modem download and support available. Order by phone, mail, or modem. Shipping and handling \$3 USA, \$4 Canada per order; based on actual cost elsewhere. Check, VISA, MasterCard. Specify PC 360K or Kaypro 4 disk format. Sage Microsystems East, 1435 Centre St., Newton Centre MA 02159-2469, Voice (617) 965-3552 (9:00 AM to 11:30 PM), Modem (617) 965-7259 (2400 bps) or (617) 965-7046 (v.32bis), e-mail SAGE@LL.MIT.EDU [2/95]

The SEBHC Journal is the magazine of the Society of Eight-Bit Heath Computerists, dedicated to Heath/Zenith H-8 and H-89 computers. It's published by Leonard Geisler, 895 Starwick Drive, Ann Arbor MI 48105, phone (313) 662-0750. [2/95]

Chuck Stafford sells products for Kaypro computers: Advent TurboROM, \$35; hard-disk conversion kit, \$175 (without clock); *Micro Cornucopia* Schematics and Theory of Operations for Kaypro II/2/IV, Kaypro 10, '84 Kaypros, \$15 each, any two for \$25, all three for \$30; Kaypro 10 Tinker Kit, \$10; Teac 96-tpi drives, \$15 each or two for \$25. Prices include tax and shipping. He sometimes has hard disks for sale: ST-225, ST-251, and others. Write to Charles B.

Stafford, 4000 Norris Avenue, Sacramento CA 95821, or phone (916) 483-0312 evenings or weekends. [2/95]

Sydex sells PC software useful for copying CP/M files and handling CP/M disk formats (22DISK), running CP/M programs on a PC (22NICE), and copying CP/M boot disks without having the original machine (AnaDisk). Free sampler disks with the limited shareware versions are available. The registered versions, which are more powerful, are \$25 each for 22DISK and AnaDisk, \$40 for 22NICE (which includes 22DISK). Add \$2.50 for shipping and handling with each order. Talk to Chuck or Miriam at Sydex, P.O. Box 5700, Eugene OR 97405, phone (503) 683-6033. [2/95]

Jim Thale sells the I/O board which gives the YASBEC two additional high-capacity disk formats, two serial ports, and two Centronics ports. The board's available with surface-mounts, PAL, and big chips only for \$150, or with the additional parts for \$210. James S. Thale, Jr., 1150 Somerset Avenue, Deerfield IL 60015-2944, phone (708) 948-5731. [2/95]

Trio Company of Cheektowaga, Ltd. sells several CP/M packages as well as PC software. They offer InfoStar 1.5 (\$160), SuperSort 1.60 (\$130), and WordStar 4.0 (\$130). Write P.O. Box 594, Cheektowaga NY 14225, or call (716) 892-9630. [2/95]

Steven W. Vagts publishes *Z-100 LifeLine*, a bimonthly journal dedicated to the Zenith Z-100 dual 8088-8085 computer. A one-year subscription is \$15 per year to any U.S. zip code, \$18 to Canada or Mexico, and \$20 to any other country, from Steven W. Vagts, 2409 Riddick Road, Elizabeth City NC 27909, phone (919) 338-8302. [2/95]

Walnut Creek CDROM sells the CP/M CDROM, containing over 480 Mb of CP/M public-domain software and freeware, including the entire Sound Potentials, CP/MUG, and SIGM collections. The cost is \$39.95. California residents add 8.25% sales tax. Shipping is \$5 in the US or Canada, \$9 elsewhere. Walnut Creek CDROM, 4041 Pike Lane, Suite D-893, Concord CA 94520. Orders can also be placed at (800) 786-9907, or orders@cdrom.com. For questions phone (510) 674-0783 or fax (510) 674-0821. [2/95]

PUBLICATIONS

The following magazines and newsletters were received since last issue:

AIM, #114 (Vol. 11 No. 8, September 1995) and Catalog #58 (October 1995), is the newsletter of Adam's House, a company selling Coleco ADAM products. The publisher is Terry R. Fowler, Adam's House, 1829-1 County Road 130, Pearland TX 77581-9503, phone (713) 482-5040, fax (713) 997-6907. [Coleco ADAM]

