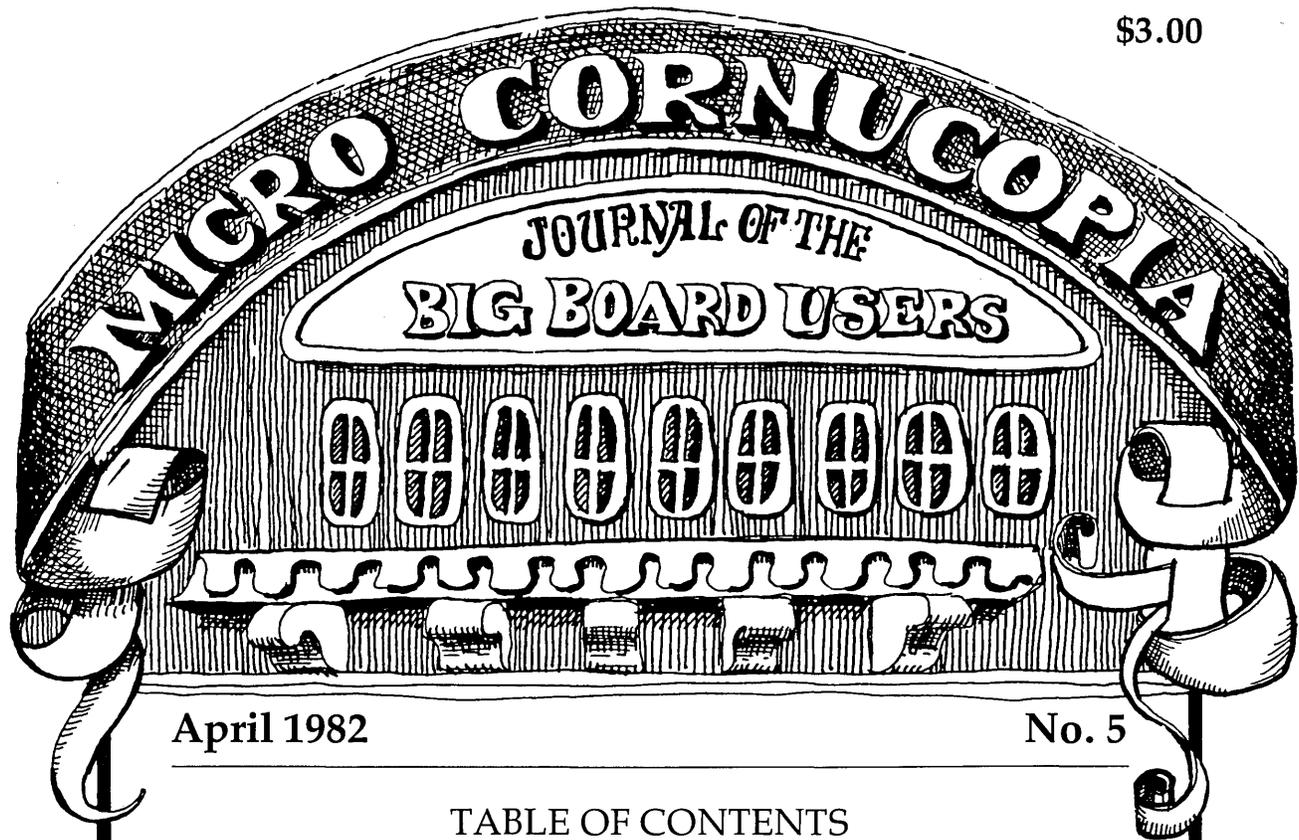


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April 1982

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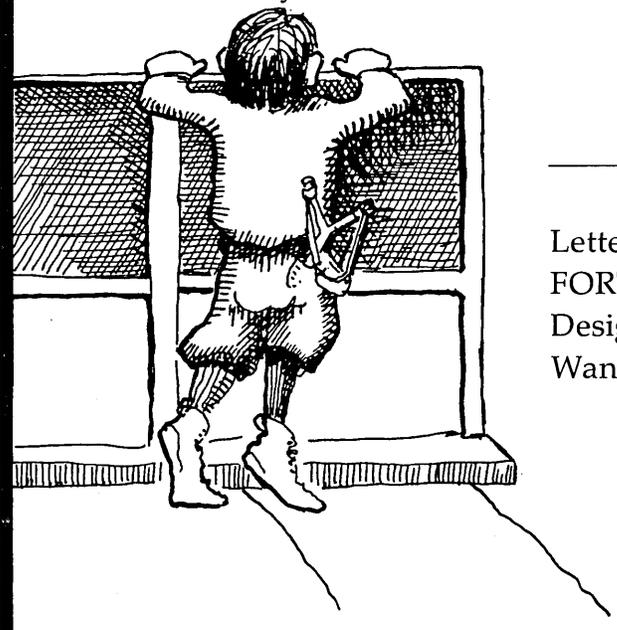
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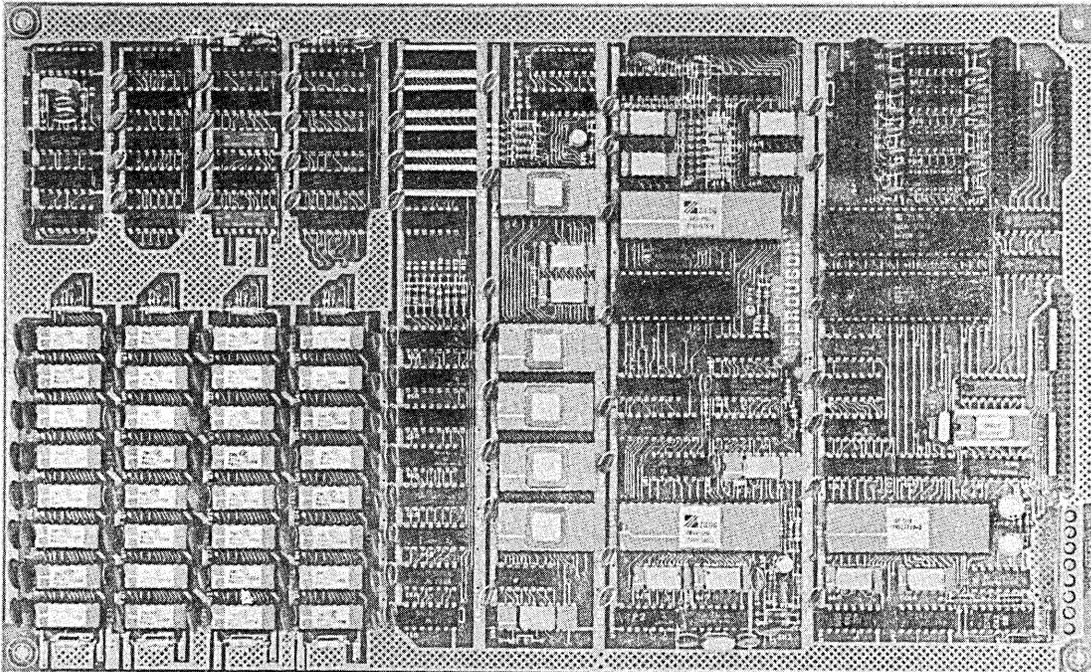
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# MICRO CORNUCOPIA

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April 1982

The Journal of the Big Board Users

No. 5

## All Write!



### Word Processing

Well, here it is, word processing from one who processes words hour upon hour, day after day. Actually I don't write text all the time, it just seems like it.

Quite a bit of this issue is devoted to word processing, but it barely scratches the surface of this immense field. The software I am now using is not necessarily the best; it's what I'm using, and it does the job very well. If it didn't do the job well, I wouldn't be able to produce Micro C in my "spare time."

### New Products

The last month or so has been very interesting for us. We have been trying to get several new things ready to distribute to the group. It's really a lot of work. Even an apparently simple task like putting together a new User disk almost didn't get done in time for this issue.

This process really makes me appreciate the amount of effort that goes into getting a product ready for market. It was March before we began shipping FORTH IN ROM despite being certain in early January that it was "a smidgin away from perfection." Thanks to Hampton Miller, Arne Henden, Sig Peterson, and, of course, Rob Devoe, FORTH IN ROM got shaken out very stoutly. (And having it resident in the system is really growing on me.)

### 'Undo' carefully

A couple of poor folks have called asking how to undo the damage they did to their directory after 'Undoing the Fatal Erase' (see page 10 in issue #4).

They didn't reboot the monitor (a HARDWARE reset) after correcting the directory.

If you don't want to take any chances with your disks, simply use the Memory command (MF72F) and change the 0A8H 'write' back to a 088H 'read' manually. Then you can read-on (not write-on) in peace.

### Mail

Delivery time for Micro C has always been slow because we are mailing bulk rate.

Issue #1 took 7-10 days on the west coast and 14-21 days on the east coast. Issue #4 took 15-25 days on the west coast and the east coast is still receiving it (after 41 days). My father-in-law lives about 15 miles from here and he received issue #4 on February 25th. We mailed issue #4 on February 5th.

Also, bulk mail gets lost fairly easily. One subscriber has yet to receive an issue via bulk mail (his subscription began with issue #1), but he has received every follow-up issue we sent via first-class (same label).

Bulk mail does not get forwarded. Period. Even if you leave a forwarding address and bribe your postman, the post office simply ash-cans bulk mail if you're not there.

Anyway, I thought I'd let you know what the situation is. I suspect that more folks will opt for first-class once they find out the kind of service they are getting from the post office. First-class is still very good. Three days seems to be the maximum anywhere in the US.

### Final note

Daryl Coulthart, author of "Translating Your Keyboard" in issue #4 was also the source of the Designer's Corner in that issue. Thanks Daryl.

David Thompson  
Editor & Publisher

# Letters

Dear Editor,

Congratulations on producing three excellent issues of Micro-C.

