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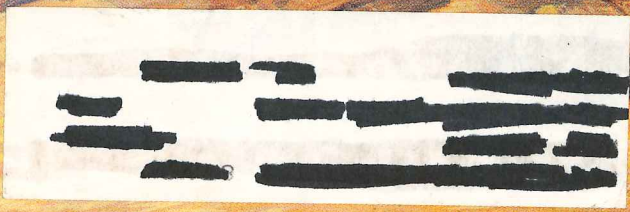
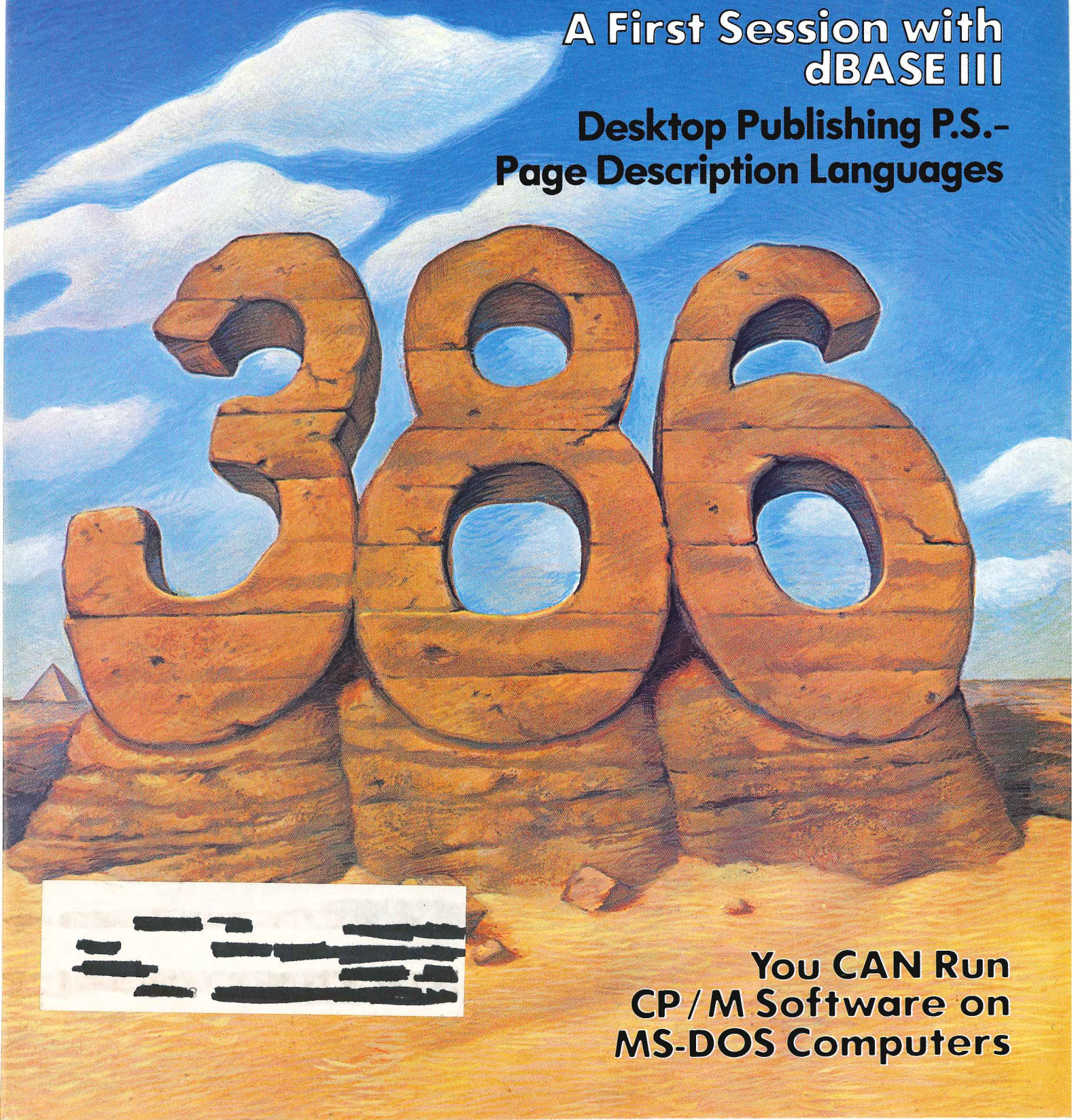
The Magazine for Kaypro Computer Users

August 1987

## THE 386: MORE POWER TO YOU

A First Session with  
dBASE III

Desktop Publishing P.S.-  
Page Description Languages



You CAN Run  
CP/M Software on  
MS-DOS Computers

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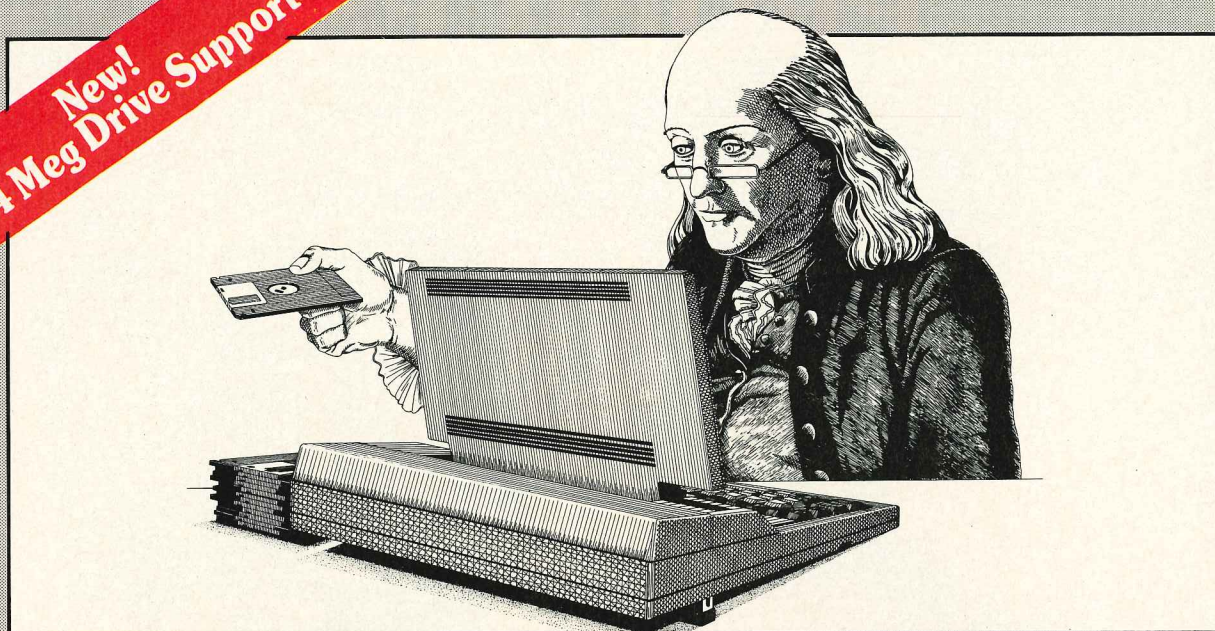
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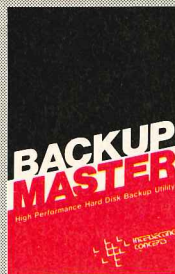
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I am interested in the CP/M MS-DOS operating system. (CIRCLE ONE)

# PROFILES

The Magazine for Kaypro Computer Users

Volume 5, Number 1 • August 1987

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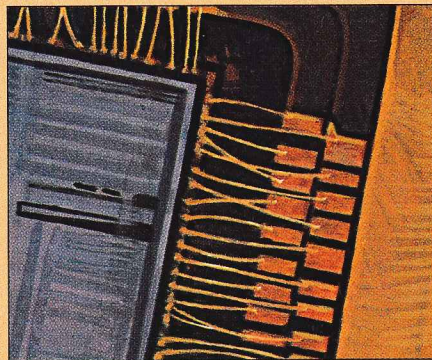
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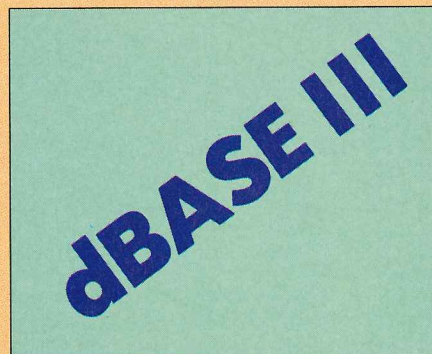
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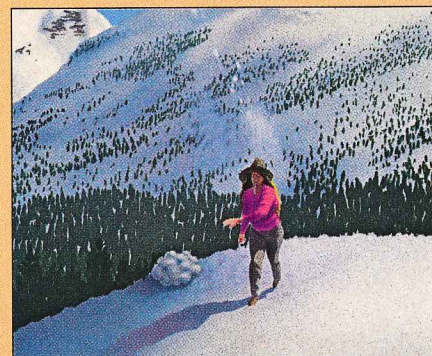
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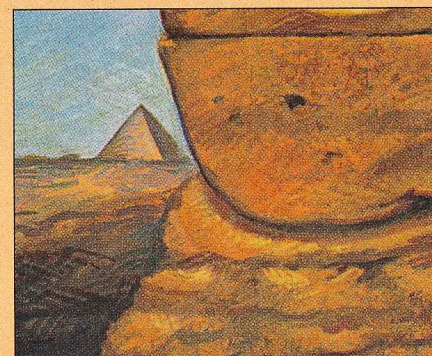
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### ON THE COVER:

If you've kept up with computer news at all in the last few months, you've heard of the new 386 machines. These computers are a quantum leap forward in terms of power and speed. Artist David Mollering captures the importance of the 386 chip with his monolithic rendering on our cover.

# Editors' Notes

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## New technology, tutorials, and a new column

**O**ur cover story this month is on the "eight-oh-three-eighty-six." It's a chip—it's a very fast, very powerful chip. And it's putting incredible computing power on your desk. Our feature article, "There's a Stranger in Town," explains what this chip can do and why it's so important. It tells you who's using 386 computers and what they're using them for. It also discusses what 386 computers *don't* have yet (an operating system, for example). Find out what the future holds for computing.

Desktop publishing continues its reign as "most popular topic" among users. And it's no wonder—it's fun! But there's a lot that goes into making those pretty pages that come out of the laser printer. In "Programmable Pages," Ted Silveira offers an overview of the unseen actors in desktop publishing: page description languages. See how these programs help produce a great page.

Tutorials to get you up and running quickly are one of *PROFILES'* strengths. This month we offer two. In "A First Session with dBASE III" we start a two-part series on creating a tracking system; next month we'll build on that base with step-by-step instructions on how to tap the *relational* powers of dBASE III.

The second tutorial article is for CP/M computers. "A First Session with BackGrounder ii" explains step by step how to install this enhanced CP/M operating system and how to use its task switching and cut-and-paste features. It's almost like having the best of MS-DOS within a CP/M system!

Since we're on the subject of CP/M,

what about running CP/M software on an MS-DOS system? You can! Our feature article, "Two Computers in One—Almost," gives you the scoop on the software/hardware packages that do this for you.

Writers of all types will be interested in the follow-up to last month's "Other' Word Processors." This month we cover Note Bene (for academic writing) and MultiMate Advantage (for office use). Perhaps one of them will fit your needs.

A little-known programming language made specifically for manipulating text is the subject of "An Introduction to SNOBOL4." Check out this intriguing language for MS-DOS computers. It could be just what you've been looking for.

Finally, this month we introduce a new column called "On The Practical Side." This column replaces "Technical Forum" and offers practical information on using your Kaypro. We're kicking off with an inside look at the Kaypro PC—what's under the hood, what individual components do, and how to change the system to fit your equipment and your needs.

*PROFILES* hopes that this issue offers you some help with your computing—the answer to a troublesome question, the insight to help solve a larger problem, the background to help you make a better software or hardware decision.

Enjoy.

Diane Ingalls  
Terian Tyre

General subscription information can be found on page 2. Our basic one-year rate is \$25 for 12 issues. If your first issue does not arrive within eight weeks after ordering, or you miss an issue, please write to us: PROFILES Magazine, P.O. Box 2889, Del Mar, CA 92014. We'll extend your subscription or send the issue. To direct PROFILES to a new address, attach a recent mailing label plus your old and new addresses. Allow eight weeks for processing. International subscriptions are available directly through PROFILES Magazine only. Our regular yearly international rate is USD \$40 (includes postage). Checks MUST be drawn on a U.S. bank in U.S. dollars ONLY.

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## Finding FeatureFormat

A number of readers have called saying that they would like to get the FeatureFormat Professional scriptwriting software (CP/M) mentioned in the June 1987 "Flea Market." However, the manufacturer, PowerSoft, Inc., seems to have disappeared—checks sent to their Los Angeles address are returned and no new address is available.

Not to worry—the software is available on Kaypro's KUG ROS bulletin board system. (It is shareware, not strictly commercial.) You can find it in the PROFILES section of KUG ROS, under PROCPM. The file you want to download is FF.LBR and it includes documentation. Please note that you do not have to be a validated user of KUG ROS to access the PROFILES section.

## Perfect Writer thanks

Thanks for Tucker Parsons' helpful information on "Saving Time with Perfect Writer." I am glad to see that there are some around who appreciate Perfect Writer which, for my money, is still one of the best word processing programs around.

But could you persuade Mr. Parsons to expand on his "Breaking the Menu Habit?" I still haven't been able to print the FIN file beginning on other than page 1. The menu permits you to do that on any page, but the A prompt approach doesn't respond to the symbol -N, at least not on my Kaypro. A full listing of all the -Symbols for Perfect Formatter and Perfect Printer would be helpful.

Jurgen Herbst  
Madison, Wisconsin

*Talk about timing! The letter below has just what you've asked for: a listing of -Symbols. In addition, look for a feature article on using these symbols and commands to "supercharge" Perfect Writer in the October 1987 issue of PROFILES.*

Thank you for the article "Saving Time with Perfect Writer," and especially for the boxed information, "Breaking the Menu Habit." It reminded me that I submitted something similar in De-

ember of 1984, which "did not meet the present needs." On the possibility that it may now be helpful, I include a more complete summary of Perfect Writer's formatting and printing commands:

PF Accesses Perfect Formatter	
-c	Sends file to console only
-dev	Give device name if don't want default
-p	Quick Print, omits embedded commands
-o	Name output file differently
-verbatim	What you see is what you get
-pause	Pause for each page
filename	Last entry
PP Accesses Perfect Printer	
-page	Give page number to start printing on a page other than one
-port	Send to a different output port
-pause	Pause for insertion of single sheets
-< n >	Type hyphen and number of copies to print
filename	Last entry

The commands are mentioned in a footnote on page 68 of current and previous manuals for Perfect Writer, but you are not told what they are, where to find them, or how to use them.

Perfect Writer gives you so much to work with, I don't see why they didn't just correct its few bugs instead of issuing the new "Imperfect" Writer. The best thing about WordStar is that you can patch it. The worst thing is you have to!

Rev. George LaBruce+  
St. Petersburg, Florida

I was pleased to read "Saving Time with Perfect Writer" by Tucker Parsons published in your June 1987 issue. I have been using the @MESSAGE and @INCLUDE commands since 1984 when I purchased my Kaypro 10. I do have one problem with the commands and would like any information you can provide that might help solve the problem.

When including the text in response to the message displayed during formatting I often discover a typo made while entering the text. In order to correct the typo I must erase back to the error then correct it and re-enter the erased text. Is there any way to modify Perfect Writer to make the word processing features function during the entry of text while formatting the @MESSAGE and @INCLUDE portions of the document?

The major purpose for purchasing my

computer was to assist me in a very small legal practice, which I do on the side to my regular practice as a state prosecutor. Most of the forms that I have developed use @MESSAGE and @IN-

CLUDE commands. A solution to the problem described above would greatly speed up my moonlighting.

Lydia Guillory-Lee

*Bad news: You cannot access the word processing features while formatting documents in Perfect Writer. The two functions are entirely separate—that's why they are separate programs.*

## In appreciation of May

Just a quick-and-dirty note of appreciation for your May issue. It may be the most valuable single issue of a computer magazine in a very long time.

I'd especially like to single out the article, "Pinning Down Patch Points," by Joseph I. Mortensen. I found this to be extremely informative and understandable. I hope that it will be useful to me when I get the time to work on some problem programs that aren't performing up to snuff.

I don't even own a Kaypro, only a CPM 3.0 Visual 1050, which cranks out what I need and would do more if I had the time to learn more of the software on hand.

Hal M. Davison  
Gaithersburg, Maryland

## Program listings in Pascal

I was delighted to hear that you would



again be publishing a combined CP/M and MS-DOS *PROFILES*. I just bought a Kaypro PC in addition to the Kaypro 2X that I already own. Both machines are used primarily in my business. This makes life a lot easier in that the material I wish to read in relation to my machines is all under one cover.

I also was pleased that the recent article in the April [1987] issue covering the handling of video and graphics in CP/M Kaypros had the routines in both Pascal and MBASIC. I recently purchased Turbo Pascal on the advice of one of my customers.

Please keep those Pascal program listings coming for both CP/M and MS-DOS machines.

Eric Noever  
British Virgin Islands

The article on handling graphics in CP/M Kaypros in the April 1987 issue was called "Getting to CP/M's Graphics," by T.F. Chiang. It included a chart of the graphics character set for '84 series CP/M Kaypros and also provided four procedures: 1) draw a pixel, erase a pixel, draw a line, erase a line; 2) draw a rectangle; 3) draw a circle; 4) draw a 3-D box.

As for providing program listings, *PROFILES* will continue to include them in tutorials.

### The tip was my solution

I just want to say thanks for Warren Allen's contribution to the "Tip Trader" in the May 1987 *PROFILES*. I had experienced inexplicable lock-ups of my 4'84 machine but just lived with it because I figured a repairman wouldn't know where to start, given that the problem was intermittent. I took my machine apart and sure enough, the very pins described had broken solder connections. Some easy soldering work fixed things up. My appreciation of *PROFILES*, which was already high, got an extra boost!

Siri Jodha Singh Khalsa  
Boulder, Colorado

On page 69 of your May issue of this year Mr. Warren Allen from Vermont provides a solution to a possible power supply problem in the '83 and '84 series CP/M Kaypros. I [used the tip and] have

successfully restored my trusted low-number [machine] to her quick and stable response patterns. Please register my thanks to Mr. Allen and to you in your files.

Andreas N. Maris Van Blaaderen  
Billings, Montana

*Sometimes there are easy solutions to seemingly difficult problems. The trick, of course, is knowing where to look. We're glad we could help.*

### NewSweep's "Y" function

In the "Letters" column of the June 1987 issue of *PROFILES*, George McLean wrote to protest that William Murdick's article concerning NewSweep in the April issue, was "incomplete." His specific complaint was that the explanation for the "Y" function of the program skipped over explaining about all of the options available (are there seven?).

Your explanation for the omission was

that the "Beginner's Luck" column, in which the NewSweep article appeared, didn't provide space enough, (although it was almost three pages long). We welcome the news that future tutorials for beginners will be full-length.


I have bought four CP/M Kaypros in the past four years, so I'm not totally a beginner, but I still don't know much about the "Y" function in NewSweep, although NewSweep and D.COM are my most-used utilities. Please give us the full story on the "Y" function.

Many thanks for a splendid magazine. Please don't let your CP/M coverage disappear.

Carl C. Rasmussen  
Kansas City, Missouri


You'll find a full explanation of NewSweep's "Y" function in the "Q & A" column (page 65), of the July 1987 issue.

And to reassure those of you who have CP/M systems - don't worry - CP/M will continue to be covered by *PROFILES*. ■



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# First Impressions

## Two interesting MS-DOS utility programs

by Tom Enright

**T**his month we will be looking at two MS-DOS utility programs. They are Backup Master from Intersecting Concepts and TopDOS from FrontRunner Development Corporation.

Backup Master is, as its name implies, a hard disk backup utility. Its ease of use and flexibility make it suitable for both new computer owners and power users. TopDOS is a hard disk management system that, at first glance, appears to do everything in the known universe at least three or four different ways.

### Backup Master

Backup Master is a hard disk backup utility. It requires a Kaypro DOS machine running MS-DOS 2.1 or newer and 384K of available RAM. This is 384K after all resident utilities have been loaded. Backup Master supports monochrome, CGA, EGA, and Hercules video and disk drives in three-inch format, as well as both standard density and high-density (1.2 meg) 5-1/4-inch format.

Backup Master's installation program will automate as much or little of the installation process as you choose. You only really need to do two things during installation: Specify what disk drives you have and run the DMA (Direct Memory Access) test for disk I/O speed.

The purpose of the test is to determine which DMA speed (slow, medium, or fast) your system can support. If your system will run at two clock speeds (as newer Kaypro PCs do), set it to the lowest clock speed before running the test or backing up software. You will get a quicker backup by running fast DMA at a lower clock speed than a fast clock

speed and slower DMA.

In addition to selecting DMA speed, the installation process is where you select whether to use Backup Master's disk format or MS-DOS' disk format. The advantage to Backup Master's format is an extra 50K per disk and better prompting for disk changes during a backup.

---

### The advantage to using Backup Master's format is an extra 50K per disk . . .

---

Using Backup Master allows you to make your backups as selective or all-inclusive as you wish. Files are selected or excluded by a series of file selection parameters. These parameters are the Date Gate, Archive Flag, Include File String, and Exclude File String.

The Date Gate allows you to specify a beginning and ending date for files. Only files between those two dates are selected for backup—that is, pass through the gate. A date may be specified relative to the system date, such as the current system date minus five days. To include all files, the Date Gate would be set to "ALWAYS:FOREVER."

The Archive Flag controls how the disk directory archive bit is used during backups. The flag can be set to use the archive bit or to ignore it. It can also be set to reset the archive bit after backing up a file or to leave it alone.

The Include File String is a list of file specifications for files to be included in

the backup. It is normally set to "\\*.\*)" so that all files are included. Another part of the Include File String is subdirectory expansion. If subdirectories are expanded they will be included.

The Exclude File String determines which files are not to be backed up. Typically you would edit this string to include files with the extension BAK and copy protected software. Entire directories can be excluded from a backup by specifying the full pathname of the directory with \*.\* appended to the end. Entries in either the include or exclude string are separated using commas.

Backup Master's Main Menu is the backup rather than the restore, menu. From that menu you can alter the file selection parameters by pressing the function key that appears next to each parameter's status entry. To begin backing up, press the F2 key. This triggers a pull-down menu that allows you to start the backup, estimate how many disks will be needed, or abort and return to the main menu.

If Backup Master's disk format is being used you don't even have to format the disks ahead of time. Backup Master can do the formatting while it is backing up your files. Also, if you have two disk drives, Backup Master will use drives A and B alternately to help speed the process. You are prompted to insert a disk in the drive that isn't being currently accessed. That way a disk is always ready and waiting in the other drive when the current disk is full. Backup Master will split large files across as many disks as needed and will write an ASCII "history file" that lists which files are on what disk.

On the Restore Menu (press F1 at the

Main Menu) there are two additional options that aren't on the Backup Menu. These are the RESTORE PATH and OVERWRITE options. RESTORE PATH allows the creation of any subdirectories that exist on the backup, but not on your hard disk. It can be set to create directories as needed or not to create them, in which case files in the directory are not restored. The OVERWRITE option can be set so that older files on the backup will or will not replace newer files of the same name on your hard disk.

Backup Master also allows automated backup sessions through the use of batch files. This allows the "office guru" to create batch files that automate the entire procedure. (Backups are vital to business users.) And once the batch file has been created, anyone can use it.

Backup Master's documentation is intimidating to new computer users. The concepts and options of the program require knowledge of MS-DOS

### Backup Master also allows automated backup sessions by using batch files.

and computers in general. Office workers who use computers strictly as tools will have difficulty understanding the manual. Experienced computer users, however, will have little trouble. The program itself is fast, efficient, and undeniably useful.

#### TopDOS

TopDOS is a hard disk management utility. It runs on any Kaypro MS-DOS computer with MS-DOS 2.0 or newer and supports monochrome, Hercules, CGA, and EGA video. TopDOS may also be used with a mouse and is compatible with many local area networks.

The term "hard disk manager" is misleading. It would be more correct to describe this program as a "productivity enhancer." It has so many features and capabilities that it is difficult to classify. TopDOS is memory resident, but is active only when the MS-DOS prompt is on the screen. An extra ">" is added to

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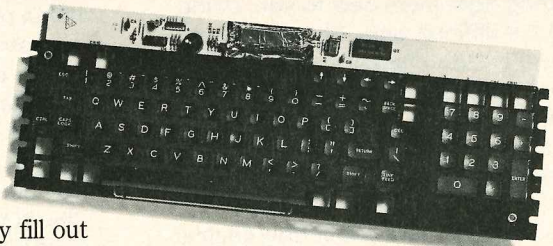
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the prompt as a reminder that TopDOS is there.

TopDOS functions include: command line recall and editing, automatic completion of commands, keyboard macros, command aliases, extensions to standard MS-DOS commands, new commands, and a built-in text editor.

Command line recall saves each command line in a circular buffer. You can then recall command lines by scrolling them back with the arrow keys or selecting them from a command list provided by the HISTORY command. A recalled command can be executed as it stands or edited before execution.

Automatic command completion is requested when you type a couple of letters of a command and press the TAB key. TopDOS then makes its best guess as to what the command was, finishes entering it, and waits for you to press the Enter key. The defaults are internal commands, programs in the current directory, and then programs along the current MS-DOS search path.

Keyboard macros in TopDOS are defined in a macro buffer and then assigned to a function key. Each macro can be any valid MS-DOS or TopDOS command(s). A single macro can contain up to 75 keystrokes. (Tip: ^A is one keystroke.) The macros may then be saved in a disk file for future restoration. You can have as many different macro definition files as you want.

Aliases are custom TopDOS commands that you define. An alias may contain printable characters only and is thus restricted to a single command line for each definition. You can have up to 1K of alias definitions active at any one time. Like macros, alias definitions can be saved to disk, and you can have as many alias files as you wish.

TopDOS adds several new commands to MS-DOS whenever TopDOS is active. New commands include MOVE (moves a file from one place to another), HISTORY (displays previous command lines), MACRO (display current macros and aliases), WHEREIS (shows where a file is on the disk), TREECOPY (copies files and subdirectories to another place), and CLUSTER (determines what file a particular disk cluster is a part of).

In addition to new commands, you get a whole pile of new command options. Command options are in the form “/X” where “X” is the option symbol. Most

options relate to file selection and sorting. Command options let you sort files by extension, date, size, or time of creation and in ascending or descending order for directory displays or copying.

*TopDOS has so many capabilities that it is hard to classify.*

The last major feature of TopDOS is a built-in editor. This editor can handle files of up to approximately 54K. It's a full-screen editor useful for batch files, programming, and other chores that require ASCII files. No formatting or printer support is provided in the TopDOS editor.

The TopDOS documentation is a reference work, not a tutorial. It reads more like Microsoft's GW-BASIC reference manual than the type of documentation most users are familiar with. Including a good overview and tutorial section would make TopDOS a lot more appealing to more users.

Overall TopDOS is a good product, but it needs better documentation. It is complex and powerful, and few users will tap its full resources. However, even new users can benefit from its less complex features. For example, the command line editing feature is simple and intuitive. Also, TopDOS improves considerably upon MS-DOS status messages (such the as one seen during file copy operations). And finally, TopDOS is active only at the operating system level and so does not interfere with your favorite application software.

### Quick Reference Summary

**Product:** Backup Master  
**Manufacturer:** Intersecting Concepts  
80 Long Court, Suite 1A  
Thousand Oaks, CA 91360  
**Phone:** (805) 373-3900  
**Sugg. List Price:** \$89.95

**Product:** TopDOS  
**Manufacturer:** FrontRunner Development Corp.  
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Van Nuys, CA 91411  
**Phone:** (818) 376-1322  
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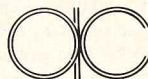
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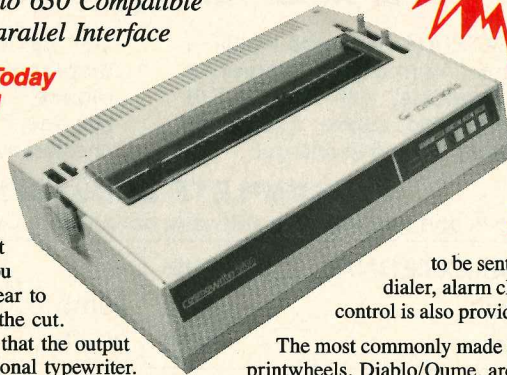
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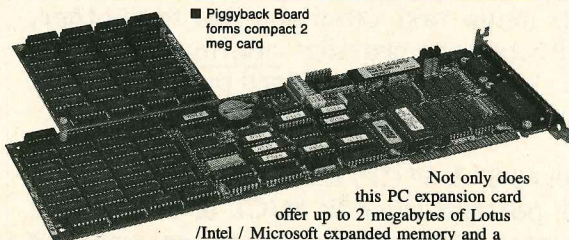
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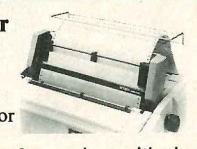
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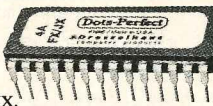
Tractor Descriptions †	Price
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NEC Elf Uni-Directional	\$ 87
NEC Pinwriter P2 and P6 Bi-Directional	\$149
NEC Pinwriter P3 and P7 Bi-Directional	\$164
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Toshiba 351 and 341 Bi-Directional	\$179
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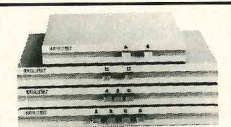
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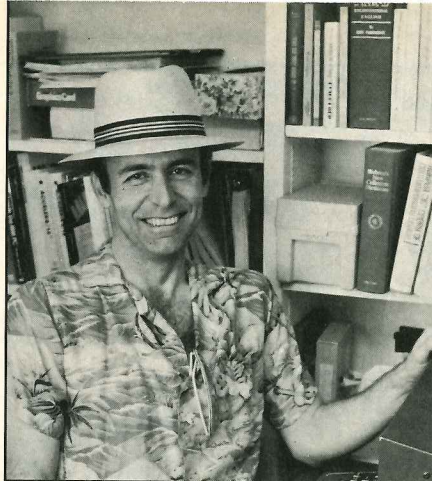
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# Flea Market

## Traps and tricks of writing

by Ted Silveira

**S**ome people tinker with numbers in a spreadsheet. Others sort names in a data base. But almost everyone who has a computer writes something — letters, articles, inter-office memos, books, financial reports, research abstracts, program documentation — and most people write a lot, because the modern world runs on written words.

