

ProFiles

THE SUPPORT MAGAZINE FOR MICROCOMPUTER USERS

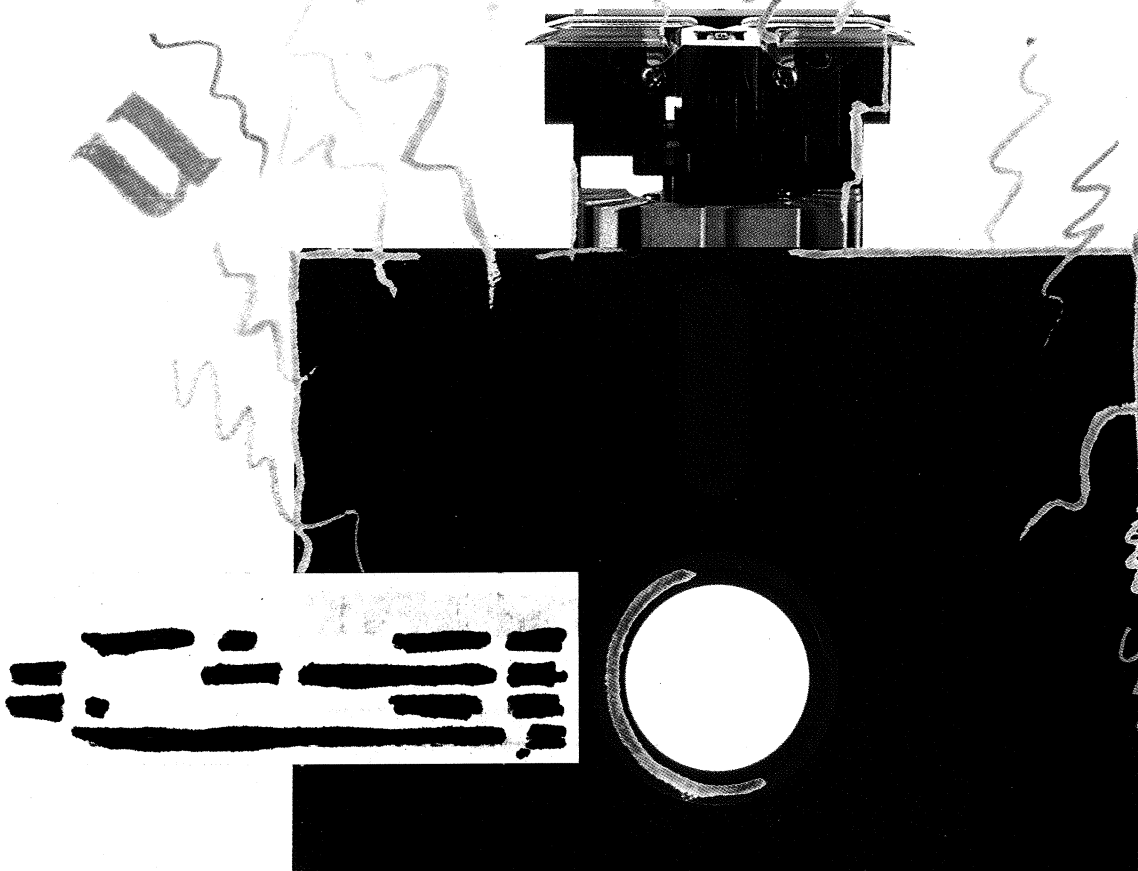
OCTOBER/NOVEMBER 1988

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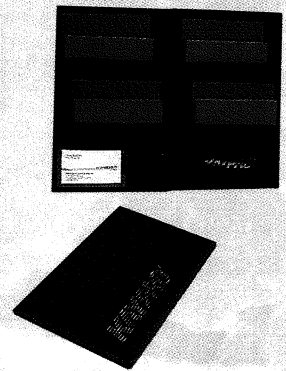
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VOLUME 6 NUMBER 3 OCTOBER/NOVEMBER 1988



ON THE COVER:
Dot matrix printers are bursting with features many programs don't tap, but you can gain access to them through patching and programming. Illustration by Tom Voss. Photograph by Kevin Halle.

FEATURES

TAP THE FULL POTENTIAL OF YOUR DOT MATRIX PRINTER 16

by Ted Silveira

Newer dot matrix printers offer a multitude of features that few programs take advantage of. To get full control, you must patch printer codes in existing programs or write your own. This article gets you started.

GET ORGANIZED WITH WORDPERFECT *by Don and Sharyn Conkey* 24

Learn how to use the WordPerfect features that let you create indexes, tables of contents, and other organizational tools.

DU TO THE RESCUE, PART 1 *by Ted Silveira* 30

This is a reprint of a popular article on disk editing with the CP/M program DU-V88. Learn how to use it to recover from crashes.

A FIRST SESSION WITH PARADOX, PART 1 *by Joseph Comanda* 36

Paradox is the first relational database that lets you see everything you're doing onscreen. Learn the fundamentals of creating records this month and find out how to link them in part 2.

HOW TO BUY A HARD DISK *by Jim Spickard* 47

If a floppy-based system no longer meets your needs, find out how to choose a hard disk and what the other mass storage alternatives are.

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- LOTUS LEARNING SYSTEM (458)** - A tutorial that covers overview, applications, etc. Lotus NOT required.



UTILITIES

- DISK COMMANDO V2.0 (218 & 219)** - (2 disk set) Norton Advanced Utilities clone. Too many features to list.
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- LIST V6.2A (274)** - Best utility for viewing documentation or any ASCII file.
- PC-DESKTEAM V1.03 (278)** - Sidekick like utility plus more features.
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THE REWARDS OF LEAVING CIVILIZATION BEHIND

Perhaps you remember when the personal computer world was something like a frontier town—a little lawless, with a lot of room for individual initiative. It was when you pretty much had to be a hacker, in the old and honorable sense of that word, in order to use a microcomputer at all.

The frontier town has been settled now; the streets are paved, and there are flower pots on the windowsills. But on the outskirts you're back on dirt roads, and there are still plenty of challenges for the adventurous and determined.

One such area is the newer dot matrix printers, which offer so many features that few programs take advantage of them. If you want to put these features to work, you'll have to run through a custom printer installation routine, at the least, or patch printer codes into your programs, or even write programs of your own to set your printer the way you want it. If you're ready to shed your city clothes and pull on your buckskins, you can follow Ted Silveira through "Tap Your Dot Matrix Printer's Full Potential" to explore this territory.

Silveira provides more guidance for the intrepid in "DU to the Rescue," a reprint of a popular article on disk editing—that is, manipulating data byte by byte. Disk editors are powerful tools that let you recover files from disk crashes, but they are not for the faint of heart. Silveira explores both disks and disk editors in part one of this article. Next month, he'll explain how to cope with common crashes.

Continuing our series of buyers' guides, Jim Spickard takes a look at mass storage devices, concentrating primarily on hard disks, but also considering streaming tape drives, CD ROMs, and other storage options. In "How to Buy a Hard Disk," he provides an overview of the technology, factors to consider in choosing a mass

storage medium, and, as always, questionnaires to help you determine your needs and ask the right questions when shopping.

If, like many users, you're sure you could make use of a database program, but have been intimidated by their difficulties—not the least of which is that they often don't let you see what you're doing onscreen—see "A First Session with Paradox." This month, in part one, Joseph Comanda provides an overview of Paradox, the first fully relational database with a fully visual interface, and explains how to set up a datafile. Next month, he'll explore ways to tap more of Paradox's potential without programming.

Even if you're an experienced WordPerfect user, you may not have learned to use the features that let you organize thoughts as well as documents. In "Get Organized with WordPerfect," Don and Sharyn Conkey explain how to generate outlines and create lists, tables of contents, indexes, and more using tools contained within this program.

Finally, you may have noticed that this issue is labeled "October-November 1988" on the cover. We are combining these two issues not to confuse you, but because we are busy putting together our newsletter format. You'll still receive it in plenty of time to order gifts for the holidays.

If you are a PROFILES subscriber, your expiration date has already been extended to account for this combined issue. You will still receive 12 issues (or 24, if you ordered two years) on your subscription, as promised.

Lanny Bullock
Publisher

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MORE MS-DOS ADVICE

In his article "A Short Course in MS-DOS: Part 2" (July 1988), William Murdick gives the following example of the COPY command:

```
COPY C:\WORDSTAR\LETTERS
JONES3.LET C:\JUNK
```

where JUNK is assumed to be a subdirectory.

He then states that you can end a path with either a "filename (JONES3.LET) or with a directory area name (JUNK), whichever would be logical in a given operation."

I believe that a beginning DOS user should be advised to end all COPY paths with a file name to avoid the following problem: Assume that the user types JUMK instead of JUNK. If there is no subdirectory called JUMK, JONES3.LET will be stored as file JUMK in the root directory. If the full path had been specified, an error message would have alerted the user to the problem.

Alfred Bruey
Jackson, Mississippi

TYPOS R US

I'm distressed by the typographic errors that occurred throughout the last issue of *PROFILES* (July 1988). Either your compositor or your conversion program is confused about hyphens and dashes.

On pages 2 and 3 of your magazine, they're all fine. But starting on page 18, there are en dashes set where hyphens should be (except at the end of lines, where proper hyphens appear), and there are two en dashes set where one uninterrupted em dash should be.

I enclose copies of pages from three books that explain the differing uses of hyphens, en dashes, and em dashes. Other books that might help your production people's understanding are the *Chicago Manual of Style*, *Webster's Standard American Style Manual*, and *Words Into Type*.

Of course, all of these styles apply mostly to bookwork. Newspapers and magazines generally follow lower typographic standards and ignore the nicety of en dashes. But no knowledgeable typesetter

converts the double hyphen, which substitutes for an em dash in typewritten material, to a typeset double hyphen or double dash; the unbroken em dash is available in any typesetting system.

PROFILES' character is excellent, but it needs to wear the proper dress; I hope I've helped raise your typographic consciousness!

Peggy Smith
Annandale, Virginia

We'll allow our production manager, Michael Herbert, a chance to reply in his own defense:

"My publisher passed on your letter concerning the proper use of hyphens, en dashes, and em dashes. First of all, thank you for your interest and for including the rules and examples with your letter. As the production manager of PROFILES, I'm responsible for what ends up in the magazine and I appreciate it when such problems are brought to my attention.

"I can assure you that the problems you described are not the fault of a less-than-adequate typesetter. On the contrary, our typesetter would never have made the mistakes you have noted. Recently we began doing the page makeup of PROFILES with desktop publishing software and delivering completed files on disk to our typesetter to be output on his typesetting equipment. He no longer manipulates the files in any way.

"Although this is proving to be an effective way of cutting costs and production time, it does have its drawbacks. One is that desktop publishing puts typesetting in the hands of non-professionals. I frankly was unaware of the differences between dashes and hyphens. Fortunately this, like many other DTP problems, can be eliminated with education and attention to detail.

"Desktop publishing is a wonderful tool, but it is not a miracle worker. It cannot make a typesetter, designer, writer, or editor out of a production manager. I hope that in future issues such bugs are noticed and corrected."

In our own defense, the "dash and hyphen" problem was noted by our proofreaders. With a little manipulation and patience on Michael's part, the

problem will be solved.

TIP TRADER

Over the past several months I have been plagued by a rather annoying problem to which the solution was deceptively simple. Just as it is difficult to transfer files from a Macintosh to a DOS computer, it is equally difficult to transfer from CP/M to either. There are (as pointed out in May 1988 ["Overcoming the Language Barrier"]) several devices and software packages that will make this process simple, but they are expensive enough that for infrequent transfers of small files they are impractical. The obvious solution is a direct connection or a modem transfer.

My DOS computer has no RS232C port (or any other serial port, for that matter) and I really didn't want to impose upon my computer-phobic friends to help me transfer these files over the phone. After some thought and experimenting, I have come up with this very elegant solution.

The key to this technique lies in the dissolution of Ma Bell. Since the phone company no longer owns and leases telephone equipment in my area, it has also ceased to install and maintain the wiring inside buildings. There is a jumper and a pair of receptacles inside my closet where the phone company's system ends and mine begins. Disconnecting this jumper and replacing it with a telephone gives me my own cheap local area network. A direct-dial modem will provide enough power to send the signal over such a short distance, so setting one computer to send and one to receive the transfer can be done by one person without purchasing exotic equipment.

I have been very successful at transferring WordStar and ASCII files between my Kaypro 2 and an IBM-PC in this manner. It can be slow, but it costs me nothing and is very reliable.

Michael Carver
Tyler, Texas

After reading the "Q & A" column in the June 1988 issue, I feel compelled to comment on the response to the question regarding capturing the dBASE III output to a print spooler so that other work may be

done while the printing is going on. The hardware solutions suggested are viable, but I wish to suggest a solution that will provide a level of flexibility not achievable with a print spooler, and at a considerable savings.

Specifically, I suggest using software to capture to a file the output directed to the printer port. Then, to actually print the file, use the DOS PRINT command to print the file in the background. This method allows you to inspect the file with a text editor prior to (or instead of) printing the file. Frequently, only a relatively small portion of the actual output in the report is ever inspected, and only for a short-term purpose. It is quicker to produce the file, inspect it with an editor, and then, if it is okay, print it. Also, with this method, if there is a problem during the printing process, the file is available for restarting the printout as well as for backup purposes if the report is important.

What programs are available for this purpose? Several come to mind. The program LPTX can be found on many local BBSs and will do the job. The program I prefer for this purpose is PRN2FILE, by Tom Kihlken, published in 1987/No. 22 of *PC Magazine*. This program can also be found on local BBSs and in the PCMAGNET forum on CompuServe. If you can't get to these sources, perhaps a friend could provide access to them. The best part is that there is no cost!

Roger Brunstrum
Alexandria, Virginia

Many of our readers may remember that PROFILES used to include a department called "Tip Trader." Hardware and software tips from our readers are invaluable sources of information, and readers have been quite generous in sharing these tips with their fellow computer users.

If you have a tip that has saved you time and/or hassle, send it to: PROFILES TIPS, 533 Stevens Avenue, Solana Beach, CA 92075. We will publish tips as space permits in our "Letters" column and elsewhere in the magazine.

ULTRABOARD—YES!

Regarding the item in "Dateline" (May

1988) on ultraboards for CP/M machines like my Kaypro 2 (upgraded to a Kaypro 4), I would like to add my vote for production and sale (at a reasonable price) of these boards. If my understanding of the function of these boards is correct—there's an increase in RAM to one megabyte, there are dramatic increases in the speed of screen and disk operations, etc.—such improvements would be worth a few hundred dollars to me and hundreds of thousands (millions?) of other users of CP/M machines.

My machine and those of a number of friends are still in excellent health and do all we require of them for home use. Any help we can get to improve operations, memory, and speed will be much appreciated by the multitude of us who still use CP/M machines. As a federal retiree on a fixed income, I am reluctant to buy a PC-DOS machine to gain relatively small increases in RAM and screen operations. The cost is prohibitive, and the prospect is that PC-DOS machines will shortly be as "obsolete" as CP/M computers.

If the ultraboards are used in either type of machine, they will not extend the life of these machines—they will wear out at their usual rate. If ultraboards are withheld to "encourage" CP/M users to buy PC-DOS machines or their clones, this "dog in the manger" attitude will doubtless turn off a goodly number of home computer users, myself included.

I hope that I speak for others who, like me, do not need stupendous amounts of memory but would relish the increased speed of operations, and would be willing to pay a reasonable cost to have this extra convenience. Enough said! Please promote the production and sale of these ultraboards.

I have enjoyed PROFILES for the past four years and trust the magazine will continue successfully for at least another four years. Many thanks to you and your staff for all the help that I have derived.

Sam Rosenblum
Lakewood, Colorado

We have received a great number of letters from CP/M users who, like you, are anxious for the Ultraboard. Rest assured

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that Bill Nesting at High Tech Research has no intention of "withholding" the Ultra-board to "encourage CP/M users to buy PC-DOS machines." His company has nothing to gain from CP/M users converting to MS-DOS computers. It is simply a matter of economics at this point: The cost of developing and refining the board has been greater than expected and has led to the need for other projects to keep the cash flowing. We'll keep you informed of any developments.

PERFECT WRITER FOR MS-DOS

I just noticed in reviewing my old copies of *PROFILES* an item in the "Letters" column in the October 1987 issue. A reader asked about the MS-DOS version of Perfect Writer. Your reply was, "We are not aware of any version of Perfect Writer in MS-DOS

format..." I can't believe that *PROFILES* has been unaware of version 2 of the Perfect software. It came out over two years ago and was widely commented on in KUGRAM and *MicroCornucopia* magazine.

Roy W. Clark
Murfreesboro, Tennessee

You're right. We goofed in the October 1987 issue, but made up for it in the December 1987 issue. We still receive a lot of calls and letters from readers looking for Perfect Writer for MS-DOS, so the information bears repeating. Contact:

Thorn EMI Computer Software
285 Mill Road
Chelmsford, MA 01824
(617) 256-3900

EYE OF THE BEHOLDER?

I dug out the April 1988 *PROFILES*, intrigued by the article on filling out forms using WordStar 4.0. It was a great idea, and I finally figured out how to roughly fill out an invoice, but it was an incredibly frustrating process. The article was poorly written and very unclear. I wish that a completed listing of the master merge file(s) had been included. Also, I found the explanation of the .SV commands confusing. It took some delving into the WordStar manual to realize that in ".SV 1, L" the 1 was a variable name and wasn't related to the fact that there was one L— i.e., only one character in the variable. This confusion was reinforced by ".SV 2, LL" and ".SV 3, LLL".

The idea of using WordStar to fill out forms is wonderful. I wish the article had been a bit more clearly written or had been subjected to a bit more careful editorial scrutiny before being printed.

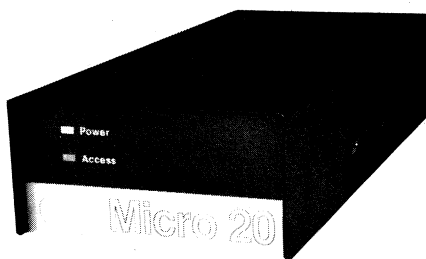
Charles R. Irwin
Cambridge, Massachusetts

One of the most important and sometimes most difficult tasks in editing articles for *PROFILES*, a magazine with a very diverse audience, is making sure that everything in each article is clear and consistently at the appropriate level for its intended audience.

The article you mention, though fairly complex, did seem clear to us for an intermediate audience, as did the explanation of the the .SV dot command. Author Steve Gilliland stated that "for each different [character] length, you use one .SV command followed by the number or letter identifying it, a comma, a space, and an "L" for each character allowed in the variable." However, perhaps it would have been clearer if the number of Ls in each of the first three examples had not coincidentally corresponded to the number used as the variable identifier (it didn't in the last three examples).

In any event, we're sorry you had trouble following the article. Our aim is not to frustrate you but to help you get the most from your computer, and we regret any confusion we caused you.

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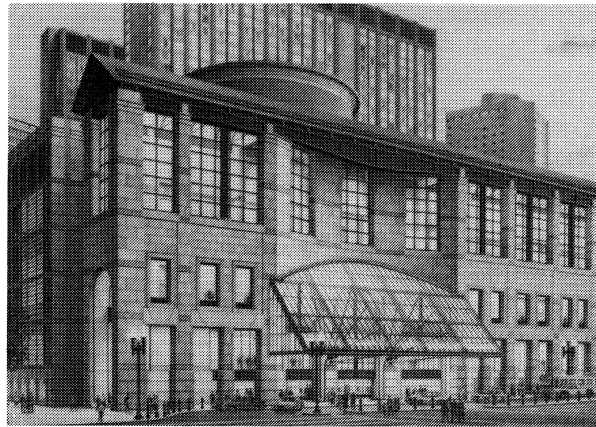
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DEFINE 'FUNKY'

Thank you for mentioning DYNACOMP in your column [Ted Silveira's "CP/M Only," July 1988]. However, I do have a few nits to pick.

In particular I take issue with three descriptors you used: "obscure," "funky," and "name brand." First, DYNACOMP's thrust has been to provide hard-to-find software that fits specific needs. Some people call this "vertical market" software. In plain English, it is specialty software that appeals to a narrow market. Using the terms "obscure" and "funky" does not objectively describe the product line. If anything, these terms connote something negative—a thread that runs through your article.

I do not think you are persecuting DYNACOMP in particular. For example, saying Spite [Software] has come on hard times just puts another nail in their coffin. Who wants to purchase from a company going out of business? If you want to keep CP/M alive, this is not the way.

Second, the term "name brand" has a very clear meaning, but you apparently have some private definition for it. DYNACOMP is a registered trademark. The software published by DYNACOMP is under the brand name "DYNACOMP." Of the 163 CP/M products appearing in the DYNACOMP catalog, about 130 are published by DYNACOMP. The remaining are (I think) what you would call "name brands"—for example, Media Master, etc. Therefore, by the definition of "name brand" found in the dictionary, DYNACOMP has 163 name brand products. If your definition is used, we have 33, which

is still respectable.

Naturally, I also take issue with your comment that the quality of software sold by Central Computer [Products] is higher than DYNACOMP's quality. The facts simply do not lead to that conclusion. Eighteen (or roughly 12 percent) of the products listed in the Central Computer catalog are published by DYNACOMP! Another 27 (roughly 19 percent) of the "name brand" products in the Central Computer catalog also appear in the DYNACOMP catalog.

Therefore, if almost a third of the products in the Central Computer catalog are the same as those in the DYNACOMP catalog, it is a bit of a stretch to conclude that the products differ in quality, as a sizable fraction of them are identical. If anything, a more reasonable conclusion is that the products offered by the two catalogs are very similar, with DYNACOMP having a larger selection weighted toward financial analysis and engineering. I suspect that a bias toward Central Computer allowed you to jump to a conclusion without carefully checking on what the two companies are actually selling! A careful examination of the two catalogs simply does not support your comments.

Here are some "facts":

- The DYNACOMP catalog is 228 pages in length—one of the largest software publisher catalogs in existence. It is exceeded in length only by a few distributor catalogs.
- The DYNACOMP catalog lists over 600 commercial programs, 163 of which are available for CP/M.
- DYNACOMP carries over 1,400 volumes of public domain disks, over 300 of which are available for CP/M.
- DYNACOMP has been a software publisher and distributor since 1978, making it an "old timer" in the microcomputer software industry.
- DYNACOMP is still adding CP/M products to its line of software (our latest additions have been in curve fit-

ting and mechanical engineering).

- DYNACOMP offers 24-hour turnaround time, a 30-day warranty, telephone support, etc.

Please do not overlook us. We may eventually become the last source for commercial CP/M software!

F. Ruckdeschel, President
DYNACOMP, Inc.
Webster, New York

Rather than replying to Mr. Ruckdeschel's letter point by point, Ted Silveira decided to let it stand on its own merits. He suggests that readers obtain copies of both the Central Computer Products and DYNACOMP catalogs and judge the software offered for themselves. Both companies have been around for a long time and have good reputations for quality and service. DYNACOMP (at Ted's suggestion) has agreed to supply its \$2 catalog free to any PROFILES reader who writes in for one. Central Computer's catalogs (one each for CP/M and MS-DOS) have always been free.

DYNACOMP, Inc.
P.O. Box 18129
Webster, NY 14618

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(800) 624-5628 (California)

PROFILES welcomes letters from its readers. Letters for this column may be sent to:

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We reserve the right to edit letters for length, grammatical corrections, and clarity.

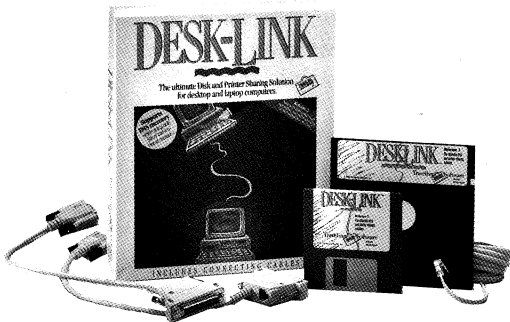
CORRECTIONS

In the August issue of *PROFILES*, an incorrect phone number was listed for the Thousand Oaks Technical BBS mentioned in Brock Meeks' "Life at 300 Baud" column. The correct number is (805) 492-5472. Our thanks to our new friend in Thousand Oaks for bringing this to our attention.

Also, the area code for Plu*Perfect Systems, listed on page 66 of "At a Glance" in the September issue, was incorrect. The correct number is (213) 395-4584. We apologize for the inconvenience.

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BY MARSHALL L. MOSELEY

MONITORING PROGRESS

I bought my Kaypro PC with a monochrome monitor, but after two years of a green screen, I have been thinking about moving to a color display. Which is the best one to buy?

What you buy, of course, will depend on your specific needs. In PC-standard computing, the type of monitor you'll use will depend on the type of video circuit board (called a display adapter) in your computer. For this reason, video standards have always been defined by the type of adapter in use, rather than the display to which it's attached. Also, certain adapters can control more than one type of display, so describing video standards by the type of display in use isn't feasible.

Color adapters are measured by two criteria: the resolution they produce and

the number of colors they display. In both cases, the higher the number, the better.

Resolution is a measurement of the number of individual dots—called pixels, or "picture elements"—that can appear on screen. A resolution of 320 by 200, for example, means that there are 320 vertical rows of pixels onscreen and 200 horizontal rows.

The subject of colors is a tricky one. The total number of colors an adapter can display is called its "palette." Unfortunately, the number of colors that can appear on screen at one time is usually about one quarter of the number in the palette. So while you may have 16 colors to choose from, for example, you will only be able to see four of them on screen at one time.

With all this in mind, let's go over the three major color adapters and look at the strengths and weaknesses of each one. Except where noted, you will have to buy a new display along with a new adapter.

The first color adapter in widespread use was the Color Graphics Adapter (CGA). It has a maximum resolution of 640 by 200 with two colors onscreen, or 320 by 200 with four colors. In graphics mode it can only display four colors out of a palette of 16, while in text mode it displays 16 foreground colors and eight background colors.

The CGA adapter is on the ropes because of its relatively poor resolution and the small number of colors it makes available, but the knockout punch is its text mode. The text resolution under CGA is *horrible*. Try to do any serious work with it and you'll have eyestrain inside of an hour. In 1983 people chose CGA because there were no other color adapters for PC computers. Now there are, and CGA adapters are languishing on store shelves. Leave them there.

The Enhanced Graphics Adapter (EGA) was introduced in 1984. It is currently the most popular video adapter, and with good reason. The EGA adapter has a maximum resolution of 640 by 350. It can display 16 colors onscreen out of a palette of 64. In text mode it displays crisp, clear characters that are ideal for text editing or database management. Also, the EGA adapter provides every IBM video mode that came before it, including those

generated by the monochrome and CGA adapters. That means that an EGA board will work with your current display. If you like, you can buy an EGA board and put off buying the Enhanced Display that goes with it.

Prices for EGA adapters have dropped markedly in the last year. You can now pick up a good EGA adapter for as little as \$200. Kaypro sells its own EGA board, part number 5763, for \$249. That's not a rock-bottom price, but it's guaranteed to work in your computer. An EGA adapter with Enhanced Display provides readable text and high-resolution graphics at a good price. I recommend it wholeheartedly.

Lastly, there's the Video Graphics Array (VGA) adapter. It debuted in April 1987, making it a relative newcomer to the color adapter world. VGA is an entirely different type of video than previous standards, and it requires a rather expensive monitor (the lowest priced one, a monochrome display, costs \$250). However, VGA will display 256 colors onscreen out of a palette of a *quarter million*. VGA's maximum resolution is 1,024 by 768, though that is a hardware option slated for the future and you will need lots of folding cash to buy it when it becomes available. The current highest VGA resolution is 640 by 480.

The best thing about the new VGA standard is its quality. Photographs actually look like photographs on a VGA display, which was not the case with earlier color adapters. Text is incredibly clear. The worst thing about VGA is the price. Getting up and running with the new standard will cost you at least \$600. Investing in VGA now is a good idea if you must have color graphics and they must be the best available. Otherwise, wait a year or so for VGA prices to drop.

WHAT'S DOT?

Every time I look at the files in the WRITE directory of my hard disk, the first two items are a period (.) and a double period(..), each of which is on a separate line. What are these and why are they there?

Those periods are symbols that represent



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directories.

The single period signifies the current logged directory, the one you are in. You can use the period in every command or path designation where you would normally type a full directory name or a wildcard designation. For example, to delete all the files in the current directory you would normally type **DEL *.*** and press Enter. The same thing can be accomplished by typing **DEL .** and pressing Enter.

The double period represents the directory above the current logged directory. If you are logged into the write directory, the directory signified by **..** is the root directory, the one above it. The double periods come in handy when you want to start moving around the hard disk. Assume for a moment there are two directories off of WRITE, the LETTERS and the MEMOS directories. If you are logged into MEMOS, switching to LETTERS would normally require you to type :

```
CD \WRITE\LETTERS.
```

The command **CD ..\LETTERS** is much easier to use; it moves to the directory above your current position and then into LETTERS.