I bought a bare Big Board early in 1981 and over a period of about 6 months, accumulated enough parts to bring it up. I'm using it with a Keytronics Word Processor keyboard and a converted TV set. I had two problems with the board when I first turned it on: 1) a bad data bus buffer and 2) extreme instability in the video crystal oscillator (!?!). To be fair to Digital Research, I did not buy the crystal from them, but got it from Quality Computer Parts in California. The fix was easy: a 100 pf capacitor from pin 13, U11 to ground.

One should be verrry careful with the 4 MHz mod in Micro-C #2. The asymmetric clock does not satisfy Z80A specs. I tried two Z80A's. One ran the monitor memory test OK, but crashed when I tried to run CP/M (wiped out the directory, too). The other Z80A seemed, at first, to run everything OK but after about 10 minutes certain instructions started to fail a few percent of the time. I could get the processor to work again by dabbing alcohol on it, cooling it off. Evi-

dently, as the Z80A heats up, the internal timing changes just enough to make some instructions unreliable.

My next project for the Big Board is to interface a graphics display to the parallel port (probably something similar to the Micrograph display described in Byte) and use the Big Board—graphics display to emulate a Tektronix 4010. I would be very interested if other Big Board owners have ideas on the subject.

**Ken Stephenson**  
Physics Division  
Argonne National Laboratory  
Argonne, IL 60439

Dear Editor,

What's our exciting adventure? We are trying to interest a large corporation here in building its own micros (20-30). We have the staff and expertise to do it, and the corporation wants to use micros but it is afraid of the lack of support from local agents.

We provide hardware and software support for our own minis (Four-Phase 1V90s) throughout Kuwait, Saudi, and Iraq.

Now the corporation wants micros scattered around the Gulf for production and materials control systems and also as front-end processors for equipment and labor systems. This remote processing will cut down on communications from the sites to the headquarters. (You can imagine what data communications is like here—you tell Ahmad to ride his camel to the head office with the tapes.)

If we can talk the corporation into assembling its own micros, it will be cheaper and support will be guaranteed. A few spare boards on hand will do the trick.

**Todd L Davis**  
Computer Department  
ICG  
Box 25068  
Safat, Kuwait

Dear Editor,

Thank you very much for sending me issues 1-3 of Micro Cornucopia. I found the quality of the editorship and contents outstanding, and look forward to receiving further issues.

I am grateful for the tip that the 8th bit on the keyboard can be used despite the statement in the BB manual. So, I have purchased a surplus Keytronic keyboard with 12 8-bit special function keys and am now working on a patch to the key-

board area of the ROM so I can use these functions.

Incidentally, I changed my flashing cursor by using DDT to create the following program at 100H.

```
MVI A,85  
STA FF76  
RET
```

I then 'SAVED' it as CURSOR.COM. It's not a true reverse video type of flashing cursor but I find it very useful when using DATASTAR to enter fields of dashes.

Also, I noted that one of the letters in issue #4 (pg 2) mentioned random upper/lower case changes. I had that problem and after much playing with the stash routine at FF33H, I traced the trouble to the keyboard encoder. It was generating random control codes. So, I was immediately in the market for a new keyboard.

**Peter Duckworth**  
11 Chelsea Embankment  
London SW3 4LE

Dear Editor,

I wanted to let you know how much I enjoy each issue of Micro C. In addition to being technically and graphically 'top shelf', one of its best features is its distinct personality. It certainly is a publication with a great deal of heart.

I'd like to suggest that Micro C continue and perhaps even increase its promotion of program readability by encouraging authors to clearly document their programs. (Perhaps they should read *Software Tools* by Kernighan & Plauger.

If space permits, I'd like to see each program accompanied by its functional equivalent in 'algorithmic language', a flowchart, or a paragraph of text (in that order).

As you can tell, program clarity and readability is one of my personal crusades and I'd like to volunteer to walk through some programs before they are published. My bookshelf includes both the Kernighan and Plauger book (the latest edition in Pascal) and Brodie's book on FORTH. (A neat book. I can tell from reading it that he and I would probably be great friends.) And I wish to help Micro C become even better.

**Philip Plumbo**  
1128 Dayton Ave  
St Paul MN 55104

*Editor's note:*

*Thank you very much for the offer, Phil. I will definitely be taking you up on it.*

■ ■ ■

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# Word Processing At Micro C

By David Thompson

I can visualize myself doing my writing off on some quiet mountain meadow or a secluded, sheltered beach, a place far away from the bustle and jangle that normally surrounds me. So, writing could once again be my connection with a mystical self.

Unfortunately, however, I will no longer wander off with a pen, a pad, and a crust of bread to tirelessly scratch out prose. The bread sounds OK but I refuse to scrawl ideas, one by one onto a piece of college-ruled wood pulp.

So, until someone comes up with a compact, CMOS Big Board, I'm tied to a power line because I'm absolutely addicted to word processing.

I am now using the following software.

1. Vedit (text editor)
2. Scribble (formatter)
3. The Word (spelling)
4. Unica (unix-like functions)
5. My typesetting formatter

And the following hardware.

1. The Big Board (three 8" drives)
2. MX-80 printer (dot matrix)
3. Diablo 1650 printer

## Word processing at Micro C

Almost everything in the magazine has come in on disk. I do an initial edit before dumping new articles out on the Epson printer. This output gets the final editing.

After I've entered all the changes on the articles, Sandy takes new printouts and character counts (done by Unica) and lays out the issue. She specifies type sizes, highlights subheads, figures out headlines, and so on. This process takes about a week.

Once Sandy has things pretty well placed and specified, I enter the typesetting control codes so that the type will come out the right face, size, spacing, width, etc. This usually takes three or four evenings.

Once all the text is ready to go to typesetting, I run it through a reformatting program (ala Lynn Cochran) that makes the disk readable by the typesetting controller. Now Patti Morris and Martin White get to cor-

rect all the formatting errors I made (the after-1 a.m. ones are the most interesting) and then output the typeset copy.

We get the typeset text in sheets (called galleys) and Sandy then spends a week pasting them onto large two-page boards called flats. If we find any drastic errors then we have to have some type reset, otherwise we just vow to do better next issue (vows are better than nothing) and plug on.

After the flats are finished we heave a big sigh of relief and take them down to Dave Cramer (the printer). About a week later we get back 24,000 pages of magazine to collate, staple, trim, label, resort, count, and mail.

The whole process from the time the writing and editing are finished

to the time we mail an issue takes 4 to 5 weeks.

So, I get 3, maybe 4 weeks to select the material for the next magazine, write any additional articles, review any relevant or irrelevant software, and get the editing done.

Meanwhile I'm getting further and further behind on correspondence, as many contributors well know. (I love you all and I think of you in my dreams when I have time.) Therefore, extra little projects like entering the Crowe Assembler source take 6 months or more and neat little software tools don't get done.

I no longer have any trouble focusing my energies, just focusing my eyes.



## Wordstar, A Word Processor

Review by Jim Showker, Jr.

11174 Penrose St. #6  
Sun Valley, CA 91352

Without question, Wordstar is the most popular word processing program on the market. It is the mainstay of the Micropro line and everything the company sells is an extension for Wordstar.

I got the Big Board so that I could write letters and technical articles at home. So it is very nice having a system that works well with Wordstar.

The BB emulates an ADM3-A which is on the Wordstar configuration menu. This makes it very easy to get up and running since you don't have to make any software patches.

### Using Wordstar

Wordstar's best feature is its main menu which is displayed at the top of the screen. This menu tells you your page and line number, the file name, and a list of common commands.

I especially like this feature because I have a hard time remembering control-character type commands. (This also means that almost

anyone can sit down and begin using it immediately.)

### Features

You can have the program right-justify your text. It does this by adding spaces between words. If you have a variable pitch printer it will add a small part of a space between each letter rather than adding a few whole spaces.

Wordstar does continuous wrap-around. You only have to hit a carriage-return at the end of a paragraph.

The program has a buffer so it can do such things as printing one document while you are editing another, or letting you type ahead of the screen without losing characters. If you run out of RAM space while you are typing, part of the file is automatically written out to the disk without interrupting you.

Page breaks are displayed as a line on the screen. Special outputs in-

(continued next page)

# Vedit, A Text Editor

By David Thompson

If I had to describe Vedit in a few words, I would say that it's small (11K), fast (works primarily in memory rather than on and off the disk), simple (but becoming less so with all the new features they are adding), and user friendly (it operates predictably).

Configuring Vedit for the Big Board is simple: you select 'Xerox 820' from the menu, choose which control keys will perform which functions, and you're set. (It's a real advantage to have famous offspring.)

One thing I particularly like about Vedit is that it doesn't do its house-keeping in the file. Wordstar does this with a vengeance and so printers, assemblers, typesetters, utilities, and other editors some-

---

*(Wordstar continued)*

clude underlining, double strike, boldface, and overstrike.

Mailmerge (an option) lets you produce personalized form letters and do some other special types of printing.

Wordstar relabels the original file as a backup and the just-edited file becomes the document file (this is standard for text editors).

There is a special mode for creating and altering assembly language source files. *Editor's note: This non-document mode doesn't fill the file with special Wordstar control characters.*

## Negatives

Wordstar is quite expensive and unless you need all of its facilities the cost is hard to justify. It also takes a while to become conversant with all the features, but the menu makes it quite easy to get started.

All in all, Wordstar comes close to being a universal word processor. It will handle almost any conceivable task. Whether it is worth the money is up to you.

**MicroPro**  
1299 Fourth St  
San Rafael, CA 94901



times gag when they see Wordstar files. If you are preparing material for other folks (including Micro C) please run Wordstar in the non-document mode.

## Running Vedit

Vedit works in two modes, visual and command. Visual mode does what you'd expect any true screen editor to do. You can go scrolling around, typing over text, inserting text, deleting text, and moving text from one place to another. An 'undo' command returns the current line to its original form. In visual mode the commands are CNTL-KEY and ESC-KEY sequences.

The command mode is a very powerful line editor with many more features than CP/M's ED and a much better user interface. You do the global searches and replaces in the command mode and you can change many of the system setups such as tab stops, indentation, and line width. You can insert all or part of a disk file into the file you're editing, or you can send any part of the file you're editing to the printer or the disk. (And that's just a start.) In this mode, one or two ordinary characters make up a command.