Amstrad PCW User's SIG, Vol. 9 No. 1 (September 1995), is the newsletter of a special interest group of American Mensa Ltd. The SIG chairman and publisher is Al Warsh, 6889 Crest Avenue, Riverside CA 92503, phone (909) 352-2521, CompuServe 73300,2644. Contact him for membership or subscription information. [Amstrad PCW]

AUGER, September 1995 and October 1995, is the newsletter of the Emerald Coast ADAM Users Group. Membership's \$15 per family per year. A 36-page list of the disks in the group's public-domain library, plus the year's issues of *AUGER*, come with the membership. Send the money to Norman J. Deere, Treasurer and Editor, at P.O. Box 4934, Fort

Walton Beach FL 32549-4934, phone (904) 244-1516. All back issues of *AUGER* are available; see the ad in any issue. [Coleco ADAM]

A Bit More, July-August-September 1995, is the newsletter of NOVAOUG, the Nova Osborne Users Group. Membership's \$12 per year from William E. Kost, 7007 Brocton Court, Springfield VA 22150, phone (703) 569-2213. [Osbornes and PCs]

Classic Computer Society Newsletter, September 1995 and October 1995, is edited by Andy Shapiro. The September issue has a glossary of laser-printer terms and related items. The October issue has *Three Programs Using TOF*, *What Goes Around Comes Around*, *4-Bit Adder*, and *Smog*, all by Al Paarmann. Contact the Classic Computer Society, P.O. Box 2007, Santa Barbara CA 93120, (805) 684-8838, for membership information. [All computers]

The Computer Journal, #75 (September/October 1995): Herb Johnson, in his "Dr. S-100" column, talks more about GIDE and answers letters. Helmut Jungkunz' "European Beat" describes the KC 85 computers, East German Z80 computers from 1984-85. Bill Kibler writes about *Embedded Control Using the STD Bus*. The centerfold for this issue is *STD Bus*

I/O. Terry Hazen provides us with an EPROM Simulator for CP/M systems. Walter J. Rottenkolber writes about Disk I/O in Forth, part 2, John D. Baker about High-Speed Serial I/O for the PCPI AppliCard, which is a CP/M card for the Apple II. See our RESOURCES section for TCJ's address and subscription rates. [All computers]

Mor-Atlanta News, Vol. 11, No. 2 (August/September 1995), is the newsletter of the Morrow Atlanta Users Group. This issue has *The History of Morrow Models* and *How Morrow Designs, Inc. Went Under* by Willis Cook. See RESOURCES for MAUG's address and membership/subscription rate. [Morrow]

Sanyo PC Hackers Newsletter, July 1995 and August 1995, contains some Sanyo CP/M model information, but most of the contents is for Sanyo PCs, mostly the MBC-550 series. Write to Victor

Frank Publishing, P.O. Box 762, Menlo Park CA 94026, for subscription and back-issue information. [Sanyo]

USA Today, Tuesday, June 27, 1995, printed *Loyal users cling to comfortable old computers* on page 40. The article is almost entirely Apples and Commodores, for interesting nonetheless.

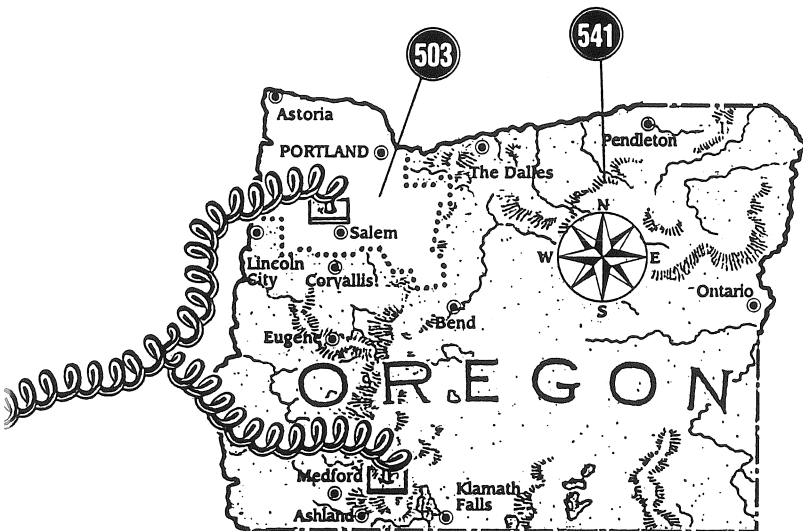
Z-100 LifeLine, #40 (July-August 1995) and #41 (September-October 1995). In issue 40 comes the news that there won't be a Z-100 Get-Together this year. Thierry Klein presents *More Z-100 Character Programs* and *How To Handle Files in Assembler*. Issue 41 informs us that Paul Herman has sold his last Z-100 and is getting out of the mail-order business. This issue also has a 10-page insert on the Z-110/Z-120 power supply, including parts list and schematic. [Z-100]