Be very careful with this command if you have MS-DOS 2.1. When you issue a delete command using the period symbols, the operating system will not ask "Are you sure? (y/n)" before it deletes every file in the specified directory. MS-DOS 3.0 and higher will prompt you before deleting all files.

KAYPROS ARE DRIVEN

I have a 286i with six drive bays and two 5.25-inch floppy disk drives. I would like to install an additional 3.5-inch drive. Is this possible?

Yes, but it will cost you a dollar or two.

The 286i comes with a combination floppy disk/hard disk controller board as standard equipment. This board will control up to two floppies and two hard disks. Installing a third floppy disk drive requires you to install another controller board dedicated to controlling the new drive. Such a board will cost you any-


where between \$100 and \$250 and is available at computer retail outlets that sell third-party hardware (check your Kaypro dealer).

The controller board you buy must meet several criteria. First and foremost, it must co-exist peacefully with your present controller board. Ask the sales person if it is designed to be the *secondary* controller in an AT-compatible system. Next, it must support both 1.2 megabyte high-density 5.25-inch disks and 720 kilobyte 3.5-inch disks. A very good one will handle the new 1.44 MB high-density 3.5-inch disks as well.

Once you select a board, test it in your own computer if possible. If that can't be done, ask the salesperson to install it in an AT-compatible in the store. If he or she balks at that (as well he may—hardware installation isn't his job), then get a

guarantee in writing that if the board doesn't work in your computer, you get your money back. (Money, mind you, not credit toward another purchase.)

Finally, the 3.5-inch drive itself will cost you anywhere from \$75 to \$150, depending on where and how you buy it. If you use a mail-order service you'll get a very low price, but you risk an interminable wait if the drive arrives damaged or unusable. If you go to a computer dealer you will pay more, but any problems you have will be smoothed over immediately.

Just about any brand of 3.5-inch drive will work in a Kaypro PC, 286i, 286, or 386. I've installed Toshiba, Epson, and Canon drives with no problems at all. Kaypro sells the Toshiba drive in a 3.5-inch drive kit, part number 5248, for \$139 (suggested retail price). 

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ADDING A SECOND SERIAL OR PARALLEL PORT

BY MARSHALL L. MOSELEY

As computing expertise increases, computing needs change. You may have reached the point where you need to add a second printer, a modem, or a mouse to your system. Unfortunately, you are limited by the number of ports installed in your computer. In this column, we'll look at factors to consider when deciding to add a second serial or parallel port, and we'll see how to add the ports to a Kaypro PC, 386, or 286i.

THE HOW AND WHY OF PORTS

For a computer to work, it must be able to send and receive information to and from devices outside of the computing system. For that reason, every system has built into it certain points specifically designed for exchanging information with external devices. Those points are called I/O (input/output) ports.

Ports are part of the computer hardware. Every component of your system—the monitor, the keyboard, the printer—is accessed by your computer via an I/O port. Your computer has many standard ports built into it, but the ones you should be concerned with now are the parallel port, which is almost always used for printers, and the serial port, which is used for modems, mice, and other instruments.

When your computer is turned on and the operating system is loaded, each port is linked to a "device." This sounds like it should be hardware, but it's actually software—it's a discrete part of MS-DOS that can send and receive information. The name of the device that's linked to the primary parallel port is LPT1; the name of the device linked to the primary serial port is COM1. Every Kaypro ever made, except for the original 2000 laptop, has had both these ports.

What you may not know is that you can add circuit boards to your MS-DOS Kaypro that provide additional serial and parallel ports. LPT2 is a designation available for a second parallel port, while COM2 exists for a second serial port. If you have MS-DOS version 3.3, you can have LPT3 and COM3 as well.

There are numerous reasons for installing additional ports. People often

need a second port for a new printer. They find that they require a dot-matrix printer for quick printing and graphics, while a letter-quality printer is necessary for correspondence and presentations.

As for serial ports, two peripherals gaining popularity by leaps and bounds are modems and mice. As you may know, a modem is an electronic device that allows you to transfer computer data over telephone lines, giving you access to other people's computers and letting them into yours. In the last few years the use of modems has boomed.

A mouse is a computer input device that provides an alternative to the keyboard. It consists of a palm-sized plastic module set on wheels or a rolling ball so it can roll across the desktop. It's called a mouse because the module and the wire that comes out of it look like a mouse with a long tail. Mice are frequently installed by connecting them to serial ports.

*If you
plan to use a
second printer, a modem,
or a mouse,
you may need more
ports.*

So if you plan to buy a second printer, or use both a modem and a mouse, you may need more ports. That means you must buy an expansion board with a serial or parallel port on it. These are called I/O boards.

CHOOSING AN I/O BOARD

The electronic characteristics of I/O boards are well known. As a result, they are manufactured in volume and are priced competitively. There are dozens of serial and parallel boards, and some cost as little as \$50. Which should you buy? That depends on your needs and how safe you

wish to be.

If you buy an I/O board from the company that manufactured your computer, you can't go wrong. Because they designed both the computer and the expansion board, the latter will almost certainly work with the former. If it doesn't, you can exchange it easily. The part number for Kaypro's I/O board, which works in the Kaypro PC, PC-10, PC-30, PC-XL, 286i, 286, and 386, is 3298. Its suggested retail price is \$119. This is one of the most reliable boards I've ever used, but it has one flaw. You can set it for primary and secondary ports only; LPT3 and COM3 aren't available.

If you choose not to buy Kaypro's board, your next best bet is an I/O board made by a reputable third-party manufacturer. Quadram, for example, makes an excellent I/O board that I've used in my 286i. If you pay full retail, name-brand third-party boards will cost as much as Kaypro's board. Keep your eyes open, however, and go to computer swap meets, and you may find a good board priced as low as \$75.

There are also the boards you see advertised in the backs of magazines. They cost between \$50 and \$100. They are frequently manufactured offshore, and for the most part they work. However, if you get a defective board it will probably be easier to build a new one from scratch than to exchange the old one.

Whatever type of board you choose, make sure that the device names for the ports—COM1, COM2, etc.—are alterable. This allows you to change the board should you ever reconfigure your system.

MULTI-FUNCTION AND VIDEO BOARDS

A second type of I/O board is the multi-function board (not to be confused with the multi-function board found in the Kaypro PC; that's a different animal altogether.) I/O multi-function boards usually have a parallel port, a serial port, sockets for 512K of memory, a clock/calendar, and a joystick port.

I don't recommend multi-function boards for Kaypro computers. Every Kaypro PC made has a built-in real-time clock and software to access it, and both

the full length multi-video boards and the ATI boards have joystick ports. That leaves simply memory expansion and ports. The 512K of memory found on a multi-function board is minimal in today's megabyte-hungry market. You'd be better off buying a dedicated memory board that provides more expansion. Also, since multi-function boards cost much more than I/O boards (\$200 and up), they are overpriced if you're just looking for I/O expansion.

The only Kaypro computer that might be enhanced by a multi-function board is the PC-XL, which does not have a real-time clock.

*I don't
recommend
multi-function boards,
but a video board
could be
a bargain.*

A video board, on the other hand, could be a bargain. Hercules Computer Technology, Paradise Systems, and several other companies sell video boards with printer ports built into them. The Hercules board is an especially good deal because you can find it for as low as \$150, which means that for just a bit more than a standard I/O board, you get Hercules Monochrome Graphics.

CONFIGURING KAYPRO COMPUTERS

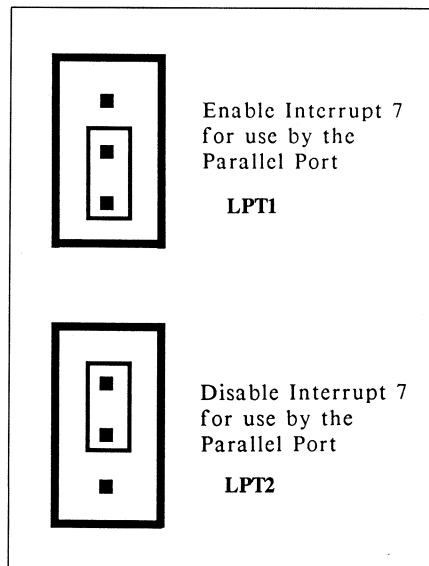
Once you've purchased an I/O board, you will need to install it. That may require the adjustment of switches inside your Kaypro computer.

First the good news. If you have a Kaypro 286i, 286, or 386, you don't need to set any switches. The computer automatically detects how many parallel and serial ports you have and what their device names are. If you have two ports

configured to use the same device name (two LPT1s for example), the computer will get confused and you probably won't be able to do anything with either port. Make sure that each port on each I/O board has a unique device name.

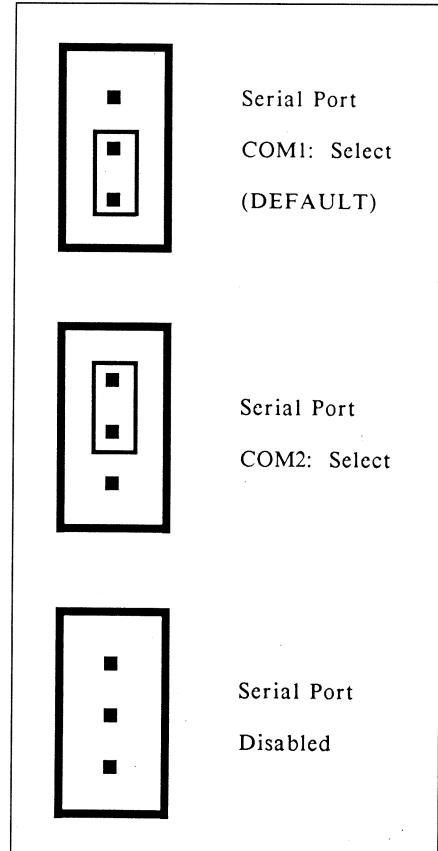
If you have a Kaypro PC built before May 1988, the switches you must adjust are on the multi-function board (I'm referring Kaypro's board this time). Remove the PC's cover, and with the drives facing you, look down into the computer. The multi-function board is the full-length board closest to the power supply. Detach the gray ribbon cable connecting the board to the floppy drives, remove the screw at the back of the board that connects it to the chassis, then lift it out of its slot.

To change the parallel port from LPT1 to LPT2, set switches 3 and 4 on switch block SW2 to OFF and ON respectively. Then set the rightmost vertical jumpers located between U37 and U38 according to Figure 1.



**FIGURE 1: Interrupt 7 Enable/Disable Jumper
(on the right side between U37 and U38)**

To change the serial port from COM1 to COM2, go to SW2 and set switch 1 ON, then set switch 2 OFF. Look again at the jumpers between U37 and U38 and set the left most ones according to Figure 2.



**FIGURE 2: COM1 and COM2 Select Jumpers
(on the left side between U37 and U38)**

In May 1988, Kaypro started using a new processor board that contained floppy disk controller circuitry and a parallel port. The port on this board can be set to LPT1, LPT2, or LPT3. Just change switches 5 and 6 on the switch block located at SW1 according to the chart below. *Do not change any other switches.*

5	6	
ON	ON	LPT1
ON	OFF	LPT2
OFF	ON	LPT3
OFF	OFF	Port Disabled

That's all there is to it. Follow these simple guidelines and you'll be able to use any port in a storm. ■

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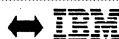


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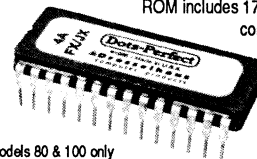
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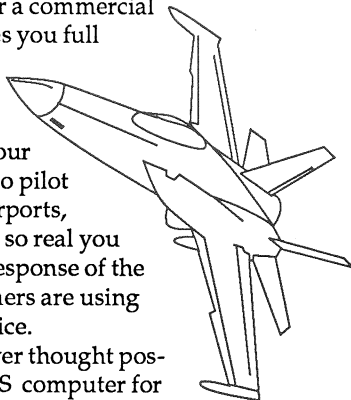
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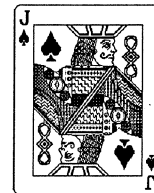
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BY TED SILVEIRA

TAP YOUR DOT MATRIX

Programming and patching for total control

A long, time ago there were two kinds of printers—daisywheel and dot matrix. The daisywheels were slow, expensive, and incapable of printing graphics, but their characters were sharp and fully formed, as if typewritten. The dot matrix printers were fast, relatively cheap, and capable of printing graphics, but their characters were made up of smudgy dots that screamed “COMPUTER! COMPUTER!”

These days, the daisywheel printer has all but disappeared. Instead, the laser printer has become the high-end printer choice, combining the print quality of a daisywheel and the flexibility of a dot matrix at a speed (and price) greater than either. The dot matrix printer, though, has also become a formidable competitor, one that bears only a superficial resemblance to its ancestor of five years ago. The modern 24-pin dot matrix printer offers speed (200 characters per second in draft printing is not unusual), letter-quality printing, graphics (at resolutions up to 180 x 360 dots per inch), type variations (such as bold, italic, and expanded characters), extra type fonts, international characters, and sometimes color.

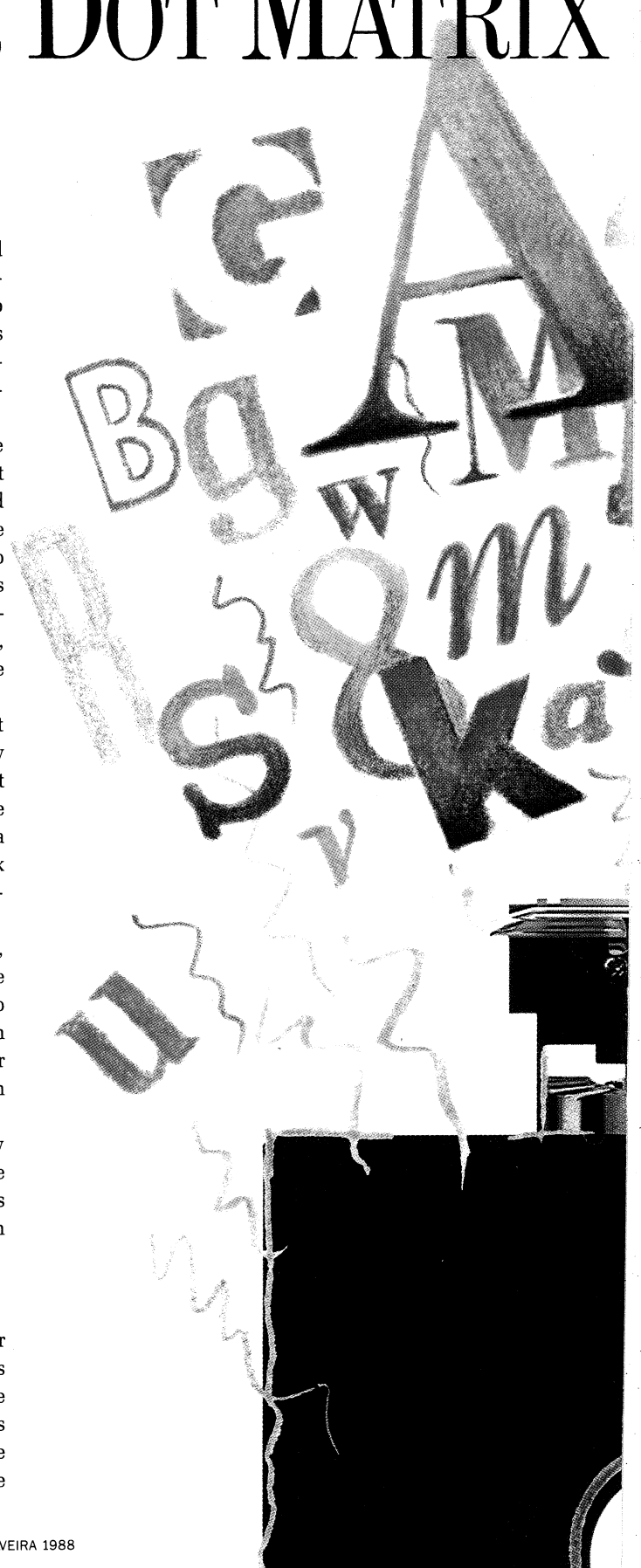
In fact, these new dot matrix printers have come so far and so fast that few software packages take advantage of all their features. A few new programs, like WordPerfect 5.0, will give you excellent control over a dot matrix printer, but an older program like WordStar 3.3 requires extensive patching before it will treat a dot matrix printer as anything more than a dumb typewriter. WordStar 4.0 offers greater control over dot matrix printers than WordStar 3.3, but it still doesn't give you access to everything a modern dot matrix printer can do.

In such cases, if you want to take full advantage of a dot matrix printer, you'll have to tell the software what printer codes to use to change typefaces, print a continuous underline, use proportional spacing, and so on. At best, you'll have to run through a custom printer installation routine. At worst, as in the case of WordStar 3.3, you'll need to teach your old dog new tricks by patching the printer codes directly into the program or writing a program of your own to set the printer the way you want it.

In the following pages, I'll cover some general information about how dot matrix printers work. Following that, I'll show how to use some specific printer commands, using the popular Epson LQ command set as an example. To wrap it up, I'll pass on some tips for using WordStar with a dot matrix printer.

HOW A DOT MATRIX PRINTER WORKS

As shown in Figure 1 (on page 18), the print head of a dot matrix printer has a number of pins arranged in a column—nine pins in older printers like the Epson FX-80, 24 pins in newer letter-quality printers like the Epson LQ-1500. To print characters, the printer sends electrical impulses that “fire” certain pins so that they strike the printer ribbon and leave black dots on the paper. By firing different combinations of pins as the



PRINTER'S FULL POTENTIAL



print head moves across the page, the printer can create the different letters, numbers, and punctuation marks.

A dot matrix printer creates each character by printing a particular combination of dots within an imaginary rectangular grid or *matrix* (see Figure 2 on page 18). An older nine-pin printer prints “fat” dots and uses a relatively coarse grid for each character—nine dots high by seven dots wide, for example. A modern 24-pin printer prints much smaller dots (because it uses smaller pins), so it can use a finer grid—24 dots high by perhaps 36 dots wide, for example—within the same space as the nine-pin printer’s coarser grid. Because the 24-pin printer prints smaller dots, closer together, the individual dots blend more and the characters look smoother. To put it another way, the 24-pin printer has a higher resolution because it prints more dots per inch.

Most dot matrix printers have two different modes of printing—*character mode* and *graphics mode* (sometimes called *bit-image* or *bit-mapped graphics mode*). In character mode, which is the printer’s normal mode, you simply send the characters you want printed to the printer. When you tell the printer to print the letter A, for example, it prints the fixed pattern of dots that represents A, column by column—the dot patterns that represent the various characters are stored in the printer’s own ROM (read-only memory).

In graphics mode, on the other hand, the printer does not use its stored character dot patterns at all. Instead, you have to tell the printer which pins to fire in every column of every line. That gives you tremendous flexibility, because you can create any shape you want out of the printer’s dots, but it also requires a tremendous amount of work—either from you, if you program the graphics yourself, or from the graphics software that you’re using. For this article, I’ll stick to character mode and leave graphics for another time.

CHARACTERS, COMMANDS, AND ASCII CODES

Computers and printers understand only one language—numbers. So when your computer talks to your printer, it does so through a system of numeric codes called *ASCII* (American Standard Code for Information Interchange). Originally, ASCII used only the decimal numbers 0 through 127 to represent the characters it needed. The codes from 32 to 126 are used for the standard printable characters—letters, numbers, and punctuation marks. The codes 0 to 31 and 127 are used to control functions of the printer (carriage return, tab, line feed, etc.), so they are called *control codes*. The ASCII codes 0 through 127, sometimes called the *lower ASCII* or *standard ASCII* codes, are the same on all printers that use ASCII.

However, as printers gained more features, printer manufacturers expanded the ASCII code by using the decimal numbers 128 through 255 (sometimes called the *upper ASCII* or *extended ASCII* codes) in addition

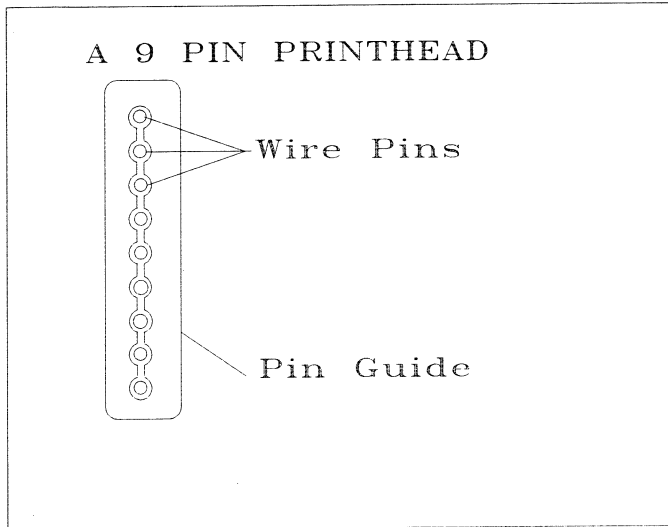


FIGURE 1: Schematic drawing of 9-pin print head

to the standard ASCII 0 through 127. Unfortunately, the manufacturers don't all use the same system, so not all printers interpret these new ASCII codes the same way. For example, as shown in Figure 3, Epson printers use the upper ASCII codes for italic characters, but the IBM Graphics printer uses them for a collection of international characters and block graphics characters. Purists argue that only the codes from 0 to 127 should be called ASCII, because these are the only codes that are actually standard, but most people refer to the whole set from 0 to 255 as ASCII. Just remember that while a lower ASCII code, such as decimal 41, will produce the same character on any two printers, an upper ASCII code, such as decimal 193, may not.

Because there aren't enough printer control codes to control all the things a dot matrix printer can do, printer manufacturers also

use a second type of printer command called an *escape sequence*. An escape sequence is a command in the form of one or more ASCII codes preceded by the ASCII escape code (decimal 27), which is usually written as ESC. The escape code by itself doesn't cause the printer to do anything—it just tells the printer that the characters that follow are a command to be executed rather than characters to be printed.

For example, if you're using an Epson dot matrix printer, the command to start boldface printing is ESC E. If you use the BASIC programming language to send the following command to your printer:

```
LPRINT "Event"
```

then the printer will simply print the word Event, like this:

Event

But if you insert an ESC character (represented by CHR\$(27) in BASIC) in the command, like this:

```
LPRINT CHR$(27) "Event"
```

then the printer will interpret the ESC E sequence as a command to print the remaining letters in boldface, like this:

vent

Notice that the E doesn't get printed because it has become part of a command.

An escape sequence may consist of ESC plus a single character, as in the case above, or ESC plus a string of characters, so printer manufacturers now have an almost unlimited number of commands to control their printers.

ABOUT PRINTER EMULATIONS

Just as there is no standard for the upper ASCII codes, so also there is no universal standard for the printer commands (control codes and escape sequences) used to control dot matrix printers. Major manufacturers like Epson, IBM, Toshiba, Okidata, and NEC have all used different command sets for their printers at one time or another.

Fortunately, not every printer manufacturer has felt compelled to create a new set of printer commands. In fact, many printers *emulate* (copy) the command sets of certain popular printers. Companies such as Star Micronics and ALPS America, for example, make printers that emulate the Epson FX series or LQ series printers—that is, they respond to the Epson printer commands in the same way a real Epson printer does.

Because the Epson commands are the most often imitated (the closest thing we have to a standard), I'm going to use the commands of the very popular 24-pin Epson LQ-1500 printer as examples in this article. If you're using a printer that does not emulate the Epson LQ series, you won't be able to use the specific commands in the following article, but the general principles will still

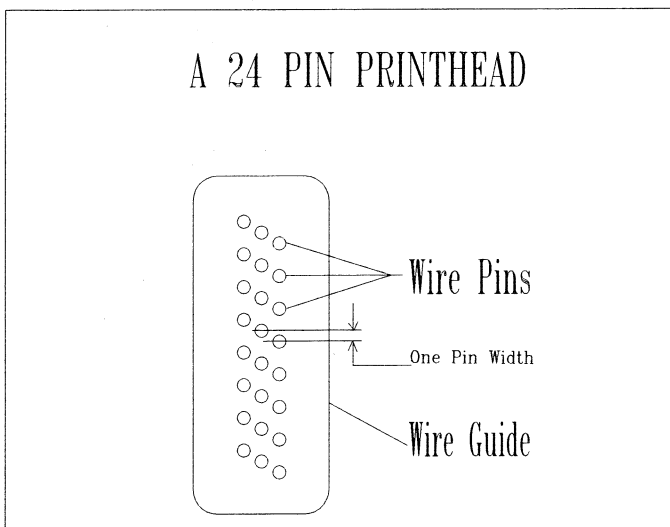


FIGURE 2: Schematic drawing of 24-pin print head

apply—you only have to substitute the appropriate commands for your own printer.

SENDING COMMANDS TO A PRINTER

To control a printer, you send it commands in one of two ways—through a programming language such as BASIC or through a program, such as a word processor, that knows how to control the printer.

First, you can send commands to your printer through any programming language. When you send commands to your printer this way, you can send them in the form of decimal numbers, hexadecimal numbers, or ASCII characters. The printer doesn't care in the least. Suppose you're using BASIC, and you want to send the Epson boldface command (ESC E) to your printer using decimal numbers. The ASCII character ESC has a decimal value of 27 and the character E has a decimal value of 69, so you could send the command with the following line:

```
LPRINT CHR$(27)CHR$(69)
```

Or you could use hexadecimal numbers instead, in which case the command would look like this (in BASIC, hexadecimal numbers are preceded by the symbols *&H*):

```
LPRINT CHR$(&H1B)CHR$(&H45)
```

And if you wanted to use ASCII characters, the command would look like this:

```
LPRINT CHR$(27)“E”
```

Notice that you must use either the decimal or hexadecimal code for ESC because it is not a printable ASCII character.

Second, to control a printer from a word processor or other commercial program, you need to “install” the printer (that is, tell the program which printer you have so that it knows which printer commands to use). In most cases, all the installation requires is that you select the name of your printer (or the printer it emulates) from a menu. However, even a word processor seldom takes advantage of all the features of a dot matrix printer, so many programs also have a custom installation routine. Through a custom installation routine, you can change the commands that the program sends to your printer so that your word processor, for example, will use a different letter-quality typeface or your spreadsheet will print in condensed characters. The custom installation routine will probably allow you to enter the printer command in ASCII, decimal, or hexadecimal. If you patch the program using a program like DEBUG or DDT, you'll probably have to use hexadecimal.

USING PRINTER COMMANDS

When you control a printer through a programming language or do a custom printer installation for a word processor or other commercial program, you have to know not only what the proper command sequence is but also exactly how it works. Your primary

source of information about what a printer can do and how to control it is the user's manual that came with your printer. Whatever else it contains, every decent printer manual will have a list of printer commands together with an explanation of what each command does, usually listed in a sort of table. Figure 3 (on page 20) shows some typical Epson LQ-1500 printer commands.

*Fortunately,
not every manufacturer
has felt compelled
to create new printer
commands.*

The first command shown in Figure 3, ESC E, is straightforward. The table shows the command in ASCII characters (ESC E), decimal numbers (27 69), and hexadecimal numbers (1B 45) and then describes what the command does (starts printing in bold characters). In simple commands like this one, the description may be quite brief. In more complicated commands (such as graphics commands), it may be several paragraphs long.

Other commands introduce a new twist, a variable value represented by *n*. For example, look at the “Start/Stop double-wide Printing” command, ESC W *n*. In its terse fashion, the description of this command tells you to set *n* to 1 in order to start printing double-wide characters and to set *n* to 0 in order to stop it. In other words, the command ESC W 1 will start double-wide printing and ESC W 0 will stop double-wide printing. Many escape sequences use such variables, and some even use more than one (labeling them *n1*, *n2*, or something similar). Just remember when you use such commands that you must substitute a particular numeric value for *n*—don't use the character *n* itself.

This command also brings up a potential source of confusion. If you want to set *n* to 1, for example, in order to turn double-wide printing on, do you use the decimal value 1 or the ASCII character 1 (decimal value 49)? If your printer has a good manual, it will tell you, but most don't. Many printers will accept either for some commands but require decimal numbers for other commands and may even need ASCII numbers for a few commands. As a general rule, use the decimal (or hexadecimal) number rather than the ASCII number (i.e., decimal value 1 instead of ASCII character “1”) unless the printer manual tells you otherwise. Then, if the command doesn't work as you expect, try substituting the ASCII number instead.

Let's take a look at some specific Epson LQ-1500 commands to see how they work.

BOLD AND ITALIC PRINTING

Two features people want to use almost immediately when they

get a dot matrix printer are bold printing and italic printing, especially italic. There a certain amount of swank in using real italics for emphasis instead of typewriter-like underlining. Fortunately, both bold printing, which Epson calls *emphasized*, and italic

printing are easy to use.