People who do write a lot would shudder at the thought of giving up their word processors — anything else is just too primitive, like shopping for dinner with a club. In my pre-computer days, I once wrote a 250-page textbook: I spent almost 50 percent of my time just typing clean copies (and a quarter of that time waiting for the Wite-Out to dry). Never again.

The word processor does more than just remove a lot of drudgery from writing. It changes the way we write, because writing on a word processor is not like writing on a typewriter. Everyone knows that, of course, and people rave about how easy it is to revise a sentence or produce perfectly-typed letters. But word processors have traps, too — traps that eat your time and occasionally your files.

To make the most of computerized writing while avoiding its traps, you need to learn enough about computers and word processors to use them fluently, so they're invisible while you're working. Yet you also need to avoid spending so much time fussing with your computer that you have no time to write. You need to adapt your writing style to take advantage of the things word processors do well yet avoid becoming a slave of the tools you use.

### The basic toolkit

For starters, here's what I think should be in every writer's toolkit (and why):

- **Word Processor.** Of course. The thing to remember about word processors is that they all have different personalities. So the program that's right for one person or job may not be right for another.

If, for example, you produce lots of

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### The real-time spelling checkers can be a real distraction to your flow of writing.

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heavily formatted documents and need absolute control of your printer, approaching desktop publishing, Microsoft Word (MS-DOS) is hard to beat. It supports dozens of printers and makes the most of them, and its style sheets make tough formatting easy. But if you write only articles or research papers, documents with simple formats but lots of changes, Microsoft Word will probably irritate you with its less than bullet-like speed, its cumbersome menus, and other quirks.

What you need is not the word processor with the most features but the one with the right features for you, even if you don't know what they are (tricky).

- **Spelling Checker.** Of course. A good spelling checker is fast, tireless, and consistent. Everybody should have one, and almost everybody does.

Trap: The supposed state of the art is the real-time spelling checker, which

watches every character you type and beeps any time you misspell a word. These programs are marvels of technology, but they're the worst possible tool for writing. It's not just that they're distracting (beeping at you all the time) but that they force you into the wrong frame of mind for writing.

Writing and correcting are two different jobs and need to be kept separate. The editorial pickiness that's required for correcting is death to the process of getting ideas out of your head onto the screen. So write first (ignoring spelling errors and other minor mistakes), and then correct later, using one of the many excellent batch spelling checkers.

- **Keyboard Macro Program.** After the word processor and the spelling checker, the writer's greatest friend is the keyboard macro program — XtraKey or SmartKey for CP/M; ProKey, Keyworks, SmartKey, SuperKey and others for MS-DOS. These programs let you redefine the keys on your keyboard so that a single key can send out a string of commands (like ^KS^QP in WordStar) or text. If your word processor doesn't have built-in macros, buy one of these programs, and learn how to use it. You'll find you can not only automate your word processor but also create whole new commands.

Trick: For example, WordStar versions 3.0, 3.3, and 3.31 don't have an undelete command. But you can fake one by defining the following macro:

```
^QC^KV^QV
```

Thereafter, when you want to delete a block of text, you first mark the block to be deleted and then execute the macro. WordStar will jump the cursor to the end



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- 7012) VDO:** Ver. 2.5. Video Display Oriented editor. Full screen editor with help menus uses only 7K of memory!  
**7013) WORDSTAR PATCHES:** Patch subroutines and patch locations for modifying Wordstar.  
**7048) EXPRESS:** Version 1.0. A full screen editor designed for programmers. This editor can access files in any user area, on any disk from anywhere on disk to anywhere on the disk.  
**7049) VDE:** Version 2.31. A small powerful text editor that takes up only 10K of memory.

## EDUCATIONAL

- 7006) DB HELP:** Dbase help program listing all Dbase II commands and functions. (Requires Dbase II).

## GAMES

- 7000) NEW ADVENTURE:** Enter into the Colossal Cave to find fortunes of treasures and gold.  
**7002) DC10:** An exciting flight in the cockpit of a DC 10. Includes instrument representation. (Requires MBASIC).  
**7015) GAMES, GAMES, GAMES:** Star Trek, Chess, Aliens and more. (Includes source code).  
**7017) BASIC GAMES:** Star Traders, Chase and Nuclear Reactor. (Requires MBASIC). (Requires Turbo Pascal).  
**7021) THE MINES OF MORIA:** A complex fantasy game that changes every time you play it. (Requires MBASIC).

## GRAPHICS (REQUIRES KAYPRO w/ GRAPHICS)

- 7003) DDRAW:** Version 2.0. Create pictures on your screen and save them on disk to recall later. This program also allows you to dump graphics to your printer. (Includes PASCAL source code).  
**7034) ARTIE:** Version 6.0. An excellent graphics design program that allows you to dump your art files to your Okidata or Panasonic printers.  
**7053) & 7065) PLOT:** Version 3.3. A very impressive high resolution plotting system for dot matrix printers. The plotting program comes preconfigured for Epson, C. Itoh, and Okidata printers. Source code is included. High level language facilities for creating the vector files are supplied for MBASIC, TURBO PASCAL and Microsoft FORTRAN80. Requires disk 7065. (2 disk set. Must order both disks)

## HACKERS/SECURITIES

- 7005) DB SQZ6L:** Take this program and encrypt your Dbase II command files to protect them from prying eyes. (Requires Dbase II).  
**7046) SCRAMBLE:** Version 2.0. A very effective way to protect your files. This program scrambles your file using an eight character password. Even the author says he could not decipher without the password!!!

## LANGUAGES

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

## APL

- 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.

## ASSEMBLERS AND STUFF

- 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.

## BASIC

- 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.

## C

- 7023) SMALL C COMPILER:** Version 2.0. Expanded version of Ron Cains Small C. (Includes sample programs).  
**7024) SMALL C SOURCE:** Version 2.0. Source code for C compiler. For those who want to modify a C compiler. (Requires 7023 to compile itself!).  
**7025) SMALL C MACRO FILES:** Macro source files for Small C.

## COBOL

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

## FORTH

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

## LISP

- 7036) & 7070) ILISP:** This is an implementation of LISP based on the LISP dialect called SCHEME. (Requires CP/M 2.0). (2 disk set. Must order both disks)

## MODULA 2

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

## PRINTER UTILITIES

- 7022) FONTSY:** Banner program for all printers. (Includes source).  
**7028) BRADFORD:** An excellent near letter quality printer program for your Wordstar or standard text files. Comes with five fonts for Epson MX w/Graffex, IBM Dot Matrix, Star Gemini 10x/15x, and Epson FX/RX printers. A truly amazing program.

## 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.  
**7043) TOUR:** Version 2.0. Document editor for outlining projects, also include desk calendar.

## TELECOMMUNICATIONS

- 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)  
**7058) & 7059) MBBS:** A very powerful BBS. (Version 4.5). (2 disk set. Must order both disks)  
**7060) MBBS UTILITIES:** Set of utility programs for MBBS.  
**7061) IMP:** Version 2.44 Modem program that supports both KMD batch protocol in addition to MODEM7 type.

## UTILITIES

- 7001) CPM POWER:** Version 2.53. A CP/M subset with many additional commands.  
**7007) DB UTILITIES:** Set of Dbase II utility programs and overlays. Includes source code.

- 7008) FBAD:** Version 6.0. Checks your hard or floppy disk for bad tracks. Includes source.  
**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. Environmental Processing EXecutive. EPEX is 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.

- 7066) & 7067) FATCAT:** Version 2.4. A catalog program that allow cataloging hard drives as well as floppy disks. Very easy to operate and configure. (2 disk set. Must order both disks)

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of your file (^QC), move the marked block to the cursor (^KV), and then return the cursor to the spot the block came from (^QV).

Instead of being absolutely deleted, the block of text is moved to a garbage dump at the end of your file. If you want to undelete a block, jump to the end of the file and rescue it from the dump. (You could also create a macro to automatically recover the most recent block in the dump.) At the end of the day, clear out the trash by deleting all the blocks left in the dump.

Moral: Never assume your word processor can't do something until you've spent a few hours with a macro program and the word processor manual.

•*Fast Printer.* If you write, you need a fast printer, faster than 120 characters per second, even if you already have a letter-quality daisywheel (like the Juki bundled with many Kaypros). It doesn't matter whether it's a cheap dot-matrix printer or a laser printer—the important thing is speed. Why? Because writing on a computer gives people tunnel vision.

Trap: When you write on a computer, you see one screen of text at a time—one long paragraph or two short ones, less if you use double-spacing, as I do. If you want to look at some other part of your text, you have to scroll tediously, screen by screen, or use a search command. And you can't see more than one section at a time, unless you have a word processor that can do split screens (and then you see only 12 lines or less of each part).

As a result, people tend to concentrate only on the current paragraph and lose touch with the overall flow of the piece. At its worst, this tunnel vision breeds the kind of writing that starts for one destination but arrives at another.

Trick: To avoid tunnel vision, print a copy of what you've written so far, and spread it out around your computer while you work. You'll be able to see all of the page you're working on and find any other page quickly. You'll also be able to compare several full pages side by side, something not even the highest of high-resolution screens can match yet.

But many people resist printing anything until they're done because it takes so long. That's why a writer needs a fast printer. This printer doesn't have to be letter-quality, but it should have a tractor

feed and a printer buffer.

The printer buffer is a box of memory chips that sits between your computer and your printer (some printers have buffers built in). The buffer receives the file to be printed as fast as your computer can send it (very fast) and then feeds it to the printer at the printer's own pace, while you and your computer go back to work. You no longer have to stop work while a long file prints.

The tractor feed lets you load your printer with paper and then leave it unattended while it prints page after page. Some people can't bring themselves to spend \$100-150 for a tractor feed, but that's a foolish economy. None of us were born to spend our lives feeding paper to a printer at one minute intervals. Spend the money and get back to work.

With a fast printer, a tractor feed, and a printer buffer, you'll have no excuse for not printing out drafts of what you're writing. After the computer itself, it's the best hardware investment you can make.

### Recommended options

I've mentioned all of the "must-haves," now I'll get into the "desirables."

•*Outline Processor.* Though I haven't yet found the perfect outline processor for either CP/M or MS-DOS, I love these programs. It takes time and effort to integrate one into your writing, but I think they're well worth the trouble.

I use outline processors in several ways. First, I use them to brainstorm and then outline practically anything I write longer than 500 words. Even if the outline is only cursory, I either print it out or pull it into my word processor when I start to write so that I can easily keep myself on track. Second, I use them when I have a bunch of related ideas and facts that don't quite make an article. When this happens, I play with the ideas and facts I do have, sorting them in different orders, grouping them under different headings, and so forth. Eventually, I either stumble onto the thread that connects them all or discover what's missing.

Third, I sometimes have an article all outlined but still find it hard to get started, usually because there's some difficult problem to solve right at the beginning of the article. In these cases,

instead of transferring the outline to my word processor, I just keep working on it in the outline processor, adding paragraphs of text beneath various headings to flesh out the parts that I'm confident of. With the outline processor, I can move around the article in a completely random way, working a bit here and a bit there, without getting lost. Eventually, I get enough done so that the article takes shape and the remaining problems don't seem so formidable.

You can find reviews of CP/M and MS-DOS outline processors in the July 1986 and August 1986 *PROFILES*. You can also find my comments on how certain outline processors stand up after months of use in the April 1987 "Flea Market."

•*Style Checkers.* Since we've got programs to check our spelling, why shouldn't we have programs to check our grammar and style? The current crop of style checkers, like Grammatik II or Punctuation & Style (CP/M and MS-DOS), are useful if you understand what they're trying to tell you. But you should never simply take what they say at face value.

One thing that both Grammatik II and Punctuation & Style do well is to check your writing for punctuation errors. They're fast and consistent, and I find them very helpful in cleaning up a manuscript before it goes out the door. They don't substitute for careful proofreading, but they earn their keep.

The tricky part of using a style checker comes when they start suggesting changes in wording or commenting on the "readability" of your style. To their credit, both Grammatik II and Punctuation & Style have manuals that are very clear about what the program can and can't do and how you should interpret their advice.

•*Electronic Thesaurus.* Some people like these programs a lot, and if you do, then they should be part of your kit. I don't find them very useful because they don't have enough synonyms for me and because most of them still have problems with words that are not in the basic form (like *laughing* instead of *laugh*). They also don't allow the same kind of associative browsing that a printed thesaurus does.

All this will change, however, and I expect to see some exciting products before long.

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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.

Fancy packaging and expensive type set manuals add greatly to the cost of most application packages but have little lasting value. Once your system/s are up and running for a week or so their real worth is their day-to-day productivity and responsiveness; the other materials gather dust. CPI Business Systems include **comprehensive manuals, sample data files, tutorial sessions, etc.—everything you need is included.**

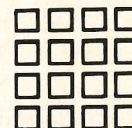
No system is perfect; CPI Business Systems are not exceptions. That's why users are entitled to support when they need it and that's why CPI continues to enhance each system regularly based on user's suggestions.

Most users need a little support when getting started so we include 45 days of FREE support with each application. Others charge hundreds of dollars extra. Users of CPI Business Systems can extend support for a full year for less than ten cents per day per application.

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A complete payroll system supplied with current tax routines for every state. Multiple pay rates, multiple overtime rates, multiple other pay rates, eight user deductions (each can be an amount, a rate or %), deductions may be taken before or after taxes. Commissions, tips, tips considered as wages, earned income credit, SUI, SDI, etc. are all included. In short it's a very comprehensive payroll system but one which is very easy to use. Its functions include Employee File Maintenance; Employee Lists in multiple levels of detail; Input Worksheets; Time Card Entry; Regular, Overtime, Other, Commissions, Tips, Misc. Pay. Exception Processing is the rule so you need only enter variable data. Manual checks are processed quickly and easily. Weekly, Bi-Weekly, Semi-Monthly, Monthly pay cycles (run individually or combined); Departmental Payrolls; Checks; Check Registers; Deduction Registers; Earnings Reports; 941's; W-2's; Unemployment Reports; Multi-state; Manual Checks; G/L interface for Federal, FICA, State and Local Taxes, Federal/State Add-Ons, FICA, FUTA, SUI, SDI, EIC, 8 user deductions. CAPACITIES - 600/2000 emp. (CPM/MS-DOS), 98 Tax File Rcds.

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Improve your cash management with this fine system. You'll get the up to date accurate picture of accounts to be paid, cash requirements for the data on file. Payments and notes vouchered automatically insuring timely payments. Complete check writing included. The system reports include Vendor File Lists, Open Vouchers, Ageing By Due Date, Discount Date Ageing, Cash Requirements, Check Registers, G/L Transaction List, Query Vendor Status, Credit Vouchers, Deleted Vouchers. CAPACITIES of 600 Vendors, (CP/M), 2000 Vendors (MS-DOS) - no limit on transactions.

**HARDWARE REQUIREMENTS**

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.  
Disk/s: Dual Floppies/Hard Disk/Both - 191K recommended, less works.  
CRT: 80/24 with Clear, Home, Clear to EOL, Up, Down, Left, Right.

**CURRENT  
UPDATE:**

NEW A/R SYSTEM FOR CP/M AND MS-DOS USERS NOW SHIPPING. NEW FEATURES INCLUDE 4 LINE NAME AND ADDRESS, FINANCE CHARGES, VARIABLE AGEING, DESCRIPTIVE BILLING, ASCII OUTPUT FILES, MULTI-CLIENT PROCESSING. MANY NEW REPORTS, ITEM INVOICE FORMATS, SERVICE INVOICE FORMATS, STATEMENT FORMATS, ETC. FOR PLAIN PAPER AND MANY POPULAR PRE-PRINTED FORMS. TAXABLE AND NON-TAXABLE ITEMS ON SAME INVOICE. FLASH REPORTING TO SCREEN OR PRINTER; MORE . . .



# Life at 300 Baud

## Electronic law

by Brock N. Meeks

*Law is nothing unless close behind it stands a warm living public opinion.*

—Wendell Phillips

*The life of the law has not been logic; it has been experience.*

—Oliver Wendell Holmes, Jr.

**T**he Law, born of public opinion and experience, stirs up passionate emotions like few other topics. Be it First Amendment rights or the speed limit, law is a hot topic for debate everywhere from barrooms to the Boston Commons to bulletin board systems.

Five years ago you couldn't find a bulletin board system dedicated to legal matters. Today, however, legal BBSs dot the electronic landscape. Some boards are for lawyers only and others encourage participation by the layperson.

Besides the obvious advantage of picking up a professional contact or a little free legal advice, careful perusal of a law-oriented BBS is likely to turn up practical items for both the professional and the layperson. For example, I found a "fill-in-the-blanks" will for the state of California, where such wills are acceptable.

For the professional I found a host of public domain programs designed by attorneys to make a legal office run smoothly.

This month we'll look at three legal BBSs. Two are run by lawyers and one by a policy analyst in Washington, D.C. All three are at the top of their class.

### Living Legacy

**Board Name:** Legacy

**Location:** Beverly Hills, CA

**Phone:** (213) 553-1473

**Password:** Issued at log-on

**Baud Rate:** 300/1200

**Hours of Operation:** 24/day

Think of a lawyer and what comes to mind? (Besides *L.A. Law*, *The Paper Chase* and BMWs.) Analytical thinking? Organization? Legacy does nothing to dispel that crack image—if anything, it enhances it. This BBS is a work of art as much as it is a forum for dispensing

magazines (six in all) offer pointed editorials on timely topics. Beyond these online magazines there are four "update" topics covering labor law, family law, tort law, and Infomat—a general legal update.

There is a File Cabinet section con-

## Legacy's referral service gives you a list of names and addresses of lawyers.

legal information.

Sysop Robert Kohn runs this board under TBBS software, which means commands execute at a single keystroke; a carriage return is seldom needed on this board.

At the main menu you'll find several options. In the Conference section you'll be able to participate in several different discussions grouped into three distinct areas: law, computer, and public.

The law conferences include topics such as Paralegals Corner, Pro Bono Publico, Computer Law, and L.A. County Bar—a private conference for practicing Los Angeles attorneys.

Under Computers you'll find the topics IBM, Ashton-Tate, Law Office of the Future, and Legal Research.

The Public conference is somewhat of a catch-all. General discussions that don't fit into any of the above categories are hashed out here.

Also from the main menu be sure to check out the News section. Here are several online magazines dealing with topics from Computer Law to a "Lawyers Lounge Magazine." These different

taining both program files and forms, such as the fill-in-the-blanks will I mentioned earlier.

Other services offered on Legacy include a lawyer's referral service (you can ask for a specific type of lawyer and receive a list of names and addresses on your screen); an electronic version of *The Paper Chase* is offered to students—course outlines can be uploaded as well as study notes; and you can roam through a free classified section looking for associated legal services, such as a transcriber or forensic specialist.

Legacy does charge \$45 a year for full access. You can use the board for free if you don't register, but you're limited to just 20 minutes a day.

A couple of text files that I found particularly interesting are called "Ten Key Questions You Should Ask Your Lawyer About Computers," by noted computer law expert Paul Bernstein, and "Computer Crime Statutes," a file that shows what states have passed computer crime laws. Those are just a few examples—this board is packed with file after file of useful information.

---

## Law, Cincy style

**Board Name:** LawTalk

**Location:** Cincinnati, OH

**Phone:** (513) 721-4902

**Password:** Issued at log-on

**Baud Rate:** 300/1200

**Hours of Operation:** 24/day

The first thing you notice about LawTalk is that it's running under the venerable CP/M operating system. Further, the software that drives the board, Micro Bulletin Board System (MBBS) was developed in California by Doren Kim Levitt on a Kaypro II. Although those facts might bring a snide remark or two from a sysop running an MS-DOS BBS, LawTalk has nothing to be ashamed of.

those needs. Comments from the sysop are only of a general nature. It would be foolhardy on your part to rely upon them in any matter of legal consequence."

Apart from the discussions is a CP/M section where all file transfers take place.

LawTalk's hard disk is divided into 18 separate directories. Most of these directories contain text files for a specific area of law. These directories include: Corporate/Business Law, Divorce/Domestic Relations Law, Estate/Probate Law, Labor Law, Landlord/Tenant Law, and more. Of particular note is a directory containing a newsletter written by Yaros called, "The View From In Front Of The Bench."

policy directly affects anyone that has ever fired up a modem. Because telecommunications encompasses AT&T and the Bell Operating Companies, every modem owner should be aware of potential legislation and policy changes that could affect the cost and access to those phone lines. A steady diet of this BBS will keep you up-to-date on precisely those subjects.

The first area of note on IDI is the Bulletins section. Here you'll find text files such as a listing of available grants for setting up your own BBS, a list of government BBSs, a telecommunications newsletter, an extensive classified section listing jobs in Washington D.C., and a proposal for a national sysops conference.

IDI also contains an extensive shareware library. There are nine different directories covering desktop utilities (such as SideKick work-a-likes) to printer utilities. (These files are for MS-DOS computers only.) In addition, there are directories containing the full-text of policy statements from government officials and columns written by Simon.

To save you the expense of running a file listing for every directory when online, you might first consider downloading the file IDIDIR.ARC. This is a complete list of all files (including a one-line description) carried on IDI.

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## LawTalk's discussions are balanced between barroom lawyers and practicing attorneys.

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### Approach the bench

From legal matters to policy decision making, bulletin boards are making inroads on the nation's legal community. It's a good move.

Used properly, a BBS can have a definite impact on the local legal environment.

In Chicago a user was able to beat a speeding ticket because of the information he received from a lawyer regarding the validity of radar speed guns.

In Michigan users of a BBS run by Senator Sederburg convinced him to change his vote on a crucial "seatbelts required" bill.

And in California a young lawyer just starting his own practice picked up a dBASE III client billing program that saved him hundreds of administrative hours.

The list goes on. Used wisely, these boards are a valuable asset to lawyer and layperson. ■

At the heart of this eight-bit beats a 40 meg hard drive.

As impressive as the Legacy BBS is for its organization and layout, LawTalk is for the sheer human interaction. The conferences on LawTalk embody the full spirit of the Wendell Phillips quote that opened this column.

For example, when I logged on to LawTalk I found a rousing discussion focusing on New Jersey's "Baby M" surrogate mother case. And although the board's barroom lawyers provided the discussion's spark, the board's practicing attorneys provided the balance and legal insight. Anyone following the ebb and flow of this controversy must have come away with a better understanding of the complexities of the case—I did. This type of discussion is typical on LawTalk.

The sysop, David Yaros, makes sure that anyone expecting legal advice from LawTalk is on their own. In an opening bulletin Yaros explains that LawTalk "is not the place to seek specific advice on a personal legal matter. Individual consultations are better suited to addressing

### Center stage

**Board Name:** Issues Dynamics Inc.

**Location:** Washington, D.C.

**Phone:** (703) 734-1796

**Password:** Issued at log-on

**Baud Rate:** 300/1200/2400

**Hours of Operation:** 24/day

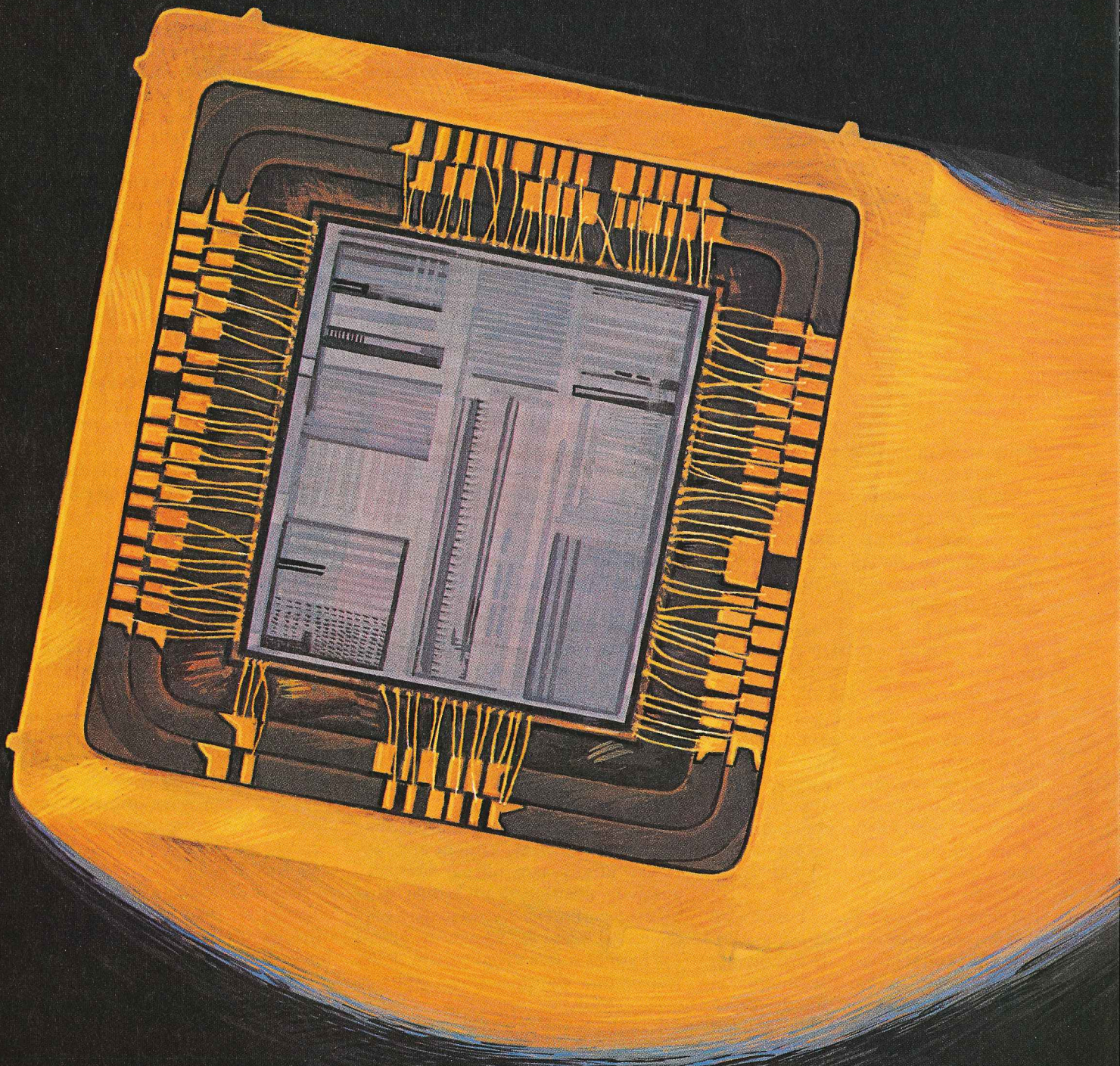
Take note, this BBS is probably the most important source of information for modem users in America today. A bold statement, but not one made lightly. Sysop Sam Simon is a lawyer and lobbyist specializing in telecommunications policy. As such, Simon has his finger on the pulse of Washington's legislators and policy makers.

Simon describes Issues Dynamics Incorporated (IDI) as "a public and consumer affairs consulting company uniquely positioned to bridge gaps between corporate, consumer and governmental interests." Obviously, Simon has been over this script before; in the Washington political arena practice makes policy.

What makes all this so important? I'm glad you asked. Telecommunications

# THERE'S A STRANGER IN TOWN

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## Getting acquainted with the 386

by Marshall L. Moseley

**A**s you may know, there's a somewhat mysterious stranger in the world of microcomputers: the 386 machine based on the 80386 microprocessor from Intel Corporation. Though the 80386 chip was introduced a couple of years ago, it has only recently begun to be used in microcomputers, and as this article is being written, the micro community is still waiting for an operating system that will take full advantage of this machine's capabilities.

It's been said that the computing power available from the 386 would have cost several million dollars just a few years ago, and this machine will offer the power of minicomputers at an affordable price to the business world. But at this point there is still a great deal of conjecture and speculation about what the 386 will mean in terms of everyday computing, and about who will use it for what purposes.