ART CREDITS

The picture of Tina Huovinen on page 5 was drawn by herself from a photograph taken by Teresa Corona.

Oregon's New Area Code

On November 5, 1995, Oregon will add the new 541 area code. * The northwest corner of the state retains the 503 area code.



A list of prefixes in the new 541 area code.

541	382	438	475	523	572	675	747	821	875	922	964		
	383	439	476	528	573	676	750	822	877	923	966		
	384	440	477	533	574	679	751	825	878	924	967		
	219	334	385	442	478	534	575	683	752	826	881	925	969
	247	336	386	443	479	535	576	686	753	828	882	926	975
	258	339	387	444	480	536	577	687	754	830	883	927	979
	259	341	388	445	481	540	582	688	756	832	884	928	980
	262	342	389	446	482	542	584	689	757	836	885	929	983
	265	343	395	447	483	544	586	710	758	837	886	932	984
	267	344	396	448	484	545	587	713	759	839	888	933	987
	268	345	401	449	485	546	589	714	763	840	889	934	988
	269	346	408	450	486	547	592	715	764	846	890	935	989
	270	347	409	451	487	548	593	718	765	847	891	937	990
	271	348	410	453	488	549	594	719	770	849	892	938	991
	276	352	412	454	489	552	595	723	772	850	893	941	992
	277	353	416	456	490	553	596	724	773	851	894	942	993
	278	354	419	457	491	554	597	726	776	853	895	943	994
	290	356	420	459	493	558	599	729	779	855	896	944	995
	296	358	421	461	495	560	601	732	782	856	898	946	996
	298	365	422	462	496	561	607	734	783	857	899	947	997
	302	367	424	465	498	562	608	737	785	858	901	949	998
	308	369	426	466	501	563	609	739	793	862	902	953	999
	309	372	427	467	512	564	619	740	798	863	912	954	
	317	374	428	468	517	565	660	741	808	865	913	955	
	327	376	430	469	518	566	664	742	809	866	914	957	
	328	379	432	471	519	567	670	744	810	867	915	961	
	332	380	433	473	521	568	672	745	814	869	917	962	
	333	381	437	474	522	569	673	746	820	874	921	963	

Prefix list current as of August 14, 1995.

Lambda Software Publishing Price List

149 West Hilliard Lane, Eugene, OR 97404-3057

(503) 688-3563 After 11/5/95: (541) 688-3563

AmigaZ80 – \$45.

CP/M 1996, calendar and Z-Catalog – \$3

CPMUG public-domain software –

Catalog disk: \$10. Lists all 92 disks.

Individual disks: \$10 each.

Complete set: \$400 (save \$520).

Digital Research Inc. (Novell) –

Software is \$25 each. Manuals are \$20 each,
\$15 if purchased with the software.