As shown in Figure 3, bold printing is controlled by two simple commands—ESC E to turn bold printing on and ESC F to turn it off. If you're using BASIC, for example, you can turn bold printing on

ESCE ASCII Decimal Hex 1B 45 Function	Start bold printing ESC E 27 69 The ESC E command starts printing in bold characters.	ESC! n ASCII Decimal Hex Function	double-wide characters. Function Stop printing double-wide characters Start printing double-wide characters Select print variety ESC! n 27 33 n 1B 21 n The ESC! n command selects a print variety determined by the value of n, as shown in the following table:
ESCF ASCII Decimal Hex Function	Stop bold printing ESC F 27 70 1B 46 The ESC F command stops printing in bold characters.	ESC 4 ASCII Decimal Hex Function	print variety Pica pitch; cancels all other codes listed below elite pitch Proportional spacing condensed pitch bold characters Double-Strike characters double-wide characters italic characters Underline status
ESC 5 ASCII Decimal Hex Function	Stop italic printing ESC 5 27, 53 1B, 35 The ESC 5 command stops printing in italic characters.	ESC - n ASCII Decimal Hex Function	You can combine several print varieties in a single command by adding their n values together. Start superscript/subscript printing ESC S n 27 83 n 1B 53 n The ESC S n command starts printing in superscript or subscript characters, as shown in the following table:
ESC - n ASCII Decimal Hex Function	Start/stop underlined printing ESC - n 27 45 n 1B 2D n The ESC - n command starts and stops printing in underlined characters.	ESC M ASCII Decimal Hex Function	Function Start printing in superscript characters Start printing in subscript characters
ESC M ASCII Decimal Hex Function	elite pitch printing ESC M 27 77 1B 4D The ESC M command starts printing at elite pitch (12 characters per inch).	ESC T ASCII Decimal Hex Function	Start printing in subscript characters Stop superscript/subscript printing ESC T 27, 84 1B, 54 The ESC T command stops printing in superscript and subscript characters.
ESCP ASCII Decimal Hex Function	Pica pitch printing ESC P 27, 80 1B, 50 The ESC P command starts printing at Pica pitch (10 cpi).	ESC x n ASCII Decimal Hex Function	Function Start printing in superscript characters Start printing in subscript characters
ESC W n ASCII Decimal Hex Function	Start/stop double-wide printing ESC W n 27 87 n 1B 57 n The ESC W n command starts and stops printing in	ESC x n ASCII Decimal Hex Function	Select print mode ESC x n 27 120 n 1B 78 n The ESC x n command selects either Draft or Letter-Quality print mode, as shown in the following table:
ESC W n ASCII Decimal Hex Function	Start/stop double-wide printing ESC W n 27 87 n 1B 57 n The ESC W n command starts and stops printing in	ESC x n ASCII Decimal Hex Function	Function Select Draft printing Select Letter-Quality printing

FIGURE 3: Sample printer commands

with the following command:

```
LPRINT CHR$(27) "E"
```

Once the printer gets the ESC E command, it will print every character it receives in boldface, until you tell it to stop by sending the ESC F command. In BASIC, you can stop bold printing with this command:

```
LPRINT CHR$(27) "F"
```

The italic printing commands are equally easy to use—ESC 4 turns italic printing on, and ESC 5 turns it off. Just as with bold printing, once you have turned italic printing on, the printer will print all characters in italics until it receives the command to stop (ESC 5). The only question that arises with the italic commands is whether you should use the decimal numbers 4 and 5 or the ASCII characters 4 and 5 (decimal values 52 and 53). As it happens, in this case you must use the ASCII characters. For example, in BASIC, you start italic printing with the command

```
LPRINT CHR$(27) CHR$(52)
```

or the command

```
LPRINT CHR$(27) "4"
```

Because bold printing, italic printing, and most other print enhancements stay on until they are specifically turned off, you can mix them together. If, for example, you turn bold printing on and then turn italic printing on, you'll get *Bbold then bold italic Printing*. If you just turn bold printing off, italic printing will remain on, so you'll get regular italic printing.

In good dot matrix printers, you can combine most print enhancements and character pitch commands as you please, even when the combination seems odd at first (such as condensed and double-wide printing).

UNDERLINED PRINTING

Most often, underlining is used as a substitute for italics on printers (and typewriters) that can't print italic characters. However, there are times when underlining comes in handy, even if you have italic characters. Many people like to use underlining for titles, column heads, and similar things, and some also prefer underlining to italics for emphasis. In addition, most publishers (other than desktop publishers) prefer writers to use underlining instead of italics.

As shown in Figure 4, the Epson command for printing underlined characters is ESC - *n* (that second character is the hyphen character, decimal 45). This command includes a variable, *n*, and the table in Figure 4 shows that you must set *n* to 1 in order to start printing underlined characters and set *n* to 0 in order to stop it. So the command to start underlining is ESC - 1, and the command to stop is ESC - 0. In BASIC, the start underlining command looks like this:

```
LPRINT CHR$(27) CHR$(45) CHR$(1)
```

This command, like the italics command, lets you use either the decimal number or the ASCII character, so the command could also be written:

```
LPRINT CHR$(27) CHR$(45) "1"
```

or even:

```
LPRINT CHR$(27) "-1"
```

As I mentioned before, it's safer in general to use the decimal number if you're not sure which is correct, so I only use the ASCII character when it's required. But many BASIC programmers like to use the ASCII character when possible because it requires less typing.

CHARACTER PITCH COMMANDS

On Epson dot matrix printers, the two basic character pitches are pica (10 characters per inch) and elite (12 characters per inch). To start printing in elite pitch, use the command ESC M. To start printing in pica pitch, use the command ESC P. Notice that there is no "Stop elite Printing" or "Stop Pica Printing" command. To stop the printer from printing at elite pitch, you tell it to start printing at pica pitch, and vice-versa. Unlike the bold and italic commands, which can be used together, the elite and pica commands cancel each other—they cannot be active at the same time.

However, either elite or pica pitch printing can be combined with other commands that affect character size, such as double-wide printing (which Epson calls *enlarged* printing). The command to start and stop double-wide printing, ESC W *n*, is similar to the underlined printing command in that it has a single variable, *n*, which is set to 1 to start the command and set to 0 to stop it. So, to start double-wide printing, use the command ESC W 1. To stop it, use the command ESC W 0.

When double-wide printing is in effect, the printer prints characters that are twice the normal width. If the printer is set to print in pica pitch, the double-wide printing command will cause it to print characters at twice pica width (five characters per inch instead of 10). If the printer is set for elite pitch, the double-wide command will cause it to print characters at twice elite pitch (six characters per inch instead of 12).

SELECT ANY PRINT FEATURE

On the Epson LQ-1500, all the print features discussed so far can also be set through a single command, ESC ! *n*. As the table in Figure 4 shows, by varying the value of *n*, you can use this command to set print pitch (pica, elite, proportional, condensed, double-wide) as well as print enhancements (bold, italic, underline, double-strike). For example, ESC ! 0 will set pica pitch, ESC ! 1 elite pitch, and ESC ! 2 proportional printing. The command ESC ! 8 will turn on bold printing, while ESC ! 64 will turn on italic printing.

Note: With this command, you *must* use the decimal numbers

for *n*, *not* the ASCII characters. In BASIC, for example, set elite pitch (ESC ! 1) by using the command:

```
LPRINT CHR$(27) CHR$(33) CHR$(1)
```

Do *not* use the command

```
LPRINT CHR$(27) CHR$(33) "1"
```

or the command

```
LPRINT CHR$(27) CHR$(33) CHR$(49)
```

The nice thing about the ESC 1 *n* command is that you can set several print features with one command just by combining their *n* values. For example, if you want to combine bold printing (*n* = 8) with italic printing (*n* = 64), just add the two values together (8 + 64 = 72) and use the combined value for *n*. For bold italic printing, the command would be ESC ! 72, or in BASIC:

```
LPRINT CHR$(27) CHR$(33) CHR$(72)
```

You can combine any number of these features in one command. If you want to print elite condensed double-wide italic underlined characters, just add up the corresponding values (1 + 4 + 32 + 64 + 128 = 229) and use the total for *n*.

The tricky thing about this command is that when you use it, it turns off any of those print features you don't specifically tell it to turn on. Suppose, for example, you use ESC ! *n* to tell the printer you want to print elite plus bold plus italic (1 + 8 + 64 = 73). In BASIC, the command is

```
LPRINT CHR$(27) CHR$(33) CHR$(73)
```

If, after a line or so, you decide you want to turn bold off so that you have just elite plus italic (1+ 64 = 65), you use the command

```
LPRINT CHR$(27) CHR$(33) CHR$(65)
```

First you told the printer to print elite plus bold plus italic, so it did. Then you told it to print just elite plus italic, so it turns bold off. So far, so good—it's a slightly different system than that used with the commands described earlier, but it does make sense.

However, when using the ESC ! *n* command, you must be careful that you don't turn off a print feature inadvertently. For example, suppose you tell the printer to print in elite pitch with the command ESC ! 1. In BASIC, that's

```
LPRINT CHR$(27) CHR$(33) CHR$(1)
```

After a few lines, you want to print a word in italics, so you look at the printer command table, see that an *n* value of 64 will produce italic printing, and give the command

```
LPRINT CHR$(27) CHR$(33) CHR$(64)
```

Urk! The printer prints italics, sure enough, but at pica pitch instead of elite. Why? Because the command above doesn't specifically tell the printer to use elite pitch, so the printer turns it off. The correct command requires an *n* value of 65 (1 + 64), like this

```
LPRINT CHR$(27) CHR$(33) CHR$(65)
```

From personal experience, I can tell you that this trap is very easy to fall into and can lead to much head-scratching and mumbling.

SUPERSCRIP AND SUBSCRIPT PRINTING

One of the nice features of many dot matrix printers is the half-height superscripts and subscripts they can print—much better than faking it with full-size characters. On the Epson LQ-1500, you start printing in superscript or subscript characters with the command ESC S *n*. Note that in many commands, including the double-wide and underlined printing commands discussed earlier, you set *n* to 1 to turn a feature on and set *n* to 0 to turn it off. Not so, in the case of the ESC S *n* command.

As shown in the table in Figure 4, you set *n* to 0 (ESC S 0) to start printing superscript characters and set *n* to 1 (ESC S 1) to start printing subscript characters. To stop either superscript or subscript printing, use the command ESC T.

DRAFT AND LETTER-QUALITY PRINTING

Modern dot matrix printers have both a draft printing mode and a letter-quality printing mode. In draft mode, the printer prints very fast (some claim speeds of over 200 characters per second), but the characters *look* like everyone's idea of dot matrix print. In letter-quality mode, the printer prints more slowly (usually 40-60 characters per second), but the characters approach the quality of daisywheel printers, at least in a 24-pin printer like the Epson LQ-1500.

The print mode is controlled by the ESC x *n* command. To select letter-quality printing, set *n* to 1 (ESC x 1). To select draft printing, set *n* to 0 (ESC x 0). The printer will stay in the print mode you select until you turn the printer off, reset the printer, or change the print mode with ESC x *n*. When you use this command, make sure you use a lowercase x (decimal 120), not an uppercase X (decimal 88). Most printer commands use uppercase letters, but this one and a few others use a lowercase letter.

USING PRINTER COMMANDS WITH WORDSTAR

A programming language like BASIC is a good way to control a printer for some things, but it's not much use while you're working with a word processor or other major program. You can write a BASIC program that will set certain print features before you start your word processor—print pitch, print mode, typeface, etc.—but you can't use BASIC to control the printer while you're writing—to italicize a word or print a superscript, for example. For that kind of control, you have to teach your word processor (or other program) how to control the printer itself. To give you an example of how it's done, here's a quick look at what you can do with WordStar 4.0, an eminently "patchable" program.

What follows applies equally to MS-DOS and CP/M versions of

While patching:

- X - Return to Patch Menu
- . - End of changes, re-display
- RETURN - Leave current byte unchanged; advance to next location
- ' - Enter the next character in ASCII

0-9, A-F - Enter the hex digit

087E 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00

FIGURE 4: WSCHANGE patch screen for custom print control ^PQ

WordStar except where noted. It is also necessarily brief—if you want a detailed look at WordStar patching techniques, including an explanation of hexadecimal numbers, or if you're using WordStar 3.3 instead of 4.0, take a look at "WordStar Deluxe," reprinted in the May 1987 issue of *PROFILES*. For now, I'm going to assume that you have WordStar 4.0 and know how to use WSCHANGE to alter WordStar's settings (or DEBUG and DDT, if that's your style).

WORDSTAR 4.0

One of WordStar 4.0's major improvements over previous versions is that it knows how to control many more printers, especially dot matrix printers. For example, where the WordStar 3.3 installation menu only offers a choice of Epson FX-80, MX-80 Graftrax, and RX-80, the WordStar 4.0 menu lists the Epson FX-80, FX-85/FX-286, LQ-800, LQ-1500, LX-80, MX-80 Graftrax, and RX-80. Other popular printers are equally well-represented—no longer do you have to choose the primitive Standard or Teletype printers just because you own a Toshiba or Mannesmann-Tally.

In addition, WordStar 4.0 can do much more with the printer once you've installed it. WordStar 3.3's Epson FX-80 installation is little better than the Teletype printer installation—it prints underlined characters and tries to print a sort of boldface, but most other things it just ignores. WordStar 4.0, on the other hand, does a good job with the Epson—it does bold, italic, and underlined printing, rolls the paper up and down for superscripts and subscripts, responds to the character width (.CW) and line height (.LH) commands, and understands things like the letter-quality print command (.LQ). The other dot matrix printer installations do similarly well.

Many people may be perfectly happy with the various dot matrix printer selections just as they are, without additions or modifications. However, some people (you know who you are) feel there's always room for improvement. As an example, on my dot matrix printer (which is not an Epson but emulates the Epson LQ-1500), the Epson LQ-1500 installation doesn't use the printer's half-height superscripts and subscripts; instead, it rolls the paper up or down half a line and prints the superscript or subscript in normal size characters. Also, the CP/M version of the Epson LQ-1500 installation doesn't give you access to the double-wide or condensed print modes. The MS-DOS version does assign these to two of the custom print controls, but it uses alternate forms of the commands (the SO and SI characters, decimal 14 and 15). In this form, the commands automatically cancel themselves at the end of each line, which can be very inconvenient.

The simplest way to gain full access to double-wide and condensed printing is to patch the four custom print controls (^PQ, ^PW, ^PE, ^PR) by using WSCHANGE. From the Main Installation Menu of WSCHANGE, select B (Printer), which will take you to the Printer menu. From there, select D (WS printer patches) in the MS-DOS version or C (WS printer patches) in the CP/M version, which will take you to the WordStar print patches menu. Next, select A (Custom print controls), which will take you to the Custom print controls menu. From this menu, you can patch print controls Q, W, E, and R by selecting menu items A through D, respectively.

Suppose you want to add double-wide printing to your printer installation. You'll need to use two of the custom print control slots

CONTINUED ON PAGE 43

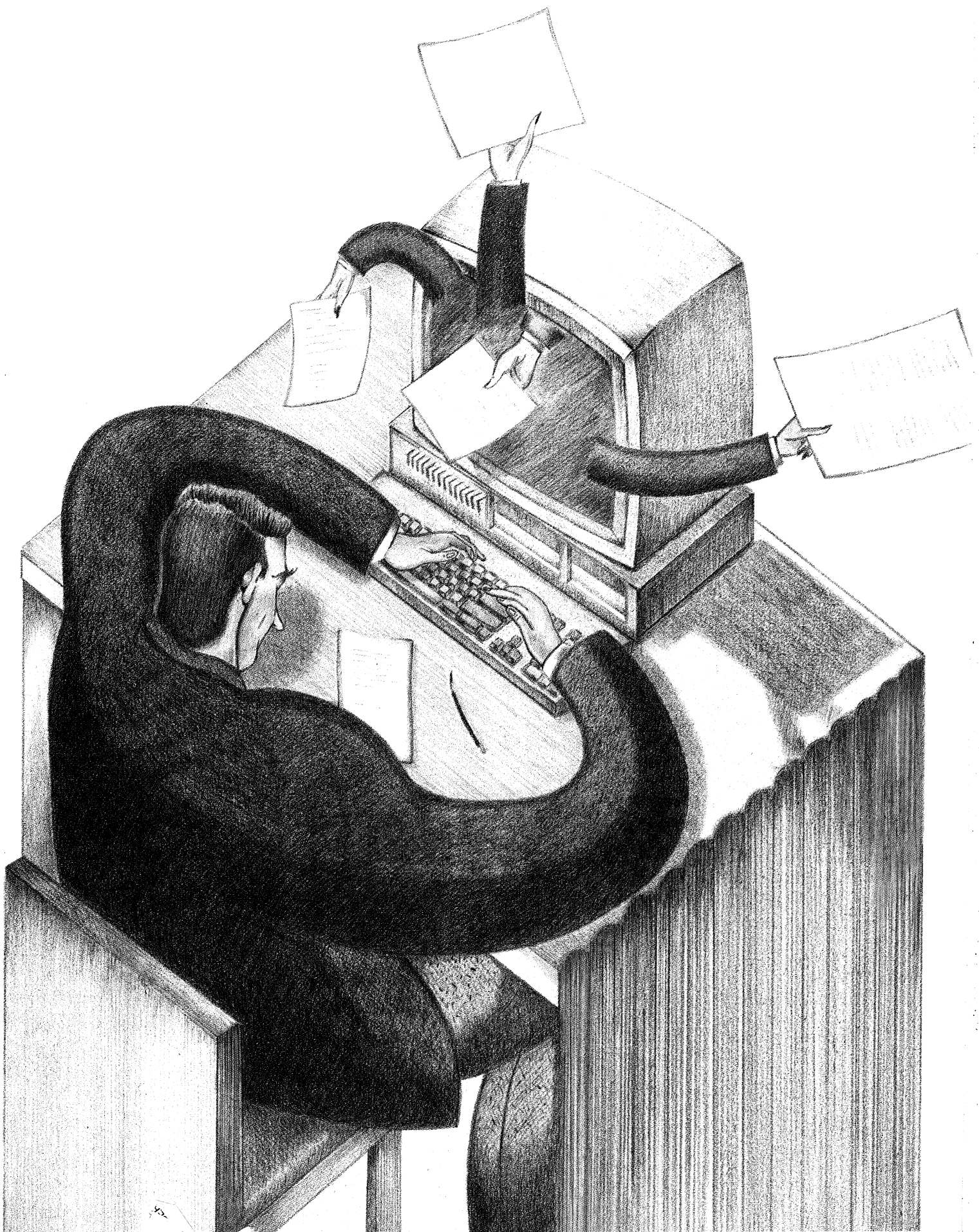
While patching:

- X - Return to Patch Menu
- . - End of changes, re-display
- RETURN - Leave current byte unchanged; advance to next location
- ' - Enter the next character in ASCII

0-9, A-F - Enter the hex digit

087E 03 1B 57 01 00 00 00 00 00 00 00 00 00 00 00

FIGURE 5: Same as in 4 except the 1st 4 bytes are 03 1B 57 01



GET ORGANIZED WITH WORDPERFECT

How to create outlines, indexes and more

BY DON AND SHARYN CONKEY

Even if you're a fairly seasoned user of WordPerfect 4.2, you may not have explored all of its most useful capabilities—features that help you organize not just your documents, but your thoughts as well. You can create outlines, number paragraphs and lines, and generate lists, indexes, and tables of contents and authorities. (In versions 4.0 and 4.1, line numbering, concordance files for use with indexing, and tables of authorities are not available.) In this article, we'll provide a step-by-step introduction to the use of these features. For this hands-on session we assume you know how to move the cursor, use the REVEAL CODES key, and delete and block text. Use a 65-character line (WordPerfect's defaults).

CREATING OUTLINES

WordPerfect will number the items in an outline as you input them, then renumber if you add, delete, or move items within the outline. To begin, press the MARK TEXT key, **ALT-F5**. Type 1 to turn outlining on. Notice the verification on the lower left of your screen.

The RETURN and TAB keys have special meanings when you're in outline mode. The RETURN key signals WordPerfect to begin a new item in the outline. The TAB key tells WordPerfect to move in a level on the outline. (You may have up to seven levels.) Let's see this work.

Press **RETURN**. You're at the first level of the outline. Press **TAB**. That moved you to the second level. Press **TAB** again. Whoops! We had you go too far. To move back a level in the outline, press **SHIFT-TAB**. Press **SHIFT-TAB** again. You should be at the first level of your outline. If you're too far to the right, press **SHIFT-TAB**; if you've deleted the level I marker, press **RETURN**.

We're going to outline this article to illustrate the outlining

process. Since tab stops define the levels in outline mode, we must use the L/R INDENT key, F4, to indent text within the outline. Type **<F4>Introduction<RETURN>**. Your screen should look like this:

- I. Introduction
- II.

Type **<F4>Numbering<RETURN><TAB>**

This puts the cursor at level A in your outline. Type **<F4>Outline: Mode on and off; seven levels; four styles; automatic recalculation.**

Notice that the left indent code causes the text to line up under the current outline level.

Type **<RETURN><TAB><F4>Line<RETURN>**

Whoops! We forgot about paragraph numbering, which we will cover before line numbering. To add this item to the outline, use the arrow keys to move the cursor to the end of level A, after the "n" in "recalculation." Type **<RETURN><TAB><F4>Paragraph.**

Move the cursor to the end of the outline: Press **<HOME><HOME><DOWN ARROW>**. Notice your outline has been renumbered.

Go ahead and finish the outline through the level IV line. (See Figure 1 on page 26.) Do not press RETURN after you type "Index". If you inadvertently press RETURN during outlining and you get a level number you didn't want, just delete it with DEL or BACKSPACE.

The outline key is a toggle: You turn it off the same way you turned it on: Press **ALT-F5**, then 1.

Move your cursor back through the outline. Notice that the outline mode, unlike math or text column modes, does not go back on. If you want to update your outline, you must reenter outline mode;

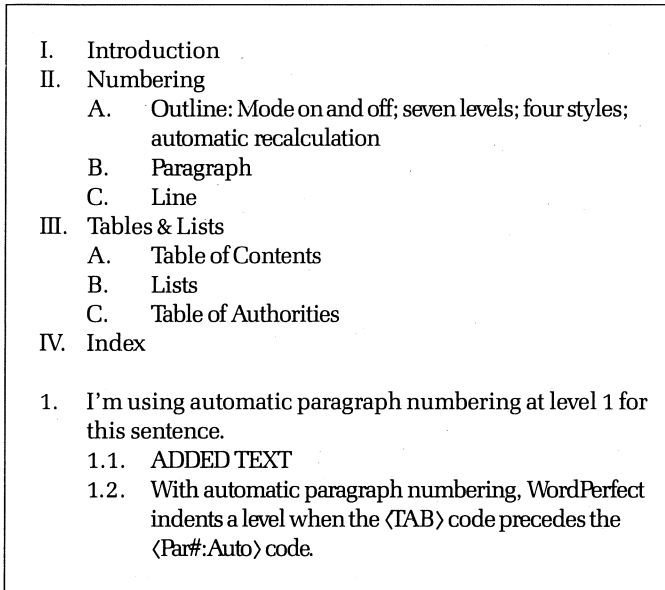


FIGURE 1: Outline/Paragraph Numbering Input

you can do it anytime. This is because WordPerfect does not use on/off codes to activate/deactivate outline mode; instead it associates a <Par#:Auto> code with each item to indicate that it should calculate the correct outline number for the item. (Note: WordPerfect calls items in an outline "paragraphs".) Press the REVEAL CODES key, **ALT-F3** to see these codes. Notice the <TAB> code indicating that a level change precedes the <Par#: Auto> code. Press **RETURN**.

A matter of style. We've been using WordPerfect's default style in our outline. Let's see what else is available. If the entire outline is not on your screen, press <HOME><HOME><UP ARROW>. Move the cursor to the right end of the line containing "Paragraph." Press **ALT-F5**, then choose "Other Options" by typing **6**. We want to redefine the numbering style in our outline, so choose option **1**. Notice the default is style 2 or outline style. You can instead use paragraph style, which uses numbers, lower-case letters and Roman numerals, or legal style, which is all numeric. You can also create your own style using combinations of upper and lower case letters, Roman numbers, periods and parentheses.

We'll choose legal style; press **3**. WordPerfect prompts for a "Starting Paragraph Number." This is the starting number for the next heading. (A minor annoyance: You must always indicate it in legal style, even if you are defining another style. Example: Suppose this were the second part of a two-part document; you want numbering to continue from the first document with Roman number VI, which is outline style. You would type the legal-style equivalent of VI, 6.) Let's begin at level 1; just press **RETURN**. Rewrite the screen (press **^F3**, then **0**). What happened? WordPerfect renumbered your outline in legal style, beginning at the cursor location. Use the REVEAL CODES key, **ALT-F3**, to see the outline definition code (<Par#:Def<). Delete it (press **BACKSPACE**), and your outline will return to the default. Press

RETURN.

Outlining tips: To insert a blank line between levels in your outline, press **RETURN** before you press **TAB** or **F4**. Don't be confused by the redundant terminology (for example, paragraph/outline numbering can have paragraph or outline style.) You're not slow; the terminology is unfortunate.

Paragraph numbers. Do you sometimes need to selectively number paragraphs throughout your text (in legal documents, for example)? Instead of using outline mode, where WordPerfect automatically numbers the text each time you press the **RETURN** key, you can specifically instruct WordPerfect to number a paragraph as you type it or as you edit existing text. You can choose from the same numbering styles as with outline numbering, and again, WordPerfect will renumber for you if you later add, delete, or move paragraphs.

Move the cursor to the end of your document, then press <**RETURN**><**RETURN**>. Reinstall the legal numbering style by typing <**ALT-F5**>**6**, then **1**, then **3**<**RETURN**>. Press **ALT-F5** again and this time choose option **2**.

You must choose a paragraph level. (Get ready for more razor-sharp terminology.) If you choose automatic, WordPerfect will move to the next level wherever a <TAB> code precedes the <Par#> code (you must input the **TAB**). If you choose fixed numbering, WordPerfect will number paragraphs at the level you specify, regardless of tabs. If you wanted level 3 legal style numbering (e.g., 1.1.1) to print at the left margin, for example, you would choose fixed numbering by typing **3** at this point. Let's choose automatic; it's the default, so just press **RETURN**. Press **F4** to indent, then type this sentence: **I'm using automatic paragraph numbering at level 1 for this sentence.**<**RETURN**><**RETURN**>. Notice that the **RETURNS** did not signal a new number as with outlining.

*You can
use one of WordPerfect's
outline styles
or you can create
your own.*

Now press **TAB** in preparation for moving to level 2. Press **ALT-F5**<**RETURN**>. Type the following: <**F4**> **With automatic paragraph numbering, WordPerfect indents a level when the <TAB> code precedes the <Par#:Auto> code.**<**RETURN**><**RETURN**><**RETURN**>

To see WordPerfect renumber your paragraphs, move the cursor between the sentences you typed, then input another line, numbering automatically at level 2: Type <**TAB**><**ALT-F5**> **2**<**RETURN**><**F4**>**ADDED TEXT**. Move the cursor to the end of the document. Your text should resemble Figure 1.

Line Numbers. WordPerfect can automatically number the lines in a document, a useful feature for creating legal documents and computer programs. All you do is specify where to start and where to stop. Line numbering is a print-time operation; you won't see the line numbers on your screen, unless you use the preview option on the print menu (version 4.2).

To insert the <LnNum> code, press the print format key, **^F8**. Choose option **B** for line numbering. You'll see a menu with six items. Press **2** to turn line numbering on. Notice that items 3 through 6 provide options. We will accept the defaults: Press <RETURN><RETURN> to exit the menus. Type the following three lines:

```
Count<RETURN>
On<RETURN>
Me<RETURN>
```

Turn line numbering off: Type **^F8**, then **B**, then **1<RETURN><RETURN>**. (Unlike with outlining, WordPerfect puts codes in your document to indicate where line numbering begins and ends. Lines added between the codes will be automatically renumbered.) Print the document to see the line numbers: Press <SHIFT><F7>, then **1**.

TABLES, LISTS, AND INDEXES

You generate tables of contents and authorities, lists, and indexes in three steps: You mark the text to be included in the reference (either as you input it or later, as you edit existing text); you define its style *at the place in the document it is to appear*; you generate the references. If you subsequently change the location of text referenced in a table, list, or index, you simply regenerate and WordPerfect produces a new reference with updated page numbers. Divide your document into three pages: Type **^RETURN** at the end of the line "C. Line"; type **^RETURN** after the line "IV. Index".

Tables of Contents. We'll mark some entries for a table of contents (ToC). Block the word "Introduction": Cursor to the "I"; press **ALT-F4**; cursor to the last "n". (Do not include the paragraph or outline numbering code <Par#:Auto> in the marked text for any of these organizational features.) Press the MARK TEXT key, **ALT-F5**, then choose option **1** to indicate this text will go into a ToC. We've got levels again: This time, the levels indicate indentations in the ToC. You may designate up to five levels. Since this is a main heading, type **1**.

Similarly, block the word "Numbering" and mark it as a level 1 entry for the ToC.

Block the word "Outline" on the next line. Mark it for your table, this time specifying level 2: Type (**ALT-F5**), then **1**, then **2**. Mark "Paragraph" and "Line" as level 2 entries, just as you've done with "Outline."

Mark "Tables and Lists" as a level 1 entry.