That, in part, is what this article is for: To provide you with a look at the potential of 80386-based computers, including Kaypro's 386 machine, in the workplace. Here's a taste of what 386 users can look forward to:

- Features inherent in the design of the 80386 chip will make it possible for an 80386-based microcomputer to directly use more than four million times the amount of memory currently addressable. And the 80386 is not simply fast, it is very fast. No more taking a sip of coffee while the file sorts or the spreadsheet recalculates. Computers based on this processor operate at twice the speed of a 286i and four times the speed of the original Kaypro PC. What all this means is that big jobs will be speeded up significantly—a huge spreadsheet could be recalculated in a fraction of the time it takes on a 286i or PC, for instance, resulting in significant time savings.

- How would you like six computers working for you at once instead of one? How about ten? Twenty? This will be possible with the 80386. Once the software is developed, you'll be able to create "virtual computers" in memory, providing each with a megabyte of memory. Each one of these "computers" will be as powerful as a standard MS-DOS computer, and all of them will operate simultaneously. You will be able to run spreadsheets, data bases, word processors, and accounting programs—all at

the same time, and the machine's speed will make it possible to more quickly and conveniently pull information from one program—say a spreadsheet—into a file in another, such as a word processor.

To appreciate what the 80386 means—the advances it represents and the changes it will bring about—you need to know a bit about how it works, so we'll start with a discussion of the structure and properties of the 80386 microprocessor, including its memory and data handling capabilities and its modes of operation. We'll end with a more detailed look at where and how the 386 will be put to use.

### The structure of the 80386

Before we go any farther, we should state what a microprocessor is and does. A microprocessor is the device that controls all the internal operations of your computer. It's an integrated circuit consisting of a single silicon chip sandwiched between two ceramic or plastic plates. That silicon chip contains many transistors, each of which is almost microscopic in size. (In fact, a single microprocessor can hold the equivalent of 200,000 transistors.) Simple math is all a microprocessor does, but it does it correctly every time, and it does it fast. Instructions to the processor are measured in MIPS, millions of instructions per second.

The 80386 microprocessor, a wafer of silicon about an inch square and less than an eighth of an inch thick, is a phenomenally powerful little package. It would be possible to devote the rest of this article to a technical discussion of its features and their functions. But for our purposes here, we'll simply hit the highlights and explain what they mean to the average user.

- The 80386 has 132 signal lines to carry electrical signals between the processor and the "outside world." Of those lines, 32 are specifically for data transfer and 32 are for memory addressing—the fact that they have separate functions is what's significant. The 8086 and 8088 microprocessors had multiplexed lines—that is, lines that do double duty. (For more on the 8086 and 8088 see the related article, "The Intel Family Tree," on page 26.) Multiplexed lines constantly switch func-

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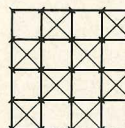
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tions, causing the processors to run much more slowly than if they had separate data and address lines. Because the 80386 does have separate lines, it runs much faster.

•Microprocessors contain (among other things) registers—locations in which values are stored. All operations performed by the processor are performed on values: bits, bytes, or groups of bytes. The 80386 contains 32 registers, many of which can hold 32 bits, whereas the registers in the earlier 80286 micro-

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## Processors work so fast that they spend much of their time waiting for instructions.

---

processor held 16 bits. There is a one-to-one relationship between the 32 bits in a given register and the number of data lines discussed above. This enables the 80386 chip to move data to and from memory 32 bits at a time, something older processors in this family could not do. The result of this ability to move more data at one time is greatly increased processing speed.

•The microprocessor is divided into separate components called *units*: the code prefetch unit, the instruction decode unit, the execution unit, the segmentation unit, and the paging unit. They all help to make the 80386 powerful, but the two most significant features are the code prefetch unit and the paging unit.

Processors work so fast that they spend much of their time waiting for instructions from whatever program is running. The code prefetch unit uses this time to retrieve incoming instructions and store them sequentially in a prefetch queue. You see this as speed; the 80386 almost never has to wait for an instruction. It executes one and turns to the prefetch queue for another.

The paging unit is the part of the 80386 that manages 4K blocks of memory called *pages*, or page frames. In the past, programmers had to manage memory themselves, laboriously figuring ways to access it, store to it, and retrieve from it. With the paging unit, a programmer can issue fewer instructions to the processor and the chip will take care of storing, retrieving, and accessing a given page of memory. The paging unit is important because both the “virtual computers” mentioned above and the protected operating mode explained below use memory paging. Without it, the most useful features of the 80386 are inaccessible.

### Memory addressing

In the world of microcomputers memory is power. The more memory you have, the more work you can do. The amount of memory a microprocessor can address—the number of locations in memory—is limited by the number of address lines running into the chip. Every time you add an address line, you raise the number of addressable memory locations by a power of two.

The 80386 has 32 address lines, so it can directly access 4,294,967,296 bytes, or four gigabytes of memory. That's *four million kilobytes of RAM*—quite a bit of room to work in.

The 80386 can *directly* address four gigabytes of RAM; it can *indirectly* address 64 terabytes of memory—70 trillion bytes—using a form of memory management called *virtual memory*. In virtual memory, portions of a disk (or magnetic tape or some other mass storage device) are used to hold data, and that data is swapped in and out of physical memory (RAM).

This is accomplished by using the paging unit. When a request is made for memory that is not physically present, the paging unit swaps four-kilobyte blocks of data from disk into memory. In effect, the four gigabytes of RAM are just the tip of the memory iceberg.

But don't look for these memory capabilities to be implemented soon. To address four gigabytes of memory using current technology you would need a PC chassis 125 feet long just to hold the chips. I have no idea what a 64-terabyte hard disk would look like—a small building, probably. Technology improves though, and the 80386, with its staggering memory abilities, will be ready when it does.

### Operating modes

The 80386 has three discrete operating modes—real mode, protected mode, and virtual 8086 mode—although not all are supported by MS-DOS.

*Real mode.* In real mode, the 80386 simply imitates an 8086 processor. It addresses only one megabyte of RAM, uses 16-bit registers (or 16 bits of a 32-bit register), has a 16-bit data path, and runs the MS or PC-DOS operating system. It functions just like an *incredibly* fast IBM PC. The Kaypro 386 uses real mode when it powers up.

Real mode provides compatibility with the thousands of programs available for MS-DOS. Lotus 1-2-3, dBASE III, WordPerfect, AutoCAD—all run under real mode, and they run *fast*. As we suggested earlier, if you're sorting huge files or recalculating a very large Lotus spreadsheet, this kind of speed is a real advantage—it offers the possibility of saving literally hours each day.

*Protected mode.* While real mode carries the restrictions of the machine it imitates, protected mode is a different story. Under this mode, the 80386 can access four gigabytes of physical memory and 64 terabytes of virtual memory in the manner described above.

More importantly, protected mode enables the microprocessor's multi-tasking abilities. In multi-tasking the microprocessor performs many tasks at one time. It quite literally does two or more things at once. Each task has memory reserved for it. The task and its memory are assigned a privilege level, so that one task cannot interfere with another. The processor keeps track of the progress of each task and how much memory is used.

The catch is that few current operating systems support protected mode, and MS-DOS is *not* one of them. Microsoft's XENIX is, but it's hellishly complex to get up and running and to use, and almost no popular software runs under XENIX.

The solution will be a special protected-mode operating system, one designed specifically for the 80386. Even then, it is doubtful that today's software will run flawlessly, because



# THE KAYPRO 386

*Built for speed*

**K**aypro Corporation recently unveiled the Kaypro 386, a microcomputer based on Intel Corporation's 80386 microprocessor and designed to provide power and performance for the business community.

The standard Kaypro 386 system consists of a system unit and a keyboard. The computer requires a video display adapter and a video display, both of which must be purchased separately.

The system unit contains the mainboard, the disk drives, the expansion slots and the power supply. The output ports are industry standard: there is a parallel port for connecting to the printer; for connecting to modems or other serial devices there is an RS-232C serial port. Both ports are exactly like their counterparts in the Kaypro 286i and the Kaypro PC.

An AT-compatible disk controller that supports up to two floppy disk drives and two hard disk drives is also standard equipment. The Kaypro 386 comes with a high-density floppy disk drive, just like the Kaypro 286i. This drive can read, write, and format both high-density 1.2 megabyte floppy disks and the more common 360 kilobyte disks.

Kaypro 386 models are available with 40, 82, 130, 240 and 330 megabyte hard disks. All the hard disk drives use a rotary voice coil head positioner to move the drive head over the media surface. This device makes the drives operate much faster than older drives, which used stepper motors to position the drive head. Also included with hard disk models is SpeedStor disk partitioning software from Storage Dimensions of Los Gatos, California. SpeedStor allows you to create partitions that exceed the 32-megabyte limit imposed by MS-DOS. With SpeedStor it's possible to partition a 132 megabyte drive into two 71 megabyte drives, three 44 megabyte drives, or even one 132 megabyte drive.

The Kaypro 386 mainboard contains the 80386 microprocessor, which operates at 16 megahertz. If the program in use requires a slower clock speed, the microprocessor can be set to operate at 8 MHz; Ctrl-Alt-1 toggles 8 MHz operation, while Ctrl-Alt-2 switches back the computer back to 16 MHz mode. There is also has a socket for an 80287 math co-processor. If you have software that uses the 80287, the co-processor will speed up this machine even more.

The 80386 addresses memory 32 bits at a time; previous

microprocessors addressed memory in 8- or 16-bit blocks. This new 32-bit data path between the processor and memory helps to make the Kaypro 386 a fast machine. All Kaypro 386 models have 512K of RAM on the mainboard. Using expansion boards, RAM can be expanded up to 15 megabytes. Along with the processor, the mainboard contains eight expansion slots: two standard 8-bit slots, four standard 16-bit slots, and two new 32-bit slots. The 32-bit expansion slots have 32 data lines and 32 address lines, making them ideal for use with 32-bit memory boards.

## The keyboard

The Kaypro 386 has an enhanced keyboard with 102 keys, very similar to the IBM enhanced keyboard with one exception: the Kaypro 386 has an extra key in the lower left corner of the keyboard labeled "Macro." No software uses it right now, but this key provides another alternate function key, similar to the control or shift keys.

There are separate keypads for cursor control keys and pre-defined function keys (Page Up, Home, End, etc.), along with the standard dual-purpose keypad from earlier MS-DOS computers. The new keyboard also has two more programmable function keys than previous models, bringing the total number to 12 (F1 through F12).

## Expansion

There are three Kaypro 386 models: A, E, and N. The main differences among the three are memory and the available hard disks. All the models have the 512K that comes standard on the mainboard; Models E and N contain a two-megabyte RAM expansion board. With the Model E there is a choice of a 40, 82 or 130 megabyte hard disk; Model N has hard disks with 150, 240 and 330 megabyte capacities.

Models E and N are shipped with the Expanded Memory Manager 386 software from Quarterdeck Office Systems of Santa Monica, California. EMM 386 is a software driver that allows you to run programs and/or use data that exceeds the 640K barrier imposed by MS-DOS. A few of the programs that have this ability are Framework II, Lotus 1-2-3 Release 2, Symphony 1.1, SuperCalc3 and Ready!. EMM 386 is fully compatible with version 3.2 of the Lotus-Intel-Microsoft (LIM) specification.

—M. Moseley ■

the differences between real and protected mode are so great. But Intel did not leave us out in the cold. They did provide a way to have access to the power of both today's software and tomorrow's microprocessor: virtual 8086 mode.

**Virtual 8086 mode.** In virtual 8086 mode, the 80386's paging unit is used for memory management. The 80386 processor partitions sections of memory into one-megabyte units and then treats each section as a single computer using an 8086 processor. You can operate these "virtual machines" simultaneously, and there will be no appreciable difference in speed between them and an actual 8086-based machine.

Think about that for a moment. Using virtual 8086 mode, the following scenario is entirely possible. You come to work, sit down at your desk and fire up your faithful Kaypro 386, which automatically loads VM-DOS (Virtual Machine-DOS). You begin with Lotus 1-2-3. Because you need to see four different financial models before noon, you create four virtual machines, run 1-2-3 on all of them, and set each one to calculating the same massive spreadsheet in a different way. While the calculations are taking place, you create a fifth virtual machine, load yesterday's inventory data into dBASE III, and set it to printing out today's reports. Finally you access a sixth machine-in-memory, run WordPerfect, and work on your quarterly reports while Lotus and dBASE take care of the drudge work.

The everyday use of virtual machines is not far off. At this writing, The Software Link Inc. of Atlanta, Georgia, planned to release PC-MOS/386, an operating system for 80386-based computers, in May of 1987. PC-MOS/386 makes full use of virtual 8086 mode, allowing the creation of up to 25 virtual machines.

The combination of virtual 8086 mode and the increased memory and multi-tasking provided by protected mode give the 80386 processor a great deal of power—power that is waiting to be tapped.

### The future

MS-DOS machines, virtual or otherwise, are still limited to one megabyte of memory: 640K of user memory and 360K of system memory. To truly progress, microcomputers must leave conventional MS or PC-DOS behind. An operating system that makes full use of the 80386 protected mode is required.

In April, Microsoft Corporation announced the impending release of OS/2, a protected-mode operating system designed for 80286- and 80386-based microcomputers. Microsoft's press release stated that OS/2 could "utilize the full address space of the 80286 processor, 16 megabytes of real memory and one gigabyte of virtual memory." These preliminary specifications revealed that OS/2 fell short of being the system that micro-computer enthusiasts were waiting for. The most telling fact about OS/2 was its memory address space: 16 megabytes. That happens to be the memory limit of the 80286 microprocessor. Collings Hemingway of The Waggener Group, Microsoft's public relations firm, confirmed that OS/2 was indeed based on the 80286 microprocessor, not the 80386. This was disappointing. It meant the 80386's memory addressing abilities and virtual 8086 mode were ignored under OS/2.

Microsoft has stated that it will release an 80386-based operating system sometime in 1988, but that may be too late;

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**Complete Business Graphics Toolkit** — Profiles said, "This is the program to which all other CP/M graphics programs must be compared." REMBRANDT can do it all — draw lines, circles, boxes and large characters on-screen. Also generates pie charts, xy plots and bar charts from your data and creates dazzling on-screen slide shows. Prints graphics on most printers. For all Kaypro CP/M machines. Older (1983) Kaypros, order III/IV version for \$44.95.

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## THE INTEL FAMILY TREE

**T**he genesis of microcomputers occurred in 1974, when Intel introduced the 8080 microprocessor. At the time, its 8-bit registers, 8-bit data path, and ability to address 64 kilobytes of memory seemed quite adequate for any microcomputing task. It was not long before the first microcomputer using the 8080 processor was introduced—the MITS Altair. It contained a mother board, a CPU card and 256 bytes of memory. (No problem though; you could expand the memory with one-kilobyte RAM cards).

Intel followed the 8080 with the 8086. The 8086's registers could hold either 8 or 16 bits, and it had a 16-bit data path. It supported faster clock speeds and could address one megabyte (1,048,576 bytes) of memory.

About a year after the release of the 8086, Intel released the 8088—though to this day many people don't understand why. The 8088 is exactly like the 8086 in every respect, except that the 8088 has an 8-bit data path, as opposed to the 8086's 16-bit data path. The 8088 is slower than the 8086; otherwise, they are exactly the same.

The 80186, released in 1983, was never widely used in the microcomputer industry. It was an improvement on the 8088 and the 8086 because it had separate address and data lines (the data and address lines are multiplexed in the 8086 and 8088), and it supported faster clock speeds. It also had two internal timers, making it useful in real-time industrial applications such as robotics. Few personal computers were manufactured using the 80186, though, and another processor released in 1983, the 80188, suffered the same fate.

The 80286 microprocessor, released in 1983, has separate data and address lines and can access 16 megabytes of physical memory. It can also use clock speeds of up to 12 MHz, though 8 MHz is the common speed.

Computers based on the 80286 processor were released in 1984, and the business community has embraced them. First came the IBM PC AT, then Kaypro Corporation's AT compatible, the 286i. In the last three years, 80286-based machines have taken away some of the market from mini-computers and mainframes. With a 40-megabyte hard disk installed in it, a Kaypro 286i or a PC AT compatible can crunch a lot of numbers, store a lot of information, and hold its own against some of the big boys.

As powerful as it is, the 80286 microprocessor is just a half measure. In 1985 Intel introduced the 80386 microprocessor, and today, two years later, computers that feature the 80386 are being released. The 80386 is a true 32-bit processor, with a 32-bit data path between the processor and memory. It has a rated clock speed of 16 MHz, and new features in the chip's design make it a silicon wonder. ■

— M.L. Moseley

The Software Link, mentioned earlier, is trying to steal Microsoft's thunder. PC-MOS/386 will run all standard MS-DOS software and makes use of protected and virtual 8086 mode. It can also address up to four gigabytes of memory, thus taking advantage of the 80386's powerful memory capabilities.

Application software that uses the 80386's full powers is on its way; the tools for writing that software are already here: Phar Lap Software of Cambridge, Massachusetts, has introduced 386/ASM, a macro assembler that supports the 80386's 32-bit registers and assembly language instructions. MetaWare Inc. of Santa Cruz, California, has released the High C Compiler 386, designed specifically for the 80386.

### Who will use the 80386?

The new 386 machines are relatively expensive, \$5,000 and up. So who's buying them and for what purposes? *Computer Dealer* magazine (February 1987) states that "The first wave of customers consists of power users in love with technology that lets them run standard PC software three times as fast as an AT." The next wave is apt to be businesses looking for affordable alternatives to mini- and supermini-computers like the VAX series.

Some likely applications:

**Design.** Engineers doing computer-aided design (CAD) and computer-aided engineering (CAE) can make instant use of the new 80386 machines. CAD and CAE software is very dependent on high-resolution graphics and on advanced mathematics, both of which require heavy-duty calculations. The 80386 was born to crunch numbers.

**Networks.** Another immediate use for 386 machines is as file servers in PC networks. In some networks, some PCs are dedicated entirely to holding file directories and controlling user requests for access to those files. A slow file server means a slow network, which makes its users unhappy. With a 386 used as file server, speed is no longer a problem.

**An alternative to time-sharing.** Some small companies that need computers to do their accounting rent time on mainframes or minis because they can't afford them themselves and micros just haven't been able to do the job. Again, the speed of the 80386 comes to the rescue. An 80386-based computer with a large, fast hard disk can equal or outperform a mainframe in many instances.

You'll probably never see a 386 machine on every desk, but as soon as the software exists to make them cost-effective, they'll make their presence felt in the business world.

### The end (or beginning?)

The time is fast approaching when the 640K limit will be a memory, and personal productivity with computers will be many times what it is today. Using 80386 technology, spreadsheets, data bases and other programs will access gigabytes, or even terabytes, of memory.

The bottom line is power—power to process information, formulate ideas, and test hypotheses; power to learn, power to work. The 386 computer puts more of it on our desks than was dreamed possible a decade ago. ■

Marshall L. Moseley is the assistant technical editor for PROFILES.

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# Programmable Pages

## An introduction to page description languages

by Ted Silveira

**T**hough desktop publishing is no longer new, it continues to be a hot topic. And why not? When you use a program like Ventura Publisher or PageMaker to create a page on your screen and then see that same page emerge from a laser printer with every column and picture and headline in place, the only word to describe it is *magic*.

Like a lot of modern computer magic, this trick is made possible by fast processors, cheap memory, high-resolution graphics, and sophisticated software, plus a new bit of magic—the page description language. Though you'll never see a page description language on the software sales hot list, it's something that's eventually going to affect almost everyone who uses a computer.

### What is a page description language?

A page description language is a special programming language whose function is to tell a laser printer, typesetter, or other device how to produce a printed page. Like BASIC, Forth, or any other programming language, a page description language can do calculations, store variables, and process strings and arrays. Its strength, however, is its text and graphics functions, which tell a printer what characters and type fonts to use, where to place graphics and how to draw them, what width and color lines to use, and so forth.

Before page description languages, a computer could control a printer in two ways. First, it could use a series of *print control codes* or *escape codes* to tell the printer how many lines down the page to move, what characters to print on that line, and when to move to the next line. These print control codes work fine for printing single or double-spaced, setting a new margin, or creating superscripts, but they aren't flexible enough for graphics or precise page design.

Second, a computer could control a dot matrix or laser printer by using *bit-mapped graphics*. In this system, the computer treats everything—both text and pictures—as simply a collection of black dots and white space. To print a page, then, the computer tells the printer where to place every individual black dot starting from the very top—print two

dots, skip the next three dots, print two more dots, and so on down the page. It's a flexible system, but it takes time and disk space (ask anyone who has printed a full page of graphics on a dot-matrix printer).

Page description languages offer a third approach, more flexible than simple print control codes yet less space and time-consuming than bit-mapped graphics. Using the page description language, the computer creates a set of instructions that describes how to create the page—move 2.5 inches down from the top of the page, move 4.25 inches in from the left edge of the page, draw a circle 2 inches in diameter using a black line 0.1 inch thick, fill the circle with a 50 percent gray, and so forth.

This set of instructions is a program, one that tells the printer how to create a page in much the same way that a mortgage analysis program tells your computer how to create an amortization table. To understand a page description language, the printer has to be “smart.” That is, the printer needs its own processor and memory to interpret the instructions and turn them into printed dots on a page. Apple's LaserWriter, for example, which uses the PostScript page description language, has one megabyte (1,000K) of RAM and uses the same processing chip as the Macintosh computer.

### Why have a page description language?

If the printer has to translate the page description language's instructions into a dot-by-dot map in order to print a page, why bother using a page description language at all? Why not use bit-mapped graphics from the start?

First, bit-mapped graphics files are big because they record every location on the page where a dot must be printed and every location that must be left blank. By contrast, a page description language creates a much smaller file that uses less disk space and takes less time to send to the printer.

Second, a page description language gives you *device-independence*. For example, a file created with PostScript (a popular page description language) can be printed on any printer that understands PostScript—an Apple LaserWriter, a QMS-PS 800 laser printer, a Linotronic 100 typesetter, etc. But

a bit-mapped graphics file created for an Epson dot-matrix printer won't print properly on a Hewlett-Packard LaserJet.

Third, a page description language also gives you *resolution-independence*. Resolution is measured by the number of dots per inch (dpi) used to create text or graphics: the more dots per inch, the higher the resolution. High resolution gives sharp, clean lines and smooth curves; low resolution gives the jagged look typical of cheap dot-matrix printers. A normal computer screen has 65-80 dpi resolution, a good dot-matrix printer 180 dpi or more, a typical laser printer 300 dpi, and a true typesetter anywhere from 1,200 to 2,500 dpi (like the characters you're reading now).

When you use bit-mapped graphics, they are created at a particular resolution (determined by the program you're using or by the printer or both), and they can never print at a higher

---

## *A page created with a page description language will print at the resolution of the output device.*

---

resolution. If you take a bit-mapped graphics file created at 300 dpi and print it on a 2,500 dpi typesetter, the results will still look like 300 dpi.

But a page created with a page description language will print at the resolution of the output device. If you print a PostScript file on a PostScript laser printer, you'll get 300 dpi resolution. If you print that same file on a 2,500 dpi PostScript-compatible typesetter, you'll get 2,500 dpi resolution.

The combination of device-independence and resolution-independence means that you can test print your file on a relatively inexpensive laser printer and then, when you have every page set perfectly, print the same file on a high-resolution typesetter for your final pages.

Fourth, in any program, it's very difficult to make what you see on the screen exactly match what you'll get from the printer because they are two very different devices. In the future, though, page description languages may be used to draw your screen as well as print your pages. If that comes about, then what you see on the screen *will* be exactly what you'll get when you print. This plan is not currently practical because of the memory and processing power required by page description languages. But as computers get faster and memory gets cheaper, the page description language could become a universal interface for all visual output.

### **What does a page description language look like?**

At the moment, there are three major page description languages—PostScript, Interpress, and DDL (Document Description Language). These three languages share at least two major characteristics.

All three languages are *interpreters* rather than *compilers*. A language compiler creates a separate program (a COM or EXE file) that can run by itself so that once you've created the

program, you no longer need to have the language in your computer. On the other hand, an interpreter, like Microsoft BASIC, doesn't create a separate runnable program. You must first load the language itself, which then reads your program, interprets the instructions in it, and executes them.

All three page description languages use what's called *postfix notation* or sometimes *reverse polish notation*, a peculiar (to humans) notation used also in the Forth language and in some hand calculators (such as Hewlett-Packard's).

Normally, if you want to add 2 and 3, you would express it this way:

2 + 3

In postfix notation, however, you first specify the *operands* (the values you want to work with) and then the operation you want to perform on them. So instead of 2 + 3, you get

2 3 +

Similarly, if you want to add 2 and 3 and then multiply the result by 8, you'd normally write

(2 + 3) \* 8

But in postfix notation, it would be

2 3 + 8 \*

It looks crazy, but the computer loves it.

To give you a sample of what a page description language really looks like, I'm going to use PostScript, the best-known of the current page description languages. PostScript maps out a printed page using the familiar X axis and Y axis (horizontal and vertical, respectively), with the starting point (0,0) at the lower left corner of the page and all measurements specified in *points* (72 points = 1 inch).

The following short PostScript program will draw a two-inch square box in the bottom left portion of the page:

```
newpath
  144 72 moveto
  144 216 lineto
  288 216 lineto
  288 72 lineto
closepath
2 setlinewidth
stroke
showpage
```

The **newpath** command clears out any previous line settings. Line 2, the **moveto** command, creates a starting point two inches (144 points) from the left edge of the page and one inch (72 points) from the bottom. Line 3 (the **144 216 lineto** command) creates a *path* from the starting point to a spot two inches from the left edge of the page and three inches from the bottom. (In other words, it creates a vertical line two inches long.) Lines 4, 5, and 6 (the next three **lineto** commands) draw the top, right side, and bottom of the box, respectively. Line 7, **closepath**, simply connects the starting and ending points so that the box is a closed figure.

At this point, the path for the line has been set, but the line itself has not been drawn. The command **2 setlinewidth** tells the printer to use a line 2 points (2/72") wide, and the following **stroke** command actually draws the specified line. The final **showpage** command prints the page, which will show a two-inch square box, drawn with a line 2/72" thick and positioned in the lower left corner of the page.

PostScript handles text in a similar way. The following short program will print the word **PROFILES** in 24 point Times Roman type, starting at a point one inch from the left edge of the page and two inches down from the top (assuming a standard 8-1/2 x 11-inch page).

```
/Times-Roman findfont
24 scalefont
setfont
72 648 moveto
(PROFILES) show
showpage
```

The **findfont** command in line 1 gets the information on the Times Roman typeface from a dictionary of fonts. The **scalefont** command creates the desired size of Times Roman (24 points here). And the **setfont** command selects 24 point Times Roman as the current type font, which will be used for any text to be printed. As in the earlier example, the **moveto** command selects the starting position, in this case 72 points (one inch) from the left edge of the page and 648 points (nine inches) from the bottom (because everything is measured from the bottom left corner of the page). The command **(PROFILES) show** places the word in parentheses on the page, and **showpage** prints the entire page.

Forth language programmers will feel right at home with PostScript's postfix notation, and like Forth, PostScript is also an *extensible* language. You can create a procedure, give it a name, and then thereafter use the procedure just by giving its name, as if it were a built-in command. For example, the definition **drawbox**, below, will draw a two-inch square box like the one drawn earlier. (The **rlineto** command used below works like the **lineto** command described earlier, except that it specifies movement relative to the current position rather than movement figured from the zero point on the page.)

```
/drawbox
{newpath
moveto
144 0 rlineto
0 144 rlineto
-144 0 rlineto
0 -144 rlineto
closepath
stroke} def
```

Once you've created this definition, all you need to do to draw a box is set the line width and then specify the starting coordinates, as in the following program:

```
2 setlinewidth
144 72 drawbox
showpage
```

If you had to program your printer's every move in PostScript just to print a simple letter, you'd never get any work done, but no one expects hordes of users to start programming in PostScript. Instead, programs that have PostScript printer drivers—like Microsoft Word, Ventura Publisher, and PageMaker—will do all the work while you get the benefits.

But it's good to have the option of programming in a language like PostScript so that you can use its special features that an off-the-shelf program may ignore. For a sample of what you can do, look at Figures 1 and 2 (on page 32), which show two short PostScript programs and their resulting output.

(Both programs are taken from Adobe Systems' *The PostScript Language Tutorial and Cookbook*, published by Addison-Wesley.)

### The battle of the languages

It's clear now that high-resolution graphics are going to become commonplace, both on laser printers and on WYSIWYG screen displays. It's also clear that page description languages are going to play a key role in making this possible. It's no surprise, then, that there's a battle going on in the marketplace to decide which (if any) language will have the upper hand.

---

*PostScript is very  
complete and flexible;  
it supports shading,  
halftones, and color.*

---

At the moment, there are three major contenders: PostScript from Adobe Systems, Interpress from Xerox, and DDL (Document Description Language) from Imagen. Here's how they stack up at the moment:

- PostScript**—PostScript is a very complete and flexible language that includes support for shading, halftones, and color. It is available on laser printers from several manufacturers and on Linotronic typesetting machines (1,200-2,500 dpi resolution). Its typefaces can be scaled to any size without loss of resolution, and it uses ASCII files, which can be easily edited or even created by users. Its files are also completely transportable—any PostScript file should print on any PostScript output device.

PostScript is generally criticized for two weaknesses. First, it is slower than many people feel it should be—it can take a long time to print a page with heavy graphics. (Adobe Systems has just introduced a new, faster PostScript controller for printers.) Second, it is a page-oriented language that has no commands to deal directly with document structure, such as odd/even page printing. (These things have to be handled by an application program such as PageMaker or Ventura Publisher.)