## The manual

I tend to use a manual as little as possible. I like to skim through it initially to get wind of how a package should work and then I refer back when I don't know how to do something. Vedit's short tutorial, the detailed command descriptions, and the brief command descriptions work quite well for me. There are more sections in the manual but I haven't read them and probably won't ever need to. It's a clear, complete manual.

## Updates

During the last five or six months I've seen three updates. Each has added a significant feature to Vedit.

For instance, they have added a simple word-fill formatting function that fills each line of a paragraph to within one word length of the line width you specify. They have also

added word-wrap which automatically adds a carriage-return, linefeed each time your line reaches the specified length. This feature is particularly important when you are entering text from written copy and don't want to have to watch the screen.

The following are some improvements they say are coming:

1. A split screen display to let you see what you're doing in command mode.
2. Easier to use search and replace commands (yippee).
3. Conditional global substitution using the visual mode.
4. Making the command mode more powerful and more Teco-like.
5. Adding additional text registers (yahoo).
6. Execute text registers as macro commands (hooray).
7. Do extensive terminal initialization such as programming function keys.

Once you have purchased Vedit, you can subscribe to the update service. For \$50.00 you get two updates (once every few months). And, considering the additions they are planning to the editor it would certainly appear worth it.

## Bug

I have found only two bugs in the latest version of Vedit. The configuration doesn't set the word wrap line length correctly (but the command mode does), and occasionally I lose a character or two when I have it format a paragraph.

## Conclusion

Vedit is a very powerful text editor though it doesn't have the menuing or complete word processing facilities that Wordstar has. However, at only \$145.00 Vedit does a lot for the price.

**Vedit**  
**CompuView Products**  
618 Louise  
Ann Arbor, MI 48103



# Two Great Spells

By David Thompson

I would be lost without a good spelling program to make a final check of the Micro C text before it goes to the typesetter. A good spelling program not only points out those little differences of opinion between my built-in dictionary and Webster's latest, it also ferrets out most of those buggy little typos.

I have two spelling programs, both donated for review by their authors (bless their hearts). I have used The Word on issues #3 and #4. I received Spell after completing issue #4.

They are both first class. They both work quickly and efficiently even though their methods and lists of features are quite different.

## User friendliness

The Word is friendly until you have to review the words. REVIEW shows you only one word at a time and the word is all upper case. This makes it difficult to remember how it was used. Also, it is frustrating to not be able to invoke LOOKUP from

REVIEW. I spend many minutes looking up words in my old Webster's so I'll know if the word should be marked or added to the user dictionary. (Note, The Word's new version, announced at the Computer Faire lets you use LOOKUP and enter corrections while reviewing suspect words, and it will display the words in context—rates a 5 in this category. However, The Word Plus, as this extended version is called, costs \$150.00. The original Word is still available for \$75.)

Meanwhile, Spell presents a true upper/lower case display of the questioned word which helps a lot. Was the word 'TI' (Texas Instruments) or 'ti' (it backwards)? Spell also forces me to go to Webster's before adding questionable words to its dictionary. In fact the consequences of adding an incorrect word to the Spell dictionary are worse than for The Word.

The Word keeps the user additions in a separate, plain-language file that I can go back and edit at any

time. So if I goof and add an incorrect word, I can remove it. Spell incorporates any new words into the hash table so there is no way to review the words I have added and there is no way to remove a word.

## Versatility

Here, The Word really shines. WORDFREQ, WC, FIND, and LOOKUP are all very useful functions that are only available in The Word. Plus, each of the functions is a separate program which means you can use them individually.

## Price/Performance

Compared with \$200.00 or more for less adequate performers, both of these packages qualify as the real bargains in spelling software.

## Disk space requirement

I like to keep spelling software on line all the time, so size is significant. (If it's not there I tend not to use it when I should.) The Word is definitely larger, so if you are using only

## The Word

Price: \$75.00

Dictionary size 45,000 + words, 138K bytes.

**Word storage** Complete words in alphabetical order (words not separated into roots, prefixes, and suffixes).

### Compression scheme

|             |            |
|-------------|------------|
| normal      | compressed |
| ABACK       | ABACK      |
| ABANDON     | 3NDON      |
| ABANDONING  | 7ING       |
| ABANDONMENT | 7MENT      |

**Word display** Words are displayed as all capitals (one area where The Word is not as user-friendly as Spell).

### Utilities

|          |      |      |
|----------|------|------|
| DICTSORT | .COM | 2K   |
| FIND     | .COM | 1K   |
| LOOKUP   | .COM | 2K   |
| MAINDICT | .CMP | 139K |
| MARK     | .COM | 2K   |
| REVIEW   | .COM | 2K   |
| SPELL    | .COM | 3K   |
| WC       | .COM | 1K   |
| WORDFREQ | .COM | 2K   |
| TOTAL    |      | 154K |

Oasis Systems  
2765 Reynard Way  
San Diego, CA 92103

### Descriptions

#### DICTSORT file.ext

Alphabetizes file.ext so it can be used as a dictionary or mark source.

#### FIND tr??

Returns all four-letter words beginning with tr.

#### LOOKUP mispeled

Returns dictionary words similar to word specified (in this case would return 'misspelled').

#### MARK text.fil

Marks misspelled words in text.fil (prepends an \*). Any alphabetically ordered file can be a source of words to mark.

#### REVIEW

Takes words from the error file and lets you choose to throw them away, use them to mark the text file, or update user dictionary.

#### SPELL text.fil

(1) Check words against standard dictionary. (2) Check words against user dictionary(ies). (3) List words to screen, file, printer (any or all). (4) Can ignore lines beginning with a period or colon. (5) Can ignore words with all capital letters (VERY handy if your copy includes listings).

#### WC text.fil

Counts the number of words in text.fil.

#### WORDFREQ text.fil

Lists the unique words in text.fil and indicates the number of times each is used. It also counts the total words, the unique words, and the number of words which occur only once. The list can be done in alphabetical order.

one or two single-density drives, space is a real consideration.

### Dictionary expansion

Both spelling packages make it easy for you to expand the number of words they will recognize. The Word lets you add words to your heart's content. The only penalty is that the user dictionary grows as you add words. (My user dictionary is only 3K—about a hundred words—so that doesn't appear to be much of a problem.)

Spell has somewhat limited expandability because of the trade-off between the size of the dictionary and the accuracy. Also, Spell doesn't let you review or remove words you've added to the dictionary.

### Roots vs whole words

By storing only the roots in its dictionary, Spell gains a real size advantage over standard spelling routines. Also, Spell gives you the advantage of only having to enter a word into its dictionary once. You won't see 'involvement' and 'involving' as errors after entering 'involve'. On the other hand, Spell will not detect incorrect use of prefixes or suffixes (The Word will).

### Speed

Spell checked a 5K text file in 27 seconds finding 14 suspects, it checked a 52K file in 131 seconds finding 167 suspects. The Word checked the 5K file in 63 seconds finding 5 suspects, and it checked the 52K file in 108 seconds finding 148 suspects.

There were 12 incorrect words in the 52K file; both found all 12.

### Conclusion

If I were to purchase a spelling program today it would certainly be one of these. If I had double density, and did crosswords, the choice would be The Word, hands down. If I had one or two drives, single density, and used the program only occasionally then I would lean toward Spell.

### Comparison Table

|      |       |                      |             |
|------|-------|----------------------|-------------|
|      |       |                      | 1=POOR      |
|      |       |                      | 3=GOOD      |
|      |       |                      | 5=EXCELLENT |
| Word | Spell |                      |             |
| 3    | 4     | User friendliness    |             |
| 5    | 3     | Versatility          |             |
| 5    | 5     | Price/Performance    |             |
| 3    | 5     | Disk space required  |             |
| 5    | 3     | Dictionary Expansion |             |
| 4    | 4     | Speed                |             |



### Spell's Data Compression

Spell adds a word to the dictionary by hashing it (using its characters to calculate a number) and using the number as the address of a bit in the dictionary (table). That bit is set to one.

This hashing is done six more times, each time using a different function to calculate an address, and each time setting the addressed bit to one (even if the bit had been set to one by a previously entered word).

The program then checks a word against the dictionary by hashing the word with the seven functions and then verifying that the seven bits addressed are ones. If any are zeros, then Spell checks to see if it can strip off any prefixes or suffixes. If so, it goes through the hash routine again, if not, it reports the word as an error.

Of course, as more and more words are added to the dictionary, it begins to fill with ones. As this happens it becomes more likely that all seven hash codes generated by a misspelled word will point to ones. The manual reports that Spell will miss approximately 2.2 errors for every thousand errors it finds. If you add a thousand additional words to the dictionary the miss rate will increase to 2.9 per thousand errors.

For more information about the hashing technique see Knuth, Vol. 3 of *The Art of Computer Programming*, 561-562, and Bloom, *Communications of the ACM*, 13 (1970), 422-426.

## Spell

The Software Toolworks  
14478 Glorietta Dr  
Sherman Oaks, CA 91423

### Descriptions

#### AFFIXTAB.SPL

This is the table of prefixes and suffixes. You can modify it with a standard text editor if you want to add or remove any appendages.

#### DICTNARY.SPL

This is the hash table that comes with Spell. Using Spell, you can add words to this table or create a whole new table of your own.

#### SPELL file.txt

Spell checks words against the dictionary and creates an alphabetical list of the words not found. This list can go to a file, to the screen, to the printer, or the list can be displayed for user selection.

The user selection (almost identical to REVIEW and MARK above) lets you (M)ark the word in file.txt, (I)gnore the word, (A)dd the word to the dictionary, or add the word's (R)oot to the dictionary.

Spell marks a word in the text file by replacing the last character with a # (or other specifiable character). You can use DDT to change Spell's defaults or you can change them on the command line.

Price: \$49.00

Dictionary size 50,000 + words, 30K bytes.

