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# PROFILES

The TUTORIAL Magazine for Microcomputer Users

May 1987

## AUTOMATIC DATA ENTRY WITH BAR CODE

## THE ELECTRONIC SHOPPING MALL

Marketplace of the 80's

## HOW TO FIND PATCH POINTS IN ANY PROGRAM

## FIRST IMPRESSIONS OF WORDSTAR 4.0

## A FIRST SESSION WITH LOTUS 1-2-3

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# PROFILES

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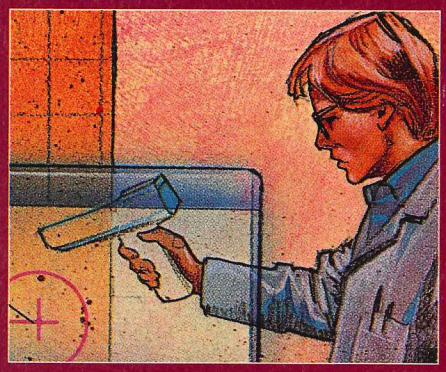

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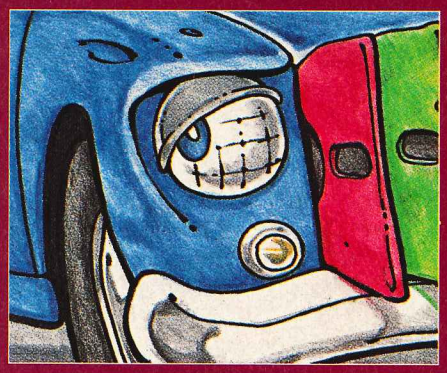

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**ON THE COVER:**
Bar codes, widely used in a variety of retail and industrial settings, provide a fast, accurate, reliable method of automatic data entry. This month's cover articles explain the fundamentals of bar code technology and detail the requirements for using bar codes with microcomputers, both in conjunction with mainframes and as stand-alone systems.

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# Editors' Notes

## *More productivity for users at all levels*

As much as microcomputers have spurred productivity by streamlining the work done in factories, offices, and small businesses, there is a continual push to make them do even more—to take on new tasks that will eliminate more of the drudgery and the errors that go with it.

Automatic data entry is part of that push, and one of the options increasingly available to micro users is bar code technology, which speeds up the data entry process enormously and virtually eliminates errors.

Though bar code has long been used with mainframes for a variety of purposes in manufacturing and retail settings, microcomputers have now entered the picture, both as adjuncts to mainframes and as stand-alone systems. Even small manufacturers and retail businesses can profitably employ bar codes using micros, and this month's cover article provides an overview of the technology and the components required for a micro-based system.

Also in this issue:

•If you're a WordStar user, don't miss the reprint of Ted Silveira's landmark article on patching WordStar, "WordStar Deluxe," with updates and revisions for MS-DOS users. WordStar users who saw the article the first time around (July/August 1985) tell us their copies of that issue have nearly fallen apart from constant use, and newer subscribers will find it an invaluable addition to their reference libraries.

•Brock Meeks provides a guided tour of electronic "shopping malls," the marketplace of the '80s. These services offer a time-saving, hassle-free way to shop for hundreds of products. Join Meeks on a hypothetical shopping excursion and learn the advantages of the various services.

•You may be reasonably satisfied with your software programs just as they came from the manufacturer, but you might like them even better if they were tailored to meet your specific needs by patching. Joseph Mortensen offers tips on locating patch points in *any* program, using the CP/M program Out-Think as an example.

•Joseph Comanda provides a step-by-step guide for the novice on using the basic features of Lotus 1-2-3. This article continues *PROFILES*' new series of "A First Session With . . . " articles. These are intended to get beginning to intermediate users up and running on various commercial programs with a minimum of effort and aggravation.

Also worth noting is technical editor Tom Enright's preliminary sketch of the features of WordStar 4.0, MicroPro's long-awaited revision of the old favorite, in his popular column, "First Impressions." Look for a closer examination of WS 4.0 in a future issue.

Diane Ingalls
Terian Tyre

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# Letters

## Morale booster

I can't thank you enough for your magazine. My brand new Kaypro PC was just set up four weeks ago and your magazine has been invaluable.

With the help of your magazine I've learned to send form letters—I haven't needed to, but it was a good learning experience. Best of all was your article, "Custom-Tailored WordStar," by Roberta Moody (March 1987). I sat right down and on the first try had myself a customized disk for typing letters on my personal stationery. It's wonderful! And what a boost for my morale and self-confidence. Everything else I've done has been so slow and full of mistakes.

I will eagerly await each issue and especially the "Beginner's Luck" section. Please don't ever eliminate that part—I'll be needing it for a long time.

Jenine Hemphill
Ruidoso, New Mexico

## Mailing list review in error

I have just finished reading your March 1987 issue and the review of our Maillist software in the article "Mailing List Managers."

I have no argument with reviewers expressing their preference when they review similar programs. But when they set their own criteria for the software in the beginning of the article and then ignore the criteria, it's amazing. Maillist met all six of the listed basic requirements, and all but two (user-definable fields and test labels) of the extra capabilities listed, and it also has some features they didn't list, and yet our software was rated as the least acceptable due to the fact that the program is intentionally designed to be used out of the box by novices via step-by-step user prompts.

But the above fades to nothing when compared to the glaring errors specifically stated in the review. The reviewers state that Maillist cannot do multiple copies of one label when, in fact, it can print up to 99 copies of a single label. They state that the software cannot generate forms other than labels when, in fact, it can generate unlimited forms, such as Rolodex cards, envelopes, custom labels, etc. They state the program cannot transfer data to other formats when, in fact, it can generate standard comma-delimited MailMerge-type files.

All of our software is designed to be used practically without the use of the manual via not only complete menu operation, but also by showing onscreen step-by-step prompts.

I wonder if you are not doing your readers a disservice by having data base professionals review software intended for novices. Why not give these types of programs to someone in your office unfamiliar with data base type programs and see which of the programs they prefer?

Arthur L. Purcilly
Micro-Art Programmers

We must point out a major inaccuracy in the March 1987 "Mailing List Managers" review of the PROMAIL III mailing system by Woodsmith Software.

The reviewers mentioned that the program can't generate form letters. We do have two versions of PROMAIL, providing the possibility for confusion with the less expensive version (it's $59.95), which doesn't produce form letters. PROMAIL III ($89.95, the version tested) does indeed generate form letters (custom labels, envelopes, etc.) with automatic data entry, page length margin control, embedded printer codes, and several mass functions for totaling and percentage calculating for printing receipts. It will print multiple copies of any form. The form printing function will even produce an ASCII disk file in nearly any form desired to allow use of the mailing data in other programs (such as when changing computers—a common occurrence). Forms can be produced in any word processor capable of producing a non-ASCII document file.

Clearly, working with custom forms is a major feature of the PROMAIL III program as reviewed, and for the reviewer to miss this feature it would be necessary to stop reading the manual at the title page, and not to read the online help screens or even the print menu in the program itself.

Although we generally appreciate being included in reviews, grossly inaccurate reviews are counterproductive, since now readers can skip over our advertisements *knowing* that our mailing program does not produce form letters while another does. At least without the review readers would have to read the features listed in the advertisment (which does, by the way, mention form letters). Too bad your reviewers didn't try it.

Ronald F. Nehing
Woodsmith Software

*Reviewers Joseph Comanda and Lucien Kress reply: "We are not sure how we managed to make so many errors in one review. Possibly we confused programs with similar sounding names. In any case, we're sorry. We're well aware that reviews like this can hurt small companies with decent products, and we regret the misunderstanding we have caused.*

*Contrary to what we stated in our review, Maillist can indeed produce multiple copies of one label, export data for use with WordStar and MailMerge, and generate forms other than labels.*

*However, the procedure for generating forms is fairly cumbersome, requiring a user to position text and fields by line and column number in response to prompts without seeing the actual layout on the screen.*

*In the end we believe we accurately conveyed the feel of the program, and our overall assessment on it remains unchanged.*

*PROMAIL III is another story. Its form generating features, which we overlooked, are fairly impressive. Unlike Maillist, which requires that the forms be designed internally, PROMAIL III lets you use your favorite word processor to set up the forms and insert the codes for the various fields from the mailing list. The process seems easier to use than MailMerge and has the mass functions necessary for producing invoices.*

*In the case of PROMAIL III, we would have to change our overall assessment. We would probably still rank it "number 3" but would add that its form-generating capabilities compared favorably with FastPak Mail. FastPak Mail codes allow for greater formatting control, but they do not include mass functions. For someone trying to do invoicing with their mailing lists, we would recommend PROMAIL."*

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We know that floppy disk users don't appreciate shuffling four or five disks in and out per application. We know that no users like to abort in the middle of an application to change printer pitch. We know that users don't like copy protection and complex licensing agreements. We don't believe that any systems with these 'features' can be considered easy to use so we left them all out of CPI Business Systems.

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CP/M users may become MS-DOS users in the years ahead; CPI has planned ahead for this possibility and we provide data file conversion service to any user. CPI will, however, continue to support and enhance these fine systems for CP/M users for years to come. Your investments today will not be obsoleted by tomorrow's technology.

These powerful systems are described briefly below. If you don't feel confident yet ask for our 30+ page overview or try an application demo system at half price (demo prices apply to future system orders).

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CAPACITIES of 600 Vendors, (CP/M), 2000 Vendors (MS-DOS) - no limit on transactions.

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CP/M: 64K (53K TPA) & CP/M 2.0 or higher.
MS-DOS: 128K (or more) & MS-DOS/PC-DOS 2.0 or higher - ANSI.SYS.
Printer: 132 columns (compressed pitch supported), continuous forms.
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CRT: 80/24 with Clear, Home, Clear to EOL, Up, Down, Left, Right.

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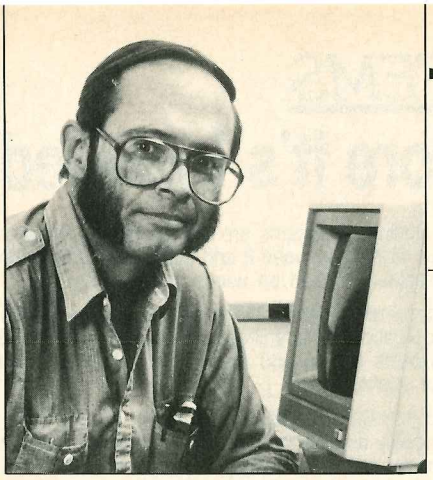


# First Impressions

## A revised WordStar—at last

by Tom Enright

This month we'll look at WordStar 4.0, the long-awaited update to "Old Faithful." You may have heard that MicroPro had acquired NewWord, a WordStar clone that has gained quite a following since it was introduced a couple of years ago, and that MicroPro would be basing its revisions to WordStar on that program. Well, folks, the "New WordStar" is here (for MS-DOS—though there are rumors that a CP/M version may be available in a few months) and it is *good*.

What *PROFILES* received for evaluation was the WordStar 4.0 Professional package. This package includes WordStar 4.0, CorrectStar, and the Word Finder thesaurus from Microlytics (formerly Writing Consultants).

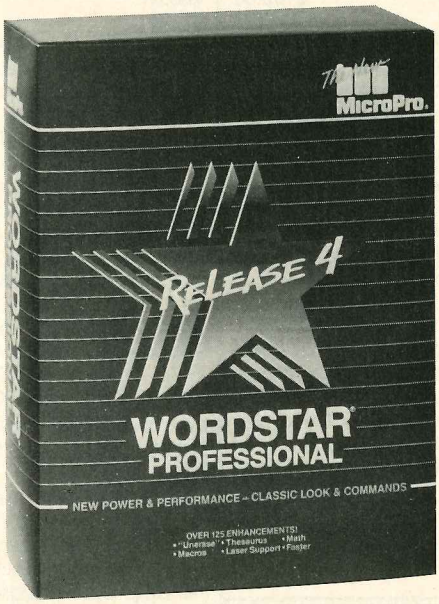
### Overview

As mentioned above, WordStar 4.0 is based on NewWord and incorporates its WYSIWYG ("what you see is what you get") features. That is, if you have a monochrome monitor, boldfaced and underlined text are actually boldfaced and underlined on your screen. If you have a color monitor, boldfaced and underlined text are shown in different colors.

WordStar 4.0 also has named directory support, uses DOS's search path for running external programs, has an internal macro facility, and supports up to 40 function keys on the standard IBM-style keyboard. (Since such keyboards only have ten function keys, WordStar defines each key in normal, Shift, Ctrl, and Alt states.)

The macro facility defaults to 400 bytes of storage for definitions, but can be patched for more. Each macro can be up to 80 characters, as long as the total does not exceed the defined maximum. You assign each definition to a trigger sequence of the form <Esc><Key>. Several sample definitions are included to transpose words, enter the system date or time in the file, and go to the previous paragraph.

The rest of the improvements include new or expanded editing and dot commands, more breadth and depth to the printer drivers, and table of contents and indexing capability from the opening menu instead of as separate programs. MailMerge is also an integral part of the new WordStar instead of a separate overlay file. The new CorrectStar is very good, something I could not say about past versions. The Word Finder thesaurus is excellent, with a recursive lookup capability that will prove popular with writers.




### New features

New editing commands include an "unerase" command, support for the IBM extended character set onscreen and during printing, a "save and print" command, and the ability to do math calculations from inside a file or on numbers that are part of the file. There are also new, shorter commands for searching to and deleting to specified characters, and better use of the numeric keypad for cursor movement.

The "unerase" command (^U) is a direct carryover from NewWord, as is ^QI, which takes you to a specified page of the file.

By holding down the Alt key and entering a three-digit number from the numeric keypad, you can get any of the IBM extended characters onscreen. If your printer supports the IBM extended characters, they will print just as you see them. MicroPro has assigned several of the most useful "line drawing" characters to the function keys in their Alt state.

Another new command that I find particularly useful is the "save and print" command (^PrtSc). This command saves the current file, calls up the print menu, submits the name of the file you were editing, and waits at the first print-time question.

When you want to do math calculations there are two choices. If you press ^QM a pull-down menu appears, and you type in the equation and receive an answer. But if the equation is part of your file, you simply mark the equation with block markers and press ^KM.

In the version of WordStar I have for review, the block-marker math command had trouble with complex equations containing parenthetical expressions. The pull-down menu command has no trouble with complex equations and has trigonometric func-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tions and exponentiation, which even SideKick doesn't provide.

In addition to the new editing commands, only a few of which I have room to mention, WordStar 4.0 has about 33 new dot commands. They include commands for up to three header and three footer lines, as well as the ability to set margins with dot commands. Note that margins set with dot commands take effect onscreen on the line following the dot command. Also, you can now redefine the user-defined print functions (^PQ, ^PW, ^PE, and ^PR) with dot commands. The new definition is active on lines following the dot command; no permanent patch is made to WordStar.

Other dot commands perform actions such as selecting different bin feeders on laser or letter-quality printers (.BN 1 to .BN 4) and inserting the system date or time in a MailMerge form letter. Many of the new dot commands are meant to be used with MailMerge. Conditional merge-print commands have been significantly expanded, including one to skip to the next data record depending on the value of a field.

## Expanded features

Several features and commands that existed in prior versions of WordStar have been expanded in 4.0. Since MailMerge is now part of WordStar itself, the merge-print selection no longer exists on the main menu. All MailMerge dot commands now work during normal printing. The "save and continue" command (^KS) now automatically returns you to the place in your file where you issued the command. Search and replace operations run faster than in prior versions. And printer drivers have been expanded in the number of printers supported, the depth of sup-


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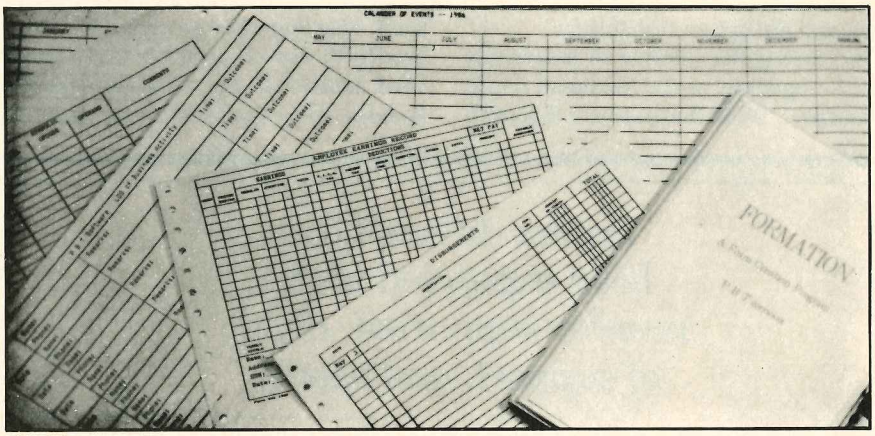

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port, and the speed of printing.

Increasing the number of printers is not as important as the increased depth of support. What this means is that each print driver taps more of the potential of each printer. For example, the dot commands for character width, character height, line height, etc., are now supported by most of the dot-matrix print drivers. If your printer supports IBM's extended character set, you can now print those characters, including foreign language and scientific characters, on your dot-matrix printer. If you use a print buffer, you will notice that WordStar 4.0 now sends a file to the printer 30 percent faster. Support for laser printers has been significantly expanded in the new WordStar.

*Printer drivers have been expanded in the number supported, depth of support, and speed.*

Also in the area of expanded features is better use of the numeric pad for cursor movement. Now Ctrl-Right Arrow and Ctrl-Left Arrow have the same result as Ctrl-F and Ctrl-A. Also, Ctrl-Home takes you to the top of the file and Ctrl-End moves you to the bottom. The scope of the search and replace commands has also been expanded so that you can now search for *any* control character. The wildcard for character searches is now the traditional question mark.

WordStar's opening menu now displays the amount of space left on the currently logged disk and the size of each file. By turning the directory display off and then on again, you can specify a file-mask for which files are displayed. Also on the opening menu are the options for creating a table of contents or index for any WordStar file. Entries for an index or table of contents are marked either in the text or on a line with its own dot command (.TC or .IX).

## CorrectStar

The version of CorrectStar that comes with WordStar 4.0 is supposed to be the same as that used with WordStar 2000. I tried WordStar 2000—once. My reaction to it was so negative that I never even looked at the spelling checker. Besides, everyone knows that MicroPro can't make a good spelling program, right? Guess what—they did it right this time.

In the past I've always used The Word Plus for spelling correction. I tried Turbo Lightning, but got tired of it beeping in my ear and not being able to check the spelling on the entire file. The new version of CorrectStar is good enough that I can finally retire The Word Plus permanently.

CorrectStar works only from within a file. It also has only three basic commands: check from the cursor position to the end of the file, check the word at the cursor, and check the next word typed. When it has analyzed the word in question and shown its suggestions, the possible responses are intuitive: "I" for ignore, "A" to add the word to your user dictionary, "E" to enter the change manually, Enter to replace with one of the suggested spellings, and ^U to halt the spelling check.

The program is even smart enough to catch some errors in which the first letter of the word is wrong. Most spelling checkers cannot catch such errors.

Also, unless you want this feature turned off, CorrectStar automatically reformats the paragraph after each correction.

## Word Finder

Word Finder 3.4m is the thesaurus supplied with WordStar 4.0 Professional. It is a modified version of the Word Finder program marketed by Microlytics, Inc. It operates as a memory-resident utility of WordStar 4.0.

Installation is straightforward and does not require any specialized knowledge. The installation program requires that you enter your name and address and then allows you to specify which directory the program will reside in and whether you wish to change the "hot key" that invokes Word Finder. Your name and address become a permanent part of the sign-on screen displayed when Word Finder is loaded into memory.

Since Word Finder is memory-resident, except for the synonym data file, it requires a special keystroke combination to start the program. The default hot key is Alt-1, but you can change that to any combination you prefer. Also, since both WordStar and Word Finder support DOS's directory structure, it needs to know what directory holds the synonym data file. Once these parameters are entered, installation is complete.

You need to run WF.EXE only once, when your system is booted. Thereafter, whenever you press the hot key, Word Finder will attempt to find a synonym for any word the cursor is on. When Word Finder presents its choices, you can move the cursor to your choice and press Enter. If you don't like the choices, you can move the cursor to one of the words and press the hot key again, or simply press Escape to return to WordStar. If Word Finder does not have the word you wanted to search on, it presents a list of similar words. You can then search on one of them or Escape back to WordStar.

The recursive nature of Word Finder searches makes this a powerful writing tool. No online thesaurus will totally replace a copy of *Roget's Thesaurus*, but this one can significantly reduce the number of times you consult the book.

## Conclusions

This column is too short to cover all the features and improvements in WordStar 4.0 Professional. I could only skim *some* of the cream from the top. Further coverage of this program is planned for future issues.

In the meantime, my opinion of WordStar 4.0 is simple: This version is a winner.

## Summary

**Product:** WordStar 4.0 Professional
**Manufacturer:** MicroPro International
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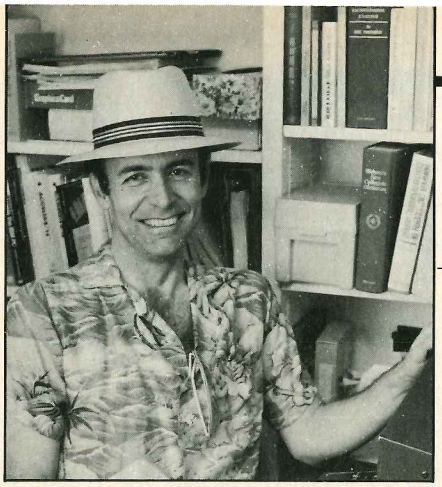

# Flea Market

## Things that make life easier

by Ted Silveira

It's the big programs that get all the attention—the word processors, spreadsheets, data base managers, communications programs. And that's as it should be, because those are the programs that caused us to buy computers in the first place. But it's the little utility programs and ancillary products—the computer tools—that make computer life livable and keep us from pounding the keyboard in frustration as we try to adapt to the computer's way of working.

### MS-DOS

*RECONFIG.* Most of us stock our PCs with the full 640K of memory (and who ever imagined we'd have that much to play with?) and then proceed to fill that space up not only with monster spreadsheets and data bases but also with all kinds of memory-resident software.

In fact, most PC users who are past the novice stage have four, five, six, or even more programs loaded at once. Let's see, there's PolyWindows, the driver for my Microsoft mouse, the RAM disk and its driver, VSWITCH, maybe a screen-blanking program or the ANSI.SYS screen driver, then perhaps a memory-resident thesaurus or outline processor . . .

And just when you think you've got your "environment" set, you run into problems. WordStar still runs fine, but your data base now complains it doesn't have enough memory to work in. Or you suddenly find your communications program is allergic to VSWITCH and refuses to run if it's installed.

In short, you find that you need to set up different working environments depending on what you're doing and which application programs you're running. But since most of your computer's environment will be set by your CONFIG.SYS and AUTOEXEC.BAT files when you cold boot it, how can you clean out your memory and change to a new environment quickly?

The answer is RECONFIG, a public domain program written by Glen Marshall. RECONFIG will reboot your computer (just as if you'd pressed Ctrl-Alt-Del) using new AUTOEXEC and CONFIG files.

For example, in addition to my normal AUTOEXEC.BAT and CONFIG.SYS files, I have several alternate sets—AUTOEXEC.CLN and CONFIG.CLN, which create a perfectly clean environment with no memory-resident programs loaded; AUTOEXEC.RAM and CONFIG.RAM, which create an environment with a very large RAM disk; AUTOEXEC.PUB and CONFIG.PUB, which create an environment that has only the Microsoft mouse driver loaded, for use with some desktop publishing and graphics programs I have; and AUTOEXEC.STD and CONFIG.STD, which restore my standard working environment. So, if I need to create a perfectly clean environment, I just give the command **RECONFIG CLN**, and RECONFIG reboots my computer using the CLN files. When I'm ready to return to my regular environment, **RECONFIG STD** takes me back.

Some people may be able to get along without this program. For me, it's indispensable.

*CTRLALT.* VSWITCH, which was included with many Kaypros, is a memory-resident program that allows you to switch the Kaypro Multi-video board between monochrome mode and color mode (if you have a half-length multi-video board, then it switches between monochrome mode and color *emulation* mode). But in my system, I have both a Kaypro Multi-video board (connected to a monochrome monitor) and a Kaypro EGA board (connected to an EGA color monitor), and VSWITCH hangs up the system if I use it to switch from monochrome to color.

*The EGACLR shareware program can help you make better use of your EGA board and monitor.*

The solution is CTRLALT, a memory-resident program from Barry Simon and Richard Wilson (copyrighted, but free for non-commercial use). Not only can I use CTRLALT to switch between the EGA system and the monochrome system (which is still the best for straight text), but I can also copy a screen from the active monitor to the other monitor so that I can refer to it while I call up something else on the first monitor (it's like having an extra window, in other words).

In addition, CTRLALT has features I haven't explored yet, including pop-up tables (ASCII codes, color attributes,



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and ANSI color codes), easy entry of non-keyboard characters, a cut-and-paste buffer, and printer set-up commands (for the IBM graphics printer and compatibles).

*EGACLR.* If you have an EGA video board and monitor, you're probably itching to make better use of it. Why, for example, should you be stuck looking at a black and white screen when you're at the MS-DOS system prompt? You shouldn't. What you need is EGACLR, a shareware program ($25) from Ivor B. Miller. With EGACLR, you can set your screen to one of 12 different color combinations through simple Alt key commands. And with EGACHG, a companion program, you can easily modify the 12 combinations that EGACLR offers and tinker with the red-blue-green mix of each color to your heart's content.

EGACLR will reset the screen colors to your chosen set if an application program changes them, and you can even have EGACLR override the colors set by a program if you don't like them. Nobody really *needs* this program, but if you have an EGA video board and monitor, it's too much fun to pass up.

## CP/M

In CP/M, it's easy enough to find public domain programs through bulletin boards (like Kaypro's KUG ROS), commercial information systems (like CompuServe), and local or national user groups. But with the rapid expansion of MS-DOS and consequent shrinking of CP/M, it's become more of a problem to track down good *commercial* programs, especially since few retail stores or mail-order distributors stock CP/M software now.

*Catalogs.* Catalogs are a good tool, not just because they usually offer decent prices and mail-order shopping, but also because they can introduce you to products you didn't know existed (some of them from companies that can't afford to advertise).

One of the best CP/M catalogs is from Central Computer Products. You've undoubtedly seen their big ads in *PROFILES*, and their catalog contains much more. The discounts are generally good, though not great, but the real surprise is the variety of software available, most of it stuff I've never encountered before. They offer speed reading programs, real estate investment and property management programs, statistics programs, project planners, decision analysis, graphics, bookkeeping, sales strategy, and two pages of educational programs. And, of course, you can get the usual word processing aids, data base programs, spreadsheets, and programming languages (C, Ada, Fortran, BASIC).

A second catalog you should get is from Spite Software. As is the case with Central Computer, Spite's catalog contains much more stuff than you see in its *PROFILES* ads. And though Spite doesn't list as many different products as Central, it occasionally has some real fire-sale prices that are just too good to pass up.

A third catalog you might (or might not) want to pick up is from Dynacomp. Dynacomp offers programs for lots of different computers—Apple, Atari, IBM, Commodore, and Radio Shack, as well as CP/M—but I have no direct experience with Dynacomp or its products.

Judging from the catalog descriptions, the CP/M programs available are less polished and "commercial" than those you'll find in the Central or Spite catalogs, and many of them require MBASIC to run. On the other hand, Dynacomp lists programs you just won't find anywhere else, even in Central's catalog—things like handicapping (for horse races), multilinear regression, Fourier analysis, molecular modeling, analysis of continuous beams, active circuit analysis, and a harmonic analyzer. I know nothing about how good these programs are, but if you're looking for "a general purpose liquid pipeline network analysis program," Dynacomp may be your only source.

*Electra-Find.* I've now written enough "Flea Market" columns (22, if you can believe it) that I can't always remember if I have written about a particular program before. To avoid the embarrassment of writing about the same thing twice (and probably contradicting myself), I often have to search through my previous columns. Because I have a hard disk (the Mini-Winnie I've mentioned before), I can keep all my columns readily accessible, but even using


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WordStar's search command, the job of scanning all 20-odd columns is tedious and boring (though not as bad as actually having to reread them all).

So now I use a free-form text retrieval program called Electra-Find, from O'Neill Software. I can set Electra-Find to search all my past columns for a key word or phrase (like *Presto!* or *Handyman*), or even for a combination of key words, and then take a minute out for coffee while the program digests my commands and spits out the results.

Electra-Find has lots of nice touches that make it a pleasure to use. It understands about CP/M's drives and user areas, so it works comfortably on a hard disk. It lets you select the files to be searched from a directory listing or specify a file name with wildcards, and it also lets you automatically exclude certain files from the search (like all BAK files). It can search either for single words or phrases or for combinations of words (combined according to the Boolean logical operators AND, OR, and NOT). It lets you set the context in which it will search (lines, paragraphs, etc.) and adjust it for the type of input file. And more, including online help for all functions.

I have a few minor gripes about Electra-Find, the main one being that for a Boolean search, I have to write a separate text file containing the key words (why can't the computer do that for me so that I can enter a Boolean combination from within the program?). But overall, Electra-Find does the job with style. If you have information that you need to refer to stored in text files, then check out Electra-Find.

*Presto! Plus.* Speaking of useful tools, Spectre Technologies, faithful supporter of CP/M in general and Kaypros in particular, is releasing a new version of its pop-up program Presto!, called Presto! Plus. I saw a beta-test (prerelease) version of this new program last December, and it looks good. Not only does Presto! Plus improve performance (to my eye, anyway) and use less memory, but it also adds two very useful new features. It now has some pop-up disk utilities that let you do things like check the disk directory while you're in the middle of another program, and it also now includes a simple key-definition function.

*Presto! Plus now has its own key-definition program built in.*

I think the key-definition function is an excellent idea, because I'm convinced that most people who use a program like Presto! also use key-definition programs. But when you load a typical key-definition program like XtraKey or SmartKey along with Presto!, you lose a fair-sized chunk of memory (though lots of people do it). So it makes sense to include the key-definition function inside Presto! Plus to save space. Of course, its key-definition function isn't as sophisticated as XtraKey or SmartKey, but it should be enough for most users.

*Turbo Modula-2.* Finally, the ultimate tool for a computer is a programming language, the software that lets you create other software. Currently, one of the hottest languages is Modula-2 (which *Byte* columnist Jerry Pournelle always raves about). And now Borland International—creator of hits like Turbo Pascal and SideKick—has released Turbo Modula-2, a CP/M version of the Modula-2 language that will be marketed through Echelon, Inc. (the Z-System people).

Modula-2 is a structured language that's similar to Pascal (as you'd expect, since both Pascal and Modula-2 were created by Niklaus Wirth). One of the interesting differences between the two is that Modula-2 allows you to work with routines from separately compiled modules, so that you need only write and compile a general-purpose routine once.

Turbo Modula-2 gives you the same wonderful working environment that Turbo Pascal does, combining the compiler with a WordStar-like editor. It's fast, as high-level languages go, and easy to use, and Turbo Pascal programmers will find themselves up to speed in no time at all. Pascal programs can generally be moved to Modula-2 with only a minimum of changes, and Turbo Modula-2 can also use routines stored in the standard Microsoft REL files, which gives users access to a ready stock of fast assembly language routines.

And best of all, it's cheap ($69.95).

## Sources

The public domain and shareware programs mentioned in this month's column are widely available through user's groups, bulletin boards, and commercial information services such as CompuServe. They are also all available on Kaypro's KUG ROS bulletin board at (619) 259-4437.

The other products mentioned are available from the sources in the following summary.

## Quick Reference Summary

**Manufacturer:** Central Computer Products (catalog)
330 Central Ave.
Fillmore, CA 93015
**Phone:** (800) 533-8049, in CA (800) 624-5628

**Manufacturer:** Dynacomp, Inc. (catalog)
P.O. Box 18129
Rochester, NY 14618
**Phone:** (716) 671-6160

**Product:** Electra-Find
**Manufacturer:** O'Neill Software
P.O. Box 26111
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**Phone:** (415) 398-2255
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4875 S.W. 19th Dr.
Portland, OR 97201
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**Product:** Turbo Modula-2
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**7005) DB SQZ6L**: Take this program and encrypt your Dbase II command files to protect them from prying eyes. (Requires Dbase II).

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**7040) ALGOL-M**: An algol subset suitable for learning algol. Includes compiler and interpreter.

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**7063) APL**: Yes you read right ... APL. Don't know much about this program except that it appears to be bug free and supports standard APL.

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**7026) NEW ZASM**: A Z80 macro assembler that assembles standard Z80 mnemonics into Intel hex format.

**7027) ZMAC**: A Zilog mnemonic assembler that generates relocatable object code. Also included is ZLINK a linkage editor for programs assembled by ZMAC. Generates native code.

**7033) XLATE**: Version 5.0. Xlate takes 8080 source code using Intel mnemonics and creates a new Z80 source code using Zilog mnemonics.

**7042) DAZZLE STAR**: Z80 disassembler with built in editor. The editor uses Wordstar compatible commands.

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**7041) NBASIC**: Nbasic is a basic preprocessor for Mbasic and Basica*. This preprocessor allows the programmer to use alphanumeric labels, REPEAT/UNTIL loops, case statements and fortran like subroutine calls.

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**7023) SMALL C COMPILER**: Version 2.0. Expanded version of Ron Cains Small C. (Includes sample programs).

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**7025) SMALL C MACRO FILES**: Macro source files for Small C.

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**7068) COBOL**: Compiles to interpreted code. Includes interpreter and full documentation.

**FORTH**

**7038) FORTH 83**: 1983 standard forth interpreter.

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**7036) & 7070) ILISP**: This is an implementation of LISP based on the LISP dialect called SCHEME.(Requires CP/m 2.*). **(2 disk set. Must order both disks)**

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**7064) MODULA 2 SOURCE CODE**: This disk contains fifty Modula source code files. Included are many useful utility procedures.

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**MISCELLANEOUS**

**7020) EXPERT SYSTEMS**: Written in Pascal. (Requires PASCAL Compiler).

**7039) DESK MASTER**: A computer desk organizer. Desk Master comes with a calendar, card file, memowriter, and calculator.

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**7004) DBBS**: A space efficient dynamic bulletin board system that incorporates passwords. (Requires MBASIC).

**7009) MBYE**: Version 4.0. This is a remote console program for CP/M 80 computers. This disk contains assembly language source code only and is NOT for the novice programmer.

**7010) & 7069) ROS**: Version 3.4. Remote Operating System including PASCAL source code. Requires Turbo Pascal. **(2 disk set. Must order both disks)**

**7069) ROS**: Requires disk 7010.**(Disk 2 of 2).**

**7011) ROSMAC**: Set of machine dependent I/O and clock drivers for ROS V 3.3 and 3.4.

**7018) MODEM 7**: Powerful modem program that supports auto-dial for Signalman Anchor Mark XII, Hayes Smartmodem 300 or 1200, U.S. Robotics 300/1200 and PMMI 103 s-100 Plug-in.

**7035) MEX**: Version 1.11. Modem program that also incorporates a phone number librarian.

**7054) & 7055) PBBS**: A Small, very fast BBS program written in Z-80 assembly language. PBBS provides 8 level user profile,private and public message system, BYE504 or 339 bdos interface, automatic user/message automatic file maintenance. Plus more. **(2 disk set. Must order both disks)**

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**7060) MBBS UTILITIES**: Set of utility programs for MBBS.

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**7001) CPM POWER**: Version 2.53. A CP/M subset with many additional commands.

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**7014) YANC**: Version 2.4. Yet ANother Catalog program for those who attempt to keep themselves organized...

**7016) MISC. STUFF**: Contains XCCP, DASM, and I/O Cap.

**7029) QUIKKEY**: Version 2.0. Key redefinition utility.

**7030) SUPERSUB**: Version 1.3. Replaces SUBMIT on CP/M. Allows submit files and supports interactive mode.

**7031) EPEX**: Version 1.1. Evironmental Processing EXecutive. EPEX ia a very powerful environmental program with such features as batch processing including IF /ELSE /END /GOTO, named directories, aliases system control and much more. Includes full documentation.

**7032) EPEX TOOLS**: Tool package for EPEX V 1.1.

**7037) EGUTIL**: Set of CP/M utilities including free disk space by sector, file tagging, and hidden files.

**7044) NEWARC**: Set of archive tools written assembly language for increased speed. Tools include copy, add, del, directory, sort, and type. There is even a utility for running command files from the archive

**7045) CRUNCH**: Version 2.3. Utility for crunching and uncrunching files.

**7047) FU-12**: Full screen binary editor using commands patterned after Wordstar.

**7050) SPOOLBUFFER**: Throughs all output to the printer to disk file then from disk to printer for more efficient use of CPU time.

**7051) CONIX**: Conix is an operating system that operates under CP/M. Some of the capabilities of Conix include path searching, automatic overlay, redesigned user areas, 8M Print spooler, user definable function keys, virtual disk system, user definable I/O devices and much, much more. Conix is a must for any serious CP/M user.

**7052) & 7071) CONIX DOCUMENTATION**: Complete documentation for Conix. **(2 disk set. Must order both disks)**

**7056) KMD**: Version 1.5. Very popular file transfer program.

**7057) LBRDISK**: This set of programs fool BDOS into thinking that a library is actually a logged disk device.

**7062) MAGIKEY+**: A key redefinition program that allows you to create and keep key definition files.

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# Life at 300 Baud

## Government-operated bulletin boards

by Brock N. Meeks

The proliferation of government-sponsored bulletin board systems (BBSs) can hardly be compared to the gestation cycle of the trout; however, an encouraging trend is emerging.

Three years ago the number of BBSs operated by governmental or quasi-governmental agencies could be counted on a single hand. Today that figure stands at 24. These boards are operated by governmental bodies such as the Department of Agriculture, the Department of Commerce, the Department of Justice, the Pentagon, and even NASA.

### Government BBS 101

The motivation for these government-operated BBSs is better information distribution. Uncle Sam churns out massive amounts of information, but it's useless until it's put in some digestible form. That task falls on the Government Printing Office (GPO). (The GPO doesn't run a BBS, as even an *index* of GPO publications would outstrip a BBS's capacity.)

The GPO cranks out a steady stream of reports, news releases, summaries, statistical analyses, abstracts, and more. All this text is stored on magnetic tape, in machine-readable form. It's a simple process for a governmental agency to transfer that machine-readable text to a hard disk. Once on a hard disk, it's a short hop into the "ethernet" via a BBS and dial-in line.

These BBSs are a viable way to deal with the online community's insatiable appetite for information. Add to that the increased popularity of BBSs among government agencies, and it's likely that their number will triple in 1987.

These BBSs are funded by tax dollars, in most cases, and can serve you well if you know where to find them and what kind of information you can expect to find on each board. To give you a head start, this column (and next month's) will give you a brief look at several government-operated BBSs.

### Economics online

**Operating Agency:** Department of Commerce, Office of Business Analysis, Office of the Under Secretary for Economic Affairs
**Location:** Washington, D.C.
**Phone:** (202) 377-3870 or (202) 377-0433
**Hours of Operation:** 24/day
**Log-On:** Guest; full use restricted to registered users
**Baud Rate:** 300/1200

This board is for anyone interested in the economy and all the statistics associated with it. If you work with figures or analyze business trends, this board can provide you with a staple diet of facts, figures and economic news.