- Interpress**—Interpress, from Xerox Corporation, is much more document oriented than PostScript, with support for two-sided printing and other features. Interpress stores its files in a binary form rather than in ASCII, but it includes a translator that can convert these files to ASCII (so that you can read them and tinker with them) and back again. These binary files give Interpress better speed in printing and also use less disk space. The language is available in three sets—commercial, publication, and professional—each with increasingly greater power (the idea being that you don't have to buy features you don't need).

Interpress, however, is less flexible than PostScript, in dealing with graphics or doing calculations, for example. In addition, because it comes in three upwardly compatible versions, Interpress files are not as universally transportable as



PostScript files. Finally, Interpress lacks strong hardware and software support—Xerox's own Ventura Publisher software didn't support Interpress in its first release version, and the Xerox 4045 desktop laser printer doesn't support it either (though Xerox's larger lasers do).

•**DDL**—DDL is a mystery because, at the time of this writing, it has not yet been released (though Hewlett-Packard has said they will support and "promote" it). From its descriptions, DDL sounds wonderful. It is a document-oriented language, like Interpress, and yet claims all the flexibility of PostScript. Its files can be either binary (for speed and compactness) or ASCII (for easy user-modification) or a combination of the two. It also claims to do some special things, like "intelligent" scaling of fonts (which gives rules for stroke width, etc., as characters are scaled to different sizes) and caching of object bit-maps (saving as many graphic bit-maps as possible so if they're used again, they won't have to be recalculated).

But though DDL sounds like it has the best of both worlds, it must pass two major tests. First, will the language as delivered live up to its promises? And second, who will support the language, besides Hewlett-Packard? Will makers of laser printers and typesetters implement DDL on their products? If not, it doesn't matter how good the language itself is.

(Hewlett-Packard originally planned to make DDL the "official" page description language for their new laser printers. Now, they've jumped on the PostScript bandwagon. However,

DDL will be "promoted" by Hewlett-Packard to their customers, according to LaVon Collins, a spokeswoman for Hewlett-Packard.)

### Who's ahead?

It's possible we'll end up with more than one standard page description language. But if you're about to spend thousands of dollars on hardware and software for desktop publishing, you can't wait a year or two for standards to develop. Yet if you spend thousands for a system based on a page description language that becomes obsolete, you'll have some long years to regret the choice. How do you decide which page description language is best for you?

### Which language has the most software support?

PostScript is supported by more software packages than Interpress and DDL put together, including major word processors and desktop publishing packages. And so far, it is the only one of the three that is supported by a wide range of graphics programs. You can expect that PostScript will continue to be supported by all major software packages that deal with page description languages.

That doesn't mean, however, that DDL and Interpress will be shut out. DDL (because of its connection with the popular Hewlett-Packard laser printers) and possibly Interpress will certainly pick up more support as the software matures, and

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**Figure 1:**

Program taken from PostScript Language Tutorial and Cookbook

```

/Times-Italic findfont 30 scalefont setfont

/printZip
{0 0 moveto (Zip) show} def
320 400 translate

.95 -.05 0
{setgray printZip -1.5 translate} for

1 setgray printZip

showpage
    
```



**Figure 2:**

Program taken from PostScript Language Tutorial and cookbook

```

% ----- Procedures -----
/Helvetica-Bold findfont
30 scalefont setfont

/oshow
{true charpath stroke} def

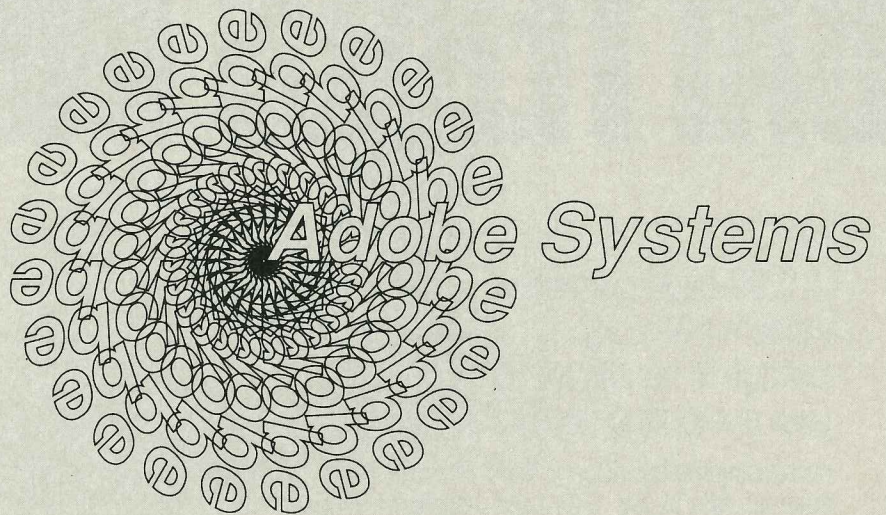
/circleofAdobe
{15 15 345
{gsave
rotate 0 0 moveto
(Adobe) oshow
grestore
} for
} def

% --- Begin Program ---
250 400 translate

.5 setlinewidth
circleofAdobe

0 0 moveto
(Adobe Systems) true charpath
gsave 1 setgray fill grestore
stroke

showpage
    
```



major software packages like PC PageMaker will probably support all three languages (or at least PostScript and DDL).

#### Who has the most hardware support?

Hardware support is probably more critical than software

microcomputer products, suggests that Interpress will increasingly fall behind and eventually fade from the scene.

DDL is the dark horse. If the language lives up to its advance billing, if Hewlett-Packard's support comes through, and if the language becomes available on some other laser printers and

## How do you decide which page description language is best for you?

support. Because of the expense of implementing a page description language on a printer or typesetter, you're not likely to see hardware companies supporting more than one language.

Again, PostScript leads the rest. It has long been used by Apple Computer on the very popular Apple LaserWriter, and earlier this year IBM announced it would use PostScript on its new laser printer. Other companies with laser printers, like Texas Instruments and QMS, have also joined the PostScript fold. In addition, PostScript is available on Allied Linotype's Linotronic typesetters, which gives PostScript users access to high resolution typesetting.

Interpress has minimal support, even on Xerox's own products (or at least, on the desktop products). DDL, on the other hand, has the support of Hewlett-Packard, whose LaserJet and LaserJet Plus laser printers are very popular in the MS-DOS world. So far, however, DDL hasn't been implemented on a typesetter, which limits its usefulness if you need high resolution output.

#### Who has the best typefaces?

One factor that's easily overlooked, but shouldn't be, is the availability of different typefaces for printers using the different page description languages. People quickly tire of unrelieved Helvetica and Times Roman, and one of the hallmarks of quality typography is to have just the right typeface for the job.

PostScript leads yet again. Adobe Systems and other companies have been steadily releasing new PostScript typefaces, and though the number of faces available is still not large, it is growing. DDL and Interpress, on the other hand, are more limited (though it's too early to expect much support for DDL yet). No one is likely to spend much time implementing new typefaces for these languages unless they become popular—but will they become popular without a variety of faces?

#### The current score

PostScript clearly has the advantage over DDL and Interpress. Though the language has weaknesses (which Adobe says it's working to correct), it has widespread software, hardware, and typeface support. Can you imagine a product adopted by both IBM and Apple not being a market leader?

Interpress, on the other hand, seems to have little support at all. Xerox hasn't even done a thorough job of supporting the language on its own hardware and software. That, combined with the fact the Xerox has had little success marketing

on typesetters, then DDL will challenge for a share of the market. But that's a lot of ifs, and PostScript itself is rapidly maturing. For now, the field belongs to PostScript.

Ted Silveira is a contributing editor to PROFILES.

### Quick Reference Summary

**Product:** DDL (pre-named PC Publisher Kit)  
**Manufacturer:** Imagen Corporation  
2650 San Tomas Expressway  
Santa Clara, CA 95052-8101  
**Phone:** (408) 986-9400

**Product:** Interpress  
**Manufacturer:** Xerox Corporation  
P.O. Box 24  
Rochester, NY 14692  
**Phone:** (800) 832-6979

**Product:** PostScript  
**Manufacturer:** Adobe Systems, Inc.  
1870 Embarcadero Rd.  
Palo Alto, CA 94303  
**Phone:** (415) 852-0271

### Helpful Publications

You can also learn more about PostScript from the following books and magazines:

*The PostScript Language Tutorial and Cookbook*  
Adobe Systems, Inc.  
Addison-Wesley Publishing Co.  
Reading, MA 01867  
\$16.95

*The PostScript Language Reference*  
Adobe Systems, Inc.  
Addison-Wesley Publishing Co.  
\$22.95

*The PostScript Language Journal*  
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Part 1 of two part tutorial: Building a donation-tracking system

by Joseph Comanda

**M**astering dBASE isn't easy, but if you invest some time in learning it, it will serve you well. In this two-part tutorial you'll learn how to use it to design a simple donation-tracking system. Along the way, you'll also learn important data base concepts that will stand you in good stead no matter what project you undertake in dBASE.

In part 1, we'll discuss the whole system and then teach you how to build the part that keeps track of donors. Since donors are people with names and addresses, you can adapt what you learn in part 1 to any kind of people-tracking system: clients, employees, club members, whatever.

In part 2 you'll add the part that keeps track of donations and learn how to use both parts together.

The commands in this tutorial work equally well in either dBASE III or dBASE III PLUS.

## The scenario

Let's suppose you work for a small non-profit organization whose sole source of income is donations. You've developed a fairly simple manual system for keeping track of donors and gifts. It consists of an index card file box and a receipts journal.

You make up a card for each donor with name-and-address information on the front and a list of each donation with a running total on the back. When you run out of space on one card, you clip a second card to the first and keep on going.

You use the cards to type mailing labels. You can even do selective mailings to big givers by picking out cards with large total contribution figures. But cards aren't well suited for preparing financial reports that look at donations for a given time period because they organize donation information by donor rather than chronologically.

That's why you keep the journal. In the journal you enter a line for each donation as it comes in, so it's easy to do the calculations for a given time period.

Your manual system works well enough, but you're painfully aware that it involves a lot of duplication of labor. You not only enter donations twice—three times if you count receipts—you're also retyping names and addresses from the cards all the time. You've decided it's time to computerize.

## Doing it in dBASE

dBASE doesn't use file boxes or paper journals. Instead it stores information on hard or floppy disks in *data files* organized into *records* and *fields*. Interestingly enough, you can treat these data files either as computerized file boxes full of index cards or as tables with a column-and-row structure like the manual journal.

If you think of a data file as a file box, then its records correspond to the index cards and its fields to the standard categories of information that appear on each card—like name, zip code, or total contributions. In the table analogy the data file looks like a spreadsheet. Each row is a separate record, each column a field.

You've probably anticipated that you'll need a Donors data file. We'll design it so the records look like the ones in Figure 1 (on this page)—like the fronts of index cards. That takes care of donor information such as name, address, and total contributions, but you still need a place to keep the details of each donation.

You could add extra fields to create the equivalent of the back of the card (see Figure 2 on this page), but there are three problems with such a design. First, it won't give you any more reporting capabilities than the manual card system. Second, no matter how much space you left for donations, you'd eventually run out of room with active donors. Third, it would be wasteful, taking up the same amount of space for one-time donors as it would for regular donors.

The solution is to keep donations information in a second data file, which we'll call Gifts. Each record in the Gifts file will look like the one in Figure 3 (on next page). Viewed as a table, it will even look a lot like the manual journal.

In your manual system, you kept the same donations information in two separate places: on the backs of donor cards, where it was organized by donor, and in the journal, where it was organized chronologically. In dBASE you can keep the

information in one place and organize it differently for different purposes. For reporting on donations income for certain time periods, you can use the Gifts file in chronological order like the journal. When you want to look at the details of each donor's giving you can temporarily link the two files and effectively treat the Gifts file like the backs of the index cards. You'll learn how to do that in part 2, which will run next month.

## Getting into dBASE

Make sure dBASE has been properly installed for your computer according to the instructions in your user's manual. Then follow the steps below to get into it.

If you're using floppy drives, put your working copy of the

Figure 1: Donor records

DONORID	101
TITLE	Mr.
FIRST	John
LAST	Milligan
STREET	975 Winding Way
CITY	Menlo Park
STATE	CA
ZIP	94025
TOTGIVING	50.00
DONORID	102
TITLE	Ms.
FIRST	Eleanor
LAST	Wilson
STREET	123 Newgate Road
CITY	Ardmore
STATE	PA
ZIP	19272
TOTGIVING	465.00
DONORID	103
TITLE	Mr.
FIRST	Nicholas
LAST	Brush
STREET	123 Market Street
CITY	Philadelphia
STATE	PA
ZIP	19107
TOTGIVING	500.00

Figure 2: A bad design

DONORID	101
TITLE	Mr.
FIRST	John
LAST	Milligan
STREET	975 Winding Way
CITY	Menlo Park
STATE	CA
ZIP	94025
DATE1	12/12/86
AMOUNT1	25.00
DATE2	01/10/87
AMOUNT2	25.00
DATE3	
AMOUNT3	
TOTGIVING	50.00

Figure 3.

A gift record: index card view

```
DONORID    101
DATE       12/12/86
AMOUNT     25.00
```

Gift records: a table view

DONORID	DATE	AMOUNT
101	12/12/86	25.00
102	12/14/86	50.00
101	01/10/87	25.00
102	01/16/87	50.00
101	02/12/87	25.00
103	02/15/87	10.00
102	02/27/87	50.00

System Disk in drive A (with dBASE III PLUS use System Disk 1) and a formatted disk for saving your work in drive B. At the system prompt, type **DBASE <Enter>**. (Any time you are instructed to type a command, you should complete it by pressing the Enter key.)

If you have a hard disk, you must first move to the dBASE subdirectory, usually called \DBASE. Try these commands:

```
CD \DBASE
DBASE
```

What happens next depends on which version of dBASE you're using and whether you're working with hard or floppy disks. The best advice is to follow the instructions at the bottom of the screen. For example, in some versions you'll be asked to consent to the licensing agreement by pressing Enter. If you're using III PLUS on floppies, you'll be instructed to insert System Disk 2 (put it in drive A) and press Enter.

You want to get to a screen where you can see the cursor blinking just to the right of a period (dBASE's famous dot prompt). dBASE III takes you there directly. In III PLUS you'll have to leave the Assist Menu (via the Escape key) to get there.

### Getting oriented

Working with dBASE at the dot prompt is like giving orders to a somewhat taciturn but obedient servant. Whenever the cursor is at the dot prompt, dBASE is waiting for orders. You employ a set of English-like words—complete with syntax—to issue commands, and dBASE responds by executing the command or saying it doesn't understand.

One of the difficult things about learning dBASE is getting used to its style. When you're doing word processing or working with a spreadsheet, your work is on the screen in front of you all the time. In dBASE things tend to happen somewhere off-screen in the murky depths of memory. You're continually sending things off into a black bag and reaching in blind to pull them back out. It can be very disorienting initially.

For example, if you're using a two-floppy system, you must tell dBASE to save information on the B drive. Do this by typing **SET DEFAULT TO B**. With dBASE III PLUS you'll see a B on the highlighted status bar at the bottom of the screen. Otherwise there's no indication that anything happened.

Fortunately, there's another way to tell. Type **DISPLAY STATUS**. You'll get two screenfuls of information. About halfway down on the first, you should see a line telling you the letter of the default drive. Hit any key to see the second screen, but don't worry about the information on it. Then type the word **CLEAR** to clear the screen. Before going on, make sure the default drive is set correctly for your machine (B for floppies, C for the hard disk) and fix the problem with the **SET DEFAULT** command if necessary.

You should already be getting a feel for what it's like to work at the dot prompt. For those of you who prefer menus, dBASE III and III PLUS each provide their own version of a menu-driven Assistant. You can explore these menus by typing **ASSIST** at the dot prompt or pressing the Assist key (F2).

There are also two forms of assistance at the dot prompt. You can always get help by pressing the Help key (F1) and exploring the Help Menu. In addition, III PLUS has a history feature.

*Working with dBASE at the dot prompt is like giving orders to a taciturn but obedient servant.*

It saves the last 20 commands you've typed and lets you access them with the Up Arrow key and then either reexecute them or edit them before execution.

### Designing a data base file

Before you can save donor records you have to create a structure for the Donors file. That involves giving the data file a name, telling dBASE what fields you want it to have, and defining their characteristics.

Figure 4 (below) shows the structure of the Donors data file.

Field names can be up to ten characters long and can contain letters and numbers, but they must begin with a letter. No spaces or punctuation are permitted except for the underscore symbol.

The Donors data file has two types of fields: character fields and numeric fields.

A character field can store any kind of text information and

Figure 4

The Donors data file structure

Field	Field name	Type	Width	Dec
1	DONORID	Character	3	
2	TITLE	Character	4	
3	FIRST	Character	15	
4	LAST	Character	15	
5	STREET	Character	30	
6	CITY	Character	17	
7	STATE	Character	2	
8	ZIP	Character	5	
9	TOTGIVING	Numeric	8	2

can be up to 254 characters wide. Number information that doesn't get calculated—like zip codes and ID numbers—should also be in character fields.

A numeric field can only store numbers. You can specify how big a number you want to store in it by specifying its width. Decimal places and the decimal point itself are included in the field width. For example, the TOTGIVING field is eight characters wide with two decimal places, so the largest number it can store is 99999.99.

The command to begin creating a structure is CREATE followed by the name of the data file. Type **CREATE DONORS**. dBASE will present you with a form to fill in with the field names and their characteristics. Just type in the field names as they appear in Figure 4. To select field types, press the first letter of the type (e.g., "c" for character and "n" for numeric).

You can use the commands on the help screen above the form to move around. The caret (^) in many commands stands for the Control key. To issue such a command, hold down the Control key and press the appropriate second key.

When you're finished, quit and save either by hitting the Enter key in a blank field or by hitting Ctrl-End (hold down the Control key and press the End key on the numeric key pad). Either way you will get a message at the bottom of the screen asking you to confirm your decision. When you hit Enter to confirm it, you will be asked if you would like to "input data" now. Type **N** (you'll add records in a few moments using another command).

You should be back at the dot prompt with a blank screen. You've just tossed the structure of the Donors file off into the black bag. Let's pull it back out. If you type **DISPLAY STATUS**, it will show you that the Donors data file (DONORS.DBF)—dBASE adds the DBF extension automatically—is in use. Another command shows the actual structure of the Donors file. Type **DISPLAY STRUCTURE**. You should see a listing similar to the one in Figure 4. To print it out, you can add the words **TO PRINT** to the end of the command.

## Adding records

Right now the Donors file is in use because you just created it. Normally, you must tell dBASE you want to use it before you add records. The following commands tell dBASE to use the Donors file and let you add records to it.

```
USE DONORS
APPEND
```

During data entry dBASE displays an entire record (or as much of it as can fit on the screen) and allows you to move around filling in the highlighted blanks or fields. When you have completed one record, dBASE saves it and takes you to a new blank record, and the session goes on.

Generally, as you fill in a field, you move to the next one by hitting the Enter key. In addition, you can use the commands on the help screen to move around and make corrections. When you fill in a field completely—a state or zip code field, for example—a bell goes off. If you find that irritating, you can turn it off the next time you're at the dot prompt by typing the command **SET BELL OFF**.

You can end the session by hitting either the Escape key or Ctrl-End. The main difference is that Escape does not save the record currently on the screen and Ctrl-End does.

Add the three records from Figure 1 plus a few of your own and then end the session. When adding your own, continue the sequential numbering system for the DONORID, and don't give the same number to more than one donor.

Again your records seem to have disappeared into the black bag. To see them, type **DISPLAY ALL**. That will show you everything—every field of every record. When records are too long to fit on one line, dBASE wraps them confusingly. The solution is to ask for a few fields at a time. Type:

```
DISPLAY ALL DONORID, FIRST, LAST, ZIP
```

That gives you just those fields from each record.

## Organizing records with indexes

When you add a record, dBASE assigns it a record number (really just a position indicator) and adds it to the end of the data file. But often that order is not good enough. For example, you might want records in alphabetical order by last name for looking people up or in zip code order for a mailing. The solution is to create a number of special-purpose indexes that impose a temporary order on the file. Another advantage of indexing is that you can use an index to find records fast.

Indexes are kept in separate index files that contain the keys (whatever you're indexing on) and *pointers* (record numbers). To create them, you must tell dBASE the key to use and the name of the index file. Issue the following two commands:

```
INDEX ON LAST TO DLAST
DISPLAY ALL FIRST, LAST, ZIP
```

The first command creates an index file called DLAST.NDX (dBASE supplies the extension) using the LAST field as the key. Notice that they now appear in index order (alphabetically by last name), not record number order.

Let's create a zip code index as well. Type:

```
INDEX ON ZIP TO DZIP
DISPLAY FIRST, LAST, ZIP
```

The records should now appear in zip code order.

One of the nice things about index files is that dBASE will update them automatically as you make changes to the file—*if you tell it to use them with the data file*. To do that you'll have to use a variation on the USE command to open a data file. Instead of typing USE DONORS, you'll have to list the indexes, as in the following command:

```
USE DONORS INDEX DLAST, DZIP
```

You can have up to seven in the list of indexes, separated by commas. dBASE will keep them all updated. When you're using more than one at a time, only the first in the list (called the master index) imposes an apparent order on the file.

If you issued the last command, DLAST is the current master index, so the imposed order is alphabetical by last name. To produce labels, you can make DZIP the master index by issuing a command to reset the index files:

```
SET INDEX TO DZIP, DLAST
```

Play around with these commands to see how the order of records in the file changes. Remember, the real order is always record number order. Master indexes only impose temporary, apparent orders.

## Looking up records and changing them

We mentioned that you can use indexes for looking up records fast. Here's how it works. You can find records using the key of the current master index. For example, if DLAST is the master

index, you can look people up by last name.

First make sure DLAST is the master index. The DISPLAY STATUS command will tell you. If it's not, issue the command:

```
SET INDEX TO DLAST, DZIP
```

Then use the SEEK command to look up a particular record and the EDIT command to bring it to the screen. Type:

```
SEEK "Wilson" (remember the quotes)
EDIT
```

The SEEK command only works with indexed files. It searches the index for the first key equal to "Wilson" and then uses the index pointer to move to the right record. If you got a

That will involve producing labels and converting mailing information into a form your word processor can use for personalized form letters. But you can learn the technique for selecting records now with the DISPLAY command.

You've already used the DISPLAY command to see selected fields. You can also use it to see selected records. The trick is to add a condition—beginning with the word FOR—to the end of the command.

Try these two commands:

```
DISPLAY ALL DONORID, FIRST, LAST, STATE FOR
STATE="PA"
```

## In effect, the DISPLAY command gives you crude reports.

"No find" message, chances are you didn't spell Wilson exactly the way you entered it in the record.

The EDIT command works just like the APPEND command except that you can only use it with existing records, so you can use the same editing keys to make changes. Hitting Page Down and Page Up moves you to the next or previous record, respectively. When you're done, use Ctrl-End to save your changes.

### Deleting records

Deleting a record is a change that deserves special mention. The easiest way to do it is to use ^U when a record is on the screen in EDIT mode. A ^U acts like a switch, setting the record's status to deleted or undeleted. In dBASE III the letters "Del" should appear at the top of the screen when a record is deleted. In III PLUS they appear on the right side of the status line. To undelete a record, just use ^U a second time.

In dBASE, deleted records aren't gone for good until a separate operation, called packing, is performed. Until then they remain in an intermediate state, marked for deletion but very much around, and they can be rendered visible or invisible to the system by turning off or on a filter that blocks out deleted records.

Delete a record by finding it with the SEEK command, bringing it to the screen with the EDIT command, and then using ^U. Then try this series of commands to see how dBASE handles deleted records:

```
SET DELETED OFF (makes sure the filter is off)
DISPLAY ALL FIRST, LAST (the deleted record is visible,
marked by an asterisk)
SET DELETED ON (turns the filter on)
DISPLAY ALL FIRST, LAST (the deleted record is invisible)
```

With the deleted filter on, try to find the record. You should get a "No find" message. Turn the filter off and try again.

It's important not to have deleted records showing up in reports or mailings. You can either permanently remove all deleted records with the PACK command or temporarily render them invisible.

### Getting information out selectively

At some point, you'll want to do selective mailings to donors.

```
DISPLAY ALL DONORID, FIRST, LAST, TOTGIVING FOR
TOTGIVING > 300
```

The first displays donors from Pennsylvania; the second, donors who contributed over \$300. If they didn't work, chances are you made a typing mistake. Remember that character information must be in quotes, but numeric information shouldn't be. With III PLUS you can just use the Up Arrow key to recall the line, fix it, and try again. With dBASE III you'll have to retype.

In effect, the DISPLAY command gives you crude reports. It's nice for looking at information on the screen—particularly with large files—because it displays records a screenful at a time. The LIST command is almost identical, except that it doesn't pause with each screen. That makes it better for sending listings to the printer. Just add the words **TOT PRINT** to the end of the command line. For more sophisticated reports with calculations, you should use dBASE's report generator.

### Transferring information into MailMerge format

dBASE can transfer data files into a number of other formats. One common format for mailing list data files is the one WordStar's MailMerge uses, in which each record occupies a separate line and each field is separated (or delimited) by commas. To convert your Donors file into MailMerge's format, issue the following command:


```
COPY TO MAIL.DTA DELIMITED
```

It creates a file called MAIL.DTA that you can use to generate personalized form letters in WordStar.

The following sequence organizes the records into zip code order first and then sends over only big donors:

```
SET INDEX TO DZIP, DLAST
COPY TO MAIL.DTA DELIMITED FOR TOTGIVING > 300
```

### Quitting

If you turn off the computer without exiting dBASE properly, you could lose valuable data. To exit, type **QUIT**. dBASE will display an exiting message, and then it's safe to shut off the computer. 

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# "OTHER" WORD PROCESSORS

## Part 2: Note Bene and MultiMate Advantage

by Jim Spickard

I feel like Don Quixote. I own 12 different word-processing programs—14 if you count major upgrades. And I still haven't found one perfect for my work. Each program does something well or I would have chucked it long ago. But no matter which one I use, I find myself longing for a feature that others have.

No matter! My search is your reward. Between last month's comparison of WordPerfect and Microsoft Word, and this month's look at Nota Bene and MultiMate Advantage, you'll know a lot about four of the best full-featured MS-DOS word processors available.

All these programs are powerful, but each appeals to a different type of person. If you write a lot, you need a word processor that matches your personality as well as your profession.

### A scholar's dream

I met Steve Siebert three years ago at a sociologists' convention. I had just written an article on automatic footnoting with WordStar and had patched in my first thesaurus. I guess I thought I was hot.

I was wrong. Steve was selling Note Bene—a word processor he'd designed that not only dropped footnotes in the right places (rare enough in 1984), but could enter them in the formats demanded by various professional journals. It could automatically construct bibliographies, tables of contents and multiple indices, handle foreign alphabets, and do a host of other things scholars need. And it was a speed demon!

Most impressively, the program combined its word processor with a text-oriented data base. Anything typed in was indexed and available through a simple relational search.

I wanted that program! Unfortunately, it only ran on an IBM, which I couldn't afford. I had to wait.

Three years later I have an affordable Kaypro PC—and a chance to look at Note Bene close up. It's still impressive, but does have serious flaws. Some scholars will be able to put up

with these defects and will enjoy the program's power. Others will not and should look elsewhere.

The program has blinding speed, plus features specifically designed for academic work. On the other hand, it is also extremely difficult to learn and does not forgive errors.

### Note Bene: a powerhouse is born

Note Bene was born from the marriage of two stand-alone programs: XyWrite (a word processor) and FYI 3000 (a text-oriented data base manager).

Like XyWrite, Note Bene is command driven. Other than entering, deleting or moving text or moving the cursor, you propel the program by pressing **F9**, then typing a command, then pressing either **F10** or **Enter**.

The screen is uncluttered. The top line holds your commands, the second line names your default directory, your work file, and a page and line counter, and the third marks margins and tabs. (See Figure 1.)

FIGURE 1: Note Bene's opening screen.

```
C:\save
\MAIN\WRITE\NB          1  WORK\4-WORDS1.ORG  4-57
L-----1-----2---3-----5---R-----6---
```

The commands are short and mnemonic: **ab** abandons a file, **rm** sets the right margin, **me** merges (reads in) a file from disk. The *Quick Reference Guide* contains 64 pages of such commands, some of which are duplicated by special key combinations. For example, **Shift + Alt + -** (the cursor pad's minus key) clears the calculator total, as does **F9 cs F10**.

While you're learning the commands, Note Bene provides a set of menus for most program functions. However, menus and commands don't perfectly overlap—ultimately you'll need to learn both.

Note Bene makes full use of the keyboard. Letters, numbers, function keys, cursor keys, even Num Lock, Scroll Lock, and PrtSc are used, often in non-standard ways.

The layout makes good sense: unshifted, the cursor pad works on characters; with the Control (Ctrl) key, it works on words; with the Shift key on sentences, and with the Alt key on paragraphs. You can even move by phrases, something I've not seen in other programs. (However, touch typists won't like

## Note Bene makes full use of the keyboard, using many keys in non-standard ways.

getting a comma and period when using the Shift key, instead of "<" and ">".)

Escape (Esc), Ctrl, Alt, Shift and Caps Lock, singly and in combination, toggle between nine different keyboards: lower and uppercase English, lower and uppercase European, Greek, mathematical symbols, and so on. Plus you can load British, French, German, Spanish or Italian keyboards, or customize one for your own needs.