Word storage 18,500 root words plus common prefixes and suffixes (user extendable).

Compression scheme Seven-function hash coding (see the data compression box for more information).

Word display Words are displayed in both upper and lower case, just as they appear in the file.

### Utilities

|               |     |
|---------------|-----|
| AFFIXTAB .SPL | 1K  |
| DICTNARY.SPL  | 30K |
| SPELL .COM    | 13K |
| TOTAL         | 44K |

## Smartkey

Review by Patti Morris

409 SE 21st  
Portland, OR 97214

Smartkey is a simple CP/M compatible utility which lets you redefine any of the characters your keyboard can produce. This software can not only translate characters one-for-one like 'Translating Your Keyboard' (Issue #4, page 6) but it can also translate a single character into a character string. Once loaded, Smartkey remains active until terminated by a companion utility called Fixkey or until you hit the reset switch (it uses 4K in high memory).

For typesetting, Smartkey is a lifesaver. We bought the Big Board to provide backup for our typesetting front-end (a Quadex).

The Quadex uses lots of character and function keys and they have to be touch-typist accessible. We bought a fancy Microswitch keyboard, with a lot of keys but the key outputs were not what we needed at all.

Now with Smartkey, we can set up the Microswitch keyboard on the Big Board to match the keyboard on the Quadex. Because many of the characters that the Quadex uses are control characters which lie between 00H and 20H (and the BB doesn't print these), we translate these keys into displayable strings.

For instance, the key which normally generates a 19H on the Quadex keyboard (causes the typesetter to do a "quad left") gets translated into the string "{ql}". Later, the Quadex changes the "{ql}" back into 19H before the file goes to the typesetter.

Smartkey lets you redefine a key any time, even without getting out of an editor, etc. To start a definition, hit the key you've defined as "KEYDEF", then the key you want to redefine, followed by the characters that key will become and finally, enter hit "KEYDEF" again to terminate the definition. If you hit "KEYDEF" twice to begin a definition then the key you are redefining takes on the HEX equivalent of the characters which follow.

Fixkey lets you view the present

(continued next column)

## Scribble, A Text Formatter

By David Thompson

Scribble is an extraordinarily versatile text formatter. In fact, it does so many things that I could fill this magazine with this review alone.

When I looked through the 100+ page manual, my first thought was that it would be months before I'd be printing justified lines, bold face characters, underlines, footnotes, pageheadings, and so on.

However, despite its long list of commands (called environments and directives) and deluxe giant size manual, it has an incredibly nice set of defaults. Scribble will take straight text and turn it into square-looking justified paragraphs.

A blank line tells Scribble that you want a new paragraph. And, if you add a half dozen simple commands, you get bold face, centered titles, underlined characters, ragged right, or whatever.

### The manual

You probably know by now that I am a sucker for friendly manuals. Well, there are places in this one that are absolutely delightful. Don't tell anyone but it's obvious that there is a rabid wit chained somewhere deep in their dungeons.

The manual's before-and-after files showing the commands and the results are better reading than an old MAD magazine.

However, the manual will require some serious reading because no matter how friendly it is or how good the defaults, you still need a solid understanding of this complex and powerful tool, and that will take some time and experience. I have been using Scribble regularly now

---

(Smartkey continued)

key definitions or save them on disk. Another utility (called Install) helps you set up Smartkey for special terminals and inquires whether your keyboard can generate 8-bit characters. If so it will reset the 8th bit for you.

(continued on page 12)

for about 3 months and I still go back often to the examples and the quick reference section.

### Printers

Scribble understands many printers including: Epson MX-80 and 100, Diablo, NEC, IDS, and Centronics. Plus you can set it up for just about anything else that makes marks on paper. The setup is menu driven so it is not difficult.

### Example output

The E.C.R.L. ad in this issue was formatted by Scribble.

### Conclusion

Scribble is probably the best deal in a full service stand-alone text formatter. It handles proportional space fill, proportional print wheels, underlining, inserting names in form letters, centering, bold face, page headings, page footings, superscripts, subscripts, footnotes, numbering (chapters, sections, and subsections) and so on. It will wait for you to feed single sheets if you'd like and it will let you enter material into a printout directly from the keyboard.

Scribble is available for \$175 from:

**Mark of the Unicorn**  
**PO Box 423**  
**Arlington, MA 02174**

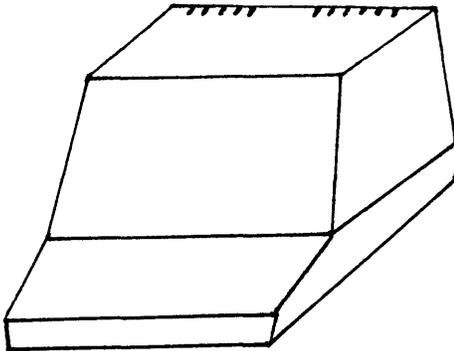
*Note: Mark of the Unicorn also produces a text editor called Mince. Mince is a VERY fancy editor with a Word Star size list of commands. I don't use Mince because I like to write in silence (the disk drive motors off) and Mince continually accesses the disk (it doesn't keep the text file in memory). Mince is also perceptibly slow at doing certain commands such as long rubouts.*

*However, Mince's features greatly outweigh its slow response time for a number of folks I know. In fact, many who have tried Word Star, Vedit, and Mince have stayed with Mince.*

*You can buy Mince for \$175 directly from Mark of the Unicorn, or you can buy Mince from SuperSoft (they have renamed it Star-Edit) for \$225. It's the same thing with the same manual.*



# SPRING CLEARANCE SALE WHILE SUPPLIES LAST



## ENCLOSURES

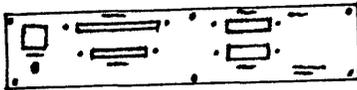
Four piece high-impact thermoplastic enclosure consisting of base, keyboard mounting plate, shroud and tinted plexiglas screen. Can be cut and drilled with ordinary hand tools. Ample room inside for a Big Board, keyboard, power supply, 12" monitor, and a mini-floppy disk drive. Lots of ventilation holes with a space for mounting a 4" muffin fan. Available with blank keyboard panel or precut for Cherry PRO and auxilliary keyboards. PLEASE SPECIFY. Color—Blue. SIZE: 21" D x 19" W x 16" H.

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Give your computer that professional look with these silk screened 12" x 3" aluminum panels. Cutouts for disk, PIO, two RS-232 connectors, convenience outlet and line cord.

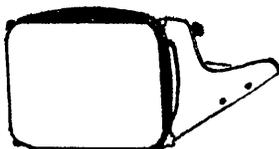


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## MONITORS

These 12" Motorola monitors provide sharp, clean characters in an 80 x 24 format. Wide 15 Mhz bandwidth with 800 line resolution, excellent geometry and separate video and sync inputs. Open frame design. Requires 12 VDC at 1.2 amps.



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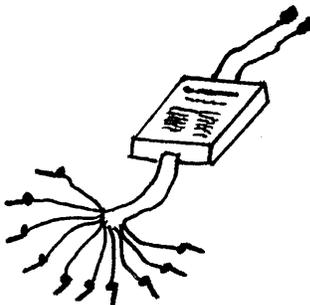
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# FORTHwords

A column by Arne A. Henden

7415 Leahy Road  
New Carrollton, MD 20784

& Hampton B. Miller

P.O. Box 816  
Carpinteria, CA 93013

In this column, I will present some simple benchmarks for FORTH systems and continue the reviews. As an addition, you will find a simple timer designed around the Z-80 CTC. Version 1 of UNIFORTH (renamed from HART-FORTH) is now available. (See ad.)

From here on, Hampton Miller will be helping me with this column. Hampton is a long-time FORTHer and has different opinions on many subjects. He should be a good complement for the column.

## Hampton Miller writes:

My first encounter with FORTH, or at least with its close relative STOIC, was around 1977 through the auspices of the late Digital Group. What an incredible sales spiel they gave! Why, if one were to believe the claims, all of the systems software usually associated with my trade (text editors, compilers, linkage editors, even the operating system itself) could be replaced by a small kernel and some machine independent extensions. To this I could add anything I needed to suit the situation.

I was unimpressed, however, having dealt with religious fanatics before. So, forgetting this foolishness, I applied myself to slaving over a machine language monitor which I never finished. Years later, the August 1980 BYTE showed me the error of my ways and commuted my sentence.

Today, I use FORTH to quickly and conveniently verify algorithms which may then be coded in C or some other language, even (shudder!) assembly language.

Since 1971 I have been a systems integrator for the State of California; Digital Equipment Corporation (DEC); and original equipment manufacturers (OEMs), including the Heath Company.

I work and live in an environment of PDP-11s, VAXs, and microprocessors. My software tools are all written in FORTH, and I have brought the FORTH Interest Group's FIG-FORTH up under several operating systems and processors. When I encounter a new processor, I just buy the FORTH listing for it from FIG and move my tools over.

One of the most important aspects of FORTH, as a complete software system, is that it can be completely understood by one person. This is a far cry from the jungle of operating systems and software development systems in use today.

The hard part is getting it up for the first time. I assembled FIG-FORTH for the PDP-11 under the RT-11 operating system after rewriting the terminal and disk I/O routines for stand-alone (bye, bye RT-11!) operation. I also replaced the DEC bootstrap on the disk with my own which just loads memory from the first 56 FORTH blocks, restores the stack pointer and returns to its caller (think about it).

So, I run FORTH under RT-11, execute a FORTH routine which saves the machine state (including the stack pointer), copies all of memory out to the disk (skipping the boot block!), restores the machine state, and voila! I am the proud owner of a stand-alone FORTH system!

Similar things can be done for the

Big Board under a friend's CP/M. My special thanks to Butler W. Lampson and Robert F. Sproull for their excellent paper, 'An Open Operating System for a Single-User Machine'. (See the Proceedings of the Seventh Symposium on Operating Systems Principles, published by the Special Interest Group on Operating Systems (SIGOPS) of the ACM.