Step 2 is definition. Move the cursor to where you want the table of contents to appear--the beginning of your document--by pressing <HOME><HOME><UP ARROW>. It's good practice to do your preparation now. You'll want a title for the ToC and you'll want it

to appear on its own page. Type <SHIFT-F6>TABLE OF CONTENTS<RETURN>, then **^RETURN**. Move the cursor above the page break. To define the table, press **ALT-F5**, then **6**, then **2**. We will have two levels, so type **2** at the prompt. You'll be asked if lowest-level entries should be wrapped--i.e., printed one after the other, separated by semicolons. This option is useful for condensing the entries in large tables. Press **RETURN** for "No." Now choose the format and position of the page numbers that will appear in the ToC. Type **2** and we'll see level 1 entries followed immediately by their page numbers; type **3** to see page numbers for level 2 entries in similar position, but with parentheses. This completes the table definition.

To generate the table, type **ALT-F5, 6, 8**. You'll be reminded that existing tables will be replaced and have the opportunity to cancel the generation. Press **RETURN** to continue. If you don't have enough memory available, WordPerfect may instruct you to clear the document 2 screen; see Figure 2 (page 28) for another solution.

Lists. A list is another type of reference to your document. You may need a list of figures, graphs, maps, or tables. List generation is similar to generation of the table of contents.

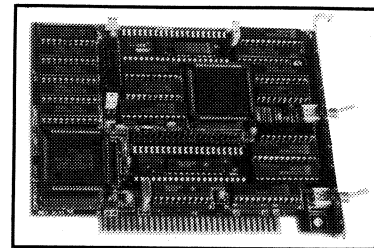
To see this, we'll "create" two figures in our working document.

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PROBLEM	CAUSE/SOLUTION
Your table, list or index is generated twice.	There are two <DefMark> codes in your document, probably because you redefined the table, list, or index. Delete the old <DefMark>.
No tables, lists, or indexes are generated.	There is no <DefMark> for the reference in the document. You probably pressed RETURN while defining the reference and that took you out of the definition screen without completing the definition. Redefine the reference.
Erroneous page numbers in table of authorities.	Specify new page number (PAGE FORMAT key) between ToA definition and first marked authority.
Not enough memory to process concordance file...	Continue index generation; only phrases processed to the point of the warning will be included. Block and save this "first" index; delete it from your document. Divide concordance file at point generation stopped. Back in your document, remove the <DefMark> for the "first" index; redefine your index, this time specifying the concordance file containing the terms not yet indexed; generate. Retrieve the first index into your document. OR Divide document into several parts and index each part.
or to generate tables, lists, or index.	Clear document 2 screen and continue. If unsuccessful, exit WordPerfect; remove RAM disk and memory-resident programs from AUTOEXEC.BAT; reboot; reload WordPerfect with no "/" options; regenerate.

FIGURE 2: When Things Go Wrong

Above the line beginning "I'm using automatic . . ." add a title: **Fig. 1: Paragraph Numbering**<RETURN>. Move the cursor to the

blank line above the word "Count", before the <LnNum> code, and add the title: **Fig. 2: Line Numbering**<RETURN>.

*Legal users
often need to create a
table of authorities,
a list of
citations for a legal
brief.*

We're going to make a list of our newly created figures. Using the ALT-F4 key, block the entire "Fig. 1: . . ." line. When the text is highlighted, press **ALT-F5**, then type **2** for list. You'll be asked for a list number (you may have five lists). We'll have one list; type **1**

Similarly, block and mark the second title line ("Fig. 2 . . .") for list 1.

We must define the list before we generate it. Move the cursor past the page break following the table of contents. Input three blank lines. Center a title: <**SHIFT-F6**>**LIST OF FIGURES**<RETURN><RETURN>. Type **ALT-F5, 6, 3**. You must specify the list number (type **1**) and choose a numbering style (this time choose **4**). Press ^**RETURN** to force a page break. (If you were constructing more than one list, you'd have to define each one similarly, at the point in the document where each list would appear.) To generate the list, type **ALT-F5, 6, 8**<RETURN>.

Tables of Authority. Legal users often need to create a table of authorities (ToA)—a list of citations for a legal brief. We won't construct one here, but a few points are worth mentioning.

Marking and definition is similar to what we've done for the table of contents and list, with a few exceptions. The first time you mark an authority, you block the entire citation. You will be given a chance to edit the blocked text so that you can make changes in the authority *as it will appear in the table*. (You might want to divide the reference into several lines, for example.) This is the *long form*, or full form of the authority. You'll be asked for a short form. The short form is a nickname; you'll use it to mark all other references to the authority in the document, saving the time of having to type the long form over and over again. The short form must be unique, and it's helpful to make it a key word from the long form. For example, in the case of Greatbanks Savings and Loan vs. Computerized Words, Number, and Pictures Inc., use "Greatbanks" for the short form.

You must mark every reference to the authority. With version 4.2, use the extended search feature (HOME, then F2) so footnotes and endnotes will be searched.

You must define the format of each section of your table. (You may have up to 16 sections.) Also, you must specify a new page number between your table of authorities definition and the first

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marked authority or your page numbers may be inaccurate. (Move to the first page of actual text and use the PAGE FORMAT key, ALT-F8, option 2.) Then you can generate the table.

CREATING INDEXES

Let's create an index. Again, we must mark the words we want indexed. We'll be working with the outlined text we created earlier (not with the table and list WordPerfect generated for us). Block the words "Table of Authorities"; then press **ALT-F5, 5**. WordPerfect presents the entire phrase on the lower left. You can edit it if necessary; we don't have to. Press **RETURN**. You'll be asked for a subheading. We'll do without this time; press **RETURN**.

Next we want to index the word "Numbering," just under "Introduction." Move your cursor back to anywhere within the word. Press **(ALT-F5)5**. There's the whole word on the lower left of your screen. Press **RETURN** and this time specify a subhead: type **outline<RETURN>**.

Move the cursor down one line. We must mark all occurrences of "numbering." Use the search feature to find the next: Press **F2**, then type **numbering<F2>**. Now, don't move the cursor—just press **(ALT-F5)5** as you did before. Voila! WordPerfect presents the entire word again. Press **RETURN**, then **paragraph<RETURN>** for the subheading.

We won't mark any remaining occurrences of "numbering," but had this been a "real" document you would want to. Yes, finding all occurrences of a word can be time-consuming, and there's a way around it—you use a concordance file containing the words you want indexed. You'll be prompted for the concordance file name when you define the index.

Prepare to define the index. Move the cursor to the end of the file. (Only markings that occur before the definition will be included in the index.) Type **^RETURN**. Title the index: **(SHIFT-F6)INDEX<RETURN>(RETURN)**. Press the MARK TEXT key, **ALT-F5**, type **6** for Other Options, **5** for Index. Press **RETURN** to indicate the absence of a concordance file. Choose **5** for page numbering format.

We must regenerate again—**(ALT-F5)6**, then **8<RETURN>**—and you can probably see why the experts suggest you create the tables, lists, and index in one fell swoop in the later stages of document creation. Generation can take some time! Also, for indexing, remember that the indexing code contains the indexed heading and subheading. If you subsequently change the original text entry, you must remember to change the index code, or else you'll have an erroneous pointer in your index. (The text for lists and tables of contents and authorities is marked by beginning and ending codes, so if you change the text within the codes, your table or list will be updated accordingly when you regenerate.)

Use WordPerfect's organizational features and you'll see several reasons why this software claims nearly a third of the word processing market. Its power helps you get organized! ■

Don and Sharyn Conkey teach and write about microcomputers for home and business users.

Ed. Note: For a review of the latest version of WordPerfect, ver. 5.0, see "Editor's Choice" on page 56.



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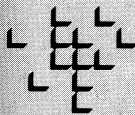
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DU TO THE RESCUE

Part 1: Into the jungle

BY TED SILVEIRA

(Editor's note: The following is a reprint of the first half of a popular article on disk editing that appeared in the September and October 1985 issues of PROFILES. (Part 2 will appear next month.) This article concentrates on the disk editor DU-V88. The program has since been updated to DU-V89, but the revisions are not substantial and do not affect the information presented here.

I t was late. I had an article due the next day, but I wasn't worried. I just had to grab some information off one of my archive disks, merge it into the article, and presto—I was done.

I found the right disk, stuck it in the B drive, and warm-booted. I called for a directory of the new disk and listened to the B drive whirr. For a long time. Too long.

"Bdos Err On B: Bad Sector."

It's called a crash. One minute you're working with a disk full of important files. The next minute CP/M won't read the files, or tells you they don't exist, or refuses to acknowledge that your disk is in the drive. If you have current copies of all your files tucked away on another disk, you're safe. But if you don't have another copy, or you've just entered a load of new information . . .

There's still hope. With a disk editor, you can recover files, especially text files, from many kinds of crashes. Such a program lets you examine, change, and move information stored on any disk, byte by byte. With it, you can get to damaged files or disks that other programs refuse to recognize, like an explorer uncovering a lost city in the jungle.

Disk editors are powerful tools, and if you're careless, you can wipe out disks, even hard disks, in an instant. But don't think that disk editors are just for technical wizards. With patience and caution, you can pull off minor miracles even if you're a novice. Before you can, though, you need to know how disks and files are organized, how to use a disk editor, and what to look for when a disk or file crashes. This month, I'll introduce you to a disk editor and use it to start you on a guided tour of a disk. Next month, I'll finish the tour of both disk and disk editor and show you how to deal with some common crashes.

GETTING A DISK EDITOR

All the disk editors I use come from the public domain—DU-V88, DU2, SUPERZAP, PATCH18A, and others. In this article, I'm going to use DU-V88—it's not the slickest of the group, but it has the right features, and it's widely available. You can get DU-V88 from al-

most any CP/M bulletin board (if you have a modem) or users' group.

(Update: If you can't find DU-V88 elsewhere, you can get it for \$8 (non-member price) by mail from FOG, P.O. Box 3471, Daly City, CA 94015; 415/755-2000. Ask for the CP/M "starter" disk, a collection of useful utilities. (FOG, by the way, offers a CP/M newsletter, 48 bulletin boards nationwide, and technical support. Membership is \$25.)

BEFORE YOU START

To work on your disks, you need to know how they're organized. If "tracks" and "sectors" are unfamiliar terms to you, read "How Disks Are Organized" on page 32. You also need to know something about bytes, hexadecimal numbers, and ASCII characters. If any of these is new to you, read "The Hex/ASCII Connection" on page 45.

Finally, you need to know whether you have single-sided or double-sided disk drives. If you have a Kaypro 2X, 4, or 10, you have double-sided drives. Since all these machines use the same floppy disk format, I'll refer to them generically as "Kaypro 4."

If you have a Kaypro II or 2, you have single-sided drives. I'll refer to both these machines as "Kaypro 2."

GETTING READY

You need two blank, formatted disks with the CP/M system written on them. You can use old disks, but make sure you reformat them so they're wiped clean.

The Utility Disk. Label the first disk "Utility Disk," and copy the following programs onto it:

- DU-V88.COM, hereafter known as DU.COM or just DU.
- D.COM or STAT.COM to show you the size of a file and how much free space is on a disk.
- PIP.COM, NSWP.COM, or some other program that will let you copy files *one at a time* (i.e., don't use COPY.COM, which copies the whole disk at once, track for track, or you won't have a clean disk, which could cause trouble).
- your usual word processor.

Make sure you have backup copies of every program on the disk. However careful you are, you still may accidentally scramble part of this disk with the disk editor.

The Test Disk. Label the second disk "Test Disk." You need some files to practice on, so use PIP or NSWP (not COPY!) to move four or five text files and a couple of programs onto the Test Disk. For the text files, the content doesn't matter, as long as:

- they're all compatible with your usual word processor.
- they're all different (so you can tell them apart).
- they're all expendable.
- one file is larger than 32K (if you use the Kaypro 4 format), or larger than 16K (if you use the Kaypro 2 format) so that you can see how CP/M handles very large files.

For the programs, any will do.

After you've done all your copying, erase one file (so you can see what happens to erased files later).

You will *without a doubt* crash your Test Disk more than once, either on purpose or by accident, so *never* put any file on this disk that you can't afford to lose. On the label of my Test Disk, I've written in large red letters "WARNING—this disk may crash at any time."

Note to Kaypro 10 owners: I'm writing as if all Kaypros had two floppy disk drives, but you, of course, have one floppy and one hard disk drive. Everything I say here applies to your floppy disk drive. Much of it also applies to your hard disk drive, but the details will be different—you'll have to translate and adapt. Above all, *don't* use DU to "experiment" on your hard disk; you risk destroying 10 megabytes of files. The Test Disk should be for your floppy disk drive *only*. Don't even think about poking around on the hard disk until you know DU inside and out. And before you do anything with DU, even on the floppy, make sure you have backup copies of everything on your hard disk stored in a safe place.

STARTING UP

Put the Utility Disk in drive A and the Test Disk in drive B, and then enter ^C to warm boot your Kaypro. At the A prompt, enter DU and hit RETURN. DU will load itself and show you this message:

```
DISK UTILITY v8.8
Universal Version under CP/M 2.2
```

```
Type ? for help
Type X to exit
```

DU immediately tells you the two things you most need to know—how to get help and how to get out. The mysterious colon (:) is DU's command prompt—it's waiting for you to tell it what to do.

Getting Help. At the command prompt, enter ? to see a list of commands. DU will show you the first of four help screens and print the prompt "[more]" at the bottom of the screen. Hit any key (except ^C) to move on to the next help screen, repeating this process until you've returned to DU's command prompt (:). These help screens are just for reference, so the command descriptions

are very brief; don't worry if you can't decipher them right now.

Aborting an Operation. You can enter ^C to force an emergency halt of anything DU is doing. If you enter ^C at the "[more]" prompt, DU will return to its command prompt without continuing through the rest of the help screens.

Exiting DU. To exit DU, enter X at the DU command prompt; DU will return you to CP/M. Try it, and then start up DU again just as you did before.

Changing Drives. When you run DU from the A prompt, it comes up ready to work on your current (or "logged in") drive, drive A. To change drives, use the 'L' command—enter L plus the letter of the drive you want to move to. To get to your Test Disk, you must move to drive B, so at the command prompt, enter LB, which tells DU that you want to Log in drive B. You'll hear whirring from your disk drives, and you'll get a new command prompt (:). To move back to drive A, enter LA.

Other than the drive noise, DU gives no sign that it has moved to the new drive.

Getting Information about the Current Drive. To confirm that DU has moved to the new drive, use the '#' command. Enter # at the command prompt, and DU will print the screen you see in Listing 1a or 1b. Don't worry if most of this information means nothing to you now; it will soon. For the moment, look only at the top line, which tells what your current drive is. If it doesn't say "Statistics for drive B:," use the L command to move to drive B. Then use the # command again to make sure you got there.

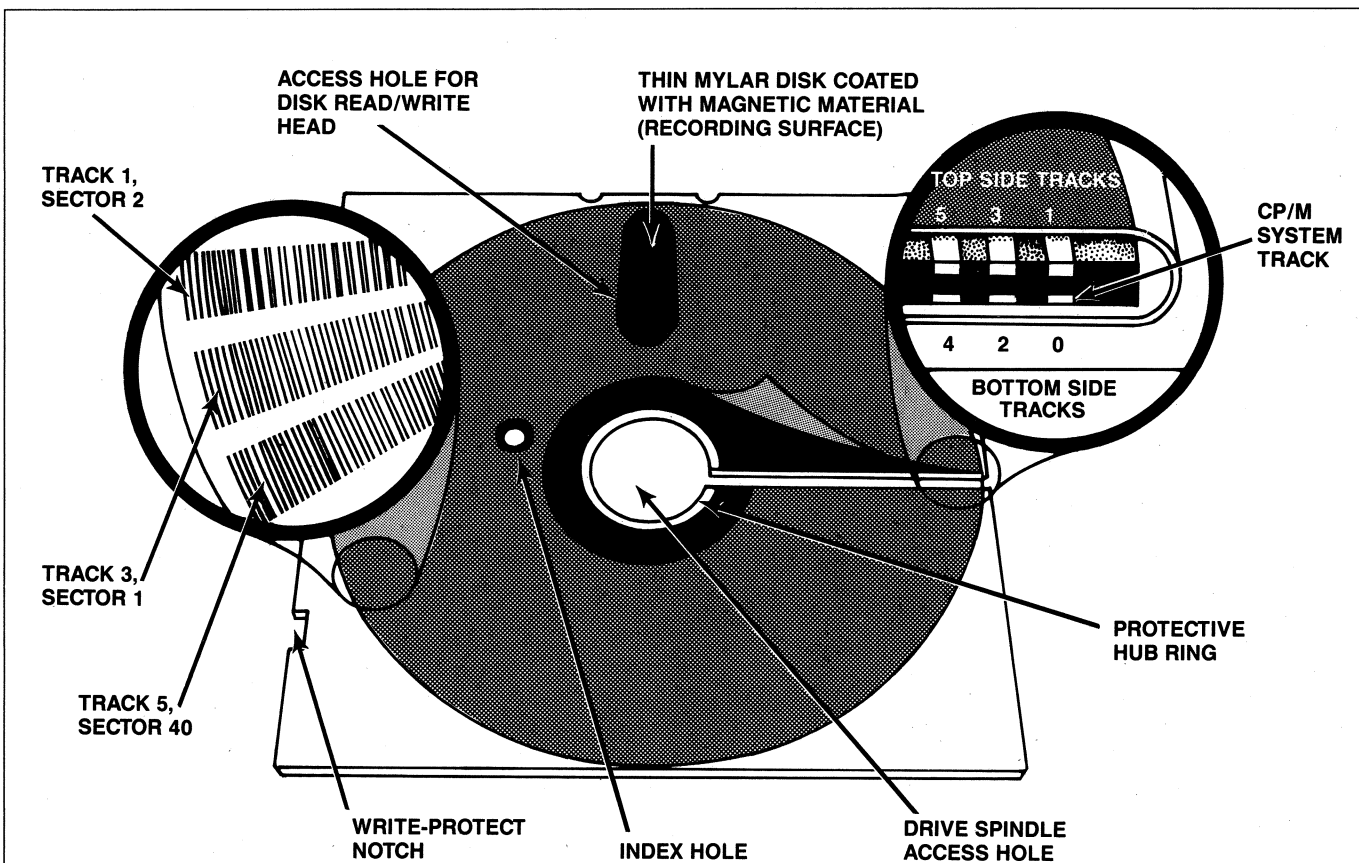
```
: #
Statistics for drive B:
Tracks:           80          50
Sys tracks:       1           01
Sec/track:        40          28
Groups:           196         C4
Dir groups:       2           02
Sec/group:        16          10
Dir entries:      64          40
```

LISTING 1a: Drive statistics for a Kaypro 4, double-sided drives, as shown by DU-V88.

```
: #
Statistics for drive B:
Tracks:           40          28
Sys tracks:       1           01
Sec/track:        40          28
Groups:           194         C2
Dir groups:       4           04
Sec/group:        8           08
Dir entries:      64          40
```

LISTING 1b: Drive statistics for a Kaypro 2, single-sided drives, as shown by DU-V88.

The rest of the display gives information about how your Kaypro's disks are organized. The lefthand column of numbers is



HOW DISKS ARE ORGANIZED

Inside the square, flat package people call a floppy disk is a circular piece of flexible plastic with a gray-brown magnetic coating on both sides. This smooth, glossy surface is as featureless as it looks, until you format the disk. When you do format the disk, you make magnetic marks on that surface, dividing it into *tracks*, arranged like concentric rings, and *sectors*, which cut up the tracks like slices of a pie (see Figure above). If you have double-sided drives (Kaypro 2X, 4, and 10), both sides of the disk will be formatted. If you have single-sided drives (Kaypro II and 2), only one side will be formatted.

Each sector on your disk is a pigeonhole in which your Kaypro can store information, and it can be located through its address—the combination of its track number (from 0-79 for double-sided drives or 0-39 for single-sided) and its sector number (from 1-40) within a given track. The physical sectors of each track are numbered in the order in which they're laid out on the disk, starting with sector 0. However, because of the speed at which the disk spins, most computers can't read a whole sequence of physical

sectors right in a row—the disk drive head gets to the next physical sector before the computer has digested the data from the sector before. To compensate, a computer may be set to read every third physical sector, for example, so that it has time to digest the data before it has to read another sector. Consequently, CP/M also assigns each sector a logical sector number according to the order in which the sectors are actually read by the computer, starting with sector 1. So when DU gives you a physical sector number, it's talking about the actual position of the sector on the disk, and when it gives you a logical sector number, it's talking about the order in which the sector is read by the computer.

The outermost track (track 0) on a Kaypro disk is used to store most of the CP/M operating system and is often called the system track. The next track (track 1) is used to store the directory of files on the disk and the rest of the CP/M operating system. Tracks 2 and beyond are used to store your files and are usually called the data or storage tracks. □

in everyday decimal, the righthand column in hexadecimal.

MOVING AROUND THE DISK

Now that you're logged in to drive B, where the Test Disk is, you can use DU to move around the disk to any track and sector you want.

Moving by Track and Sector. To move to a particular track, use the "T" command, followed by the number of the track you want (track numbers are always given in decimal). At the DU command prompt, enter **T0** to move to track 0, **T1** to move to track 1, **T39** to move to track 39, and so on.

By itself, the T command doesn't cause the disk drive head (the part that "reads" the disk) to move to a new track; it just *selects* the track you want. The actual move takes place only after you also select a sector.

The "S" command, for moving to a particular sector on the current track, works like the T command—you enter S followed by the number of the sector you want (sector numbers are always in decimal, too). Enter **S1** to move to sector 1 of the current track, **S2** to move to sector 2, and so on.

If you've already selected a new track, you'll probably hear some noise from the disk drive after you use the S command—that's the

disk drive head moving to a new spot. Move back and forth between track 0, sector 1, and track 39, sector 40, and listen.

Knowing Where You Are. After each track or sector move, DU displays a line telling you where you are, like this:

T=0, S=1, PS=0

The first part of this status line (T=0) gives your current track (track 0) and the second part (S=1) gives your current sector (sector 1). This sector, the one you address with the S command, is sometimes called a *logical* sector. The third part of DU's status line (PS=0) gives your current *physical* sector.

To DU, the difference between logical and physical sectors is their numbering: physical sectors are numbered in the order in which they're laid out on the track; logical sectors are numbered in the order in which they're used by CP/M. In the Kaypro, DU considers logical and physical sectors to be the same, except that logical sectors are numbered starting with 1 and physical sectors starting with 0. Fortunately, you can ignore physical sectors for everything I'll cover in this article. You'll be working only with logical sectors, which I'll just call "sectors" from now on.

Moving One Sector at a Time. To move just one sector forward or back from your present position, you can use the "+" and "-" commands. Enter + at the command prompt to move forward one sector (from sector 2 to 3, for example). Or enter - at the command prompt to move back one sector (from sector 2 to 1, for example).

Move to sector 40 of your current track and enter +; you'll move to sector 1 of the next track. Move to sector 1 of your current track, and enter -; you'll move to sector 40 of the previous track. Move to track 0, sector 1, and enter -; you'll end up on track 79 (track 39 if you have a Kaypro 2), sector 40.

Play with the T, S, +, and - commands a bit, and then move to track 1, sector 1. Here you'll find the first of 16 logical sectors that make up the disk directory, which tells what files are on your disk and where they are.

VIEWING THE DISK DIRECTORY

To see what's in this sector of the directory, use the "D" (for Display) command. Enter D at the command prompt.

Reading the DU Display. When you look at the first sector of the disk directory, you should see a display like that in Listing 2 (though the actual file names and other details will be different).

On the right side of the display in Listing 2, you'll see a block of letters and periods, eight rows deep by 16 columns wide, set off by a column of asterisks (*) on either side. This block gives the ASCII display of this sector—if a byte can be shown as a printable ASCII character, it is; if not, it is shown as a period (.). Within this block, you can make out three file names—FLMKT001.TXT, BIO.TXT, and MONSTER (entered twice).

The rest of what you see in Listing 2 is the hexadecimal display of this sector—it's not easy to read at first. The leftmost column contains two-digit row numbers that you'll use for reference later. In between this column and the ASCII display, you'll see four blocks of hexadecimal numbers that make up the hexadecimal display. This display shows every byte in this sector as a *two-digit*

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hexadecimal number—if you read the top line of the display, the first byte is 00h, the next is 46h, the next 4Ch, and so on.

```
G=00:00, T=1, S=1, PS=0

;D
00 00464C4D 4B543030 31545854 0000005B *.FLMKT001TXT...[*
10 02030405 06070000 00000000 00000000 *.....
20 E542494F 20202020 20545854 00000003 *eBIO   TXT....*
30 08000000 00000000 00000000 00000000 *.....
40 004D4F4E 53544552 20202020 01000080 *.MONSTER .....*
50 090A0B0C 0D0E0F10 1112191A 1B1C1D1E *.....
60 004D4F4E 53544552 20202020 03000003 *.MONSTER .....*
70 1F28292A 2B2C2D2E 2F000000 00000000 *.(*)+,-./.....*
```

LISTING 2: this listing shows the display given by DU-V88's D command. It shows the first sector of the disk directory (track 1, sector 1)

In Listing 3, I've tried to create a clearer picture of the hexadecimal display from Listing 2 by adding spaces to separate the bytes and column numbers (00-0F) along the top to help identify the location of each byte. If you start in the upper lefthand corner of the display (row 00, column 00), the first byte (00h) is at location 00. Moving to the right, the next byte (46h) is at location 01 (row 00, column 01), the next (4Ch) at location 02, and so on to the last byte (5Bh) in this row, at location 0F. In the next row down, the leftmost byte (02h) is at location 10 (row 10, column 00), the byte to its right (03h) is at 11 (row 10, column 01), the next byte (04h) is at 12, and so on. This numbering continues through the bottom row, locations 70 through 7F.

```
      00 01 02 03   04 05 06 07   08 09 0A 0B   0C 0D 0E 0F
      -- -- -- --   -- -- -- --   -- -- -- --   -- -- -- --
00 | 00 46 4C 4D   4B 54 30 30   31 54 58 54   00 00 00 5B
10 | 02 03 04 05   06 07 00 00   00 00 00 00   00 00 00 00
20 | E5 42 49 4F   20 20 20 20   20 54 58 54   00 00 00 03
30 | 08 00 00 00   00 00 00 00   00 00 00 00   00 00 00 00
40 | 00 4D 4F 4E   53 54 45 52   20 20 20 20   01 00 00 80
50 | 09 0A 0B 0C   0D 0E 0F 10   11 12 19 1A   1B 1C 1D 1E
60 | 00 4D 4F 4E   53 54 45 52   20 20 20 20   03 00 00 03
70 | 1F 28 29 2A   2B 2C 2D 2E   2F 00 00 00   00 00 00 00
```

LISTING 3: This listing reproduces the hexadecimal display from Listing 2 in a modified form. Here I have added spaces and column numbers to show the location of each byte more clearly.

In other words, a byte's location is the combination of its row number and column number—to find location 5F, you look in row 50, column 0F.

Using this system, you can refer unambiguously to any byte in the sector by its location. At location 43 (row 40, column 03), you'll find the byte 4Eh; at location 5C, the byte 1Bh; at location 76, the byte 2Dh. You'll also use this same system of referring to byte locations later, when you change the bytes in a sector.

Now look back at Listing 2, where you can see the two displays, hexadecimal and ASCII, side by side. These two displays show exactly the same information—only the form is different. In the hexadecimal display, for example, the byte in location 01 is 46h; in the ASCII display, the same byte is F. If you look at the ASCII table in your Kaypro User's Guide, you'll see that the code for uppercase F is, in fact, 46h.

*When CP/M
allocates disk space,
it does so
not a sector but
a group at
a time.*

UNDERSTANDING THE DISK DIRECTORY

Once you can read DU's display, it's fairly easy to understand the disk directory itself. Every file on a disk has at least one entry in the directory. In Listing 2, which shows the first sector of the directory on my Test Disk, there are four entries, each taking two lines (32 bytes). The first entry (locations 00-1F) is for a file called FLMKT001.TXT. The second entry (locations 20-3F) is for the file BIO.TXT, while the third and fourth entries (locations 40-5F and 60-7F) are taken by one large file, MONSTER. Now look at the directory of your own Test Disk; you should see some of the files you put on it, laid out in a similar way.

The User Code. The first byte in every directory entry is the user code, which tells whether a file is active or not. If the file is active, the user code is usually 00h (I'll cover other possibilities next month). If the file has been erased, the user code is E5h. For the first entry in Listing 2, FLMKT001.TXT, the user code (location 00) is 00h, so the file is active. For the next entry, BIO.TXT, the user code (location 20) is E5h, so the file has been erased.

The Filename and Filetype. After the user code, the next eight bytes in a directory entry (locations 01-08) contain the filename, and the following three bytes (locations 09-0B) contain the filetype. For the first entry in Listing 2, FLMKT001.TXT, the filename is FLMKT001 and the filetype is TXT. For the second entry, BIO.TXT, the filename is BIO and the filetype TXT. For the third and fourth, the filename is MONSTER, and there is no filetype. As you can see from the second, third, and fourth entries, any unused locations in the filename and filetype are filled with 20h, the ASCII code for a space.