There are lots of nice touches. You can uppercase or lowercase a character, word or marked block; you can transpose characters, words, lines, sentences or paragraphs with a single keystroke; hyphenation is automatic in either English or Spanish (you choose). You can even "space backwards"—erase text with spaces so you don't lose your page design.

The program manages up to nine windows, several of which can be displayed at once. Moving text from one to another is quick and easy. Marking blocks, copying, and so on are snaps—much faster than with WordPerfect, almost as fast as Microsoft Word with a mouse.

I've never seen so much control, all of it moving at light speed.

This power comes at a price, though. All these commands and keyboards must be learned. Though they are sensibly designed, the fact that the *Quick Reference Guide* contains 64 pages should put one on guard. The *main* reference manual is two inches thick, not counting covers. Note Bene is the first word processor whose tutorial and reference manual I've actually had to read through before diving in.

Fortunately Note Bene has thorough help screens—the most complete I've ever seen. Unfortunately the prose is almost impenetrable. Take a look at the first sentence in Figure 2. Once you know the program these screens are handy reminders, but you'd better not rely on them at the beginning.

### Added features

As complex as it is, Note Bene should not be your first word processor. But if you don't mind a lot of study, its advanced features are worthwhile.

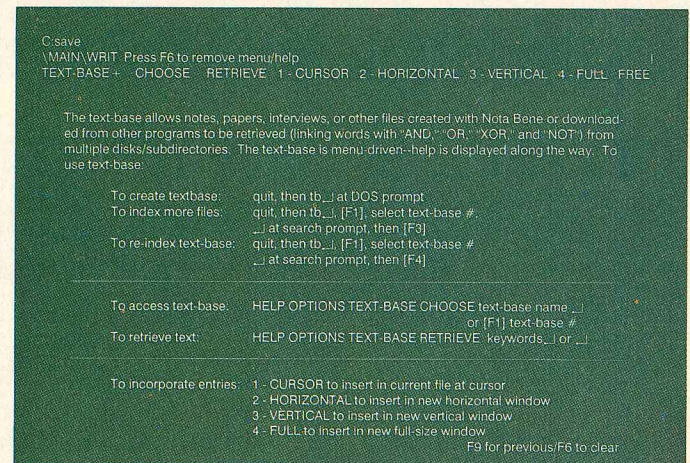
Unlike most other major word processors, Note Bene lacks an integrated spell checker and thesaurus. That shouldn't stop

you, however: The manual says you can add Borland's Turbo Lightning, which contains both.

More significant are Note Bene's style manuals, its footnoting and endnoting, table of contents and indexes, automatic bibliographies, and ability to cross-reference figures and diagrams.

To understand how these features work you have to know how Note Bene formats text. Like WordPerfect, Note Bene

FIGURE 2: A sample help screen.



inserts formatting symbols in the text—normally displayed as small triangles on the screen. These control margins, justification, print style (typeface, underlining, etc.) and a host of other things that affect your document's appearance.

About a score of these triangles control note placement: whether to use footnotes or endnotes, note margins and spacing, the type of call symbol and separator to use between notes and text, etc. You can have up to three different note series, each with its own format. Changing the triangles at the start of your document changes your note formats automatically.

Similarly, nine related triangles control tables of contents, lists of tables and figures, bibliographies—of which you can have two—and indexes—of which you can have three. Table and list triangles mark the text that immediately follows and provide automatic cross-referencing. Bibliography and index triangles insert hidden text that you can collect separately.

Different academic journals, of course, require different text and footnote styles. This can be a real pain for scholars who write for more than one publication. Note Bene lets you avoid most of the pain of switching styles, but not all.

The program provides room for 19 style sheets—collections of triangles that set your document for whatever style your publisher requires. Four of these are the scholarly styles specified by the American Psychological Association, the Modern Language Association, *The Chicago Manual of Style*, and Kate Turabian's *Manual for Writers*. Two are "generic" scholarly styles, which you can modify, and the other 13 are for letters, legal documents or what-have-you—including additional formats you design yourself.

Calling up a style adds several triangles to the start of your text. Switching styles is not as simple as switching stylesheets

in Microsoft Word: You have to manually delete many of the old triangles before adding the new ones, but much of your work is done for you.

Unfortunately quite a bit remains. Note Bene will not alter footnotes or bibliographic entries—surely the most time-consuming stylistic changes. Some journals require titles to be underlined; others want them capitalized, and still others want them lowercased. Some want the date at the end; others want it after the author's name. It shouldn't be difficult to write an algorithm for such changes, but none is provided.

Plus, you have to type in references exactly as you want them to appear. To avoid bibliographic duplications, all entries must be in the same form. The stand-alone program Bibliography, which I use with WordStar, lets you use keywords and a separate reference list, and will replace the keywords with full citations. With a built-in data base manager, Note Bene should have included these options.

### Text-Base

Note Bene's data base program, Text-Base, is an early version of FYI 3000. (Paul Ofman and I reviewed FYI 3000 in "Free-Form DBMs," *PROFILES*, April 1986.) It lets you quickly locate text—notes, boilerplate, even book-length documents—that contain certain keywords.

The program is simple to run. You first have to index your text, either on specified keywords or on all words except those you include on an "omit list." Once it's indexed, you can access text in hundreds of files with the flick of a finger.

Hundreds of files? Yes, because Text-Base can index up to 255 floppies, and that's per index; you can have more than one!

Just specify the keywords you want to find: Text-Base searches its index and tells you which disk to insert, then pulls the entry containing your search terms onto the screen. You can combine up to 128 terms joined by "AND," "OR," "XOR" and "NOT." If several entries match, you see them one after another until the right one appears.

Entries may be anything you like. If they are longer than about 1,000 words, you need to list keywords yourself; otherwise the program indexes for you. In any case, the program makes organizing easy.

Your data base can even include ASCII and WordStar files, as well as those created with Note Bene.

Actually, Note Bene comes with two data base managers, not one. There's also a simple list manager designed for use with form letters. It's a sop to the office market and doesn't work well. The problem is error trapping. If you end field entries with the Enter key the fields won't print correctly. You have to enter them with **Alt Ins** and end each record with **Ctrl Alt Ins**. It would be awfully easy to enter **Ctrl Alt Del** accidentally. The manual and reference guide note this, but Note Bene should stop you when you do things wrong. It doesn't.

### Watch your step

Lack of error trapping is a problem overall in Note Bene. Take the **ab** command. This abandons a file without saving it—something that shouldn't be easy to do. But type **F9 ab** followed by the Enter key and your file is gone.

Deletions have the same problem. If you delete something you can't get it back unless it was part of a deleted block. Footnotes are especially at risk: backspace over a footnote call,

and the note disappears.

The installation program also contains at least one bug: It asks you to specify a subdirectory to hold your work files, but if you do the help screens don't work. In addition, printer installation for non-standard printers is difficult and doesn't always work the way the manual indicates. Software bugs are like cockroaches—there are always more than you see.

Such visible bugs, the lack of error trapping, and the program's inability to alter citation styles—plus its overall complexity—limit Note Bene's usefulness.

If you really need speed and power, can remember lots of commands, and seldom make mistakes—and particularly if you will use Text-Base—Note Bene may be right for you.

Otherwise you'd better look elsewhere.

### MultiMate Advantage

Ashton-Tate—the makers of dBASE II and III—also sell MultiMate, modeled on the Wang dedicated word processor. MultiMate comes in two versions: Advantage (which I review here) and 3.3, a less expensive, file-compatible subset.

MultiMate Advantage is about as far from Note Bene as you can get. Where Note Bene is complex and fast, MultiMate is easy and slow, but it still has respectable power. Anybody can learn to use it.

Office workers will love it! Alongside WordPerfect, it's fast becoming an office standard. In fact, *InfoWorld*, the business-oriented microcomputer newsweekly, gave this program a 9.1 rating (out of a possible 10), surpassed only by WordPerfect's 9.3. (Microsoft Word got a 7.1; Note Bene has not been reviewed.)

MultiMate starts with a menu (see Figure 3). When you open a file (choices 1 or 2) you must fill out some information about your document before you can write it (see Figure 4). This information lets MultiMate identify your text: You can search your Document Summary screens for, say, all the letters written to Irvin Peckham since March 1985. No more trying to decipher MS-DOS filenames!

Finally, you get to write. The screen is blank except for the

FIGURE 3: MultiMate's opening menu

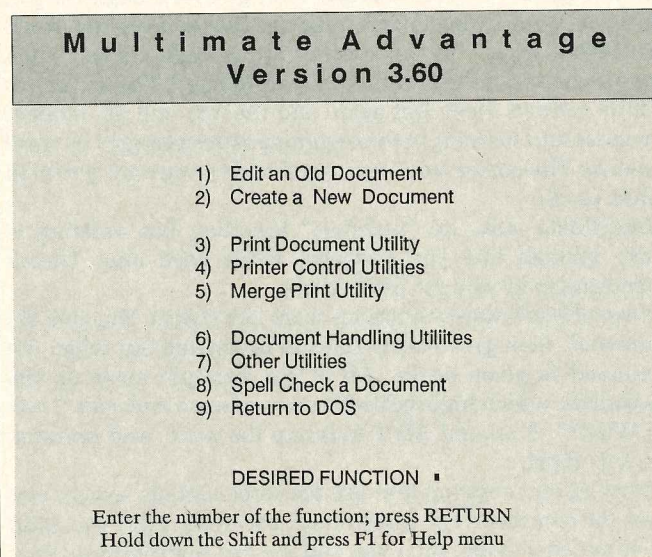


FIGURE 4: MultiMate's document summary screen

## DOCUMENT SUMMARY SCREEN

Document	4-words2.mm	Total pages	1
Author	JVS		
Addressee	PROFILES Mag.		
Operator			
Identification key words :			
	Multimate,		
	word-processors,		
	comparison		
Comments :			
	Second half of article comparing Note Bene and Multimate Advantage		
Creation Date	03/25/87	Modification Date	03/25/87
Total Editing Time	0:44	Editing Time Last Session	0:34
Total Keystrokes	1965	Keystrokes Last Session	1472

Use tab keys to change fields -- Press F10 when finished

two top lines. The first contains your file name, page number, and cursor location, plus space for the current command. The second line shows your margins and tabs.

You enter text as you would with any other word processor. Cursor movement is limited but adequate; the arrow keys can outrun the screen display, so be careful scrolling through text. MultiMate lacks automatic hyphenation, but you can insert soft hyphens as you type.

A few things are unusual. If you want to insert text, push the **Ins** key. A big space opens on the screen for your insertion. Press **Ins** again and the space closes up. If you find yourself forgetting to push **Ins** and typing over text, you can reset the system default so that the Insert mode is always on and text is automatically pushed to the right.

Deleting, too, is a bit strange. First go to the beginning of what you want to delete and push the **Delete** (Del) key. You'll see "Delete what?" in the screen's upper right corner. Then move to the end of the section you want deleted. The text above will be marked. Push **Del** again and the text will be deleted. You must start marking at the *beginning* of the passage you want to delete: The cursor won't move to the left or up once you're in Delete mode.

MultiMate lacks an "undelete" function, but deleting is tricky enough that you probably won't need one. There's something to be said for inefficiency.

Most of MultiMate's functions work like Delete: You give the command, then give instructions to be carried out when the command is given again. **Alt T**, for example turns on the Thesaurus, which highlights the current word and asks "Look Up What?". A second **Alt T** looks up the word, and pressing **Esc** will abort.

Moving and copying text use the same system, except you press the command key three times, not twice. First you enter Move or Copy mode, then you end the text highlighting, then

you move to the new location and transfer the text. MultiMate even allows you to transfer text between files, though you cannot see both files at once because it doesn't provide windows.

Speed freaks won't like all these extra keystrokes, but the procedure is easy to master and the slowness produces fewer errors.

### Page-oriented

While I'm on the subject of oddities, I ought to mention the biggest of all: MultiMate's page breaks. Most word processors are document oriented. They treat each document as a long line of text, which they divide into pages for printing. WordStar, WordPerfect, and Note Bene show page breaks; Microsoft Word usually does not. None of them pays attention to page breaks while you edit.

For MultiMate, pages are supreme. The computer's memory only holds one page at a time; most of the document stays on disk where you won't lose it if something goes wrong. You don't have to remember to save it every few minutes.

At the end of each page you have to insert a page break—manually. The old page disappears and you get a new blank screen.

Fair enough, though it's a bit disconcerting to have to go back a page to see what you just wrote. If you add something to any page except the last, though, all your page breaks are thrown off. You have to repaginate before you print, or else you'll print right across the tear lines in your fan-fold paper—or on the platen if you are using cut sheets.

You can set MultiMate to insert page breaks automatically, but it inserts them while you're editing, not at print time. You're typing along in the middle of a thought and *whoosh*, you're on a new page—with most of your paragraph no longer visible! You're better off inserting page breaks by hand.

I've heard rumors that Ashton-Tate is coming out with a new version of the program that avoids this problem. I hope so.

### MultiMate's good side

Enough of the bad stuff. How about the goodies? MultiMate comes with a good spell checker and thesaurus, plus an excellent Merge Print (mail merge) utility. Merge Print will work with any data base manager, not just MultiMate files. If your customer records are in dBASE II, just print out a report containing the records you need and merge it into your document.

MultiMate's column mode allows you to enter tables or snake text across several columns, newspaper style. Decimal tabs make tables easier to read and speed typists' work.

## MultiMate comes with a good spell checker and thesaurus, plus a great Merge Print utility.

You can create a table of contents, number sections automatically, and set up templates for filling in forms. MultiMate lets you draw boxes to highlight key information; completed forms can be sent to a data file or printer.

You can import files from many other word processors, including dedicated machines like the Wang (on which MultiMate was based).

MultiMate also automatically footnotes, but notes appear only at page bottoms and are limited to eight lines each. Only one footnote format is allowed per document. Scholars will probably find MultiMate too limited for serious work.

However, if you're looking for a word processor that's well suited for an office and that's full-featured, well-documented and simple to learn, MultiMate Advantage may be the product for you.

Jim Spickard is a contributing editor for PROFILES.

### Quick Reference Summary

**Product:** Note Bene v.2.0  
**Manufacturer:** Dragonfly Software  
 409 Fulton St., Suite 202  
 Brooklyn, NY 11201  
**Phone:** (718) 624-0127  
**Sugg. List Price:** \$495

**Product:** MultiMate Advantage v.3.6  
**Manufacturer:** Ashton-Tate Customer Service  
 20101 Hamilton Ave.  
 Torrance, CA 90502-1319  
**Phone:** (213) 538-7915  
**Sugg. List Price:** \$595

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# AN INTRODUCTION TO SNOBOL4

## *The string and pattern language*

by Ed Quillen

**T**he whole idea behind creating languages for computers was to make life easier for us while letting the machines handle the tedious work required to solve the problems that cross our desks.

That's a noble ideal. As with most noble ideals, though, things don't work quite so easily in the real world. Most computer languages still require you to keep track of scores of details every time you write a program to solve a problem.

With highly structured languages like Pascal, C, and Modula-2, you're busy declaring variable types: integers, real numbers, characters, strings, etc. With others, like BASIC and FORTRAN, you're worried about managing memory and making sure the machine's resources are allocated efficiently. You can't just tell the machine to sort some data—you've got to specify, step by painstaking step, just how to perform the sort. And so it goes.

By all that's right and proper, the computer should be attending to such details as variable types, memory allocation, and sorting algorithms. You should be free to focus on the things we humans do best—identifying problems, suggesting solutions, testing theories, drinking coffee, etc. But instead, writing the program often becomes a bigger problem than the problem the program was supposed to solve.

If it occurs to you that your time is valuable, and that the machine on your desk, not you, ought to be handling the tedious and painstaking scutwork, then it's time you discovered SNOBOL.

### **SNOBOL's origins**

Despite what it sounds like, SNOBOL is not some variant of COBOL. SNOBOL supposedly stands for StriNg Oriented

symBOlic Language, and it was created at Bell Laboratories in 1962 by three researchers. Although they worked with big mainframe computers every day, they weren't professional programmers.

They wanted a computer language that would allow them to concentrate on solving complex equations and analyzing the long-distance network, rather than on coding arcane machine instructions for manipulating registers and stacks. There wasn't such a language, so they made one: SNOBOL. It spread through Bell Labs, into the academic community, and even to secretive federal agencies concerned with national security. Users requested new features, so there came SNOBOL2 and SNOBOL3. In 1967, the programming language was standardized as SNOBOL4, and within a decade, it was in wide use on mainframe and mini-computers.

### **SNOBOL4's strengths**

Every computer language performs some operations with more ease than it performs others, and SNOBOL4's specialty is strings and pattern-matching.

If you've ever dabbled in programming, you know that a string is a series of characters, and the computer treats a string differently than, say, a value. For instance, the expression "3 + 2" is handled differently, depending on whether it is a string or a value. If it's a value, the machine adds the two numbers and comes up with 5. If it's a string, the machine just treats it as a sequence of characters.

The quickest way to demonstrate how well SNOBOL4 handles strings is to solve a simple string exercise in a familiar language like BASIC, and then in SNOBOL4. So, we have a line of text, and we want to convert all its lower-case letters to capital letters and display the result. Let's try it in BASIC.



```

10 LINE$ = "Replace lower-case letters with capitals."
20 FOR A% = 1 TO LEN(LINE$)
30   B% = ASC(MID$(LINE$,A%,1))
40   IF B% > 96 AND B% < 123 THEN B% = B% - 32
50   NEWLINE$ = NEWLINE$ + CHR$(B%)
60 NEXT A%
70 LINE$ = NEWLINE$
80 PRINT LINE$

```

We defined the problem as converting lower-case letters to capitals, but look at how we had to solve it in BASIC. We had to get the characters out of the string, one at a time, and convert the characters to numbers. Then we checked the numbers against the ASCII table. If the numbers were those of lower-case letters, then we subtracted 32 from them; otherwise, we passed them on. Then the numbers had to be converted back to characters and assembled into a new string.

That's a short program, but even at that, writing it requires considerable programming knowledge—putting the "\$" after the name of a string variable, and the "%" after an integer variable, and knowing the arrangement of the ASCII chart and its numeric relationship between lower-case and upper-case letters, and so forth. And little of that knowledge was directly related to the problem we were trying to solve.

Let's try doing the same thing in SNOBOL4.

```

UPPERS = "ABCDEFGHIJKLMNOPQRSTUVWXYZ"
LOWERS = "abcdefghijklmnopqrstuvwxyz"
LINE = "Replace lower-case letters with capitals."
LINE = REPLACE(LINE,LOWERS,UPPERS)
OUTPUT = LINE

```

What did we do here? We defined two strings: UPPERS and LOWERS. This didn't require looking at the ASCII chart—we could use the same alphabet we learned in first grade. We then gave a value to the variable LINE, just as we did in BASIC. But we didn't have to use any special symbol to tell SNOBOL4 that the variables are strings—SNOBOL4 can keep track of such details, so we don't have to.

The next statement is a built-in SNOBOL4 function, REPLACE, and it does just that—every time there is a character in LINE that also appears in the string LOWERS it replaces it with the corresponding character in the string UPPERS. After that, we assigned LINE to OUTPUT, so the capitalized LINE appears on the screen. The program reads almost like the definition of the problem.

Note the major difference between SNOBOL4 and virtually all other programming languages. In BASIC—or Pascal or C—the string has to be chopped up into individual characters. Those languages can deal with only one character at a time, and generally the characters must be converted into numbers.

SNOBOL4 handles the whole string with one statement—and the string can be up to 32,767 characters long. Further, SNOBOL4 performed a string operation as a string operation; there was no need for us to tell the computer to convert letters into numbers and then back into letters.

There are other ways SNOBOL4 makes it easy to work with strings. Putting two strings together is called concatenation. In BASIC, you concatenate with a statement like **BIG\$ = LEFT\$ + RIGHT\$**, and in C, you'd have to merge two arrays. But in SNOBOL4, it's as natural as writing one word after the other:

**BIG = LEFT RIGHT**

This barely scratches the surface of what SNOBOL4 easily does with strings, but before we delve any deeper, we need to understand SNOBOL4 syntax, as well as "success" and "failure."

### SNOBOL4 syntax

Every computer language has a syntax—a way its statements are written. In interpreted BASIC, for instance, every line must start with a number, a programmer's comment is indicated by "REM" or a single quote, variables are typed by their suffixes, and so forth. Standard Pascal requires variable-type declarations at the start of a program, insists on brackets around procedures, and wants you to indent in a certain way. Such considerations, taken together, form the syntax of a programming language.

SNOBOL4 doesn't use line numbers and it doesn't require you to declare whether a variable is an integer or a string. But it still has a syntax.

Program statements in SNOBOL4 look like this:

**LABEL OPERATION :(GOTO)**

Every SNOBOL4 statement contains at least one of those—LABEL, OPERATION, or GOTO—and it can contain any two, or all three. The label must start in the first column. There has to be at least one space between the label and the operation, and if the line has no label, then there must be at least one space (or tab) before the operation. There must be at least one space before the goto, and the goto must start with a colon. The goto transfers program control to a label, and the name of the label must be enclosed in parentheses. Comments are indicated by an asterisk in the first column.

### "Success" and "failure"

Explaining more about how the goto works involves an understanding of what "success" and "failure" mean in SNOBOL4. Suppose we have a variable called WORD, and we want to know whether WORD contains the letter "E." If it does, we want to increment a counter, which we'll call ECOUNT. If it doesn't, we want to go get the next word.

Given that, we can write this short program:

```

&ANCHOR = 0
GETWORD  WORD = INPUT           :F(SHOW)
          WORD "E"             :S(ADDCOUNT) F(GETWORD)
ADDCOUNT ECOUNT = ECOUNT + 1   :(GETWORD)
SHOW     OUTPUT = "Total words containing an E: " ECOUNT
END

```

This program starts by setting the keyword &ANCHOR to 0, which means that SNOBOL4 will try to match patterns everywhere it can. If &ANCHOR were set to 1, then SNOBOL4 would match only at the beginning. We're trying to find out if WORD contains an "E," and here's the difference.



With &ANCHOR set to 0, the word "BELL" would show a match to the letter "E," because there is an "E" inside the word. But if &ANCHOR were set to 1, then "BELL" would not match "E" because "BELL" does not start with an "E." But "ECHO" would match in both cases.

The next line has the label GETWORD, and it assigns input to a variable called WORD. At the end is a goto, preceded by an F. The F means that if the operation fails—which occurs when there are no more words to be input—then program control goes to the label after the F—SHOW. Otherwise control pro-

---

## This program takes 60 statements in BASIC and twice that in Turbo Pascal; SNOBOL4 does it in 14 lines.

---

ceeds to the next line.

On the next line, we see simple SNOBOL4 pattern-matching at work, and we also discover that a space is an operator in SNOBOL4. The statement that has WORD, followed by a space and "E," asks if WORD contains "E." If so, then the statement succeeds, and control goes to the goto label right after the S—ADDCOUNT. If WORD does not match, then control goes to the goto label after the F—GETWORD.

So if WORD has an "E," then the statement succeeds, and the program goes to ADDCOUNT. If WORD has no "E," then the statement fails, and control goes back up to GETWORD—the program fetches the next word to be tested.

At ADDCOUNT, the variable ECOUNT is incremented by 1. After this statement is an unconditional goto, distinguished by not being preceded by an S or F. No matter whether that statement succeeds or fails, control will go back to GETWORD.

The program arrives at SHOW when GETWORD fails—when it has run out of words. At SHOW, the program displays a message and whatever value is stored in ECOUNT. All good things come to an END, and all SNOBOL4 programs must have that as their final statement.

### Power and simplicity

Granted, this isn't a very sophisticated program. You could probably write the same thing in BASIC in almost as few lines. But with just a few more statements, you can see how powerful SNOBOL4 can be while retaining such simplicity.

Let's say we have a text file, and we want a word-frequency table for it. We want to know how many times we used the word "a" and how many times we used the word "computer," and so forth, and we want the listing so that the most-used words appear first. This is handy for textual research, and writers sometimes employ word-frequency tables to see if they're over-using some words.

To do this in BASIC takes about 60 statements, and Turbo Pascal requires twice as many. The C version runs to about six full pages of source code. Here's how SNOBOL4 does the job in 14 lines:

```
* WORDUSE.SNO
&ANCHOR=1
&TRIM=1
LOWERS="abcdefghijklmnopqrstuvwxyz"
UPPERS="ABCDEFGHIJKLMNOPQRSTUVWXYZ"
WORDPAT=BREAK(LOWERS)SPAN(LOWERS).WORD
TALLY=TABLE()

GETLINE LINE=REPLACE(INPUT,UPPERS,LOWERS) :F(SORT)
GETWORD LINE WORDPAT="" :F(GETLINE)
      TALLY[WORD]=TALLY[WORD]+1 ::(GETWORD)

SORT      RESULT=RSORT(TALLY,2)
      COUNT=1

SHOW      OUTPUT=RESULT[COUNT,1]'-'RESULT[COUNT,2] :F(END)
      COUNT=COUNT+1 ::(SHOW)

END
```

The top line is a comment—the name of the program as it is stored on a disk file. SNOBOL4 programs are stored as straight ASCII text, and you write them with your favorite text editor, such as WordStar in non-document mode.

SNOBOL4 programs are invoked from the MS-DOS prompt by specifying the language, the program, and its input and output. For instance, if we were to run WORDUSE on drive A, and we were preparing a word-frequency table for a file called TEXT.IN on drive B, the command from MS-DOS would be:

```
SNOBOL4 WORDUSE /I=B:TEXT.IN
```

As you see, the input file is indicated by "/I" followed by the file's name. If we wanted to write the output to the printer instead of the screen, the command would be:

```
SNOBOL4 WORDUSE /I=B:TEXT.IN /O=PRN:
```

Output can also be sent to disk files this way, and SNOBOL4 offers many other ways to specify input and output. But it's time to get with the program.

### A walk-through the word frequency program

The first program line sets the keyword &ANCHOR to 1, so that SNOBOL4 tries to match only the first part of a string. The next line sets another keyword, &TRIM, to 1. This removes trailing blanks from input lines. (As you've noticed by now, keywords in SNOBOL4 start with an ampersand, and they're used to set various parameters. Other keywords set such parameters as numeric precision, maximum string length, and tracing for debugging purposes.)

Next come definitions of two strings, LOWERS and UPPERS, which we've seen before. After that is something new—a pattern definition. We want to extract individual words from the text, so we have defined something called WORDPAT as:

```
BREAK(LOWERS)SPAN(LOWERS).WORD
```

—which sounds delightful, but what does it mean?

BREAK and SPAN are built-in SNOBOL4 functions. Essentially, BREAK(STRING) says "Go along and skip over everything that is not in STRING." So BREAK("e") would skip everything that is not an "e," and it would stop right before the

first "e." Here, BREAK(LOWERS) goes along and skips over everything that isn't in the string LOWERS, such as spaces and punctuation marks.

SPAN(STRING) says "take everything that you run into here that is part of STRING." So SPAN(LOWERS) matches all the lower-case letters it encounters up to the point where there isn't one. Right after SPAN(LOWERS) is a period. In SNOBOL4, a period is known as the "assignment operator." Here, the series of characters matched by SPAN(LOWERS) is assigned to a variable called WORD.

This entire operation is defined as WORDPAT, and it means "From the first character in each line, go along and ignore any characters that aren't in LOWERS. As soon as you find some that are in LOWERS, proceed until you hit something that isn't in LOWERS, and then put that sequence of LOWERS in WORD."

The last thing we do before reading in the text is to set up a table called TALLY. Tables are one of SNOBOL4's most exquisite features, and I'll explain them further on.

GETLINE reads in a line of text and converts all the letters to lower-case, because for what we're doing here, "The" and "the" are identical. So a line might start out as "She said she would come soon." After this conversion, it will read: "she said she would come soon." As you see by the goto, when GETLINE fails—when there are no more lines to read—control goes to SORT. Otherwise, the program proceeds to GETWORD.

At GETWORD, SNOBOL4's pattern-matching power goes to work. We have defined a pattern earlier, WORDPAT, and we apply that pattern to the string LINE. By putting an equals sign afterward, followed by a null string, we chop off whatever matched the pattern from the beginning of the line.

After the first time that our sample line encounters this operation, it will read "said she would come soon." The first word, "she," has been assigned to WORD. The next time through, "said" will be assigned to WORD, and LINE will read "she would come soon." When GETWORD fails, control goes back up to GETLINE to fetch another line of text to process.

Once the current WORD has been extracted from LINE, SNOBOL4 places it in TALLY, which is a table.

### SNOBOL4 tables

Most programming languages have arrays, and the easiest way to see how a SNOBOL4 table works is to consider it a special kind of one-dimensional array. In conventional arrays, there is an index and a value, and the index must be an integer. In BASIC, for instance, you can have A(6), but you couldn't have an A(6.3) or A("what").

In a SNOBOL4 table, the index can be anything. Here, we are using WORD as the index, and the value is the number of times the program has encountered whatever is in WORD.

Remember our lower-case sample line, "she said she would come soon." On the first pass through the line, "she" is assigned to WORD, and in the table called TALLY, we have the index "she" that points to the value 1. On the next pass, WORD is "said," which results in "said" and 1 in the table. Then "she" is assigned to WORD again; the table is adjusted so that "she" now points to its old value plus 1—2.