*Hampton*

## FORTH benchmarks

Each attempt to present benchmarks is controversial. My use of FORTH benchmarks has been to compare different processors for speed and ease of use. Benchmarks also show up the relative merits of different algorithms.

You must realize that any implementation of FORTH makes trade-offs between speed and memory conservation. FIG-FORTH uses a very small kernel of machine language routines, and builds all other routines upon these. This makes converting to other processors simple. Other versions such as SL5 and GSFC use many more machine language definitions.

My feeling is that the 10 to 20 percent speed advantages are usually outweighed by increased complexity and size.

The benchmarks labelled T1 through T17 show the speed of FORTH implementations for basic arithmetic operations. The time found for each test was divided by the number of iterations to determine the time per loop. Then the time for the loop structure (T1 or T11) is subtracted to obtain the time

```
SCR # 1
0 ( FORTH benchmark tests -- 1...integer functions)
1 ( Run each function with noted input. Then divide by)
2 ( the number of iterations. Finally, subtract the time)
3 ( of T1 or T11 from each time. A. Henden 1982)
4 : T1 30000 0 DO LOOP ;
5 : T2 30000 0 DO I + I - LOOP ; ( use 1 for input)
6 : T3 10001 1 DO I * I / LOOP ; ( use 1 for input)
7 0 VARIABLE W
8 : T4 30000 0 DO W @ W ! LOOP ;
9 : T5 30000 0 DO W C@ W C! LOOP ;
10 : T6 30000 0 DO 3, D+ LOOP ; ( use 3, for input)
11 --½
12
13
14
15
```

```
SCR # 2
0 ( FORTH benchmark tests -- 2...floating functions)
1 : T7 10000 0 DO FLOAT FIX LOOP ; ( input 2.113,)
2 : T8 10000 0 DO 2.5 2.5 F* 2DROP LOOP ;
3 : T9 10000 0 DO 2.5 1.2 F/ 2DROP LOOP ;
4 : T10 10000 0 DO 2.5 2.5 F+ 2DROP LOOP ;
5 : T11 1000 0 DO 2DUP 2DROP LOOP ;
6 : T12 1000 0 DO 2DUP SQRT 2DROP LOOP ; ( input 2.113)
7 : T13 1000 0 DO 2DUP LOG10 2DROP LOOP ; ( input 2.113)
8 : T14 1000 0 DO 2DUP EXP 2DROP LOOP ; ( input 2.113)
9 : T15 1000 0 DO 2DUP ATAN 2DROP LOOP ; ( input 2.113)
10 : T16 1000 0 DO 2DUP SIN 2DROP LOOP ; ( input 2.113)
11 : T17 101 1 DO I BLOCK DROP LOOP ;
12 ;S
13
14
15
```

Figure 1. FORTH screens

for the operations inside the loop. These tests are shown in Figure 1, and the results are given in Table 1.

It's remarkable how similar most FORTHs are! You will gain more by optimizing your application than trying to choose the fastest FORTH.

### Implementation Notes

**Z-80 FORTH:** The software conversions and F+ are remarkably fast! In my review, I mentioned that you should define floating point values as constants if they are to be used within loops. For T8-T10, not using constants slows the times down by a factor of 4 from those shown in the table.

**Timin FORTH:** The disk access is again long on the Big Board because of timing problems with the 3-sector skewing scheme. A 4MHz system would presumably be much faster. T11 time is long because Timin defines 2DROP as a colon word.

**URTH:** Note that though this version uses the 9511, times are slightly slower than L.S. Z-80: 8080 interfacing was used instead of the multi-I/O instructions of the Z-80. Using the 9511 for integer multiply and divide speeds T3 up by 3.3x over the FIG model. However, double precision addition using the 9511 (T6) is slower than doing it in software!

**SL5:** Very few extensions are available for this version and so table entries are slim. Note however, that T3 is fast! Stackworks has used the Zilog algorithms for multiply and divide, utilizing the Z-80 efficiently.

**UNIFORTH:** The disk access time is short because the routines have been optimized for the Big Board. One novel feature of this FORTH is

that the skewing factor is user adjustable and therefore can be optimized for other systems. Note that with proper optimization, you can perform multiply/divide faster than interfacing with the 9511!

**GSFC FORTH:** This is included to demonstrate the speed advantages of a mid-sized minicomputer. You get an 8x advantage on most operations, with 30x on integer multiply/divide and 80x on basic floating point operations because of the hardware support. Tests T12-T16 are only 3x faster than the 9511, because they are performed in software on the PDP-11/44.

**ROM FORTH:** This test was on version 1.0. It showed no bugs and typical FIG-FORTH times.

**T17:** This test demonstrates some of the problems with benchmarking. Each version of FORTH works well on the system used to develop the language. On other systems, processor speeds and head load/seek times can dramatically change the result.

### A Hardware Software Timer

Most Big Board owners have by now purchased a CTC for their board. Listed in screen 3 are some machine-language words to use the CTC for timing software routines. These routines are written for UNIFORTH, but are easily converted for Z-80 FORTH. The interrupt handler is in machine language to be as fast as possible.

CTC#0 is set in the timer mode to interrupt every 0.009946 seconds. The variable KNTR is used to count clock ticks. STIMER clears KNTR and sets CTC#0 to the proper mode. Routine \$INCR does the actual incrementing on each clock tick. It takes about 30 microseconds for each interrupt, or less than one percent of the CPU time. ETIMER takes KNTR, scales it by the lost time due to \$INCR, and prints the final value.

To use these words, load the block. Call STIMER before the loop to be timed, and ETIMER after the

(continued next page)



Table 1. FORTH benchmarks

| Test | L.S.  |       | Timin | URTH  |     | UNIF |   | SL5    | GSFC |   | ROM |  |
|------|-------|-------|-------|-------|-----|------|---|--------|------|---|-----|--|
|      | A     | B     |       | A     | B   | A    | B |        | C    | B |     |  |
| T1   | 63    | 61    | 73    | 57    | 69  | 96   |   | 7      | 73   |   |     |  |
| T2   | 123   | 119   | 129   | 97    | 127 | 131  |   | 14     | 127  |   |     |  |
| T3   | 3430  | 3240  | 3340  | 1054* | 741 | 1400 |   | 36     | 3346 |   |     |  |
| T4   | 105   | 101   | 100   | 83    | 100 | 117  |   | 21     | 100  |   |     |  |
| T5   | 99    | 97    | 96    | 90    | 96  | 111  |   | 24     | 96   |   |     |  |
| T6   | 114   | 107   | 119   | 242*  | 117 |      |   | 19     | 119  |   |     |  |
| T7   | 803*  | 620   | 3910  | 920*  |     |      |   | 31\$   |      |   |     |  |
| T8   | 717*  | 3910  | 2460  | 840*  |     |      |   | 56\$   |      |   |     |  |
| T9   | 800*  | 4950  | 3690  | 1000* |     |      |   | 51\$   |      |   |     |  |
| T10  | 660*  | 790   | 1890  | 790*  |     |      |   | 42\$   |      |   |     |  |
| T11  | 136   | 137   | 220   | 100   | 133 | 162  |   | 17     | 150  |   |     |  |
| T12  | 632*  | 39560 |       | 890*  |     |      |   | 292\$  |      |   |     |  |
| T13  | 2700* |       |       | 2900* |     |      |   | 1065\$ |      |   |     |  |
| T14  | 2500* |       |       | 2900* |     |      |   | 975\$  |      |   |     |  |
| T15  | 3010* |       |       | 3100* |     |      |   | 1323\$ |      |   |     |  |
| T16  | 2290* |       |       | 2400* |     |      |   | 685\$  |      |   |     |  |
| T17  | 41s   | 141s  | 137s  | 37s   | 33s |      |   | 5.5s   | 139s |   |     |  |

\* = hardware assistance from 2 MHz 9511

\$ = hardware assistance from FP-11

all times except T17 in microseconds, adjusted to 4MHz CPU (A&B)

#### Versions Benchmarked

L.S. Z-80 FORTH: version 1.14 Oct 1981  
 Timin FORTH: version 3 Oct 1981  
 URTH: Astrojek version (Ind. Univ.) Oct 1981  
 UNIFORTH: version 1.6 Feb 1982  
 SL5: version 1.2 Mar 1980  
 GSFC FORTH: version 2.3 (RSX-11M) Dec 1981  
 ROM: MicroC ROM FORTH version 1.0 Feb 1982

#### Benchmarking systems

A: IMSAI S-100. 4 MHz Z-80, 4 MHz memory, 2 MHz 9511, Persci voice-coil dual floppy drives.  
 B: Big Board. 2.5 MHz Z-80, 2.5 MHz memory, Siemens floppy drives using 1771 controller.  
 C: PDP-11/44. 10MHz CPU with FP-11 floating point processor, RLO2 10M byte hard disk drives.