The Storage Map (Group Numbers). The second line of any directory entry is a map that shows where a file is stored on the disk by listing its "allocation groups" (sometimes called "allocation blocks, but usually just called "groups").

CONTINUED ON PAGE 44

SOFTWARE BARGAINS

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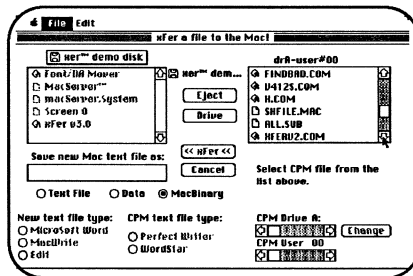
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	January	February	March	April	Total
Widget Sales (units)	3654	3345	3215	4222	14436
Price Each	1.28	1.28	1.28	1.28	1.28
Widget Sales (\$)	4677.12	3985.60	4115.20	5392.16	18169.96
Widget Sales (units)	4222	3452	3494	4547	15715
Price Each	2.34	2.34	2.34	2.34	2.34
Widget Sales (\$)	9877.14	8077.08	8095.56	10546.78	36596.56
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BY JOSEPH COMANDA

Traditionally, database management programs have been in a class of their own—reserved for heavyweight users. You had to be a programmer to do anything interesting with them. To make even the simplest things happen, you had to type commands in an “English-like” language with its own unforgiving grammatical rules. Perhaps the most disorienting thing about them was the way they worked visually. You’d start with a blank screen, and when you issued a command, you wouldn’t necessarily get any visual confirmation that anything had happened.

We’re all used to seeing what we’re doing on our screens. When we retrieve a document or a spreadsheet, there it is on the screen in front of us. As we move around it doing our work, we can always see where we are. But database programs haven’t been like that.

Paradox was the first fully relational database program with a fully visual interface. It has all the power of dBASE or R:base, *but it lets you see what you’re doing!* When you retrieve a datafile, there it is on the screen in front of you. What’s more, while other programs were busy supplementing their command-driven approaches with menus to make life a little easier, Paradox dispensed with a command line altogether. In its place it offered a top-line light-bar menu reminiscent of Lotus 1-2-3 and a *workspace* where everything happens right before your eyes.

In this article, I’ll give you an overview of how Paradox works and then show you how to set up and use a simple Donors datafile. (For a review of basic database concepts and terminology, see the box on page 00.) Next month, you’ll learn how to turn it into a full-

fledged donation tracking system without programming. Since donors are people with names and addresses, the system we develop will have a lot of similarities to any other people-tracking system: clients, employees, club members, whatever.

For those of you interested in comparisons, I did the same thing in dBASE last year in the August and September issues of *PROFILES*. You’ll find the project easier to do and the results more satisfying in Paradox.

HOW PARADOX WORKS

Like other database programs, Paradox is a replacement for the old index card filebox approach to record keeping. It lets you flip through your records a card at a time, or you can flatten the filebox into a two-dimensional table in which each record is a row and each standard category of information (a zip code or a telephone number) is a column. What’s more, you can switch between these alternate “views” of your data with a single keystroke. Figures 1 and 2 (on page 38) show Table and Form (index card) views of the same set of records.

But database programs go beyond what a filebox can do for you. They let you put information in one way and get it out another. On the screen, your names and addresses can look like index cards, but you can print them out in the form of labels or membership lists or invoices. In your computer, you may have thousands of records of people from all over the world, but if you’ve structured your in-

formation right, you can tell it to just print out labels for people in Pennsylvania who have blue eyes and an interest in trout fishing.

Any database management program worth its salt can do all that, but Paradox lets you do it more easily. It produces instant index card-like data-entry forms for any table and then also lets you design your own. It produces instant columnar reports and then gives you a highly versatile tool for custom designing free-from “reports” (labels or Rolodex cards), tabular or columnar reports (membership lists) or hybrids (invoices). But probably its most interesting innovation is its approach to queries.

Queries are requests for information, and a lot of traditional database work gets done in Paradox through queries. Queries can be used to select a group of records from one or more tables, to look up individual records, even to update records.

Instead of requiring lengthy statements of selection criteria, Paradox uses a special query form in which you check off appropriate columns and specify conditions with a minimum of writing (e.g., “CA” in the state column of a mailing list table would select the people from California. And alternately, “9.” in the zip code column would select all the people whose zip code

starts with “9.”) Then Paradox creates an Answer table that includes all of the columns checked and all the rows that satisfy the selection criteria. Figure 3 (on page 38) shows a query form and the resulting Answer table.

A FIRST SESSION WITH PARADOX

PART 1: INTO THE JUNGLE

The DBM that lets you see what you’re doing

CREATING A DONORS TABLE

If you’re using this as a tutorial, find your way into Paradox. At the DOS prompt

on your hard disk, type `cd | paradox2` to move to the paradox2 sub-directory, and then type `paradox2` to load the program. If you are using a version of Paradox earlier than 2.0, substitute “paradox” for “paradox2” in the above instructions.

That will take you to the Paradox main menu. You can select options either by moving to them with the left or right arrow key and pressing Enter or by pressing the first letter of their names.

In addition to offering a menu system, Paradox makes heavy use of the function keys. Some function keys only work in certain contexts. Others are always available. F1, the help key, and F10, the menu key, both fall into the latter category. No matter what you’re doing in Paradox, you can always press F1 to access Paradox’s extensive, context-sensitive online help facility. Similarly, whenever a menu is not visible, you can press F10 to get to one. The actual menu that will appear will depend on where you are in the program.

Since we want to create a new table, select the **Create** option. Paradox will ask you to give this table a name. Type **Donors** and press **Enter**.

Creating a new table means defining its structure by telling Paradox what categories of information—Paradox calls them fields or columns—you intend to keep in it. You can use the form on the screen to give each field a name and specify its type. There are five field types—alphabetical (for text), currency, date, number and short number for integers. Using the structure in Figure 4 as a



View Ask Report Create Modify Image Forms Tools Scripts Help Exit
View a table.

DONORS	First Name	Last Name	Street
1	John	Smith	975 Winding Way
2	Mary	Jones	2345 Iron Gate Way
3	Wilson	Waterway	123 Palm Drive
4	Julie	Johnson	2346 Woodlands

FIGURE 1: A table view of the Donors table

Viewing Donors table with form F: Record 1 of 4 Main ==^_

		Donors	#	1
First Name:	John			
Last Name:	Smith			
Street:	975 Winding Way			
City:	Menlo Park			
State:	CA			
Zip:	94025			
Total Giving:		470.00		

FIGURE 2: A form view of the Donors table

√ [F6] to include a field in the ANSWER; [F5] to give an Example Main

DONORS	First Name	Last Name	Street	City
√		√		

ANSWER	First Name	Last Name	Total Giving
1	John	Smith	470.00
2	Julie	Johnson	225.00
3	Mary	Jones	160.00
4	Wilson	Waterway	35.00

FIGURE 3: A query form and an Answer table in the workspace

Creating new Donors table Create

STRUCT	Field Name	Field Type
1	First Name	A15
2	Last Name	A15
3	Street	A30
4	City	A17
5	State	A2
6	Zip	A5
7	Total Giving	\$

FIELD TYPES

A: Alphanumeric (ex: A25)
Any combination of characters and spaces up to specified width. Maximum width is 255

N: Numbers with or without decimal digits.

\$: Currency amounts.

D: Dates in the form mm/dd/yy, dd-mon-yy, or dd.mm.yy

Use '*' after field type to show a key field (ex: A4*).

FIGURE 4: The structure of the Donors table

guide, fill in the form.

Start by typing **First Name** in the first column of the form, then press **Enter** to move to the Field Type column. The First Name field will contain text, so it will be alphabetical. Alphabetical fields can be up to 255 characters long, but this one is just 15. Type **A15** in the second column and press **Enter** again to move to the next field. Fill in the rest of the field names and types in the same way. Notice that the field type of Total Giving is represented by a dollar sign (\$) for currency.

When you're done, press **F10** for the menu. Among the choices on this particular menu are **Help** and **DO-IT!**. "Help" is comparable to pressing **f1**, the help key. **DO-IT!** tells Paradox to go ahead and create the table. Select **DO-IT!** from the menu or press **F2**, the **DO-IT!** key.

ENTERING RECORDS

To add records to the Donors table, you must bring it to the workspace. Select **View** from the menu. Paradox will ask you for the name of the table. Type **Donors** and press **Enter**.

The table is still empty, so all you can see is its skeletal structure. Press **F9**, the Edit key, to begin adding new records. You can enter your record in this Table view, where each record gets a row, or you can press **F7** to flip between it and Form view, where you can see a record at a time. The first time you do this, Paradox will create the form for you.

Enter the following names and addresses for starters, and then add as many of your own as you'd like. When you're done filling in one record, press **Enter** to move to the next record. You can also add a new record by pressing **Ins** whenever you're in Edit mode. If you make mistakes, use the Backspace key to make corrections. Watch out for the Delete key. It deletes records. If you should hit it by mistake, press **Ctrl-U**, the Undo key, to undelete the record.

```
Record #: 1
First Name: John
Last Name: Smith
Street: 975 Winding Way
City: Menlo Park
State: CA
Zip: 94025
Total Giving: 470
```

```
Record #: 2
First Name: Mary
Last Name: Jones
Street: 2345 Iron Gate Way
City: Philadelphia
State: PA
Zip: 19123
Total Giving: 160
```

Record #: 3
First Name: Wilson
Last Name: Waterway
Street: 123 Palm Drive
City: Jacksonville
State: FL
Zip: 12345
Total Giving: 35

Record #: 4
First Name: Julie
Last Name: Johnson
Street: 2346 Woodlands
City: Highland
State: IN
Zip: 57463
Total Giving: 225

When you're done adding records, press **F2** to end the editing session or **F10** to get the menu and select **DO-IT!**

MOVING AROUND AND MAKING CHANGES

You can flip through the records in Form view with the PgUp and PgDn keys or return to Table view and see several records at a time. In Table view, PgUp and PgDn let you scroll through screenfuls of records. The Home and End keys move you to the first and last records in either view.

In version 2.0 and following, you can also use Ctrl-Z, the Zoom key, to locate a record. Suppose you want to look up Julie Johnson by her first name. Move to the First Name field of any record in either Table or Form view and press **Ctrl-Z**. Then type **Julie** and press **Enter**, and Paradox will move to her record.

*Paradox
lets you do inexact searches—
you can find "Jones" or
"Johnson" just by
typing "Jo."*

You can even do inexact searches. Move to the Last Name field and try looking for a last name that starts with "Jo." Press **Ctrl-Z**, type in **Jo.** (don't neglect the two dots), and press **Enter**. Paradox should jump to Mary Jones' record. To move to the second occurrence of "Jo," press **Alt-Z**, the Rezoom key. That should take you to Julie's record again.

We'll cover the proper way to record each gift in part 2 of this article, but for now the only way to record more than one gift from a

donor is to increase Total Giving in his or her record.

To change a record, simply move to the record, press **F9** to get into Edit mode, and make your changes. Remember that **Ins** inserts a new record and **Del** deletes one. Another useful key is **Ctrl-F**, the Field View key. When you're editing a field, it lets you move around within the field to make changes without having to retype the whole field. You can press **Enter** to leave Field view. When you're done making changes, press **F2** to end the edit session.

QUERYING: THE ART OF ASKING INTERESTING QUESTIONS

Now that you have some records in your table, you can begin to ask some questions. The more records you have, the more interesting the results will be.

We'll start with an easy one: Who are our donors in California and how much has each one contributed?

Make sure you are in Main Mode (press **F2** to get there). If the menu is not on the screen, press **F10**. Select **Ask**, type in **Donors**, and press **Enter**. This will bring the Donors query form to the workplace. It looks a lot like an empty table.

We'll begin by checking off the columns we want to see in our answer. Since we're interested in knowing our donors' names and the amount they've given, we'll check off First Name, Last Name, and Total Giving. Move to each of these fields in turn and press **F6** to place the checkmarks.

Now we need to say we're only interested in California donors. Move to the State field and type **CA**.

Then press **F2** to process the query. The result will appear at the bottom of the workplace in an Answer table. It's one of several temporary tables Paradox creates as needed and then reuses. Next time you do a query, it will produce a new Answer table and the old one will be lost unless you rename it (using an option on the **Tools** menu).

Now let's try another query. Press **F3**, the Up Image key, to move up an image at a time until you're back in the query form. Erase "CA" in the state field, type **200** in the Total Giving column, and press **F2** again. This will show you all donors who've given more than \$200.

You can also use queries to do calculations. For example, the following query will show you total donations. Move back to the query form and remove all the checkmarks by pressing **F6** in all of the columns that currently have them. Then move to the Total Giving column, erase "200," type **calc sum**, and press **F2**. To get a breakdown of giving by state, place a checkmark in the State column and process the query a second time.

We haven't begun to explore all the possibilities of querying, but these few exercises should give you some idea of how versatile querying can be.

PRODUCING REPORTS

Suppose you wanted a printout of all your donors and their total contributions. You could produce an instant report with that information. First, press **Alt-F8**, the Clear All key, to clear the cluttered workspace. Then get the Donors query form again. Check off First Name, Last Name, and Total Giving and press **F2**. That will produce an Answer table with the information we need. Now turn

your printer on and press **Alt-F7**, the Instant Report key, to produce a columnar printout.

The report designer can produce a sophisticated report with totalling and even subtotalling.

That's all there is to it. With a little more work, you could use the report designer to produce a more sophisticated report with totalling and even subtotalling for each state.

DESIGNING LABELS

Instead, let's design labels. From the menu, use this sequence to get started: **F10/Report/Design/Donors/R1**. Paradox will ask you for a description of the report. Type in **Labels** and press **Enter**. Then select **FreeForm**.

You are now in the report designer looking at a rough version of your labels. All the fields have already been placed for you, but some of them are in the wrong place, and of course, you don't want the Total Giving field to show up on your labels.

Cleaning Up the Report Bands. The horizontal divisions across the screen indicate the various bands of the report. Anything above the top page band line will print once at the beginning of the report. Anything between that line and the top form band line will print at the top of each page. The same goes for the corresponding band areas at the bottom of the report. They print out at the bottom of each page or at the end of the report.

Since you aren't printing a page-oriented report, you can use

Ctrl-Y to delete all those lines, leaving only the lines in the Form band area. You should be at the left edge of the line for **Ctrl-Y** to work. The band line dividers themselves can't be deleted.

Deleting Excess Information. Next, delete excess fields in the form band. Use **Ctrl-Y** to get rid of the lines with the following fields: Last Name, State, Zip, and Total Giving. Later you can reinsert the ones you need in the right place. Then use the Backspace key or the Delete key to delete all the field names at the beginning of the remaining lines. You'll still be able to tell which field is which by the message in upper right corner of the screen when the cursor is in a field.

Placing Fields. Now you're ready to place the fields that have to go back in. Move the cursor until it's one space to the right of the First Name field. Use the following sequence of keystrokes: **F10/Field/Place/Regular/Last Name**. After selecting the field, press **Enter** once to indicate the field position and then a second time to indicate the field width.

Move to the right of the City field, type in a comma and a space, and then repeat the field place procedure to place the State field and then, to the right of it, the Zip field.

Making the Labels Continuous. The default page length for reports is 66 lines. That's fine for ordinary reports, but for labels the length should be set to "Continuous." Use the following sequence of keystrokes to get to the Page Length setting: **F10/Setting/Page-Layout/Length**. Delete "66," type C, and press **Enter**.

You should also make sure you have a total of six lines in the form band area, including blanks. If you need more lines, move to the bottom of the Form band area, turn Insert on (**Ins**), and press **Enter** to add lines. When you're done with it, the report screen should look like Figure 5.

Testing the Labels. Try sending the labels to the screen to see how they look at this point. You can do this without leaving the report designer. Just select **F10/Output/Screen** from the menu. When you're done, it will bring you back to the report designer. You can also cancel the report by pressing **Ctrl-Break**.

Looks terrible, doesn't it? You need to get rid of the spaces at the

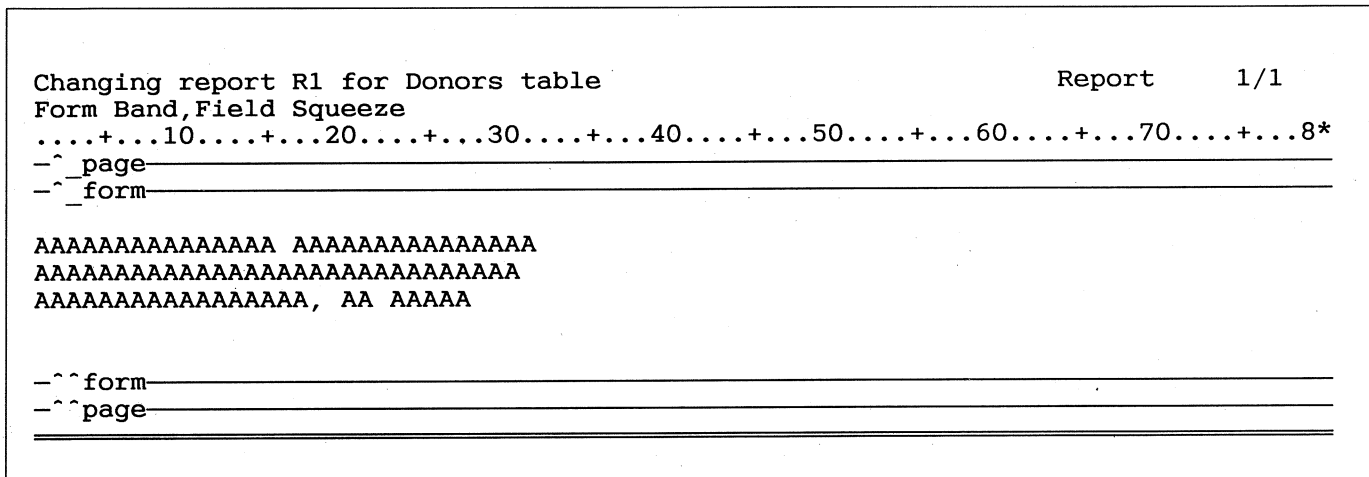


FIGURE 5: The label design screen

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ends of fields.

Squeezing Blanks. You can squeeze fields (remove trailing spaces from fields and push them together) or lines (remove blank lines that might show up if a street field was empty). With line squeeze you have three options. You can either leave the blank line there (no line squeeze), eliminate the blank line (variable line squeeze—i.e., your forms will vary in length), or move the blank line down to the bottom of the form (fixed line squeeze). You want the latter for labels. Turn on Field and Line Squeeze (fixed). They're both under the RemoveBlank option on the Setting menu.

Test the labels again. When they look good, save the report (F2) and print them: **F10/Report/Output/Donors/R1/Printer.**

That's it for now. Next time we'll add a Gifts table to our donor tracking system. ■

Joseph Comanda is a freelance writer, consultant, and software trainer in Philadelphia.

QUICK REFERENCE SUMMARY

Product: Paradox 2.0
Manufacturer: Borland International
4585 Scotts Valley Dr.
Scotts Valley, CA 95066
Phone: (800) 543-7543
Sugg. List Price: \$725
Hotline Number: 751-54

PARADOX

DATABASE CONCEPTS IN BRIEF

In simple terms, a database is a collection of information that's easy to get at. By that definition, a file cabinet is a database. So is a phone book or an appointment calendar. A cluttered desk is not—or if it is, it's a poorly maintained one.

The heart of a *computerized* database is the data file, the basic repository of information.

DATA FILES

Think of a data file as a computerized version of an index card file box. In a file box, individual cards contain certain standard categories of information and are arranged in some kind of alphabetical or numerical order so they'll be easy to find. In a name-and-address filing system, for example, the standard categories are first name, last name, street, city, state, and zip

code, and the cards would probably be arranged alphabetically by last name.

A data file stores names and addresses in the computer in much the same way. It organizes the information into records (corresponding to the index cards) that are further divided into fields (the standard categories of information).

Figure 1 displays the contents of a small name- and-address data file in table form. Each row is a separate record, and each column corresponds to a category of information—i.e., a field.

Since data files can be displayed as tables that look a lot like spreadsheets, some programs like Paradox actually use spreadsheet terminology. They refer to the data file as a "table" composed of rows (records) and columns (fields). □

FIRST	LAST	STREET	CITY	STATE	ZIP
1John	Smith	123 Palm Dr.	Mainville	CA	93456
2Mary	Jones	1 W. Main	Newtown	PA	19054
3Bob	Morris	7556 Waller Dr.	Small Town	NY	11204

FIGURE 1: A name-and-address data file

(one to turn double-wide on, one to turn it off again)—let's make it ^PQ for ON and ^PW for off. To patch the first custom print control, ^PQ, select A (Print control Q) from the Custom print controls menu. When you do, you'll see a screen of information like that shown in Figure 4.

The screen shows you one line of numbers at the bottom, all in hexadecimal. The four-digit number on the left is the address of this patch point; the rest of the numbers show 16 bytes in that patch area. Unless someone has already patched the custom print controls, the 16 bytes should all be 00. The cursor will be underneath the first byte of the patch area, just to the right of the four-digit address. WSCHANGE is now waiting for you to type in the codes for the printer command you want to insert.

All the numbers you enter here will be in hexadecimal (there is a way to enter codes in ASCII, but it's much simpler to use hex—trust me). If you're not used to using hexadecimal numbers, don't worry. To find the hexadecimal equivalent of the ASCII character or decimal number you want to enter, all you have to do is look at the ASCII table. Find the ASCII character or decimal number you want, and there on the same line you'll find its corresponding hexadecimal value.

When you enter a patch like this, you first enter a hexadecimal value corresponding to the number of bytes (characters) in the command, followed by the command itself. For this first custom print control, you want to enter the command to start double-wide printing, which the table in Figure 4 shows will be ESC W 1 (in decimal, 27 87 01; in hexadecimal, 1B 57 01).

The command is three bytes long, so type in 03 (hexadecimal numbers always have two digits). Next, type in the command itself in hexadecimal—1B 57 01. If you make a mistake, you can backspace to correct it. Figure 5 shows what the screen should look like when you're done. When you're sure that you've entered the correct values, press X to return to the Custom print controls menu.

Now you're ready to patch the second custom print control (^PW). Select B from the Custom print controls menu—you'll again see a screen like that in Figure 4, except that the four-digit address on the left will be different (because you're now patching a different location). The table in Figure 3 shows that the command to turn off double-wide printing is ESC W 0 (in decimal, 27 87 0; in hexadecimal, 1B 57 00). This command is also three bytes long, so this time you'll enter the hexadecimal values 03 1B 57 00. Check your entry as before, and then press X to return to the Custom print controls menu.

You can now make further patches or exit WSCHANGE (type ^X, and then answer "Yes" to say that you're done). The next time you run WordStar, you'll be able to turn double-wide printing on and off by using ^PQ and ^PW. Note that if you select a new printer at some later time, the commands that you've inserted for the custom print controls may not be right for your new printer. If so, you can either repatch them (tedious if you change printers often) or use the custom print control dot commands (.XQ, .XW, etc.) to redefine them temporarily.

However, though the custom print controls are handy, there are only four of them. If you really want to do a custom printer installation, you can use the Custom/Simple printer installation that

WSCHANGE provides. In this installation, you define *all* of the standard print control commands—bold, italic, underline, double-strike, superscript and subscript, strikeout, letter-quality printing, and so forth. Essentially, the Custom/Simple printer is an empty shell waiting for you to fill it in. (According to MicroPro, the difference between the Custom and Simple printer installations is as follows. If the Simple printer encounters a print control for which you have not installed a command sequence, it will just ignore it. If the Custom printer encounters such a print control, it will try to fake the effect when it can.)

There are some distinct advantages to using the Custom/Simple installation. You can, for example, have your dot matrix printer use its half-height superscript and subscript commands instead of rolling the paper up and down a half line as it does in most printer installations. You can modify commands or take other commands that you don't use (such as strikeout or double-strike) and use them for other features. You also lose some things, though. Specifically, you won't be able to control character width and line height through dot commands (.CW and .LH) as you can with the standard Epson LQ-1500 installation.

If you're using the MS-DOS edition of WordStar 4.0 and WSCHANGE, here's how you get to the patch points for the Custom or Simple printer. From the Main Installation Menu of WSCHANGE, select B (Printer). From the Printer menu, select D (WS printer patches). From the WordStar print patches menu, select B (CUSTOM and SIMPLE driver controls), which will take you to the first page of a two-page menu listing the print controls you can patch for the Custom and Simple printers—boldface, double-strike, underline, and so forth. Select these items one by one. As you select each one, you'll be taken to a patching screen just like that shown in Figure 5. Enter the appropriate printer command sequence just as described previously, using hexadecimal numbers and beginning each entry with a value that gives the number of bytes in the command that follows. As you finish each patch, press X to return to the patch menu. When you're all done, press ^X to exit WSCHANGE and save your new printer installation.

If you're using the CP/M edition of WordStar 4.0 and WSCHANGE, you have to take a slightly different route. In WSCHANGE, first select either the Custom or Simple printer in the usual way. Then, from the Main Installation menu, select B (Printer). Next, from the Printer menu, select B (Printer driver lib). Then, from the Printer driver library menu, select D (Change printer driver data). From the Change printer driver data menu, select C (Patch strings & tables), which will take you to the first page of a three-page menu listing the print controls you can patch for the Custom and Simple printers. From here, proceed just as described in the preceding paragraph for MS-DOS.

That's only a bare taste of what you can do, but I hope it's enough to get you started with WordStar. Most other major programs include a similar sort of printer installation routine or program, and though the details will be different, of course, the general process will be the same. The rest is up to you—have some fun. ■

Ted Silveira is a remote editor for PROFILES.

What's an allocation group? When CP/M allocates disk space for a file, it doesn't do so one sector at a time—that would require too much record keeping. Instead, CP/M treats a number of sectors as a group and allocates space one *group* at a time.

*You'll need
to understand logical
extents if you
should have to
build a new
directory.*

Different computers may use different group sizes. The Kaypro 2 uses eight sectors per group (8 sectors/group X 128 bytes/sector = 1,024 bytes/group, or 1K bytes). The Kaypro 4 uses 16 sectors per group (2K bytes/group). If you use DU's # command again to get your drive statistics, the sixth entry (Sec/group) will tell you how many sectors per group your computer uses.

Because a group is the smallest space CP/M can allocate to a file, it determines the minimum file size. If you have a Kaypro 2 and create a WordStar file with only one character in it, STAT.COM (or D.COM) will say the file's size is 1K. If you create the same file on a Kaypro 4, STAT.COM will say the file's size is 2K.

Now look at Listing 2 again. In the first directory entry, the second line (locations 10-1F) shows the group numbers allocated to FLMKT001.TXT. This file takes up six groups, numbers 02h through 07h (group numbers are always hexadecimal). The unused locations in the storage map are filled with zeros.

If a file takes up more groups than can be listed in a single directory entry, CP/M opens a second entry for it (and a third, fourth, etc., if needed). In Listing 2, MONSTER takes up 25 groups, so it has two directory entries. Sixteen groups (09h-12h and 19h-1Eh) are listed in the first entry, the remainder (1Fh and 28h-2Fh) in the second.

When CP/M allocates space for a file, it doesn't try to keep all the pieces of the file in the same place; it jumps all over the disk, sticking the pieces in wherever it can find room. For example, MONSTER's first directory entry jumps from group 12h to group 19h, and its second entry jumps from group 1Fh to group 28h; the missing groups (13h-18h and 20h-27h) have been allocated to other files somewhere else in the directory.

The Logical Extent Count. The 13th byte in a directory entry shows the logical extent count. Unfortunately, there's practically nothing logical about this one—if tracks, sectors, and groups haven't boggled your mind already, logical extents surely will.

Some history may help. In early versions of CP/M, all computers

had to use a group size of 1K (as the Kaypro 2 does now). Using these 1K groups, a single directory entry could only cover 16K bytes of a file (because there are only 16 slots to list the group numbers in); any file over 16K required more than one directory entry. The maximum amount of space that could be covered in one directory entry (16K) became known as an "extent," and within a single file, each extent was numbered (00, 01, 02, etc.) so that CP/M knew which contained the first part of the file, which the second, and so on.

The current version of CP/M still uses the 16K extent (now called a "logical extent") to keep track of files, but it allows computers to use group sizes larger than 1K, so they can cover more than 16K in one directory entry. As a result, a single directory entry can cover more than one logical extent. The Kaypro 4, with its 2K groups, can cover 32K (two logical extents) in one entry.

Each time a logical extent is filled (i.e., 16K worth of groups is added to the directory entry), a new logical extent is opened, even if it only contains one sector of one group. The 13th byte in a file's directory entry (location 0C for FLMKT001.TXT in Listing 2) shows the current logical extent being used by this directory entry.