Thus the words are chopped out of the text and placed in a table. We have the information we wanted, and now we need to display it in an understandable way. At SORT, we use

## SNOBOL4 for Kaypros

There are two implementations of SNOBOL4 for personal computers that run MS-DOS, and both run on the Kaypro PC and the Kaypro 286i. Both versions are derived from the mainframe language as defined by its creators in the "Green Book"—*The SNOBOL4 Programming Language*, by Ralph E. Griswold, John F. Poage, and Ivan Polonsky (Prentice-Hall, 1970, \$24.95 in paperback).

### The language

Minnesota SNOBOL4 from Berstis International costs \$44.95. This gets you the language, several sample programs, and a 56-page reference manual. With the Green Book, the package costs \$59.95.

SNOBOL4+ from Catspaw costs \$95 and includes the language, sample programs, and a 240-page tutorial and reference manual. Besides the full language, SNOBOL4+ has extended functions from SPITBOL (a mainframe language that supposedly stands for SPeedy ImplemenTation of snoBOL).

In independent tests, Catspaw SNOBOL4+ runs about 50 percent faster than Minnesota SNOBOL4. Catspaw SNOBOL4+ can work with real numbers (numbers with decimal points) on a standard PC; Minnesota SNOBOL4 requires an 8087 math co-processor for real numbers. Catspaw also publishes a quarterly newsletter for registered owners, and operates a bulletin board.

The MS-DOS versions of SNOBOL4 are sold by some retailers and mail-order houses that specialize in languages and are also sold directly by Berstis and Catspaw.

### Reference books

Of the books that have been published about SNOBOL4, two stand out.

An excellent beginner's text is *SNOBOL Programming for the Humanities* (by Susan Hockey, Clarendon Press, Oxford, 1985, \$15 in paper).

The book that explains how to do almost anything in SNOBOL4, from producing poetry to playing poker, is *Algorithms in SNOBOL4* (by James F. Gimpel, originally published in 1976 by Wiley & Sons, republished in 1986 by Catspaw, \$24.95 in paperback).

Even if you purchase Minnesota SNOBOL4, you should write to Catspaw and ask for their catalog, since Catspaw sells SNOBOL4 books and programming aids by mail-order.

—E. Quillen 

SNOBOL4's built-in sorting facilities in the statement:

```
RESULT = RSORT(TALLY,2)
```

Translated, this statement says "Take the table called TALLY. There are two items in there, the index, which is a list of words, and the values, which is the number of times each word was used. Sort on the second item—that's why we put a 2 after TALLY. And sort it in reverse order, with the biggest numbers on top. That's why we specified RSORT instead of plain old SORT, which would have put the biggest numbers on bottom."

If we had wanted an alphabetical list of the words and their frequencies, the statement would read this way:

```
RESULT = SORT(TALLY,1)
```

In either case, merely telling SNOBOL4 to sort a table is a great deal easier than writing your own sorting routines, which you have to do in other languages.

When the table TALLY has been sorted here, it becomes a rather conventional two-dimensional array called RESULT. In our brief sample line, "she" was used most, so the full array looks like this:

INDEX	RESULT[INDEX,1]	RESULT[INDEX,2]
1	she	2
2	said	1
3	would	1
4	come	1
5	soon	1

At SHOW, the program displays the array entry for the value of COUNT and then adds 1 to COUNT and continues. When it runs out of values, SHOW fails, and the program goes to END.

SNOBOL4 has dozens of built-in functions, as well as a wealth of ways to store and format data. However, going much deeper into SNOBOL4 is beyond the scope of this article. You could speculate all day on the things you could do with its pattern matching capabilities. So let's see how SNOBOL4 can earn its keep in *practical* ways on your Kaypro PC.

### Real-world applications

I like WordStar; my wife favors a word processor called SuperWriter, which stores text much differently. Until I discovered SNOBOL4, we ran into trouble when we worked together on projects—it's tedious and time-consuming to go through all the search-and-replaces required to convert a WordStar file into a SuperWriter file or vice-versa. A 10-line SNOBOL4 program does it in seconds. We can still work together, and neither of us has to learn a new word processor.

I write a weekly column for a metropolitan newspaper in Denver, 140 miles away. Naturally, it goes in by modem, but what their computer wants and what WordStar produces are very different files. They want each paragraph to be one long string without carriage returns or line feeds, and their computer despises the high bits on some WordStar characters. It used to take me 10 or 15 minutes every week to reformat the column with WordStar; now SNOBOL4 reformats an 800-word column in six seconds.

The local newspaper uses a SNOBOL4 program on ASCII text from personal computers, converting their output into the codes required by the typesetting machines. Other print shops use SNOBOL4 to justify and hyphenate lines of text for

typesetting.

People use SNOBOL4 for reformatting many kinds of data—converting mainframe EBCDIC to small-computer ASCII, for instance, or making dBASE II files into dBASE III files. They even write data base management programs in SNOBOL4, to take advantage of its unique pattern-matching features.

SNOBOL4 programs on a PC can write original poetry, solve cryptograms, generate brand names, play tolerable poker, and, for the hard-core hacker, prototype a compiler.

## SNOBOL4 programs on a PC can write poetry, play tolerable poker, and prototype a compiler.

### SNOBOL4's place in the world

Although SNOBOL4 is powerful, versatile, and easy to learn and use (ease being a relative thing in programming), it has never gained the popularity in the PC community that it enjoys in the world of mainframes and minicomputers.

One reason is that it took a long time to arrive. With so much power, SNOBOL4 requires more RAM than the 64K maximum offered by early personal computers. When machines with at least 256K of RAM came into wide use, SNOBOL4 could run on personal computers, but by that time, other languages had become dominant.

Another reason is that SNOBOL4 shows its age. Many reference books assume that SNOBOL4 is being run on a mainframe with a card punch and reader, instead of on a personal computer with disk drives.

Short programs are easier to work with than long ones, and with its power, SNOBOL4 lets you accomplish in a few lines what would take pages in other languages. That means you can solve your problems more quickly, and have the machine do most of the work—which is the main reason you have a computer on your desk.

*Ed Quillen is a Salida, Colorado-based freelance writer, who enjoys programming in his free time.*

## Quick Reference Summary

**Product:** Minnesota SNOBOL4  
**Manufacturer:** Berstis International  
P.O. Box 441  
Millwood, NY 10546  
**Phone:** (914) 271-5855  
**Sugg. List Price:** \$44.95; with Green Book \$59.95

**Product:** SNOBOL4+  
**Manufacturer:** Catspaw, Inc.  
P.O. Box 1123  
Salida, CO 81201  
**Phone:** (303) 539-3884  
**Sugg. List Price:** \$95

# Two Computers in One—Almost

Ways to run CP/M software on your MS-DOS Kaypro

by Michael Schwager

Lured by the prospect of 640K or more of RAM, greater flexibility, and expandability—or perhaps just wanting to keep up with the Joneses—you've put aside your trusty CP/M Kaypro and entered the wide-open world of MS-DOS.

A new operating system and new software have come your way, with a plethora of fresh possibilities. Yet as powerful as your new software seems, there are times when you long for Perfect Filer or The Word Plus, or perhaps DDT. If only you could use those old CP/M standbys in your MS-DOS machine.

Good news—you can. Several software-hardware combinations allow you to run many CP/M programs on your MS-DOS machine, giving you two machines in one. I'll talk here about two types of products that do the trick: CP/M emulators and coprocessors.

Emulators translate the machine-language opcodes, or instructions, used in CP/M software into the 8088 opcodes used by your MS-DOS machine. They do this either by software alone or by teaming software with the NEC V-20 CPU.

The software approach resembles a BASIC interpreter, while the team approach replaces an 8088 chip with a NEC V-20. The V-20 recognizes opcodes for both the 8088 (MS-DOS) and the 8080 (CP/M); it's like having two chips in one.

The 8080 is a forerunner of the Z-80 chip used in CP/M Kaypros. Programs using 8080 code run on the Z-80, but Z-80 programs will not run on the 8080. If you try 8080 emulation on a program that uses Z-80 code, you may crash your system and have to reboot it or turn the computer off and back on. The accompanying article (on page 54) gives more information about which CP/M programs use 8080 code and which require a Z-80.

Coprocessors use a Z-80 chip on an expansion card that fits in a slot of your MS-DOS computer. Because they have a Z-80 right on board, they run programs using either 8080 or Z-80 code, and require no software translation from CP/M to MS-DOS code.

Emulators are less expensive than coprocessors and don't use an expansion slot, but they run more slowly.

## Terminal and keyboard emulation

Both emulators and coprocessors include provisions to emulate the terminals of CP/M computers. Without terminal emulation, some CP/M programs would scramble the MS-DOS computer's screen making them difficult or even impossible to use. Cursor positioning codes are one example of terminal emulation. WordStar, for example, absolutely requires the ability to move the cursor to specific screen locations.

Keyboard emulation is also important. The programs covered here set your arrow keys to match ones on a CP/M Kaypro. Some use the Perfect Software series' arrow keys (^H, ^J, ^K, and ^L); others use the WordStar arrow keys (^E, ^S, ^D, and ^X). If you're running Perfect Writer, Filer, or Calc on an emulator that uses the WordStar setup—or WordStar on an emulator that uses the Perfect setup—you can't use the arrow keys. You have to use the Control key combinations—which are cumbersome—or redefine the arrow keys with a keyboard macro program such as SmartKey or Newkey.

Unlike the emulators, the coprocessors allow you to reassign the arrow keys.

## Converting disk formats

Since your CP/M programs are on CP/M disks, you cannot use them in your MS-DOS machine without special software. The programs covered here all come with software that handles the disk-format conversion for MS-DOS drives. (See the July 1986 issue of *PROFILES* for T. F. Chiang's article, "Multi-Format Programs," about disk-conversion software.)

Each vendor has you follow one of two avenues: copy files from CP/M to MS-DOS disks and then run the CP/M programs; or include a special device driver in your CONFIG.SYS file that lets your disk drives read and write CP/M-format disks.

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The first method typically requires two steps: copy the files from CP/M to MS-DOS disks, then run the program. The second method permits you to access CP/M-format disks directly.

### The emulators—a rundown

The emulators I'll cover are Accelerate 8/16 from Intersecting Concepts, RUN/CPM from Micro Interfaces, UniDOS from Micro Solutions, and the CP/M-DOS Kit from Kaypro Corporation.

*Accelerate 8/16.* Accelerate 8/16, which comes with Media Master conversion software and a NEC V-20 chip, includes both 8080 hardware emulation and Z-80 software emulation. The program automatically detects whether your computer has a V-20. If so, it selects hardware emulation; if not, it selects software emulation. You can manually override the selection when necessary to run Z-80 software.

Accelerate 8/16 comes in three separate variations on the distribution disk. Each variation is set up to emulate a different CP/M terminal. The program that Kaypro owners will want is ACCELKAY.EXE. The other variations on the disk are for Osborne and Zenith. None of the variations support graphics.

Accelerate's documentation includes a section on installing the V-20 chip. It has instructions (and photos) for installation in the IBM PC, Compaq Portable, and Zenith Z-150, but not the Kaypro PC. After installing the V-20 and before running Accelerate 8/16, you must use Media Master to copy CP/M programs from a CP/M disk to an MS-DOS disk and change their extensions from COM to CPM.

You then run the version of Accelerate 8/16 that has the terminal emulation you want (ACCELKAY for Kaypro emulation). Intersecting Concepts recommends that you first try Accelerate under 8080 software emulation. This enables you to determine whether a program has Z-80 opcodes. If it does, Accelerate will tell you so, and you must then use its software emulation. If not, you can use hardware (V-20) emulation, which is two or three times faster.

Ordinarily you run Accelerate 8/16 in command mode. At the MS-DOS system prompt, you enter the command **ACCELKAY** (or **ACCELKAY /8080** to force 8080 emulation, or **ACCELKAY /Z-80** to force Z-80 emulation). Each of these commands puts you in CP/M mode and gives you a modified system prompt, A). From this prompt you can perform the usual CP/M operations, such as loading, saving, running, and renaming files.

To run, for example, Perfect Filer under Accelerate 8/16 you would first copy the files on your Filer program disk and your data base disk to MS-DOS disks using Media Master. Then rename **FILER.COM** to **FILER.CPM**. Put the MS-DOS disk containing **FILER.CPM** in drive A and the data base disk in drive B. Type **ACCELKAY /Z-80** to force Z-80 software emulation. At the A) prompt, type **FILER**. You will soon see the familiar "Enter disk drive containing data base" message. From here, you act as if you were using Filer on your old CP/M Kaypro.

One difference you'll see in running Filer under Accelerate 8/16 is that the arrow keys match the WordStar diamond rather than the Perfect Software series. You have to use them that way or redefine them with a macro program.

Another difference (and this is also true of the UniDOS emulator) is that Filer runs slower under Z-80 emulation than on a CP/M machine.

Once you exit Filer (using the ESCape key, just as in CP/M), you find yourself back at Accelerate's A) prompt. You can run other CP/M programs or you can return to MS-DOS. To end emulation and return to MS-DOS, enter the command **EXIT**.

*RUN/CPM.* RUN/CPM uses a NEC V-20 chip (included) to run CP/M 8080 programs on your MS-DOS computer, but does not have a Z-80 emulator to run CP/M programs that use Z-80 code. On the other hand, it lets your floppy drives act as both MS-DOS drives and as CP/M (single- or double-sided) drives. And its arrow keys match the Perfect Software series rather than the WordStar diamond.

You will need to install RUN/CPM for Kaypro CP/M terminal emulation. The installation utility allows you to select terminal emulation, specify drive assignments, set up a RAM disk,

---

*If you bring up the  
RUN/CPM main menu with  
Alt-R, you can toggle both  
drives to CP/M format.*

---

and select onscreen colors. It also creates or modifies existing **CONFIG.SYS** and **AUTOEXEC.BAT** files to set your computer properly when you boot it.

Let's say you have a two-floppy MS-DOS system. When you call up RUN/CPM, the drives will access MS-DOS disks; but if you bring up the RUN/CPM main menu with Alt-R, you can toggle one or both drives to read and write the CP/M format specified during installation or you can select a different CP/M format.

The main menu also allows you to enable or disable the 25th line of your display as a status line, to reconfigure your system, and to format a CP/M disk. You can bring up the main menu at the MS-DOS prompt or from within a CP/M program. To exit the main menu, simply press ESCape.

To load RUN/CPM, you type **RUNCPM** at the MS-DOS prompt. A RUN/CPM copyright notice appears, and you see the MS-DOS prompt in inverse video. You can now issue MS-DOS commands and run MS-DOS programs as always, or you can run CP/M 8080 programs—all from the same prompt. If you wish to exit type **QUIT**, **EXIT**, or **BYE**.

To run CP/M programs on MS-DOS disks, you must rename CP/M COM files to files with the extension CPM. You needn't rename CP/M files if you run them on CP/M disks. If you set the drives to CP/M (and configure the system for Kaypro II disks), you can simply insert Kaypro II disks in the drives and run the 8080 programs as if you were using a Kaypro II.

*UniDOS.* UniDOS unites some features of Accelerate 8/16 and RUN/CPM. Like Accelerate 8/16, it allows you to use a V-20 chip for programs with 8080 opcodes and software emulation for programs with Z-80 codes. (The V-20 is not

included but can be purchased separately.) When UniDOS is used with its companion program, UniForm, you can install a CONFIG.SYS file that sets one disk drive for both MS-DOS and CP/M formats.

Notice that unlike RUN/CPM, the UniDOS-UniForm duo transforms one drive rather than two. Instead of toggling between formats, the duo assigns two names to one drive. If you have floppy drives A and B, it sets drive B as CP/M drive C. When invoked as B:, the drive reads and writes in MS-DOS format; when invoked as C:, it reads and writes in CP/M format.

You set the terminal emulation by using an included configuration utility. You can change this from within UniDOS, however, via the /c option.

UniDOS is memory resident; you load it by typing UNIDOS. The program checks to see whether UniForm has been installed; if so, you can use one drive as both an MS-DOS and a CP/M drive. UniDOS prints a sign-on message and tells you which terminal it's emulating and which CP/M format it is using. It then returns you to the MS-DOS prompt. To run CP/M programs on MS-DOS disks, you must rename them from COM extensions to CPM. You don't have to rename them if you're running them from CP/M disks. Also, the arrow keys adhere to Perfect Software's commands rather than WordStar's.

Like Accelerate 8/16, UniDOS has options that allow you to choose software or hardware emulation. Typing UNIDOS at the MS-DOS prompt calls up Z-80 emulation, which is the default unless you installed a V-20 in the system. If you *do* have a V-20, the /i option forces Z-80 emulation (for programs using Z-80 opcodes); the /v option tells the program to use the V-20 for 8080 hardware emulation. If you use the /v option with programs using Z-80 code, the system will crash.

**CP/M-DOS Kit.** Kaypro Corporation's CP/M-DOS Kit is a more modest emulator than the others. It works only with a V-20 chip (included) and on CP/M Kaypro double-sided disks. It does not have software emulation for programs with Z-80 code. The kit contains files to set up one MS-DOS drive as a Kaypro CP/M drive. The drive will then read Kaypro CP/M double-sided disks, but not single-sided disks.

Included with the kit is a double-sided CP/M disk with the full complement of CP/M 2.2 programs: ASM, DDT, MOVCPM, PIP, STAT, SUBMIT, SYSGEN, and XSUB.

The program is designed to work only on the Kaypro PC and is not warranted to work on any other brand of computer. The manual has thorough instructions for installing the V-20 in the Kaypro PC.

After you install the V-20, place a copy of the program disk in your PC and type CPM. The system responds with a sign-on message and tells you to insert a [double-sided] CP/M disk in drive A and press Return. The CP/M system boots, and you can now run CP/M programs that use 8080 code. The programs must have the extension COM.

You can also boot CP/M from MS-DOS disks. To set up a CP/M boot file on an MS-DOS disk, you generate a CP/M system on a CP/M disk using MOVCPM or SYSGEN. You then copy the system to an MS-DOS disk using the utility CPMDEV included with the kit. At the MS-DOS prompt, type CPM and the boot system's file name. You can then run 8080 programs from MS-DOS disks.

The kit also has provisions to format Kaypro CP/M double-sided disks and to copy them. You use Alt and function key combinations: Alt-F1 formats a disk; Alt-F3 formats and copies. The program tells you when to insert the source and destination disks.

The manual is rather sketchy and does not tell you how to exit the program. I tried several commands, such as EXIT and QUIT, but none worked. The only way I could exit was to reboot the PC with Ctrl-Alt-Del. (Ed. note: Rebooting is indeed the only way to exit from CP/M emulation and return to MS-DOS.)

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## Coproductors contain a Z-80 chip, so they don't have the speed limitations of Z-80 emulation.

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### The coprocessors—a different group

**Blue Thunder.** Z-World's Blue Thunder coprocessor, a half-length board, plugs into an expansion slot of an MS-DOS computer. The standard version runs at 5 MHz, and faster versions are available. The Blue Thunder has Kaypro CP/M terminal emulation and graphics emulation. The software supports MS-DOS path names but not CP/M user area numbers.

After installing the coprocessor in an empty expansion slot, running the software's configuration program to set up a boot disk, and copying files to MS-DOS disks, you have three ways to run CP/M software:

(1) At the MS-DOS prompt, type CPMT and then the normal CP/M command, such as PW FILENAME.

(2) Switch to CP/M-compatible mode by typing CPMT. The system responds with a new prompt, A: A>, and you can then run programs as if you were working on a CP/M computer. You can also run MS-DOS programs from this prompt by typing a comma and then the MS-DOS command. To exit CP/M emulation and return to MS-DOS, press Enter at the Blue Thunder prompt.

(3) Bind a CPMT program header to a CP/M program; there's an included utility for this purpose. This allows CP/M programs to be run directly from the MS-DOS command line.

You can use CP/M programs with either COM or CPM extensions. To avoid confusion with MS-DOS programs of the same name, Z-World recommends using the CPM extension for all CP/M programs.

Using the recommended CPM extension for file names also helps speed operation because the software first searches for a file with the extension CPM, then for COM, and finally through other directories, which you can specify with CPMPATH. Similar to the MS-DOS PATH command, this establishes a path by which the software searches for CP/M files.

The Blue Thunder software recognizes some special keys, such as Ctrl-NumLock to stop screen output, Ctrl-Break to quit CP/M emulation, and ESC to cancel the current command-line input.

# Kaypro CP/M

## Software and Supplies

Description	Price	Description	Price
<b>Accounting</b>			
Checks & Balances	\$ 64	<b>Project Management</b>	
Financial Calculator	\$ 34	Milestone	\$ 95
Home Inventory Plus	\$ 37	<b>Utilities, General</b>	
<b>Business</b>			
Bottomline V	\$199	Backgrounder	\$ 45
Decision Analyst	\$ 79	DateMate	\$ 29
Landlord	\$495	DateStamper, Kaypro	\$ 39
MarketFax	\$395	DateStamper, General	\$ 46
NWA Statpak	\$219	dFastest	\$ 49
Walonick StatPak	\$429	FastBack 10/20	\$ 89
Walonick Forecast +	\$495	FastPak Mail	\$ 74
<b>Communications</b>			
Crosstalk	\$145	FeatureFormat Prof.	\$ 74
Mite	\$ 49	Free Filer 5.0	\$ 79
<b>Database</b>			
dBase II	\$389	Media Master	\$ 37
Filebase	\$ 99	Memory Typewriter	\$ 39
FYI 3000 Plus	\$339	Presto	\$ 37
InfoStar	\$179	SmartKey V4.2	\$ 49
Notebook	\$ 64	SmartPrint	\$ 25
Personal Pearl	\$149	SmartKey/SmartPrint	\$ 59
SuperFile	\$ 79	<b>Utilities, Disk</b>	
<b>Educational</b>			
Family Roots	\$159	C/Nix	\$ 54
I Ching	\$ 29	Diagnostic II	\$ 99
Home Appraiser	\$ 34	Disk Doctor	\$150
Language Tutor	\$ 47	FastBack 10/20	\$ 89
Memory Tutor	\$ 47	PluPerfect Writer 2.2E	\$ 39
Reading Professor	\$ 57	PluPerfect CP/M 2.2E	\$ 32
Self Search	\$ 39	Rescue & Repair	\$ 55
The Word (Bible)	\$179	UniDos	\$ 59
Touch & Go Typing	\$ 28	UniDos v V20	\$ 89
Quiz Writer	\$ 47	Uniform	\$ 59
UnderStand Yourself	\$ 24	<b>Spreadsheets</b>	
<b>Entertainment</b>			
Best of Wok Talk	\$ 27	MultiPlan	\$169
Computer Chef	\$ 27	SuperCalc 2	\$235
Chocolate Bytes	\$ 27	<b>Training</b>	
Deadline *	\$ 45	ATI Basic	\$ 42
Eliza	\$ 22	ATI dBase II	\$ 69
Enchanter *	\$ 37	ATI CP/M	\$ 42
HitchHikers Guide *	\$ 37	ATI Multiplan	\$ 69
Infidel *	\$ 39	<b>Word Processing</b>	
Lotto Master	\$ 25	Bibliography	\$ 54
MyChess	\$ 31	Biblio & Footnote	\$ 99
Wishbringer *	\$ 37	Footnote & Pair	\$ 54
Witness *	\$ 37	Grammatik I	\$ 69
Word Wiggle	\$ 27	Index	\$ 79
Zork 1 *	\$ 39	MathStar	\$ 49
Zork II or III *	\$ 39	MicroPro Mailmerge	\$ 89
* Infocom games		Number	\$ 55
<b>Graphics</b>			
Banner Plus	\$ 25	Punctuation & Style	\$ 95
Fancy Font	\$155	Thoughtline Outliner	\$ 59
FontStar	\$ 49	Word Finder	\$ 69
PrintMaster	\$ 49	StarIndex	\$ 89
Art Gallery I	\$ 39	Superwriter	\$175
Art Gallery II	\$ 39	<b>Supplies</b>	
Rembrandt 3.0	\$ 39	3M SSDD Kaypro/Box	\$ 12
Rembrandt II/IV	\$ 47	3M DSDD Kaypro/Box	\$ 14
SCS-Draw 1.1	\$ 57	3M Head Cleaning Kit	\$ 21
Draw Image Ext	\$ 19	3M KeyBd Static Mat	\$ 34
Twist & Shout	\$ 32	Board Disk Mailers/10	\$ 9
<b>Integrated Software</b>			
T/Maker Integrated	\$189	10 ft Parallel cable	\$ 29
<b>Languages</b>			
Cobol Compiler	\$189	10 ft Serial cable	\$ 23
Fortran Compiler	\$189	Smart Cable RS232	\$ 47
Macro Assembler	\$ 99	Juki Printwheels	\$ 19
MBasic Compiler	\$239	NEC ELF Thimbles	\$ 22
MTBasic Compiler	\$ 67	Brother Printwheels	\$ 25
SuperSort	\$139	<b>Bookware</b>	
Toolwork's C	\$ 46	Comp Kaypro CP/M	\$ 13
Toolwork's C Mathpak	\$ 27	CP/M Handbook	\$ 15
Turbo Pascal	\$ 59	Online Research	\$ 24
Turbo Tutor	\$ 32	Practical WordStar	\$ 19
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Prices subject to change without notice.

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Just put your cursor on a word in your text, press the escape key twice, and a list of synonyms appears. Choose the synonym you want, press another key, and it zips into your text. Magical. Word Finder can help you find the exact word you need to express your thought. CP/M version has 9,000 keywords and 120,000 synonyms. Word Finder is \$69. Order today.



### Free Computer Tamer

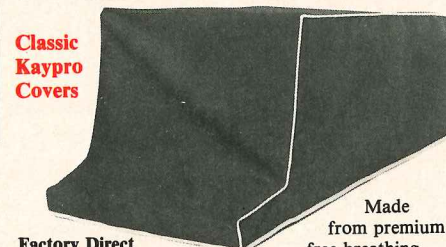
CP/M SmartKey version 4.2 now comes with windows. Lets you redefine every key on your keyboard from inside any program. Just push a key, a window opens up on your screen, redefine the key. Move the cursor anywhere in the window. Make corrections in the window. Unlike similar programs, SmartKey does not 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.

### Cordura Travel Case

Super tough. Made from rip, shred, and water resistant cordura. Comes fully padded and lined. Protects your Kaypro from unexpected bumps and jolts. Keeps rain, sand, and other debris out of your machines. Includes external carrying handles, detachable strap with non-slip shoulder pad, and large interior pocket for transporting manuals and diskettes. Regularly \$79.95. Central's price is \$59.95. Please indicate your choice of color: silver-gray, dark blue, or brown. Satisfaction guaranteed or money back.



### Classic Kaypro Covers



Factory Direct

Made from premium free breathing, and fade resistant sailcloth. Comes in rich looking Navy blue or Royal blue. Includes a smart contrasting silver gray piping and trim. Made to form fit and protect a portable Kaypro that's set up and ready to use. One piece cover is \$18.95. Two piece cover set includes cover for CPU and separate cover for keyboard: \$21.95. Specify color. Matching printer covers are \$15.95 each. Order today.

### Educational

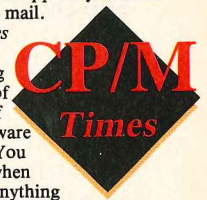
Super programs to boost grades. Challenging computer assisted learning at its best. More than 40 titles in CP/M Times catalog. \$39 each or three for \$99. Order today.

Description	Grade Level
Simple Addition	1-3
Funzeez	2-5
Simple Division	1-3
Using Fractions	5-7
Using Decimals	5-7
Practicing Percents	5-7
Vocabulary Skills	5-8
Algebra	8-college
Honors Algebra	8-college
Calculus	8-college
Geometry	8-college
Chemical Symbols	8-college
SAT Score Builder	10-12

## Giant Catalog

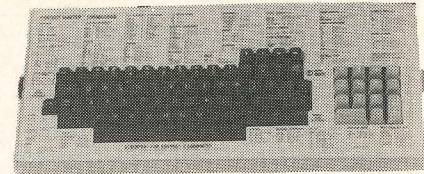
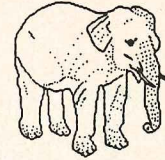
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The software has a translation program to modify the keyboard. The default translation sets the arrow keys to be the WordStar diamond. To use the arrow keys with the Perfect Software series (instead of resorting to Ctrl keys), you need to modify the key translation table. The process is not fully explained and is somewhat tricky, but with some effort it does work.

KDISK, included with Blue Thunder, allows your MS-DOS machine to use Kaypro CP/M single- and double-sided disks. It, too, is not easy to use and, according to the manual, may not work with all PC compatibles. If KDISK doesn't work on your computer, Z-World recommends conversion software such as Media Master or UniForm.

Blue Thunder also has additional features for programmers

## Programs: Which Run? Which Don't?

**T**wo of the big questions in choosing a CP/M emulator or coprocessor are what CP/M software will it run, and how fast? Many CP/M programs using 8080 code will work on the emulators that use the NEC V-20 chip. Many programs using Z-80 code will work on the emulators that have Z-80 emulation and on the coprocessors.

CP/M software that calls the computer's hardware generally will not run. Such software, which often causes the MS-DOS system to hang, includes STAT, COPY, FINDBAD, SWEEP and NEWSWEEP, D, DU, MOVCPM, UNERASE, and Plu\*Perfect Systems' CP/M 2.2e, BackGrounder (and BG ii). Modem programs don't work either.

A few CP/M utilities *did* work in my testing. Those that worked under Z-80 emulation included F, X, and SD. Those that worked under both Z-80 emulation and V-20 hardware emulation included PIP, RPIP, EX, DSORT, and VIEW. SPIP loaded and could view files, but would not copy them.