The board operates under the popular Remote Bulletin Board System (RBBS) public domain software. Because RBBS software is widely used, making your way around the board should be no problem. RBBS boards operate at both novice and expert levels. (Novice level presents you with verbose menus; expert mode presents you with only a command line prompt.)

As a new user you must log on as a "guest." This gives you limited access time (15 minutes)—just enough to get a feel for the board. To become a regular user you must pay a $25 registration fee. You can download the registration form by typing **D;REG-FORM** at any prompt.

Once inside the board you'll find current economic news from the Department of Commerce (DoC) and Economic Affairs (EA) agencies. The news comes in the form of press releases, economic indicators, official DoC summaries of economic trends, and summaries of reports and studies produced by EA agencies. In addition, you'll find information on how to obtain data tapes produced by EA agencies and press releases issued by the Bureau of Labor Statistics.

The board has two major sections: message base and file transfer. The message base is the interactive section. Here you can leave any questions or comments you might have. The board's sysop, an employee of the Office of Business Analysis (OBA), will answer questions or refer you to an expert who can.

*The most extensive part of the board is the file transfer section.*

The file transfer section is the most extensive part of the board. This section contains hundreds of files that you can download using the Xmodem protocol or as straight ASCII "reads"—you simply open a capture buffer for this kind of download. (Xmodem transfers are preferred, as any burst of line noise will corrupt your straight ASCII downloads.)

The file transfer section is further divided into directories. These include Statements by Departmental Officials and Summaries of Current Economic Conditions, National Income and Product Accounts, Foreign Trade, Industry


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Statistics, Monetary Statistics, Special Studies and Reports, and Sources of Data.

Here is a sample of the files you can expect to find:

•ECON.GAO—abstracts of Government Accounting Office reports of special interest to economists and businesses;

•IND-RPTS.ITA—lists of competitive assessment studies of industries;

•BULLET6—online access to DoC economic studies;

•DISK-DAT.BLS—Bureau of Labor Statistics data on disks;

•NIPA3.WKS—government receipts and expenditures tables in Lotus 1-2-3 format.

## State of health

**Operating Agency:** National Center for Health Statistics, Public Health Service, Department of Health and Human Services
**Location:** Hyattsville, MD
**Phone:** (301) 436-6346
**Hours of Operation:** 24/day
**Log-on:** password issued, no pre-registration required
**Baud Rate:** 300/1200

The National Center for Health Statistics (NCHS) is one of the major federal statistical organizations. It operates a diverse survey and inventory program.

On the international level, the center seeks to improve the availability and quality of health information in conjunction with the World Health Organization. NCHS data is available to the health care community and the public in published reports, data tapes, and special tabulations prepared to answer specific requests.

The board operates under the RBBS software and includes the usual message and files sections.

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Many files on this board contain detailed statistical data from NCHS surveys. Additional information on titles and prices of all NCHS reports is here, including all data tapes distributed during the last year. Among the files you'll find full ordering instructions, should you desire a hardcopy version.

Of particular interest in the files section is a set of spreadsheet templates from the Second National Health and Nutrition Examination Survey. (The templates are in Lotus 1-2-3 format.) These templates give a breakdown of the nation's overall state of health in several different categories. (Statistics are available by individual state.) Complete instructions and documentation for these templates can be found in directory 100.

Other directories include: Vital Statistics (current month), Highlights of the National Health Interview Survey, and NCHS Major Data Systems.

## Micro guidance

**Operating Agency:** The Institute for Computer Sciences and Technology (ICST), The National Bureau of Standards, Department of Commerce
**Location:** Washington, D.C.
**Phone:** (301) 948-5718
**Hours of Operation:** 24/day
**Log-on:** password issued, no pre-registration required
**Baud Rate:** 300/1200

This board is dubbed the Microcomputer Electronic Information Exchange (MEIE). It claims to be the oldest government-operated BBS and has evolved from its original floppy-based CP/M system to its present incarnation on an IBM XT computer.

According to sysop Lisa Carnahan, MEIE "is one of the activities initiated by the ICST in its effort to provide guidance on the acquisition, management, and use of small computers, and to encourage an exchange of information."

As with the previous boards, MEIE runs under the RBBS software. However, the file transfer system on MEIE is far more sophisticated than those on the other systems mentioned here. In addition to supporting Xmodem protocol transfers, MEIE also supports Kermit and MNP protocols. During my testing, each of these protocols performed equally well.

When asked about the purpose of MEIE, Carnahan says: "ICST is a clearinghouse of technical information on technology, in general. MEIE helps us get that information distributed. However, we plan to focus more on computer security issues in the future."

The board contains the two standard subsystems: message and file transfer. Of particular note are the message bases (also known as "conferences") dealing with security and optical storage devices.

Throughout this board you'll find information on the acquisition, management, and use of microcomputers. Other topics include nationwide conference schedules, federal publications and activities (relating to the use of computers in business and government), user groups, other technically oriented bulletin boards, and more.

A sample of this board's files includes:

- LIST88.TXT—complete list of ICST publications;
- LIST91.TXT—complete list of Security publications;
- SOFTMAIN.TXT—control and improvement of software maintenance;
- GUIDANCE.TXT—suggests actions and procedures for software maintenance;
- MMBIB.TXT—a selection of articles on microcomputer-to-mainframe communications.

And if you can't wait for next month's column, you can download a well-maintained list of government operated BBSs from MEIE's Bulletin section.

## Making it work

If you're a casual modem user, these BBSs may not seem worth your time and money, but don't pass them by too quickly.

For example, you may not care much about the nation's general state of health, and so you might ignore the NCHS BBS. But where will you go for information if your mother needs a nursing home? The NCHS board can supply you with statistics about nursing care facilities in your state.

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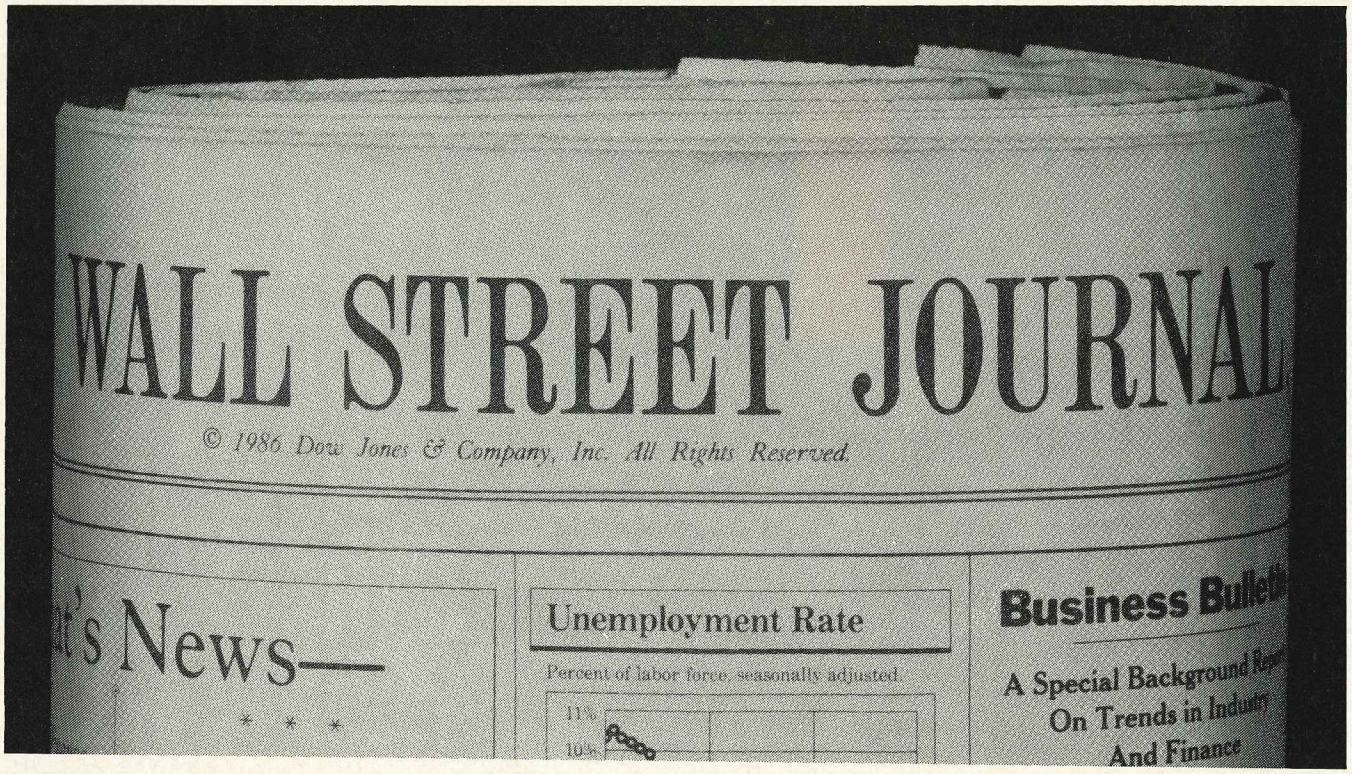


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# COMPUTERS EARN THEIR STRIPES

## *Automatic data entry via bar codes*

by Jonathan Chevreau and Diane Ingalls

*If you make regular trips to the grocery store, you're probably familiar with bar code. You've seen the bar code symbols, made up of vertical black and white stripes, on the labels of all sorts of products, and perhaps you've watched as the clerk whisked cans and boxes over a reader built into the checkout stand, rather than punching keys on a cash register.*

No longer confined to grocery products, bar code technology is speeding product handling in increasingly diverse industries, including the automobile manufacturing, health care, and electronics industries, and in the manufacturing of a myriad of retail goods. Even libraries and blood banks use the familiar vertical stripes, as do taxis and trucks, auctioneers, liquor makers, and issuers of passports. Bar codes are even on Levis jeans. They play a major role in inventory control, wholesale/manufacturing distribution, job costing, production control, material tracking, and retail sales.

Many industries now demand bar codes on incoming shipments. Detroit's automakers and the U.S. Department of Defense are setting standards requiring the smaller companies that supply them with parts to incorporate bar coding into their products. Many other businesses are turning to bar codes, not because they have to, but for their own profit.

An alternative to manual data entry, bar codes offer greater speed, accuracy, and reliability. Although bar codes are only one of a number of automatic identification technologies—others include magnetic strip, optical character recognition, machine vision, and voice recognition—they are probably the most visible, and they remain the most efficient, accurate, and lowest-priced method of data entry.

Until recently many bar code applications were entirely mainframe-based. Now, personal computers are being used equally as independent workstations or as data-gathering devices for mainframes. (See related article starting on page 26.) Personal computers can act as a front end to a network, taking data from bar codes and uploading it to a mainframe; they can also do the initial processing so finished results go up to the mainframe. Or PC-compatibles can be used individually in applications such as tracking employees' hours.

Bar Code Applications Ltd. of Blaine, Washington, reports that 90 percent of its business is related to micros, either as front ends to mainframes or as stand-alone systems. Its major PC-based application is order entry: providing portable scanners to salespeople to restock retail shelves.

Personal computers are also being used to print as well as to read bar codes. The trend is increasingly to on-demand, on-site bar code printing. Benefits include reduced costs and improved customer service.

### Bar code defined

Bar code was invented in the late 1940s by Norman J. Woodland and Bernard Silver, who at that time worked for RCA. Woodland later went on to IBM and became the principal architect of UPC (Universal Product Code), a bar code format widely used in grocery stores.

A bar code is a series of vertical, black and white bars and spaces of varying widths, easily generated and read by a computer, that represent a series of characters or symbols. These symbols are read by various types of scanners, and the information gathered in this manner is processed by a computer.


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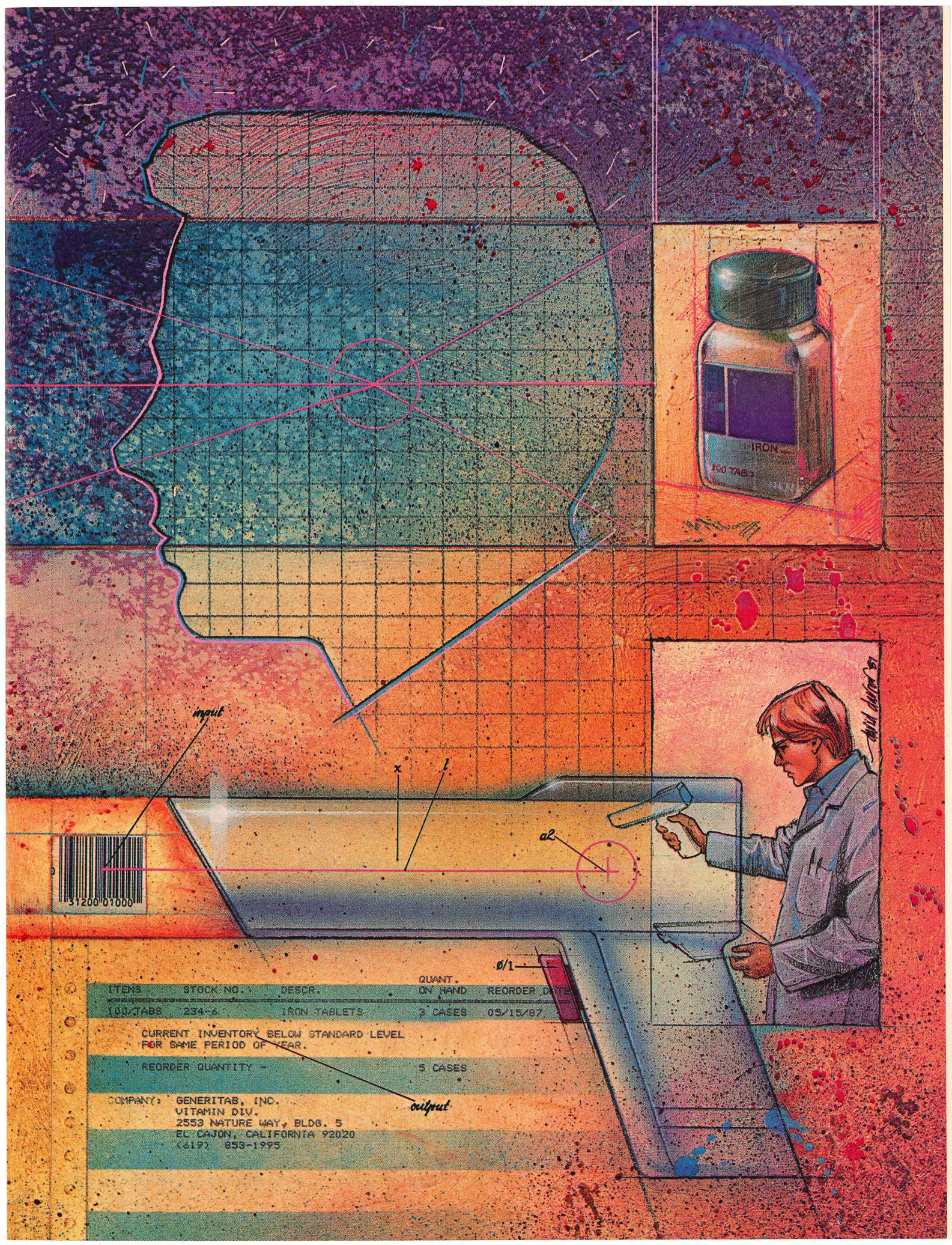
ILLUSTRATION BY DAVID DARROW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Code 39 was actually designed on the spot on a blackboard at the seminar. The name reflects the fact that three of the nine elements (bars or spaces) in Code 39 symbols are always wide. The complete Code 39 character set includes 43 data characters: ten digits, 26 letters, space, and minus sign, plus sign, period, dollar sign, slash, and percent sign. (Code 128, a variant of Code 39, includes the entire ASCII character set.)

"Code 39 is the most popular bar code format in manufacturing—and that could even be extended to include all non-grocery applications," Adams explained. "It has been adopted by the U.S. Department of Defense, which insists that all vendors put their GSA contract numbers in bar code on packages of items sold to it."

Code 39 has also been adopted by the automotive industry, Adams said. The Big Three auto makers now require all vendors to use Code 39.

In addition, Code 39 has been adopted by the health care industry for non-retail health care products—that is, products sold directly to hospitals.

*Code Two of Five.* Code Two of Five was developed by Identicon Corporation in 1968 and has been used extensively in warehouse inventory handling. According to Adams, Code 39 is encroaching on this application, but Two of Five is still widely used for photo finishing, airline ticketing, and baggage handling.

"Two of Five has a density problem," Adams said. "It doesn't carry a lot of information per inch. But in 1972, David Alais, the developer of Code 39, came up with a modification of Two of Five that was called Interleaved Two of Five and doubled the amount of information that could be stored in a standard symbol. Interleaved Two of Five is being used more than Two of Five now—most users converted to Interleaved when it was developed."

One problem with Two of Five and Interleaved Two of Five, Adams said, is that because of the way information is stored, if only part of a symbol is scanned, it can be misread. "Generally it is considered a worthwhile practice with Two of Five to include a check digit related to the information carried by the symbol," he said.

*Codabar.* Codabar was developed by Monarch Marking Systems, a division of Pitney-Bowes. Adams said it was originally developed as a competitor to UPC, but UPC won out. Codabar is used by blood banks and in the health care industry, and also in checkout systems in libraries.

"In blood banks, Codabar is used as a tracer to identify the source of blood, its type, and the type of blood product it may be," said Adams. He added that the use of bar codes may have helped to do tracing when it was discovered that AIDS could be contracted via donated blood.

*Plessey Code.* Plessey Code was developed by the Plessey Company Limited of Dorset, United Kingdom. It is primarily used for shelf marking in grocery and drug stores. Variants are MSI, Telxon Code, and Anker Code.

"If you go into a grocery store early in the morning, you'll see people walking down the aisles with portable readers, scanning the codes and doing a physical count of items on the shelf," Adams said. "As a general rule those people are vendors to the grocery store, not store employees, and they're doing a shelf inventory to see how much they should bring on the next delivery."

## Bar code readers

Bar code readers generally contain three common components: a scanner, a decoder, and a data communication interface, Adams explained.

The scanner contains both a focused light source and a photodetector. The light can be from a laser, lamp, LED or other source. This light is reflected from the bar code symbol and received by the photodetector, which converts the light to an electrical signal that is sent to the decoder. As the light moves across the black bars and white spaces of the symbol, its intensity changes, thereby causing the electrical signal to change. The signal from the photodetector is decoded by measuring the duration of the oscillation of the signal. These measurements are processed by a dedicated microchip or a microprocessor controlled by software in ROM. The microchip or microprocessor decodes the data, thereby determining the letters or numbers that were represented by the bar code, and translates the data into standard ASCII.

*Although all scanners follow the same steps in decoding bar code, they scan symbols differently.*

As an example, Adams said, in the grocery store a scanner in the checkout stand reads the UPC symbol on each package. The symbol contains the item's specific product number, which is transmitted to a computer at the store and compared to a list of product numbers stored there. When a match is found, a product description and price are transmitted back to the checkout stand.

Although all scanner types follow the same basic steps in decoding bar code symbols, and most can read any format, they differ in the way they scan these symbols. "There are different ways of categorizing bar code scanners," Adams said, "and some fall into more than one category." His description of the various types follows.

## Types of scanners

*Hand-held contact scanners.* Hand-held contact scanners or "wands" are the most widely used bar code reading devices. They are designed to be held by the operator and placed in physical contact with the bar code symbol. Such scanners consist of a light source and a photodetector in a housing a little larger than a pen.

*Hand-held non-contact scanners.* As the name implies, this type of scanner does not have to be held in contact with the bar code symbol, and it can employ either a fixed light beam or a moving beam.

In a fixed-beam, hand-held, non-contact scanner, the light beam remains stationary and the scanner is manually traced across the bar code symbol. In a moving-beam scanner, the beam itself moves 40 times a second and the operator only needs to point and shoot, not trace the scanner across the symbol.

*Stationary non-contact scanners.* As the name again suggests, the scanner itself remains stationary while the object labeled with bar code is moved through the scanner's light beam. Stationary scanners may use either a fixed or a moving light beam.

Fixed-beam stationary scanners use a relatively broad, stationary light beam to illuminate a moving bar code symbol. When a bar code moves through the beam, the scanner's photodetector receives light reflected from the bar code and reads the symbol. Because the light beam is broad, a large area of the bar code is illuminated, though only a small part of the symbol is focused on the photodetector.

Fixed-beam stationary scanners are less expensive than moving-beam scanners, but a disadvantage is that the symbol must pass close to the scanner, and the distance between scanner and symbols must be constant.

This type of scanner is used to identify packages, read badges, sort envelopes, and in other applications where the positioning of the bar code relative to the scanner can be carefully controlled. Fixed-beam stationary scanners are generally used in manufacturing environments. They are placed along conveyor belts, and packages move on the belt across the fixed beam (usually a laser) and scan themselves.

Moving-beam stationary scanners use a beam of laser light that moves back and forth in a straight line or in a figure 8 or starburst pattern. Scanners in grocery stores use the starburst or figure 8 pattern because this way the bar code symbol does not have to be aligned in a particular direction—the UPC symbol can be read in any orientation as long as the symbol faces the scanner. The straight line pattern is used in industrial applications. Moving-beam scanners are relatively expensive,

*"Bar codes are coming to the little guy—four- or five-person shops that make one part."*

and most read only UPC code in retail checkout applications.

A variation on the moving beam scanner is the holography scanner, which is much more expensive still. Such scanners use holography to create a three-dimensional scanning pattern that enables the scanner to read a symbol on the side of a package—the label does not have to face the scanner.

*Video-image scanners.* This type of scanner operates like a television camera. It takes a picture of an image—the bar code symbol—analyzes the code, and decodes the information. The symbol is illuminated by either a flash or a flood lamp, and the symbol image is reflected on an array of very small photodetectors called a linear photodiode array. A microprocessor periodically samples each photodetector to produce a video signal of the image. This signal is then conditioned and decoded.

Video image scanners can be either fixed or hand-held, and they are used in some retail applications as an alternative to moving beam scanners, which are more expensive.

(continued on page 71)


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# Bar Codes and Microcomputers

## *A match made for productivity*

by Marshall L. Moseley

Microcomputers have long been touted as productivity tools, and indeed they are. But for both the home and business computer user their usefulness has been restricted mainly to analysis. And while spreadsheets are a great help with the books, they do not move products out the door. Rarely have the machines themselves been used to streamline and speed up day-to-day procedures.

Bar code technology is changing all that. Microcomputers combined with bar code scanners are being used profitably on manufacturing floors, in warehouses, and in small businesses. (Though there are applications for CP/M machines, more than 90 percent are for PC-compatible microcomputers.)

This article will provide an overview of the ways in which bar code technology is being implemented on microcomputers in both large-scale industrial applications in conjunction with mainframes and as stand-alone systems. Also included is a generalized description of factors that should be taken into consideration when choosing bar code equipment.

### The PC-mainframe connection

A common misconception is that microcomputers aren't nearly as useful as powerful, expensive mainframes in an industrial setting. In fact, in certain applications, microcomputers are superior to their bigger brothers.

There are three reasons for this. First, microcomputers are so inexpensive that they can be dedicated to performing relatively few tasks. Second, they are so standardized that buying hardware to connect them to scanners is easy and inexpensive, especially compared to buying or designing custom hardware to work with mainframes.

Finally, the development of software for a microcomputer takes far less time then it does on a mainframe. Mel Endelman of Bar Code Applications Ltd. in Blaine, Washington, says it is easier to create bar code software for a microcomputer. "You are looking at six months development time on a mainframe, and maybe three weeks on a PC," he said.

Bar codes and micros have already proved equal to a variety of industrial tasks. These include keeping track of employees' hours, doing order entry, and generating waybills. Micros really shine in industrial warehousing, where bar codes are used to identify packages so they can be sorted, stored, counted, or sent to their destinations automatically.

In a warehouse environment there may be up to 20 workstations, each with a bar code scanner and decoder. At each station, bar codes on products are read with the scanners as they leave the building. Each scanner and decoder is connected to a device called a multiplexer, which contains one to two megabytes of memory and control circuitry for interpreting data from the decoders.

Bar code data from the scanner is sent to the decoder and in turn to the multiplexer, which stores the data in a memory buffer. The multiplexer sorts and prioritizes this data and sends it through a serial cable to a microcomputer's serial port. The software running on the micro accepts the data and stores it on a hard disk. (Most industrial bar code software runs under one of two networking operating systems: Manufacturing Area Protocol, which was created by General Motors and is used in their production areas; and System Network Architecture, developed by IBM Corporation for use with their computers.)

At the end of the day, the data is transmitted from the hard disk to a mainframe computer, which crunches numbers, updates the inventory files, and issues reports.

Before, a worker would have typed a form for tracking the product; with this technology, he or she simply waves a wand over a bar code. The process takes three seconds instead of three minutes, and the incidence of error goes way down. Endelman states that a study done by the United States government a few years ago determined that humans hand-keying data into a computer had an error rate of one in 300 characters, while bar code scanners and decoders had an error rate of one in three *million*.

This is just one way of using microcomputers and bar code technology in an industrial environment. There are others. Symbol Technologies in Bohemia, New York, manufactures bar code equipment for microcomputers. Tim Harrington of their marketing department says that many manufacturers are using bar codes and bar code equipment to track products as they are being built. This is accomplished by placing an identifying bar code on each item. Then, once it is in the production area, an inventory clerk can count it and assay its value by scanning the bar code. Manufacturers can now know the exact value of the parts and half-built products they have tied up in the production process.

Though not yet available on a widespread basis, some industries are using "smart" bar code labels, which change color once they have been scanned. This helps stop double counting during inventories ("If the label is blue, don't scan


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it."). Smart labels are also being used to track the freshness of perishable items, such as food.

One thing is certain: microcomputers have found their way onto warehouse and manufacturing floors, and they have proved themselves to be invaluable.

## Stand-alone systems

In the last few years the use of bar codes and bar code readers with individual microcomputers has increased greatly, thanks to a handy little device called a "wedge." A wedge is a bar code scanner and decoder connected to your computer at the point where you usually plug in your keyboard. The keyboard in turn is connected to the wedge. Data from the keyboard is routed through the wedge and is received by the computer in the normal manner.

*Anywhere data would normally be laboriously entered, bar code can speed up the process.*

Bar codes read by a wand-type scanner are converted into numeric and alphabetic data by the decoder and are sent to the computer *just as if they were typed at the keyboard*. The applications software running on the micro can't tell that the data being received came from a bar code.

In industrial applications there may be many scanners and decoders attached to a single microcomputer. The wedge device precludes this setup. With a wedge it's one scanner, one microcomputer. But because the wedge functions as a keyboard, the bar codes it reads can be used with standard applications software. This opens up bar code technology to the all the power inherent in popular applications programs. An industrious programmer could write an entire program in dBASE III, for example, with bar codes and bar code equipment specifically in mind. The data entry portion of the program would be exponentially faster than anything written for manual data entry at a keyboard.

Ways in which this sort of system is currently being put into practice:

- A microcomputer and bar codes can be used in place of a conventional time clock. On the wall or table next to the computer would be a series of bar codes, each with an employee's name beside it. There would be specific codes for time in, time out, lunch, and coffee breaks. When workers arrive, leave, or take a lunch break, they would stop and use the bar code scanner to note the time. This way an employee's hours could be tracked for payroll purposes or to analyze productivity.
- A wedge can be used at a cash register to deduct items from inventory. When a product is purchased, a clerk passes a scanner over the bar code label on the item. The item and its value are immediately subtracted from the inventory.

A simpler wrinkle on this application is the *classification* of products in inventory. Individual bar codes do not need to be created for individual items. Instead there can be four or five codes that indicate what *types* of products are being sold. With this type of information it is possible to easily analyze sales histories and project future sales.

In short, anywhere data would normally be laboriously entered into a computer, bar code can speed up the process incredibly.

## The big picture

To effectively use bar code technology with a microcomputer the user must first have a clear idea of what must be accomplished—inventory or point-of-sale transactions, for example. Then the routine to be followed by employees must be analyzed and the type of of application/analysis software to be used must be determined. Every aspect of the system must be considered: the software, the computer, the scanner, the decoder, and the methods used to employ them are all interrelated. The following discussion of system components is intended to provide a basic grounding for further research, and suggested reading is listed at the end of this article.

*Scanners and decoders.* As noted above, the most popular scanner/decoder combination currently used with microcomputers is the wedge. A wedge can work with almost any applications package, and many wedges can read several different bar code formats.

There are two alternatives to using a wedge. A bar code scanner can be connected to a computer's serial port, but this can be cumbersome and usually requires technical expertise. Generally a scanner is connected serially only if there will be many scanners attached to a single microcomputer.

A second alternative for owners of IBM PC compatibles is to install bar code scanner expansion boards in their computers. These boards are usually wedge readers, installed internally. Data from them is no different than keyboard data to the computer, and they do not disable the keyboard. Aedex Corporation of Placentia, California, makes such a board, called the BCS 150. It features an input port for a scanner and has both decoding software and print drivers in ROM.

Scanners vary in quality and features. For example, if bar code is used to input data into a data base, the program may expect a carriage return at the end of each character string. Some scanners require that the carriage return be encoded in the bar code, while others will automatically add a carriage return. A wedge scanner/decoder marketed by Worthington Data Solutions of Santa Cruz, California, has a DIP switch that allows the user to choose whether automatic carriage returns are inserted or not.

*Choosing a format.* Selecting an appropriate bar code format is important because the success of a system hinges upon using the format best suited to the kind of information that will be encoded (for an explanation of bar code formats, see the accompanying article). Many formats do not lend themselves to use under a wide variety of conditions.

UPC is most widely used in grocery stores, for example. It only allows 12-digit numbers to be encoded, and the 12th digit must be a "checksum" digit, which the software computes. UPC symbols are easily readable by many scanners, but the data they represent must be meaningful to your applications software. In addition, UPC codes cannot be arbitrarily

assigned to manufactured products. The Uniform Code Council, Inc. of Dayton, Ohio, assigns UPC code numbers to specific products.

Code Two of Five, used primarily in warehousing, has fewer restrictions, but only the numbers 0 through 9 and a decimal point can be encoded with it. Code 39 is by far the most popular format. It can be read in either direction by most of the scanners on the market today. Code 128, a variation on Code 39, lets you encode the entire ASCII character set—letters, numbers, and symbols like % and $.

If a bar code reader is going to be used with standard microcomputer software such as Lotus 1-2-3 or dBASE III, then a bar code format that can produce the standard ASCII character set is desirable.

*Printers.* The method selected for producing bar code labels is highly dependent on individual needs. If there is a large inventory of individual items, contracting with a printer to print bar code labels may be practical. Because they are printed professionally with good equipment, these labels are usually of very high quality.

Laser printers, with their eight-page-per-minute printing speed and 300-dots-per-inch resolution, are well suited to printing bar codes in some, but not all, circumstances. Laser printers do produce very clear bar codes, but they are susceptible to contamination from the dust and dirt that is often present in manufacturing facilities and busy retail stores. Many laser printers cannot handle press-apply labels very well and cannot accept continuous-feed paper at all. The exception is the Kyocera F-1010. While it cannot use continuous feed paper, it *can* handle labels and even has a built-in command for producing bar code labels. Also, Avery International of Azusa, California, has just introduced a label designed specifically for use in laser printers.

Thermal printers and thermal transfer printers are used in the industrial arena to produce quality bar code labels very quickly. Thermal printers work by heating chemically treated paper so that characters appear on it. Some thermal printers are priced competitively with dot-matrix printers. Thermal transfer printers heat the printer ribbon so that images are "burned" onto standard paper, producing very high resolution bar codes. Both of these printer types work well, but thermal printers require special paper, and images produced by them can fade in a year or so. Thermal transfer printers can be rather expensive. Computer Identics of Canton, Massachusetts, offers a thermal bar code printer for $2,580 and thermal transfer printer for $5,995. Intermec of Lynnwood, Washington, offers a thermal printer for $2,595.

Dot-matrix printers are relatively inexpensive and quite capable of producing quality bar code labels. They accept labels and continuous feed paper and don't mind a little dust and dirt. Although they are not designed for the day-in-and-day-out pounding that printing bar codes can entail, they can still be cost effective compared to expensive custom printers. Vince Worthington, of Worthington Data Solutions, says that a standard dot-matrix printer costing $200 to $600 used to print up to 1,000 bar code labels every day will last eight to ten months.

"Then the part that usually breaks is the print head," he said, "which costs $70 to replace. Compare that with a minimum of $1,500 for a custom printer, and replacing print heads twice a

*(continued on page 76)*


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# Electronic Shopping

## *Marketplace of the '80s*

by Brock N. Meeks

Jim Peters

The shopping mall is the cultural phenomenon of the 1980s. A conglomerate of fun, food, and free enterprise, a mall incorporates nearly all aspects of community life under one roof. (One mall near Cleveland even includes a cemetery!)

Author and syndicated columnist Richard Louv writes in his book *America II*: "Mall culture now dominates the nation's urban social and commercial life . . . [shopping malls] serve as the homogenized community centers for beauty contests, art, boat, and auto sales, and local craft fairs."

Guess what? Beyond your computer screen a similar development has taken place.

Electronic shopping services aren't as diverse as their urban counterparts (to date, no beauty pageant has been held online). But this marketplace via modem offers just about any type of product or service you can think of.

You can, for example, order coffee from the Kona Coast; fly in a live Maine lobster; book a travel package to Europe; add a Gucci handbag to your ensemble; buy a cellular phone that fits in your pocket; or comparison shop for a Pontiac. You can even participate in online auctions.

Such a multitude of choices should satisfy even the most discriminating shopper.

Electronic shopping malls can be found in a variety of places. Some you dial up directly. Other malls are on systems such as CompuServe and Dow Jones News/Retrieval. And there's even a "chain" of malls, known as "Fantasy Plazas," that operate on electronic bulletin boards.

## Marketplace of the '80s

Whether you're buying a multi-million dollar office complex or a $4.95 paperback, there are three common elements in any transaction: a buyer, a seller, and the goods changing hands. These elements are evident when shopping online, too.

But when a merchant sells an item through an electronic mall, there can be price advantages for you, the buyer.

Merchants selling their products online don't have to rent floor space, pay the electric bill, stock shelves, or hire a manager to run the store. Online shopping services help both the seller and buyer. The buyer gets a lower price because the seller doesn't have to add in costs for overhead.

If you own a modem and a credit card, you have 90 percent of what's needed to take advantage of this electronic marketplace. (And if you don't have either one, borrow them and you can order your own; yes, you can even apply for a VISA card by filling out an online application.)

The other things you need are time and access to the service, either directly or through a commercial information utility like CompuServe or The Source.

## Malls in the ethernet

Since 1950 more than 25,000 shopping malls have been built across the nation. Although online marketplaces haven't reached such numbers, there is still a wide selection. The following are some of the services available.

•*Comp-U-Store*. A service of Comp-U-Card International, Inc., Comp-U-Store allows you to comparison shop for and order more than 250,000 products from manufacturers such as Sony, General Electric, Canon, IBM, and Nikon. Comp-U-Store has 16 product categories ranging from major appliances to office equipment.

Comp-U-Card stores its data on computers in Columbus, Ohio, and is a "gateway" service. This means you can access it directly through a packet-switched network (Tymnet or Telenet) or through a service like CompuServe or The Source.

The Comp-U-Store data base is constantly being revised—new products are added, prices are changed, etc. This makes it impractical for a service like CompuServe to house it on its own computers because Comp-U-Store would have to send hourly updates to assure the most current data base was online.

When you access Comp-U-Store through CompuServe, a CompuServe computer dials out over Tymnet or Telenet and connects you to Comp-U-Store. All this takes place without any significant delay at your end. I mention this because, although these gateways make it convenient to shop at Comp-U-Store, you may be paying a higher price for access than if you just dial directly.

Even in the electronic marketplace the phrase "buyer beware" applies.

•*Electronic Mall*. CompuServe also has its own in-house service. Its Electronic Mall offers more than 80 online merchants providing goods and services in 27 different categories, such as audio equipment, books, gourmet foods, jewelry, travel, and video equipment.

•*Menutronics System 2000*. For those living near Kansas City, Guaranteed Foods, Inc., offers an online grocery shopping service called Menutronics System 2000. This is a mini-electronic version of Guaranteed Foods' shop-by-catalog grocery service. (Guaranteed Foods has offered its catalog service since 1956.) Here you can shop for more than 500 brand-name items—no "generic" items on this menu.

From Airwick to Zardi, you can choose from the following categories: meats, canned foods, frozen foods, dry groceries such as cereals, eggs, dairy products, fresh produce, and household items such as oven cleaner. You can even use all those cents-off coupons you've been clipping to cut your total bill.

The service claims that your order will be delivered to your doorstep within 24 hours. They hope to expand to other Midwestern cities in the near future.

•*Fantasy Plaza*. This online shopping service is designed to operate in the bulletin board environment. The software is set up to appear as a multi-level shopping mall; each "floor" contains a different group of merchants.

The system throws some inane remarks at you as you skip around the different floors. When first entering the system, for example, you're told, "In front of you is the most beautiful glass elevator you've ever seen." And as you continue to shop, the system treats you to unsolicited comments such as, "You're a lucky shopper!" Sometimes the "mall manager" pops up with comments of his own, such as " 'We hope you're happy here,' the mall manager."

ILLUSTRATION BY JIM PETERS

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Beyond that, these systems can offer good buys, usually from local merchants. The systems I saw all encouraged me to check their bank references, should I be the least bit suspicious about ordering from them. I found everything from software to lingerie available for sale.

•*Other sources.* In addition to organized malls, you can find advertisements for products or services. On The Source, you can find these under the "User Publishing" area. Users of The Source "rent" space (pay online storage fees) to advertise their goods and services. According to Nancy Beckman, manager of corporate communications for The Source, there are several "user vendors" offering products ranging from records and tapes to computers.

CompuServe has its "National Bulletin Board" where users can advertise things for sale. These areas are often overlooked by online shoppers, as the bigger shopping services extensively advertise their presence. However, in the interest of ferreting out the best price, it's wise to look in as many places as possible for an online bargain.

## Getting the goods

Although the expanse of online shopping services may seem a bit overwhelming, using these services is simply a matter of choosing from a menu and tapping the correct keys.

There are two ways to use shopping services. The first is to go after a specific product—a mixer, for example. This way you start shopping with a clear goal in mind. The second is akin to window shopping. You can browse through the different stores, looking at the items available for sale, and not be obligated to buy anything.

Let's walk through an actual online shopping session.

Suppose you've discovered that your 12-year-old is a budding microbiologist; your future Nobel Prize winner could really use a microscope. However, as a busy professional, you don't have time to comb the local discount stores or trudge out to the nearest mall (even if it is sponsoring a car show this week). You decide to visit The Electronic Mall on CompuServe, hoping you'll find a deal.

After connecting with the CompuServe network you issue your account number and password and are presented with the familiar "!" CompuServe command prompt. Typing in **Go EM-1** (which means "go to the electronic mall, page 1") puts you into The Electronic Mall. Here you see your first menu (see Figure 1 below).