In Listing 2, which shows part of the directory from a Kaypro 4, the logical extent counts for FLMKT001.TXT (location 0C) and BIO.TXT (location 2C) are both set to 00h. Neither of these files is larger than 16K, so neither has filled up the first logical extent (extent 00). The two directory entries for MONSTER, however, tell a different story. The first directory entry for MONSTER is full (32K worth), and the logical extent count is set to 01h (location 4C), meaning that the first two logical extents (00 and 01) are being used. In the second directory entry for MONSTER, the logical extent count is set to 03h because the next two logical extents (02 and 03) are being used, even though the last one (03) is not full.

I apologize for this long excursion into the meaning of logical extents, especially since you'll rarely need to do anything with them. You will need to understand them, however, if you should ever have to build a new directory entry in the course of rescuing a file.

The Record Count. The 16th byte in a directory entry (location 0Fh for FLMKT001.TXT) shows a count of the number of sectors (called "records" in this case) used in the highest numbered logical extent of this entry. In Listing 2, the record count for MONSTER's second directory entry (location 6F) is 03h, so only three sectors of the current logical extent (03—see location 6C) have been used.

The remaining two bytes in a directory entry are the 14th and 15th (locations 0D and 0E for FLMKT001.TXT); these are used for housekeeping by CP/M and should be 00h.

MOVING AROUND THE DISK BY GROUP NUMBERS

When you first moved to the disk directory (using T1 and then S1), DU added something to the line displaying your current track and sector. Along with the track, sector, and physical sector, DU told you that "G=00:00" (see Listing 2). This figure indicates what allocation group you're in. The number to the left of the colon gives your current group number, and the number to the right of the colon indicates your current sector within the group (both in hexadecimal).

THE HEX/ASCII CONNECTION

Computers deal only with binary numbers, and the smallest piece of information a computer can work with is a single binary digit (0 or 1), which is called a "bit." Your Kaypro usually works with a group of eight bits, called a "byte," which might look something like this: 10011101. Depending on its context, a single byte can represent an instruction telling the computer what to do, a numeric value (like the number of lines on a page), or a character (like the letter "A").

Hexadecimal Numbers. It's very inconvenient for humans to work with bytes in a form like 10011101, so they are often translated into hexadecimal numbers, which are more compact. Technical programs like DU, for example, usually display bytes as hexadecimal numbers. These hexadecimal numbers work much like the familiar decimal ones except that where the decimal system has 10 single digits (0-9), the hexadecimal system has 16 single digits (0, 1 . . . 8, 9, A, B, C, D, E, F). In hexadecimal numbers, when you add 1 to hexadecimal F, you get 10 hexadecimal (which equals 16 decimal). To get a fuller explanation of hexadecimal numbers, read my article "Bits, Bytes, and Hexadecimal Numbers" on page 35 of the July/August 1985 *PROFILES*.

Hexadecimal numbers are usually written with a trailing **H** to distinguish them from decimal numbers, so that hexadecimal 1A is written 1AH or 1Ah. I use a lowercase **h** to show hexadecimal

numbers, except when I'm reproducing what you'll see on your screen, as in the examples from the DU session. You *never* type the **h** when entering a hexadecimal number while you're using DU.

ASCII Characters. A byte can represent a character, like the letter "A," but the relationship is arbitrary—there has to be a system to specify which byte represents which character. In the microcomputer world, the most commonly used system is ASCII (American Standard Code for Information Interchange). In the back of your *Kaypro User's Guide*, you'll find an ASCII chart, which lists each possible character together with its corresponding hexadecimal value: 41h equals A, 42h equals B, and so on.

The ASCII characters are represented by bytes that use only seven of the possible eight bits—the eighth bit (called the high bit) is always set to 0. WordStar, however, uses this eighth bit for its own purposes. In a WordStar document file, some characters (the last letter in a word, for example) have this eighth bit set to 1, so they are no longer standard ASCII characters. That's why if you use CP/M's TYPE command to list a WordStar document file on the screen, you'll see odd graphics characters instead of letters in various places. Fortunately, DU removes these eighth bits from every byte in its ASCII display, so that when you display part of a WordStar file, you see only normal characters. □

In Listing 2, the group is 00h because the disk directory, on track 1, is always the first group on the disk (the system track, track 0, isn't divided into groups). The sector is also 00h because Listing 2 shows the first sector of the directory. (The first sector in a group is 0, but the first sector on a track is 1—I wish these people would make up their minds.) As you move around on the disk, you'll see the group and sector numbers change.

Because files are usually dealt with by allocation groups, DU lets you move directly to any group with the "G" command. At the DU command prompt, enter **G** plus the number, in hexadecimal, of the group you want. **G02** will take you to group 02h, **G2F** will take you to group 2Fh, and so on. To return to the disk directory, enter **G00**.

Do some experimenting on your own. Go to the directory on your Test Disk and display a sector. Choose one of the text files, identify its first group number, and use the G command to move to that group. Once you're there, display the first couple of sectors, looking at the ASCII display—it should show the beginning of the file you chose. Do the same thing with a few other files.

A TEASER

This month, I've covered how disks are organized, how to move around a disk with DU, how to read DU's display, and how to read a disk directory. Next month, we get to the really interesting part—how to change or move bytes with DU and what to do with crashed disks and files.

Just for fun, though, try this. Go to the beginning of your Test Disk directory and display the sector. Now, at the command prompt, enter **CH00,E5**. This command tells DU to Change the Hexadecimal byte at location **00** to **E5h**. Display the sector again, and you'll see that the byte at location 00 has been changed to E5h—you've erased the file in the first directory entry.

So far, the change is only temporary, so enter **W** at the command prompt to Write the changed sector onto the disk. Now exit DU and

use STAT.COM, D.COM, or DIR to list the files on your Test Disk—the file you erased will be missing.

Now run DU again, log on to your Test Disk, go to the beginning of the directory, and display the sector. The directory entry for the erased file is still there; it just has its user code set to E5h. Now at the command prompt, enter **CH00,00** to Change the Hexadecimal byte at location **00** to **00h**. Display the sector to make sure the change was made, and then enter **W** at the command prompt to write the change to the disk. Now exit DU and list the files on your Test Disk again—your file is back. You've erased and unerased a file.

See you next month. ■

Ted Silveira is a remote editor for PROFILES.

SUMMARY OF DU-V88 COMMANDS COVERED

?	show help screens
^C	cancel any operation
X	eXit program
LX	Log in drive X
#	print disk statistics for current drive
Tnn	select Track nn (nn is decimal value)
Snn	select Sector nn (nn is decimal value)
+	move forward 1 sector
-	move back 1 sector
D	Display sector in hexadecimal and ASCII
Gnn	move to allocation Group nn (nn is hexadecimal value)
CHnn,bb	Change the Hexadecimal byte at location nn to value bb (nn and bb are hexadecimal values)
W	Write current sector to disk to save changes



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How To Buy A HARD DISK

Plus a look at other mass storage devices

BY JIM SPICKARD

My daughter walked into my computer room the other day. That's not as easy as it sounds. I try to keep it neat, but, well, you know... After threading her way through the cables and piles of papers, she stopped at the shelves where I keep old disks. Boxes and boxes of them.

"Daddy, why do you have so many disks?"

Good question, that. "I've got a lot of programs," I replied.

"Do you use them?"

I nodded toward the CP/M Kaypro in the corner. "Whenever I use my old computer."

She thought for a moment. "What about your new one? Doesn't it need disks, too?"

"Not as many, sweetie. It has a big disk inside that holds as much as 60 of those little ones. I just need a few disks for data." I patted my Kaypro PC. "The programs live right in here."

There is a saying in the computer business: users will pay for speed, but they will kill for storage. Time was, a 10 megabyte (MB) hard disk was a luxury. Nowadays, 20 megabytes is considered small. 40MB is common, 80MB is not rare.

It's not that we have to store more data. I keep old manuscripts on floppies as I did before. But today's programs are bigger and more demanding. RAM-resident utilities proliferate. Operating systems take up more and more space. To load the programs I'm using to write this article, for example, would take six disk changes on a floppy-based machine. I could load those disks, but I couldn't easily switch to my spreadsheet or database. Those programs *also* take several disks to load. Mass storage is more convenient.

Sometimes it's crucial. I've got one file, a bibliography, that's 636K long—too big for a standard floppy. OS/2—the newly introduced operating system for 286 and 386 machines—takes up 2.5MB of disk space. That doesn't count its virtual memory manager, which spills RAM-hungry operations to disk.

Some programs won't even run from floppies. Aldus' Page-maker, for example, needs 10MB of free disk space.

Mass storage gets more important all the time.

In this article, I'll introduce you to mass storage systems. I'll tell you what's available and give you an idea of the questions you need to ask yourself and your dealer. Hard disks are the most common and the cheapest of the mass storage devices—at least when you count storage in tens of megabytes—so I'll spend most of my time talking about them.

But hard disks aren't the only kids on the block. If you want to move masses of data between computers, for example, you can choose from several portable media. Streaming tapes have their uses, as do CD-ROMs, RAMs, WORMs and other creatures from the alphabetic ooze.

By the time our tour is over, you will at least know the landscape.

Then you can decide whether mass storage is for you.

HARD DRIVES

A hard drive is a bit like a traditional floppy drive. A platter—made out of metal rather than the floppy's plastic—spins at high speed between two or more drive heads. These heads magnetize the platter's surface. They make analogs of the 1s and 0s computers use to store information. Because the hard disk's platter is rigid, the heads can "read" and "write" to as many as 1200 tracks—as opposed to a floppy's 39. More precise control means more data can be stored.

Actually, a hard drive involves three components: the drive, a drive controller, and a power supply. The drive itself determines how much data can be stored and how fast you can get to it. Hard drive capacities for IBM-compatibles range from 20 to over 300 megabytes; access times range from 25 to 80 milliseconds. All things being equal, you want a large disk with a small access time. That's especially true if you use disk-intensive programs like databases.

Like floppies, hard disks now come in both 5 1/4- and 3 1/2-inch formats. Unlike with floppies, you needn't worry about which to get. They are the same from your computer's point of view.

The drive controller tells the disk how to work: which track to find and which sector to return to for processing. The CPU (central processing unit) "calls" the controller's BIOS (basic input/output system), which issues commands to the drive itself. Drive and controller must match. (I'll tell you how below.) You may already have the controller you need: many floppy drive controllers support hard disks, too.

Hard drives run off your computer's power supply. They draw between seven and 100 watts, not counting the controller. Thirty watts is average.

If your current power supply is rated at 150 watts or above, it is probably big enough. If it only provides 65 watts, you will need a new one. At 135 watts—the rating on most Kaypro products—you will only need a new supply if your expansion slots are full, or if your drive is a power hog. Otherwise you are probably okay.

INTERNAL, EXTERNAL, OR CARD?

If you already have a controller, your power supply is big enough, and if you have an empty drive bay, an internal drive is the most economical choice. Just buy the proper drive and have your dealer slip it in. If you haven't got a controller—or have the wrong kind—buy a complete hard disk system: drive, cables, and controller together.

If you haven't got a spare drive bay, you can buy a "hard card"—a circuit board containing both hard drive and controller that fits in an expansion slot. Hard cards typically cost a bit more than in-

ternal drives and have a lower maximum capacity—about 40MB. But they draw less power and, ideally, take up no more room than would be used by a controller card.

Also, you can use hard cards to transfer programs and data between machines. Unplug it here, plug it in there. Voila!

If your power supply is weak, or you are short on drive bays and expansion slots, consider an external drive. They provide their own power and come with case, controller card, and cables. They can sit almost anywhere—even strapped to the underside of your desk. Though they are more expensive than internal models, their net cost may be lower. You don't have to replace your present power supply.

*A hard drive
involves three components:
the drive,
a drive controller,
and a power
supply.*

WHAT SIZE?

Of course, you want to get a disk big enough to hold your programs, plus any you may soon buy.

A good rule of thumb is to add up the disk space required by all the programs you use or expect to use in the future. Include DOS and any special disk utilities. If your money is tight, add 50 percent to this figure; if not, double it. Then round up to the nearest 10MB, with a 20MB minimum. You may find little price difference between 20 and 30MB; if that is the case, go with the latter. You will never regret having the extra space.

I am a living example of the adage, "Software expands to fill all available disks". I often have to trim unused files from my hard disk, just so I have space to work. Right now, it's holding four word processors, three programming languages, a desktop organizer and electronic mail collector, a typesetting program, three graphics programs, a spreadsheet, a text-oriented database manager, and two financial managers— plus the Norton Utilities and Fastback. That's 18MB. I need them all. Already this week, I've used everything but the financial managers. And it's only Tuesday!

If I had more disk space, I'd probably not have deleted a second typesetter and part of one of the programming languages. On the other hand, I am glad I had to purge three word processors I never use. Be realistic—but get enough storage to last a while.

THE INNARDS

Hard disks are made in several different ways, most of which affect

performance. As usual, better performance comes at a higher price. Owners of 286 and 386 machines will want to pay that price: there is no sense having a fast computer with a slow drive. (That's the problem with IBM's PS/2 Model 50.)

In any case, if you know what is involved, you can shop more intelligently.

First off, there is the disk itself—the platter or platters that hold your data. These platters spin at about 3600 rpm—quite a torque. To withstand such pressures, older disks are fairly thick. An iron oxide coating provides the magnetic medium on which data sits.

Newer disks are thinner and plated with metal alloys. Plated drives are more rugged, and they can store more data in a given area. If you have a choice, get plated media. Durability is worth extra money.

Different hard drives also have different ways of storing data on the disk, called encoding formats. The MFM (Micro Frequency Modulation) format is the most common, largely because it is inexpensive and reliable. (Double-density floppy drives also use MFM encoding.) RLL (Run Length Limited) format stores more data in a smaller physical space—up to twice as much, in some cases. RLL is easier to use on plated drives than on oxide.

Often, MFM and RLL drives are nearly identical. The Seagate ST-238 30MB drive, for example, is merely an RLL version of Seagate's 20MB ST-225. Fortunately you don't have to worry about this: just get the size drive you want. The encoding format will follow. But make sure your drive controller supports the format you get. An MFM controller won't run an RLL drive.

While I'm talking about drive/controller compatibilities, I might as well mention the drive interface. That's the cabling system that connects the hard disk to the controller. You can choose among three types, only one of which is common in the IBM-compatible world. Unfortunately, that is the slowest interface: the ST506/412.

Invented by Seagate, the ST506/412 transfers data serially at five megabits (not bytes) per second. That may seem like a lot, but it's not. The ESDI (Enhanced Small Disk Interface) moves twice as much data, and the SCSI (Small Computer System Interface)—a parallel interface—moves six times as much. You must match the interface on the drive controller with the drive: you can't run a SCSI drive off a ST506 controller. The ST506/412 will do for an XT-compatible like the Kaypro PC, though. Only 386 machines need a "scuzzy" (SCSI) drive. (No joke—that's what they are called!)

If you go for ST506/412, make sure your controller supports both 506 and 412 modes. (For details, see the glossary on page 00.)

Different drives also have different ways of moving the drive heads. Access time is the most common way to measure drive performance. It takes a typical XT-class hard drive about 65 milliseconds to start delivering data after the computer requests it. Any slower than that and the computer has to wait too long. A typical AT-class drive takes 28-30 milliseconds. Faster computers need faster drives.

Most XT-class drives use stepper motors to move the heads in discrete steps from one track to another. AT-class drives combine voice coils with electronic marks on the platters to position the heads properly. Voice coils are more reliable because they let the head adjust when heat expands the disk. They are also more ex-

HARD DRIVES



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PRF1088

pensive and take up more room. Voice coil drives typically use a full drive bay; stepper motor drives are half-height. I often hear drive makers brag about their "interleave." That's the number of physical sectors between logical sectors on a disk.

*One last
factor to consider:
for a hard drive to work
properly, you need
the right version
of DOS.*

The concept is pretty simple. Disks don't read and write single bytes; they work with groups of bytes called "sectors". Those sectors are numbered consecutively—"logically," to use computer jargon. If the logical sectors on a track are too close together, the drive will have to make a full turn between each "read" or "write". That wastes time. It's far better to separate them a bit. An interleave factor of four makes every fourth sector the next one in line. The drive reads the intervening sectors later, when their time comes.

Ideally, the interleave factor is set so that the next logical sector is under the drive head when the computer requests more data. A fast machine needs a low interleave; a slower machine a higher one. As long as your drive and your computer are properly matched, you needn't worry about the interleave.

Access time and compatibility with your controller are the key technical issues.

SYSTEM COMPATIBILITY

There's one last factor to consider. For a hard drive to work properly, you have to have the right version of DOS. Though PC- or MS-DOS 2.0 or later are usually adequate, only version 3.0 and above can identify bad hard disk sectors above 16MB. That's important. You want DOS to "lock out" those sectors when it formats the disk. Early versions of DOS can't do it.

Also, all DOS versions before 3.31 have a 32MB disk size limit. That doesn't mean you can't use larger drives. You will just have to partition them into smaller units. DOS 3.0 and above have utilities to do so.

Several drive makers provide software to trick DOS into using larger drives without partitioning. But DOS 3.31 solves this problem.

If you've got an early PC, another problem may crop up. The ROM BIOS in the early IBM PCs and compatibles, including early Kaypro PCs, doesn't recognize a hard drive's BIOS. So you can't boot from a hard drive: you have to boot from a floppy, then transfer to the hard drive by typing "C: <RETURN>". If you have such a

machine, you can either get a BIOS upgrade or you can construct a clever AUTOEXEC.BAT file to work around the problem. Just be warned.

One last caveat—for Kaypro owners. Hard drives, like other components, are made to IBM standards. Drive makers typically won't guarantee that their products will work in non-IBM computers. While Kaypro computers are *extremely* IBM-compatible, there's always a chance that a particular drive or controller won't work.

Your best bet is to buy from a dealer who will guarantee performance.

EXAMPLES

Unfortunately, I don't have space to review any hard drives in depth. But I can make a few comments.

The Seagate ST225 is probably the most common 20MB drive for XT-class computers. It is reliable and cheap, though not particularly fast: its access time is in the 65- to 80-millisecond (ms) range. The "street price" for the disk and a Western Digital controller is about \$325 plus shipping: about \$16 per megabyte. Cut \$75 if you don't need the controller.

The Seagate ST4038 is a similar 30MB drive for AT-class machines. It boasts a 40ms access time and sells for around \$525 (\$17.50 per MB). Both the ST225 and the ST4038 are MFM-format drives. Higher capacity RLL versions cost a bit more.

Many *PROFILES* readers saw Tom Enright's review of the Plus HardCard 40 (November 1987). Plus invented the disk-on-a-card concept, and this 40 MB card is probably the best of such products. Its list price is high, but I've seen it discounted to \$18 per megabyte. And it works well.

If you own a 286 or 386 machine and need a truly huge drive, you might consider the Micropolis 1375 PC Pak. For \$2,295 (list, not street) you get the controller and nearly 140MB of storage—\$16.50 per megabyte. It's quick, with a SCSI interface and an average access time of 23 milliseconds. And you will probably never run out of disk space.

BEYOND HARD DISKS

That's enough about hard disks. What are some of the other options?

The Bernoulli Drive or "Box" is the most famous alternate mass storage system. It's a cross between a hard drive and a floppy. Like a hard disk, it is fast and capacious—about 20 megabytes, in its current version. Like a floppy, the storage medium is removable. In essence, you have an unlimited number of 20MB disks.

The first Bernoulli Boxes were external units, as large as a standard computer. The latest version is much smaller: with a bit of squeezing, you can fit one into the lower right half-height drive slot on most IBM-compatibles. The 5 1/4-inch cartridges are as sturdy as the newer 3.5-inch floppies, and thicker. The drive heads ride on a cushion of air that effectively prevents head crashes. That, plus removability, makes a Bernoulli's data safer than a traditional hard drive's.

Tandon makes a similar cartridge drive: a 30MB Personal Data Pac. The cartridges are much larger than Bernoulli's—about the

size of a book.

Kodak makes a smaller drive—essentially a thick floppy disk holding 10MB. Kodak's drives use a different technology: they've beefed up the traditional floppy disk, rather than paring down the hard disk. Here, too, the selling point is portability. Once you've bought the drive, additional storage space costs \$5 per megabyte. Moving masses of data from office to office becomes a snap.

*You might
consider a hard disk
for your programs
and a portable medium
for your
data.*

This flexibility comes at a price: portable systems are expensive. For example, Radio Shack sells a re-labeled version of the Bernoulli drive for \$1,800, plus \$85 per disk. Mountain Computer sells it for \$2,200, with disks at \$140. Kodak's list price (under its Verbatim label) is \$1,400, plus \$50 per disk.

If you like the idea of unlimited storage or need portability, these prices may be okay. Traditional hard disk storage is much cheaper, though. You might consider getting a hard disk to hold your programs and a portable medium for your data.

Of course, you could use any of these cartridge systems to back up regular hard disks. Such backups are essential: hard disk problems are rarer than problems with floppies, but they are potentially much more serious. Instead of the 50 or so floppies needed to back up a 20MB hard disk, you could use two Kodak cartridges. It's a lot simpler.

A variety of tape drives are available, though, that do the job faster and better. Tapes aren't so good for primary storage: they retrieve information sequentially, not randomly like regular drives. But for backups they shine.

A DC2000 internal tape unit can store 40 to 50MB. That's enough for 90 percent of the hard disks now in use. They are easy to install, running off your floppy drive controller. They cost about \$700, plus another \$30 for a pocket-sized tape cartridge.

Your whole office can share a tape system, if you like. You can either connect a DC2000 to a network server, or you can use an external DC600 unit and put a controller card in each computer. DC600 tapes are about the size of a paperback book and store up to 500MB. They're faster than DC2000 but the drive/controller combination costs several hundred dollars more.

ALPHABET SOUP

About a year ago, CD-ROM drives were all the rage. Not that people were buying them—they were just talking about them, waiting for

them to come of age. (See Ted Silveira's article, "CD-ROM Information Publishing for the PC," in the August 1988 issue of *PROFILES*.)

CD-ROMs are close cousins to compact disks—those little silver platters that have revolutionized the recording industry in the last few years. They work like a Bernoulli drive or a floppy: disks can be moved from system to system, while the CD player itself stays in one place. Unlike other drives, though, they only read information, not write it. Capable of holding up to 550MB, they give you access to truly staggering amounts of information.

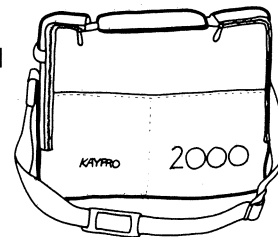
A single disk, for example, can hold a copy of *Psychological Abstracts* or the entire *Grolier's Electronic Encyclopedia*. The latter sells for \$199 in CD. That is a real bargain compared to the \$700 or so the bound version costs. You have to have the CD player, though—currently about \$1,000.

CD-ROMs are beginning to crack the corporate market. Lotus Development sells *One Source*, a collection of financial databases. *The Microsoft Bookshelf* holds "The World Almanac," a copy of "Familiar Quotations," and the "Zip Code Directory," plus seven other business references. You can easily pull information from any of them into your word processor or spreadsheet.

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I have to admit, I am tempted by the *Bookshelf*. I'd like to have electronic access to "Familiar Quotations." But one wish isn't going to open my wallet that far. CD-ROM drives will take off when

there are enough popular and affordable databases to justify putting CD players on everyone's desk—not before.

WORM (write once, read many times) drives are a bit more spe-

DRIVE TALK

Access Time: The average time (in milliseconds) required to move the head to a given spot and read data.

AT-class Drive: Drive built for a 80286-based computer.

Auto-parking: Automatically moves drive heads away from data areas of the disk when the power is turned off.

Bernoulli Box: A hard drive-like storage device that stores large amounts of data on removable rigid disks.

BIOS: Software routines in ROM that tell the computer how to start operation. The BIOS determines which disk your computer boots from.

Buffered Seek: A means of increasing drive speed by letting the drive accept positioning commands faster than it can move its drive heads.

Cartridge Drive: A drive featuring a removable hard disk, often used to transfer data between computers.

CD-ROM Drive: Compact Disk/Read Only Memory. An optical disk that can contain a tremendous amount of information—as much as 550MB—on a removable disk. Unfortunately, it can only read information, not write any.

Data Compression: A software technique of cramming more data on a disk.

Disk Caching: A technique of speeding data access by storing recently retrieved disk sectors in RAM.

Drive Bay: The slot in which the drive sits. Two half-height drives will fit in a full-height (3 1/2 inch) bay.

Drive Capacity: The amount of data (in megabytes—MB) a drive can store.

Drive Controller: The circuit card that tells your hard drive how to act. The controller and drive must use the same interface (ST506, ESDI or SCSI) and the same encoding format (MFM, RLL, ERL or ARLL).

Drive Heads: The parts of the disk drive that pass over the disk, reading its information.

ESDI: Enhanced Small Disk Interface. A disk interface capable of transferring up to 10,000 bits of data per second.

Encoding Format: The way a hard drive stores data. See **MFM** and **RLL formats**.

External Drive: A drive or storage device that has its own housing and power supply outside the computer.

Hard Card: A drive on a circuit card that fits in one of the computer's expansion slots. Does not need a separate controller.

Hard Drive: A disk drive built around a permanently affixed, rigid, 5 1/4-inch or 3 1/2-inch disk. Able to hold extremely large amounts of data.

Interface: The cabling system that connects hard disk to drive controller. See **ST506/412**, **ESDI**, **SCSI**.

Interleave: The number of physical sectors between consecutively numbered logical sectors on the disk. Drives are usually quicker than computers, so drive makers often have the drive skip several sectors between reads. That way, the computer doesn't get behind. Match the interleave factor to your computer's clock speed: higher speed, lower interleave.

Internal Drive: A drive or storage device that fits into one of the computer's drive bays.

MFM Format: Modified frequency modulation. The original information encoding format for hard drives.

Optical Drive: A drive that uses a laser to transfer information to and from a storage medium. See **CD-ROM** and **WORM**.

Oxide Coating: The original hard disk coating, colored dull red.

Power Supply: The component that transforms house current into current your computer can use. Should be rated to at least 135 watts.

Plating: A shiny hard disk coating, able to store large amounts of data. More rugged than oxide.

RAM Disk: A portion of Random Access Memory designed to emulate a disk drive. Very fast and very reliable, as long as the power is on.

RLL Format: Uses one of the Run Length Limited formats for data encoding. A (1,7)RLL drive holds 25 percent more data than an MFM drive; a (2,7)RLL (ERLL) drive holds 50 percent more; a (3,9)RLL (ARLL) drive holds 100 percent more.

SCSI: Small Computer System Interface. A parallel disk interface, faster than the standard ST506 serial interface commonly in use. Transfers up to 4MB of data per second. Permits several devices to be connected like a daisy-chain.

Seek Time: The average time (in milliseconds) required to move the head from one track to another.

ST506: A serial interface used by most XT- and AT-style hard drives. Transfers data at up to 5,000 bits per second.

ST412: A modified form of the ST506 serial interface, supporting buffered seek operations. ST412 drives are compatible with ST506 controllers, but not vice versa.

Stepper Motor Positioning: A head-positioning system that moves the drive's read/write heads in discreet steps to various tracks.

Voice-coil Positioning: A head-positioning system that uses signals on the disk to move the read/write heads. Faster and more accurate than stepper motors.

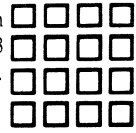
WORM Drive: Write Once/Read Many. A high-capacity optical disk capable of being written to and read but not erased.

XT-class Drive: A drive built for an 8088/8086-based computer.

C.P.I. BUSINESS SYSTEMS

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cialized. Like CD-ROMs, they're optical drives, and they use a laser to read and write data to removable disks. They are smaller—around 200MB. They're unlike CD-ROMs in that you can write information on them, but only once, as the name implies. They are not erasable, as ordinary disks are.

That means they're good for archives and backups or for storing large databases that don't go out of date quickly. They aren't for storing things that have to be corrected. Accountants would love them: they provide a complete audit trail.

Other uses are pretty arcane. One well-known writer uses a WORM to collect all his edits—so he doesn't "lose anything important". Fine. But I'd rather send my sloppy writing to the microvoid.

By the time this article appears, a third kind of optical disk will hit the market. The Maxtor Corporation of San Jose, California, just announced two *erasable* optical drives. One can store 160MB of data; the other can store up to 1 gigabyte (1,000MB). Each comes with a SCSI interface and removable cartridges. The smaller unit will cost about \$2,000; the larger about \$6000. That sounds like a lot, but it works out to \$6 per megabyte for the first cartridge. Subsequent cartridges are virtually free. The system should prove popular if it works well.

There is one more mass storage system I'd like to plug—but I can't tell you where to get one.

Though my CP/M Kaypro didn't have a hard drive, I did have a big RAM disk. One megabyte was enough to hold my word processor, thesaurus, spell-checker and several utilities—everything I need for writing. A battery kept the programs in RAM when the computer was off. As soon as I flicked the power switch, I was ready to go. I've also got one for my Apple II, and it's a godsend.

I haven't seen RAM disks for IBM-compatibles, but there's no reason why they couldn't be built. Some NEC laptops use them. Perhaps some clever soul will hook a battery and some software to an extended memory card and make hard disks pass. Here's hoping.