Application programs were a mixed bag: a couple worked only with Z-80 emulation or the coprocessors, but most worked with either Z-80 or V-20 emulation.

Manuals included with the products touched on other programs. Kaypro cites AUTOSTAR, BAUDM, BAUDP, CONFIG, CS, DUTIL, IMAGE, MASMENUE, MFDISK, PAUSE, TERM, and TIME as programs that don't run on the CP/M-DOS Kit because they contain Z-80 code or use direct input/output to CP/M hardware.

Micro Interfaces says the following will run under RUN/CPM: dBASE II, CalcStar, SuperCalc, and DataStar.

Z-World says the following work on the Blue Thunder: ASM, MASMENUE, MASPREP, SUBMIT, and LOAD.

### They run, but do they run fast enough?

As for speed, remember that Z-80 emulators must translate code from Z-80 to 8088. This slows down some programs considerably.

I found that the word processors containing Z-80 opcodes worked too slowly under Z-80 emulation to be practical. The screens displayed sluggishly. They had trouble keeping up with fast typing, and the lag until the words showed up on the screen once I paused was far too long. Sometimes the displays were more than a line behind.

On the coprocessors, WordStar and Plu\*Perfect Writer run fast enough to be useful. Perfect Writer 2.0 worked fine with the V-20. The screens did keep up with fast typing, and articles printed out at a reasonable speed.

The other programs that worked with the V-20 also ran fast enough to be practical — although I've never used Per-

fect Calc or Profit Plan with large spreadsheets and don't know how long those programs would take in recalculating. In small spreadsheets of less than 2K, Perfect Calc and Profit Plan ran okay with the V-20. The Word Plus ran fine with the V-20.


### Time trials

Perfect Filer contains Z-80 code and thus won't work with the V-20. With the Z-80 emulators, it runs much more slowly than on my Kaypro II.

I didn't mind the time when I was entering data or editing the data base. The time is excessive for data base search or sort operations. Sorting a 354 record Perfect Filer data base under Accelerate 8/16's Z-80 emulation required 4 minutes and 10 seconds. The same sort took 40 seconds on the Blue Thunder with a hard disk, and 67 seconds on a Kaypro II.

To get a further measure of how fast the emulators and coprocessors run, I wrote two short MBASIC programs. Test1 prints the numbers between 32 and 127, along with their ASCII characters, in columns and beeps when it's finished. Test2 prints the numbers from 0 to 1,000 in columns and then beeps. The results are shown in the table below.

Program	Time in seconds	
	Test1	Test2
Accelerate 8/16		
Z-80 emulation	8	6
V-20	3	29
UniDOS		
Z-80 emulation	10	83
V-20	2	18
RUN/CPM		
V-20	2	16
CP/M-DOS Kit		
V-20	4	37
Blue Thunder		
5-MHz board	2	20
RP/M2		
5-MHz board	3	27
GW BASIC		
at 4.77 MHz	4	39
MBASIC on Kaypro II		
at 2.5 MHz	3	20
at 5 MHz	2	10

— M. Schwager 



and software developers.

**RP/M2.** Micro Methods' RP/M2 works with the Blue Thunder board. It is actually an operating system compatible with CP/M 2.2. The operating system has enhancements such as date and time stamping, common access to user area 0, and multiple commands on a line. On a 640K system, it sets up a RAM disk of 512K, called drive M.

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## Though these products endow your Kaypro with a dual personality, they don't make it a CP/M clone.

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To boot RP/M2 you place a special RP/M2 disk in drive A and an MS-DOS disk containing RP/M2 in drive B. You then log onto drive B and type **RPMSYS**.

Several utility programs enable you to access both MS-DOS and CP/M format disks, set up terminal emulation for many CP/M computers, and use macros to save typing.

For example, to use Kaypro CP/M single-sided disks in your A drive, you'd place such a disk in drive A and type **SETDISK A:6** (6 is RP/M2's code for Kaypro II disks). To remove this setup, type **SETDISK** without any parameters.

To use Kaypro terminal emulation, you type **KAYPRO**. To emulate other terminals, you type **RTERM** and choose from a menu of terminals.

RP/M2 allows you to program your computer's function and cursor keys. The commands and phrases are stored in a special file with the extension PFK. You write (or modify an example) PFK file using **NEWPFK FILENAME**, such as **NEWPFK WS** for WordStar. To install WS.PFK, you first copy it to drive M (the RAM disk) using **RPMPIP**. You then issue the command **SETPFK WS**.

Another utility, **AUTOCALL**, lets you configure your system from a batch file when you boot up. You could, for example, write a batch file that included the commands outlined above to set your system for the Kaypro II.

To exit from RP/M2 to MS-DOS, type **GODOS** at the RP/M2 prompt.

### Conclusion

You might have sensed that although the products I've described here endow your MS-DOS machine with a dual personality, they don't transform it into an exact CP/M Kaypro clone. You're right—they all have limitations.

RUN/CPM and the Kaypro CP/M-DOS Kit don't run programs using Z-80 code. Accelerate 8/16 and UniDOS are slow in Z-80 emulation. And none of them will run *all* CP/M software.

The coprocessors run Z-80 programs at full speed rather than interpreted speed, but they're not perfect either. They, too, can't run all CP/M programs, and they're fairly complex.

Both with emulators and with coprocessors you might crash your system if you try loading a CP/M program that the system can't run or if you neglect to rename programs from COM

extensions to CPM (or if you do and shouldn't have).

Eventually, though, you get used to these idiosyncrasies. No MS-DOS computer can totally replace a CP/M Kaypro but the emulators and coprocessors I've described here may come close enough to meet your needs. All boast clever programming and more features than a single magazine article can detail.

Running CP/M programs on an MS-DOS machine offers some benefits you can't get in a CP/M Kaypro, such as the ability to pop up MS-DOS memory-resident programs like SideKick. It also allows relatively inexpensive use of CP/M programs on a hard disk.

The coprocessors may be a bit expensive for the occasional use of CP/M programs—it depends on what you use them for. You might find them highly satisfactory, especially if you're involved in CP/M programming or development.

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*Michael Schwager is a freelance writer and editor in Bala Cynwyd, Pennsylvania. He also does consulting for corporations and nonprofit organizations.*

## Quick Reference Summary

**Product:** Accelerate 8/16  
**Manufacturer:** Intersecting Concepts  
4573 Heatherglen Court  
Moorpark, CA 93021  
**Phone:** (805) 529-5073  
**Sugg. List Price:** \$99.95

**Product:** RUN/CPM  
**Manufacturer:** Micro Interfaces  
16359 NW 57th Ave.  
Miami, FL 33014  
**Phone:** (305) 823-8088  
**Sugg. List Price:** \$99.95 (\$124.95 with 8 MHz V-20)

**Product:** UniDOS  
**Manufacturer:** Micro Solutions  
132 W. Lincoln Hwy.  
DeKalb, IL 60115  
**Phone:** (815) 756-3411  
**Sugg. List Price:** \$69.95 (UniForm \$69.95)

**Product:** CP/M-DOS Kit  
**Manufacturer:** Kaypro Corp.  
533 Stevens Ave.  
Solana Beach, CA 92075  
**Phone:** (619) 481-4300  
**Sugg. List Price:** \$99

**Product:** Blue Thunder  
**Manufacturer:** Z-World (Decmaton)  
2065 Martin Ave., Suite 110  
Santa Clara, CA 95050  
**Phone:** (408) 980-1678  
**Sugg. List Price:** \$249.95 (5 MHz); \$399.95 (10 MHz)

**Product:** RP/M2  
**Manufacturer:** Micro Methods  
118 S.W. 1st, Box G  
Warrenton, OR 97146  
**Phone:** (503) 861-1765  
**Sugg. List Price:** \$129 plus \$5 for S&H (not including Blue Thunder)



# A First Session with BackGrounder ii

## *Installation, task switching, and cut-and-paste*

by Durwin A. Schmitt

If you've had your CP/M Kaypro for any length of time, you've probably experienced the heart-stopping message that the destination disk is full when trying to save a file. While there have been different procedures suggested to let you save the file, none approach the following ideal solution.

1) You suspend operation of your application program without having to leave it (normally leaving your application causes you to lose your irreplaceable data file).

2) You calmly switch to a program like NewSweep, examine the files on disk, and erase an old one to make room on the disk.

3) You then switch back to your suspended application program and save the file.

If that didn't get your attention, how about the following? While using your word processor, you need to include a small table in the text. You feel that it is easier to construct tables with your spreadsheet, which allows quicker column and decimal point control and alignment. Again, you simply suspend operation of the word processor and switch to the spreadsheet. After constructing the table, you transfer it directly to your text file.

Does this sound too good to be true? Not if you have BackGrounder ii, the latest update in a line of useful CP/M programs from Plu\*Perfect Systems. Some have described it as the most impressive and exciting piece of CP/M software ever introduced. It will open a whole new spectrum of exciting capabilities, many of which were previously available only to MS-DOS users.

### Objective of this tutorial

Ted Silveira's July 1987 "Flea Market" outlined some of the features of BackGrounder ii (called BGii from here on). The purpose of this article is to get you up and running with several of BGii's powerful features. We'll start with installation and then proceed to show how to perform the apparent sleight of hand described in the above two scenarios. Since BGii has too many commands (37) to describe in a single article, we'll concentrate on two: task switching and moving text from one

program to another. These are new features that have been added to the original BackGrounder. This article is intended for those of you who have not used the program before.

Before describing the installation procedures, I should say that BGii is intended for '83 and '84 series Kaypro CP/M computers with RAM disks or hard disks. While it works with floppy disks, the time required to switch from one program to another is much greater. If you do try this tutorial with floppy disks, double-sided, double-density drives are highly desirable. A 500K RAM disk will work fine (although I've added

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*We'll focus on two features: task switching and "cut and paste."*

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another 500K to my RAM disk to take full advantage of BGii's task-switching capabilities). If you are thinking of adding a hard disk or a RAM disk to your CP/M system, BGii may provide the final excuse you need.

BGii is available in a demonstration version from bulletin boards, users groups, or directly from Plu\*Perfect Systems for \$10. The demo version is complete enough to support the examples we will be doing, but doesn't include all features (like print spooling) or documentation. This article should help those of you who are "test-driving" the demo version, as well as those of you who have the full-fledged program.

### Step-by-step installation

Start by making a working copy of the BGii files on the demo or complete program disk. Since BGii was written to be run on any Z-80 CP/M computer, the original disk contains more files than needed to run on your Kaypro. For Kaypros, only the following files need to be copied to the working disk:

SETTERM.COM	TERMBASE.DAT
SETBG.COM	PUTBG.COM
LOADBG.COM	BG.REL
K83SCRN.DRV	K84SCRN.DRV
K8384FNK.FNK	

Also add a copy of the public domain "housekeeping" utility NewSweep (hereinafter called SWEEP).

The demo version restricts command line drive specifications to drive A. However, programs can access files on other drives. If you are running with a RAM disk, set the RAM disk to drive A and copy the above programs (including SWEEP) to this drive. If you're using a hard disk, copy all of the programs to an empty user area. If you are trying BGii with floppy drives, put the working copy disk in drive A.

After logging onto drive A, the first step in the actual installation procedure is to type **SETTERM** at the A > prompt. The program will ask for "the drive containing the file TERMBASE.DAT." **Drive A** should be the response to this question and all questions pertaining to which drive to use. BGii will then display a menu of the available terminals. Enter **14** if you have an '84 Kaypro, or **25** for an '83 Kaypro. Answer **N** to the prompt that asks "Review or edit the terminal definition (y/n)?" You should answer **Y** when asked if you "wish to install the terminal definition into utilities." When asked whether it is "OK to update," answer **Y**. When finished, type **Q** to quit and **N** in response to "Do another terminal (y/n)?"

Next, type **SETBG**. The program will show the terminal you selected in the above steps. At the prompt requesting "Enter the drive, user number and name of the source file," enter **A:LOADBG.COM**. Return to the Main Menu prompt and select option **1**, the Parameters Menu. Choose item **1**—this gives you the Hardware Menu. The first thing you'll see on the Hardware Menu is that the screen driver and function key driver are not installed. To install them, select item **2** and at the first prompt answer **Y**. At the next prompt enter **A:**, and then choose a screen driver for either an '83 or '84 Kaypro. After returning to the Hardware Menu, select option **3**, and repeat the above steps to define the function key driver. (If you have an '83 Kaypro, you will also need to change the CPU speed from the default value of 4 MHz to 2.5 MHz by using option **4**.)

Return to the Main Menu. Select option **2** to update the file with new or changed parameters. Then select option **1** from the Update File Menu. We are now ready to create the BGii Swap File, which requires about 100K of space. The following command does it: **PUTBG -d=A**

The final step is to load BGii by typing **LOADBG**. You will be greeted by the familiar CP/M prompt plus the user number (**AO>**). The program has now been installed for your Kaypro.

If you are using the demo program, however, there is one more thing to do (because of the limitation of only operating on drive A). To work the examples in this tutorial you need to load your word processor and spreadsheet on drive A, and you may not have enough room left on the disk. Once the program is installed not all of the BGii files are needed. So if you don't have room on drive A, you can remove all the BGii files except for **LOADBG.COM**, the **BG.SWP**, **BG.HLP** and **BGINFO.HLP** (although even the help files can be removed if necessary). Caution: Be certain you have a backup of the program disk

before erasing any files.

If you're using the demo disk you can't switch to another drive using CP/M's usual command: **A>B:**. However, you can copy your application programs (a word processor and a spreadsheet program) onto the disk in drive A by using **SWEEP**. At the **A>** prompt, type **SWEEP**, then log onto another drive by typing **L**. Select the drive containing your application programs, then copy the program and any data files to drive A.

BGii has undergone beta testing on many different Kaypros using a variety of RAM disk boards and driver programs. Most present no installation problems. (Note to SWP RAM disk owners: the SWP RAM disk software requires a patch if you are not using a fully populated board.)

One final comment regarding installation. If you encounter a problem, you will probably be able to find the solution by scanning the comments and technical notes available for downloading on Plu\*Perfect's electronic bulletin board system.

## Plu\*Perfect's Bulletin Board

**P**lu\*Perfect Systems maintains its own bulletin board system. You can place orders on it, download technical notes and patches, leave technical queries, and receive replies. Demo versions of BackGrounder ii and some of Plu\*Perfect's other software are also available. To access it, call (714) 659-4432 between 6 p.m. and 8 a.m. PST on weekdays, and all day on weekends and holidays. If you call this number at other times, you will reach the Plu\*Perfect office or an answering machine.

### Scenario 1: Task switching

Load your word processor and open a text file on drive A. Now we'll assume that you have modified the text file, tried to save it, and received the dreaded "destination disk full" message.

With BGii at hand, all you do is switch to background CP/M mode by typing its *suspend* command (**CTRL^**). You'll see a list of BGii's commands, some status information, and finally the prompt **A0}**. Note the curly brace—this is used to denote BGii's background mode (instead of a **>** symbol). You cannot run programs from a curly brace prompt, but you can use BGii's background functions.

Now, at the **A0}** prompt, type **SWAP**. You'll see the message: "Swapping to CP/M," followed by an **a0>** prompt. The swapping procedure takes about five seconds with a hard disk, and from 20 to 60 seconds with floppy disks (the 20-second time applies to those with the Advent TurboROM; the 60-second time occurs with the original Kaypro ROM). The prompt appears in *lower-case* to remind you that you are in BGii's *lower task*,—the main task is called the *upper task* and its prompts use *upper-case* letters.

When in the lower task, you can run any program you wish, while the original program is suspended in the upper task. For this scenario, we need to run **SWEEP** and log onto drive B.

From within **SWEEP** you can see the files on drive B and delete any obsolete files to make room for the new file. Leaving **SWEEP** returns you to the **a0>** prompt. You return to the

original task by typing **SWAP**. This puts you back in the original program at the exact place in the text file from which you left. You can now save the file.

Here's a recap: To figure out where you are in BGii, just look at the prompt line. A curly brace in the prompt means you're in BGii's background mode. Prompts in upper-case mean that you're in the upper (or main) task; prompts in lower-case mean you're in the lower task. The **SWAP** command switches tasks (upper to lower or vice versa).

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*A curly brace in the prompt tells you that you're in BGii's background mode.*

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### Scenario 2: Task-to-task data transfer

You are still in the word processor writing a text file and want to put a table in the text. You decide to switch to your spreadsheet program to construct the table. Suspend the word processor with **CTRL^**; this puts you into background CP/M mode (the A0 prompt). Type **SWAP** to switch to the lower task (the a0 > prompt). Now load the spreadsheet and construct the table. When the table is done, you're ready to transfer it into your text file.

The transfer is accomplished using BGii's "cut and paste" commands. The **CUT** command clips and saves a portion of the screen for later use. To use it press **CTRL^** to switch to background CP/M (A0), then type **CUT**, and return to the spreadsheet. At this point, use the arrow keys to mark out the section you want "clipped." Move the cursor to the top left-hand corner of this region and type **X**. Then move the cursor to the bottom right-hand corner of the table and type another **X** or a carriage return. As you move the cursor, the section to be cut will blink rapidly or be highlighted. The section you clipped is now saved for future "pasting."

To place this clipped text into the text file, you need to suspend the lower task, so type **CTRL^**. (BGii responds with a0.) Then switch to the upper task by typing **SWAP**, after which your text file reappears. Position the cursor at the spot where you wish to insert the **CUT** section. Press **CTRL^** again to temporarily suspend the word processor. (The A0 prompt will appear.) Now type **PASTE**, and the **CUT** region is inserted into your file.

To reiterate, the steps to **CUT** a section of your screen are very simple. Simply suspend your current program, type **CUT** and then move the cursor to the top left-hand and bottom right-hand corners of the desired section, typing **X** at each corner. The **CUT** portion will be saved for future **PASTE** operations. Note that when moving the cursor to mark out the section to **CUT**, you may not move off the screen (i.e., you are limited to the current screen).

### Getting HELP from BGii

If you're using the demo disk, you can explore other BGii

commands by using the on-line **HELP** command. **HELP** is always available, even when a program is running. Use of the onscreen help requires that the files **BG.HLP** and **BGINFO.HLP** be on the drive you specified during installation.

To get help, type either **HELP** or **HELP BGINFO**. The first form gives a brief summary of BGii commands. The second version gives more of a tutorial on how to implement various features.

To display the help information, enter the appropriate letter

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*HELP BGINFO is a tutorial on how to implement various BGii features.*

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or number from the Help Menu. BGii then shows the information one screen at a time. At the bottom of the screen, a one-line menu indicates what keys should be pressed to control the display. A number at the left margin of this menu line indicates which screen, under this index entry, is currently displayed. When you see "EOI" it means "End Of Information" — there are no more screens on this item.

### More to the story

This article has only scratched the surface of what BackGrounder ii can do. Some of its other capabilities include:

- a notepad available at any time
- a calculator for decimal and hexadecimal arithmetic that can insert its results into a program
- the ability to print files while you run other programs (a print spooler)
- keyboard macros to replace a single key with an entire string of characters
- a screen dump

Obviously, there's more to this piece of software than first meets the eye. Now that we've got you going with its task switching and cut-and-paste features, you can try some of its other tricks.

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*Durwin Schmitt is an aerospace engineer with Martin Marietta's Denver Aerospace Division.*

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## Quick Reference Summary

**Product:** BackGrounder ii  
**Manufacturer:** Plu\*Perfect Systems  
Box 1494  
Idyllwild, CA 92349  
**Phone:** (714) 659-4432  
**Sugg. List Price:** \$75



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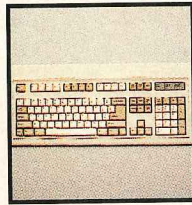
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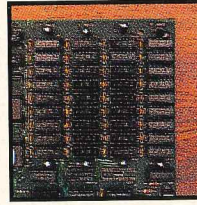
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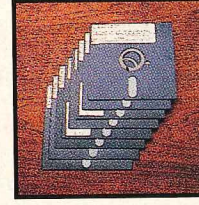
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Since being reviewed by Michael Schwager for this issue of Profiles (see page 55) PC RP/M2 has been enhanced. For example, Z80 is now fully supported with or without a softcard. Call for other details.

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## The K-20 and The Cambridge Spreadsheet Analyst

by Ted Silveira and Brian Lewandowski

**P**roducts reviewed this month include a modified 20-megabyte Kaypro CP/M computer by High Tech Research and a spreadsheet analyst for Lotus 1-2-3 by Cambridge.

### K-20

The K-20 computer from High Tech Research looks like an ordinary CP/M Kaypro 10—it even has Kaypro written on the side in familiar gray letters. But don't be fooled. The K-20 is about as much like a Kaypro 10 as a Saturday night street racer is like the family sedan.

*Features and Performance.* To make the K-20, High Tech Research (maker of Handyman) buys '84 series Kaypro 10s direct from Kaypro, complete with clock, internal modem, and software bundle (WordStar, The Word Plus, CalcStar, InfoStar, MITE). High Tech then modifies the basic Kaypro 10 as follows:

In place of the Kaypro 10's ten megabyte hard disk, the K-20 has a 20-megabyte Seagate 225 hard disk with a 65 ms access time, which is noticeably faster than the original so you get more speed as well as more space. And in place of the usual 390K double-sided 48-track-per-inch floppy disk drive, the K-20 has a double-sided 96-track-per-inch floppy drive storing 782K (though you can have the 390K drive if you want).

In place of the normal Kaypro ROM chip, the K-20 has the latest Advent TurboROM. The TurboROM speeds up disk writes and has optional disk formats that also speed up disk reads and random file access. It also adds a type-ahead keyboard buffer, a built-in screen dump facility, automatic screen blanking (after ten minutes of inactivity), automatic detection of several different floppy disk formats, optional on-screen time display, and (if you have Plu\*Perfect's DateStamper program) time- and date-stamping of files. The TurboROM has other tricks, too, including built-in

support for the Advent RAM disk, some added video features (like an optional 25-line display), and a program that lets you reassign and repartition your hard disk, floppy disk, and RAM disk drives.

Along the way, High Tech also added a fix for the amnesiac Kaypro clock so that the computer now always knows the correct time.

Finally, the K-20 has the latest version of Handyman (1.3), a SideKick-like pop-up desk accessory for CP/M Kaypros. Unlike Presto! Plus and Write-Hand-Man, which are purely software, Handyman is hardware-based, a small

used it for a few hours.

Handyman, which is really the centerpiece of the K-20 system, is also very fast because it keeps its programs and workspace in its own RAM and ROM—there's never any delay while you wait for a program overlay to be read in from the disk. In this regard, it has a decided advantage in speed over all-software products like Presto! Plus and Write-Hand-Man.

Also, Handyman's various functions work very smoothly with each other and with the rest of the K-20, so the total effect of having all Handyman's functions available at any instant is greater than my description of its parts. It's the kind of thing you get immediately addicted to.

My one complaint about Handyman is that the notepad can't handle files longer than 8K. That's plenty of room for taking notes most of the time, but I'd like to be able to use Handyman to view or edit longer files while I'm in the middle of WordStar or some other program.

*Documentation and Support.* The K-20 comes with a stack of manuals. The Handyman manual is very good—clear, straightforward, complete but not overly long. High Tech also includes several pages of documentation about special features of the K-20 (files, 96 tpi disks, etc.), which is adequate but needs to be expanded and made more user-friendly. It should serve as an overall introduction to the system, but it doesn't.

The Advent TurboROM manual is complete and usable—all the information you need is there—but it's laid out in a way that could intimidate novice users.

The rest of the documentation consists of the standard manuals delivered with the Kaypro 10 software. Overall, the documentation accompanying the K-20 is satisfactory—fine for the experienced CP/M Kaypro user, less than per-

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### Handyman is the centerpiece of the K-20 system.

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board full of chips that plugs into the Kaypro's Z-80 socket. Because Handyman carries its software in a ROM chip and has its own RAM chips for storage, it doesn't use up any of the K-20's 64K main memory and yet doesn't require any disk-based program overlays, as Presto! Plus and Write-Hand-Man do.

As with any pop-up program, you can call Handyman at any time, even in the middle of another program. Just press its hot-key (^), and you instantly get the Handyman menu listing its ten functions: help, setup, ASCII table, screen dump, directory, phone dialer, notepad, calculator, calendar, and file manager.

In addition to these features, the K-20 is now available with the Z-System, an enhanced, CP/M-compatible operating system that I'm addicted to.

As for the K-20's performance, with its faster hard disk and the TurboROM, it's markedly faster than the original Kaypro 10—fast enough so that you'll never consider switching back once you've

fect for the novice user.

Apart from the documentation the experienced CP/M Kaypro user will find the K-20 is dead easy to use. It's just like any other CP/M Kaypro — only better.

From the outside, the K-20 looks like a Kaypro 10, but in action, it's nothing like it. Once you start to explore all of its features, you begin to see it's really almost a new machine — faster, more versatile, more useful.

Handyman, which is likely to be the only new feature for experienced users, is very easy to use, following familiar WordStar commands in the notepad and offering very intuitive choices elsewhere. The one exception is the file manager, which has a somewhat less obvious command structure (probably due to the pressure of cramming those extra functions into the limited ROM and RAM space).

People who have never used computers before face a considerable task in learning this (or any other) computer system. But they'll find the system relatively easy to use once learned.

And although High Tech Research is a small company, its support is excellent. That doesn't mean that problems never occur — there are so many people running so many different combinations of hardware and software that every major product eventually runs into some kind of conflict. But Handyman has had few such problems, and High Tech Research has always done a top notch job of resolving any problems that do occur. And High Tech has a toll-free 800 number for users to call. —T.S.

## SCORECARD

<b>Features:</b>	<i>Excellent</i>
<b>Performance:</b>	<i>Very Good</i>
<b>Documentation:</b>	<i>Satisfactory</i>
<b>Ease of Use:</b>	<i>Very Good</i>
<b>Error Handling:</b>	<i>Very Good</i>
<b>Support:</b>	<i>Excellent</i>

## The Cambridge Spreadsheet Analyst

Ever since Lotus 1-2-3 first stormed the software marketplace nearly four years ago, a multitude of software companies have been attempting to capitalize on Lotus 1-2-3's phenomenal success and

inherent weaknesses by introducing add-on enhancement programs. The Cambridge Spreadsheet Analyst is an excellent example of these products.

With it, Lotus 1-2-3 and Symphony spreadsheets can be analyzed, checked for errors, and fully documented, insuring that the spreadsheet that keeps the books afloat doesn't sink in a quagmire of errors and traps.

The Analyst is targeted for the novice user and is not copy protected. It requires a Kaypro MS-DOS computer, 192K of system memory, and two floppy disk drives or one floppy disk drive and one hard disk.

**Features and Performance.** The Spreadsheet Analyst is a stand-alone audit program that runs independently of Lotus 1-2-3 or Symphony. Once loaded into the program, Lotus worksheet files cannot be altered in any way. With the Analyst, Lotus users can search for potential worksheet-destroying errors, explore underlying spreadsheet logic, and construct reports of its findings. Like Lotus, the Analyst is menu driven and grants access to the MS-DOS operating system, allowing users the mobility to switch back and forth between the Analyst and Lotus. The program works simply enough: The user first retrieves a file from within the Analyst and then chooses from four troubleshooting options: SCAN, CIRC, XREF, and PROBE.

SCAN analyzes individual cells and ranges within a worksheet, checks for approximately two dozen error conditions and summarizes its findings. Just because the Analyst indicates likely mistakes does not mean worksheet errors exist. In general, most of the Analyst's citations will not be errors. The user must review the Analyst's findings to determine the legitimacy of each citation. And some problems still require a human to figure out: the Analyst cannot locate omissions such as the exclusion of a necessary column within a Lotus @SUM function.

Overall, the SCAN findings are very informative. SCAN can alert users to any cell formula with questionable label references and can determine whether specific ranges were created with duplicate range names. It also informs new

Lotus/2.0 users of formulas that were not correctly translated to Lotus/2.0 from Lotus/1A. In addition, Lotus users can run SCAN before printing huge worksheets to determine whether any cells contain the dreaded "ERR" message.

The CIRC function aids users in locating circular arguments within a worksheet. A circular argument occurs when

## The Analyst lets you search for potential worksheet-destroying errors in Lotus 1-2-3.

interlocking formulas contingent on each other's outcome form a continuous loop. Lotus/1A users who did not upgrade to Lotus/2.0 will soon wonder how they survived without CIRC's ability to pinpoint annoying circular arguments. Moreover, Lotus/2.0 users will appreciate the Analyst's ability to display all circular argument anchor cells and show how formulas within the circular argument are linked together.

The XREF cross reference feature allows users to interactively inspect and view all formulas where a chosen cell, range or Lotus function is located. XREF comes in handy when a user wishes to erase what appears to be an unnecessary cell, but would like to be certain that the cell does not infringe upon any existing formulas.

PROBE is another intriguing option. It's a powerful way to search through the intricacies of a spreadsheet model. By selecting a formula within a specific cell, one can carefully work back through all cells and formulas that flow into it. The PROBE function is useful in worksheets where many formulas have been rendered invalid by multiple moves of cells or ranges and the user needs to quickly determine the sources of error.

In REPORTS, users can create a variety of customized reports that thoroughly document the inner workings of Lotus worksheets. Spreadsheet ama-

teurs unfamiliar with complex worksheets created by others can generate reports to help them understand a spreadsheet's logic. Lotus experts can use REPORTS to print permanent documentation for very large worksheets that may be used indefinitely and will need future updating or improvements. And spreadsheet developers can utilize REPORTS to review complex formulas that they may want to incorporate into future spreadsheet models.