**FIGURE 1**

```
The Electronic Mall                    EM-1

    ___/___/ THE
   ___/___/ ELECTRONIC
        MALL (tm)

1 -- Shop by Department
2 -- Shop by Merchant
3 Index to Products
4 This Week's Mall News
5 How to Shop
6 Talk to the Mall Manager
7 TAX TIME AT THE MALL

Enter Choice !1
```

Since you don't have any idea which merchant sells microscopes, you'll have to do some searching.

Choosing **1** from The Electronic Mall menu gives you a menu of the first eight departments (see Figure 2 below).

**FIGURE 2**

```
MALL DEPARTMENTS

1 Apparel/Accessories
2 Auto
3 Books
4 Computing
5 Financial
6 Gifts/Gourmet
7 Health/Beauty
8 Home/Leisure
9 Merchandise/Electronics

Enter Choice or <CR> for more !8
```

From this menu you make an educated guess and choose **8**. This choice scrolls a list of the seven merchants that are indexed under the Home/Leisure department (see Figure 3 below). Figuring Cosmic Concepts looks close to what you need, you choose **1**. This places you at the electronic storefront that Cosmic Concepts calls home, and you get a "welcome" menu from the store itself.

**FIGURE 3**

```
HOME – LEISURE

1 COSMIC CONCEPTS: Telescopes, binoculars, kids stuff
2 HOBBY CENTER TOYS: Hobby items, model trains & games
3 MUSIC ALLEY ONLINE: Guitars, synthesizers, keyboards
4 QUALITOY: Quality children's toys
5 RIN ROBYN POOL & PATIO: Pool and patio, outdoor items
6 TSR HOBBY SHOP: Adventure games and accessories
7 VACUUM ADVANCE: Vacuum cleaners, sewing machines

Last menu page, enter choice !1
```

Looking over these menu selections (see Figure 4 below) you decide to browse a bit and acquaint yourself with the store. If you choose **1**, the introduction, you are informed that Cosmic Concepts is a division of Optical Concepts Corp., and that this company specializes in optical products such as binoculars, telescopes and, among other things, microscopes. *Bingo.*

**FIGURE 4**

```
COSMIC CONCEPTS                        CC-1

WELCOME TO COSMIC CONCEPTS (tm)
A Division of
Optical Concepts Corp.
*=*=*=*=*=*=*=*=*=*=*=*=*=*=*=*=*=*=*
1 Introduction
2 How To Order
```

*continued*

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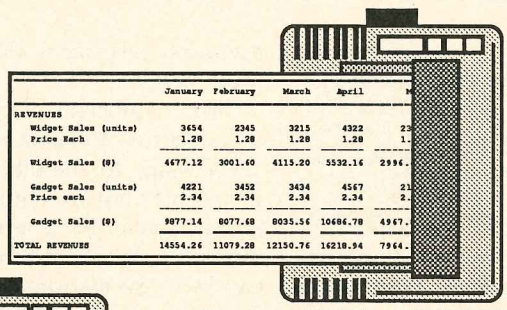

| | January | February | March | April | |
|---|---|---|---|---|---|
| REVENUES | | | | | |
| Widget Sales (units) | 3654 | 2345 | 3215 | 4322 | 2 |
| Price Each | 1.28 | 1.28 | 1.28 | 1.28 | 1. |
| Widget Sales ($) | 4677.12 | 3001.60 | 4115.20 | 5532.16 | 2996. |
| Gadget Sales (units) | 4221 | 3452 | 3434 | 4567 | 2 |
| Price each | 2.34 | 2.34 | 2.34 | 2.34 | 2. |
| Gadget Sales ($) | 9877.14 | 8077.68 | 8035.56 | 10686.78 | 4967. |
| TOTAL REVENUES | 14554.26 | 11079.28 | 12150.76 | 16218.94 | 7964. |

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```
3 About Lenses, Telescopes, and Binoculars
4 ON-LINE CATALOG
5 Customer Service Desk
6 MONTHLY BLOCKBUSTER SPECIAL

Enter Choice !4
```

In the absence of a store clerk to answer your questions, you decide to bone up on your (limited) knowledge of optics by choosing **3** from the welcome menu. This choice pulls up a 24-line description of what lenses are and some of the important things to look for in a quality lens. When that's finished you decide to check out the merchandise and select **4**, the online catalog.

This gives you yet another menu (see Figure 5 below). Number seven, Microbe Gazing, looks like it'll direct you to any available microscopes, and you enter it.

**FIGURE 5**

```
COSMIC CONCEPTS                    CC-11

                ON-LINE CATALOG

1 Star Gazing
2 Paramutual Window
3 Peeping Tom
4 For The Kids
5 Books and Videotapes
6 For The Opticalphile
7 Microbe Gazing
8 Monthly Blockbuster Special
9 Miscellaneous

Enter choice !7
```

This choice gives you a menu (see Figure 6 below) of 12 different items ranging from magnifying glasses to the sought-after microscopes. You decide that the Selsi 1200X Zoom Microscope Set sounds good, and you select that from the menu by typing in **9**.

**FIGURE 6**

```
COSMIC CONCEPTS                    CC

 1 Bar Magnifier For Computer Prints
 2 Quality 3" Round Reading Glass
 3 Illuminated 3" Glass Magnifier
 4 Quality 4" Round Magnifier
 5 Quality 5" Round Reading Glass
 6 4 x 2" Rectangular Reader
 7 30X-50X Zoom Microscope
 8 Selsi 600X Microscope Set
 9 Selsi 1200X Zoom Microscope Set
10 Selsi 750X Photo-Microscope Set
11 Selsi Stereo Microscope
12 Electric Illuminated 4 x 2" Reader

Enter choice !9
```

Cosmic Concepts now gives you a short five-line description of the Selsi 1200X microscope; it also tells you the price: $68, retail. Ah, you're in luck! Today, Cosmic Concepts happens to be running a 15 percent mall discount on this item. With the discount, the price is $57.80. To buy the microscope you enter **O** for "order."

Cosmic Concepts acknowledges your order and gives you the opportunity to look around some more before filling out the "paperwork" for the actual purchase. (Each of the stores in The Electronic Mall does this for you.) If you wanted to, you could go back and order several other items from Cosmic Concepts, following the procedure just described. However, you only came after the microscope, and so you'd like to buy it and leave. To do this simply enter the word **checkout**.

When the system sees you would like to "check out," it runs you through a series of questions that confirm your purchase items. You're even given the option of having the purchase gift wrapped (handy if you're having the item sent to someone as a gift). In addition you must fill in your address, phone number and method of payment. Cosmic Concepts accepts VISA, MasterCard, American Express, or Diners Club. When you pay with a credit card you have to have your card number nearby, as you are required to type it when completing the purchase. (The Electronic Mall has an online credit card verification system that catches bogus credit card numbers.) If for some reason you suddenly get cold feet about your prospective purchase, simply enter **exit** and the transaction is instantly voided.

Once you've finished the checkout phase you can move on to other online business or take a look at another online store. To leave both the mall and CompuServe, you enter **bye** at the next "!" prompt.

Your online shopping excursion is finished. Any merchandise you ordered should arrive in about a week—it depends on the item being shipped.

## Deal or disaster?

Was the microscope a good deal? Only a check of your local stores can tell you that. Shopping with Comp-U-Store, however, would have given you more of a choice. Using Comp-U-Store, you can comparison shop.

Comp-U-Store searches its entire data base of merchants and presents you with a menu of products from assorted vendors, all within a price range that you've specified. (For example, if you were interested in a 35mm camera, you could tell Comp-U-Store to show only those cameras in its data base that sell for under $350.) When your menu of products pops up onscreen, you can choose to examine each listed product by pressing its corresponding menu number.

For each product selected you're given the retail price, the Comp-U-Store price, and a short description of the product's features. Since you can compare several products at once this way, you can be reasonably assured of getting a "deal."

Even with online comparison shopping, however, there are some hidden costs that can turn your deal into a disaster, if you're not careful.

First of all, there is the "online overhead." This is the cost of online time when you're using a commercial system, or the cost of the phone call when dialing into a bulletin board mall like Fantasy Plaza. In addition, if you want to shop through Comp-U-Store, you'll have to pay a membership fee of $25 a year.

Once you become familiar with a shopping service like The Electronic Mall, you can bypass the tedious string of menus by telling CompuServe to take you directly to a specific "address." For example, if you want to go back to Cosmic Concepts and

order a pair of binoculars, you can simply enter **Go CC** at the first "!" prompt. This lowers your online overhead and cuts the bottom-line cost of any item purchased online.

## Pros and cons

There are, of course, both positive and negative aspects to shopping online. Making your purchases from the keyboard of a computer carries a few caveats.

- You can't examine the merchandise. You have to rely on your knowledge of the items you want, or trust the online descriptions.
- Shopping electronically makes it easier to "put it on the plastic." According the Bankcard Holders of America, Americans have racked up debts totaling $84 *billion* using credit cards. It's much easier to spend money when shopping electronically because you don't feel like you're really buying anything. No money changes hands, and you don't even have to sign anything. (The reality sets in when your next credit card billing arrives in the mail.)
- Browsing costs. Prowling through the local shopping mall doesn't cost you anything but time. Browse online with the meter running and window shopping suddenly becomes more than a spectator sport.

*The convenience of online shopping attracts customers and turns them into repeat buyers.*

Given those caveats, electronic shopping does have much to offer on the positive side.

- It's convenient. No parking hassles. No crowds. No sore feet. You can shop 24 hours a day, 365 days a year, regardless of the weather.
- You can easily comparison shop. Anyone who has hunted for a bargain knows that tramping through several different stores can be taxing, both emotionally and physically. Electronic comparison shopping alleviates the problem. You have to walk no farther than the nearest keyboard and look no farther than your CRT.
- Time savings. This is perhaps the biggest advantage of all. You can, for example, do all your Christmas shopping without ever leaving the house—and in a single session at the computer. Because your online purchases can be sent anywhere in the nation (gift wrapped, at that), all you need is your gift list, a healthy credit limit, and something cold to drink.
- Lower prices. Because merchants don't have to pay a high overhead, they can—and do—pass on their savings on to you. During the holidays and on special "midnight madness" days, CompuServe waives all connect charges when you're visiting The Electronic Mall.

## Does it work?

There is no doubt that online shopping is a success. After all, services like The Electronic Mall wouldn't continue to gain new merchants (and merchants wouldn't continue to gain new customers) if the system wasn't profitable and convenient. Convenience has played a big part in the success of online shopping.

Research done by the marketing department of Ohio State University shows that the convenience of online shopping is what attracts most customers and turns them into repeat buyers—the life blood of any commercial enterprise. The demographics on those customers is interesting to note.

CompuServe statistics show that a whopping 96 percent of those using their shopping services are male. The "typical" electronic mall shopper, according to CompuServe, is 34, married, uses the computer 10 or more hours a week, and has a median income of $44,000. That's a lot of buying power sitting in front of the keyboard. It's the kind of buying power that attracts merchants to the electronic marketplace. And when you have more merchants, you have a better variety of products to choose from, which in turn, attracts more buyers. It's a win-win situation.

So, the next time you get a craving for rattlesnake steaks; are in the market for a fur coat; want to buy stocks, fly to France, stock up on Cuban cigars or order something practical from Tiffany & Co., and you feel tempted to grab your checkbook and car keys and head for the door . . . consider heading for the keyboard instead.

*Brock Meeks is a frequent contributor to* PROFILES *who specializes in telecommunications. His work has also appeared in* BYTE *and other computer-oriented publications.*

## Where To Find Them

**What:** The Electronic Mall
**Where:** CompuServe, Inc.
5000 Arlington Centre Blvd.
P.O. Box 20212
Columbus, OH 43220
**Phone:** (614) 457-8650

**What:** Comp-U-Store
**Where:** Comp-U-Card International, Inc.
777 Summer St.
Stamford, CT 06901
**Phone:** (800) 843-7777

**What:** Menutronics System 2000
**Where:** Guaranteed Foods, Inc.
8901 Rosehill Rd.
Lenexa, KS 66215
**Phone:** (913) 888-5000

**What:** Fantasy Plaza
**Where:** Fantasy Plaza
P.O. Box 6055
Burbank, CA 91510
**Phone:** (818) 840-8211
**BBS reviewed for this article:** (818) 840-8066,
300 baud only, 24/hrs day

# WordStar Deluxe

## *A comprehensive guide to customizing WordStar*

by Ted Silveira

*Editors' note: This article is a reprint from the July/August 1985 issue of* PROFILES. *It is unquestionably the most popular article ever published in* PROFILES *and just might be the most comprehensive piece done on patching WordStar. We've updated the information in the article and added a section on WordStar version 3.31 for MS-DOS systems to the table of labels and addresses of patch points (on pages 44-49). The newly released WordStar 4.0 is not addressed in this article.*

People talk about WordStar as if it were an aging American sedan, something like a '56 Mercury. It was top drawer in its day, but now it's showing its age. It doesn't have the features or the zip of the new models. It takes up too much room. It's a disk hog.

But like an old Mercury, WordStar has another side for those who can see—it can be customized. In fact, WordStar can be patched, tweaked, and generally modified like few other programs, all in your own garage.

Why bother? If you customize WordStar, you can avoid doing that elaborate finger-dance at the start of a session to get WordStar set up right. You just change the defaults for margins, line spacing, help level, justification, etc., so they start out the way you want. For example, I have one copy of WordStar that defaults to a standard manuscript format: justification and the hyphen-help off, help level 0, double line-spacing, right margin 65, 10 pitch printing, and page offset 10. I have a second copy of WordStar for letters: justification off, hyphen-help on, help level 0, single line-spacing, right margin 78, 12 pitch, and page offset 12. And I have a third copy for programming: it defaults to non-document mode, help level 0, 12 pitch, and page offset 5.

If you customize WordStar, you can also wring a little extra performance out of it. You can use your computer's video features to improve your screen display. You can make it possible to edit one file while printing another, without annoying delays or lost characters. And you can use the special features of dot-matrix printers, like condensed or expanded print.

You can't get multiple windows or onscreen italics by customizing WordStar, but you can make the most out of what you've got. Best of all, you end up with a WordStar that suits your particular style.

### What customizing WordStar involves

To customize WordStar, you have to patch it—change individual bytes in the main WordStar program, WS.COM, and thereby change the instructions that WordStar gives to the hardware inside your computer. In one sense, patching WordStar is a very technical operation, since you're actually fiddling with the program's innards; but in practice you'll find it quite easy, and you'll need very little technical knowledge. It is very helpful to know something about hexadecimal numbers; if you're unfamiliar with them, read the related article, "Bits, Bytes, and Hexadecimal Numbers" on page 39.

To customize a particular feature in WordStar, you have to find the right location in WS.COM to patch. Table 1 (on pages 44-49) lists all the patch points I know of that might possibly be useful. It covers WordStar versions 3.0 and 3.3 for CP/M systems and WordStar 3.31 for MS-DOS systems. This table exists through the work of many people in the public domain—most recently, Milton Hicks and Guy Gamble, and before them, many anonymous contributors. This information has been steadily added to, sorted, edited, and re-edited for almost as long as WordStar has been available, and my additions certainly won't be the last.

For each patch point, the table shows a mnemonic label, hexadecimal addresses for the different versions of WordStar, a *brief* description of what the patch point controls, and the bytes at that point. Depending on which method of patching you use, you can locate a patch point by using either the label or the hexadecimal address. The hexadecimal address will work with any method, while the labels will work only with WordStar's own installation program (WINSTALL.COM or


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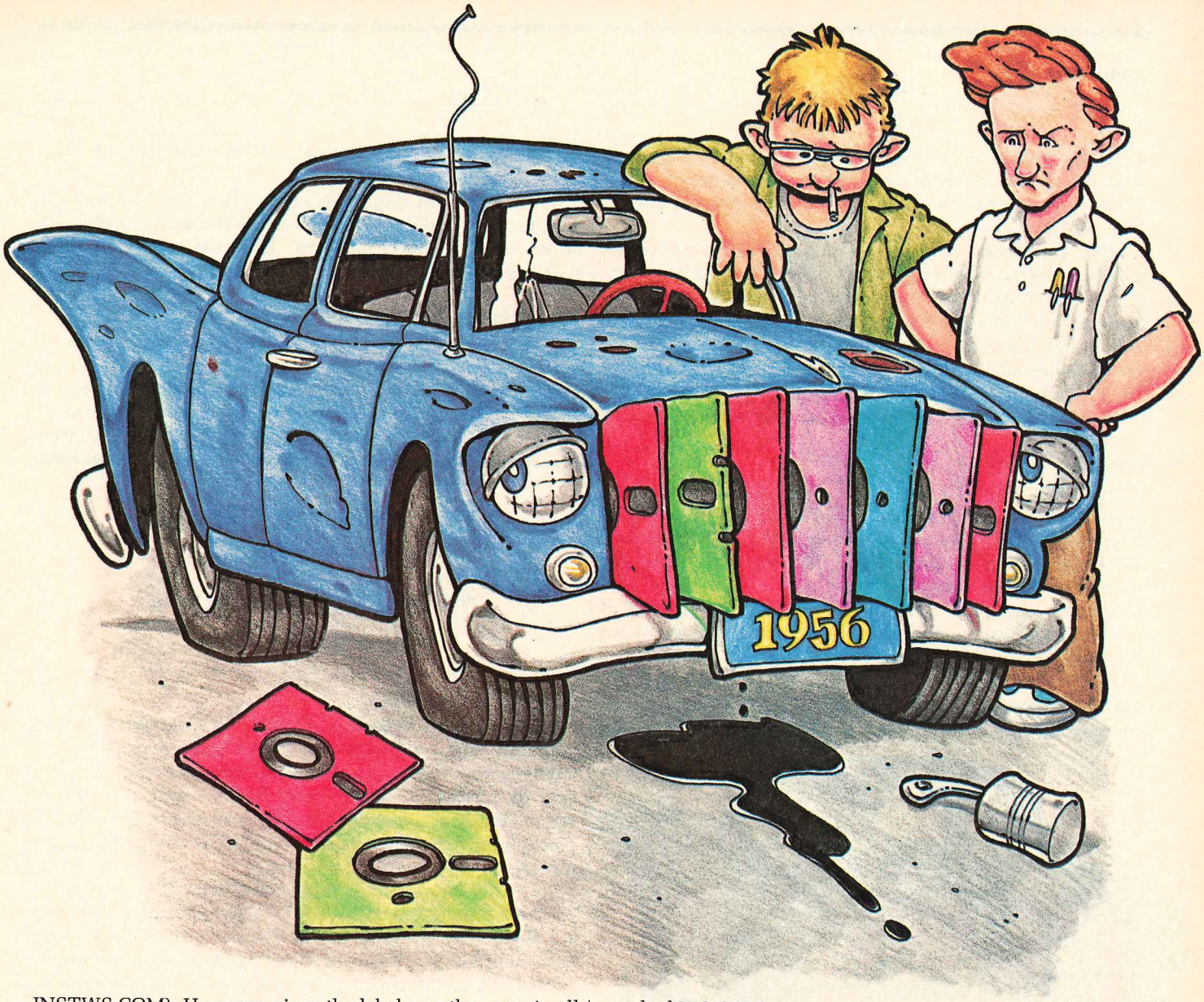



INSTWS.COM). However, since the labels are the same in all versions of WordStar, I'll use them as a convenient way to refer to a particular patch point.

## First steps

Find out which version of WordStar you have. Kaypro now ships WordStar 3.3 with its computers, but earlier owners may have WordStar 3.0. Most of the differences between these won't concern us here, but the patch points have different addresses in the two versions.

Owners of the Kaypro 16, PC, 286i and 2000 series computers have the 16-bit version of WordStar 3.3. The labels are the same in this version as in the others, so you can use the WordStar installation program, but many of the hexadecimal addresses are different. If you want the addresses, the installation program will give them to you as it locates the labels.

Whatever version you have, always work with an expendable copy of WordStar. I suggest you set up a separate disk for all your patching. It will need:

•WS.COM—an already-installed version of your working WordStar.

•WSOVLY1.OVR and WSMSGS.OVR—the overlay files that go with WS.COM to make up the complete WordStar program. You don't patch these two files, but you'll need them to test your patched WS.COM.

•INSTWS.COM or WINSTALL.COM/WS.INS—the WordStar installation program. If you have WordStar 3.0, your installation program is INSTWS.COM. If you have WordStar 3.3, your installation program comes in two parts—WINSTALL.COM and WS.INS; you'll need both.

*Make a list or you may forget patches, resulting in a WordStar that behaves oddly.*

•DDT.COM—from your CP/M distribution disk. You only need DDT if you plan to patch WordStar with it instead of the WordStar installation program.

•PIP.COM or NSWP.COM—a copy program to copy files on and off the disk.

It's also handy to have a two- or three-page text file that you can use to test your newly patched WordStar.

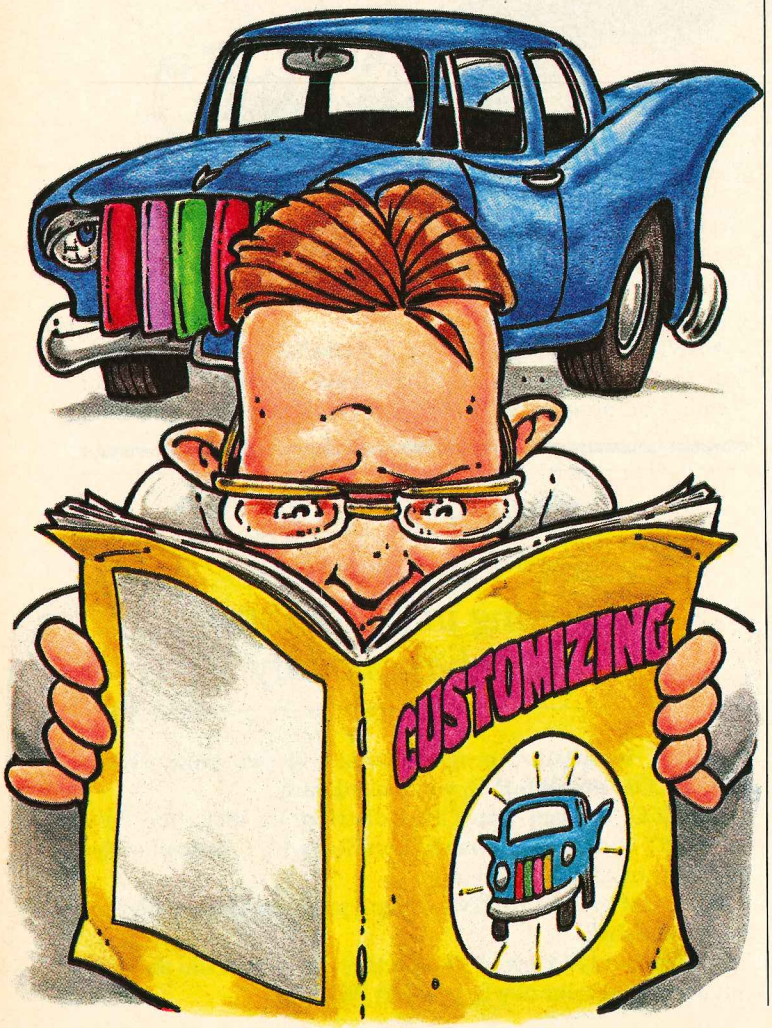
Finally, make a list of everything you're going to change and what you're going to change it to. Otherwise, it's easy to forget one or more patches, resulting in a WordStar that may behave very oddly.

When you're ready to begin patching, you can use either the WordStar installation program or DDT.COM. Each has its advantages: With the installation program, you gain the use of the mnemonic labels; with DDT you gain speed. Tom Enright and Joseph Katz have already described how to use the WordStar installation program (see "Technical Forum," *PROFILES*, April 1985, and also "Adding Auto-Log to WordStar," *PROFILES*, May 1985), so I'll concentrate on DDT.

## Patching with DDT

If you patch WordStar using DDT.COM and CP/M's built-in SAVE command, you gain two advantages. Once you're comfortable with DDT, you can patch and repatch WordStar very quickly. (Patching becomes a habit, like sorting your socks by color or correcting people's grammar.)

You can also patch very large routines onto the end of WS.COM, making it larger than the original. You can't make such patches with WINSTALL or INSTWS because they automatically truncate WS.COM to its original size. In fact, if you use the installation program after adding an oversize patch or a commercial enhancement such as MathStar, you'll wipe out everything beyond the normal end of WordStar and thoroughly bomb the program.




You don't get any step-by-step prompting with DDT, and you can't use the WordStar labels, only the hexadecimal addresses, so it's easier to make mistakes. With DDT, you can patch *anything* and create some spectacular failures.

## A session with DDT

To patch WordStar with DDT, you go through three steps: 1) load DDT and WS.COM into your computer's memory so you can work with them; 2) patch a new value into the copy of WS.COM now in memory (repeat as many times as necessary); 3) exit DDT and save the patched copy of WS.COM from memory into a disk file.

*You're patching a copy of the WS.COM file; if anything goes wrong you can bail out.*

Notice you're not patching the file WS.COM that exists on your disk, only a *copy* of that file in your computer's memory. If anything goes wrong, you can bail out any time before the third step by hitting ^C or the reset button—your disk file of WS.COM will be untouched. For the same reason, if you have a power failure or other disaster while you're using DDT, you'll lose all the patches from that session.

Let's walk through one simple patch using DDT. I'll assume you have a standard, unmodified Kaypro version of WordStar 3.3. If you have WordStar 3.0, or if your WordStar has already been modified, you'll have to adjust the examples accordingly.

*Load DDT and WS.COM.* In drive A place a disk that contains the files DDT.COM, WS.COM, WSOVLY1.COM, and WSMSGS.OVR. At the CP/M A> prompt, enter **DDT WS.COM <RTN>**.

DDT will load itself and then load WS.COM. When it's ready, it will sign on and display the following information:

```
NEXT PC
4600 0100
```

All numbers from here on are going to be hexadecimal. The number under NEXT tells you where the next free memory in your computer is after WS.COM has been loaded. The number under PC tells you where WS.COM starts in memory. So you know that WS.COM is occupying the space from 0100h (100 hexadecimal) to 4600h (4600 hexadecimal). Write down the number under NEXT (4600h in this case) in a safe place; you'll need it when it's time to save your patched WS.COM.

The hyphen you see below these numbers is DDT's prompt. It's now waiting for you to tell it what to do.

*Patch a new value into WS.COM.* Suppose you want WordStar to clear the screen when you exit and return to CP/M. To do that, you need to insert two bytes at the label TRMUNI, which is short for TeRMinal UNInitialization, a function executed as you exit WordStar. When you look up TRMUNI in Table 1, you find its address in WordStar 3.3 is 027Eh. So, at the DDT

# Bits, Bytes and Hexadecimal Numbers

Your computer doesn't really understand graphs or words or even letters; it only understands binary numbers, in which every digit is either 0 or 1. The smallest piece of information a computer can deal with is a single binary digit (0 or 1), which is called a "bit."

Most often, a computer deals with a group of eight bits, called a "byte." A single byte can be an instruction telling the computer what to do next, or it can be a value for the computer to work with (like the value for WordStar's right margin setting or for the letter "A"). Two bytes together can make an address, which identifies a particular spot in memory.

Few people ever deal with bytes as binary numbers; it's just too inconvenient for a human being to decode the binary number 10110111, for example, into the more familiar decimal number 183. BASIC programmers often deal with bytes as decimal numbers. Those work pretty well for a single byte, which can have a decimal value from 0 to 255. But decimal numbers, too, get clumsy when you start working with two-byte (16 bit) addresses, which can have a decimal value anywhere from 0 to 65,535.

So assembly language programmers and patchers (and their tools, like DDT.COM) most often use hexadecimal numbers (base 16) instead of decimal numbers (base 10). The decimal number system, of course, uses ten single digits (0-9) to make up its numbers. When you get to the last single digit (9) and need to add one more, you start over again one column to the left, placing a zero in the previous column (10).

The hexadecimal number system works the same way, except that it has sixteen single digits to make up its numbers. It gets these sixteen by using the usual 0-9 and then adding A, B, C, D, E, and F to make up the rest. So in hexadecimal numbers, when you add 1 to 9, you get A (instead of 10, which you would get in decimal numbers). Only when you get to the hexadecimal digit F and add 1 does the count roll over to 10 hexadecimal (which equals 16 decimal). Here's a comparison of hexadecimal and decimal counting:

| HEXADECIMAL | DECIMAL |
|---|---|
| 0 | 0 |
| 1 | 1 |
| 2 | 2 |
| 3 | 3 |
| 4 | 4 |
| 5 | 5 |
| 6 | 6 |
| 7 | 7 |
| 8 | 8 |
| 9 | 9 |
| A | 10 |
| B | 11 |
| C | 12 |
| D | 13 |
| E | 14 |
| F | 15 |
| 10 | 16 |
| 11 | 17 |
| . | . |
| 1F | 31 |
| 20 | 32 |
| 21 | 33 |
| . | . |
| 2F | 47 |
| 30 | 48 |
| . | . |
| 9F | 159 |
| A0 | 160 |
| . | . |
| FF | 255 |
| 100 | 256 |
| . | . |
| 200 | 512 |
| . | . |
| FFF | 4095 |
| . | . |
| FFFF | 65535 |

Humans don't naturally think in hexadecimal numbers, and it takes a while to get used to the fact that BEAD is a valid hexadecimal number (equal to decimal 48,813). Fortunately, you only need to know a few things about hexadecimal numbers to be able to patch WordStar:

Often, hexadecimal numbers are written with a trailing "H" or "h" to distinguish them from decimal numbers, so that hexadecimal 1A is written 1AH or 1Ah. I use a lowercase "h" to show hexadecimal numbers (the WordStar installation patcher does the same), except for those cases in which I'm reproducing exactly what you'll see on your own screen, as in the examples from the DDT patching session. You *never* type the H (or h) when actually entering a hexadecimal number using DDT.COM or the WordStar installation program.

To convert a hexadecimal number (ACh, for example), to decimal, follow these steps:

1) Convert the righthand digit to decimal.
   C = 12 decimal

2) Convert the lefthand digit to decimal and multiply by 16.
   A = 10 decimal
   10 X 16 = 160

3) Add the two results together.
   12 + 160 = 172

So AC hexadecimal equals 172 decimal.

To convert a decimal number (like 172) to hexadecimal, divide the number by 16 (172 / 16 = 10 with 12 remainder). Convert the whole number result (10) to hexadecimal (10 = A hexadecimal) and use that as your left-hand hexadecimal digit. Then convert the division remainder (12) to hexadecimal (12 = C hexadecimal) and use that as the right-hand digit. Put the left- and right-hand digits together and you have your hexadecimal answer (ACh).

There's also another method. Just take a known equivalence, such as 30h = 48 or A0h = 160, and work out the rest on your fingers. I do conversions this way much of the time. And why not? It works. —**Ted Silveira**

hyphen prompt, type:

**S027E <RTN>**

The S tells DDT you want to substitute new values starting at address 027Eh. DDT replies by echoing back the address and its present value: 027E 00.

Notice that the hyphen prompt has disappeared and DDT has left the cursor to the right of the present value. To leave this value unchanged, hit RETURN and DDT will move you to the next address. To change it, type in a new value. In this case, enter the value 01h and hit RETURN:

027E 00 **01 <RTN>**

DDT will then move to the next address and show the value stored there: 027F 00. This time, enter the value 1Ah:

027F 00 **1A <RTN>**

DDT will move to the next address (0280h), but you're finished with this particular patch. (The first entry, 01h, tells WordStar how many bytes follow, and the second, 1Ah, is the code that actually clears the screen.) To get back to DDT's hyphen prompt, just enter a period (.):

0280 00 . **<RTN>**

-

From this point, you can go on to patch other areas in WS.COM by using the S command in the same way, as many times as you need to. You can even go back and patch the same areas over again; nothing is permanent until you take the next step.

*Exit DDT and save the patched WS.COM.* When you've made all your patches, you're ready to save the results. Exit DDT by typing ^C (CTRL-C) at DDT's hyphen prompt; the computer will warm boot, and you'll be back at CP/M's A> prompt:

-**^C**

A>

Now, *before you do anything else*, you must use CP/M's built-in SAVE command to save your patched WS.COM from memory into a disk file. I suggest you save it under a new name, such as WSX.COM (X for eXperimental). If you save it as the name WS.COM, you'll wipe out your old unpatched WS.COM, which you may need again if your patches don't work. So save it as WSX.COM, and test it. If it works, rename it to WS.COM. (When it's named WSX.COM, the Run-a-Program command on the no-file menu won't work properly, but everything else should.)

If you haven't made WS.COM longer than it was by tacking a patch on the end or adding a commercial enhancement such as MathStar, saving the file is easy. If you have a standard WordStar 3.3, when you loaded DDT and WS.COM you should have seen:

"NEXT PC
4600 0100"

If the number under NEXT was 4600, then to save your patched WS.COM, type:

A>**SAVE 69 WSX.COM**

If you have a standard WordStar 3.0, when you loaded DDT and WS.COM you should have seen:

"NEXT PC
3F00 0100"

If the number under NEXT was 3F00, then to save your patched WS.COM, type:

A>**SAVE 62 WSX.COM**

In either case, you'll find a new file named WSX.COM on your disk when you're done.

If your NEXT number was different from the two given above, you'll have to compute the right number for the SAVE command yourself. Follow these steps:

1) Find the number that was under NEXT when you loaded DDT and WS.COM (say 3F00 for this example).

2) Take the two left digits of the number (3F). You convert this number from hexadecimal to decimal.

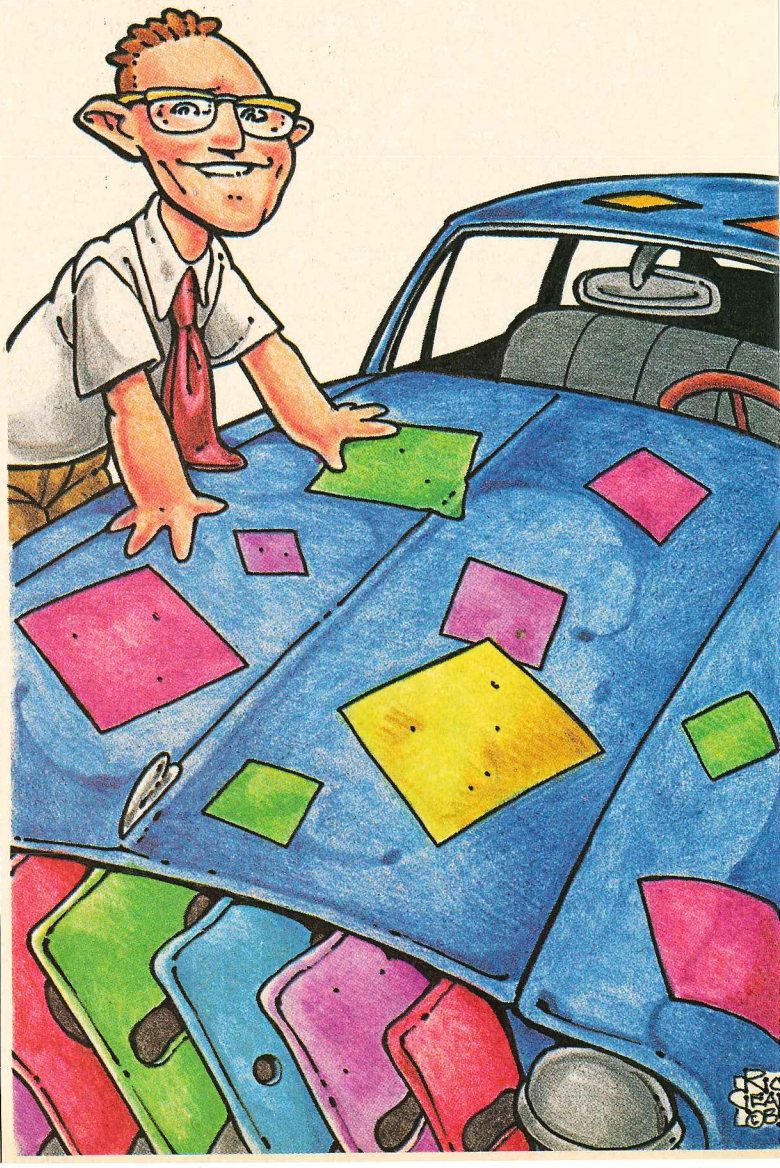
3) Take the right-hand digit of the pair (F) and convert it to decimal (hexadecimal F equals decimal 15).

4) Take the left-hand digit of the pair (3), convert it to decimal (hexadecimal 3 equals decimal 3), and multiply it by 16 (3 x 16 = 48).

5) Add the two decimal numbers together (15 + 48 = 63).

6) Look again at your original number (3F00). If the two rightmost digits are 00, then subtract one from the decimal result you got in Step 5 (63 - 1 = 62), and use the result in the SAVE command (SAVE 62 WSX.COM). If the two rightmost digits are not 00 (if the original number were 3F80, for example), then do *not* subtract one; just use the decimal result you got in Step 5 (SAVE 63 WSX.COM).

If you think this process is a little weird, I agree. Here's what you're doing. To use the SAVE command, you have to specify



the number of "pages" of memory to save. Each page of memory is 100h bytes, so the space from the bottom of memory up to 3F00h is 3F (hexadecimal) pages. Easy. Unfortunately, CP/M's SAVE command can only handle decimal numbers, so you have to convert 3F hexadecimal to 63 decimal.

And why subtract one? Because a standard CP/M program like WS.COM always starts at 0100h, not 0000h (the space from 0000h to 0100h is used by CP/M for housekeeping). So it takes only 3E hexadecimal pages (62 decimal) to cover the area from 0100h to 3F00h, but it takes 3F hexadecimal pages (63 decimal) to cover the area from 0100h to 3F80h (even though only part of the last page is filled).

## Major patch points in WordStar

As you start customizing WordStar, you'll find there are four main kinds of patch points:

*Flag*— A single byte that signals whether a function, such as justification, is turned on or off. Usually, patching the flag to FFh turns a function on, and patching it to 00h turns it off.

*Value*— A single byte that sets a default value, such as the initial right margin setting or the delay before menus appear. If you don't know exactly what new value to patch in, raise or lower the current value a few points at a time, testing WordStar after each change to see what effect the new value has. In the case of delay values especially, you can only find your ideal setting by experimenting.

*String*— A series of bytes sent to the screen or printer to control some function, such as turning on reverse video or changing character pitch. The first byte gives the number of bytes in the following string; the rest of the string contains the bytes that do the work. When the first byte is 00h, the label is inactive, regardless of what other bytes may follow.

*Routine*— A special user-installed set of program instructions that add a function. These patch points don't contain the routines themselves, only an instruction that jumps to the address where the routine has been installed (usually at MORPAT). For advanced programmers only.

Make sure you always know which kind of patch point you're working on so that you don't insert a routine at a string patch point or vice versa. TRMINI and INISUB, for example, both deal with terminal initialization, but the first is a string patch and the second a routine. If you confuse the two, your customized WordStar won't roll an inch.

With that warning in mind, let's go to work. In Table 1, you find a list of all the user patch points for WordStar, each with its label, its addresses in WordStar 3.3 and 3.0 for CP/M systems and WordStar 3.31 for MS-DOS systems, and a brief description. What follows here is a fuller description of the most useful ones.

*LINDEL* (String)— Deletes a line from the screen. Your CP/M Kaypro has a special code for this function, but the modified WordStar bundled with those Kaypros doesn't use it (the WordStar shipped with CP/M computers has been modified by Kaypro; the MS-DOS version has not). By patching in the proper strings here and in the following Line Insert function, you'll improve screen scrolling on commands like ^W,^Z, ^QW, and ^QZ. Insert the following bytes at this label:

**02h 1Bh 52h**

Warning: All versions of the *Kaypro User's Guide* I've seen contain an error—they have reversed the codes for Line Insert and Line Delete. The proper escape sequence for Line Insert is <ESCAPE> E (1Bh 45h), and the proper sequence for Line Delete is <ESCAPE> R (1Bh 52h).

Some people who use this patch together with reverse-video highlighting get some flickering when the status line or menu portion of the screen is rewritten. If you do, and you find it annoying, you can either remove the LININS/LINDEL patches or change your highlighting from reverse video to half-intensity video (see IVON and IVOFF).

*LININS* (String)— Inserts a line on the screen. Read the comments at LINDEL above and patch this section only if you also patch LINDEL. Insert the following bytes here:

**02h 1Bh 45h**

*Table 1 lists the user patch points for WordStar, including labels and addresses.*

*IVON* (String)— Turns on inverse video (highlighting). WordStar uses IVON and IVOFF to start and stop highlighting for menus and marked blocks. On '84 Kaypros, this function is set to 06h 1Bh 42h 30h 1Bh 42h 31h, which produces half-intensity inverse video. I don't like inverse video, even at half-intensity; it's like staring into a searchlight. So I changed mine to use half-intensity only by patching in these bytes:

**03h 1Bh 42h 31h 00h 00h 00h**

The last three bytes aren't necessary; they just keep things neat. If you patch IVON, patch IVOFF also.

*IVOFF* (String)— Turns off inverse video (highlighting). See comments at IVON above. Must be patched to cancel out video effects turned on by IVON. To go with the change I mentioned at IVON, I patched IVOFF with these bytes:

**03h 1Bh 43h 31h 00h 00h 00h**

*TRMINI* (String)— Sent to the terminal (screen) when WordStar first starts up (TeRMinal INItialization). The standard Kaypro installation just sets this to clear the screen on start-up.

*TRMUNI* (String)— Sent to the terminal when exiting WordStar (TeRMinal UNInitialization), usually to reverse the effects of TRMINI. Standard Kaypro installation has nothing here. To have WordStar clear the screen on exit, patch in these bytes:

**01h 1Ah**

*DELCUS* (Value)— Sets the length for a delay after the cursor is moved to a new spot. Lower this value to shorten the delay; if you lose characters after cursor moves, you've made the delay too short. (I've set this delay and the following one to 00h without any problems, so far.)

*DELMIS* (Value)— Sets the length for a delay after miscellaneous screen functions. Lower this value to shorten the delay; if you lose characters or find odd things happening on the screen, it's too short.

*DEL1, DEL2* (Values)— Sets length for short delays. These two values set the cursor blink rate when the cursor is on a highlighted character. They also control how the cursor jumps back and forth between ^QA's "REPLACE Y/N:" prompt and the text to be replaced. You gain little or nothing by changing these.

*DEL3* (Value)— Sets length for a medium delay. This value controls how long WordStar waits after you press a prefix key (^K, ^Q, ^P, ^O, ^J) until it displays the menu. It also controls the delay before the display of the special characters menu. If you're unsure of WordStar commands, you can lower this value to shorten the delay; the menus will come up more quickly. If you know the commands, you can raise this value to lengthen the delay; the menus won't come up so quickly and get in your way.

*DEL4* (Value)— Sets the length for long delays. This value controls the time for the "abandon file" and "new file" messages and for WordStar's sign-on messages, including the MicroPro copyright message. This delay (with DEL5) also controls screen update after a horizontal scroll. To shorten these, you can lower this value considerably. There's no general agreement on whether or not it's OK to lower DEL1 through DEL5 to 00h or not. Some people swear it works fine; others say that doing so will eliminate some important messages. I play it safe by *not* lowering any of them all the way to 00h.

*DEL5* (Value)— Sets the delay for screen update after a keystroke and (with DEL4) affects screen update after a horizontal scroll. You can lower this value, too.

*SCRLSZ* (Value)— Sets the number of columns WordStar will move during a horizontal scroll. The standard value here is 14h, which means you scroll 20 columns at a time. You can get faster horizontal scrolling if you increase this value to 28h for a 40 column scroll and shorten the delays at DEL4 and DEL5.

*MORPAT*— An empty section available for user-installed subroutines. In a standard WordStar, this area will be filled with 00h. Don't put anything here unless you know what you're doing. If your WordStar has been modified and you find anything here, leave it alone.

Note: Poking around here, you will discover some odd code. The standard Kaypro installation of WordStar 3.3 for CP/M systems, just as it comes off the master disk, has 12 bytes of code right at the beginning of MORPAT. This code is part of a routine that patches a keyboard translation table in the BIOS. Since the arrow keys on your Kaypro don't send the codes that WordStar wants to see, a patch was added to change the codes to what WordStar wants. When you exit WordStar the arrow key codes are restored to their original values. Do not alter this code in any way.

*ITHELP* (Value)— Sets the default help level. In a standard installation, this byte will be 03h for help level 3. Patch to 02h, 01h, or 00h for help levels 2, 1, or 0, respectively.

*INITPF* (Values)— Sets up the initial page format (paper length, top and bottom margins, etc.) used for onscreen page-break display and pagination during printing. All can be overridden by dot commands. Most are of no interest unless you habitually use some odd page format.

*INITPF+16h* (Value)— Sets default standard character width in 1/120ths of an inch, for printers installed as precision (daisywheel) printers only. It's normally set to 0Ch, which gives 10 characters per inch. If you like to print 12 characters per inch all the time, you may want to change this to 0Ah. Then your normal printing will be 12 pitch without using ^PA.

*INITPF+17h* (Value)— Sets default alternate character width in 1/120ths of an inch, for printers installed as precision (daisywheel) printers only. It's normally set to 0Ah, which gives 12 characters per inch. If you change the standard character width as described above, change this to 0Ch. Then your alternate printing, controlled by ^PA, will be 10 characters per inch.

*INITPF+18h* (Value)— Sets the number of characters for the default page offset, the margin that WordStar automatically supplies when printing. The standard value for this is 08h. I've changed this value to 0Ah for a page offset of 10 characters, one inch at 10 pitch.

*INITLM* (Value)— Sets the default left margin on the screen. You set this value to *one less* than the margin you want. Its standard value is 00h, which sets a left margin of 1.

*INITRM* (Value)— Sets the default right margin on the screen. As above, you set this value to *one less* than the margin you want. Its standard value is 40h (64 decimal), which sets a right margin of 65. Remember, when you're using DDT or INSTWS to make patches, this value and all others must be entered as hexadecimal numbers.

*INITWF* (Flags)— Turns various word-processing flags on or off. Most of these 11 flags you probably won't want to bother with, but I've found it useful to patch the following three.

*INITWF+01h* (Flag)— Turns right margin justification on or off. The standard setting is FFh, which turns justification on. I prefer ragged right margins, so I patched this byte to 00h to turn justification off.

*INITWF+04h* (Flag)— Turns hyphen-help on or off. The standard setting is FFh, which turns hyphen-help on. I've patched this byte to 00h to turn hyphen-help off (most publishers prefer unhyphenated manuscripts).

*INITWF+09h* (Value)— Sets the default line spacing for both screen and printer. The standard value for this byte is 01h, which sets the line spacing to one. I've patched it to 02h so that my default line spacing is two.

*NONDOC* (Flag)— Sets WordStar to either document or non-document mode when you enter a file name on the CP/M command line (i.e., when you do A>WS B:EXAMPLE.TXT). The standard setting is 00h, for document mode. Patch to FFh to make non-document mode the default—useful if you use WordStar for programming.

*HZONE* (Value)— Sets the hyphenation zone used when reforming a paragraph with hyphen-help on. This value decides how far from the right margin the last full word can end before WordStar tries to hyphenate a word that carries over the margin. Lowering this value will mean more stops for hyphenation and less empty space on the line. Raising the value will mean fewer stops and more empty space.

*PAGFIL* (Character)— Defines the character used to mark page breaks on screen. Standard setting is 2Dh, the hyphen character. You can change this character to any other one you want. The table of ASCII characters in the back of your *Kaypro User's Guide* will give you the hexadecimal equivalents for all printable characters.

*PODBLK* (Flags)— Sets default answers to the block of printout questions asked when you start to print a file. Patching these bytes to 00h makes the default answer NO, and FFh makes it YES. You probably won't want to change any of these except perhaps the last one, below.

*PODBLK+3* (Flag)— Sets the default answer to the "Pause between pages?" question. If you usually print single sheets, you may want to make the default answer YES by patching this byte to FFh.

*(continued on page 64)*

# Kaypro CP/M
## Software and Supplies

| Description | Price |
|---|---|
| **Accounting** | |
| Checks & Balances | $ 64 |
| Financial Calculator | $ 34 |
| Home Inventory Plus | $ 37 |
| **Business** | |
| Bottomline V | $199 |
| Decision Analyst | $ 79 |
| Landlord | $495 |
| MarketFax | $395 |
| NWA Statpak | $219 |
| Walonick StatPak | $429 |
| Walonick Forecast + | $495 |
| **Communications** | |
| Crosstalk | $145 |
| Mite | $ 49 |
| **Database** | |
| dBase II | $389 |
| Filebase | $ 99 |
| FYI 3000 Plus | $339 |
| InfoStar | $179 |
| Notebook | $ 64 |
| Personal Pearl | $149 |
| SuperFile | $ 79 |
| **Educational** | |
| Family Roots | $159 |
| I Ching | $ 29 |
| Home Appraiser | $ 34 |
| Language Tutor | $ 47 |
| Memory Tutor | $ 47 |
| Reading Professor | $ 57 |
| Self Search | $ 39 |
| The Word (Bible) | $179 |
| Touch & Go Typing | $ 28 |
| Quiz Writer | $ 47 |
| UnderStand Yourself | $ 24 |
| **Entertainment** | |
| Best of Wok Talk | $ 27 |
| Computer Chef | $ 27 |
| Chocolate Bytes | $ 27 |
| Deadline * | $ 45 |
| Eliza | $ 22 |
| Enchanter * | $ 37 |
| HitchHikers Guide * | $ 37 |
| Infidel * | $ 39 |
| Lotto Master | $ 25 |
| MyChess | $ 31 |
| Wishbringer * | $ 37 |
| Witness * | $ 37 |
| Word Wiggle | $ 27 |
| Zork 1 * | $ 39 |
| Zork II or III * | $ 39 |
| * Infocom games | |
| **Graphics** | |
| Banner Plus | $ 25 |
| Fancy Font | $155 |
| FontStar | $ 49 |
| PrintMaster | $ 49 |
| Art Gallery I | $ 39 |
| Art Gallery II | $ 29 |
| Rembrandt 3.0 | $ 39 |
| Rembrandt II/IV | $ 47 |
| SCS-Draw 1.1 | $ 57 |
| Draw Image Ext | $ 19 |
| Twist & Shout | $ 32 |
| **Integrated Software** | |
| T/Maker Integrated | $189 |
| **Languages** | |
| Cobol Compiler | $189 |
| Fortran Compiler | $189 |
| Macro Assembler | $ 99 |
| MBasic Compiler | $239 |
| MTBasic Compiler | $ 67 |
| SuperSort | $139 |
| Toolwork's C | $ 46 |
| Toolwork's C Mathpak | $ 27 |
| Turbo Pascal | $ 59 |
| Turbo Tutor | $ 32 |
| Turbo Database | $ 49 |
| Turbo Holiday Pak | $135 |

| Description | Price |
|---|---|
| **Project Management** | |
| Milestone | $ 95 |
| **Utilities, General** | |
| Backgrounder | $ 45 |
| DateMate | $ 29 |
| DateStamper, Kaypro | $ 39 |
| DateStamper, General | $ 46 |
| dFastest | $ 49 |
| FastBack 10/20 | $ 89 |
| FastPak Mail | $ 74 |
| FeatureFormat Prof. | $ 74 |
| Free Filer 5.0 | $ 79 |
| Media Master | $ 37 |
| Memory Typewriter | $ 39 |
| Presto | $ 37 |
| SmartKey V4.2 | $ 49 |
| SmartPrint | $ 25 |
| SmartKey/SmartPrint | $ 59 |
| **Utilities, Disk** | |
| C/Nix | $ 54 |
| Diagnostic II | $ 99 |
| Disk Doctor | $150 |
| FastBack 10/20 | $ 89 |
| PluPerfect Writer 2.2E | $ 39 |
| PluPerfect CP/M 2.2E | $ 32 |
| Rescue & Repair | $ 55 |
| UniDos | $ 59 |
| UniDos w V20 | $ 89 |
| Uniform | $ 59 |
| **Spreadsheets** | |
| MultiPlan | $169 |
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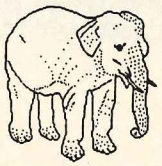
## Kaypro Drawing Program



SCS-Draw turns your CP/M Kaypro into a free hand drawing machine. See what you're drawing on the screen too. Comes with drawing tools, windowing capabilities that let you draw pieces larger than one screen, lettering, textures, and much more. Save to disk, or print your work anytime. Simple. There's nothing like it. Turns your Kaypro 1, 2X, New 2, 2'84, 4'84, or 10 into a real Macintosh-like drawing machine. Kids love it, adults too. $57. Draw's new $19 PrintMaster graphics extractor lets you see PrintMaster graphics on your Draw screen and alter them too. Order today.

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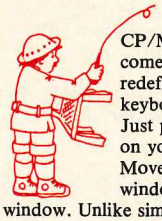
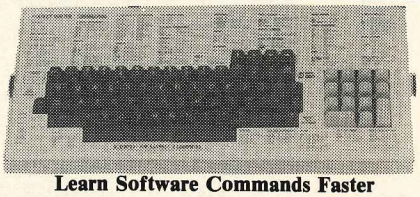


CP/M SmartKey version 4.2 now comes with windows. Lets you redefine every key on your keyboard from inside any program. Just push a key, a window opens up on your screen, redefine the key. Move the cursor anywhere in the window. Make corrections in the window. Unlike similar programs, SmartKey does not interfere with the regular function of your keyboard. Lets you redefine keys, stack them with numerous complex command codes, boilerplate paragraphs, inventory numbers, or whatever, and inject any of them into your work with a single key. Super time and keystroke saver. Central's price includes Paul Golding's $15.95 book, Screen Smarts, The Computer Tamers Guide free. Smartkey — $49. Order today.



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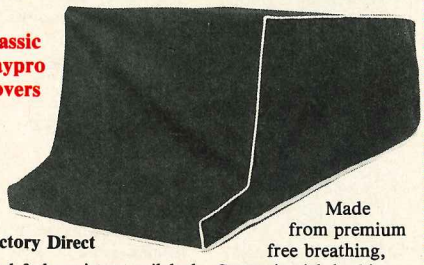

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## WS3330A.DOC—User Patch Points for CP/M and MS-DOS WordStar

The patch points are listed in the order in which they are found in CP/M WordStar 3.3. As a result, other WordStar users will find that a few of their patch points are not listed strictly in order, as MicroPro moved some things around when they changed versions. Sorry, but there was no way to avoid it.

To make this list, I've combined those from WS33.DOC and WS30.DOC, which were originally compiled by Milton Hicks and updated by Guy Gamble. (I owe them, and the anonymous contributors who preceded them, many thanks.) I've also added some new information, including the addresses for MS-DOS WordStar version 3.31q, and made a number of corrections.

Ted Silveira
Santa Cruz, CA
12/15/86

### Labels and Addresses of WordStar Patch Points

| LABEL | MS-DOS WS 3.31 ADDR | CP/M WS 3.3 ADDR | CP/M WS 3.0 ADDR | DESCRIPTION | KAYPRO CP/M WORDSTAR 3.3 ORIGINAL SETTINGS |
|---|---|---|---|---|---|
| WSVER | 0110 | 0110 | 0110 | WordStar version | |
| COPRIT | 0117 | 0112 | 0117 | copyright notice | |
| SIGNON | 0153 | 014E | 0153 | WordStar sign-on message | |
| | 017F | 0179 | 017F | serial number | |
| IDTEX | 018F | 018A | 018F | terminal id text | |
| PIDTEX | 01B3 | 01AE | 01B3 | printer id text | |
| PROTTX | 01D7 | 01D2 | 01D7 | printer protocol text | |
| PDRVTX | 01FB | 01F6 | 01FB | port driver text | |
| | 0220 | 021B | 0220 | various flags and holders for internal use by WordStar | . . . |
| HITE | 0248 | 0232 | 0248 | screen height in lines (24) | 18 |
| WID | 0249 | 0233 | 0249 | screen width in columns (80) | 50 |
| CLEAD1 | 024A | 0234 | 024A | cursor positioning: lead-in string | 02 1B 3D 00 00 00 00 00 00 |
| CLEAD2 | 0253 | 023D | 0253 | crsr pos: string between row/column | 00 00 00 00 00 |
| CTRAIL | 0258 | 0242 | 0258 | crsr pos: ending string | 00 00 00 00 00 |
| CB4LFG | 025D | 0247 | 025D | crsr pos: 00 = row/col, FF = col/row | 00 |
| LINOFF | 025E | 0248 | 025E | crsr pos: row offset | 20 |
| COLOFF | 025D | 0249 | 025F | crsr pos: column offset | 20 |
| ASCUR | 0260 | 024A | 0260 | crsr pos: 00 = binary row & col numbers | 00 |
| UCRPOS | 0264 | 024B | 0264 | jmp to user crsr pos routine | 00 00 C9 00 00 |
| ERAEOL | 026D | 0250 | 026D | terminal erase to end of line string | 01 18 00 00 00 00 00 |
| LINDEL | 0274 | 0257 | 0274 | terminal delete line string | 00 00 00 00 00 00 00 |
| LININS | 027B | 025E | 027B | terminal insert line string | 00 00 00 00 00 00 00 00 00 |
| IVON | 0284 | 0267 | 0284 | turn on highlighting string | 06 1B 42 30 1B 42 31 |
| IVOFF | 028B | 026E | 028B | turn off highlighting string | 06 1B 43 30 1B 43 31 |
| TRMINI | 0292 | 0275 | 0292 | terminal initialization string | 01 1A 00 00 00 00 00 00 00 |
| TRMUNI | 029B | 027E | 029B | terminal uninitialization string | 00 00 00 00 00 00 00 00 00 |
| INISUB | 02A4 | 0287 | 02A4 | jmp to user term init routine | 00 00 C9 |
| UNISUB | 02A7 | 028A | 02A7 | jmp to user term uninit routine | 00 00 C9 |
| USELST | 02AA | 028D | 02AA | FF = can use last row w/o scrolling | 00 |
| DELCUS | 02AE | 028E | 02AE | delay after cursor positioning | 0A |
| DELMIS | 02AF | 028F | 02AF | delay after misc other functions | 05 |
| MEMAPV | 02B0 | 0290 | 02B0 | FF = memory-mapped video display | 00 |
| MEMADR | 02B1 | 0291 | 02B1 | address of home pos in mm video | 00 00 |
| HIBIV | 02B3 | 0293 | 02B3 | FF = highlighting by setting high bit | 00 |
| HIBCUR | 02B4 | 0294 | 02B4 | FF = show crsr by setting high bit | 00 |
| CRBLIV | 02B5 | 0295 | 02B5 | FF = WS blink crsr in iv, term or mmv | 00 |
| ZAFCIN | 02B6 | 0296 | 02B6 | fix for backspace on delete | 00 00 |
| RUBFXF | 02B8 | 0298 | 02B8 | FF = use RFIXER | 00 |
| RFIXER | 02B9 | 0299 | 02B9 | fix for backspace on delete | 00 |
| UCNSTA | 02BA | 029A | 02BA | jmp to user con stat routine | 00 00 C9 |
| UCONI | 02BD | 029D | 02BD | jmp to user con input routine | 00 00 C9 |
| UCONO | 02C0 | 02A0 | 02C0 | jmp to user con output routine | 00 00 C9 |
| SWIN | 02C3 | 02A3 | 02C3 | routine or jmp before char out to con | 00 00 C9 00 00 00 |
| SWOUT | 02C9 | 02A9 | 02C9 | routine or jmp after char out to con | 00 00 C9 00 00 00 |
| DEL1 | 02CF | 02AF | 02CF | short delay – highlight crsr blink on | 03 |
| DEL2 | 02D0 | 02B0 | 02D0 | short delay – highlight crsr blink off | 09 |

| LABEL | MS-DOS WS 3.31 ADDR | CP/M WS 3.3 ADDR | CP/M WS 3.0 ADDR | DESCRIPTION | KAYPRO CP/M WORDSTAR 3.3 ORIGINAL SETTINGS |
|---|---|---|---|---|---|
| **DEL3** | 02D1 | 02B1 | 02D1 | medium delay – time to prefix menus | 19 |
| **DEL4** | 02D2 | 02B2 | 02D2 | long delay – time for msg displays | 40 |
| **DEL5** | 02D3 | 02B3 | 02D3 | delay until screen redisplay/refresh | 09 |
| **TRSCRS** | (n/a) | 02B4 | 02D4 | for TRS-80 only | 00 |
| **TRSCIF** | (n/a) | 02B5 | 02D5 | for TRS-80 only | 00 |
| **HETHBS** | (n/a) | 02B6 | 02D6 | for Lifeboat CP/M – Heath 89 | 00 |
| **IBMFL** | 02D4 | (n/a) | (n/a) | for PC-DOS/MS-DOS only | |
| **IBMATT** | 02D5 | (n/a) | (n/a) | for PC-DOS/MS-DOS only | |
| **MSDOS** | 02D6 | (n/a) | (n/a) | for PC-DOS/MS-DOS only | |
| **APLFLG** | (n/a) | 02B7 | 02D7 | for Apple only | 00 |
| **MPMFLG** | (n/a) | 02B8 | (n/a) | MP/M flag | 00 |
| **NMOFUS** | 02D8 | (n/a) | 02D8 | number of users on system | 01 |
| **TCKFLG** | 02DA | (n/a) | 02DA | for MP/M only | 00 |
| **RSTFLG** | 02DB | (n/a) | 02DB | FF = no disk resets by WordStar | 00 |
| **DEFDSK** | 02DC | 02B9 | 02DC | drive for OVR files after logged drive | 01 |
| **SCRLSZ** | 02DD | 02BA | 02DD | columns for horizontal scroll | 14 |
| **CNVTBL** | (n/a) | 02BB | (n/a) | | 00 00 00 00 00 |
| | | | | | . |
| **MORPAT** | 02E0 | 02CB | 02E0 | space for user-added routines | CD 8A 02 C3 AB |
| | | | | (Kaypro WordStar version 3.3 has | 24 CD A0 3E C3 |
| | | | | routines here to reprogram arrow | 87 02 00 00 00 |
| | | | | keys on entering and leaving | 00 00 00 00 00 |
| | | | | WordStar.) | . |
| | | | | | . |
| | | | | | . |
| **MORPR1** | 0338 | (n/a) | (n/a) | | |
| **MORPR2** | 0341 | (n/a) | (n/a) | | |
| **MORPR3** | 034A | (n/a) | (n/a) | | |
| **MORPR4** | 0353 | (n/a) | (n/a) | | |
| **PBGMEM** | 035C | 034B | 035C | pointer to begin of memory (i.e. text) | 60 84 |
| **MEMTOP** | 035E | (n/a) | (n/a) | | |
| **ITHELP** | 0360 | 034D | 0360 | initial help level | 03 |
| **NITHLF** | 0361 | 034E | 0361 | 00 = display spec msg if ITHELP 1 or 2 | FF |
| **ITITOG** | 0362 | 034F | 0362 | FF = insert mode on, 00 = off | FF |
| **ITDSDR** | 0363 | 0350 | 0363 | FF = no-file dir on, 00 = off | FF |
| **INITPF** | 0366 | 0351 | 0366 | initial page format: line height 1/48s | 08 |
| | 0367 | 0352 | 0367 | paper length (.pl) in lines (66) | 42 |
| | 0368 | 0353 | 0368 | paper length in 1/48s | 10 02 |
| | 036A | 0355 | 036A | line height in 1/48s again | 08 |
| | 036B | 0356 | 036B | margin at top (.mt) in lines | 03 |
| | 036C | 0357 | 036C | margin at top in 1/48s | 18 00 |
| | 036E | 0359 | 036E | line height again | 08 |
| | 036F | 035A | 036F | heading margin (.hm) in lines | 02 |
| | 0370 | 035B | 0370 | heading margin in 1/48s | 10 00 |
| | 0372 | 035D | 0372 | line height again | 08 |
| | 0373 | 035E | 0373 | bottom margin (.mb) in lines | 08 |
| | 0374 | 035F | 0374 | bottom margin in 1/48s | 40 00 |
| | 0376 | 0361 | 0376 | line height again | 08 |
| | 0377 | 0362 | 0377 | footing margin (.fm) in lines | 02 |
| | 0378 | 0363 | 0378 | footing margin in 1/48s | 10 00 |
| | 037A | 0365 | 037A | line height again | 08 |
| | 037B | 0366 | 037B | 00 for standard character width | 00 |
| | 037C | 0367 | 037C | std char width in 1/120s | 0C |
| | 037D | 0368 | 037D | alt char width in 1/120s | 0A |
| | 037E | 0369 | 037E | page offset in characters | 08 |
| **INITLM** | 037F | 036A | 037F | initial left margin less 1 | 00 |
| **INITRM** | 0380 | 036B | 0380 | init right mar less 1, up to WID – 4 | 40 |
| **INITSR** | 0381 | 036C | 0381 | initial sub/superscript roll in 1/48s | 03 |
| **INITWF** | 0385 | 036D | 0385 | word wrap (^OW), 00 = off, FF = on | FF |
| | 0386 | 036E | 0386 | justification (^OJ), 00 = off, FF = on | FF |
| | 0387 | 036F | 0387 | variable tabs (^OV), 00 = off, FF = on | FF |
| | 0388 | 0370 | 0388 | soft hyphens (^OE), 00 = off, FF = on | 00 |
| | 0389 | 0371 | 0389 | hyphen help (^OH), 00 = off, FF = on | FF |
| | 038A | 0372 | 038A | show ctrl char (^OD), 00 = off, FF = on | FF |
| | 038B | 0373 | 038B | show ruler line, 00 = off, FF = on | FF |
| | 038C | 0374 | 038C | figure page breaks, 00 = off, FF = on | FF |
| | 038D | 0375 | 038D | show page breaks, 00 = off, FF = on | FF |
| | 038E | 0376 | 038E | line spacing | 01 |
| | 038F | 0377 | 038F | (^KN) 00 = block move, FF = column | 00 |
| **NONDOC** | 0392 | 0378 | 0392 | direct entry, 00 = doc, FF = nondoc | 00 |
| **DOTSON** | 0397 | 0379 | 0397 | dot cmds during edit, 00 = disable | FF |
| **DECCHR** | 0393 | 037A | 0393 | decimal point character | 2E |
| **DOTCHR** | 0395 | 037B | 0395 | character to begin dot cmds | 2E |
| **BLNCHR** | 0396 | 0386 | 0396 | non-break space char (^O) | 0F |
| **CMTCHR** | (n/a) | 0387 | (n/a) | comment char (;) | 3B |
| **ENDEXP** | (n/a) | 0388 | (n/a) | | 47 |
| **PVWTB** | 039B | (n/a) | (n/a) | | |
| **PNCON** | 039D | (n/a) | (n/a) | | |
| **RVELIM** | 03D8 | 0389 | 03D8 | MailMerge delimiter for data values | 2C |

| LABEL | MS-DOS WS 3.31 ADDR | CP/M WS 3.3 ADDR | CP/M WS 3.0 ADDR | DESCRIPTION | | KAYPRO CP/M WORDSTAR 3.3 ORIGINAL SETTINGS |
|---|---|---|---|---|---|---|
| **RVQUOT** | 03D9 | 038A | 03D9 | MM delimiter for enclosed values | | 22 |
| | | | | | | 00 |
| **TXBACK** | (n/a) | 038C | (n/a) | | | 2F |
| | | | | | | 42 |
| **VARCH1** | 03DB | 038E | 03DB | MM delimiter to introduce variables | | 26 |
| **VARCH2** | 03DC | 038F | 03DC | MM delimiter to terminate variables | | 26 |
| **VARNBC** | 03DD | (n/a) | (n/a) | | | |
| **VAROPC** | 03DE | 0390 | 03DE | char after name before option letters | | 2F |
| | 03DF | 0391 | 03DF | opt ltr for omit line if variable null | | 4F |
| | | | | | | . |
| **COMPOP** | (n/a) | 0396 | (n/a) | table of MM comparison operators | | 3C 3E 00 FD 3E |
| | | | | | | . |
| **LOGICP** | (n/a) | 03B7 | (n/a) | table of MM logical operators | | 2E 41 4E 44 2E |
| | | | | | | . |
| **HZONE** | 039A | 03C9 | 039A | hyphenation zone at end of line | | 04 |
| | 039B | 03CA | 039B | pointer to non-consonant table | | D3 03 |
| | 039D | 03CC | 039D | pointer to vowel table | | CE 03 |
| **VOWTAB** | 039F | 03CE | 039F | table of vowels | | 59 5B 5D 7B 7D |
| **NONCON** | 03A4 | 03D3 | 03A4 | table of non-consonants | | 41 45 49 4F 55 |
| | | | | | | 00 00 00 00 00 |
| **BOFCHR** | 03AE | 03DD | 03AE | beginning of file flag char | | 3A |
| **CONCHR** | 03AF | 03DE | 03AF | line cont past screen edge flag char | | 2B |
| **EOFCHR** | 03AD | 03DF | 03AD | end of file flag char | | 2E |
| **FDTCHR** | 03B5 | 03E0 | 03B5 | merge-print command flag char | | 4D |
| **HARDCR** | 03B4 | 03E1 | 03B4 | hard cr flag char | | 3C |
| **LFCHR** | 03B1 | 03E2 | 03B1 | line ends in lf w/o cr flag char | | 4A |
| **OVPCHR** | 03B0 | 03E3 | 03B0 | overprint line flag char | | 2D |
| **PAGCHR** | 03B2 | 03E4 | 03B2 | end of page flag char | | 50 |
| **SOFTCR** | 03B3 | 03E5 | 03B3 | soft cr flag char | | 20 |
| **SOFHYC** | 03B8 | 03E7 | 03B8 | character used for soft hyphens | | AD |
| **PAGFIL** | 03B9 | 03E8 | 03B9 | character used for page breaks | | 2D |
| **MARKS** | 03BA | 03E9 | 03BA | character used for start of blocks | | 42 |
| | 03BB | 03EA | 03BB | character used for end of blocks | | 4B |
| | 03BF | 03EE | 03BF | characters (0-9) used for place markers | | 30 31 32 33 34 |
| | | | | | | 35 36 37 38 39 |
| **PODBLK** | 03CA | 03F8 | 03CA | disk file output, 00 = no, FF = yes | | 00 |
| | 03CB | 03F9 | 03CB | use form feeds, 00 = no, FF = yes | | 00 |
| | 03CC | 03FA | 03CC | suppress page format, 00 = no, FF = yes | | 00 |
| | 03CD | 03FB | 03CD | pause between pages, 00 = no, FF = yes | | 00 |
| **NOUFF** | 03D1 | 03FC | 03D1 | FF = suppress form feed question above | | 00 |
| **ITPOPN** | 03D3 | 03FD | 03D3 | print page numbers, 00 = on, FF = off | | 00 |
| **ITMIJ** | 03D4 | 03FE | 03D4 | microjustification, FF = on, 00 = off | | FF |
| **ITBIP** | 03D5 | 03FF | 03D5 | bi-directional print, FF = on, 00 = off | | FF |
| **FNWSCM** | 03E6 | 0400 | 03E6 | name of main WordStar program | | 00 WS COM |
| **DSKTNA** | 03F2 | 040C | 03F2 | name of message file | | 00 WSMSGS OVR |
| **FNOVLY** | 03FE | 0418 | 03FE | name of overlay file | | 00 WSOVLY1 OVR |
| **FNMRGP** | 040A | 0424 | 040A | name of merge-print overlay | | 00 MAILMRGEOVR |
| **AUTOBS** | 0422 | 0430 | 0422 | table of auto-backspace characters | | 00 00 00 00 00 |
| | | | | | | 00 00 00 00 00 |
| | | | | | | 00 |
| **BSCHR** | 042D | 043B | 042D | char to use after autobs, usually ^H | | 08 |
| **NOFTAB** | 0430 | 043C | 0430 | no-file command table | | 04 00 00 01 |
| | | | | (each entry 4 bytes, first two are | | . |
| | | | | cmd chars, next two are address of routine | | . |
| **VTAB** | 0481 | 0489 | 0481 | file editing command table | | 11 FF 12 00 |
| | | | | (same format as NOFTAB) | | 0B FF 16 00 |
| | | | | | | 0F FF 1E 00 |
| | | | | | | 0A FF 22 00 |
| | 0491 | 0499 | 0491 | set help level | ^JH | 0A 08 04 01 |
| | 0495 | 049D | 0495 | cursor left | ^S | . |
| | 0499 | 04A1 | 0499 | backspace | ^H | . |
| | 049D | 04A5 | 049D | cursor right | ^D | . |
| | 04A1 | 04A9 | 04A1 | cursor left | ^A | |
| | 04A5 | 04AD | 04A5 | cursor right word | ^F | |
| | 04A9 | 04B1 | 04A9 | cursor down | ^X | |
| | 04AD | 04B5 | 04AD | cursor up | ^E | |
| | 04B1 | 04B9 | 04B1 | cursor to left margin | ^QS | |
| | 04B5 | 04BD | 04B5 | cursor to end of line | ^QD | |
| | 04B9 | 04C1 | 04B9 | cursor to bottom of screen | ^QX | |
| | 04BD | 04C5 | 04BD | cursor to top of screen | ^QE | |
| | 04C1 | 04C9 | 04C1 | cursor to block begin | ^QB | |
| | 04C5 | 04CD | 04C5 | cursor to block end | ^QK | |
| | 04C9 | 04D1 | 04C9 | cursor to previous position | ^QP | |
| | 04CD | 04D5 | 04CD | crsr to source of search, move | ^QV | |
| | 04D1 | 04D9 | 04D1 | cursor to marker 0 | ^Q0 | |
| | 04D5 | 04DD | 04D5 | " " " 1 | ^Q1 | |
| | 04D9 | 04E1 | 04D9 | " " " 2 | ^Q2 | |
| | 04DD | 04E5 | 04DD | " " " 3 | ^Q3 | |
| | 04E1 | 04E9 | 04E1 | " " " 4 | ^Q4 | |

| LABEL | MS-DOS WS 3.31 ADDR | CP/M WS 3.3 ADDR | CP/M WS 3.0 ADDR | DESCRIPTION | | KAYPRO CP/M WORDSTAR 3.3 ORIGINAL SETTINGS |
|---|---|---|---|---|---|---|
| | 04E5 | 04ED | 04E5 | cursor to marker 5 | ^Q5 | |
| | 04E9 | 04F1 | 04E9 | " " " 6 | ^Q6 | |
| | 04ED | 04F5 | 04ED | " " " 7 | ^Q7 | |
| | 04F1 | 04F9 | 04F1 | " " " 8 | ^Q8 | |
| | 04F5 | 04FD | 04F5 | " " " 9 | ^Q9 | |
| | 04F9 | 0501 | 04F9 | cursor to begin file | ^QR | |
| | 04FD | 0505 | 04FD | cursor to end file | ^QC | |
| | 0501 | 0509 | 0501 | find | ^QF | |
| | 0505 | 050D | 0505 | find & replace | ^QA | |
| | 0509 | 0511 | 0509 | set left margin | ^QL | |
| | 0511 | 0515 | 0511 | scroll back continuously | ^QW | |
| | 0515 | 0519 | 0515 | scroll forward continuously | ^QZ | |
| | 0539 | 051D | 0539 | delete to begin line | ^Q⟨DEL⟩ | |
| | 053D | 0521 | 053D | " " " " | ^Q_ | |
| | 0541 | 0525 | 0541 | delete to end line | ^QY | |
| | 0551 | 0529 | 0551 | repeat nest command | ^QQ | |
| | 050D | 052D | 050D | repeat last ^QF or ^QA | ^L | |
| | 0519 | 0531 | 0519 | scroll forward one line | ^Z | |
| | 051D | 0535 | 051D | scroll back one line | ^W | |
| | 0521 | 0539 | 0521 | scroll back one screen | ^R | |
| | 0525 | 053D | 0525 | scroll forward one screen | ^C | |
| | 0529 | 0541 | 0529 | delete character left | ⟨DEL⟩ | |
| | 052D | 0545 | 052D | " " " | ^_ | |
| | 0531 | 0549 | 0531 | delete char under cursor | ^G | |
| | 0535 | 054D | 0535 | delete line | ^Y | |
| | 0545 | 0551 | 0545 | delete word right | ^T | |
| | 0549 | 0555 | 0549 | toggle insert mode on/off | ^V | |
| | 054D | 0559 | 054D | reformat to end paragraph | ^B | |
| | 0555 | 055D | 0555 | insert line | ^N | |
| | 0559 | 0561 | 0559 | tab | ^I | |
| | 055D | 0565 | 055D | carriage return | ^M | |
| | 0561 | 0569 | 0561 | put nxt char in txt as ctrl char | ^P | |
| | 0565 | 056D | 0565 | toggle display of marked block | ^KH | |
| | 0569 | 0571 | 0569 | mark/hide block begin | ^KB | |
| | 056D | 0575 | 056D | mark/hide block end | ^KK | |
| | 0571 | 0579 | 0571 | set/hide marker 0 | ^K0 | |
| | 0575 | 057D | 0575 | " " 1 | ^K1 | |
| | 0579 | 0581 | 0579 | " " 2 | ^K2 | |
| | 057D | 0585 | 057D | " " 3 | ^K3 | |
| | 0581 | 0589 | 0581 | " " 4 | ^K4 | |
| | 0585 | 058D | 0585 | " " 5 | ^K5 | |
| | 0589 | 0591 | 0589 | " " 6 | ^K6 | |
| | 058D | 0595 | 058D | " " 7 | ^K7 | |
| | 0591 | 0599 | 0591 | " " 8 | ^K8 | |
| | 0595 | 059D | 0595 | " " 9 | ^K9 | |
| | 0599 | 05A1 | 0599 | move block | ^KV | |
| | 059D | 05A5 | 059D | copy block | ^KC | |
| | 05A1 | 05A9 | 05A1 | delete block | ^KY | |
| | 05A5 | 05AD | 05A5 | toggle column mode on/off | ^KN | |
| | 05A9 | 05B1 | 05A9 | ⟨not implemented⟩ | ^KZ | |
| | 05AD | 05B5 | 05AD | interrupt command in progress | ^U | |
| | 05B1 | 05B9 | 05B1 | save file and exit | ^KX | |
| | 05B5 | 05BD | 05B5 | save file and return to menu | ^KD | |
| | 05B9 | 05C1 | 05B9 | save file and continue | ^KS | |
| | 05BD | 05C5 | 05BD | abandon file and return to menu | ^KQ | |
| | 05C1 | 05C9 | 05C1 | read file into text | ^KR | |
| | 05C5 | 05CD | 05C5 | write block to another file | ^KW | |
| | 05C9 | 05D1 | 05C9 | delete file | ^KJ | |
| | 05C5 | 05D5 | 05CD | toggle directory on/off | ^KF | |
| | 05D1 | 05D9 | 05D1 | print file | ^KP | |
| | 05D5 | 05DD | 05D5 | change logged disk | ^KL | |
| | 05D9 | 05E1 | 05D9 | copy file | ^KO | |
| | 05DD | 05E5 | 05DD | rename file | ^KE | |
| | 05E1 | 05E9 | 05E1 | set left margin | ^OL | |
| | 05E5 | 05ED | 05E5 | set right margin | ^OR | |
| | 05E9 | 05F1 | 05E9 | set tab | ^OI | |
| | 05ED | 05F5 | 05ED | clear tab | ^ON | |
| | 05F1 | 05F9 | 05F1 | set mar/tabs frm new ruler line | ^OF | |
| | 05F5 | 05FD | 05F5 | toggle word wrap on/off | ^OW | |
| | 05F9 | 0601 | 05F9 | " justification on/off | ^OJ | |
| | 05FD | 0605 | 05FD | " variable tab on/off | ^OV | |
| | 0601 | 0609 | 0601 | " dot cmd interp on/off | ^OD | |
| | 0605 | 060D | 0605 | " ruler display on/off | ^OT | |
| | 0609 | 0611 | 0609 | " page break display on/off | ^OP | |
| | 060D | 0615 | 060D | " soft hyphen on/off | ^OE | |
| | 0611 | 0619 | 0611 | " hyphen help on/off | ^OH | |
| | 0615 | 061D | 0615 | paragraph tab | ^OG | |
| | 0619 | 0621 | 0619 | margin release | ^OX | |
| | 061D | 0625 | 061D | center line | ^OC | |
| | 0621 | 0629 | 0621 | set line spacing | ^OS | |
| | 0625 | 062D | 0625 | help for dot commands | ^JD | |
| | 0629 | 0631 | 0629 | " " status line | ^JS | |

| LABEL | MS-DOS WS 3.31 ADDR | CP/M WS 3.3 ADDR | CP/M WS 3.0 ADDR | DESCRIPTION | | KAYPRO CP/M WORDSTAR 3.3 ORIGINAL SETTINGS |
|---|---|---|---|---|---|---|
| | 062D | 0635 | 062D | help for flags | ^JF | |
| | 0631 | 0639 | 0631 | " " place markers | ^JP | |
| | 0635 | 063D | 0635 | " " paragraph reform | ^JB | |
| | 0639 | 0641 | 0639 | " " tabs and margins | ^JM | |
| | 063D | 0645 | 063D | command index | ^JI | |
| | 0641 | 0649 | 0641 | help for moving text | ^JV | |
| | 0645 | 064B | 0645 | " " ruler line | ^JR | |
| | (n/a) | 0651 | (n/a) | (not implemented) | ^JA | |
| **XTAB** | 0649 | 0655 | 0649 | expansion space for edit cmd table | | 00 00 00 00 |
| **FUNTAB** | 066E | (n/a) | (n/a) | | | 3B 5E 02 0A |
| **FPTAB** | 0724 | 067A | 066E | merge-print cmd table (2 byte cmd char + 2 byte address) | | 10 00 28 43 00 |
| **PNFTAB** | 0735 | 068B | 067F | pointer to no-file cmd table | | 3C 04 |
| **PVTAB** | 0737 | 068D | 0681 | pointer to edit cmd table | | 89 04 |
| **PFPTAB** | 0739 | 068F | 0683 | pointer to merge-print table | | 7A 06 |
| | | | | (following are spec chars used at prompts) | | |
| **CLCHR** | 073C | 0691 | 0686 | cursor left char | | 13 |
| **CRCHR** | 073D | 0692 | 0687 | cursor right char | | 04 |
| **LITCHR** | 073E | 0693 | 0688 | prefix to take next char as literal | | 10 |
| **DIRCH** | 073F | 0694 | 0689 | directory on/off | | 06 |
| | | | | scroll dir up | | 1A |
| | | | | scroll dir down | | 17 |
| **STPCHR** | 0742 | 0697 | 068C | must match interrupt char above | | 15 |
| **ERELCH** | 0743 | 0698 | 068D | error release char for interrupt | | 1B |
| **POSMTH** | 0746 | 0699 | 0690 | type of printer<br>FF = teletype, no backspace<br>00 = teletype w/backspace<br>01 = daisywheel<br>03, 04 = special oem printers | | FF |
| **BLDSTR** | 0747 | 069A | 0691 | number of strikes for boldface | | 03 |
| **DBLSTR** | 0748 | 069B | 0692 | number of strikes for double-strike | | 02 |
| | | | | (Next 8 labels active only if POSMTH = FF or 00) | | |
| **PSCRLF** | 074C | 069C | 0696 | string to do CR and LF | | 02 0D 0A 0D 0A 0A 00 00 00 00 00 |
| **PSCR** | 0757 | 06A7 | 06A1 | string to do CR only | | 02 0D 00 00 00 00 00 |
| **PSHALF** | 075E | 06AE | 06A8 | string to do CR and half-LF | | 00 0D 0A 00 00 00 00 |
| **PBACKS** | 0765 | 06B5 | 06AF | string to do backspace | | 00 08 00 00 00 00 |
| **PALT** | 076B | 06BB | 06B5 | string to set alt char width | ^PA | 00 1B 45 00 00 |
| **PSTD** | 0770 | 06C0 | 06BA | string to set std char width | ^PN | 00 1B 4E 00 00 |
| **ROLUP** | 0775 | 06C5 | 06BF | str to roll carr up part line | ^PT | 00 00 00 00 00 |
| **ROLDOW** | 077A | 06CA | 06C4 | str to roll carr down part line | ^PV | 00 00 00 00 00 |
| **USR1** | 077F | 06CF | 06C9 | string for user function 1 | ^PQ | 00 00 00 00 00 |
| **USR2** | 0784 | 06D4 | 06CE | " " " " 2 | ^PW | 00 00 00 00 00 |
| **USR3** | 0789 | 06D9 | 06D3 | " " " " 3 | ^PE | 00 00 00 00 00 |
| **USR4** | 078E | 06DE | 06D8 | " " " " 4 | ^PR | 00 00 00 00 00 |
| **RIBBON** | 0793 | 06E3 | 06DD | string to set alt ribbon color | ^PY | 00 00 00 00 00 |
| **RIBOFF** | 0798 | 06E8 | 06E2 | string to set std ribbon color | ^PY | 00 00 00 00 00 |
| **PSINIT** | 079D | 06ED | 06E7 | string to initialize printer | | 01 0D 54 31 32 00 00 00 00 00 00 00 00 00 00 00 00 |
| **PSFINI** | 07AE | 06FE | 06F8 | string to uninitialize printer | | 00 1B 41 00 00 00 00 00 00 00 00 00 00 00 00 |
| **SOCHR** | 07C1 | 070F | 070B | character for strikeout | | 2D |
| **ULCHR** | 07C2 | 0710 | 070C | character for underline | | 5F |
| **PRINIT** | 07C3 | 0711 | 070D | jmp to user printer init routine | | 00 00 C9 |
| **PRFINI** | 07C6 | 0714 | 0710 | jmp to user printer uninit routine | | 00 00 C9 |
| **CSWTCH** | 07C9 | 0717 | 0717 | switch to select printer driver<br>(00 = primary list device)<br>(01 = WordStar's port driver)<br>(02 = user printer driver)<br>(03 = oem driver)<br>(04 = alternate console driver) | | 00 |
| **HAVBSY** | 07CA | 0718 | 0718 | have printer busy rtn? FF = yes | | 00 |
| | | | | (If CSWTCH = 00, next 3 active) | | |
| **LIBSY** | 07CC | 0719 | 071A | jmp to user busy test routine | | 00 B7 C9 |

| LABEL | MS-DOS WS 3.31 ADDR | CP/M WS 3.3 ADDR | CP/M WS 3.0 ADDR | DESCRIPTION | KAYPRO CP/M WORDSTAR 3.3 ORIGINAL SETTINGS |
|---|---|---|---|---|---|
| LISEND | 07DD | 071C | 071D | routine send character to list device | 5F 0E 05 CD 05<br>00 B7 C9 |
| LISINP | 07ED | 0724 | 0725 | jmp to user char input rtn<br>(if using XON/XOFF or ETX/ACK) | 00 37 C9 |
| | | | | (If CSWTCH = 01, next 11 active) | |
| POBSY | 07F0 | 0727 | 0728 | port driver output status entry | DB |
| POSTAT | 07F1 | 0728 | 0729 | output status port address | 05 |
| POMASK | 07F4 | 072B | 072C | bit mask for transmit ready | 00 E6<br>01 |
| POOM | 07F6 | 072D | 072E | bits that change | EE<br>01 |
| POSEND | 07FD | 0732 | 0733 | port driver send char entry | 37 C0 B7 C9<br>D3 |
| POOP | 07FE | 0733 | 0734 | output data port address | 04 |
| POINP | 0801 | 0736 | 0737 | port driver input status entry | 00 C9<br>DB |
| PISTAT | 0802 | 0737 | 0738 | input status port address | 05 |
| POINSK | 0805 | 073A | 073B | bit mask for receive ready | 00 E6<br>02 |
| POIM | 0807 | 073C | 073D | bits that change | EE<br>02 |
| POIP | 080D | 0740 | 0741 | input data port address | 37 C0 DB<br>04<br>00 B7 C9 |
| | | | | (If CSWTCH = 02, next 3 active) | |
| PUBSY | 0811 | 0744 | 074C | jmp to user printer busy test routine | 00 B7 C9 |
| PUSEND | 0814 | 0747 | 074F | jmp to user char output routine | 00 00 C9 |
| PUINP | 0817 | 074A | 0752 | jmp to user char input routine | 00 37 C9 |
| | | | | (If CSWTCH = 04, next 7 active) | |
| ACBSY | 081A | 074D | 0758 | jmp to user alt con busy test | 00 B7 C9 |
| ACSEND | 082D | 0750 | 075B | send char to alt con | CD 6C 07 CD F0<br>20 C3 63 07 |
| ACINP | 083A | 0759 | 0764 | input char from alt con | CD 6C 07 CD 55<br>1D C4 6C 1D 57 |
| ACFIN | 0847 | 0763 | 076E | exit routine start | 78 |
| ACSTA1 | 0849 | 0764 | 076F | set/reset iobyte | 32 03 00 7A B7<br>C0 37 C9 |
| ACSTAR | 0858 | 076C | 0777 | entry routine start | 57 3A 03 00 47<br>E6 FC F6 |
| CONFIE | 0863 | 0774 | 077F | alt con device assignment<br>(00 = TTY:, 01 = CRT:) | 01 |
| PROTCL | 0879 | 0778 | 0786 | printer protocol type<br>(00 = none)<br>(01 = ETX/ACK)<br>(02 = XON/XOFF) | 00 |
| EAKBSZ | 087A | 0779 | 0787 | ETX/ACK msg buffer size | 7F |
| | | | | (Most of the following are for daisywheels only) | |
| DVMILE | 087C | 077A | 0790 | vertical motion index leadin string | 00 1B 1E 00 00 |
| DVMITR | 0881 | 077F | (n/a) | vertical motion index trailing string | 00 1B 02 00 00 |
| DVMMIN | 0886 | 0784 | 0795 | minimum vertical motion value | FF FF |
| DVMRNG | 0888 | 0786 | 0797 | maximum vertical motion value | FF FF |
| DHMILE | 088A | 0788 | 0779 | horizontal motion index leadin string | 00 1B 1F 00 00 |
| DHMIFG | 088F | 078D | 079E | (probably hor. motion trailing string) | 00 |
| DHMIN | 0890F | 078E | 079F | minimum horizontal motion value | FF FF |
| DHRNG | 0892 | 0790 | 07A1 | maximum horizontal motion value | FF FF |
| DFWD | 0894 | 0792 | 07A3 | string to set forward print | 00 1B 35 00 00 |
| DBAK | 0899 | 0797 | 07A8 | string to set backward print | 00 1B 36 00 00 |
| DSP | 089E | 079C | 07AD | forward space | 00 20 00 00 00 |
| DBS | 08A3 | 07A1 | 07B2 | backward space | 00 08 00 00 00 |
| DLF | 08A8 | 07A6 | 07B7 | line feed vmi | 00 0A 00 00 00 |
| DRLF | 08AD | 07AB | 07BC | reverse line feed | 00 1B 0A 00 00 |
| DPHSPC | 08B2 | 07B0 | 07C1 | print phantom space | 00 1B 59 00 |
| DPHRUB | 08B6 | 07B4 | 07C5 | print phantom rubout | 00 1B 5A 00 |
| OVRFLG | 08BF | (n/a) | (n/a) | | |
| DNPROS | 08C4 | 07B8 | 07D3 | suppress proportional spacing<br>(00 = on, FF = off) | 00 |
| DMJWB | 08C5 | 07B9 | 07D5 | use alt microjustification algorithm<br>(00 = no, FF = yes) | 00 |
| PSTAB | 08C9 | 07BA | 07D8 | proportional spacing table<br>(righthand digit of each byte is<br>the one involved in the totally<br>unsupported proportional spacing<br>command ^P^P) | .<br>.<br>. |
| | 0948 | 083A | 083A | END OF USER PATCHING AREA | |

OUT
THINK

# PINNING DOWN PATCH POINTS

## *How to find them in the pattern of any program*

by Joseph I. Mortensen

ILLUSTRATION BY EDWARD ABRAMS

Many software packages work well just as they come, right out of the box or directly from the modem. Like a lucky purchase off the rack at the clothing store, they fit with no need for alteration. Other programs, however, may need taking in here or letting out there in order to work to the user's satisfaction. This involves patching, which consists of making changes or additions to the program code or data on the floppy disk. Rightly applied, a patch can improve the performance of software or custom tailor it to the user's liking.

This article will explain how I analyzed and patched the program Out-Think using the public domain disk editor SuperZap. My purpose is not to teach you about Out-Think; anything you learn about it is incidental. My hope is that you come away from this article with an understanding of how to analyze *any* program so that you can patch it. Understanding the method is what's important here.

Toward that end I will first explain how to use SuperZap, and then I will tell you the steps I went through in examining and patching Out-Think.

### Some reasons for patching

Patching has come to my aid in several ways. Along with thousands of others I have patched my copy of WordStar to eliminate the slow, inane sign-on and to allow the printer to run at the same time I am editing. My July/August 1985 issue of *PROFILES* has nearly fallen apart from repeated reference to Ted Silveira's article on customizing WordStar. (*Ed. note: "WordStar Deluxe" is reprinted in this issue.*)

I have also made use of patching to exterminate bugs in software. For example, a public domain program acquired from a Kaypro Users Group worked acceptably except that cursor positioning went crazy in one part of it. After a long search I discovered that whoever converted it from its Osborne original had made an error. Patching one byte fixed the problem.

One more example: I recently downloaded some software written for newer CP/M Kaypros capable of inverse and half-intensity video. The programs work on my 2'83, but do queer things to the cursor character and also put garbage on the screen. Patching (or unpatching, in this case) removed the offending video control codes.

My most serious venture into patching came about when I purchased Out-Think, the outline processor from Kamasoft. In most respects it has proved itself a great tool for writing, preparing speeches, planning, and playing with ideas. As distributed, however, it lacks some conveniences. Out-Think has its mind made up about format parameters and its configuration program does not permit you to change the default values. If you want anything different, you must tell Out-Think via a special menu.

Inspired by Ted Silveira's article on customizing WordStar, I

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set out to find the locations in Out-Think to patch with my preferred formatting options. All I needed was the addresses of the proper locations in the program code. Unfortunately no Ted Silveira stood by with a list of patch locations for Out-Think. Out-Think's manual, far better than most software documentation, divulged no such secrets. I was in uncharted territory, forced to do my own mapmaking.

## The tools for patching

The equipment I put together for the exploration consisted of a copy of the program in need of patching (OT.COM, in my case), any documentation available for the program, and a public domain disk examination and editing utility called SuperZap (version 2.3, available through users groups, Micro Cornucopia, and many bulletin boards).

*An introduction to SuperZap will help make clear the process of discovering patch locations.*

A brief introduction to SuperZap will help make clear the process I went through to discover Out-Think's patch locations. As a disk utility program SuperZap has two main functions, the first of which allows the user to examine a disk either directly or a file at a time. SuperZap also functions as an editor so that changes can be patched into a file. Since it has the power to kill as well as cure, make sure you *always* use a backup copy of the program or data file to be examined or edited.

SuperZap's *direct* examination mode permits browsing through any track and sector on a disk, including the areas where the operating system and the disk directory reside. The *file* mode restricts the examination to a given program or data file.

Figure 1, below, shows how the screen looks in file mode. A menu of commands appears in the upper half of the screen. The lower half displays the first sector of Out-Think in two formats: as eight lines of hexadecimal (base 16) numbers and as ASCII code. For clarification I have added a boldfaced line to Figure 1 that would not appear on the screen. The rows of hexadecimal numbers that take up most of the display each represent 16 bytes (numbered 00 through 0F) of "op codes," machine language instructions and data that the central processor (CPU) in the computer uses to run the program. On the left side of the screen the column of hexadecimal numbers shows the beginning address of each row of Out-Think's program code. Every byte has its own address expressed as a hexadecimal number. For example, in Figure 1 the 54 in row 000130 has an address of 0134h (the h stands for hexadecimal). The column at the right of the screen displays the ASCII character equivalents as strings of dots and printable characters. Each ASCII character has its hexadecimal counterpart. Using the same example, you can see that the 54 in row 000130 is the uppercase T in "ASOFT."

**FIGURE 1**