SCR # 3

```

0 ( Hardware/software CTC timer, using CTC#0)  HEX
1 0 VARIABLE KNTR ( 0.01 second tick counter)
2 SUBROUTINE $INCR ( interrupt handler, iners KNTR)
3 ( takes 77 clocks or 31 usec @ 2.5 Mhz)
4 HL PUSH, KNTR ) HL LD, HL INC, HL KNTR ) LD,
5 HL POP, EI, RETI, END-CODE
6 : STIMER ( start timer by loading CTC command:)
7 ( A7=timer mode, 256 scale, autorun..97 ticks before)
8 ( interrupt,=.0099331 sec/tick for 2.5Mhz clock)
9 0 KNTR ! OA7 18 P! 61 18 P! ;
10 : ETIMER ( end timer, scale and print result)
11 23 18 P! KNTR @ 3E3 3E8 ( 995/1000) */ 0
12 1# # # 2E HOLD #S #1 TYPE ." seconds" CR ;
13 $INCR OFF! ( move intr. routine adr to CTC vector)
14 DECIMAL ;S
15

```

# USER'S SOFTWARE

20% - 40% off retail. CP/M software for BIG BOARD USERS

|   | list    | users  |   | list    | users    |
|---|---------|--------|---|---------|----------|
| Ashton Tate dBase II                      | 700.00  | 517.00 | Microsoft                                     |         |          |
| Condor I (entry level data base sys.)     | 295.00  | 218.00 | BASIC 80                                      | 350.00  | 259.00   |
| Condor II (relational dbase sys.)         | 595.00  | 440.00 | BASIC COMPILER                                | 395.00  | 292.00   |
| Condor III (relational, w/ report writer) | 995.00  | 735.00 | FORTRAN 80                                    | 500.00  | 369.00   |
| Digital Research                          |         |        | COBOL 80                                      | 750.00  | 554.00   |
| MAC (macro assembler)                     | 90.00   | 78.00  | MACRO 80                                      | 200.00  | 160.00   |
| ZSID (symbolic debugger for Z80)          | 100.00  | 86.00  | Northwest Analytical Statpak                  | 495.00  | 366.00   |
| PL/1-80                                   | 500.00  | 431.00 | Oasis "The Word" (spell check & dict.)        | 75.00   | 56.00    |
| CBASIC 2                                  | 150.00  | 105.00 | Sorcim Pascal/M                               | 395.00  | 292.00   |
| CB 80 (true compiler for CBASIC 2)        | 500.00  | 431.00 | Supercalc                                     | 295.00  | 218.00   |
| PASCAL MT+ VERSION 5.5                    | 475.00  | 409.00 | Structured Systems per module                 | 1250.00 | 738.00   |
| Ecosoft Microstat (advanced statistics) + | 295.00  | 255.00 | Supersoft                                     |         |          |
| Supervyz (simplifies CP/M)                | 95.00   | 62.00  | DIGNOSTIC II (hardware checker)               | 100.00  | 80.00    |
| Faircom Micro B+ (keyed file accessing) + | 260.00  | 208.00 | FORTH (specify Z80 or 8080)                   | 200.00  | 160.00   |
| Quickscreen (screen builder) +            | 149.00  | 128.00 | SSS FORTRAN                                   | 250.00  | 200.00   |
| Graham Dorian (requires CBASIC 2)         |         |        | RATFOR (language enhancer Fortran)            | 100.00  | 80.00    |
| per module                                | 600.00  | 443.00 | SUPER M-LIST (mail list program)              | 75.00   | 59.00    |
| interactive-per module                    | 1000.00 | 738.00 | TINY PASCAL                                   | 85.00   | 68.00    |
| I.S.A. Spellguard (spelling checker)      | 295.00  | 218.00 | DISK DOCTOR (lost data recovery)              | 100.00  | 80.00    |
| Ithaca Intersystems Pascal Z              | 395.00  | 340.00 | UTILITIES I or II                             | 60.00   | 48.00    |
| Key Bits Wordsearch (spelling checker)    | 195.00  | 169.00 | STAR EDIT (text editor)                       | 225.00  | 180.00   |
| Lexisoft Spellbinder (word processor)     | 495.00  | 277.00 | NEMESIS                                       | 40.00   | 32.00    |
| Microtax Level I (fed./individual)        | 250.00  | 154.00 | DUNGEON MASTER                                | 35.00   | 27.00    |
| Level II " "                              | 1000.00 | 615.00 | ANALIZA                                       | 35.00   | 27.00    |
| Level III (fed./partnership)              | 750.00  | 462.00 | ANALIZA II                                    | 50.00   | 40.00    |
| Micro Pro                                 |         |        | Systems Plus                                  |         |          |
| WORDSTAR (most popular word processor)    | 495.00  | 304.00 | FMS 80  | 995.00  | 735.00   |
| MAILMERGE                                 | 150.00  | 93.00  | ACCOUNTING PLUS                               |         |          |
| WORDSTAR/MAILMERGE                        | 645.00  | 396.00 | 1 module                                      |         | 431.00   |
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| SUPER SORT I (sort/merge)                 | 250.00  | 154.00 | 4 modules                                     |         | 1538.00  |
| SPELLSTAR (spell check/dict.)             | 250.00  | 154.00 |   |         |          |
| CALCSTAR (electronic spread sheet)        | 295.00  | 185.00 |   |         |          |
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(FORTHwords continued)

loop execution. Simple as pie! The timer words are extremely useful in checking out different algorithm speeds, such as FIG's multiply routine versus Zilog's routine.

## Next issue

By now, you should now be able to make an intelligent FORTH purchase. My suggestion is to get one of the three inexpensive versions—ROM FORTH, UNIFORTH or Z80 FORTH—as all three are good systems. ROM is necessary if you don't have disk drives, the other two versions offer many options.

Next issue, we will concentrate heavily on applications. For example, I have a whole set of words to control the MX-80 printer, and also to make the Big Board function as a terminal.

Hampton will review UNIFORTH and ROM FORTH, and I am working on some additional applications. Any questions? Just ask!



## Designer's Corner

Those who have Microsoft Basic and a CTC timer can start their pseudo-random number generator at a truly pseudo-random place by using the following:

```
nn RANDOMIZE
PEEK(&HFF6C)
```

Location FF6C is the disk activity timer. If the disk motor is still running, the value will be between 0 and 30. Otherwise, the timer free runs and the value will be between 0 and 255.

John P. Jones  
 5826 Southwest Ave.  
 St. Louis, MO 63139



(Smartkey continued)

If you need to use the 8th bit on the Big Board then use the following mod suggested by Nick Hammond of FBN. Use DDT to load Smartkey and then do the following:

| Loc    | From      | To       |
|--------|-----------|----------|
| 0A64   | JZ 0A7C   | JZ 0A87  |
| 0A87   | CALL 0A94 | LDA 0BF3 |
| (0A8A) |           | NOP      |
| (0A8B) |           | NOP      |

The manual is a little confusing, but most everything you need to know is there somewhere and the screen cues help a lot. If you need to redefine keys on the fly or turn single keystrokes into whole strings, you need Smartkey—it's a very good friend.

Smartkey is available for \$39.00 from:

**FBN Software**  
 1111 Sawmill Gulch Road  
 Pebble Beach, CA 93953

# UNIFORTH

You've heard about FORTH's interactiveness, speed and versatility. NOW HERE'S YOUR CHANCE TO OWN THE BEST! UNIFORTH is a stand-alone FORTH for the Big Board. No operating system is needed -- save your bucks for more important purchases -- but if you have CP/M, there is a utility available for file transfer.

UNIFORTH is FORTH-79 standard, with the double precision integer and assembler extensions. Don't get stuck with the 128-byte "blocks" and slow disk access of fig-FORTH! All code is FULLY OPTIMIZED for the Z-80, and all Big Board devices are supported, such as the CTC for listings with date and time. Included with UNIFORTH are:

- All SOURCE CODE except for a 5K byte kernel, so you can easily modify the system. The kernel source will be available in June as part of the Programmer's Manual.
- An interactive CURSOR-ADDRESSED EDITOR (the best around!). Others charge the price of UNIFORTH for just this alone. All keystroke commands are logical, and include string search and replacement, even across block boundaries. Forget a command? Just inspect the omnipresent menu.
- Full Z-80 ASSEMBLER, using Zilog mnemonics, with completely logical syntax; and it supports the undocumented index register instructions.
- Full IEEE-compatible single-precision FLOATING POINT software. Eight-bit signed exponents yield more range than the AMD-9511. All functions are included, such as sines, cosines and logarithms. Compare with the other FORTHS and see the difference!
- A 136-page USER'S MANUAL. Broken into logical function divisions, it includes many examples and leads you step-by-step through the learning process.

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| Version 1 (without floating point) | \$50 |
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Welcome to an astonishing new experience! ADVENTURE is one of the most challenging and innovative games available for your personal computer. This is not the average computer game in which you shoot at, chase, or get chased by something, master the game within an hour, and then lose interest. In fact, it may take you more than an hour to score at all, and will probably take days or weeks of playing to get a good score. (There is a provision for saving a game in progress).

The original computer version of Adventure was written by Willie Crowther and Don Woods in Fortran on a PDP-10 at MIT. In this version the player starts near a small wellhouse. Upon entering the house, he finds food, water, a set of keys and a lamp. Armed with only these items, he must set out to explore the countryside in search of treasure and other objects of play. He must also confront dwarfs, snakes, trolls, bears, dragons, birds, and other creatures during his quest. The game accepts one- or two-word commands such as GET LAMP\* SOUTH\* or KILL DWARF. Of course, if you don't have the proper tool to carry out an action, or if you do something foolish, you may find yourself in big trouble.

In playing the game you wander thru various 'rooms' (locations), manipulating the objects there to try to find 'treasures'. You may have to defeat an exotic wild animal to get one treasure, or figure out how to get another treasure out of a quicksand bog. You communicate thru two-word commands such as 'go west', 'climb tree', 'throw axe', 'look around'.



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# Tiny Basic In ROM

From Micro C

(\$35.00)

OK, OK, I know what you're thinking. I swear on a stack of TRASH-80's that I'm not reverting back to basics.

However, I really like Tiny Basic. It's perfect for those simple little controller or utility projects that might call object code routines. For the small stuff, you really can't beat this for getting something out fast. Commercial outfits have found that writing small utilities and controllers in Tiny Basic is between 10 and 20 times faster than writing them in assembly code. And, you don't need CP/M, even if you are storing data or program on disk. (And, of course, you don't have to have a disk.)

### Catch a load of this.

1. It can read one or more Basic programs off the disk, append them together, and run them all.
2. It can, of course, also store Basic programs on the disk using its own

simple disk format.

3. It can store object code onto the disk and then read it back (into a reserved memory area).
4. It also looks at the 3rd ROM socket for a 2716 containing code. If there is a ROM there, its contents get loaded into a protected memory area. This can be object code, called by Tiny Basic to do high speed assembly language functions.
5. Plus some other little goodies that you wouldn't expect from Tiny Basic (like a simple renum routine).
6. And best of all, the whole thing fits into two 2716's that can settle right in next to the PFM 3.3 ROM.