REPORTS is divided into six areas. DIAGNOSTICS takes the 25 possible error conditions found in SCAN and summarizes them in various reports customized by the user. SETTINGS provides a record of all global worksheet defaults, window settings, and range names. RANGE displays the location and contents of named ranges within a worksheet. XREF shows where all chosen cells, ranges, or functions are used throughout a spreadsheet. CONTENTS allows users to view cell contents of formulas, labels, and constants as they are displayed to the user or stored internally. Finally, MAP provides typographical views of spreadsheets that are helpful in determining optimal locations for additional cells when restructuring or expanding worksheets.

While testing the Analyst, the reviewer noted one incompatibility problem. Since the size of many worksheets can easily exceed the capacity of a 360K floppy disk, some Lotus users using personal computers without hard disks must save files to floppy disks using accessory software that packs Lotus files. Because these file-compressing software packages save Lotus files differently, the compacted files will probably not be recognized by the Analyst. One of these accessory packages, Turner Hall's SQZ software, is not compatible with the Analyst. Squeezed worksheets must first be retrieved in Lotus 1-2-3 and resaved under the WK1 extension.

Generally speaking, the product fulfills its promises and performs well in assisting users in locating spreadsheet errors.

*Documentation and Support.* Overall, the documentation (approximately 150 pages) is quite good. The manual's table

of contents is very detailed—almost excessively—and the heart of the manual is concise, easy to understand, and well-organized. Although a few illustrations in the REPORT section would have been helpful in demonstrating reporting options, beginners can catch on quickly by routing all report output to the screen.

Users who have unanswered questions regarding the Analyst's detective-like features can call a toll-free technical support line. The reviewer's calls were answered promptly and the technicians seemed to be very knowledgeable in all aspects of the Analyst. —B.L.

*(Editors' note: At press time we learned Cambridge Spreadsheet Analyst had been acquired by Turner-Hall Publishing. It is now being distributed as a bundled package with The Macro Analysis Module and The Spreadsheet Comparitor. These are separate companion programs also originally from Cambridge Software. The cost for the new package is \$99.95 for all three programs.)*

#### SCORECARD

<b>Features:</b>	Very Good
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<b>Error Handling:</b>	Excellent
<b>Support:</b>	Excellent

Ted Silveira is a contributing editor for PROFILES.

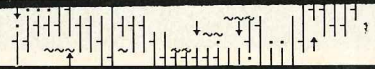
Brian Lewandowski, a C.P.A., is a financial analyst at Knott's Berry Farm in Southern California and a member of the Professional Software Programmers Association.

#### Quick Reference Summary

**Product:** K-20 Computer  
**Manufacturer:** High Tech Research  
 1135 Pine St. #107  
 Redding, CA 96001  
**Phone:** (800) 446-3220;  
 in CA (800) 446-3223  
**Sugg. List Price:** \$1,595

**Product:** Cambridge Spreadsheet Analyst  
**Manufacturer:** Turner-Hall Publishing  
 10201 Torre Ave.  
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by Marshall L. Moseley

### Driving alone

I recently bought a Kaypro 2000 secondhand from a colleague. My problem revolves around the lack of instructions in the documentation on using a single disk drive (with WordStar). Can you tell me how to use a single-drive machine?

Hubert J. Charles  
Saint Lucia, West Indies

When MS-DOS is installed on a single-drive computer, it treats that drive like two: the A and the B drive. The operating system keeps track of which drive is in use and prompts the user to insert the correct disks at the correct times.

When WordStar is logged onto the B drive or uses that drive for data, it often needs information from its overlay files on the A drive, requiring the user to switch disks constantly. There are two solutions to this: Use a single disk for programs and data, or add a second disk drive.

**A single disk:** Copy the files WS.COM, WSMMSG.S.OVR, and WSOVLY1.OVR to a blank, formatted system disk (making copies of WordStar is legal if the copies are for your own personal use). This copy of the WordStar will not have MailMerge or CorrectStar, but otherwise it will be fine. WordStar and MS-DOS take up 139K, which leaves 581K free on each disk—plenty of room for some large text files.

**A second drive:** Kaypro offers a Base Unit and Multi-Adapter. The Base Unit provides you with room for a hard drive, a floppy drive and two IBM-compatible expansion slots. The Multi-Adapter has one expansion slot for video only, and a DB-37 connector for an external 5-1/4-inch drive, also available from Kaypro.

### Get grounded

After reading "Do It Yourself Drive Swap," by Ted Silveira in the June 1986 PROFILES, I decided to remove the cover on my Kaypro 1 and become better acquainted with it.

Silveira's article said there would be a ground wire attached to each drive. There was one attached to the A drive,

but not to the B drive. Will this cause me some problems? If so, how do I ground the B drive?

Jim Derstine  
Washington, D.C.

The B drive is already grounded through the power connector to the power supply. This method provides more than adequate protection. However, grounding the drive with a wire has some advantages: It reduces RFI (radio frequency interference) between the drive and the computer, and vice versa; and it allows the drive to demand and receive power faster. Kaypro PC owners take note—your drives don't have ground wires either.

Go to Radio Shack and buy a few feet of 18 gauge insulated wire, and some quick-disconnect connectors (Radio Shack part number 643039). Cut a piece of wire about a foot long. Attach the quick-disconnect connector to one end and strip a half inch of insulation off the other end.

With the cover off the computer, look at the rear of drive A and locate the grounding tab. (It's at the end of the green wire running into the drive.) Now locate the same tab on the B drive and slip the connector over it.

Ground the drive by attaching the other end of the wire to any convenient screw on the chassis. Do not attach it to the bracket holding the drive in place—that's aluminum and makes a poor ground.

### Extended characters

I would like to thank you for your tip on "The power of ^P" in the March 1987 issue. It was the answer I have been looking for. I now face another problem.

How do I insert the ASCII characters shown in the back of the Kaypro User's Guide (decimal 1-31 and 127-254) into a WordStar document? I have a Kaypro PC, an Epson RX-80 printer and WordStar 3.3.

Randy A. Magor  
Cheyenne, Wyoming

Look carefully at that chart and you will see two columns, one labeled "Symbol" and another labeled "Keystrokes." To produce the symbol, press the keys in the keystroke column. For example, to display the British pound symbol (£), hold the Alt key down, press 156 on the numeric keypad, then release the Alt key. To insert the character in a WordStar document, preface keystrokes with a ^P.

Some problems: For a printer to print the IBM extended character set (which is what you are referring to), it must have that particular character set in its ROM. You should contact an Epson dealer or service facility about their graphics upgrade if your printer did not come with that capability. If it does, you face yet another hurdle—your word processor must be able to send those characters to the printer. That ability has to be designed into the software, which is not the case with WordStar 3.3.

A solution might be WordStar 4.0, which will print the extended character set. MicroPro, the makers of WordStar, will replace your registered copy of WordStar 3.3 with 4.0 for \$89. For more information call MicroPro customer service at (800) 227-5609.

### Video roundup

I am thinking about making the switch from CP/M to MS-DOS. One of the most confusing things about the project is the different types of video available under MS-DOS. What is the difference between MDA, CGA, and EGA?

Arthur Williams  
Salt Lake City, Utah

MDA stands for monochrome display adapter. An MDA board does not display graphics; it displays characters in a single color only (amber or green depending on the monitor). MDA video is very clear, ideal for those who spend long hours doing word processing.

CGA is an acronym for color graphics

## User Groups

adapter. Video games, charts and graphs are all available under CGA. Unfortunately CGA has two drawbacks: In graphics mode you can only display four colors at a resolution of 320 by 200 pixels or two colors at 640 by 200 pixels. In text mode characters are pretty grainy.

With the enhanced graphics adapter (EGA) you get the best of both worlds. EGA supplies two grades of resolution: 320 by 350 and 640 by 350. The EGA can also display up to 16 colors, pulled from a palette of 64. The number of colors you get are controlled by the amount of memory on the video board, with 64K giving you the least power and 256K giving you the most (the Kaypro EGA card comes with 256K standard). Almost every EGA board displays both MDA text, CGA text, and graphics. EGA is on its way to becoming a de facto color graphics standard.

### Two PC questions

I've had my first computer, a Kaypro PC, for a year and half. I have been reviewing past issues of *PROFILES*, and a few questions have come to mind.

In the September 1986 issue, Ted Silveira mentions that one can purchase a technical manual for CP/M Kaypros. Is one available for the Kaypro PC?

Next, can you explain why, on executing certain programs, the PC looks for COMMAND.COM on the A drive when the program is running from the RAM disk (drive C)? Particularly when there is a perfectly good copy of COMMAND.COM on C?

Mark T. Wolfe  
Tallahassee, Florida

First, The Kaypro Professional Computer Technical Manual, Kaypro part number 5097, is available from your local Kaypro dealer. It contains complete technical information on the Kaypro PC.

Second, MS-DOS searches for COMMAND.COM on the A drive because that is the drive from which MS-DOS boots. To tell MS-DOS that COMMAND.COM is on a different drive, use the internal command SET to designate the command file specification, (COMSPEC).

Inserting the command  
**SET COMSPEC=C:\COMMAND.COM**  
in your AUTOEXEC.BAT file will remedy this problem.

Earning to operate a computer is not easy—everyone needs help at one time or another. This is precisely the reason why user groups were born.

Basically, a user group is a collection of computer owners and users who learn from each other. These are non-profit membership organizations devoted to making life with a computer easier.

Almost every computer brand and operating system has user groups that support it; many groups are a mixed bag. For example, owners of many different brands of computers find they all use the same operating system, and therefore, have some common ground.

Most user groups have members with a wide range of expertise and experience—from absolute beginners to those who have “working” knowledge to people who are “power users.” Often people's expertise breaks down into types of software applications—word processing, data base managers, spreadsheets, telecommunications, etc. Perhaps more often, a member's knowledge is specific to a particular piece of application software.

The bottom line is that user groups are a veritable goldmine—and the mother lode is information. An expert overnight, and no one does it alone.

### KUGs

For those readers who own Kaypro computers, Kaypro User Groups (KUGs) exist in every state, in Canada, and in countries all over the world. To find the KUG closest to you, write to Fred Zuill, KUG Manager, at Kaypro Corporation, 533 Stevens Avenue, Solana Beach, CA 92075; (619) 481-4368 (voice). Be sure to include your zip code.

Fred Zuill also maintains a BBS—the KUG ROS—for the exchange of information and help. It contains a message section, as well as lots of public domain software for both the CP/M and DOS operating systems. Public domain programs mentioned in *PROFILES* can also be found there. The system is online 24/hrs, 7 days a week, and can run at 300/1200/2400 baud.

**KUG ROS — (619) 259-4437**

## Back Issues

Some back issues of *PROFILES* are still available. Highlights of recent issues are detailed below. We'll send you the desired issue(s) for \$4.00 each, including the postage and handling charges. Enclose your name and address along with a check or money order payable to *PROFILES* and mail to:

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- Local area networks
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# On The Practical Side

## Inside the Kaypro PC

by Marshall L. Moseley

**T**his month we introduce a new column: On The Practical Side. Each month, we will teach you about some aspect of your computer hardware or software. The only criteria is that this column provide you with some *practical* information about using your computer.

The first three installments will answer some long-asked questions about the Kaypro PC. This month we'll touch on DIP switches and the processor board.

### First steps

Before getting started, you should know that removing the cover from your system unit will *void your warranty*. If you bought your unit in the last year, think carefully before you start tinkering—you may want to wait until the warranty expires.

To get a look at the inside of your computer, begin by placing the system unit (the square box that holds the disk drives) on a table and make sure it is not plugged into an outlet or connected to any peripheral devices (monitor, etc.).

Remove the cover by first removing the five screws on the rear panel that hold it in place. Then face the front panel of the computer and pull the cover toward you. Be careful as you pull not to snag the cover on any cables.

Now turn your attention to the circuit boards. The Kaypro PC is built with "snap-in" technology. This means that there is no mainboard, but rather a series of modular components that can be replaced at any time.

Each board performs a different function within the computer system—and each board (with the exception of the bus board) has DIP switches.

### DIP switches

DIP (Dual In-line Packet) switches are toggle or paddle switches built into a small plastic box and located on circuit boards. Each switch opens or closes an electric circuit. If a switch is ON or

CLOSED, the circuit is active; if a switch is OFF or OPEN, the circuit is not active. The position of the DIP switch controls the presence or absence of various circuit configurations. The pattern in which the switches are set tells the computer what kind of equipment is in use.

When you make a change to your system you will probably have to change a DIP switch on one of the boards.

### The bus board

The bus board, located parallel to the base of the system, is the board to which all the other boards attach. It is the conduit through which data from each of the expansion boards flows. Looking down into the Kaypro PC, you can see that the bus board is the only board positioned horizontally, and that expansion boards plug into it.

### The heart of the computer

The board in the far left expansion slot is the processor board. It contains the CPU (Central Processing Unit). The newer Kaypro PCs have a switch on the rear of the processor board that toggles the clock speed between 4.77 MHz and 8 MHz. You will want to adjust the processor board when you change the video display, install a co-processor, or change a disk drive.

Looking carefully at the board you will see numbers stenciled next to each chip, such as R2 or U51. These numbers are to help you locate board components easily. Look at the upper left corner of the board. At position SW1 you will see a DIP switch with five switch paddles.

The settings of these switches tell the computer three things: whether or not there is a math co-processor, what type of video board is installed, and how many floppy disk drives are installed. See Figure 1 below for a complete chart of the switch settings.

As an example, let's assume you have a PC-10, and you're switching from monochrome to color and adding a second floppy disk drive. To change the video you would set switch 2 OFF, and switch 3 ON. To allow for a new floppy disk drive in the system you would set switches 4 and 5 ON.

To reset a switch, move it using a small non-conductive tool. The pointed end of a plastic pen cap should work fine—be careful not to scratch the board.

### Next month

Next month we'll cover the multi-function board and jumper settings, and in October, the final installment will describe the Kaypro video boards and how to adjust them. ■

1	2	3	4	5	
ON					Co-processor installed
OFF					Co-processor not installed
	ON	ON			No video board
	ON	OFF			40x25 Color video
	OFF	ON			80x25 Color video
	OFF	OFF			80x25 Monochrome video
			ON	ON	One disk drive installed
			ON	OFF	Two disk drives installed
			OFF	ON	Three disk drives installed
			OFF	ON	Four disk drives installed

# New Products

edited by Suzanne Kesling

The following new product listings are not reviews and should not be considered endorsements of tested products. To be considered for publication in "New Products," 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 on which Kaypro models products run. Include photos if available.

## Job hunting

The Career Management Partner assists job hunters in writing resumes and cover letters, typing envelopes, and keeping records.

The program includes word processing for creating, editing, printing, and storing letters, proposals, and resumes.

A data base listing of 100 of the leading executive recruiting firms includes addresses, contacts and telephone numbers that can be used in automated mailing and telephoning. The data base can also be expanded to include 500 names.

Information from the data base can be retrieved by name, company or contact date. The program also provides mail merging for addressing envelopes and for personalizing on-file letters.

\$129. Kaypro MS-DOS computers. Scientific Systems, Five Science Park, New Haven, CT 06511; (203) 786-5236.

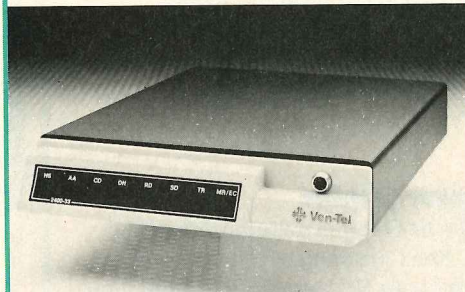
## Error-correcting modem

The 2400-33 is a 100 percent Hayes-compatible modem. It runs at 2400, 1200, or 300 bps, and it automatically provides both X.25 and MNP error correction. This allows you error-corrected data transmission over public or private lines, commercial networks, or through a protocol

converter across a synchronous network.

In originate mode, you can add a one-letter command in the dialing string to set the error-correction protocol, or it can be established automatically in answer mode.

The 2400-33 will detect the baud rate of the originator and will negotiate the highest speed link that both modems can support.



Speed buffering allows the modem to communicate with the terminal at a higher speed than the connect speed. This also lets you set a constant terminal speed interface (up to 9600 bps), instead of resetting the terminal speed every time the connect rate changes.

\$749. Kaypro MS-DOS computers. Ven-Tel Inc., 2342 Walsh Ave., Santa Clara, CA 95051; (408) 727-5721.

## Close to the real thing

The American Investor is a stock market simulation program that uses actual historical market data so that investors become confident and comfortable with professional investment techniques.

The trading portfolio consists of 48 companies with options or equities listed on the American Stock Exchange and the New York Stock Exchange as well as the Amex's Major Market Index Option.

Investors can trade both options and equities on a daily basis over a nine-month period, learning what to invest in and when to invest.

The data in The American Investor is real, which means that if you make money with the simulation, you would have also made money in the real world.

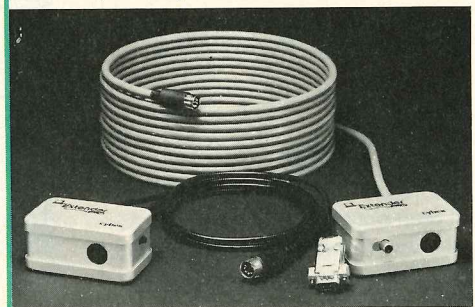
During the 190 trading days programmed into the game, you are able to review stock and option price, research company information and analyze their performance, buy stocks, write or buy options and more.

\$149.95. Kaypro MS-DOS computers except the 286i. Blue Chip Software, published by Britannica Software, 185 Berry St., San Francisco, CA 94107; (415) 546-1866.

## Extension cord

The Extender is a device that allows you to extend the distance between your keyboard/monitor and system unit up to 250 feet.

At the end of the system unit there is a connector for the monitor and a connector for the keyboard, and at the remote end there is a socket for both your keyboard and monitor.



The Extender is self powered, and it requires no extra connectors. The cable is 3/8-inch wide and flexible, and it is resistant to electromagnetic interference.

Prices range from \$99 to \$259 for Kaypro MS-DOS computers using either a monochrome or color monitor. Cable lengths range from 25 feet to 250 feet.

Cybex Corp., 1860-B Sparkman Dr., Huntsville, AL 35816; (205) 830-1100.

## Extra keys

COMMANDPATCH is an electronic peripheral for your MS-DOS keyboard that provides 22 additional function keys, and duplicates both the pre-defined function keys and the cursor control keys from your standard keyboard. COMMANDPATCH works with keyboard templates and special software that provides pull-down menus for popular software.



This system incorporates a 32 key micro-processor based mini-keyboard that attaches to your computer's keyboard; it also includes a PC/MS-DOS template, a software disk, and related manuals.

The 32 keys, which are both template and pull-down menu driven, give you easy access to every program feature and command without having to memorize them.

\$159.95. Kaypro MS-DOS computers. Micro-D, Genest Technologies Inc., 1331 East Edinger Ave., Santa Ana, CA 92705; (714) 547-0880.

## Scanner reader

ScanPro is a software package that can read scanner-produced images and convert them to formats readable by CAD systems such as ProDesign II or AutoCAD.

With ScanPro and a scanner, you can read existing drawings from paper into a computer for use with CAD software. It provides the raster-to-vector conversion necessary to use a scanner image with CAD software.

\$595 for users of ProDesign II; \$995 for users of AutoCAD. Kaypro MS-DOS computers with at least 512K RAM. American Small Business Computers, 118 South Mill, Pryor, OK 74361; (918) 825-4844.

## Hang-man game

SPIN-FOR-MONEY is a text-graphics game similar to "Wheel of Fortune." The display on your screen is also similar to the television program.

There are close to 2,000 different words, phrases and movies that are included, and you can add up to 1,200 more.

The game allows for two to three players to guess what the word or phrase is.

\$24.95 plus \$3 for S&H. Kaypro CP/M and MS-DOS computers. Generic Computer Products, Inc., P.O. Box 790 - Dept. 27E, Marquette, MI 49855; (906) 249-9801.

## Laser printer

The Jet-Setter is a laser printer from C. Itoh Corporation. It comes standard with HP LaserJet Plus emulation and uses font cartridges compatible with HP's font combinations so that it will work with all popular software packages on the market.



It prints at five pages per minute at 300 dpi and comes with 512K memory, allowing for applications requiring the integration of text and graphics.

Jet-Setter can handle letterhead, plain and A4-size paper using a 100 sheet input cassette tray. Output is provided either face-up or face-down for collating.

Its easy-to-use front control panel comes equipped with indicator lights to alert you when paper and toner require replacement. A quick refer-

ence card provides easy-to-follow instructions.

\$1,795 includes Centronics parallel, RS-232C serial and RS-422 interfaces. C. Itoh Digital Products, Inc., 19750 South Vermont Ave., Suite 220, Torrance, CA 90502; (213) 327-2110.

## Color card

The Hercules Color Card/NP (model GB201) is a lower cost version of their



Color Card. This card has all the features except that it contains no parallel port—it is for users who already have a parallel port in their computer.

This card is also for users who don't require such a port, or who are linked in networks, in which only one parallel port is required for the entire network.

The Color Card/NP accommodates either half-height or full-height slots.

\$225. Kaypro MS-DOS computers. Hercules Computer Technology, 2550 Ninth St., Berkeley, CA 94710; (415) 540-6000.

## Finding problems

BASCHECK is a program that finds compiler syntax problems in files written to run with BASIC interpreters. It was specifically designed for QuickBASIC.

BASCHECK is a compiled artificial intelligence program written in PROLOG.

\$59.95 plus \$2.50 for S&H. Kaypro MS-DOS computers. Haines & Associates, Inc., 12000 Westheimer, Suite 214, Houston, TX 77007; (713) 493-3149.



# Product Updates

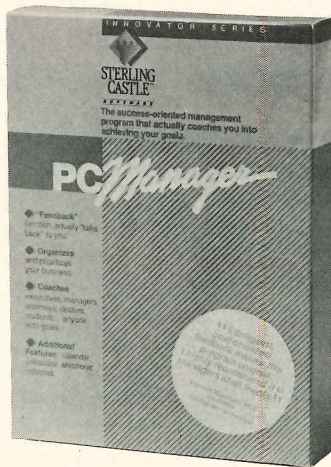
## Managing your work

PC Manager is a goal-oriented program with an active feedback feature that reminds you of deadlines and encourages you to meet your objectives.

A reminder feature can be adjusted from its minimum level of reminders—15 minutes prior to appointments—to its maximum level of random feedback throughout the day.

The Information/People module allows you to safely store personnel information in a password-protected file, while the Action/People module tracks their productivity and interaction.

The program's Calendar module is arranged daily and monthly to trigger reminders, and the Notes module is an easy-to-use memo pad allowing up to four pages of notes.

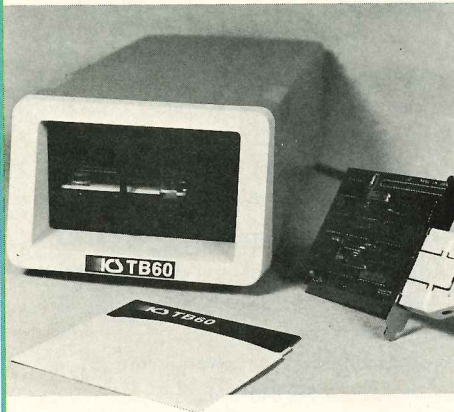


\$59. Kaypro MS-DOS computers. Sterling Castle, 702 Washington St., Suite 174, Marina del Rey, CA 90292; (800) 722-7853, in CA (213) 306-3020.

## Hard disk backup

The TB60 provides a complete tape backup sub-system for your computer. It transfers data between your hard disk and tape cartridge drive at rates up to 90K per second. It can also do an image backup of five

megabytes per minute, up to 60 megabytes total.



The TB60 does complete image backup, file by file, plus batch files and more. It also has a backup alarm, to let you know at any time during the day or week that it is time for another backup.

The system includes tape drive, cable, controller card, software, and free software revisions for one year.

\$895. Kaypro MS-DOS computers. International Computer Services, 12771 Western Ave., Suite J, Garden Grove, CA 92641; (714) 891-6328.

## Mini modem

The Parrot 1200 is a 300/1200 baud AT (Hayes)-compatible modem that establishes industry standards for size—approximately the size of an audio cassette.

A microprocessor-controlled power management system enables the Parrot 1200 to function at high levels of reliability using only the power available from the host computer's RS-232 serial interface. Neither batteries nor external AC power are required.

Other features include: touch tone and pulse dialing, auto-answer, four LED indicators for Normal, Offhook, Carrier, and Data, MCI and SPRINT tone detection, speaker with volume control, and more.

\$119. Novation, Inc., 21345 Lassen St., Chatsworth, CA 91311; (818) 998-5060.

MITE, release 4.1, now includes the KERMIT file transfer protocol. Other enhancements are loadable terminal emulation modules, built-in line numbering text editor, YMODEM and ZMODEM file transfer protocols and more. Mycroft Labs, Inc., Tallahassee, FL □ **Stella Business Graphics**, a chart and graph generation program, has lowered its price from \$199 to \$99. Stella Systems, Cupertino, CA □ **Laser Fonts** now works automatically with WordPerfect and WordStar 2000. The new released version 2.0 features high-quality fonts licensed from Bitstream Inc., and a SoftCraft-to-HP Font Conversion Program. SoftCraft, Inc., Madison, WI □ **KAMAS** version 2 is a low end outline processor for MS-DOS. This version combines a full-screen outline editor with "hide" and "reveal" and a text editor for inserting and editing text in the outline. KAMASOFT, Inc., Aloha, OR □ **MagicPrint**, **MagicBind**, and **MagicIndex**'s prices have been dropped 35 to 50 percent to saturate the WordStar territory. The MagicSeries enhances many different word processors, although it is specifically aimed at WordStar users who don't want to switch to another word processor. Computer EdiType Systems, New York, NY □ **Allegory**, a Wang-like word processor, is best suited to the office environment for preparing anything from three-line memos to hundred-page documents. Release 2.0 now includes the Proximity/Merriam-Webster spelling checker. April Software, Inc., Davis, CA □ **Label Master** now has automatic dialing. Other features include instant on-screen scrolling for fast scanning and instant display of records, regardless of the file length. RKS Associates, Arlington, VA □ **PC COMplete** is an electronic mail software package. Version 3.61 fully automates the exchange of electronic messages and files and combines full-screen text editing, address lookup, message filing, powerful macros, and a DOS shell. Transend Corporation, Portola Valley, CA.

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\* Kaypro 2000 requires serial to parallel converter.

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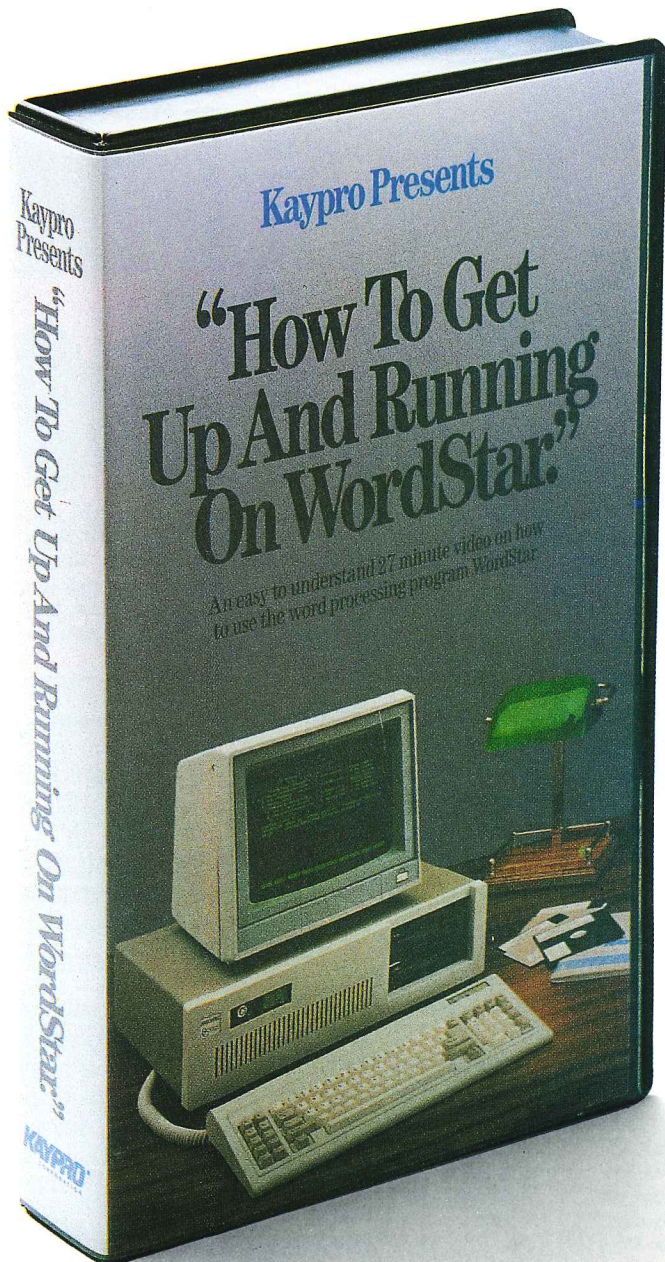


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