LAST WORDS

If you don't yet have a mass storage system, the foregoing should give you enough information to decide whether you want to take the plunge or not. If you already have a hard disk that is short on available space, you may want to add a second. Or you may want to get a file-compression program instead, to better use the space you have.

There are several on the market. *Free Space* from Ashton-Tate and *Cubit* from SoftLogic are the best known. Isogon's *Newspace* is the neatest I've encountered: once you install it on your disk, it automatically compresses and decompresses files. You don't even see it operate. I like a program that works without any direction from me.

And that's what it's all about, isn't it? Mass storage lets me worry less about my equipment and more about my work. I use to think I didn't need all that disk space; now I don't know how I lived without it.

Whatever you choose, I can assure you that you'll never want to go back to floppies.

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

QUESTIONS TO ASK YOURSELF

1. What size storage do I need?

List the maximum disk space needed by:

- a. Word processor(s) _____
- b. Spreadsheet(s) _____
- c. Database manager(s) _____
- d. Graphics program(s) _____
- e. Desktop publisher(s) _____
- f. Financial program(s) _____
- g. Programming language(s) _____
- h. Utilities(s) _____
- i. DOS _____
- j. Desktop Organizer(s) _____
- k. other _____

TOTAL: _____ (M B)

x2 _____

Round up to the nearest 10MB _____

This should be enough to store your programs and whatever data you are working on in the short run.

2. Do I want a hard disk or a specialized medium?

- a. Do I need to store masses of data as well as programs? _____

Consider buying a very large hard disk or two storage devices.

- b. Do I need to move this data between computers? _____

Consider buying a hard disk for your programs and a portable storage medium for your data.

- c. Do I need to use CD-ROM reference materials? _____

Consider buying a hard disk for your programs and a CD-ROM player.

- d. Do I need to archive large databases or keep an accounting trail? _____

Consider buying a hard disk for your programs and a WORM drive.

3. What kind of hard drive do I need?

- a. Do I have a free drive bay? (Y/N) _____
- b. Do I have a free expansion slot? (Y/N) _____
- c. Is my power supply at least 135 watts? _____

If "a" and "c" are yes, get an internal drive. If "a" is yes and "c" is no, get an internal drive and a new power supply.

If "a" is no and "b" and "c" are yes, consider a hard card.

If "a" is no and either "b" or "c" is no, consider an external drive.

QUESTIONS TO ASK YOUR DEALER

1. Hard Drive Characteristics:

- 1. Size when formatted _____
- 2. Average access time _____
- 3. Encoding format: MFM or RLL _____
- 4. Type of interface _____
- 5. Power requirements _____

You need to match these drive characteristics to your drive controller and your computer. Choose a size based on your answers above.

If your computer is:

- XT-class, get a 65ms drive
- AT-class, get a 40ms drive (or better)
- 386-class, get a 28ms drive (or better)

If you want to use your floppy controller, get an MFM drive. Otherwise, get the kind of controller that your drive prefers. Match your interface to your controller. Should draw no more than 50 watts.

- 6. Plated surface (Y/N) _____
- 7. Self-parking heads (Y/N) _____

Desirable characteristics.

- 8. Interleave factor _____

Should be adjustable to your computer.

2. Service/Warranty:

- a. Will you guarantee this drive/controller combinatin will work in my computer, or my money back? _____
- b. How much will you charge to install the drive/controller? _____
- c. How long a warranty do you provide? _____

3. Price:

- a. How much does the drive cost? _____
- b. How much does the controller cost? (if needed) _____
- c. How much do cables cost? _____
- d. How much does a new power supply cost? (if needed) _____
- e. How much does installation cost? _____

TOTAL: _____

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User Groups

Learning 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; no one is 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 Kaypro Online — 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.

Kaypro Online — (619) 259-4437

WORDPERFECT 5.0: A NEW STANDARD

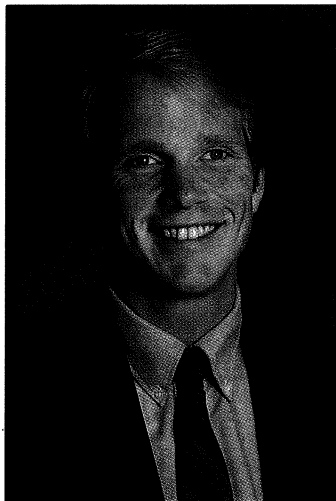
Okay, I admit it. I'm no loyalist. When it comes to productivity I am a shameless opportunist. If you show me a piece of software that lets me work faster and better, no matter what I've been using, I'll switch to the new product. WordPerfect 5.0 from WordPerfect Corporation is such a product. It sets a new standard in word processing. To better understand WordPerfect 5.0, let's take a quick look at its history.

THE KING IS DEAD, LONG LIVE THE KING

From 1979 to 1984, the most popular word processing software was WordStar from MicroPro International. WordStar was a powerhouse in its time because it offered features never before seen: onscreen formatting of text, simultaneous printing and editing, context-sensitive help, and the ability to customize the program to an incredible degree.

In November 1982, a Utah-based software manufacturer called SSI Incorporated released the IBM PC version of its word processing software, WordPerfect. (Other versions were available for different computer systems.) WordPerfect competed directly with WordStar. The newcomer's power, coupled with SSI's policy of unlimited, toll-free technical support, caused sales to take off almost immediately. At the same time, MicroPro did not upgrade WordStar, choosing to concentrate on WordStar 2000 instead. That was a mistake, the results of which were written in red ink. Within two years WordPerfect was out-selling all of MicroPro's products. Since 1985 it has never been off the top ten list in software sales. WordPerfect proved so popular that in 1986 SSI changed its name to WordPerfect Corporation to reflect its commitment to its flagship product.

The first version of WordPerfect I examined was 4.1. I found it to be powerful, but burdened with endless menus and very dependent on documentation. A few months later I glanced at version 4.2, and while there were some improvements, they were not enough to make me give up WordStar. Then in July 1988, WordPerfect Corporation released WordPerfect 5.0. Now WordPerfect's menus are no longer a burden since they provide access to word



processing features I'd only dreamed of.

FEATURES AND PERFORMANCE

WordPerfect is quite easy to install. When you unwrap the software package, you find a sheaf of papers labeled "Installation Help." After you follow those instructions, WordPerfect is copied to your hard disk or floppies in moments.

The primary editing screen for WordPerfect is blank except for a status line at the bottom, which tells you the page and line number the cursor is on. This is a very "clean" interface; there are no moving bar menus to get in the way, no exploding windows. The screen is like a blank canvas, which I like.

The editing commands are fairly easy to learn. Ctrl-left arrow and Ctrl-right arrow move the cursor left one word and right one word, respectively. The plus and minus keys on the numeric keypad scroll you through the document a screen at a time, while PgUp and PgDn move you page by page. You can delete words, sentences, or entire pages. You can also "undo" your last three deletions.

The power of WordPerfect is available through a series of menus, which are accessed via the function keys in conjunction with the Ctrl, Alt, and Shift keys. Some of the function keys act directly on text (F6 starts and stops boldface, for example), but for the most part they bring up menus, which in turn bring up more menus. This structure is intimidating at first, but once

BY MARSHALL L. MOSELEY

you realize that the functions within the menus are logically connected, memorizing the commands becomes much easier.

To help speed you through the menu system, WordPerfect provides the most powerful macro facility I've ever seen in a word processor. You can assign any series of characters to any other series of characters. WordPerfect has an editor that lets you customize macros using any of more than 40 commands. You can build complex macro structures using these commands, which are in fact a pseudo-programming language for macros. There are sophisticated commands like ON ERROR, which executes a specified instruction should an error occur. Also included are the logical operators AND, OR, and IF, along with true memory variables and the operators to add and subtract them.

To further simplify the creation of complex documents, WordPerfect has style sheets. A style sheet contains margins, tab settings, formatting codes, and similar text control features. Once you implement a specific style, the text you are working on adheres to it.

WordPerfect also has Master documents, which are small files containing codes that invoke subdocuments. An example would be the table of contents for a book, which might include as subdocuments all the chapters it lists. (WordPerfect lets you generate tables of contents and indexes.)

The program will allow you to move through text, designating marked portions

of it for a list or a table. Once the data is marked, a table or list can be generated in moments. If you need to manipulate a list of items, WordPerfect features a powerful sort facility that sorts paragraphs, lines, or Merge records.

Merge is WordPerfect's version of Mail-Merge. It allows you to personalize mass mailings using data files and documents that act as templates. Merge has codes that allow for interactive input and the insertion of the time and date into merged documents. Some codes display messages on screen, while others execute macros and insert specific files into documents. WordPerfect's merging facility isn't quite as powerful as WordStar's (few are), but it is very powerful indeed.

The most impressive feature of WordPerfect 5.0 is graphics integration. From anywhere inside a document, you can tell the program to include a graph, chart, or table. A box will immediately materialize onscreen, taking up the space that the figure will occupy. Text flows around the box, thus appearing onscreen exactly as it will appear on paper. Because the graph appears only as a box, you can include graphs in your documents even if you don't have a graphics adapter.

If you do have a graphics adapter, however, WordPerfect allows you to edit any graph you include. You can invert, scale, or size the figure. A WordPerfect graphic image will print on any graphics printer for which the program has a printer driver. The image can be printed in draft, medium, or high-resolution modes.

WordPerfect's graphic feature requires graphics files stored in a unique format invented by WordPerfect Corporation. This upsets me slightly because the last thing the PC world needs is another graphics "standard." On the other hand, WordPerfect does not market it as such, and it does provide a conversion program that translates almost any other type of graphics file into the WordPerfect format.

I consider WordPerfect's graphics to be a milestone in word processing software; for the first time graphics can be seamlessly incorporated into text, and the results are high-quality, professional documents.

There are many things I haven't covered here—newspaper-style columns and split

screen editing, to name just two. WordPerfect does so many things so well that this entire column wouldn't be enough to describe its features.

*The most
impressive feature
of WordPerfect 5.0
is graphics
integration.*

With all that power, I expected WordPerfect 5.0 to perform sluggishly. It doesn't. Because it is written in low-level assembly language, version 5.0 retains all the speed of previous versions. It isn't often that you find powerful software that performs with such agility.

DOCUMENTATION AND SUPPORT

Like previous WordPerfect documentation, the WordPerfect 5.0 manual is strong on reference and weak on teaching. The book is divided into four sections: Getting Started, Reference, Appendix, and Glossary/Index.

Getting Started is a 26-page tutorial that quickly gets the complete novice up and running with WordPerfect. It tells the user how to install the program and covers the rudiments of program operation. By itself this section would be too skimpy; its only purpose is to get the new user's feet wet. But WordPerfect also provides a very good tutorial program that gets the novice swimming in deeper waters.

The reference section, which is laid out alphabetically, is the heart of the manual. Every program option is listed and explained in detail. The clear, concise descriptions are backed up by sensible examples and illustrations. The text strikes just the right balance, neither babying readers with simplistic instructions nor overwhelming them with "computerese." Most of what I've learned about this program I absorbed by working through the reference section.

The Appendix contains documentation on WordPerfect's graphics and text conversion programs, the advanced use of macros, and various utility programs. Each of these sections is clear and informative.

The Glossary is only three pages long and is filled with oversimplified, unclear explanations of basic computer terms. WordPerfect should either get rid of the glossary, or do the job right by expanding it and making it an enlightening section of the book.

The index, on the other hand, is complete and informative. It makes good use of subheadings and includes some cross references indicating links that might not be readily apparent, such as "Title" under "Math." (Columns of numbers that are being summed sometimes need a title above them.)

With the exception of the Glossary I found WordPerfect 5.0's documentation to be of a very high caliber, among the best in the software industry.

As for technical support, WordPerfect Corporation can't be beat. It provides a toll-free number that is listed clearly in manual. Any registered owner can call during standard business hours. I called and got through immediately, and my problems were handled quickly and efficiently by knowledgeable personnel.

CONCLUSION

Give the folks from Utah a giant gold star. They have pushed word processing software forward a generation, and I've switched from WordStar to WordPerfect 5.0. (Sorry, MicroPro).

WordPerfect 5.0 provides good design, a multitude of modern features, fast operation, good documentation, and unparalleled customer support. And at \$495 it's equitably priced. If you are thinking of buying a new word processor, WordPerfect 5.0 is a very good choice. ■

QUICK REFERENCE SUMMARY

Product: WordPerfect 5.0
Manufacturer: WordPerfect Corporation.
1555 North Technology Way
Orem, Utah 84057
Phone: (801) 225-5000
Sugg. List Price: \$495
Hotline Number: 750-54

A LOOK AT THREE POCKET MODEMS

In the '70s, the Eagles sang about "life in the fast lane"—try to do it all, they said, and you lose control. But in the '80s, corporate America seems bent on proving that you *can* do it all.

Today you can live in the fast lane and get your work done at the same time—if you have the necessary high-tech, portable gadgetry: battery-operated fax machines, laptop computers, cellular phones, cellular modems, and remote controlled TVs.

Perhaps the ultimate "fast-lane" machine is the Cadillac Trump Edition (named for mega-millionaire Donald Trump). It includes remote controlled TV and VCR, three cellular phones, portable fax, paper shredder, and even a garbage disposal.

I find this appalling. Not because the price of the Cadillac is that of a mid-size home in Nebraska, but because it isn't equipped with a laptop computer with a cellular modem. If I'm going to shell out three times my annual salary for a car, I want it *all*.

Now, back to reality.

If you're the typical *PROFILES* reader, you're a small businessperson, academic, or working writer; you're not in the market for a Trump Edition Cadillac. But this doesn't mean you have any less need for portability—it's just more likely to be limited to a laptop computer and modem.

As laptops become more popular they're undoubtedly going to see their share of hotel rooms, and they'll need some kind of telecommunications capability.

If you're like me, you've discovered that hauling your stand-alone modem to a hotel room in Cleveland or Boise isn't remarkably convenient. There's got to be a better way. And there is: the "pocket modem."

A PERFECT FIT

Pocket modems take up scarcely more room than a pack of cigarettes, and they can be used with any computer that has an RS-232 port.

The ads claim that these down-sized modems give you all the telecommunications capability of your regular modem, which, by comparison, is the size of a 1932 Hudson. The ads are peppered with the wit of Madison Avenue copywriters and photography straight from the pages of *Vogue*. But do these modems work? Yes—though



BY BROCK N. MEEKS

some are better than others. In this column I'll look at three of the better-known pocket modems: Migent, Parrot, and Worldport.

Pocket modems offer you an alternative to internal modems, which means that if you have a slot in your laptop, you can save it for other things. And for those using the venerable Tandy Model 101s and 200s, these modems free you from the tyranny Tandy's built-in 300-bit per-second (bps) modem.

All the modems examined below respond to the Hayes "AT" command set. This assures compatibility with the majority of communications software on the market.

POINTS FOR STYLE

The best-known pocket modem is from Migent, Inc., which is billed as a "state-of-the-art information machine that looks like one." In this age of sleek lines and fast figures, the Migent's Corvette-red plastic case looks to have been designed by a graduate of Pasadena's famed Art Center College of Design.

Although Migent has done its PR homework, the modem itself falls short of the promises. This modem turns out to be the largest of the lot. It also has the fewest features.

My tests of the Migent got erratic results—not reassuring in a modem mainly used in the field.

When used on noisy telephone lines the Migent would summarily drop carrier—

sometimes. When I asked Migent marketing director John Pocaro about this, he could only say: "I have reports that say the modem is susceptible to noise, and others that say the modem works fine on noisy lines; so it depends on where you test the modem." Comforting, no?

The Migent is also devoid of status lights, those tiny LEDs that flash on and off to tell you exactly what's happening with your data transmission. (The lights flash when data is sent and received, stay lit when a carrier is detected, and offer a kind of built-in diagnostic check.) Most external modem users I know swear by these status lights.

In an attempt to overcome the lack of status lights, Migent is now shipping a software program with the modem that puts a graphic representation of the status lights on your monitor—but only if you are working on an IBM or compatible. Model 100/200 users are out of luck.

The modem is powered by a nine-volt battery or AC adapter. (The AC adapter is now shipped with modem; early versions of the modem had the adapter listed as an option.) One nice feature is that the modem sounds an alarm through the computer's speaker when the nine-volt battery is low. This is more of a survival feature than a luxury; a low-power battery can wreak havoc on your data transmission, much like a noisy telephone line will.

The modem has no provision for use with acoustic modem cups (more on this

later.) Also, the modem is based on the Bell standard and doesn't work well when trying to connect with overseas modems.

At \$159 the Migent is adequate, but it's more flashy than functional. Pocaro hinted at some extensive upgrades "in the next three months," but did not give details.

POCKET PARROT

This modem from Novation gets high marks for its engineering. It's about the same size and weight as an ordinary audio cassette. Unlike the other modems examined here, the Parrot uses neither battery power nor a wall outlet; it draws all the power it needs from your computer's RS-232 port.

External modem users will appreciate two distinct features of the Parrot: status lights and a speaker. The four red LEDs indicate when the modem is ready, off-hook, connected to a carrier, and transmitting (or receiving). The speaker is a meek-sounding device, but it is a speaker nonetheless. I like speakers—in addition to status lights—because you can hear whether your call goes through or whether the number you're calling is busy.

For all its technological innovation, the Parrot is the most cumbersome to hook up. Although the Migent and Worldport modems connect directly to the RS-232 port, the Parrot has no serial connector. In place of the serial connector there is modular plug similar to the one on your phone. This connector runs to a serial adapter that, in turn, must be connected to your computer. For those of you who dislike fooling around with cables, this is a definite drawback. The Parrot is also devoid of an adapter allowing the use of an acoustic coupler.

I used the Parrot on a desktop IBM, a Toshiba T1000, and my model 200. The Parrot worked fine with several different communications programs. It also performed well with the Model 200's built-in communications program. But the modem was also susceptible to noisy lines. Any amount of noise on the line caused the Parrot to drop carrier.

Despite the cabling hassle, the Parrot is a bargain at only \$119.

WORLD CLASS

Touchbase Designs has two pocket mod-

ems: the Worldport 1200 (\$199) and the Worldport 2400 (\$399). These modems work at 300/1200 bps and 300/1200/2400 bps, respectively. Both are upgraded designs of earlier pocket modems put out by Touchbase. The experience shows.

Each modem is equipped with a serial connector. When ordering you simply specify male or female connector. The choice of connectors enables you to connect the modem directly to the RS-232 port, regardless of the type on your computer.

The Worldport modems have no speakers, but they do have LED status lights, including one that warns of a low battery. The modems are powered by a nine-volt battery that provides about ten hours of continuous use. The modems shut off automatically when you start and stop using them. They are also compatible with AC adapters.

One nice touch is that these modems have an adapter that allows you to use acoustic couplers. This comes in handy if you happen to be stuck in a hotel room without a modular phone jack (or if you like to telecommute via phone booth). Such a feature might seem frivolous at first, but it's indispensable overseas, where you need the flexibility of an acoustic modem to fit the odd-size handsets found throughout the world. (Like many things, handset size is anything but standardized.) And the adapter works just fine when using either Worldport modem in conjunction with your acoustic couplers. This is quite a treat for anyone used to only 300 baud performance from acoustic couplers.

These modems performed well with all the communications software I tried. In addition, the Worldport modems are compatible with both Bell and CCITT modems. (Most of the world, with the exception of North America, uses the CCITT standard, so CCITT compatibility allows you to connect with computers overseas—no doubt this is where the name "worldport" came from.)

Of all the modems tested, the two from Worldport performed the best under noisy telephone line conditions. Although the noise disturbed the data communications (as it will on almost every modem) the Worldport didn't drop carrier.

QUICK REFERENCE SUMMARY

Product: Migent modem
Manufacturer: Migent Inc.
P.O. Box 6065
Incline Village, Nevada 89450
Phone: (702) 832-3700
Sugg. Retail Price: \$159
Hotline Number: 753-54

Product: Parrot modem
Manufacturer: Novation, Inc.
21345 Lassen St.
Chatsworth, CA 91311
Phone: (818) 998-5060
Sugg. Retail Price: \$119
Hotline Number: 754-54

Product: Worldport modems
Manufacturer: Touchbase Designs
169 Laurel Ave.
Northport, N.Y. 11768 **Phone:** (516) 261-0423.
Sugg. Retail Prices: Worldport 1200, \$199,
Worldport 2400, \$399
Hotline Number: 755-54



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A STEP IN THE RIGHT DIRECTION?

Last month I suggested that developers of word processors and outliners have been ignoring tools for thinking tasks like organizing and categorizing in favor of tools for clerical tasks like formatting and printing. I also described my "ultimate" writer's program, a general-purpose tool for anyone who works with ideas in the form of written words. This dream program would integrate outlining and word processing with a free-form text database, communications, and electronic mail.

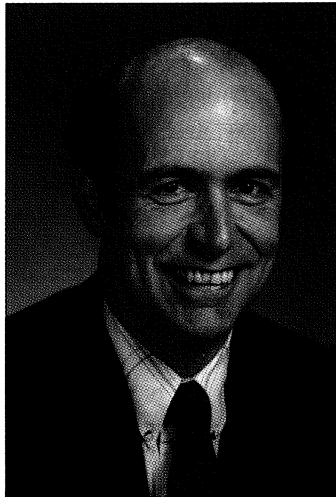
Well, not two days after I finished that column, I received a review copy of GrandView, a new outlining program from Symantec/Living Videotext. Living Videotext practically invented the genre of outliners when it introduced ThinkTank, first on the old Apple II, then on MS-DOS and other computers. Though ThinkTank and its memory-resident cousin, Ready!, have been quite successful in the MS-DOS world, I was never happy with either one, mainly because of restrictions they placed on the way I could work. (See *PROFILES*, July and August, 1986, for a review of ThinkTank, Ready!, and other outline processors.)

GrandView, however, is a different animal, programmed by John Friend, creator of PC-Outline, the popular shareware outliner. GrandView not only eliminates the problems that bothered me in ThinkTank and Ready! (and in PC-Outline) but also adds a batch of new features aimed at helping you organize (*not* just print) information. Could this package, arriving so providentially on my doorstep, be the program I've been looking for?

No. GrandView didn't turn out to be my dream program, but it *is* a major step in the right direction and an excellent program. I'm not *satisfied* with it, but right now it's my favorite writing and organizing tool, and that's saying a lot.

GRANDVIEW THE OUTLINER

The heart of GrandView is an excellent outliner with good word processing power. In place of ThinkTank's Lotus-style command line, GrandView uses a more modern interface, with menus that drop down from the top of the screen—similar to PC Outline, but organized more logically. You



GAIL GOODENOW

BY TED SILVEIRA

can select commands from the menus either by using the arrow keys to highlight the command you want or by typing the first letter of the command. For the most common commands, you can also use keyboard and function key shortcuts (Alt-S to save a file, Alt-Q to quit, and so forth). For many movement and editing commands, GrandView also lets you use WordStar-style keyboard commands, if you want.

*The
heart of Grandview
is an excellent
outliner with good
word processing
power.*

In addition, GrandView lets you to work with a mouse if you have one. Unlike most MS-DOS programs, in which the mouse functions are clumsy and seem to have been added as an afterthought, GrandView does a good (though not perfect) job of making the mouse a useful tool for editing and manipulating an outline. I'm not a mouse fanatic—many things are easier to

do from the keyboard—but when properly implemented, the mouse does make some jobs much easier. I find, for example, that I can mark a block of text more quickly with the mouse than with keyboard commands. On the other hand, I can execute a save or quit command with keyboard shortcuts more quickly than with the mouse. (It's a pity that the mouse is used so badly in many MS-DOS programs that support it, because it unfairly prejudices many users against the little beast.)

GrandView has the usual outlining commands plus a few new ones. Along with the standard commands for creating, editing, and moving headlines and sub-headlines, GrandView also retains ThinkTank commands such as Clone and Hoist. With Clone, you can create exact duplicates (clones) of any entry—when you modify any one of the clones, all the rest will automatically be modified in the same way. With Hoist, you can temporarily isolate one part of your outline so that you can concentrate on it exclusively and then return to the full outline when you're done.

Unlike many other outliners, GrandView can mark-and-gather—you can mark individual headlines in widely separated parts of the outline and then gather or move them all to one spot with a single command. GrandView also now has a prioritize command that lets you quickly sort a list of headlines into priority order.

But the big news, as far as I'm concerned, is that GrandView has vastly improved

word processing and has broken away from the ThinkTank philosophy of single-line headlines. In ThinkTank, a headline can be only one line long. If you have more to say than will fit on one line (as I usually do), you have to open a separate "document" window to write in. This extra step means not only that you have to break your train of thought at the end of the first line—something I hate to do—but also that you can't see both your outline and its attached documents at the same time, a major weakness. I've always found this split between "headline" and "document" to be particularly senseless and aggravating.

Fortunately, GrandView dispenses with this artificial division. You can now make a headline as long as you want (up to 64K). If you keep typing at the end of the first line, GrandView simply wraps to the next line, like any good word processor. If you want to create a document separate from but attached to the headline, you can. If you want to hide the documents and see only the outline, you can. If you want to hide the outline and work only on a document, you can. And if you want to see both the outline and any attached documents at the same time, you can do that, too. It's about time.

*In Grandview,
the split
between headline
and document is gone.
It's about
time.*

There are some other new features. GrandView has a built-in macro function so that you can automate commands or attach a series of commands to a single keystroke—useful for creating new functions that the programmer forgot. And GrandView also allows you to name headlines and then perform some functions using those names—jump to a specific named headline; move, copy, or clone the current headline to a named headline.

Using this last feature and the macro function, for example, I can create a version of the binsort command that GrandView lacks but that I've become addicted to (from using MaxThink, Thoughtline, and Kamas, all of which have it).

GRANDVIEW THE PERSONAL INFORMATION MANAGER?

Unless you've been asleep for the last six months, you've probably heard about a new kind of program called a "personal information manager" (PIM). No one's exactly sure what a personal information manager does, but it sounds great, so software publishers are now attaching the label to their latest products (sometimes combining it with "hypertext," just to let you know the program's extra-hot). Lotus Agenda, IZE, GrandView, Tornado Notes, DayFlo Tracker, and others are all being lumped in this category by their publishers and by the media, even though they don't always have a lot in common.

Briefly, a personal information manager is supposed to be a tool for making sense out of the chaos of daily life, something that will let you store all those little notes you used to write on scraps of paper and then find the right note when you need it. A personal information manager should not only store and retrieve these bits of information but also sort them, organize them, and help you massage them into new relationships.

One of the buzzwords attached to this new form of software is "view"—a good personal information manager is supposed to offer you different "views" of your information. Some of the products lumped in the category are free-form text databases, others include calendars and appointment books, and still others, like GrandView, are based on outliners.

The extra wrinkle that makes GrandView a candidate for this new class of software is its newest and most interesting feature, the Category View. Along with the normal outline structure of headlines and sub-headlines, you can create a series of categories in a GrandView outline. If you were using GrandView to manage a project, for example, you might create categories like Date Due, Person Responsible, Priority, and so forth. Once you've es-

tablished the categories, you can then select a headline and attach assignments for one or more of the categories. For one particular headline, for example, the Date Due might be January 1989, the Person Responsible might be Gwyn, and the Priority might be High. Other headlines could also have assignments within each category or have no assignments at all.

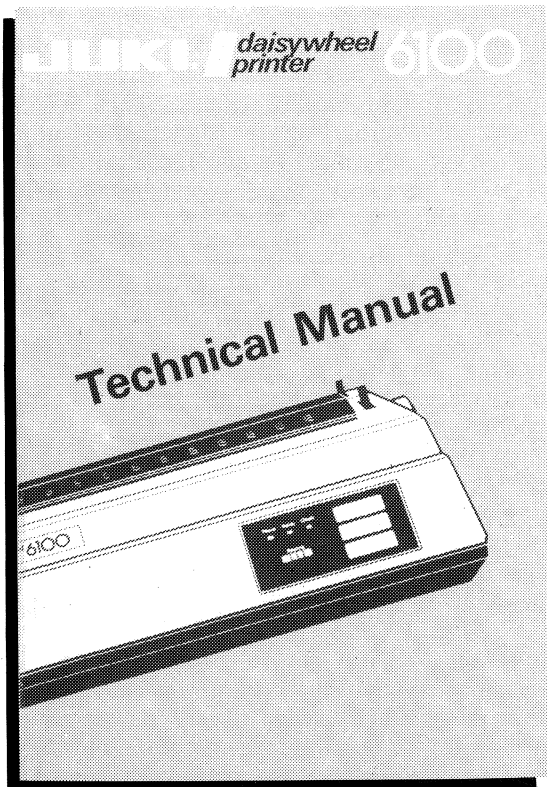
*Grandview's
Category View is a great
idea—it
lets you look at
information in different
ways.*

Once you've given assignments to various headlines, you can switch to GrandView's Category View, a separate display from the normal outline display. From the Category View display, you can see all the outline entries that have a particular assignment within a category (all the entries assigned High in the Priority category, for example). You can quickly shift to view different assignments or different categories, and you can sort all the headlines in a category according to their assignments (only the Category View display is sorted, not your original outline).