This doesn't have fancy floating point numbers or long variable names but it's certainly useful and definitely fun. (Did I say fun? Sssh! Don't tell!) Rob Devoe did the modification for the BB and added the extra goodies. ■ ■ ■

# WANT ADS

The following folks are reaching you for only 20 cents per word. If you would like to reach the same audience, send your words and 20 cents for each, to Micro Cornucopia, 11740 NW West Rd., Portland, OR 97229.

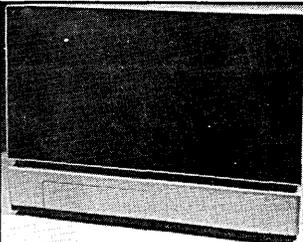
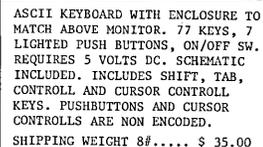
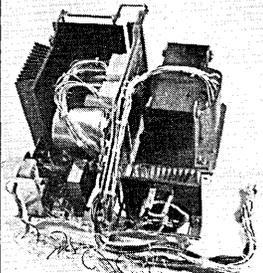
WANTED—EPROMS's for non-disc Big Board. Dumb terminal to SIO. Minimal letter writer to PIO, Kansas City or TRS-80 cassette. Tom Mason, 2402 Audubon Road, Akron, OH 44320, 216-575-5647.

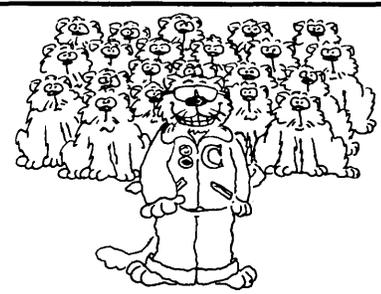
Printer program to drive NEC 5515 Spinwriter, includes details of minor serial interface hardware modifications. \$30.00

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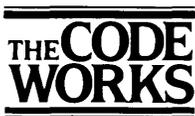


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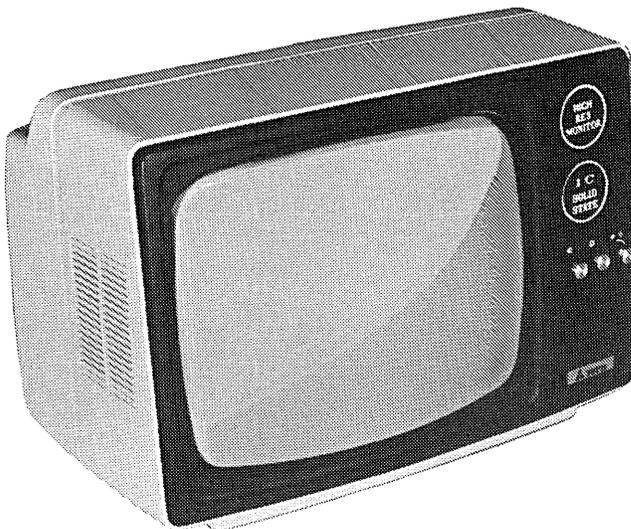
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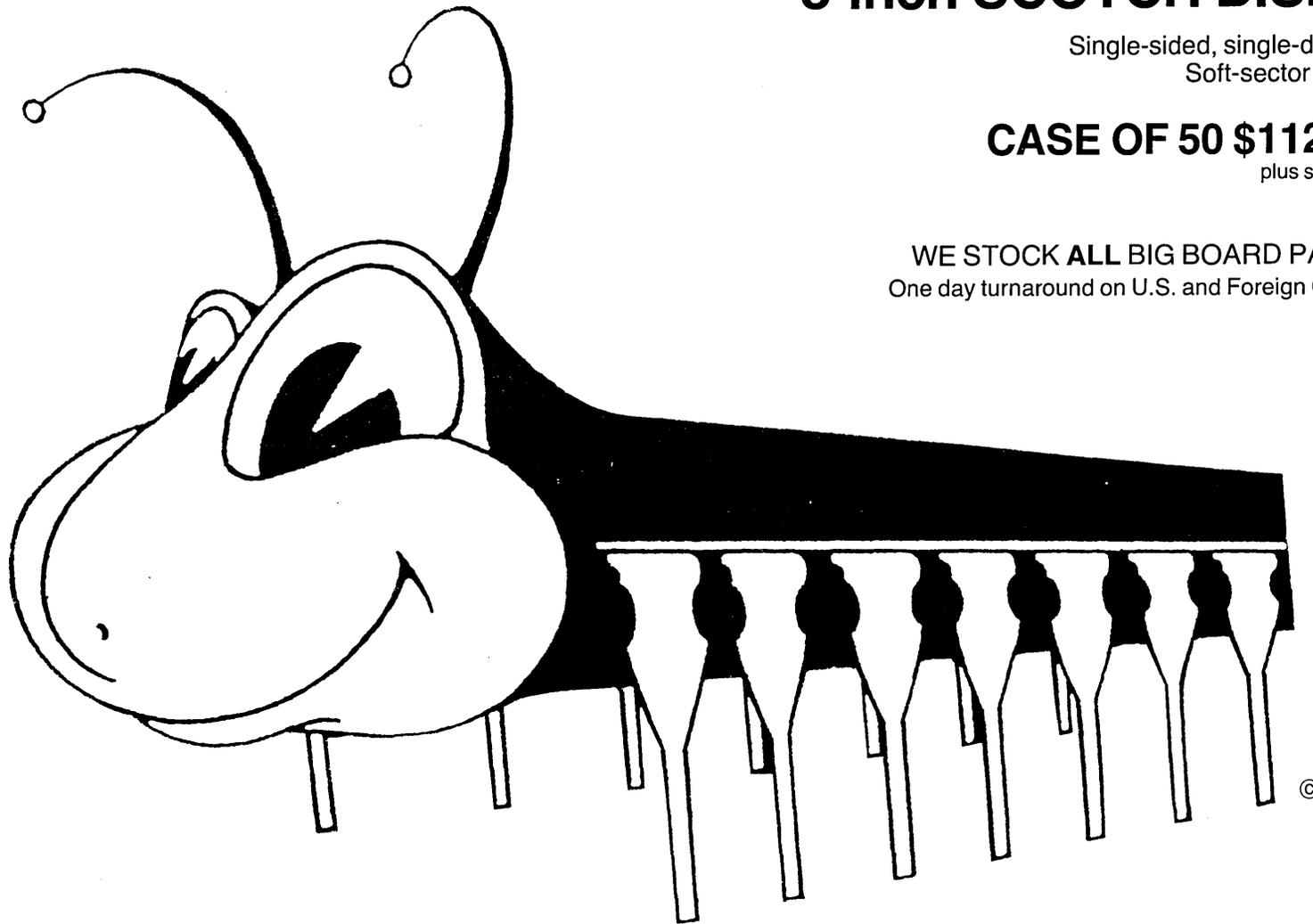
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# Double Density

By David Thompson

One of the big stories around Micro C is, of course, density. No longer satisfied with being singly dense, folks are lining up to get doubly dense.

## What is density?

Well, single density looks at every couple of transitions and translates them into a one or a zero, double density is a way of translating single transitions (or places where there could have been transitions) into ones or zeros. The total number of transitions placed on the disk is the same, but double density decoding results in twice the data.

So, you could take a single density format of 77 tracks, 26 sectors per track and 128 bytes per sector and simply change the bytes per sector to 256. Then you'd have about 480K bytes of file space per disk instead of about 240K.

However, you don't have to use 26 sectors per track. There are two advantages to using larger sectors.

The most obvious advantage is that you can get 16—512 byte sectors

or sometimes 9—1024 byte sectors on a track rather than 26—256 byte sectors. Thus you get about 600K per disk using 512 byte sectors and a possible 670K per disk using 1024 byte sectors (file space).

The second advantage to the larger sector sizes is speed. Disk I/O is the slowest part of most operations. So, reading data off the disk in large chunks and then parcelling it out to CP/M 128 bytes at a time (called deblocking), speeds up a system substantially.

There are three double density packages available for the Big Board. I have one of them running on this system (Jim Monesmith's) and I am fairly familiar with the other two. Hopefully, I'll have a chance to try out the others so I can do a real comparison of all three.

I haven't heard any really negative reports about any of the double density boards. I've heard a few grumbles about the setup time on Otto's but the folks seem happy once it is up and running. Monesmith changed the upper/lower case

switch into a TTY lock and it occasionally switches when I use my rub-out key. (Since I have the source I'll get rid of that 'feature' myself when I get the time.) Russell Smith's board might not even work if your system runs faster than 2.5 MHz (you should check with him). This would be unfortunate because the 4 MHz modification is so easy and makes such a dramatic difference in system speed.

## How can you get them?

Hiller's and Smith's boards are advertised in this issue.

Monesmith's board is available from:

**Jim Monesmith**  
438 Patterson Road  
Dayton, Ohio 45419  
513-298-6926

*Note: Double density disks are twice as heavy as single density only when they are full of bits. In a future issue we will cover use of half-bits (called tid-bits) to reduce the weight.*



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| FEATURE                      | HILLER   | SMITH            | MONESMITH       |
|------------------------------|----------|------------------|-----------------|
| DD Sector Size               | 256-1024 | 256-1024         | 512             |
| Bytes/Disk (K)               | 480-670  | 480-670          | 600             |
| Extended Monitor             | Yes      | No               | Yes             |
| Parallel Print               | Yes      | No               | Yes             |
| Serial Printer               | Yes      | No               | Yes             |
| CBIOS source                 | No       | No               | Yes             |
| Monitor source               | No       | Yes <sup>1</sup> | Yes             |
| R/W single dens              | Yes      | Yes              | Yes             |
| Auto Density                 | Yes      | Yes              | No <sup>2</sup> |
| Added utilities <sup>3</sup> | Yes      | ?                | Yes             |
| Supports 5"                  | ?        | Yes              | No              |
| 4 MHz req.                   | Yes      | No               | Yes             |
| Other BB mods                | Yes      | No               | Yes             |
| Startup time                 | 2 hrs    | 2 minutes        | 30 minutes      |
| Price                        | \$200    | \$250            | \$175           |

1. Since Russell Smith is using the present monitor, the source is available. This also means that most monitor-dependent software such as printer drivers will run unchanged.