```
                        SuperZap VERSION 2.3

CR Next Sector                          E  Change Sector
-  Previous Sector                      F  Select New File
B  First Sector of File                 S  Select Sector
Z  Last Sector of File                  X  Exit from Superzap

                    Select Function = = = >

      File-Name          Access              Current-Sector    File-Offset
   OT          .COM       R/W                      0000           000100

(Addr)  00 01 02 03  04 05 06 07  08 09 0A 0B  0C 0D 0E 0F   (ASCII Display)
000100  C3 D6 8E 4F  55 54 2D 54  48 49 4E 4B  20 28 74 6D  :...OUT-THINK (tm:
000110  29 20 43 4F  50 59 52 49  47 48 54 20  28 43 29 20  :) COPYRIGHT (C) :
000120  31 39 38 33  2D 31 39 38  35 20 62 79  20 4B 41 4D  :1983-1985 by KAM:
000130  41 53 4F 46  54 2C 20 49  6E 63 2E 20  23 31 30 20  :ASOFT, Inc. #10 :
000140  44 38 36 30  31 50 30 30  3D 3D 41 2E  54 72 65 6E  :D8601P00= =A.Tren:
000150  74 00 01 20  00 C0 00 74  09 0C 18 24  FF 00 00 3F  :t.. ....t...$....?:
000160  3F 3F 3F 20  41 42 45 4E  44 3A 20 00  2E 2E 2E 2E  :??? ABEND: . . . . :
000170  20 57 6F 72  6B 69 6E 67  20 2E 2E 2E  2E 00 00 00  : Working. . . . . :
```

The "CR" and "-" commands at the top of the screen allow one to browse through the file a sector at a time. CR (the RETURN or Enter key) moves forward one sector at a time; the minus key moves back.

SuperZap's second function allows the user to change one or more bytes to new values. Pressing the "E" command turns SuperZap into a screen editor. A look at Figure 2, below, reveals that a new menu of commands appears in the upper portion of the screen. The cursor jumps to the first byte in the display of hexadecimal numbers, where it can be moved about with the arrow keys.

**FIGURE 2**

```
                        SuperZap VERSION 2.3

^H  Cursor left                         ^L  Cursor right
^K  Cursor up                           ^J  Cursor down
^E  Change Side                         CR  New Line
^X  Cancel Changes                      ^W  Save Changes

      File-Name          Access              Current-Sector    File-Offset
   OT          .COM       R/W                      0077           003C80

003C80  3A 3C CD A3  3A CD 2C 3B  CD D6 3B C3  3A 3C CD A3  :: < ..: .,..;.: < ..:
003C90  3A CD 2C 3B  CD C6 3B C3  3A 3C CD A3  3A CD 78 25  :: .,..;...: < ..: . x%:
003CA0  D2 3A 3C C3  CE 02 CD A3  3A C3 CE 02  CD CD 0C 00  : .: < ....: .....:....:
003CB0  00 CD CD 0C  05 00 CD CD  0C 00 00 CD  CD 0C 03 00  : ..... ..... ..... :
003CC0  CD CD 0C 01  00 CD CD 0C  42 00 CD CD  0C 00 00 CD  : ..... ....B..... :
003CD0  CD 0C 40 00  CD CD 0C 01  00 CD CD 0C  02 00 CD CD  : ..@. ..... ..... :
003CE0  0C 03 00 CD  CD 0C 00 00  CD CD 0C 10  00 CD 3B 0D  : ..... ..... ..;.:
003CF0  00 00 CD 3B  0D 00 00 CD  3B 0D 01 00  CD 10 0D 46  : ...;.... ;..... F:
```

Changing the value of a byte is a simple matter of typing it in place. In Figure 2, for example, to change the 42 to 54 at location 003CC8, move the cursor to the 4 and type **5**. The cursor moves one space to the right and you type **4**. The screen immediately reflects the changes. (Note: only hexadecimal numbers are valid entries. SuperZap traps all other characters. It does not, however, know the difference between 10 hex and

10 decimal. Stay alert.) If you make an error or change your mind, typing ^X (CTRL-X) cancels your work, restores the original values, and takes you out of the edit function.

Editing may also take place in the ASCII portion of the display. Tapping ^E moves the cursor back and forth between the hex and ASCII portions of the screen display. Editing the ASCII area is particularly useful for changing or correcting text portions of a program or data file. Simply type in the new characters; any keyboard character is valid on the right side of the screen. As you type, the hexadecimal numbers in center screen change simultaneously to reflect the new values. Typing ^W writes the changes to disk and returns you to SuperZap's browse function.

## Searching for patch points

Now that you have an understanding of SuperZap's workings, I will describe how I used it to browse, guess, infer, and map my way to Out-Think's patch locations. I began by putting a floppy disk with SuperZap on it into drive A of my Kaypro 2'83. Into drive B went a copy of OT.COM on its own disk. At CP/M's A> prompt I entered **B:** and pressed **RETURN** to make B the logged drive. At the B> prompt I entered **A:SuperZap OT.COM**, and then **RETURN**. SuperZap loaded itself and Out-Think. After a few seconds of disk drive activity the screen looked like Figure 1, above.

Using the RETURN key to scroll forward a sector at a time, I looked through Out-Think for clues to the addresses I wanted to patch. I knew from having used Out-Think that somewhere I would find in the ASCII part of the display the text of the menu of formatting options. After many, many taps of the RETURN key I came to the sector shown in Figure 3, below, where the words "Lines Per Page" and "Left Margin" appeared at the right of the screen.

**FIGURE 3**

```
                        SuperZap VERSION 2.3

CR Next Sector                          E  Change Sector
-  Previous Sector                      F  Select New File
B  First Sector of File                 S  Select Sector
Z  Last Sector of File                  X  Exit from Superzap

                    Select Function = = = >

      File-Name       Access                Current-Sector    File-Offset
  OT        .COM      R/W                        007A           003E00

003E00  C3 02 03 CD  DB 02 37 0E  4F 19 37 0E  2E 18 1E 13  :.....7.0.7.....:
003E10  06 00 37 0E  02 03 09 03  CD DB 02 39  06 BF 07 4E  :..7.........9...N:
003E20  65 77 20 3D  20 00 CE 02  F1 DA AD 1A  03 03 C3 E6  :ew = ............:
003E30  02 C5 CD 09  04 C1 C3 BF  07 CD DB 02  31 3E 41 20  :............1>A :
003E40  20 20 23 20  4C 69 6E 65  73 20 50 65  72 20 50 61  :  # Lines Per Pa:
003E50  67 65 3A 00  C5 3C 1E 16  CE 02 CD DB  02 31 3E 42  :ge:..<.......1>B:
003E60  20 20 20 4C  65 66 74 20  4D 61 72 67  69 6E 3A 00  :   Left Margin:.:
003E70  CA 3C 1E 16  CE 02 CD DB  02 31 3E 43  20 20 20 52  :.<.......1>C   R:
```

I studied this display carefully for clues. After the word "Page:" were two dots and a less-than symbol (<). These corresponded to three hexadecimal numbers in the center of the screen: 00 C5 3C. After the word "Margin:" in the ASCII side were two more dots and another "<". On the hexadecimal side I found the values 00 CA 3C. Feeling I may have hit on something, I pressed the RETURN key again to move to the next sector. The words "Right Margin:" and "Line Spacing:" appeared. See Figure 4 below. After "Margin:" and "Spacing:" again there were two dots and a "<". These corresponded respectively to 00 CF 3C and 00 D4 3C in the hexadecimal display.

**FIGURE 4**

```
                        SuperZap VERSION 2.3

CR Next Sector                          E  Change Sector
-  Previous Sector                      F  Select New File
B  First Sector of File                 S  Select Sector
Z  Last Sector of File                  X  Exit from Superzap

                    Select Function = = = >

      File-Name       Access                Current-Sector    File-Offset
  OT        .COM      R/W                        007B           003E80

003E80  69 67 68 74  20 4D 61 72  67 69 6E 3A  00 CF 3C 1E  :ight Margin:..<.:
003E90  16 CE 02 CD  DB 02 31 3E  44 20 20 20  4C 69 6E 65  :......1>D   Line:
003EA0  20 53 70 61  63 69 6E 67  3A 00 D4 3C  1E 16 CE 02  : Spacing:..<....:
003EB0  CD DB 02 31  3E 45 20 20  20 49 6E 64  65 6E 74 20  :...1>E    Indent :
003EC0  53 69 7A 65  3A 00 D9 3C  1E 16 CE 02  CD DB 02 31  :Size:..<.......1:
003ED0  3E 46 20 20  20 53 65 63  74 69 6F 6E  20 23 20 44  :>F      Section # D:
003EE0  65 70 74 68  3A 00 DE 3C  1E 16 CE 02  CD DB 02 31  :epth:..<.......1:
003EF0  3E 47 20 20  20 54 61 62  6C 65 20 6F  66 20 43 6F  :>G      Table of Co:
```

Remembering that addresses always have two bytes, low byte first and high byte second, I made a list of what might be addresses, reversing the bytes but disregarding the 00s. As Table 1 below shows, a definite pattern appeared in the list.

**TABLE 1**

| | |
|---|---|
| Lines Per Page: | 3CC5h |
| Left Margin: | 3CCAh |
| Right Margin: | 3CCFh |
| Line Spacing: | 3CD4h |

To check out my hunch, I scrolled backward several sectors (using the minus key) to the one in which these addresses occur. Figure 5, below, shows what I saw.

**FIGURE 5**

```
                        SuperZap VERSION 2.3

CR Next Sector                          E  Change Sector
-  Previous Sector                      F  Select New File
B  First Sector of File                 S  Select Sector
Z  Last Sector of File                  X  Exit from Superzap

                    Select Function = = = >

      File-Name       Access                Current-Sector    File-Offset
  OT        .COM      R/W                        0077           003C80

003C80  3A 3C CD A3  3A CD 2C 3B  CD D6 3B C3  3A 3C CD A3  :.<...:.,.;.:.<...:
003C90  3A CD 2C 3B  CD C6 3B C3  3A 3C CD A3  3A CD 78 25  :.:.,.;.:.<...:.x %:
003CA0  D2 3A 3C C3  CE 02 CD A3  3A C3 CE 02  CD CD 0C 00  :.:<.....:.......:
003CB0  00 CD CD 0C  05 00 CD CD  0C 00 00 CD  CD 0C 03 00  :................:
003CC0  CD CD 0C 01  00 CD CD 0C  42 00 CD CD  0C 04 00 CD  :........B.......:
003CD0  CD 0C 48 00  CD CD 0C 01  00 CD CD 0C  02 00 CD CD  :..H.............:
003CE0  0C 03 00 CD  CD 0C 03 00  CD CD 0C 10  00 CD 3B 0D  :..............;.:
003CF0  00 00 CD 3B  0D 00 00 CD  3B 0D 01 00  CD 10 0D 46  :...;....;.......F:
```

Beginning at location 3CC5h I found the bytes CD CD 0C. At 3CCAh, 3CCFh, and 3CD4h were the same three bytes: CD CD 0C. From having delved a bit into 8080 and Z-80 instruction codes, I knew that CD followed by two bytes is the "op code" for a CALL, similar to a GOSUB in BASIC. I needed to look a little further. So I studied the sector in Figure 4 to see what followed the CD CD 0C sequence. I went one byte beyond CD CD 0C at 3CC5h and found the value 42. A quick calculation in my head converted that to 66 decimal. The Out-Think manual had told me the default setting for "Lines Per Page" is 66. How about three bytes past 3CCAh? The value 04 appeared there. Four is the default left margin setting. I checked 3CCFh plus three bytes and found 48h or 72 decimal. 72 is the default right margin. How about the line spacing? Three bytes past 3CD4h yielded the value 01. The default setting for line spacing is one. By now I was pretty sure I had found the key to Out-Think's address book.

*Out-Think had yielded its secrets about format parameters, so I tried to unravel one other mystery.*

## Making the patch

Changing one of the values and then running Out-Think would confirm that I had found the right locations. SuperZap had helped me find the place, or so I hoped. Now SuperZap would help me do the patching.

Pressing the letter **E** engages SuperZap's editing mode. Refer to Figure 2 on page 52. With the arrow keys I moved the cursor to the address for "Page Length," 3CC8h (3CC5h plus 3) to change the value from 42h (66 decimal) to 54h (84 decimal, the number of lines on legal size paper). I simply typed **54** in place of the 42. A **^W** wrote the new page length value (I hoped) to the disk, and **X** took me out of SuperZap.

Now I ran Out-Think to see if I had indeed found the right place to patch. The format parameter list showed "Lines Per Page: 84" just as it should. My detective work had succeeded. From this point I went back to SuperZap with confidence to locate the patch points for all 22 format parameters in Out-Think. The list of addresses, default settings, and range of reasonable values for the output parameters for Version 1.0 of Out-Think appears in Table 2 on page 56.

## Another search, another method

Since Out-Think had yielded its secrets about the format parameters, I decided to try to unravel one other mystery. The configuration program allows the option of sending an initialization string of up to 23 bytes to the printer. Upon exit from configuration, however, Out-Think erases the installation files. Re-configuration requires making new copies of them from the master disk and then running the configuration program—a fairly cumbersome process.

With SuperZap and the address of the printer initialization I could set up new strings with ease. First, however, I needed to know the location in Out-Think.

Here is how I tracked it down. I copied the following four files from the master disk to a formatted floppy disk: OT.COM, OT.CFG, OTCFG.TOP, and HELP.TOP.

Putting this newly copied disk in drive A, I entered **OT** and hit **RETURN**. The configuration program runs automatically. "Step 5, Printer Initialization," asks for an initialization code that must be entered in hexadecimal numbers. To make the string easy to find, I entered the following bytes:

**48 49 20 54 48 45 52 45**

That string, of course, represents no meaningful printer code, but it would show up in the SuperZap ASCII display as "HI THERE." Upon exit from the configuration program, I started the search.

With SuperZap in drive A and OT.COM in drive B, I entered **B:**, and pressed **RETURN** to make drive B the logged drive and then loaded SuperZap and OT.COM by typing **A:SuperZap OT.COM**, and pressing **RETURN**. It took only one tap of the **RETURN** key to find the printer string. "HI THERE" showed up in the ASCII display of the second sector of OT.COM. (See Figure 6 below.) Looking across to the corresponding location in the hexadecimal numbers, I found the string's location at 019Ch. One byte to the left, 019Bh, was the number 08, the length in bytes of the initialization string.

**FIGURE 6**

```
                    SuperZap VERSION 2.3

CR Next Sector                          E  Change Sector
-  Previous Sector                      F  Select New File
B  First Sector of File                 S  Select Sector
Z  Last Sector of File                  X  Exit from Superzap

          Select Function = = = >

     File-Name        Access              Current-Sector    File-Offset
A:OT          .COM    R/W                      0001            000180