Access Manager 1.1

Programmer's Guide

Reference Manual

BT-80 1.0

CBASIC 2.8

Reference Manual

CBASIC Compiler 2.0

Graphics Guide

Programming Guide

Reference Manual

CP/M 2.2

Operating System Manual

CP/M 3.0 (CP/M Plus)

Programmer's Guide

System Guide

User's Guide

The CP/M Card

User's Guide

CP/M Software Finder

CP/Net 1.1

Despool

DR Graph

Reference Guide

GSX

Programmer's Guide

User's Guide

Link 1.31

Operator's Guide

MAC 2.0

Language Manual and Applications Guide

MP/M

MP/M II

User's Guide

Pascal/MT+ 5.6.1

Reference Manual

Personal Basic Reference Guide

Personal Basic Tutorial

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Applications Guide

Language Manual

Programmer's Utilities Guide

RMAC 1.1

Reference Manual

SID

Reference Manual

User's Guide

SPP 5.5

User's Guide

TEX 1.0

User's Guide

XLT86 1.1

ZSID

DR Assembler Plus Tools set – \$60.

Includes MAC, RMAC, SID, ZSID, *Programmer's Utilities Guide*, and *SID Reference Manual*

Eagle Computer Users Group newsletter –

July 87-October 90 in one volume, \$15.

Echelon products –

Software and manual, \$40 each;

Manuals only, \$15 each.

Assembly Language Translators

DISCAT (version 1.3)

DSD

TERM III (version 1.2)

ZAS/ZLINK (version 3.0)

Z-MSG

Publications, \$15 each,

\$10 each if four or more ordered.

JetFind User's Guide

Kaypro Z-System Manual

ZCPR3 and IOPs

ZCPR3: The Libraries

ZCPR 3.3 User's Guide

ZDM/ZDMZ/ZDMH User's Guide

Z-Index, index to *The Z-News*

The Z-News, complete set

Z-Node Configuration

ZRDOS 1.0 Programmer's Guide

Z-System User's Guide

LeBug (version 5.1) – \$20.

MagicIndex text formatter (version 3.00) – \$100.

Micro Cornucopia -**Back issues:**

Issues 8, 10, 11: \$8 @ US, Canada, Mexico,
\$10 each elsewhere.

All other issues: \$4 @ US, Canada, Mexico,
\$6 apiece elsewhere.

Complete set: \$150 (53 issues).

Author and subject index on disk: \$10.

Kaypro disks -

Catalog disk: \$5. Lists all 49 disks.

Individual disks: \$5 each.

Entire set of disks: \$200. Save \$45.

Big Board disks -

Catalog disk: \$5. Lists all 30 disks.

Individual disks: \$5 each.

Entire set of disks: \$100. Save \$50.

MIX ASM (version 1.1.0) - \$20.

MIX C (version 2.1.0) - \$60.

MIX Editor (version 1.1.0) - \$30.

SIG/M public-domain software -

Catalog disk: \$10. Lists all 310 disks.

Individual disks: \$10 each.

Complete set: \$1000 (save \$2100).

**Sound Potentials and Sound Potentials II
public-domain software -**

Catalog disk: \$10.

Any software in the collection: \$10/disk.

Spellbinder Word Processor (version 5.3H) - \$60.

SuperCalc 2 - \$30.

TeleSolutions-80 - \$25.

Turbo Editor Toolbox - \$40.

UniForm - \$65.

Versions available:

Actrix

Epson QX-10

Kaypro

Micromint

Morrow MD-2, 3

Morrow MD-5, 11, 16, 34

Osborne 1 (DD)

TeleVideo 801, 802, 802H

Toshiba T100

Xerox 820-II

Z-Fonts catalog - \$3 (US, Canada, Mexico),
\$5 (elsewhere).

Z-Fonts - \$8 each.

The Z-Letter -

Subscription: \$18 per year, all countries.

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\$10 if purchased with NZ-COM.

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All three at once - \$60.

We have extra copies of many other computer manuals, software manuals, and books, in quantities too small to list here, for \$15 each (\$10 each if you order four or more). Call us and ask!

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Disk copying service - \$10 per disk. Discounts over 20 disks.

HOW TO ORDER

Write your name, company name if any, address, home and business phone, and the computer format in which software should be supplied. Specify completely what merchandise you want. Please allow 4-6 weeks for delivery.

Sorry, no credit cards or CODs. If you live outside the U.S., payment should be in U.S. funds in an international money order. Don't add anything for shipping and handling; it's included in the price. Don't add anything for sales tax; Oregon has none.