2. Monesmith supplies a simple .COM routine for setting or changing the density on a particular drive. The default for all drives is double density.

3. Here is where I can't really compare the various systems. Monesmith has added a number of very neat features such as automatically searching drive A for any file not on the default drive and automatically returning to the default drive after a reboot. He has also cured the head banging which occurs when accessing data on a non-default drive.

## Especially For The Big Board From Micro C

### USER'S DISK #1

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- 3-A Z80 assembler.
- 4-Two disk formatters.
- 5-Othello.
- 6-A serial print routine.
- 7-Modem software.
- 8-Documentation for all the above.

See issue #3, page 15 for more information about the disk. Also see "Using Modem7" in the same issue for information about configuring the modem software.

### USER'S DISK #2

Especially for folks with single-drive systems and those who want to try their hand at extending an assembler. Also a new CBIOS with printer interface, returns to default drive on reboot, stifles head banging, supports CP/M 2.2 and 1.4, and written for M80.

#### Including:

- 1-Two single-disk copy programs, both with source.
- 2-The source of the Crowe Assembler.
- 3-New Crowe.com file with larger symbol table.
- 4-New CBIOS for CP/M 1.4 and 2.2 (& boot).
- 5-Disk mapper with source.
- 6-Documentation for all the above.

### FORTH IN ROM

Now, what you've all been waiting for - FORTH in ROM. This is standard FIG FORTH in three 2716's. FIG FORTH is standalone FORTH so you don't use CP/M at all. If you have disks, FIG FORTH handles the disk I/O. If not, you can still enjoy a most fascinating language. A simple FORTH line editor and a decompiler are available on disk.

### TINY BASIC IN ROM

This two-ROM set takes control of the system just like FORTH, doing its own I/O, loading Basic programs and object code routines on and off the disk or out of the third ROM. This fun little Basic is great for controller and utility applications.

### Screen Editor in Small C

A simple but full-function screen text editor plus a text formatter, all written in Small C by Edward Ream. This package includes the editor and formatter .COM files setup for the Big Board, Small C itself, and source code for all. With the documentation this is over 400K on a floppy disk. Edward is selling this package for \$50, you can buy it from us for \$39 (and Ed gets a royalty).

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Keyboard Translation  
More 4 MHz Mods  
Modems, Lync & SIOs  
Undoing the ERASE  
(Much More)

#### ISSUE #5

Word Proc at Micro C  
Two Great Spells  
Two Text Editors  
Scribble, a Formatter  
(Much More)

### PRICES

|                            | US, Can, Mex | Other Foreign |
|----------------------------|--------------|---------------|
| User's disk #1 or #2 ..... | \$15.00      | \$20.00       |
| FORTH in ROM .....         | \$65.00      | \$70.00       |
| FORTH in fast ROM .....    | \$80.00      | \$85.00       |
| FORTH Ed & Decompiler disk | \$15.00      | \$20.00       |
| Tiny Basic in ROM .....    | \$35.00      | \$40.00       |
| Tiny Basic in Fast ROM ... | \$45.00      | \$50.00       |
| C/Text Editor/Formatter .. | \$39.00      | \$44.00       |
| Fast monitor ROM .....     | \$25.00      | \$30.00       |
| Version 2.2 character ROM. | \$25.00      | \$30.00       |
| Back issues (each).....    | \$3.00       | \$5.00        |

Your choice of either user's disk or the deluxe character ROM **FREE** if you send an article or software and a ROM or extra disk.

### NOTES

- The above prices include media, package, and first class postage (air mail for Other Foreign).
- U.S. funds only please.
- Send Big Board number with monitor ROM orders.
- Monitor & char. ROMs \$5.00 each if you send a fast ROM and a stamped, self-addressed return envelope.

## Latest on the New Ferguson Board

We got a real scoop on the new Ferguson board at the Big Board/Micro C meeting last week at the West Coast Computer Faire. Cal-Tex (the name Jim Ferguson, Russell Smith, and Bill Siegmund selected for their new enterprise) will be assembling the packages at a storefront in San Jose.

Bill Siegmund (the marketing member of the group) showed off a prototype of the bare board and handed out a sheet of general information.

### The new board will have:

1. 4 MHz clock standard.
2. Room for 8, 64K DRAMs; 4K of static CRT RAM; and 24K of EPROM or EEPROM or static RAM (and it will have a ROM programmer on board).
3. An interface for 5-in, 8-in, SD, and DD, SS and DS drives.
4. SASI interface so you can add a hard disk by simply plugging it in (this was just added).
5. Display capabilities similar to DEC VT-100, including 7x9 dot matrix and programmable attributes such as reverse, blinking, half intensity, etc.

6. STD bus interface, three parallel ports plus keyboard, DMA, two CTC timer chips and more.

Approximate prices are \$245 for bare board, \$595 for complete kit (including all I/O, and 4 MHz), and \$895 assembled and tested. They are estimating a three-day turnaround on orders for boards and kits and they expect to ship the first units May 1.

**Cal-Tex Computers**  
780 Trimble Rd Suite 504  
San Jose, Calif 95131

# ANNOUNCING DOUBLE DENSITY DISK INTERFACE FOR THE BIG BOARD

New floppy interface package for the Big Board lets you read and write single and double density disks with 128, 256, 512, and 1024 Bytes/sector.

The package includes:

1. Fully assembled and tested board, cable and connector to replace the 1771. Board contains 5 ICs including a Western Digital 1795.
2. An extended monitor in two 2716s.
3. A disk containing:
  - Disk formatting program. (128, 256, 512, 1024 bytes/sector)
  - Disk copying program.
  - An overlay for MOVCPM.COM
  - A double density SYSGEN
4. Documentation
  - Dependable 4MHz mod
  - Jumpers to add to the Big Board.

Sector size is determined by how the disk was formatted and is totally transparent to the user.

Disk capacity ranges from: 241K for SS, SD, 128 bytes/sector to 668K for SS, DD, 1024 bytes/sector

Requires minor modification to Big Board and requires that Big Board run 4 MHz.

Available December 15, 1981.

Price: \$200

Otto Hiller Co.  
Scientific Equipment  
P.O. Box 1294  
Madison, WI 53701  
608-271-4747 3-5 pm

## Bring the flavor of Unix To your Z80-based CP/M system with Unica

*"Unicum: a thing unique in its kind, especially an example of writing.  
Unica: the plural of unicum."*

The Unica: a unique collection of programs supporting many features of the Unix operating system never before available under CP/M. The Unica are more than software tools; they are finely crafted instruments of surgical quality. Some of the Unica are:

```
bc - binary file compare
cat - catenate files
cp - copy one or more files
dm - disk map and statistics
hc - horizontal file catenation
ln - create file links (aliases)
ls - directory lister
mv - move (rename) files, even across users
rm - remove files
sc - source file compare, with resynchronization
srt - in-memory file sorter
sr - search multiple files for a pattern
sp - spelling error detector, with 20,000 word dictionary
```

Each Unicum understands several flags ("options" or "switches") which control program alternatives. No special "shell" is needed; Unica commands are typed to the standard CP/M command interpreter. The Unica package supports several Unix-like facilities, like filename user numbers:

```
sc data.bas:2 data.bas:3
(compares files belonging to user 2 and user 3);
Wildcard patterns:
```

```
rm *tmp* -v
(types each filename containing the letters TMP and asks whether to delete the file);
```

I/O redirection:

```
ls -a >list
```

(writes a directory listing of all files to file "list");

Pipes:

```
cat chap* ! sp ! srt > !st:
```

(concatenates each file whose name starts with "chap", makes a list of misspelled words, sorts the list, and prints it on the listing device).

The Unica are written in XM-80, a low level language which combines rigorously checked procedure definition and invocation with the versatility of Z80 assembly language. XM-80 includes a language translator which turns XM-80 programs into source code for MACRO-80, the industry standard assembler from Microsoft. It also includes a MACRO-80 object library with over forty "software components", subroutine packages which are called to perform services such as piping, wildcard matching, output formatting, and device-independent I/O with buffers of any size from 1 to 64k bytes.

The source code for each Unicum main program (but not for the software component library) is provided. With the Unica and XM-80, you can customize each utility to your installation, and write your own applications quickly and efficiently. Programs which you write using XM-80 components are not subject to any licensing fee.

Extensive documentation includes tutorials, reference manuals, individual spec sheets for each component, and thorough descriptions of each Unicum.

Update policy: each Unica owner is informed when new Unica or components become available. At any time, and as often as you like, you can return the distribution disk with a \$10 handling fee and get the current versions of the Unica and XM-80, with documentation for all new or changed software.

The Unica and XM-80 (which requires MACRO-80) are priced at \$195, or \$25 for the documentation. The Unica alone are supplied as \*.COM executable files and are priced at \$95 for the set, or \$15 for the documentation. Software is distributed on 8" floppy disks for Z80 CP/M version 2 systems.

## Knowledge

"Shaping Knowledge for Evolving Worlds"

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Wilsonville, Oregon 97070

Visa/Mastercard customers call (503) 635-5701 after hours for next day shipment.

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# MICRO CORNUCOPIA

Journal of the Big Board Users Group

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## GIVE YOUR BIG BOARD THE TIME OF DAY **MICROTIME 80** CLOCK/CALENDAR BOARD

A unique accessory for your Big Board, the MICROTIME 80 provides full time of day and date functions from thousandths of seconds through months. Built around National Semiconductor's MM58167 clock chip, it's features include a full-function alarm, eight programmable interrupts (1/10 second to once a month), a programmable interrupt vector register, and NICAD battery back-up.

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DISKETTE CONTAINING PFM MODS AND PROGRAMS—ADD \$5.*

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