000180  04 13 18 05  06 03 12 17  0E 07 14 19  15 0F 11 1A  :................:
000190  10 02 16 08  0A 0B 0C 1F  3F 00 00 08  48 49 20 54  :.........?...HI T:
0001A0  48 45 52 45  00 00 00 00  00 00 00 00  00 00 00 00  :HERE............:
0001B0  00 00 00 00  01 1A 00 00  00 00 00 00  00 00 00 00  :................:
0001C0  01 18 00 00  00 00 01 17  00 00 00 00  02 1B 45 00  :..............E.:
0001D0  00 00 02 1B  52 00 00 00  02 1B 3D 00  00 00 00 00  :....R.....=.....:
0001E0  00 00 00 00  20 20 00 50  18 00 00 DB  1C C9 10 02  :.... .P.........:
0001F0  01 80 80 80  80 80 80 80  80 80 80 80  80 80 80 FF  :................:
```

To patch in a new printer string I need only enter the printer codes beginning at 019Ch (up to 23 bytes) and then put the length byte at 019Bh. The following string tells an Epson or Epson-compatible printer to print in double-strike mode at a pitch of 12 characters per inch in italic font:

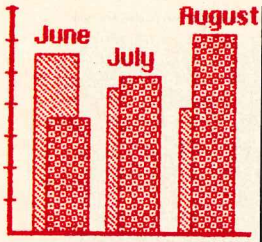
**1B 47 1B 4D 1B 34**

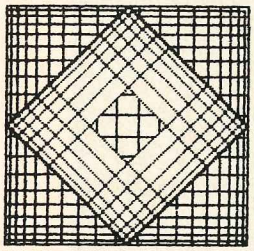
It is six bytes long, so 06 should be entered at location 19Bh. A **^W** saves the changes to disk. Knowing the printer patch location allows me to bypass Out-Think's slow configuration program and make changes in the printer initialization string with ease.

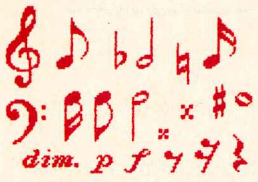
I now have two versions of Out-Think. One is pretty standard for 11-inch continuous feed paper; the other one is customized for single sheets of 6 by 9-1/2-inch loose-leaf paper, which I use

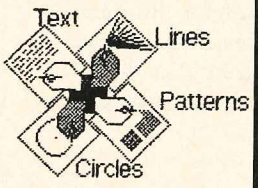
# "Kaypro makes a nice computer—too bad it doesn't do graphics"

Graphic Designer

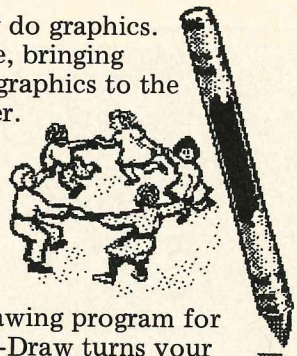






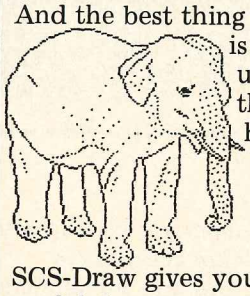
Make that *didn't* do graphics. SCS-Draw is here, bringing Macintosh-style graphics to the Kaypro computer. With SCS-Draw, you can use your Kaypro to draw a picture. Of anything.



The first true drawing program for the Kaypro, SCS-Draw turns your computer screen into a sketchpad on which you can draw detailed images like those shown here. These images can be saved on disk or printed on your dot-matrix or letter-quality printer.

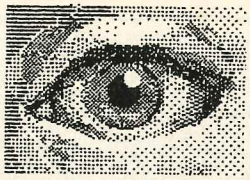
There are many applications of SCS-Draw. For example, you could use SCS-Draw to design and print party invitations, banners, or technical diagrams. You could also use SCS-Draw to promote your business or design your company logo.

And the best thing about SCS-Draw is that it's fun to use — when was the last time you had some *fun* with your Kaypro?

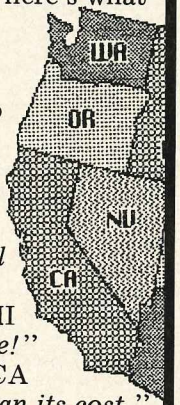


SCS-Draw gives you a variety of useful drawing tools to choose from. You can draw a detailed image dot-by-dot, or do a rough sketch with straight lines. Need a compass? SCS-Draw can draw circles of any size, wherever you need them. For subtle shading effects, use one of 23 pre-defined patterns, or create your own.

Other features include block moves, four built-in fonts, and powerful print options like enlargement, indentation, mirror image and rotation. And SCS-Draw's windowing capability lets you work on images much larger than your Kaypro's screen.

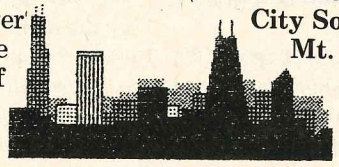


How good *is* SCS-Draw? Every day, we get unsolicited letters and phone calls from SCS-Draw users around the country — here's what *they* have to say:




*"Very easy to use."*
— G.H., WPAFB, Ohio
*"Keep it up ... the program is great fun."*
— J.S., Roseburg, OR
*"A pleasure to use ... user-friendly, fun, well put together."*
— D.A., Kalamazoo, MI
*"Everything is bug-free!"*
— D.C., Los Angeles, CA
*"Worth much more than its cost."*
— B.H., Birmingham, AL

your KAYPRO can Draw



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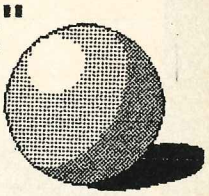
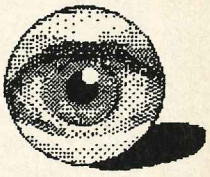
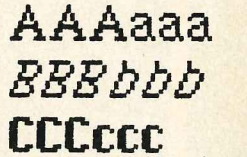
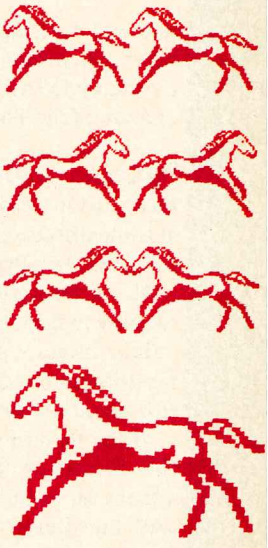




Simon&Simon Photography



Banners



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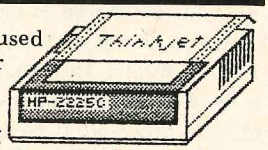


SCS-Draw can be used with most popular dot-matrix and letter-quality printers, including those from Epson, Star, Okidata, C. Itoh, Panasonic, IBM, HP, Diablo and Kaypro.

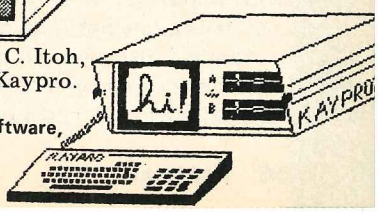


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**TABLE 2: For Out-Think, Version 1.0**

| | FORMAT PARAMETERS | ADDRESS | DEFAULT | RANGE OF VALUES |
|---|---|---|---|---|
| A | # Lines Per Page: | 3CC8h | 42h 66d | 25 to 65335 |
| B | Left Margin: | 3CCDh | 04 | 0 to 95 |
| C | Right Margin: | 3CD2h | 48h 72d | 32 to 128 |
| D | Line Spacing: | 3CD7h | 01 | 1 to 3 |
| E | Indent Size: | 3CDCh | 02 | 0 (off) to 5 |
| F | Section # Depth: | 3CE1h | 03 | 0 to 16 |
| G | Table of Contents Depth: | 3CE6h | 03 | 0 (off) to 16 |
| H | Output Depth: | 3CEBh | 10h 16d | No need to change |
| I | Use Expanded Outline? | 3CF0h | NO (00) | 00 = no; 01 = yes |
| J | Stop Before Page? | 3CF5h | NO (00) | 00 = no; 01 = yes |
| K | # Copies: | 3DBFh | 01 | No need to change |
| L | WordStar Output? | 3DC4h | NO (00) | 00 = no; 01 = yes |
| M | Headers & Footers? | 3CFAh | YES (01) | 00 = no; 01 = yes |
| N | Rotate Headers & Footers? | 3DA7h | NO (00) | 00 = no; 01 = yes |
| O | Title in Header? | 3D93h | NO (00) | 00 = no; 01 = yes |
| P | Header: | 3CFFh | 46h 70d | See note 1 |
| Q | Date in Footer? | 3D98h | YES (01) | 00 = no; 01 = yes |
| R | Footer: | 3D4Ch | 30h 48d | See note 1 |
| S | Page # in Header? | 3D9Dh | YES (01) | 00 = no; 01 = yes |
| T | Page # in Footer? | 3DA2h | YES (01) | 00 = no; 01 = yes |
| U | Page # Prefix: | 3DADh | Page | See note 2 |
| V | Starting Page #: | 3DBAh | 01 | No need to change |

Note 1: No patching needed. This is a temporary storage location for the current title name.

Note 2: Normally the page number will print with "Page" preceding it. For something else, perhaps "Pagina" if you write in Spanish, you can patch. Put the length byte at 3DADh. Limited to eight characters. In SuperZap you can type the new word directly. Ctrl-E moves the cursor to the ASCII display where you simply type in the letters.

much of the time for notes for speaking engagements. The two versions reside on the same disk, but the special version has the name OS.COM. Thanks to SuperZap and patches, I have changed Out-Think's mind to *my* way of thinking.

## Patching anything

Leaving Out-Think itself behind for a moment, let's take a look at some things you can do to help you in analyzing a program to discover its patch points.

•*Look for familiar text.* I began by using SuperZap's ASCII display to find the place in the program code where the default values menu was. Similarly, you can examine a program for familiar menus or prompts. From there you can look for printer initialization strings, addresses, etc.

•*Look for addresses.* Once I found familiar text, I did not find the default values I was looking for, but I did discover addresses pointing to those strings. If you're in an area filled with familiar text and you do not see the values you want, look for sequential addresses nearby; those addresses may point to where you want to be. Remember that addresses always have two bytes, low byte first and high byte second.

•*Embed messages.* To discover the location of the printer initialization string, I changed it to read "HI THERE" in ASCII. To find the location of values withing a program, you can use the program's installation procedure to insert your own messages, then use SuperZap to find them.

•*Look for patterns.* This may sound pretty vague, but try to look for patterns in the construction of any program—try to recognize the logic with which it is put together. The placement of text relative to default values, or to addresses, may be indirect, but consistant throughout a program file.

•*Learn assembly language.* This is not required, of course, but the more you know about Z-80 or 8080 assembler, the easier it is to patch. Knowledge of assembly language makes it easier to figure out what is happening within a program. You do not need to become an expert, or even proficient; a smattering of knowledge is helpful.

## Solving the mysteries

The internal structure of any program can be a mystery, waiting to be solved. With the correct tools you can give yourself hours of enjoyment, puzzling out the intricacies of software and creating customized programs that do exactly what *you* want.

*Joseph I. Mortensen is a freelance writer and serves as pastor of the First Baptist Church of Midland, Michigan.*

# A First Session with Lotus 1-2-3

## *Getting started, step by step*

by Joseph Comanda

Lotus 1-2-3 is probably the best known computer spreadsheet on the market. It lets you work with a computerized version of the paper spreadsheet that has cluttered corporate offices for years. Spreadsheets can get big and complicated, but they all start with a simple grid structure of columns, rows, and cells (boxes created by the intersections of columns and rows). For all its sophistication and power, Lotus is an easy program to learn.

Of course, a Lotus spreadsheet is far more dynamic and flexible than its paper counterpart. It not only calculates automatically, it lets you make changes easily. You can insert another row for a new expense category or add a whole new section for income sources. You can use the same form year after year, just changing the numbers. You can play "what if" games by changing the numbers in some cells and seeing what that does to your totals. You can even produce graphs that dramatize the numbers.

We'll use a personal budget spreadsheet in this tutorial (see Figure 1 on page 62), but you could apply the same principles, even the same format, to the budget of a big corporation. You'll notice that most of its cells contain numbers. Some—the column headings, for example—have labels (text that makes the numbers intelligible). And some—the totals at the bottoms of columns—contain formulas (instructions for performing automatic calculations). Building a spreadsheet is simply a matter of filling in cells in a grid with numbers, labels, or formulas. Once you've learned how to do that you're off and running.

But this is a tutorial to get you started. With the step-by-step instructions in this article, you'll learn the basics: how to design and use a simple spreadsheet and how to print it and save it on a disk. Then you'll be ready to experiment with more advanced Lotus features.

### Getting into Lotus

If you have two floppy drives, use a DOS disk to start the computer, then put the Lotus system disk in drive A and a formatted disk (to save your spreadsheet on) in drive B, type **123**, and hit **Enter**.

If Lotus is on your hard disk and you don't have any special menu for getting into Lotus, start the computer and type the following commands:

**cd \123 <Enter>**
**123 <Enter>**

### Moving around the spreadsheet

You always start Lotus with an empty spreadsheet grid. The letters across the top identify the columns, and the numbers down the left identify the rows. A given cell is at a particular location defined by the column and row that intersect to form it. For example, right now cell A1 (for column A, row 1) is highlighted.

The highlighting in cell A1 is actually a pointer that can be moved. Use the right arrow key to move it one cell to the right. Now you're in cell B1. Notice that your position is displayed at the upper left-hand corner of the screen on the Status Line. If you hold the right arrow key down for a few seconds, the pointer will scoot to the right several cells. In the same way, the other arrow keys will move you down, up, or to the left.

(Note: The numeric keypad doubles as a cursor pad, and the NumLock key above it switches it from one use to the other. If the NumLock key is on, the numbers work and Lotus displays the word NUM in the lower right-hand corner of the screen. If it's off, the arrow keys work. Make sure the NumLock key is off.)

A Lotus spreadsheet can be bigger than the eight columns and 20 rows that fit on the screen initially, so Lotus lets you move around a screenful at a time too. The Tab key, for example, moves you a screenful to the right, and Shift Tab (holding down the Shift key while you press the Tab key) moves you a screenful to the left. Try tabbing out to the right a few screenfuls until you're past column Z. Notice that the column after that is AA, then AB, and so on. By recombining letters, Lotus comes up with 256 columns, the last of which is named IV. You can also move up and down a screenful at a time using the PgUp and PgDn keys. And finally, there's the Home key, which will take you back to cell A1 no matter where you are in the spreadsheet.

Get comfortable with these commands. As you move around, look at the cell location change on the Status Line. When you're done, hit the Home key to move back to cell A1.

### Entering labels and numbers

Remember, we can put three types of information into a cell: numbers, labels (text), and formulas. We'll start with a label.

Here are the instructions for putting a label in cell B3.

1. Move the pointer to cell A3.
2. Type **EXPENSES <Enter>**

As you type the letters for "EXPENSES," they appear first at

*(continued on page 61)*

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# Price Breakthrough — Sharp PC 7000 Price Slashed

The Sharp PC 7000 is strong, compact, and lightweight. It is 99.99% IBM compatible. It runs Lotus 123, dBase III, and graphics programs. The keyboard is roomy and full size — you don't have to have dainty little hands or hold them in an unnatural position to get your work done.

**$749**

*Includes 30 day money back guarantee and free $79 travel case.*

### Desktop Power in a Portable

The built-in adjustable flat screen of the PC 7000 has a standard 80 column by 25 line screen that is super readable from any angle. It has a bright, clear, high-contrast LCD screen image that you can control with the touch of a knob. So you don't need special lighting or have to strain to read it. This makes it easy to use.

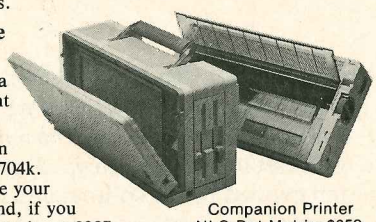
### Sharp PC 7000 Specifications

● 8086 CPU switchable to 4.77 MHz or 7.37 MHz ● 8087 socket for math chip ● 320k RAM expandable to 704k on the motherboard ● Two standard 5¼ DSDD 360k floppy drives specially shock mounted ● Documentation includes Sharp PC User's Guide and MSDOS Reference Manual ● 1 parallel printer port ● 1 serial port ● MSDOS 2.11 operating system ● Built in diagnostics ● Full size 84 key AT-type keyboard with separate function keys and standard size return key ● 120 volt power ● Weighs 18.8 pounds ● Built in carrying handle ● Internal clock, calendar ● Entire unit 16 5/32 inch wide x 6 5/16 inches deep x 8 15/32 inches high ● PC compatible ● Large 25 line, 640 x 200 pixels, bit-mapped illuminated crystal LCD for clear, detailed graphic images and text display

The PC 7000 is filled with super features that make it a pleasure to use. In addition to a parallel and serial port, you get switchable speed operations, built-in monographics capabilities, and two standard size 5 1/4 inch disk drives. So you can run all regular MSDOS programs without playing around with non-standard 3 1/2 inch disk drives.

### Close Up and Carry Anywhere

The Sharp PC 7000 packs the speed, power, and convenience of a desktop computer into a lightweight portable. Carry it anywhere.



Companion Printer
NLQ Dot Matrix: $359.

It comes with 320k RAM but can easily be expanded to a whopping 704k. This is more than enough to handle your large databases or spreadsheets. And, if you do alot of number crunching — drop in an 8087 math chip for extra power. Or get your PC 7000 the optional 1200 baud auto-dial, auto-answer internal modem. When you need a full size screen — get the optional CRT color adapter card. This card fits inside your PC 7000 and lets you use any standard external monochrome or RGB color monitor with your computer. This is it.

## Quantities are Limited. Order today.

### Critics' Corner

"The Sharp PC 7000 is an 18 pound package full of great surprises. An electroluminescent panel illuminates (backlights) the 25-line by 80-character crystal display — the result is easy readability in all lighting conditions."

"About the size of a double toaster..."

— *Pico Magazine*

"The Sharp PC 7000 is a well-built, quality portable...it has many...endearing touches."

"...this is the most readable LCD screen we have seen. It is backlit, and the contrast is adjustable for a wide range of lighting conditions."

"...comes with color emulation in shades of gray, so you can run color software on the LCD screen."

"...the Sharp PC 7000 is noticeably faster that the IBM PC running at standard speed."

— *Infoworld Magazine*

"Even more impressive was Sharp's $1795 PC 7000....Its LCD screen with electroluminescent backlighting is absolutely the best LCD-based display yet seen. It is fast, smear-free, and easy to read — perhaps the first LCD screen that would be comfortable to work on all day."

— *PC Magazine*

"...the PC 7000 is a strong alternative to either buying an additional computer for working at home, or carrying bulkier transportables home with you or on business trips."

— *Personal Computing*

### Why this Low, Low Price?

Wow! Now you can save big because Sharp is introducing a new portable called the *PC 7000A*. The difference between the PC 7000A and the PC 7000 is — the 7000A comes with a supertwist screen display. This makes it a bit more readable, but much more expensive.

You can see from the quotes here the Sharp 7000 has gotten rave reviews. It's a great portable with a super readable adjustable screen. It runs all popular IBM type software like Lotus 123, dBase III, Flight Simulator, and all the other favorites. However, a new model is coming so if you hurry, you can get one of the last few remaining Sharp PC 7000s from Central Computer for only $749.

To avoid disappointment, please order today. Remember quantities are limited. This is not a fire sale. The Sharp 7000 is not an orphan computer. The PC 7000A looks just like the PC 7000. Both share the same options including a portable printer, internal modem, and internal CRT color adapter. These will still be available for your PC 7000. Factory fresh. $749 price includes 90 day warranty and a rugged $79 travel case with generous side pockets free. Satisfaction guaranteed. Order today.

Price subject to change without notice. Quantities are limited. Order today.

Please enclose $25 freight per computer.

### Order Today

**Attention:**

Get this 320k $1795 computer for only $749. Price includes Sharp's 90 day warranty, our 30 day risk-free money back guarantee, and a free rugged $79 travel case. 704K model $819. Order today.

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## CA: 800-624-5628

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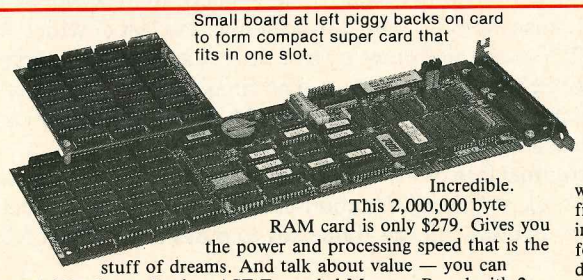


Small board at left piggy backs on card to form compact super card that fits in one slot.

## Step Into the Future
### with a Giant 2 Megabyte RAM Disk

# $279

- 2 megabytes per board
- Supports up to 8 megabytes
- Includes parallel port
- Includes serial port
- Includes games port
- Includes clock calendar
- Includes print buffering
- Intelligent Memory System
- Factory Installed DRAMs
- Lotus/Intel/Microsoft EMS
- Works in PC, XT, and AT
- One year factory warranty

Incredible. This 2,000,000 byte RAM card is only $279. Gives you the power and processing speed that is the stuff of dreams. And talk about value — you can spend $895 for an Intel or AST Expanded Memory Board with 2 megabytes and not get as much performance or as many extra software and hardware features.

FastCard makes the Kaypro PC perform 10 times better than an IBM PC AT on typical I/O operations. And that's not all. FastCard lets you use up to 8 megabytes of RAM with split memory mapping. That's right — use one FastCard with 2 megabytes of RAM or put four in your computer for an incredible 8 megabytes of RAM. Backfills memory on your motherboard too.

FastCard uses a unique disk caching technique for completely natural operations. So natural, all you notice is the incredible speed — screens snap into place — and searches are almost instantaneous when you have your programs and files in RAM. FastCard also includes custom password security features that you can enable or disable anytime, comes with big print buffering features, and built-in diagnosis and automatic fault tolerance capabilities.

Best of all, FastCard IV is fully compatible with the industry standard Lotus/Intel/Microsoft Expanded Memory Specifications (EMS). It also comes with a serial port, parallel port, game port, clock calendar with battery, setup instructions, manual, software, and one year warranty. Installation is super simple. All this for only $279. Satisfaction guaranteed or money back. Order today.

**Attention:** This is a special sale. Offer only good while quantities last. Price is subject to change. Please order today. $279. 30 day money back guarantee. Order with confidence. You will love the power of FastCard IV. Order today.

## *Kaypro PC MSDOS Software*

| Description | Price |
|---|---|
| **Accounting** | |
| Checks & Balances | $ 64 |
| DAC Easy GL, AR, AP | $ 45 |
| DAC Easy Payroll | $ 45 |
| Dollars & Sense | $135 |
| Home Inventory Plus | $ 37 |
| Managing the Market | $121 |
| Managing Your Money | $137 |
| One Write Plus | $199 |
| Winning Wall Street | $159 |
| **Business** | |
| Bottomline V | $199 |
| Decision Analyst | $ 79 |
| Landlord | $495 |
| MarketFax | $595 |
| NWA Statpak | $219 |
| Resume | $ 49 |
| Time Slips | $ 89 |
| Walonick StatPak | $429 |
| Walonick Forecast+ | $495 |
| Will Writer | $ 47 |
| **Communications** | |
| Carbon Copy | $159 |
| Crosstalk | $145 |
| Mirror | $ 55 |
| Mite | $ 49 |
| **Database** | |
| dBase II | $389 |
| dBase III Plus | $459 |
| Filebase | $ 99 |
| FYI 3000 Plus | $339 |
| InfoStar | $179 |
| Reflex | $119 |
| Reflex Workshop | $ 65 |
| Reflex & Workshop | $159 |
| VP Info | $ 79 |
| **DeskTop Publishing** | |
| Click Art Publisher | $149 |
| Desktop Publisher | $495 |
| NewsMaster | $ 89 |
| NewsRoom | $ 59 |
| **Educational** | |
| Art of Negotiating | $379 |
| Evelyn Wood Reading | $ 75 |
| Family Roots | $159 |
| I Ching | $ 29 |
| Language Tutor | $ 47 |
| Memory Tutor | $ 47 |
| Mind Prober | $ 45 |
| Mind Over Minors | $ 53 |
| The Word (Bible) | $179 |
| Typing Tutor III | $ 45 |
| Quiz Writer | $ 47 |
| **Entertainment** | |
| Ancient Art of War | $ 43 |
| ChessMaster 2000 | $ 45 |
| Flight Simulator | $ 45 |
| Jet | $ 45 |
| Karateka | $ 35 |
| Lotto Master | $ 25 |
| P. W. Teaches Chess | $ 79 |
| Wizard of Wall Street | $ 43 |
| **Graphics** | |
| Certificate Maker | $ 55 |
| Chart Master | $279 |
| Diagram Master | $259 |
| Dr. Halo | $ 89 |
| Energraphics | $279 |
| Fancy Font | $155 |
| Fontasy | $ 67 |
| Fontrix | $139 |
| FontStar | $ 49 |
| Form Tool | $ 89 |
| Generic Auto Dimen. | $ 45 |
| Generic CADD 2.0 | $ 87 |
| Generic Dot Plot | $ 25 |
| Graphtrix | $ 99 |
| MapMaster | $295 |
| PrintMaster | $ 49 |
| Art Gallery I | $ 39 |
| Art Gallery II | $ 29 |
| PrintShop | $ 55 |
| Graphics Disk 1 | $ 33 |
| Stella Bus. Graphics | $159 |
| **Integrated Software** | |
| Ability | $ 79 |
| Enrich | $279 |
| Framework II | $479 |
| PFS Write | $121 |
| Q&A | $279 |
| Symphony | $539 |
| **Languages** | |
| Let's C | $ 79 |
| Macro Assembler | $121 |
| Basic Compiler | $279 |
| Turbo Pascal w BCD | $ 89 |
| Turbo Tutor | $ 45 |
| Turbo Database | $ 65 |
| Turbo Gameworks | $ 65 |

— *continued next page*

## MSDOS Software

| Description | Price |
|---|---|
| Turbo Graphix TBox | $ 65 |
| Turbo Prolog | $ 89 |
| **Project Management** | |
| Harvard Project | $359 |
| Milestone | $ 95 |
| Super Project Plus | $359 |
| Timeline | $359 |
| **Utilities, General** | |
| Bookmark | $ 69 |
| Desqview | $ 89 |
| dFastest | $ 49 |
| DS Backup | $ 65 |
| DS Recover | $ 45 |
| DS Backup & Recover | $ 95 |
| FastPak Mail | $ 74 |
| Free Filer 5.0 | $ 79 |
| Homebase | $ 69 |
| Hot | $ 69 |
| Idea Generator | $159 |
| Keyworks | $ 79 |
| Little Black Book NCP | $ 75 |
| Media Master | $ 37 |
| Memory Typewriter | $ 39 |
| Note It | $ 69 |
| Poly Boost | $ 75 |
| Poly Windows Desk | $ 79 |
| PRD Plus | $ 65 |
| Pro Key | $109 |
| Print Q | $ 79 |
| SideKick | $ 69 |
| Sideways | $ 53 |
| SmartKey 5.11 | $ 59 |
| SmartNotes | $ 69 |
| SmartPath | $ 29 |
| SmartStuff | $ 59 |
| StarIndex | $ 89 |
| SuperKey | $ 65 |
| SuperSort | $127 |
| Twist & Shout | $ 31 |
| Uniform | $ 59 |
| **Utilities, Disk** | |
| Backup Master | $ 84 |
| Cubit | $ 45 |
| FastBack | $125 |
| Carousel | $ 45 |
| 1DIR | $ 79 |
| Disk Optimizer | $ 45 |
| Double Dos | $ 45 |
| Le Menu | $ 75 |
| Mace Utilities | $ 69 |
| Norton Commander | $ 69 |
| Norton Utilites | $ 79 |
| SQZ! | $ 69 |
| Xtree | $ 45 |
| **Spreadsheets** | |
| Javelin | $159 |
| Lotus 123 | $395 |
| Multiplan | $149 |
| Spreadsheet Auditor | $129 |
| SuperCalc3 | $295 |
| SuperCalc4 | $359 |
| Twin | $ 99 |
| VP-Planner | $ 84 |
| **Training** | |
| ATI dBase III | $ 57 |
| ATI Framework | $ 57 |
| ATI Lotus 123 | $ 57 |
| ATI MSDOS | $ 57 |
| ATI SuperCalc4 | $ 57 |
| ATI Word Perfect | $ 57 |
| DAC Acctng Tutor | $ 20 |
| Project Management | $ 65 |
| Using dBase III Video | $ 69 |
| Using DOS Video | $ 69 |
| Using Lotus 123 Video | $ 69 |
| **Word Processing** | |
| Grammatik II | $ 79 |
| MailMerge | $ 89 |
| Mathstar | $ 49 |
| Microsoft Word | $349 |
| Multimate | $359 |
| Number | $ 57 |
| Punctuation & Style | $ 95 |
| Ready | $ 89 |
| Reference Set | $ 79 |
| Thoughtline Outline | $ 59 |
| Turbo Word Wizard | $ 65 |
| Webster Writer | $121 |
| Wordfinder | $ 69 |
| Word Perfect | $279 |
| WP Library | $ 99 |
| WordStar 2000 | $349 |
| **Supplies** | |
| 3M SSDD Kaypro/Box | $ 12 |
| 3M DSDD Kaypro/Box | $ 14 |
| 3M Head Cleaning Kit | $ 21 |
| 3M KeyBd Static Mat | $ 34 |
| Board Disk Mailers/10 | $ 9 |
| 10 ft Parallel cable | $ 29 |
| 10 ft Serial cable | $ 23 |
| Smart Cable RS232 | $ 47 |
| Juki Printwheels | $ 19 |
| NEC ELF Thimbles | $ 22 |

## SmarTeam 1200AT Modem

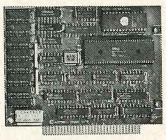
Features include: auto-answer, auto-dial. Touch tone or pulse. Switch selectable with auto speed selection. Varible speaker volume. 300-1200. Bell 103, 212A. 8 LED display indicators. Quality components throughout. 30 day risk-free trial. 2 year warranty. Order today.

**Attention:** SmarTeam 1200BH internal modem card. Same great quality and compatiblity. Just plug in. 100% Hayes compatibility and free Mite communications software: $159. Order today.

**SmartNotes** Like Post-It Notes? Put little electronic notes anywhere you want in your computer work. SmartNotes lets you stick notes on database records, spreadsheet cells, accounting records, directory listings, and even on any phrase or passage in your word processor. Capture an idea. Add supporting information anywhere. Works with all popular software. Lift up these electronic notes and toss them out anytime. Call or hide them from view anytime. $69.

## RUN 5MHz CP/M in Your PC

Plug this bargain priced half-size card into one of the open slots of your Kaypro PC or compatible. In seconds you can be running the CP/M software you have now 300% faster in your PC than in a regular CP/M computer.



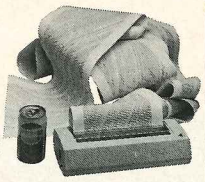
The Micro Interface RUN CP/M Z80 Co-Processor lets you share your PC hardware with CP/M software. Use PC ram resident programs like SideKick on top of CP/M programs. Operate CP/M programs from any floppy disk, ram section, or hard disk on your PC without resetting or exiting programs. Completely natural operation. It's just like putting a 5 MHz 64k Z80 computer in your PC. Run any CP/M software as is. Save software replacement costs. Does everything $595 co-processors do but only costs $195. One year warranty. Fully guaranteed. $195. Order today.

**Play the Lottery?** Lotto Master comes with a unique database that lets you track and analyze winning numbers. You may be able to use this information for projecting the future. Play and track more than one lottery at a time. It can also be altered so you can play any lottery up to 9/99. Test out numerous schemes at once. Super easy to use. Exciting. $25. Order today.

## Personal Computer Toolkit

This is the perfect PC Toolkit. It has all the tools needed to add peripherals, cards, and hard disks to your PC. Kit includes nut drivers, phillips and flat screwdrivers, tweezers, chip retriever and inserter extractors. Includes a black vinyl zipper case. $27. Order today.

## Hush 80 Portable Printer



This may be the world's quietest printer. You can see it is very small and prints up a storm. This is not a toy printer that uses flashlight batteries. It comes with a heavy duty internal rechargeable battery and weighs less than five pounds complete with internal 90 foot roll of thermal paper. $159 with rechargeable battery. $139 without rechargeable battery. Money back guarantee. Order today.

Includes 90 foot roll of 3M thermal-type paper • 90 day warranty • 100,000 characters between recharges • Bidirectional 80 CPS • 80 character line on 8 1/2 thermal paper • Comes with 2 foot cable • available in both parallel and serial versions. Specify computer type and interface. Extra paper: six 90ft rolls: $29. Auto adapter plugs into lighter: $13. Order today.

## Dynamic Disk Utilities

**Xtree.** Hard disk organizing program. Displays all subdirectories and files in a tree diagram. Zip around the whole tree with your cursor arrows. Call up, delete, view, move, list, copy, and print single or multiple files in any or all directories and subdirectories with the push of a key. Makes using your computer natural — no more cryptic DOS commands. $45.

**SmartPath.** Load programs from any directory on your disk drive without crashing. Put one copy of WordStar or any other program on your hard disk and use it from any directory. Works with copy protected software too. $29.

**Mace Utilities.** Unformat and read an accidentally formatted hard disk! Get back erased files, lock out bad sectors, reclaim files from unreadable disks, squeeze and sort directories, and condense files so they are contiguous. Powerful. $69.

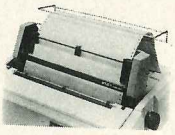
**Bookmark.** Memory-resident. Automatically takes a snapshot of RAM memory and saves it to a reserved area on the hard disk. Work in progress can be resumed within seconds after accidental reset, power down, or power failure. $69.

## Printer Buffer

"You didn't say enough good things about it."
— Robert Bruce
— Fort Worth, Texas

Works with any computer and printer • Reset button • Multi-copy repeat function • Auto diagnostics • Self-test • With cable • 90 day warranty • Satisfaction guaranteed •

## Kaypro Printer and Juki 6100 Tractor



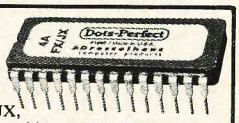
Bidirectional tractor with an exclusive anti-blacklash drive for precise positioning of continuous paper and clear printing. Tractor clips right on your printer. Totally mechanical and streamlined with few moving parts. Trouble free performance. Flips forward and up for easy loading. One year warranty. 30 day trial. Thousands sold. $125. Order today.

## Premium Tractors

| Tractor Descriptions † | Price |
|---|---|
| Diablo D-25 Bi-Directional | $195 |
| NEC Elf Uni-Directional | $ 87 |
| NEC Pinwriter P2 and P6 Bi-Directional | $149 |
| NEC Pinwriter P3 and P7 Bi-Directional | $164 |
| NEC Pinwriter P5 Bi-Directional | $167 |
| Toshiba 351 and 341 Bi-Directional | $179 |
| Toshiba 321 Bi-Directional | $ 95 |

† Firm money back guarantee and full warranties.

## Epson Upgrade




If you have an Epson MX, RX, JX, or FX printer — get this special attachment and do beautiful things just by touching a button. Dots Perfect is a smart hardware upgrade that gives your printer all the latest Epson printer enhancements and capabilities. Why buy a new printer? Upgrade it. $74. Order today.

**Attention: Okidate 82A and 83A users.** *PC Write* is a similar hardware upgrade that makes your printer a new machine too. $89. Order today.

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Please send me the items listed below. I want fast, friendly service. My check, money order, or credit card number is enclosed. Thank you.

| Description | Price |
|---|---|
| | |
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| | |
| | |
| Computer _____ Sub Total | |
| CA Resident 6% Tax | |
| Firm Money Back Guarantee Order With Confidence — Postage & Handling | $ 3.50 |
| Total | $ |

☐ Check ☐ Money Order

☐ Visa/MC # _____

☐ AMEX # _____

Exp. Date _____ Sig. _____

Name _____

Address _____

City _____ State ____ Zip ____

Credit Card phone orders accepted. **Call toll free.** To order by mail use coupon, letter, or photo copy.

## Seagate Hard Disk Kits for Kaypro PC

*Kaypro Uses Seagate and Western Digital*

**20 megabyte Seagate Kit.** You get a factory fresh Seagate 20 meg hard disk, Western Digital controller, and all necessary software. Includes park command. Boots off hard disk. $399. One year factory warranty.

**30 megabyte Seagate Kit.** Comes with a factory fresh Seagate 30 meg hard disk, Adaptec RLL controller, and all necessary software. Includes park command. Boots off hard disk. $499. One year factory warranty.

**Attention:** Save hundreds on hardware and installation fees. Central Computer will show you how with step by step instructions for easy at home or in office installation. Really easy. Order today.

## Slimline Data Switches

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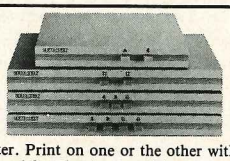

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# HAL: The Invisible Helper

Lotus 1-2-3 is one of those programs that has changed the way people work with computers. In particular, its widely imitated, top-line menu system largely supplanted more command-driven approaches to using a program. So it may come as something of a surprise that Lotus has introduced a new companion to 1-2-3, called HAL, that brings back an older way of working. More surprising still, it doesn't seem like a step backward.

Named after the friendly computer in *2001: A Space Odyssey*, HAL is a memory-resident program that works alongside any version of 1-2-3, providing an alternative to 1-2-3's top-line menu. It remains invisible—except for the word HAL highlighted at the bottom of the screen—until the user summons it by pressing the backslash key. Then it opens up a Request Box at the top of the screen so the user can type in requests (English-like commands) to do Lotus' work. The user can either call upon HAL intermittently and then return to 1-2-3 or keep the HAL Request Box on the screen continuously.

What kinds of requests could you make? Here are a couple of simple ones that could have been used with the spreadsheet in the accompanying tutorial.

•Instead of typing in the name of a month at the top of each column, you could issue the following request to HAL:

**PUT JAN THRU JUN ACROSS**

•Instead of painstakingly defining the formulas for each column, you could tell HAL:

**TOTAL JAN THRU JUN**

In each case the HAL command saves numerous keystrokes and greatly simplifies a task.

New users will find HAL an invaluable assistant, but HAL is not just for beginners. It brings significant new capabilities that Lotus-users at every level will appreciate.

## The UNDO command

Perhaps the single most important new feature HAL adds to 1-2-3 is an UNDO command. UNDO (activated by the backspace key) will reverse the effects of the last command executed, whether it was issued directly from 1-2-3 or with the HAL Request Box. Its primary use is for recovering from dumb mistakes. Suppose, for example, you're working on one spreadsheet and you issue the command to retrieve another one without saving the first. UNDO will bring back the old one so you can save it.

But UNDO can also be used as a positive tool. Suppose you're playing around with projections and you want to see how an increase in income in one category will affect an overall budget. You can change one cell temporarily, look at the results, then UNDO them to get back to your original figures.

## Old features made more accessible

The name 1-2-3 stands for the three application areas of the program: spreadsheets, graphs, and data bases. Before HAL, a user who hoped to make graphs or access data base features had to invest a considerable amount of time learning the ropes. Even for experienced users, designing a graph or searching a data base were cumbersome tasks. With HAL, instead of building a graph by painstakingly defining data areas, you can issue this two-word command:

**GRAPH THIS**

That does two things. It makes it easier for a beginner to design a graph in the first place, and it makes it more likely that a user at any level will take the trouble to bother with graphs. The same thing applies to 1-2-3's data base features.

## Spreadsheet documentation

Spreadsheets can easily get big and unwieldy. Before long you don't know anymore where figures came from or what's included in which calculation. HAL brings a number of spreadsheet documentation and audit features to 1-2-3. There are HAL commands to list the formulas or the relationships in a spreadsheet and to highlight precedences and dependencies for formulas.

## Advanced capabilities

HAL also comes with a number of tools and capabilities that will permit advanced users and programmers to build better applications. For one thing, HAL lets you build dynamic links between spreadsheets so that changes in one will be reflected in the other.

For another, HAL lets you record transcripts of a 1-2-3 session. Transcripts are ASCII text files (1-2-3 .PRN files) that contain on separate lines each of the commands issued in Lotus while the transcript recorder was on. They can be used as documentation of what went on in a particular session, or they can be edited and used to build macros (a series of commands assigned to a single keystroke). HAL also lets you define your own commands, called synonyms. You can, for example, define "PAYABLES" to mean "sort and then give me the ones with balance > 0."

## The catch

There is a lot more to HAL than we've gone into: a find-and-replace command, commands for projecting, incrementing, and decreasing cell values—the list could go on and on.

But as you may have suspected, there is a price to pay for all these features. As the Lotus people tell the retailers, "HAL will help you make memory upgrade sales." Indeed it will. It takes a minimum of 512K to run HAL and Lotus. And that doesn't count the spreadsheet.

In conclusion, if 1-2-3 has changed the way people use computers, it's safe to say that HAL will at the very least change the way people work with 1-2-3.

*(continued from page 57)*

the top of the screen just below the Status Line. Then when you hit the Enter key, they show up in the cell with the pointer.

Now let's enter a number. The instructions are similar.

1. Move the pointer to cell B5.
2. Type **300 <Enter>**

The same thing happens with numbers. First the digits appear above, then when you hit the Enter key, they show up in the cell with the pointer.

With both labels and numbers you just start typing, and Lotus figures out what you're entering. If the first character is a letter, Lotus assumes it's a label and sticks it into the cell left-justified. If it's a digit, Lotus assumes you want a number and right-justifies it. You can put anything in a label, but Lotus is very strict about numbers. You can't use commas or dollar signs, and you can't use lower-case L's and upper-case O's instead of ones and zeros.

Later you'll learn how to change the way labels and numbers are displayed. But for now you know enough to fill in the rest of the spreadsheet except for the total row. Then you'll be ready to learn about formulas.

If you make a mistake while entering information, just start over. If you haven't hit the Enter key yet, hit the Escape key instead and start retyping. If you've already entered the information, re-enter it.

## Entering formulas

To do calculations, Lotus needs to know three things: what numbers to calculate, how to calculate them (add, subtract, multiply, or divide), and where to display the results. You tell it "what" and "how" with a formula. You tell it "where" by sticking the formula in that cell.

In our spreadsheet, you need to total the expenses for January (the contents of cells B5, B6, B7, and B8) and display the total in cell B10. The formula for that is:

**+B5+B6+B7+B8**

You could type it in as you did with numbers and labels, but Lotus has an even easier way. You can use the pointer to indicate the cells in the formula. Try it.

1. Move the pointer to cell B10.
2. Type: + (tells Lotus you're starting a formula).
3. Move the pointer to cell B5 to select the first cell in the formula.
4. Type: + (the next arithmetic operator).
5. Move the pointer to the second cell in the formula (B6).
6. Type: +
7. Move the pointer to the third cell in the formula (B7).
8. Type: +
9. Move the pointer to the last cell in the formula (B8).
10. Complete the formula by hitting the **Enter** key.

If you did it right, the number **1250** should appear in cell B10. If it didn't work, try doing it again.

As you can see, Lotus handles formulas differently from numbers and labels. Instead of displaying the formula in the cell, it uses the formula to perform a calculation and displays the result. The formula is dynamic. If the value of one of the cells in the formula changes, Lotus will recalculate and display a new result. Why don't you test that? Move to cell B5 and type in the number **1000**. The total in B10 will reflect the change.

You can construct any kind of formula in this way. It's simply a matter of starting with a mathematical operator [a formula must start with one of the following characters: +, -, *, /, (, or @], and then pointing and entering other operators until the formula is complete.

Try entering the formulas for March and April in cells C10 and D10, respectively, using the same technique.

## Entering formulas: using functions

For the formulas in cells B10 through D10, we pointed directly to each cell we wanted included in the calculation. That's okay for a small spreadsheet like this one. But what if you wanted to total a 52-row column? Shouldn't there be an easier way? Yes.

Lotus has a number of functions that contain built-in instructions for special financial and mathematical calculations. We can't possibly cover them in this tutorial, but there is one that we could use right now. It's called the @sum() function, and it totals up all the cells in a specified range (or group) of cells. Because it works with a range, we don't have to point to each cell, only the first and last cells in the range.

The @sum() function looks like a typical Lotus function. It starts with the "at" sign (@) located above the number 2 at the top of the keyboard, and it ends with parentheses inside which we will put the range of numbers we want totaled. Let's use it to enter a formula into E10 that will total the cells from E5 through E8. The formula will be **@sum(E5..E8)**. Again, we could type it in by hand, or we could use the pointer to indicate the range. Let's do the latter.

1. Move the pointer to the cell where the result is to be displayed.
2. Type **@sum(** (begins the function).
3. Move the pointer to the first cell to be included in the calculation.
4. Type **.** (tacks down the pointer to start the range)
5. Move the pointer to the last cell to be included in the calculation.
6. Type **)** (completes the function).
7. Hit the **Enter** key.

Getting the hang of defining ranges with the pointer can be tricky, so you may need to try it again. Once you've got it right, use the same technique to enter formulas for May and June. Then you're ready to save the spreadsheet.

## Saving and retrieving spreadsheets with the Lotus menu

Lotus has a host of commands you haven't even seen yet. They're stored on a menu that appears at the top of the screen when you hit the slash key (/), the one under the question mark. Hit it now, and the menu will appear. To make it disappear, hit the Escape key. Now let's explore it further.

Display the menu again. It consists of two lines. The first one has the actual menu choices. The second one explains somewhat cryptically what the highlighted choice leads to. You can move the pointer around the menu by using the arrow keys. As you do so, the explanation on the second line changes. Selecting commands from the Lotus menu generally involves moving through several levels of the menu system. You can select a menu choice by hitting the Enter key when the choice is highlighted or by typing the first letter of the menu choice, and

you can generally back off from a choice by hitting the Escape key.

Now you're going to use the menu to save the spreadsheet you just created. Why do you need to save it? Right now it's in the computer's temporary memory, but when you turn off the computer it will be forgotten. To save it permanently you have to save it in a file on a disk—either a floppy disk or the hard disk—and that involves naming it as well. You can use up to eight letters or numbers (no spaces) for the file name. (Lotus automatically tacks on ".WKS" or ".WK1" for worksheet, depending on which version of Lotus you're using.)

To save the worksheet the first time, start by hitting the Escape key until the menu disappears entirely. Then follow the steps below.

1. Type / (displays the menu).
2. Type **F** (selects the File menu option).
3. Type **S** (selects the Save menu option).
4. If you have a two-floppy system, type **b:budget87** (the name we are giving the file); otherwise type **budget87**
5. Hit the **Enter** key.

If you try to save it a second time under the same name, Lotus warns you that there is already a file with that name on the disk and that you're about to replace it with the version currently in memory. Normally you'll want to do that. Here are the steps for saving the file a second time.

1. Follow steps 1-5 above.
2. Type **R** (selects the Replace option).

The point of saving a spreadsheet is to have it around for future use. When you're ready to use it again, you'll need to get it from the disk and bring it into memory using the File Retrieve option on the Lotus menu.

In the the next series of steps you'll learn how to exit Lotus and then how to retrieve the spreadsheet next time you come back in.

To exit Lotus:

1. Type /
2. Type **Q** (selects the Quit menu option).
3. Type **Y** (confirms that you want to quit).

Now get back into Lotus using the instructions on page 57 and retrieve the budget spreadsheet. If you're using a hard disk you have it easy. Here's what you do:

1. Type /
2. Type **F** (selects the File menu option).
3. Type **R** (selects the Retrieve menu option).
4. Move the pointer until the spreadsheet you want is highlighed.
5. Hit the **Enter** key.

If you're using two floppies, you have to tell Lotus to look on the B drive first. Once at the beginning of each session, use the following command sequence to change the directory. Then you can use the steps above to retrieve your file.

1. Type /
2. Type **F** (selects the File menu option).
3. Type **D** (selects the Directory menu option).
4. Type **B:** (selects the B drive directory).
5. Hit the **Enter** key.

## Getting fancy: aligning and formatting

You could leave the spreadsheet as is. But Lotus has a number of options for refining the display of labels and numbers.

**FIGURE 1: Personal Budget Spreadsheet**

| | A | B | C | D | E | F | G | H |
|---|---|---|---|---|---|---|---|---|
| 1 | BUDGET | | | | | | | |
| 2 | | | | | | | | |
| 3 | EXPENSES | January | February | March | April | May | June | |
| 4 | | | | | | | | |
| 5 | Food | 300 | 300 | 300 | 300 | 300 | 300 | |
| 6 | Housing | 600 | 600 | 600 | 400 | 400 | 400 | |
| 7 | Clothes | 200 | 200 | 200 | 200 | 200 | 200 | |
| 8 | Travel | 150 | 150 | 150 | 150 | 150 | 1,000 | |
| 9 | | | | | | | | |
| 10 | TOTAL | $1,250 | $1,250 | $1,250 | $1,050 | $1,050 | $1,900 | |

If you look at the column headings across row 3, you'll notice they don't all sit nicely over the numbers below them. January and February aren't so bad, but the rest sit too far to the left. That's because they're all left-justified. If we right-justified them, they'd look better. We'll do that using a Range command on the Lotus menu.

Here are the steps for right-justifying the names of the months:

1. Move the pointer to the beginning of the range you want to right-justify (in this case, B3).
2. Type /
3. Type **R** (selects the Range menu option).
4. Type **L** (selects the Label option).
5. Type **R** (selects Right-justified).
6. Type . (tags down the beginning of the range).
7. Move the pointer to the end of the range (in this case, G3).
8. Hit the **Enter** key.

Now let's format the numbers in the spreadsheet. It would be nice to have commas in numbers over a thousand and dollar signs in the total figures. Lotus won't let you type them into number cells, but you can format them so they'll display that way.

Format the totals first using the Format option on the Range menu. Here are the steps.

1. Move the pointer to the beginning of the range you want to format.
2. Type /
3. Type **R** (selects the Range menu option).
4. Type **F** (selects the Format option).
5. Type **C** (selects Currency format).
6. Type **0 <Enter>** (selects zero decimal places).
7. Type . (tags down the beginning of the range).
8. Move the pointer to the end of the range.
9. Hit the **Enter** key.

There's one more thing to fix: the numbers that need commas. So far we've talked about ranges that are one column wide or one row deep, but ranges can be rectangular too, taking in cells from several adjacent columns and rows. The range you need to format this time extends from B5 to G8.

Follow the steps you used last time, but this time select the comma format by typing , instead of **C** and indicate a different range.

## Printing

Now you're ready to print. Lotus has many print options—for example, you can set margins or change the character font your

printer uses—but minimally, printing involves two things: defining a range to print and then printing.

Make sure your printer is on, and then issue the following series of commands to define the range and then print.

1. Type /
3. Type **P** (selects the Print menu option).
4. Type **P** (select the printer for output).
5. Type **R** (selects the Range option).
6. Move the pointer to the beginning of the range you want to print (in this case use the Home key to go to A1).
7. Type . (tags down the beginning of the range).
8. Move the pointer to the end of the range (in this case G10).
9. Hit the **Enter** key.
10. Type **G** (starts printing).
11. When you're done printing, hit the **Escape** key *twice* to make the menu disappear.

## Going further

You haven't learned all there is to know about Lotus, but you've got the basics. Here are some suggestions for going further on your own.

•Add columns to the right for July through December. You could even add a total column that adds across for each category.

If you do that, the spreadsheet won't fit on one sheet of letter-size paper anymore. Lotus will automatically print the spreadsheet in separate sections for you, but you have other alternatives: you can use wider paper, use a smaller font, or print the spreadsheet a range at a time. To do either of the first two, use the Print Options Menu (/PPO) to change the right margin setting and the setup code sent to your printer to change fonts.

•This budget only has expense figures. Design an income section above or below the expense section to enter various sources of income. Then you could calculate the net balance (income minus expenses) for each month. To insert rows at the top, use the Worksheet Insert command (\WIR).

•Play around with the figures to see how a change in one category or month affects the overall financial picture. Always save the spreadsheet one more time before you start making such changes, so you have something to go back to. If you like the new version of the budget, save it again under a new name so you'll have both versions.

While you're doing all this, you can get help from Lotus. Wherever you are in the spreadsheet or menu system, hit Function key 1 (F1) to bring up a context-sensitive help screen. Use the pointer to explore topics and then hit the Escape key to get back to your work.

---

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*(continued from page 42)*

*ITPOPN* (Flag)— Turns page-numbering on or off. The standard setting is 00h, which causes page numbers to be printed, unless you specify otherwise with a dot command. Patch this byte to FFh if you want the default to be no page numbers, as you might for letters or short pieces.

*ITMIJ* (Flag)— Turns micro-justification on or off. Micro-justification deals only with spaces between words; it is not the same as proportional spacing. If your printer is installed to do incremental spacing (usually 1/120") and micro-justification is on, then WordStar uses incremental spacing between words when justifying a line. If micro-justification is off, WordStar inserts only whole spaces between words to justify a line. If your printer is installed as a teletype printer, WordStar won't micro-justify.

Supposedly, your printer will run faster if micro-justification is off. I haven't noticed much difference.

*FNWSCM* (String)— Stores the name of the WordStar COM file, usually WS.COM. This string determines what file name WordStar looks for when it returns after executing another program via the R command. If you are using DDT rather than the WordStar installation program, and you want to rename WS.COM, you must change the string stored here to match the new name. Use the ASCII character table in your *Kaypro User's Guide* to find the hexadecimal equivalents of the letters you need. There are 11 bytes here: the last three for the filetype (COM) and the first eight for the file name. There's no period between the file name and filetype, and the unused bytes in the file name must be set to spaces (20h).

*AUTOBS* (Table)— Defines characters for auto-backspace operation. Here you can insert up to 10 characters for auto-backspace. When WordStar finds one of these characters in your text, it will follow it immediately with a backspace so that the next character will be printed on top of the auto-backspace character. You can use this trick to print accent marks over letters or slashes through zeroes, for example. The last (11th) byte in this table must always be 00h, to signal the end of the table. Otherwise, disaster.

*VTAB* (Strings)— Starting at VTAB, you'll find a table of the various key combinations for WordStar's editing commands. Each table entry is four bytes—the first two for the command characters (the second will be 00h for a one-character command) and the last two for the address of the routine that executes the command. Ordinarily, you'll have no reason to change these, but you might want to try one change. I find it too easy to hit ^Y instead of ^T and delete a line instead of a word. So I patched the two bytes at 054Dh in WordStar 3.3 (0535h in WordStar 3.0) from 19h 00h to 19h 19h.

Now I have to hit ^Y^Y to delete a line instead of just ^Y. I lose a little speed, but I gain insurance against accidents.

*BLDSTR* (Value)— Sets the number of strikes used for boldface (^PB). It should be set to 02h if you have a daisywheel printer that uses incremental spacing to create boldface. You can set it higher on a standard (teletype) printer to create a darker image. (These printers don't do incremental spacing; they just type the character several times in the same place.)

*DBLSTR* (Value)— Sets the number of strikes used to create double-strike (^PD). Daisywheel printers don't use incremental spacing on double-strike, so you can set this value higher to get a darker character.

*PALT* (String)— Causes printer to change to an alternate character width (^PA)—for non-daisywheel printers only. For daisywheel printers, leave this string empty. If your printer can change pitch (character width) but is installed as a standard (teletype) printer, you can patch this and the following label with the command strings to control pitch changes. Proceed with caution.

*PSTD* (String)— Causes printer to return to standard character width (^PN)—for non-daisywheel printers only. See comments and cautions at PALT.

*USR1, USR2, USR3, USR4* (Strings)— Provides space for user-defined printer commands. At these four labels, you may patch in printer command strings that will let you use special features of your printer. These strings are sent to the printer when WordStar encounters ^PQ (USR1), ^PW (USR2), ^PE (USR3), or ^PR (USR4) in your text. Each label has space for five bytes—the first byte for a character count of the following string and the next four bytes for the string itself. Do not overrun the patch area, and be sure to test these new functions carefully.

*Printers epitomize McHolm's Law: They think they're the center of the universe.*

*RIBBON, RIBOFF* (Strings)— Causes printer to change ribbon color, if installed. Often installed even when printers can't execute the command. The print command ^PY toggles between these two strings. At its first encounter with ^PY, WordStar will send the string at RIBBON to the printer. At the second encounter, it will send the string at RIBOFF. At the third, the string at RIBBON again, and so on. If your printer can't change ribbon color, or you don't care if it does, you can use these strings for another printer function. If you patch RIBBON, you must patch RIBOFF also.

*PSINIT* (String)— Sends commands to get printer ready for printing. This string is set up for your printer by the WordStar installation program, but you may want to add to it or change it. It is sent at the start of printing and should always contain at least a carriage return (0Dh).

*PSFINI* (String)— Sends commands to return printer to its normal state once printing is done. This string is sent when printing is complete in order to undo any unusual settings made by PSINIT. It is often empty.

*SOCHR* (Character)— Defines the character to be used for strikeout command (^PX). This byte is normally set to 2Dh, the hyphen character, but you can change it to any character you like. Patch it to 2Fh to use the slash (/) for strikeouts.

## The wonderful world of printers

Printers cause more grief than any other computer peripheral because they epitomize McHolm's Law—"Every piece of computer equipment thinks it's the center of the universe." So when installing printers for WordStar, manufacturers and salespeople usually do it the simplest possible way: standard or

# Using MS-DOS DEBUG to Patch WordStar

If you want to patch your MS-DOS version of WordStar, you can use either the WordStar installation program, WINSTALL, or the MS-DOS patching program, DEBUG. WINSTALL is easier to use, but DEBUG is faster and more flexible. And fortunately for MS-DOS users, DEBUG is easier to use than its CP/M cousin, DDT, because you don't have to mess with CP/M's wretched SAVE command.

To patch WordStar using DEBUG, you must:

1) load DEBUG and WS.COM into your computer's memory;

2) patch a new value into the copy of WS.COM now in memory (repeat as many times as necessary);

3) save the modified WS.COM to disk and exit DEBUG.

*DEBUG doesn't show the beginning and ending addresses for WS.COM, but don't worry—you won't need them.*

Note that you're patching a *copy* of WS.COM that exists only in the computer's memory, so the changes you make don't become permanent until you save them to the disk. If you want to cancel a patching session at any time, just exit DEBUG without saving, by entering **Q** at DEBUG's prompt.

Suppose you want to change the default help level of WordStar from level 3 to level 0. Here's what you do:

*Load DEBUG and WS.COM.* Move an experimental copy of WordStar and a copy of DEBUG into a separate "patching" directory or onto a separate disk. (Never experiment with your main working copy of WordStar, and never ever work on your WordStar master disk.)

At the MS-DOS system prompt, enter **DEBUG WS.COM** and press the **Enter** key. DEBUG will load itself, load WS.COM, and then present you with its terse hyphen prompt:

**C>DEBUG WS.COM <Enter>**

The hyphen prompt indicates that DEBUG is waiting for your command.

If you've used CP/M's DDT debugger, you'll notice that DEBUG doesn't show you the beginning and ending addresses for WS.COM, but don't worry—you won't need them.

All numbers from here on are going to be hexadecimal numbers.

*Patch a New Value into WS.COM.* You can find the patch point for WordStar's initial help level by looking up label ITHELP in the accompanying table of patch points (on pages 44-49). The table will tell you that in MS-DOS WordStar 3.31, the address for ITHELP is 0360h. To change the initial help level to 0, you need to insert the value 00h at this address, so at DEBUG's hyphen prompt, enter the following:

**-E 0360 00 <Enter>**

DEBUG will make the change you ordered and return with its hyphen prompt again so that you can make more changes if you want to.

If you want to see what you've done, you can use DEBUG's D command to display part of memory. To display the memory starting at address 0360h, enter the following at the hyphen prompt:

**-D 0360 <Enter>**

DEBUG will show you 128 bytes of memory starting at the address you specified. These bytes will be arranged in eight rows of 16 bytes each (hexadecimal numbers, remember). At the left end of each row is an eight-digit hexadecimal number that gives the address of the first byte in that row. For our purposes, you can ignore the left four digits and just look at the rightmost four, which in the present case should be 0360 in the top row, the address of ITHELP.

*Save Changes and Exit DEBUG.* Once you have made all the changes you want for this session, you must save the modified WS.COM to the disk. With DEBUG, this save is wonderfully easy—at the hyphen prompt, just enter:

**-W <Enter>**

DEBUG will write the patched WS.COM to a disk file and return to its hyphen prompt.

To exit DEBUG once you have saved your patched WordStar, enter the following at the hyphen prompt:

**-Q <Enter>**

DEBUG will quit, returning you to the MS-DOS system prompt.

After you've patched and saved WS.COM, test it thoroughly before you replace your current working copy.

**—T. Silveira**

teletype printer, no communications protocol, primary list device printer driver. Unfortunately, this installation sets printer technology back 15 years, treating every printer as a clunky teletype and every communications channel as a one-way street. The following patches will help bring your printer into the 1980s.

## Installing Juki and NEC printers

If you have one of the daisywheel printers sold by Kaypro in 1985 and early 1986 (really a Juki 6100), you can make a very simple improvement by installing it as a Diablo 630—use the printer menu in the WordStar installation program. This daisywheel printer and many others (Brother, Silver Reed, Daisywriter 2000, DTC) understand most of the Diablo 630 command set for boldfacing, incremental spacing, and other tricks.

After the first quarter of 1986 the daisywheel printer sold by Kaypro was really a NEC ELF. To get the best performance out of it, you should install it as a NEC 2015/3515/7715 using WordStar's printer menu in the installation program. The dip switches on the printer itself should have switches 1, 2, and 3 set to ON; the rest should be set OFF.

## A patch for parallel printers

Most people now seem to have printers that use a parallel interface. Because Kaypros come with the parallel port assigned as the primary CP/M list device, it's dead easy to use WordStar with a parallel printer. You just plug-and-go, if you're content using the basic WordStar printer installation: standard printer, no protocol, list-device driver. But if you try to edit one file while printing another, you'll face many annoying delays and lose characters from the keyboard.

The problem with this installation is that WordStar has no way to know when the printer is busy and when it's ready for more characters. The solution is to install a "printer-busy test" routine in the area labeled MORPAT. To make sure there's room for this routine, load DDT and WS.COM. At DDT's hyphen prompt type:

**D0310 <RTN>**

This command tells DDT to display part of WordStar starting at address 0310h (which is inside the MORPAT area for both WordStar 3.3 and 3.0). In response, DDT should show you something like this:

```
0310 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
0320 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
.
.
.
```

It will show you more lines than I have, but as long as you have two lines of 00h at 0310h and 0320h, you're set to go. Patch in the following 26 bytes:

**E5h D5h 21h 10h 03h 11h 17h 00h 19h D1h**
**E3h E5h D5h 2Ah 01h 00h 11h 2Ah 00h 19h**
**D1h E3h C9h DEh 01h C9h**

Check your entries *carefully*; then check them again. When you're sure they're right, patch label HAVBSY from 00h to FFh. This change tells WordStar you now have a busy routine.

Finally, at LIBSY, patch in the following bytes:

**C3h 10h 03h**

Now you're done. These bytes tell WordStar to jump (C3h) to address 0310h to find the busy routine. When you patch an actual address (like 0310h) into a program, you must always put the low byte (the two right digits, 10 in this case) first, followed by the high byte (the two left digits, 03 in this case). It seems screwy, but that's the way your computer wants it to be.

If you didn't find two empty lines of 00h at address 0310h, you'll have to find another empty place in MORPAT. Use DDT's D command and start at the beginning address of MORPAT. When you find 26 bytes of empty space, note the starting address. Substitute this address for the fourth and fifth bytes in the busy patch itself and for the second and third bytes in the patch at LIBSY. Remember to reverse the two bytes of the address—*low* byte first, *high* byte second.

Test this patch carefully. You should find that editing one file while printing another file is less frustrating now. It's still possible to bog down the system by hammering on one or two keys as fast as you can, but under normal conditions all should run smoothly.

## Installing a serial printer

There are still many serial interface printers around, particularly among the high-quality daisywheels—NEC Spinwriter, Diablo 630, and so on. To get the best performance from these serial printers, especially when editing one file while printing another, you should set WordStar to use its serial port driver.

In this case, it's easier to use the WordStar installation program than DDT. At the printer installation menu, choose your printer type. Next, choose a communications protocol—X-ON/X-OFF if your printer can handle it. That brings you to the driver menu. Choose the driver labeled "Direct I/O to 8-bit ports" or "Port driver." The installation program will then ask you a series of questions; your answers, in hexadecimal, are as follows:

```
Output port = 0Ch
Output status port = 0Eh
Bits which change when ready to output character = 04h
Bits which change from 0 to 1 = 04h
Input port = 0Ch
Input status port = 0Eh
Bits which change when ready to input character = 01h
Bits which change from 0 to 1 = 01h
```

These answers apply to the serial printer port on '84 model Kaypros, which also have a separate serial data/modem port.

Pre-'84 model Kaypros have only one serial port, which the printer and the modem must share. On these models, the output port is 04h, the output status port 06h, the input port 04h, and the input status port 06h. Everything else is the same.

If you install your serial printer using this port driver, you'll find it much easier to edit one file while printing another.

## Patches for dot-matrix printers

Because dot-matrix printers are usually installed as dumb

teletype printers, they never get to show what they can do—condensed print, expanded print, and so on. The problem is that WordStar knows nothing about the codes that control these features. The solution is to use the patch codes for your particular printer.

As it happens, WordStar has some slots you can use for these codes, at labels PSTD, PALT, RIBBON, RIBOFF, ROLUP, ROLDOW, USR1, USR2, USR3, and USR4. All these labels take strings, and all can be patched with DDT. If you have WordStar 3.3, you can also get at all these labels directly through the WINSTALL installation menu, choice B, Custom Installation of Printers.

Here's a sample of how you might install an Epson FX80, set as a standard or teletype printer (POSMTH = FFh or 00h):

•*PALT (^PA)*— Condensed printing (about 17 characters per inch) is useful for printing anything wider than normal. To have condensed print as the alternate pitch, patch in these bytes at PALT:

**01h 0Fh**

Now ^PA will turn on condensed printing. You can turn it off with ^PN.

•*PSTD (^PN)*— To use ^PN to cancel condensed printing and return to your default print pitch, patch in these bytes:

**01h 12h**

•*USR1 (^PQ)*— Let's use double-wide printing, too. Double-wide printing requires one string to turn it on and another string to turn it off. To turn it on, patch USR1 with these bytes:

**03h 1Bh 57h 01h**

When you enter ^PQ, you'll get characters twice the width of the current print pitch.

•*USR2 (^PW)*— To turn double-wide print off, patch USR2 with these bytes:

**03h 1Bh 57h 00h**

Now you can enter ^PW to turn off double-wide printing and revert to your previous print pitch.

•*RIBBON (^PY)*— Continuous underlining is nice because it also underlines spaces, unlike WordStar's usual underlining. I chose ^PY for continuous underlining because it's a toggle—the first time it sends the string at RIBBON, the next time it sends the string at RIBOFF, the third time the string at RIBBON again, and so forth. If you use RIBBON to turn continuous underlining on and RIBOFF to turn it off, you can use ^PY just like ^PS—one entry to start it and the next to stop. At RIBBON, patch in these bytes:

**03h 1Bh 2Dh 31h**

•*RIBOFF (^PY)*— To turn off continuous underlining, patch RIBOFF with these bytes:

**03h 1Bh 2Dh 30h**

Remember, the first ^PY turns continuous underlining on, and the next turns it off.

There's one catch—you must turn the continuous underlining off at the end of each line. Even if you want the underlining to carry over from one line to the next, you must stop it at the end of each line and restart it at the beginning of the next. If you don't, the printer will underline through your left margin (that's why it's called *continuous* underlining).

•*ROLUP (^PT)*— ROLUP and its companion ROLDOW normally roll the paper up or down a half-line to print superscripts and subscripts. The Epson printer has its own reduced-size super- and subscripts that don't require moving the paper, but in manuscripts, for example, it's sometimes better to have the full-size versions. To install full-size superscripts, patch in these bytes at ROLUP:

**03h 1Bh 6Ah 0Eh**

Now any characters bracketed by ^PT will be printed as normal size superscripts, half a line above the normal line.

•*ROLDOW (^PV)*— To get full-size subscripts, patch in these bytes at ROLDOW:

**03h 1Bh 4Ah 0Eh**

Any characters bracketed by ^PV will be printed as subscripts in the current print pitch. Like RIBBON and RIBOFF, ROLUP and ROLDOW are a pair. If you patch one, you must patch the other.

•*USR3 (^PE)*— We're running out of slots, but the Epson can still do more. So at USR3, patch in these bytes:

**01h 1Bh**

Now wherever you enter ^PE in your text, WordStar will send the ESCape character (1Bh) to the printer. By itself, ESCape does nothing, but the printer will take it *and the following character* as a command. So if you enter ^PEE in your text, the printer will see it as <ESCAPE> E (1Bh 45h), which turns on emphasized printing. If you enter ^PEF, the printer will see it as <ESCAPE> F (1Bh 46h), which turns off emphasized printing.

This trick lets you use any two-character escape string without patching it into WordStar beforehand, but it has two drawbacks. First, WordStar won't count ^PE as a character, but will count the following character, even though it won't be printed. That will mess up a justified right margin. (The solution is to insert these characters after formatting your text.) Second, you can only use this trick for a two-character command string, not a three-character one.

•*USR4 (^PR)*— There's one slot left, USR4, controlled by ^PR. I'll leave this one for you.

If you have an Okidata, NEC, or C. Itoh dot-matrix printer, you'll find that it doesn't use the same codes as the Epson. You'll also find that your printer may not have some features that the Epson does (such as italics), while it does have some that the Epson lacks (such as a special serif typeface). You can still use this sample installation as a model for doing your own, and your printer manual should tell you what features you have available and what codes control them.

## Almost the last word

Though the patches I've covered have all been used successfully by various people, some just may not work for you—there's just no way to test every possible combination of patches in every possible situation on every possible pairing of computers and printers. That's why you test everything before you try it on your irreplaceable files. That's also why you shouldn't expect MicroPro to bail you out if something doesn't work.

*Ted Silveira is a contributing editor for* PROFILES *and a freelance writer and editor based in Santa Cruz, California.*

# Tip Trader

edited by Marshall L. Moseley

*Found a shortcut? Solved a nagging problem? Discovered an easier way to do something? If you have and you'd like to share your tip with other readers, please send it to Marshall Moseley, "Tip Trader" editor, PROFILES Magazine, 533 Stevens Avenue, Solana Beach, CA 92075.*

---

This month I'll describe a new way to create a menu system, a use of the PATH command, and a batch file to send a form feed to the printer. *PROFILES* readers will tell you how to install dBASE II for some older Kaypros, fix intermittent problems with CP/M Kaypro power supplies, avoid falling into a subroutine without using GOTO in BASIC, and make room to recover from a full-disk message.

## Menus with batch files

In the past I have set up computers for people who do not want to learn how to use their operating system. They simply want access to their data base, spreadsheet, or whatever, and don't want to be bothered with this "see-prompt" nonsense. So be it. In these cases I have set up extensive menu systems using batch files.

This method involves the creative use of the MS-DOS commands TYPE and PROMPT. As an example, assume you want to create a menu with two options, word processing and data base management.

Begin by creating a text file using EDLIN or WordStar's non-document mode. Call it MENU.TXT. This file should contain the text of the menu you desire. For example:

```
Main Menu
1. Word Processing
2. Data Base Management
```

Next, create a batch file called 1.BAT containing the commands to invoke your word processor, and another called 2.BAT with commands to start your data base program.

Now, write an AUTOEXEC.BAT file that looks like this:

```
ECHO OFF
CLS
PROMPT Enter Choice—}
TYPE MENU.TXT
```

When the AUTOEXEC file executes, it will clear the screen (CLS) and then change the system prompt so that the prompt requests the user to enter the number of his or her choice. (Do not use the greater-than or less-than symbols in the prompt [< and >]; MS-DOS will think you are redirecting I/O.)

Finally, the AUTOEXEC file types "MENU.TXT" on the screen and displays the new system prompt. The user types 1 or 2 and presses Enter, and the chosen application program runs. The last two commands in 1 or 2.BAT should be CD\ to return you to the root directory and then TYPE MENU.TXT, to redisplay the menu.

## The PATH to success

PATH is quite a powerful little MS-DOS command that does not get the attention it deserves. Using PATH, you designate what directories should be searched for a designated program file, if the current directory does not contain it. PATH works with floppies, but is really only useful with hard disks.

For example, you may be in the WRITE directory and wish to format a disk. Unfortunately, all the MS-DOS utilities reside in the UTILITY directory. Type **PATH C:\UTILITY** and press **Enter**. When you issue the format command, MS-DOS will search the WRITE directory for the file FORMAT.COM. If it does not find it, DOS will *look in the UTILITY directory*. It follows the designated path in searching for the program file you designate. Using this method you can be in any directory on your hard disk and still have access to all the MS-DOS utility files.

## A quick feed

Sometimes programs stop printing in the middle of the page, so that when you print something else, it starts in the middle of the page. In addition, printers are sometimes placed quite a distance from their computers; getting to the front panel to issue a form feed can be a nuisance.

The answer is a batch file that sends a form feed to the printer. Create a file called FF.BAT and place the following line in it:

```
ECHO ^L >LPT1:
```

From now on, typing **FF** and pressing **Enter** will advance the paper to the top of the next page.

## dBASE installation

In the February "Q & A" column, reader Roger Robinson described screen problems he was having with dBASE II.

I don't believe Marshall Moseley's solution (installing dBASE II for an ADM-3A terminal) will be effective if Robinson has an '83 model Kaypro. Apparently the ADM-3A supports inverse video, while the '83 Kaypros do not.

My solution is as follows: first, run the installation program as Moseley suggests, get out of it, then run it again. This time do not choose a terminal type; instead, choose "MODIFY PREVIOUS INSTALLATION." Install will ask you if you are using hexadecimal or decimal codes. I choose decimal. Next you will see a menu allowing you to designate the commands for brightness, inverse video, initialization, and reset to standard video.

Choose each option, and when the program prompts you for the command sequence, press Return, indicating no command. After each sequence has been changed, terminate the session and save the modified dBASE II.

This fairly simple solution came after quite a bit of hair pulling. I hope that readers with the older machines may be able to avoid some of that using this procedure.

David Seidman
Collingwood, New Jersey

## Back to BASIC

In part two of his article on BASIC, Jerry Houston correctly points out that GOTO is a four-letter word. He also points out the dangers of falling into a subroutine.

However, I disagree with the example he gives of using a GOTO statement to jump around a subroutine. A different way to avoid falling into to a subroutine is illustrated below:

```
10 – – – – – – –
20 MAIN PROGRAM
– GOES HERE
–
– STOP
1000 SUBROUTINE 1
– STARTS HERE
– RETURN
– SUBROUTINE 2
– STARTS HERE
– RETURN
– ETC.
– END
```

The main program does not have embedded subroutines and is followed by a STOP. All of the subroutines are segregated at the end of the BASIC code. This prevents falling into the subroutine without using GOTO and also adds to the clarity of the program, since the user does not have to go looking through the main code to find the subroutines.

Ed Gelerinter
Akron, Ohio

## Power supply problems

Does your '83 or '84 series CP/M Kaypro ever reset itself in the midst of saving two hours of work to disk? Does the machine ever lock up for no reason? Go so far south even the reset button doesn't help? Does everything return to normal if you power down and wait a couple of hours? If so, you may have bad solder joints on your power supply.

Remove the cover on your Kaypro and you will see the power supply circuit board bolted to the inside of the rear panel, just beneath the main board. It is distinguished by its large can-type capacitors and by a three-inch plastic connector holding a dozen or so wires.

This connector mates to several steel pins on the power supply board. The pins are anchored to the board by some hefty solder joints. These joints are the problem: they tend to disintegrate over time. The machine powers up, the solder joints expand, and vital connections are lost. The top two pins are the chronic offenders. They are your computer's source of +5v DC—its very lifeblood.

The solution is to re-solder the pins. The work is easy to do if you have any soldering skill at all. If not, you can take the computer to your local dealer for servicing. Take two important precautions before you try it yourself: unplug the computer, and leave the machine off for an hour before you begin. This allows any high voltage charge in the video assembly to dissipate.

Warren Allen
Bennington, Vermont

## A disk full solution

Several tips have been sent in concerning the way to handle full disks when working with WordStar. If employees use your CP/M Kaypro and you don't want them poking around trying to find a disposable file to erase, try this. For each disk they use, at the A0> prompt type **SAVE 80 Z**. This creates an empty file with 20 kilobytes of reserved space. Then configure one of the keys on the keypad with ^KJZ <Return>. I identify this as "the rescue from full disk" key. I don't have to explain how it works, and it does the job.

Charles H. Faber
Boise, Idaho

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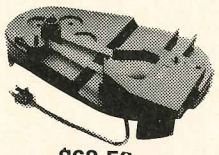

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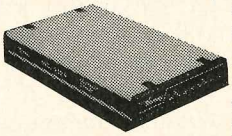

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# Beginner's Luck

## *Creating function keys with CONFIG*

by William Murdick

If you own a CP/M Kaypro, you possess a program on your CP/M disk called CONFIG.COM that can be used to redefine the numberpad keys on the right side of the keyboard. By redefining those keys, you can create a set of "function keys" that execute commands within a program.

For example, for work with WordStar, you could define a key to mark the text from the cursor to the end of your file and erase it, an operation that would normally require four separate commands involving the CTRL key:

^KB ^QC ^KK ^KY

Or, you could define one of the numberpad keys to set your left margin at the cursor's location:

^OL ESC

Most long-time WordStar users put basic cursor movement commands on the numberpad, since those commands are the most commonly used. After you have redefined the numberpad keys to your own liking, you still have the number keys at the top of the keyboard for entering numerals.

In this column I will show you step by step how to use the configuration program CONFIG.COM to establish a set of commands suitable for WordStar. Once you see how it is done, you can create your own set of function key definitions embodying those commands you use most often.

There have been several versions of CONFIG.COM over the years, each new version easier to use and more powerful than its predecessor. I will explain the latest two versions. This whole operation is very simple, so even if you are a nervous and confused novice, follow along. Conquering CONFIG.COM may give you confidence to pursue more difficult challenges.

### CONFIG step by step

*Step One.* Put a working copy of your CP/M disk in drive A and obtain the A0> prompt. To do that, you may have to hit the **ESC** key or type **X**, depending on which model Kaypro you own.

*Step Two.* At the A0> prompt, type **config** (upper or lower case) and hit **RETURN**.

*Step Three.* You should now be looking at the main "CONFIGURATION PROGRAM" menu. The choice we are interested in is the third one down:

"Redefine the number pad . . . n N"

**Sample Numberpad Configuration**

| | | | |
|---|---|---|---|
| 7 PREVIOUS SCREEN ^R | 8 ERASE Character cursor is on ^G | 9 ERASE Word to the right ^T | - ERASE Line to the right ^QD |
| 4 NEXT SCREEN ^C | 5 FIND ^QF | 6 SAVE Return to Menu ^KD | , SAVE Continue Writing ^KS^QP |
| 1 CURSOR <——— Beginning of Line ^QS | 2 CURSOR ———> End of Line ^QD | 3 HOME Beginning of File ^QR | Enter CURSOR Right One Word ———> ^F |
| 0 CURSOR Left one Word <——— ^A | | . End of File ^QC | |

If you type a lower case **n**, you will get an *explanation* of what the "N option" allows you to do—namely, redefine the numeric keypad. Don't bother with that. Instead, type a capital **N**—this starts the process.

*Step Four.* You should now see a diagram of the numeric keypad, with some text along the right-hand side. The instructions to the right of the diagram are fairly easy to follow; however, I will take you completely through the process, step by step. Next time, when you do it on your own, use the onscreen instructions.

The zero key is highlighted, meaning it is ready to be defined. Its current definition—or output—is the number 0.

For demonstration purposes, we'll use the sample WordStar set-up, or "configuration," represented in the figure titled "Sample Numberpad Configuration" on this page. This specific set-up is actually used in a word processing lab that I oversee, so it is realistic. Try it out for a few weeks, and then decide what changes to make in it so that your keypad definitions more accurately reflect your own word processing habits. Most of the commands in the figure are for cursor movement and deletion; in other words, they carry out common editing chores.

Right now, the zero key prints a 0. Following the design in the figure, we wish to redefine the zero key so that it prints nothing but instead executes ^A (CTRL A), which in WordStar jumps the cursor left one word.



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To begin the process of redefining, owners of the two latest (meaning most recent) versions of CONFIG will have to follow different instructions. Let me deal first with the latest version, version 6.0, and then with its predecessor, version 5/40. You can tell which version you own by reading the top of the screen after typing CONFIG at the prompt. Version 5/40 has a box with a zero in it below the text. Those readers should skip to Step Four-B, which has been included here just for them.

Owners of version 6.0: As the instructions indicate, you begin the process of key definition by typing the number of keys needed for the new definition. (By the way, the CTRL key does *not* count as a separate key.) For the zero key, then, type a **1** from the top of the keyboard. This indicates the need for only one character for the zero key's redefinition. Immediately, the box below the text should become empty, awaiting your definition. Type **^A** (hold down the CTRL key and type the letter A). That takes care of redefining the zero key on the numberpad.

Now hit the **LINEFEED** key to move to the next key on the diagram, the 1 key. Type a **2**, since this key's definition will require two boxes (or keys). Then type **^QS** (the CTR-Q will end up in the first box and the S will end up in the second). Continue until all keys are redefined according to the "Sample Keypad Configuration." You will need four boxes for the comma key. If you make a typing error in the course of redefining a key, ignore it until you have finished the other definitions. Then hit LINEFEED until the key containing the error is again highlighted on the diagram, and re-do your definition. When all the keys are to your liking, type **X** to exit.

Skip Step Four-B and go on to Step Five.

*Step Four-B.* Owners of version 5/40 should now hit the **ESC** key. At the bottom of the screen you'll see the message:

"Desired Keystrokes For This Key ===> "

Type **^A** (hold down the CTRL key and type the letter A) and then hit the **ENTER** key on the numberpad. That's it for redefining the zero key.

Now hit the **LINEFEED** key to move to the next numbered key on the diagram, the 1 key. Define that as ^QS, the command to move the cursor to the beginning of the line it occupies. Continue until all keys have been defined, correcting errors by backing up with the left arrow key and then overwriting. Then type **X** to exit.

*Step Five.* Everyone should now be looking at the original "CONFIGURATION" menu. The last option is the one you want: X to exit. Type **X** in upper case.

*Step Six.* Your screen should now be asking you if you "really want the requested changes." At this point you could type **N** if you wished to chicken out. Assuming you want the changes, type **Y** (for "yes"). This will copy the new definitions onto the CP/M disk, so that every new disk formatted with that particular CP/M disk and every new disk created with its disk copy program will have the new definitions.

## Accessing your new definitions

Once you have copied the definitions onto the CP/M disk, some Kaypros allow you to copy them onto another disk, such as your WordStar disk, by merely loading the CONFIG program, switching disks so that the WordStar is in drive A, and then typing **X** followed by **Y**. If that doesn't work for you, simply use your new CP/M disk to make a new copy of WordStar and your new definitions will be included.

As you may have noticed, when you save the new definitions onto a disk, the screen tells you that the new definitions "will become effective after the next reset." Here's why. Your Kaypro, when it starts up, loads whatever keypad definitions happen to exist on the disk in drive A. If you changed disks in drive A, and the new disk had a different set of definitions, that new set would not come into play if you merely "warm booted" your machine by typing ^C. You would have to reset your machine with the red button in the back to load the new keypad definitions.

*William Murdick is an English professor at the California University of Pennsylvania, where he oversees a word processing lab and is setting up a desktop publishing lab.*

**STRIPES**

*(continued from page 25)*

## Putting bar code to work

It is fairly simple to put bar code technology to work in manufacturing companies, according to Hewlett-Packard senior vice president Lewis Platt. Solutions often result from "grassroots" endeavors by people who need results, "and who act without waiting for corporate guidelines or mandates."

"Bar codes are coming to the little guy," said Kris Dahlin, vice president of software development for New Wave Systems of Mar Vista, California, a company that's developed bar code readers for both CP/M and DOS computers. New Wave has many customers who don't have mainframes but do need some bar coding capability. It sells to micro dealers, as well as to retailers.

"The people we hear from are small manufacturers, four- or five-person shops that make one part and need to have bar code. They'll buy a simple PC-compatible or CP/M machine and use our program to print labels required by the auto companies. The big market is auto ID labels and defense contractors."

Typically, small retailers may already have PCs and point-of-sale software. All they need are bar code printing programs and labels, and 128K of RAM is usually sufficient main memory; seldom do they need a hard disk. (See related article for details.)

While the growth of the bar code industry slowed early in 1986, it has generally enjoyed a growth of 20 to 50 percent annually in the last several years. Projections for the total market in the U.S. are $1.6 *billion* in 1988.

Interest seems to be high for potential new buyers, judging by the 19 percent attendance increase at ScanTech '86, the premier show of the industry. Products seen there proved to be smaller, faster, and more specialized. As Richard McDonald, recent president of Automatic Identification Manufacturers, said at the show, "The future of bar coding is going to continue to explode."

*Jonathan Chevreau is a Toronto-based freelance writer, specializing in high technology. Diane Ingalls is co-editor of* PROFILES *Magazine.*

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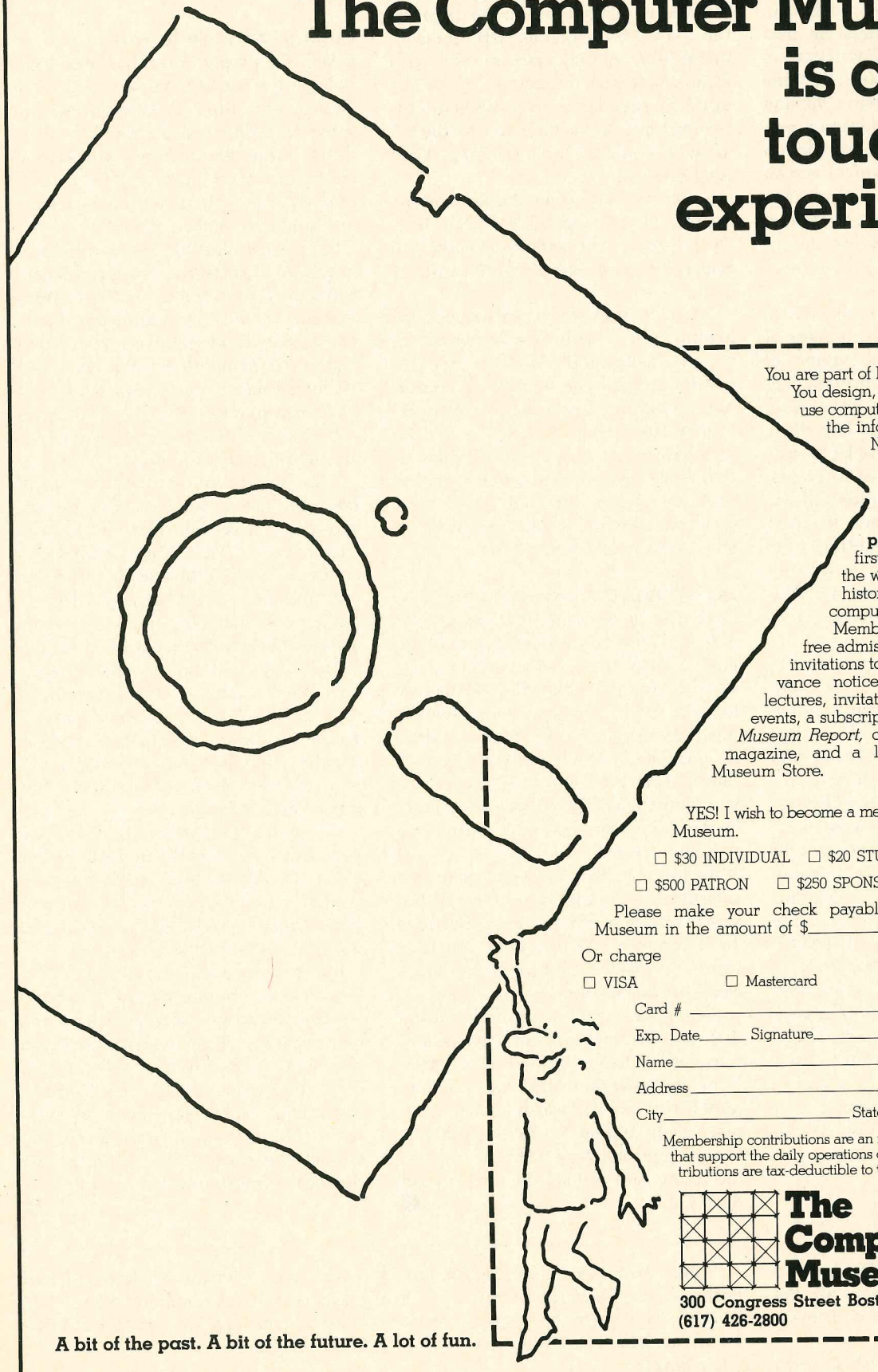

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# Q&A

by Marshall L. Moseley

## Serial questions

I have a Kaypro PC, and I am very confused about my serial port. My dealer told me that the connector for the serial port is exactly like the one on the IBM PC AT, and that if I bought a modem cable for an AT, it would work with my computer. Sorry to say, it didn't. (I have a Hayes-compatible modem.)

What kind of serial port do I have, and how do I get a modem cable that will work with it?

Anne Coleman
Los Angeles, California

*You have an RS-232C serial port. The problem is not what type of port you have, but how the pins within the serial port connector are arranged. Each pin has a function, and which function is assigned to which pin is important. The cable you use must be manufactured so that the wires within the cable connect to the correct pins, so that in turn the correct signals can be sent to the modem.*

*The early Kaypro PCs and Kaypro 16s were equipped with serial ports that had a unique pin assignment set. There was nothing wrong with it; it's just that no one else made their serial ports that way. To get a modem cable for that port you had to make it yourself, or buy one from a Kaypro dealer. If you are going to make it yourself, you will need the pin assignments shown in the figure below.*

*In 1986 Kaypro made several improvements in the Kaypro PC and 16 lines, one of which was a change to the serial port. The new serial port is exactly like the serial port in an IBM PC AT (or a Kaypro 286i, for that matter). They have the same pin assignments and the same type of pins. They did this so that parts for Kaypro computers, including cables, would be more readily available.*

*Your dealer probably thought you had the new style when you had the old. The way to tell is this: The old style is a female DB-9 connector, meaning it has nine receptors for pins, rather than pins. The AT-style port is a male DB-9 with nine pins.*

*The Kaypro part number for the old style cable is 3264; the number for the new AT-style cable is 5242. Note: these cables are for Hayes or Hayes-compatible modems, meaning that the connector on the back of the modem must exactly emulate the connector on a Hayes Smartmodem.*

**AT Style Serial Port Pin Assignments**

| PIN | SIGNAL |
|---|---|
| 1 | Carrier Detect |
| 2 | Receive Data |
| 3 | Transmit Data |
| 4 | Data Terminal Ready |
| 5 | Signal Ground |
| 6 | Data Set Ready |
| 7 | Request To Send |
| 8 | Clear To Send |
| 9 | Ring Indicator |

**Original Style Serial Port Pin Assignments**

| PIN | SIGNAL |
|---|---|
| 1 | Data Set Ready |
| 2 | Transmit Data |
| 3 | Clear To Send |
| 4 | Receive Data |
| 5 | Signal Ground |
| 6 | Data Terminal Ready |
| 7 | Carrier Detect |
| 8 | Request To Send |
| 9 | Ring Detect |

## Some BASIC definitions

I own a 4'84 and a Robie with standard double-sided, double-density drives. Among the software that came with the two computers are three versions of BASIC. How can I tell, before delving into manuals, what the differences between these BASICs are?

Douglas E. Perkins
Sedona, Arizona

*MBASIC is the version of BASIC for CP/M computers distributed by Microsoft. MBASIC is an interpreted BASIC, which means that you must run MBASIC.COM, and then from within MBASIC you can run BASIC programs. Because interpreters must decode and then execute program statements one at a time, they are slow. But the MBASIC interpreter does have extensive help messages and a program editor so you can debug programs on the fly. MBASIC is widely known, and there are many applications written in it.*

*CBASIC is a compiled BASIC. A compiler reads your source code in the form of an ASCII file and produces a machine language file (usually) as its output.*

*CBASIC is not a true compiler; you need a "run-time interpreter" (CRUN-.COM, which comes with CBASIC) to execute the intermediate code generated by the compiler. Programs compiled under CBASIC do, however, execute much faster than interpreted BASIC programs. There are no longer a lot of applications written for CBASIC.*

*SBASIC is another BASIC compiler distributed first by Topaz Programming, and later by Kaypro Corporation. SBASIC is a true compiler—it produces executable program files having a COM extension. Once compiled, the SBASIC programs run just like any other program.*

*MBASIC is the best of the three for learning to program.*

## The Hayes command set

I recently purchased a Hayes-compatible modem, and I got it working by following exactly the setup instructions included with it. But I am still unclear as to what modem commands are, how to issue them, or even if I want to issue them. Can you help?

David Jenkins
Jamaica, New York

*You probably will want to use modem commands at some point.*

*A Hayes or Hayes-compatible modem is very much like a computer in that it accepts commands and performs tasks based on the commands. Commands tell the modem to do things like pick up and dial the phone or activate the modem's speaker. The Hayes command set is the entire series of commands that the modem understands and responds to.*

*To send commands to the modem, you must first place your software in direct connect mode, in which the software communicates directly with the modem. In MITE you do this by starting at the Main Menu and pressing* **O** *to take you to the Options menu. From there choose* **D** *for*

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## Q&A

*direct connect mode. Press* **X** *to return you to the main menu, then press* **G** *to initiate communications.*

*Now you can issue commands. Every command in the Hayes set (save one) begins with the letters AT, followed by the command you specify. To tell the modem to answer the phone on the second ring, for example, you would type* **ATS0=2**, *and press* **ENTER**. *The modem will respond with the message "OK." If your modem closely mimics the Hayes external model, a light on the front panel labeled AA (for auto answer) will light. If you send an incorrect command, the modem will respond "ERROR."*

*For more information on Hayes commands see your modem manual.*

### Characters, not graphics

When I bought my Kaypro PC with a monochrome video board and a monochrome monitor, my dealer told me that my system would not "do graphics." Since I use it mostly for writing, that's fine. Now, however, a friend of mine tells me that my monitor does "extended graphics." I am confused, will my PC do graphics or not?

Chris Weiser
Tallahassee, Florida

*No, it will not. A computer using monochrome video exclusively can display characters only. Pie charts, video games, and presentation graphics are forever beyond your reach (barring, of course, dipping into your wallet and going back to the computer store).*

*But letters and numbers are not the only characters available to you. Your friend is probably referring to the IBM extended character set. Your computer is capable of displaying standard alphanumeric characters (letters, numbers, etc.) It can also display 129 other characters, called* extended graphics characters. *These characters include straight lines and corners, Greek letters, shaded boxes, and fractions. The entire character set—standard and extended—is stored in a ROM on your video board.*

*Those of you with MS-DOS computers should have an ASCII chart in the back of your* User's Guide *depicting the entire IBM character set.*

# Bulletproofing programs

by Tom Enright

The last three installments of this column have been about speeding up screen I/O by writing directly to video memory. This month we'll look at some similar tricks to help "bulletproof" your programs.

One of the tricks I mentioned was using DOS to gather information about the hardware environment (where video memory began). The other trick was how to alter specific memory addresses to obtain a desirable result (writing directly to video memory).

DOS stores information about the system configuration (what hardware is installed) in memory. If you know where to look and how to interpret the information, your programs can tell exactly how the system is configured. As long as you write programs only for your own use, that information isn't much use. (You know how your system is configured.) But if your programs need to run on other computers, having software that can see what hardware is installed can be invaluable. Then your program can detect whether the only parallel printer is set up as LPT2 instead LPT1 and act accordingly. (You always run into one person who sets his or her computer up in some weird configuration just because it's neat.)

## Key addresses

During the power-up and boot sequence the boot ROM fills a section of low memory with data on how your system is configured. The data in this area is intended for use by service routines in the BIOS. But nothing prevents you from using this information in your programs. All you need to know is where the information is in memory and how to interpret it.

The section of low memory that we are interested in begins at 00400h. According to DOS's memory segmentation, you can reference the beginning of this area as 0040:0000h. This is the same addressing method that was used with video memory in the direct I/O program. All of the addresses that I will be giving you are offsets in hexadecimal from this starting point. Most of the data that I will be talking about are two-byte values stored in Intel format. In Intel format the least significant byte is stored first, followed by the most significant byte. This means that you must reverse the order of the two bytes before interpreting them.

*System configuration data is intended for use by service routines, but you can use it in programs.*

The addresses that I feel you will find most useful are:

0000 & 0001: Pointer to COM1
0002 & 0003: Pointer to COM2
0008 & 0009: Pointer to LPT1
000A & 000B: Pointer to LPT2
000C & 000D: Pointer to LPT3
0013 & 0014: Amount of memory installed in the system.

0049: The currently active video mode. (Yes, the direct video I/O program could have gotten its information from here.)

0050 to 005F: Cursor location (two bytes) in each of eight video pages. Each byte pair represents a column and row. The programmer is expected to know how many video pages each video mode supports.

0062: Current video page.

0010 & 0011: Equipment list.

Instead of being interpreted as a single 16-bit number, the bytes in the equipment list are interpreted according to the following bit map:

Bit 0: 1 if any diskette drives are installed; otherwise 0.

Bit 1: Not used; should be 0.

Bits 2-3: Memory on system board. A holdover from original IBM PC. 00=16K, 01=32K, 11=64K. Should always be 11 on Kaypros.

Bits 4-5: Initial video mode. A value of 10 means 80-column color, and 11 is monochrome. The value 01 is reserved for the PCjr.

Bits 6-7: Number of diskette drives, with 00 meaning one drive. Think of it as drives minus 1.

Bit 8: 0 if DMA chip installed.

Bits 9-B: Number of serial ports.

Bit C: 1 if game adapter is installed.

Bit D: 1 if serial printer is installed.

Bits E-F: Number of printers installed.

## The example program

Accompanying this column is the listing (on page 76) for a Turbo Pascal program that illustrates how to access information in low memory. The example program checks the pointers for the two serial ports that DOS supports. If the two-byte pointer contains an address, then that port is installed. If the two bytes contain zeros, the port is not installed. After each pointer is checked, a message is printed telling you whether the port is installed. Lastly, the program checks the current video mode and informs you of its status.

The example program starts by defining four constants. The starting address of the section of memory we want to examine (0040h) is defined as "refseg." Next we define the status messages as constants. Defining the messages as constants is not required; it is an arbitrary choice on my part.

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year looks like a good alternative."

Another advantage to dot-matrix printers is the industry-standard Epson command set. Because of it software companies can write bar code software that works on a variety of printers.

*Software.* It is possible to pay a great deal for custom bar code printing software, but it is unnecessary. In the past few years many good, inexpensive programs have been issued that will print just about any bar code format on any industry-standard printer.

Bear Rock Software of Placerville, California, sells PrintBar II, which will print bar codes in the Code 39, UPC, and Code Two of Five formats. Worthington Data Solutions' BarRes and GraphRes packages do the same thing (BarRes simply prints bar codes; GraphRes prints characters as well).

The programs from both companies function by being installed in memory, where they monitor data being sent to the printer. When certain "key characters" are sent to the printer, every character that follows is printed in bar code form. When the key characters are again encountered, printing returns to text mode. For example, PrintBar II uses a double at sign (@@) as its key characters. An invoice could be printed using WordStar, and @@7890-2@@ could be placed in the text. The number 7890-2 would appear on the invoice in bar code form.

## For more information

The following books offer more detail on bar code and its use with micros.

*The Handbook of Bar Coding Systems*, by Harry Burke. Van Nostrom Reinhold, Inc. 115 Fifth Ave., New York, NY 10003.

*Reading Between the Lines: An Introduction to Bar Code Technology*, by Russ Adams and Craig K. Harmon. North American Technology, Inc. 174 Concord St., Peterborough, NH 03458.

Also coming this summer is *Bar Code and the IBM PC and Compatibles*, by Russ Adams, also to be published by North American Technology, Inc.

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*Marshall L. Moseley is the assistant technical editor for* PROFILES *Magazine.*

# Technical Forum

In the variable declaration part of the program, we define one integer variable, "i," that will hold the data while we examine it.

The procedures "gettwo" and "getone" are the heart of our program. Each of the procedures requires an integer argument that is the offset of the data we want to examine. When the procedure is done, the value at the specified offset is stored in the integer variable "i." Fortunately, Turbo Pascal stores integers as 16-bit values, which is also the largest data size we need.

In "gettwo" we have to get two bytes of information from memory, in reverse order, and make a single number from that data. For example, let's take a look at what should be found at the pointer to COM1. The pointer to COM1 is at 0040:0000h and 0040:0001h. If COM1 is present, the port address should be 03F8h (1016 decimal). The pointer is stored in memory as F8h at 0040:0000 and 03h at 0040:0001.

Decoding this pointer is a little more complex than simply adding the two bytes together. The least significant byte (LSB) is the portion of the total less than 255. The most significant byte (MSB) records how many 255s are in the number. (In the decimal number 385 there are five ones, eight tens, and three hundreds. In the hexadecimal number 3F8 there are eight ones, F (15) 16s and three 256s.) To convert the two numbers F8h and 03h to a single value, we multiply the MSB (03h) times 256 and add the result to the LSB (F8h). That is precisely the operation that takes place within the procedure "gettwo."

In "getone" the job is considerably simpler. We simply get a single byte of data from the specified memory location and assign its value to "i."

The mainline simply calls "getone" or "gettwo," depending on whether we wish to check a word-size or byte-size value, with the offset of the location as an integer argument. In our example program, the precise address of each serial port is available in the variable "i," but we only want to know whether the value is greater than zero.

When checking the current video mode, we again simplify things greatly by assuming that if the mode is not monochrome, it is color. In an actual program you would need to be more thorough in checking the video mode. But in a magazine column there is limited space, so I chose to illustrate an abbreviated version.

Next month we will expand two areas of this program. I'll show you a more complete method for checking the video mode, and we will attack the two bytes that detail the "equipment list."

Program Listing

```
program information;

const refseg = $0040;
      msg1 = ' is installed';
      msg2 = ' is not installed';
      msg3 = 'Video is ';

var i: integer;

procedure gettwo(pntr:integer);
begin
  i := mem[refseg:pntr] +
    (mem[refseg:pntr + 1]* 256);
end;

procedure getone(pntr:integer);
begin
  i := mem[refseg:pntr];
end;

begin
  clrscr;
  gettwo(0); { Check COM1 }
  if i > 0 then
     writeln('COM1',msg1)
  else
     writeln('COM1',msg2);
  gettwo(2); { Check COM2 }
  if i > 0 then
     writeln('COM2',msg1)
  else
     writeln('COM2',msg2);
  getone(73); { Check video }
  write(msg3);
  if i = 7 then
     writeln('monochrome')
  else
     writeln('color');
end.
```

# New Products

edited by Suzanne Kesling

The following new product listings are not reviews and should not be considered endorsements. To be considered for publication in this column, press releases should be sent to Suzanne Kesling, "New Products" Editor, c/o *PROFILES* Magazine, 533 Stevens Ave., Solana Beach, CA 92075. Releases must state prices and whether products run under CP/M or DOS. Include black and white photos if available.

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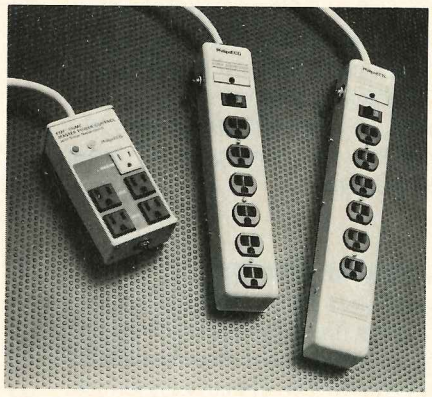

*The 615 and 615RF are equipped with an illuminated "on-off" switch that controls all six outlets and a surge protection indicator light. They also feature a resettable circuit breaker, which protects against accidental overloads. Both models provide three-way protection from voltage spikes: hot to neutral, neutral to ground, and hot to ground. The 615RF also features RF noise protection.*

*For information on a local distributor and prices, call (800) 225-8326 or write Philips ECG, Inc., 100 First Ave., Waltham, MA 02254.*

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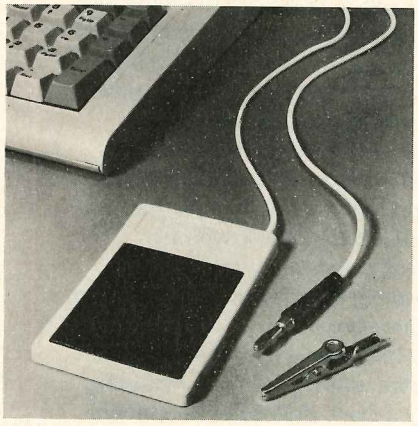

*You simply touch the black conductive pad before equipment operation for positive grounding between you and your equipment.*

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*ACTOR is an object-oriented interactive programming system that brings together programming and Microsoft Windows.*

*Programming with ACTOR and Windows makes it easy to examine and edit an object's procedures in one window while watching its output change in another. The user can fill in a template for creating new class definitions, find mistakes with a powerful debugger, and send*

messages in the interactive workspace editor. Procedures, output, template, and debugger can all be visible on the screen and accessible at the same time via Windows.

ACTOR also provides all the standard artificial intelligence operations, including list processing, pattern matching, parsing, symbol manipulation, and recursion.

$495. DOS systems. The Whitewater Group, Technology Innovation Center, 906 University Pl., Evanston, IL 60201; (312) 491-2370.

## File searching

Golden Retriever uses a Text Pattern Recognition technique to search files for a given phrase (up to four words). It locates exact matches as well as similar text patterns, in case you're not sure of the word order.

The menu-driven program first finds the file containing the desired phrase, then it displays the file and highlights the phrase where it appears. It also lets you move any portion of the file into a proof file for further processing.

Golden Retriever can search and display any of your files, including spreadsheet, data base, and binary files. It provides a wildcard character, a sub-directory, and a file date option to allow searching on a single file, a selected group of files, or all files in the disk drive.

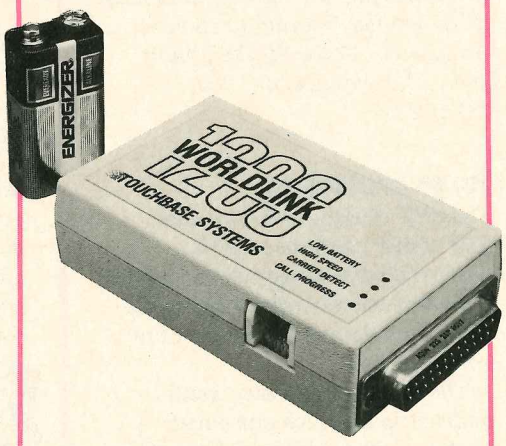
A "Menu Assistance" feature is available to guide beginners through their first search session. Context sensitive help is also available with a single keystroke.

$99 plus $5 shipping and handling. DOS systems. S.K. Data Inc., P.O. Box 413, Burlington, MA 01803; (617) 229-8909.

## Portable modem

The WorldLink 1200 Portable Modem is Hayes compatible and works with both portable and desktop computers. It features 1200/300 bps operation, auto-dial, auto-answer, and pulse and tone dialing.

The modem provides a direct interface for acoustic cup operation at both 300 and 1200 bps, and a standard RJ-11 jack is provided if a telephone line is available.




The 9-volt, battery-operated modem supports the U.S.-accepted Bell standard as well as the internationally recognized CCITT V.21 (300 bps) and V.22 (1200 bps) standards.

The unit is available with either a male or female DB-25 connector. An array of four LEDs provides visual information on status of call progress, carrier detect, high/low speed, and low battery condition.

$199. Touchbase Systems, Inc., 16 Green Acre Ln., Northport, NY 11768; (516) 261-0423.

## Computer shades

SuperScreen and PROTECTOR are anti-glare filters for monochrome or color and high-resolution monitors, respectively. The filters improve contrast by blocking diffuse reflections from bright walls that can wash out displays.

These matte black microfiber filters provide a shadow-box effect that can prevent glare. The microfibers work in the same way as the slats on a Venetian blind—they block light that comes in at an angle, both up and down and side to side.

The PROTECTOR filters are electrically conductive and connect to ground, effectively neutralizing static to help keep screens cleaner longer, making them easier on the eyes.

SuperScreen $29.95 for monochrome, $34.95 for color; PROTECTOR $49.95. Sun-Flex Company, Inc., 20 Pimentel Ct., Novato, CA 94947; (415) 883-1221.

## Accounting software

Net Advantage Accounting Package includes accounts receivable, accounts payable, and general ledger modules, along with a custom letter generator. All are fully integrated.

The letter generator allows you to automatically merge data from your customer or supplier data files into form letters. Several pre-formatted collection and sales letters are included, or you can create your own customized letters.

The accounts receivable and payable modules include cash receipt journals, sales by salesperson breakdowns, commission reports, vendor listings, and more.

The program has three security levels and password access. It is menu driven and designed with the first-time user in mind.

$99.75 plus $7.50 for shipping and handling. DOS systems. Soft-Wear LTD., P.O. Box 4125, Osbornville, NJ 08723; (800) 242-7509.

## Labels

LABELPRO is a label generating program that can store up to 200 names and addresses per mailing list on a disk. The program is not copy protected, so unlimited disk copies can be used for making specialized mailing lists.

The list may be added to at any time until the maximum 200 names are used; editing and deleting names and addresses is very simple. In addition, data may be sorted by last name, first name, street address, city, state, or zip code.

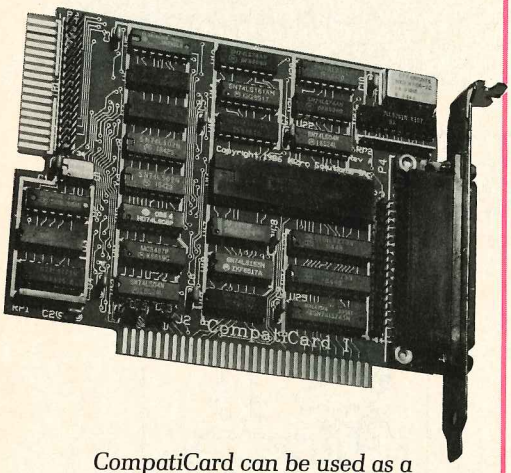
The program is preset to print a three-line name, street address, city,

state, and zip code, including the new 9-digit zip codes, in a format to fit on standard 1 by 3-1/2-inch labels.

$10. DOS systems; call for info on CP/M systems. William M. McGuigan Enterprises, 1124 Benjamin Pl., P.O. Box 754, El Cajon, CA 92020-0754; (619) 440-9274.

## Floppy disk controller card

CompatiCard is a floppy disk controller card that can accommodate up to four drives and will support any combination of 5-1/4-inch (48 TPI, 96 TPI, or high capacity AT), 8-inch and 3-1/2-inch drives. It will also support both single and double density on all drives.




CompatiCard can be used as a direct replacement for the controller card in your PC and XT or compatible, or it can be installed without interfering with your existing floppy disk controller. Uniform-PC is needed to support 8-inch and high capacity drives.

$175. DOS systems. Micro Solutions Computer Products, 132 W. Lincoln Hwy., DeKalb, IL 60115; (815) 756-3411.

## Turbo powered BASIC

Turbo Basic achieves the fastest benchmarked compilation by combining the interactive strength of BASIC with the structured, modular approach of Pascal.

It employs the same powerful, yet easy-to-use, language development environment that is characteristic of Turbo Pascal and Turbo Prolog.

The package includes a fast memory-to-memory compiler, full screen editor, an internal linker and runtime library, and Microcalc spreadsheet complete with source code.

Turbo Basic has full 8087 integration, block structured programming statements, and the ability to access all of the computer's memory.

$99.95. DOS systems. Borland International, Inc., 4585 Scotts Valley Dr., Scotts Valley, CA 95066; (408) 438-8400.

## Make it portable

Computer Valet is a carrying case on wheels for transportable computers.

It eliminates inconvience by adding wheels and features the removable Detache, which doubles as a briefcase. Two side compartments allow storage of up to 30 disks.

Velcro flaps unzip for cable access and air flow, and the keyboard unzips from the bottom, allowing you to use the computer while it is still in the case.

$99.95. Computer Aspects, P.O. Box 32057, San Jose, CA 95152; (408) 923-6767.

## Key defining

Key Assignment is a utility program that allows you to assign command strings to keyboard function keys.

Function key definitions may be made directly from system level at any time, or automatically when the system is booted by including the key definitions in your AUTOEXEC.BAT file.

Key assignments continue in effect at the system level until new key assignments are made. Assignments may be made to the function keys alone, or to the function keys in combination with the SHIFT, ALT, or CTRL keys.

$50. DOS systems. Custom Software, P.O. Box 2958, Olathe, KS 66062-2958

# Product Updates

**Printility**, version 5.5, is RAM-resident laser printer software that allows you to merge text and graphics. Its new features include support for the IBM Enhanced Graphics Adapter and the ability to download character fonts. Metro Software, Inc., Tucson, AZ ☐ The makers of **StatPac Gold** have released a new module for forecasting and quality control. This module adds exploratory data analysis, time-series forecasting, and quality control analysis. Walonick Associates, Minneapolis, MN ☐ **Instant-C** 2.2 now supports Microsoft 4.0 and Lattice 3.1 object files and libraries, allowing you to use those libraries directly. The new version can use memory beyond the DOS standard limit of 640K, but not extended or more than 64K of expanded memory. Rational Systems, Inc., Matick, MA ☐ **WIN** is a program designed to help you win at the lottery games. Version 2.0 accommodates games in which up to 20 numbers between 1 and 99 can be picked. F/22 Press, Leonia, NJ ☐ A new feature of version 2.2 of **The Major BBS** allows the sysop to display complete individual user account status on the master console. A "midnight cleanup" feature also is now operational. Galacticomm, Inc., Plantation, FL ☐ **ldir Plus**, the front-end shell utility, now features eight new user interfaces, selective file displays in sub-directories, global operations, a built-in, three-mode file viewer/editor, graphics tree display and much more. Bourbaki, Inc., Boise, ID.

*Product Updates provides information about revisions of existing products. Information for this column must be received at least eight weeks ahead of the publication date. Users should contact vendors for more complete information and current prices.*

**One match can destroy an area the size of Hiroshima.**

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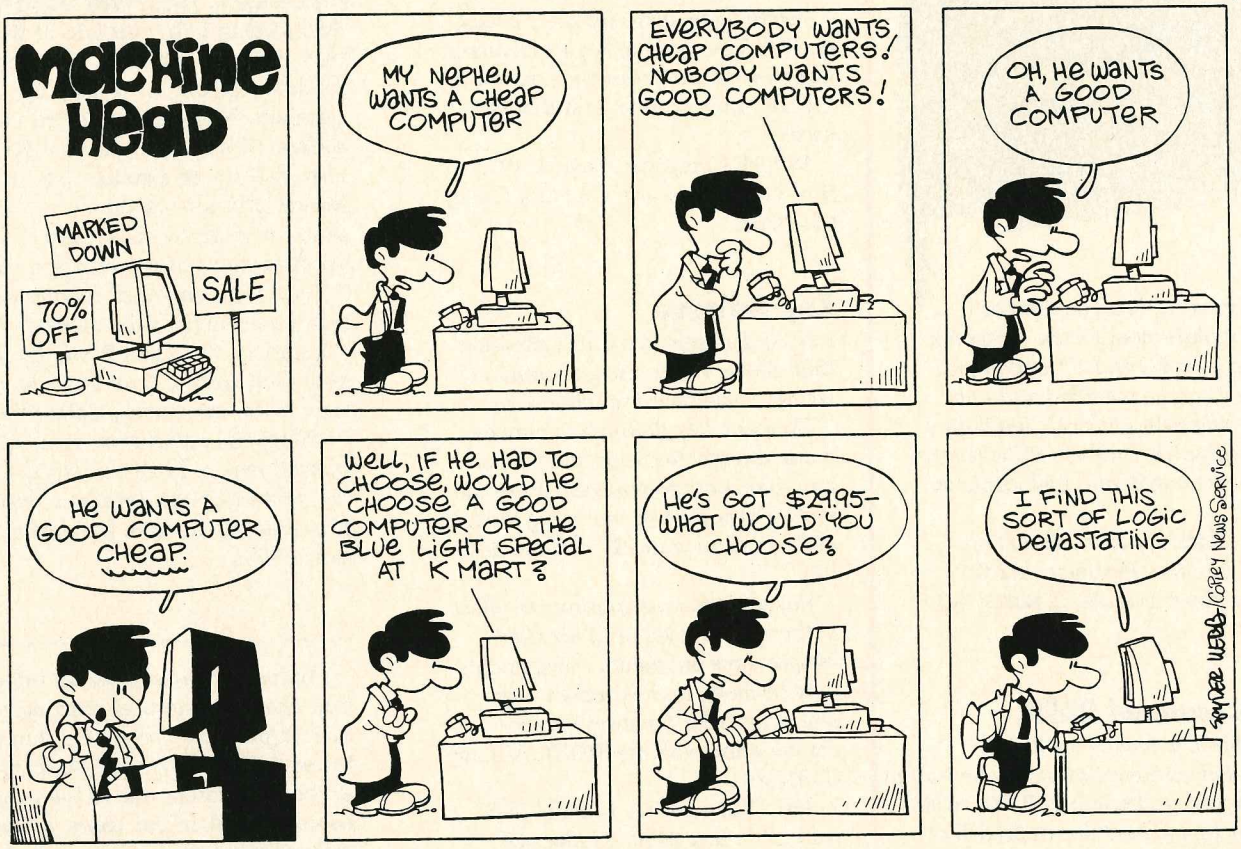

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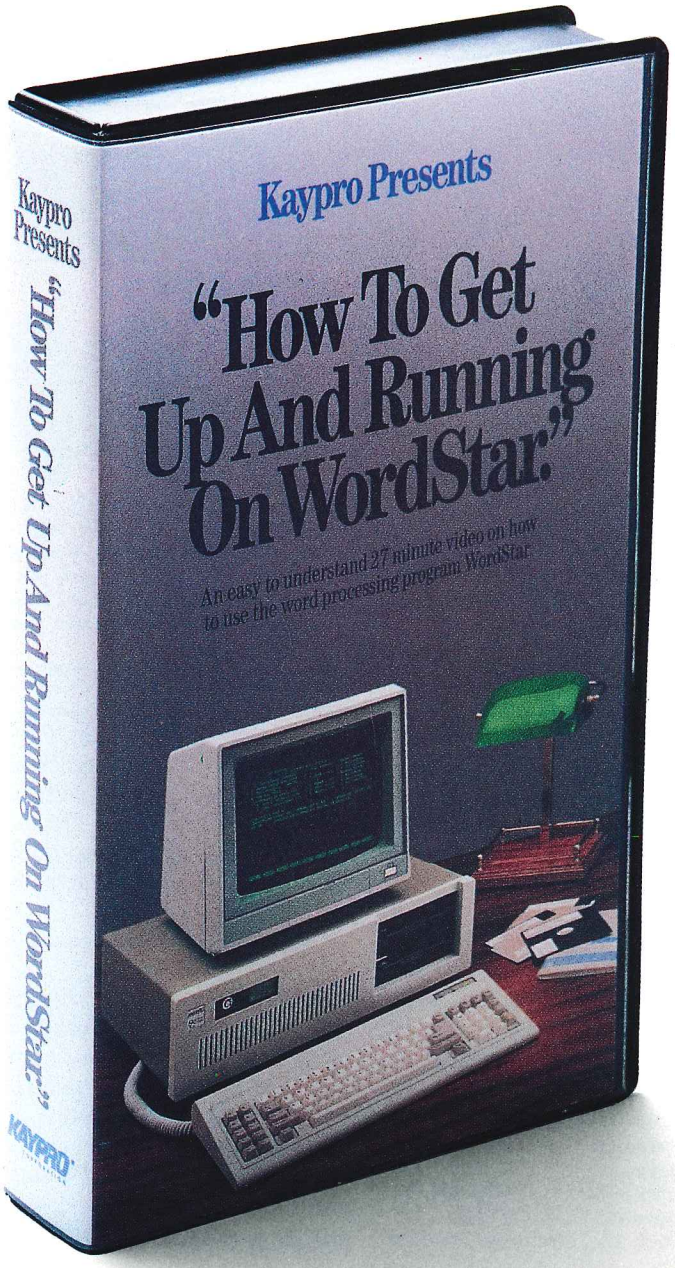


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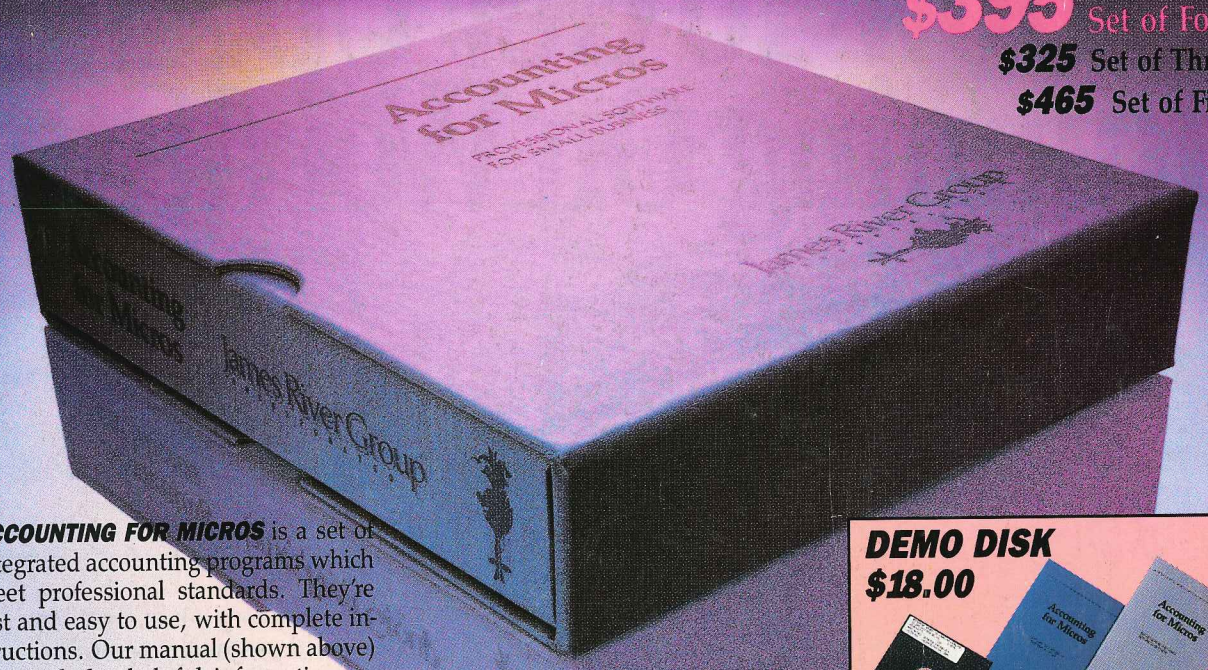


***ACCOUNTING FOR MICROS*** is a set of integrated accounting programs which meet professional standards. They're fast and easy to use, with complete instructions. Our manual (shown above) also includes helpful information on bookkeeping and computers.

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Allows up to 500 vendors and 600 invoices/mo. Records invoices and hand-written checks. Prints computer checks on any pre-printed form. Keeps vendor names and addresses.

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