Categories are a great idea for an outliner because they let you look at your information in several different ways without having to rearrange the outline itself. Unfortunately, GrandView doesn't take this feature far enough. You can't, for example, take the obvious step of combining categories to view all the headlines that have a Priority of High and a Due Date of January 1989. That one omission alone is enough to keep GrandView from being a true personal information manager as far as I'm concerned. And, unfortunately, GrandView doesn't offer anything else that would lead me to class it as a personal information manager rather than simply as an outliner. It can't even dial a telephone

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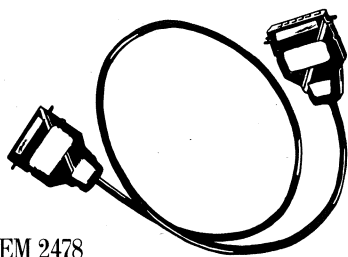
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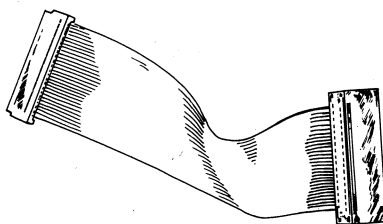


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number stored in a headline as its older sibling Ready! can. (Why not?).

So, as an outliner, GrandView is smooth and sophisticated, but as a personal information manager, it's crude and limited, at best. On the whole, though, I like GrandView and have great hopes for its future. Despite the fact that it falls far short of my dream program, it has a very good set basic features and a good "philosophy" (i.e., it seems to be developing in the right direction, unlike many other writing programs). If Symantec continues to push GrandView in its present direction and resists the temptation to turn it into a "desktop presentation" or other printer-oriented program, then a few versions down the road it might come very close to being my writer's dream program.

Don't take these brief opinions as final, though—they're based only on a very short acquaintance with GrandView (just about two weeks, in fact). GrandView is a sophisticated program that takes some time to learn. And, like most new programs, it has some minor bugs, quirks, and awkward spots. For example, GrandView has several commands for inserting new headlines, one of which is Ctrl-Enter. If you press Ctrl-Enter while in a headline that has no sub-headlines, GrandView will create a new headline at the same level. But, if you press Ctrl-Enter while in a headline that does have sub-headlines, GrandView will create a new *sub*-headline of the current headline. I *hate* it when programs try to outsmart me like that—they should do what I tell them, not what they "think" I want to do. (Fortunately, it's possible to avoid this command altogether.)

So, if you're addicted to outliners, as I am, you'll probably love GrandView. If you're not so sure it's the program for you, check back in six months after I've logged a few hundred hours with it. Then I'll tell you what I *really* think. ■

QUICK REFERENCE SUMMARY

Product: Grandview
Manufacturer: Symantec Corporation
Living Videotext division
117 Easy Street
Mountain View, CA 94043
Phone: (415) 964-6300
Sugg. Retail Price: \$295
Hotline Number: 752-54

Despite its many virtues, WordStar isn't the most suitable tool for a lot of chores. There are times when you just need to make a few changes to a short file. Or you're writing source code for BASIC, assembler, dBASE, or some other programming language. Or you just want to make a note or two.

In those cases, it is cumbersome to load WordStar. WordStar has lots of bells and whistles, which are a necessity for text that has to be precisely formatted—resumes, business letters, manuscripts, etc. But if what you're working on doesn't need all that formatting power, you might want to look into two public-domain text editors, VDE and KP-EDIT.

Both follow the fundamental WordStar commands fairly closely, especially when you're moving the cursor around the file, so you don't have to learn a new command structure. Generally, you'll feel right at home, although neither of these editors has a "no-file" menu. To print a file, for instance, you don't save it and go back to the menu; you give the command while the file is on the screen. You can fire up either program and just start writing; you won't have to name the file until you save it.

These editors are small, and they hold the entire file in memory while they're working on it. So the biggest file you can work on is not determined by disk space, as in WordStar's case, but by how much free memory your machine has. Typically, this will be in the neighborhood of 50K, or about 18 single-spaced typewritten pages.

The trade-off for that limitation on file size is speed; both VDE and KP-EDIT will startle you with their speed in comparison to WordStar. To go from the start to the end of a 52-kilobyte file with either of these takes about a second; WordStar 4 takes 12 seconds on a hard disk, and 41 seconds on a floppy.

KP-EDIT. KP-EDIT is tiny; the COM file is only 6K. It is designed for Kaypro CP/M machines with graphics (the 1, 2x, 4-'84, and 10). A companion program bundled with it (E.COM) works with non-graphic Kaypros, like the Kaypro II. Other than some inverse video displays, they appeared identical.

The maximum file size is going to vary

TWO FAST TEXT EDITORS

BY ED QUILLEN

with your configuration, since it is determined by available memory. On my test machine (a Kaypro 10 with the Advent Turbo ROM), the biggest size was 55,467 characters. You always know how much room you have left; the other information on the status line tells you the name of the file you're editing, the line and column numbers, and whether the insert is on or off.

As in WordStar, a ^J brings up help screens; you shouldn't have any trouble finding your way around.

KP-EDIT doesn't have much in the way of print formatting. You can use DDT to install a printer initialization string, and while you're in there, you can tell it how many lines to print on a page. But that's about the size of it.

*KP-EDIT
produces
straight ASCII files,
which makes it
good for writing
programs.*

KP-EDIT produces straight ASCII files, which makes it good for writing program code. It's also a programmer's editor in that it doesn't have word-wrap. You have to push <RETUTN> when you've decided to end a line; it won't do that for you.

KP-EDIT supports most block operations (move, copy, delete, write to file), but I found it annoying that KP-EDIT doesn't show you where blocks start and end. KP-EDIT will not handle a file in a different user area, although that isn't really a

problem if you are working with floppies. The other major annoyance was that when you reach the program's file size limit, you're not warned. The machine locks up, and you have to reboot.

But if you're using a floppy-disk system, and you want a utility text editor to keep on most disks, the way you keep SWEEP or WASH handy, KP-EDIT should be just the ticket. It may not be that sophisticated, but it's small, fast, convenient, and running it is almost second nature if you're used to WordStar. The instructions that come with it are only a page long, but that's about all you need; the help screens and some WordStar familiarity take care of the rest.

VDE. VDE may have the longest history of any public-domain text editor for desktop computers. It started in 1982 as VDO, a fast editor that took full advantage of the Osborne's memory-mapped video. VDE appeared in 1984, and in 1986, it was adapted to run on just about any CP/M machine, no matter how it handled video.

The latest version, 2.66, was released in June 1988, and Eric Meyer, the author, says it will be the last CP/M version. The bugs are fixed, it works well, and he's going to devote his attention to an MS-DOS shareware version of VDE. (The CP/M version isn't shareware in that there's no "suggested registration fee," but Meyer gladly accepts donations.)

VDE is fast and capable; it does more than KP-EDIT, but it also takes more disk space, 16K as opposed to 6K. However, it will edit as big a file as KP-EDIT, because Meyer uses some compression techniques on the file in memory. Its commands are generally the same as Wordstar's, although for Kaypro machines, thanks to some terminal differences, where WordStar wants a ^K, VDE will want an ESC—for instance, you would use ESC S, not ^KS, to save the file you're working on.

VDE stores files as either straight ASCII

or in WordStar format. It doesn't use dot commands for print formatting, but it supports bold, double strike, underlining and italics (^B, ^D, ^S, and ^Y), as well as the custom print controls (^Q, ^W, ^E, and ^R). You specify page length, tab stops, and margins when you install VDE with its separate installation program.

*VDE offers
some sophisticated
features, including
a macro feature
similar to
Shorthand.*

The installation is fairly simple; you work through menus, including one for terminals, until you find what's appropriate ("Kaypro II/IV" or Kaypro "2/4/10"). Installing the printer means providing hex codes; if you ever installed a printer for WordStar 2.26, you'll find the process familiar.

One nice feature is that you can specify a default way to store files (such as WordStar format, with the high bit set where soft returns are possible), and then specify that files with certain extensions, such as "BAS" or "ASM" be automatically loaded in the non-document mode, so that they'll be saved as straight ASCII. There are two ASCII modes; "N" should be used for programming, and "A" has word-wrap and the like, so it's good for word processing.

VDE offers some fairly sophisticated features. It supports macros, similar to the Shorthand feature in WordStar 4, and it does windows. You can't have two files open at once, but you can show part of the file on the screen while you're working on a different part, which is a blessing for both writers and programmers.

VDE knows about user areas, which makes it quite useful on hard disks. Its manual runs to 18 pages, with another nine pages in the installation guide, and there's

a quick-reference card.

Because VDE is versatile and fast, it might be the only word-processor you'll need, especially if you haven't upgraded from WordStar 3.31 to WordStar 4.0. The WordStar companion programs, like "The Word Plus," seemed to work just as well with VDE as they do with WordStar.

To see just how fast these two editors were in comparison to WordStar, I ran a few speed tests. Given the frailties of stop-watches and human reaction time, these

speed readings (the times are in seconds) aren't the epitome of accuracy, but they should give you a basis for comparison (see box below).

VDE and KP-Edit are widely available, and your users' group library may well have them. They're also in the CP/M roundtable on the GENie network (which seems to have more CP/M material than CompuServe). They're stored as VDE266.LBR (File Number 6231) and KP-EDIT2.LBR (File Number 1730), and they

(With program and file on hard disk)			
	WS4	VDE	KPEdit
Load 52K file from prompt	008.2	10.6	07.0
Save 52K file (^KS)			
From start	000.2	09.9	10.7
From middle	025.4	10.1	10.9
From end	014.2	10.0	11.2
Go from start to end (^QC)	012.3	01.2	01.3
Go from end to start (^QR)	014.9	00.9	01.2
Find unique string near end	031.5	01.3	06.2
(With program on hard disk, file on floppy)			
	WS4	VDE	KPEdit
Load 52K file from prompt	010.6	26.0	13.8
Save 52K file (^KS)			
From start	117.0	32.0	19.3
From middle	072.0	32.0	19.8
From end	032.0	32.0	20.3
Go from start to end (^QC)	041.3	01.2	01.3
Go from end to start (^QR)	045.2	01.0	01.0
Find unique string near end	061.0	01.4	06.2

are also on the Kaypro ROS. You'll need a library utility, like NULU15, to extract the separate files. VDE's document files have been "crunched," so you also need UNCR to expand them after they've been extracted.

*If you
can't find a local
CP/M users' group
you need
FOG.*

A HOME FOR ORPHANS

Even my isolated little town has an active users' group, but almost all groups these days focus on something besides CP/M.

Don't despair, though, because there's an *international* users' group, FOG, that has the same concerns you do. It started as the "First Osborne Group" and has expanded to serve about 17,000 users of all sorts of computers. But FOG hasn't lost its CP/M roots; it publishes a monthly newsletter, "Foghorn," which is packed with tips, tricks, fixes, patches, and techniques for CP/M systems and popular CP/M software, especially WordStar. It also maintains a huge library of public-domain CP/M software, from which you can order disks.

If you can't find a local CP/M users' group, you need FOG. And you'll save some money if you hurry. Dues go up to \$30 a year on Jan. 1, 1989. They're now \$25 a year (\$24 if you don't use a credit card). You'll get the newsletter, as well as access to FOG's library, bulletin board, and hotline for technical questions.

Here are the particulars:

FOG
P.O. Box 3474
Daly City CA 94015
Telephone: 415-755-2000.

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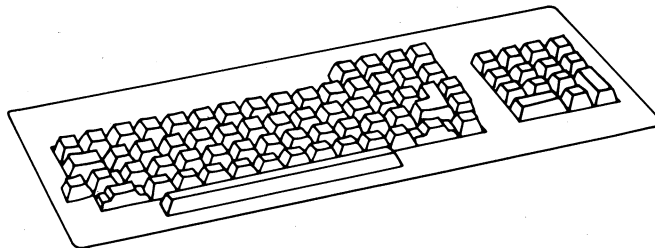
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This is one of the most difficult reviews I've ever had to write. On the one hand, I want to tell you to run out and buy Borland's Sprint: The Professional Processor. After all, it's lightning fast, chock-a-block with features, and an absolute steal at a nickel shy of \$200.

On the other hand, Sprint has one drawback so overwhelming, so out of step with the times, that the program may never find more than a niche market. In this world where WYSIWYG (what you see is what you get) is king, what Sprint shows on screen bears only a passing resemblance to what it will print out.

Page breaks normally aren't indicated at all, lines wrap onscreen at positions completely unrelated to where they will wrap on paper, and formatting commands, the display of which cannot be suppressed, always clutter your workspace.

Sprint is an upgraded, repackaged version of Final Word II, a word processor sold by a company called FW Corporation (formerly Mark of the Unicorn). Final Word, in turn, is a direct descendant of Perfect Writer, a non-WYSIWYG CP/M program.

Perhaps Borland should have taken a lesson from Kaypro's history: for a short time, Kaypro bundled both Perfect Writer and WordStar with its CP/M computers. Even though PW was arguably a more powerful program (it had, for instance, unerase, multiple editing windows, and automatic file saving long before WordStar offered such niceties), most Kaypro users opted for WordStar because they knew that if they got something to look right on screen it would print out properly.

With Perfect Writer (and Final Word and Sprint), what you see on screen is a mess of formatting instructions that you have to mentally interpret as you go along. If you want a numbered list, for instance, you select "Begin Numbered" from a menu. The full text of that command appears in your text in inverse video, pushing what you've typed off to the right; the numbers aren't added until print time.

Now, there are some Kaypro users who did stick with Perfect Writer. For them, Sprint may well be the MS-DOS word processor of choice. They will feel right at home with Sprint's @Verbatim and

SPRINT: FAST AND POWERFUL, BUT LIMITED FORMATTING

BY ROBERT J. SAWYER

@AppendixSection commands, its use of swap files to continuously write work in progress to disk, its approach to block moving, and so on.

EDITING COMMANDS RESEMBLE WORDSTAR'S

What Perfect Writer users won't find familiar is the basic cursor movement commands. To provide consistency with other Borland products, including SideKick, SideKick Plus, and the editors in the Turbo family of programming languages, Sprint uses commands that are largely the same as those found in WordStar Professional Release 4.

ecute any command that the program is capable of.

Sprint comes with ready-made alternative user interfaces that mimic EMACS, Final Word II, SideKick, WordStar 4.0, WordPerfect 4.2, and Microsoft Word 4.0. You just pick the one you want from a pop-up menu.

EMACS is the mainframe editor upon which Perfect Writer was modeled. Those familiar with PW will find Sprint's clone a comfortable choice. It uses the familiar ^B to move back a character, Esc-< to jump to the beginning of the document, ^S to begin a forward search, Esc-H to mark a paragraph as a block, and so on.

AN IMPRESSIVE IMITATION

As for the WordStar interface, it's an impressive imitation, right down to such details as putting the thesaurus on Alt1. Almost all WordStar commands are duplicated, including the ^K 0-9 place markers. However, this interface is really meant for those for whom WordStar is already second nature. Instead of organizing menu commands into logical groups, as real WordStar does, Sprint's version just lists them alphabetically by command letter. Very little help is provided. For instance, ^QA to begin a find-and-replace brings up a list of possible option characters—G, U, N, B, W, and ?—but no reminder of what they stand for.

You can also define your own user interface from scratch. If you just want to change the command associated with a particular function, press <return> while that function is highlighted on a menu and type a new Control, Alt, or function key combination.

Those who like to get under the hood of their programs can use Sprint's C-like high-level programming language to create completely new word processing functions, such as commands to transpose sentences or capitalize a word. This isn't a task for the faint of heart, though. To give you a taste of what's involved, here's what

*Sprint
has a completely
user-definable
command structure,
good news for PW
die-hards.*

You'll find the famous cursor diamond, ^V to toggle insert, ^QS and ^QD to go to the beginning and end of a line, ^QR and ^QC to go to the top and bottom of a file, and even such arcana as ^QT to delete everything up to the next character typed and ^Q? to show how many characters there are between the beginning of the file and the cursor position.

I can hear the cry of the PW die-hards now: "But I liked the old Perfect Writer commands!" Not to worry. Borland believes in different keystrokes for different folks. Sprint has a completely user-definable command structure: you can make any key or combination of keys ex-

the code to define a WordStar-style beginning block marker looks like:

```
BlockBegin :
  if (inbuff Marknumber 11)
    if after Marknumber 11 {
      setmark
      swap Marknumber 11
      set marknumber 10
      tomark
    }
    else (set Marknumber 10 ShowBlock)
      else (set marknumber 10 set mark-
        number 11)
```

Whew! (*Ed. note—The last else statement was broken into two lines to accommodate magazine column widths.*)

*Tinkerers
can use Sprint's
programming language
to create new
word processing
functions.*

SPRINT'S NATIVE INTERFACE

After a day of using the mock-WordStar, I decided to graduate to Sprint's own native interface. As I mentioned earlier, it already supports almost all WordStar commands directly (although the place markers have inexplicably been moved from ^K to AltM), plus it gives you access to features that aren't available through the WordStar interface, because they have no WS equivalent.

Sprint's native interface uses pop-up menus. Pressing <F10> brings up the main menu, a box in the top right corner of the screen. It lists the available submenus: File, Edit, Insert, Typestyle, Style, Layout, Print, Windows, Utilities, Customize, and Quit. Alternatively, you can go directly to any of these submenus by holding down the Alt key and pressing the first letter of the name of the one you want. Most sub-

menus have their own sub-submenus.

Shortcut keys for many of the common functions are available. For instance, to insert a ruler line into the text you can either work your way down the menu structure by typing <F10>, selecting Layout, then Ruler, then Insert, or you can just issue the shortcut AltR, bypassing the menus. Although they're not listed on the menus, WordStar shortcuts work, too: good old ^OO does the same thing as AltR. You can suppress the display of shortcut keys on menus (others include Ctrl-F2 for save a file and Shift-F4 to close a window) if you prefer a cleaner screen.

Sprint's interface actually comes in two versions, basic and advanced. The basic is a subset of the advanced, leaving the more esoteric functions off the menus so as not to overwhelm a new user. A clever idea.

STATUS LINE INCLUDES CURRENT TIME

At the bottom of the screen, there's an inverse-video status line (which you can turn off if you want). It shows the name of the file you're working on (including drive and path), whether you are in insert or overwrite mode, the current time, what line number you are on, the total number of lines in the file, and the current column number (Sprint supports lines up to a whopping 32,000 columns wide). If the file has changed since the last time you saved it, an asterisk appears in the center of the status line. There is no ruler line display.

Sprint marks blocks the way Microsoft Word does, a style I've always found awkward. You anchor the cursor at one point, then drag it to another point as everything between becomes highlighted. Unlike WordStar, which allows you to mark a block for future reference, you must cut or copy a Sprint block immediately. If you are moving the block, you must paste it at its new location before you erase anything else, or the block will be lost for good. In addition to free-form block marking, Sprint provides commands for marking individual words, lines, sentences, and paragraphs.

Sprint can jump to the end of a large file some 40 times faster than WordStar can and it does searches and replaces 10 times

faster. This editing speed presumably results from not doing any formatting as you work. The trade-off comes at print time: there's an awfully long delay before printing starts while Sprint works out what the document should look like.

What's worse is that Sprint treats your text like source code. If it finds a problem (such as a command to start a function without a paired command to stop it), Sprint flashes an error message on the screen and refuses to print your document. So not only won't Sprint show you what you're document is going to look like while you're editing it, if you've made a formatting mistake, it won't give you a printout so that you can try to track down the problem. This is going to drive corporate computer support people bonkers.

Sprint can take full advantage of PostScript laser printers, but when using my Epson LQ-850 24-pin dot-matrix printer, one of 350 models specifically supported by Sprint, printing slows to a crawl if I'm using proportionally spaced, justified text.

*Sprint
jumps to the end
of a large file
40 times faster than
WordStar.*

AN IMPRESSIVE SUITE OF FEATURES

Sprint's most impressive feature is its ability to have up to six user-sizable editing windows open at once. Beyond that, all the tools included with other full-featured word processors are found here, including file management while editing, line sorting, one of the best box drawing capabilities I've ever seen, parallel and snaking columns (although you won't see them until the document is printed), mail merge, sophisticated macros, footnoting, and a 100,000-word speller and 220,000-word thesaurus (which together look suspiciously like a beefed-up, non-memory-

resident version of Borland's Turbo Lightning).

You can check spelling when you're done, or have the program beep each time you type a word that's not in its dictionary. Unfortunately, though, once the speller has landed on a word it doesn't recognize, you have to press another key to get it to offer suggested corrections—a time-wasting step. Looking up suggestions takes a lot longer than in WordStar, and unlike WordStar 5, no word definitions are available. Also unlike WordStar 5 and WordPerfect, Sprint fails to catch doubled words when doing its proofreading.

Still, Sprint supports some common courtesies that MicroPro somehow still hasn't gotten around to implementing in WordStar, including widow-and-orphan control and a command to set a text element flush with the right margin. Automatic paragraph reform and screen scrolling are almost instantaneous.

Sprint automatically and incrementally saves your work to a special disk file, unobtrusively writing out whatever new material you've created every time you stop typing for three seconds. That way, you lose only a small amount if the power goes off. Your original file isn't overwritten until you manually issue a save command, and, like WordStar, Sprint makes a backup file each time you save.

UNERASE AND SEARCH COMMANDS

Sprint's unerase falls somewhere between WordStar's (bad) and WordPerfect's (excellent). Although Sprint will only let you recall your most recent deletion (WordPerfect can resurrect your last three), it considers a series of words or lines deleted in a row to be one operation, so a simple ^U brings back everything, and, unlike WordStar, there seems to be no limit to the size of deletion you can recall.

Sprint's search-and-replace is the best in the business. It supports ? and * wildcards, and any character but the one specified wildcard, and specified search ranges: looking for 198[1-3,5] will find all references to 1981, 1982, 1983, and 1985.

This program will make the most of whatever hardware you've got. It provides full support for the Hercules Ramfont mode, showing true boldface, italics, su-

perscripts, subscripts, and strikethroughs on screen. It also supports Postscript Printers, allowing you to scale fonts on the fly and insert encapsulated Postscript graphics files; and it supports two- and three-button mice.

Despite this, Sprint actually has modest requirements. It eats up just 220K of free RAM (leaving lots of room for all those memory-resident utilities that Borland also sells, or for briefly popping out to DOS and running another program), works fine on floppy disk, and is as quick as a rabbit even on a V20-based Kaypro PC running at 4.77 MHz.

Sprint provides a file conversion routine for going between the native Sprint format (which is plain ASCII peppered with a few control codes) and pure ASCII, DisplayWrite 4 (which uses IBM's DCA/RFT format), Microsoft Word, MultiMate, MultiMate Advantage, WordPerfect 4.2, WordStar 4.0, and SideKick Plus's Outlook outline formats.

The conversion is actually provided by The Software Bridge, a third-party product also sold as a WordStar add-on under the name Star Exchange and as a WordPerfect add-on under the name Perfect Exchange. Unfortunately, the translator has a bug when converting from WordStar files, putting a hard carriage return at the end of every page.

SOME DRAWBACKS

Although feature-laden, Sprint still does not offer everything. There's no word count facility (although any of the public-domain ASCII word counters should work fine with Sprint files), no math capabilities, and no graphics capability for non-Postscript printers. Sprint's character-based page preview is anemic by today's standards. After whirring your disk drives for several seconds, it will show you line and page breaks, but, unlike WordStar 5 or WordPerfect 5, gives no indication of font sizes or typestyles.

According to Borland ads, the \$199.95 price is an introductory special and the alternative user interfaces are included free for a limited time only. After that, they'll be sold as an add-on package for \$99. Considering that these chameleon command sets are one of Sprint's most attractive fea-

tures, the decision to eventually un-bundle them strikes me as silly.

When Borland raises the base price and demands an extra C-note for the alternative interfaces, Sprint will cost about the same as the established powerhouse word processors. Can it compete head-to-head against Microsoft Word, WordPerfect, WordStar, and WordStar 2000? That depends in part on whether Borland brings its policies on support and upgrades in line with those of other vendors. MicroPro and WordPerfect offer toll-free telephone support; Borland does not.

SuperKey, Borland's keyboard macro program, and Reflex, its database manager, were just as exciting as Sprint now is when they first appeared in 1985. Neither has ever had a major upgrade and they now lag far behind their competition in the features war. Further, after users loyally waited years for a new version of SideKick, Borland had the gall to tell them that SideKick Plus was a new product and did not offer upgrades at all.

WordStar 2000 (in my opinion, the current features leader) should have a new release in about six months, and 1989 should see WordPerfect 6 with a completely graphic editing screen that will set a new standard in WYSIWYG. If Sprint is going to stay competitive, Borland will have to change its upgrade tune.

Despite these misgivings, I would still call Sprint a remarkable product. If you can learn to live with a quirky, non-WYSIWYG display (believe me, I'm trying to), it just might be the word processor you've been waiting for. ■

Toronto writer Robert J. Sawyer has tried a lot of word processors, including Microsoft Word, MultiMate, Perfect Writer, WordPerfect, WordStar 2000 and now Sprint, but he keeps going back to WordStar.

QUICK REFERENCE SUMMARY

Product: Sprint: The Professional Word Processor

Manufacturer: Borland International
4585 Scotts Valley Drive
Scotts Valley, CA 95066

Phone: 438-8400

Sugg. List Price: \$199.95 (introductory special)

Hotline Number: 765-54

NEW PRODUCTS

BY TONY EVANS

The following new product listings are not reviews and should not be considered endorsements. To be considered for publication in this column, press releases should be sent to Tony Evans, "New Products" Editor, c/o *PROFILES* Magazine, 533 Stevens Ave., Solana Beach, CA 92075. Releases must state prices and the operating systems supported by the products. Please include photos if available.

BIBLE QUEST REFERENCE TOOL

Bible Quest, a powerful Bible study tool for MS-DOS computers, presents the King James version of the Bible in a new format. It gives the user instant access to all 789,360 words of the Bible and allows virtually unlimited query capability.

Users can search for text by word, phrase, or reference, and can use logical operators to find specific text phrases within either the Old or New Testaments. The program includes HyperSearch, a special feature that can reference related topics throughout the Bible with easy-to-use commands.

Although it's easy to use, *Bible Quest* is a sophisticated program suitable for clergy and other professionals who use Bible references in their work. It features pull-down menus and pop-up text windows and employs a unique indexing method for quick reference to any part of the Bible. Multiple report formats are available, and reports may be sent to MS-DOS text files, a printer, or a specially designed Word-Perfect shell.

System requirements are 512K RAM, at least 2.1 MB free space on your hard disk, and MS-DOS version 2.1 or later.

\$99. Works with all Kaypro MS-DOS and IBM compatible computers that meet the above specifications. InfoQuest Technologies, P.O. Box 399, Pleasant Grove, UT 84062; (801) 375-8864.

Hotline # 550-54



STANDBY POWER SOURCE

Sola, a unit of General Signal Corporation, is offering a new 1800 VA standby power source (SPS). The unit is intended for general use with a wide variety of computers and augments the company's 330, 450, 800, and 1200 VA models introduced previously.

Designed to provide offline battery/inverter backup power for protection against power failures, this portable, plug-in unit offers greater economy in less critical applications where the clean, continuous power conditioning of an uninterruptible power source (UPS) is not required.

When AC power is present, the system guards against transient AC line interference and noise in frequency ranges of 10 KHz and above. If AC line power fails, the system's lead-acid batteries will provide four minutes of running time at full load, and ten minutes at half load.

\$1,899. All Kaypro computers. *Sola*, 1717 Busse Road, Elk Grove Village, IL 60007; (312) 439-5666.

Hotline # 552-54

ELECTRONIC MAIL SYSTEM

tPOST Central, a new electronic mail system from Coker Electronics, allows businesses to install their own custom electronic mail systems. It is

designed to act as a main company post office for a system of remote computers running PC-*tPOST* V3.0, or any other communications software that supports Xmodem CRC protocol.

tPOST Central and remote stations (*tPosts*) are connected via the public dial-up telephone network with Hayes-compatible modems. Text and binary E-mail files may be delivered between any two *tPosts* for point-to-point delivery, sent to *tPost Central* for storage, or distributed to other *tPosts* using *tPOST Central's* host distribution mailing lists.

All *tPosts* can run unattended 24 hours a day for sending and receiving mail. Companies can even form a global E-mail network by connecting *tPosts* through regional *tPOST* Centrals.

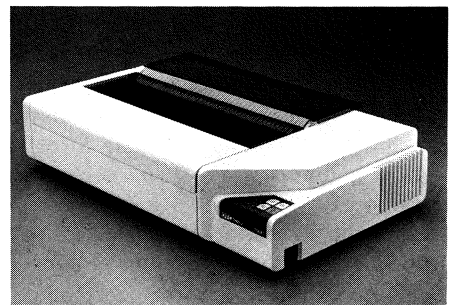
tPOST Central, \$299. Remote PC-*tPost* sites \$129 (single unit), \$99 (two or more). All Kaypro MS-DOS and IBM compatible computers. Coker Electronics, 1430 Lexington Avenue, San Mateo, CA 94402; (415) 573-5515.

Hotline # 553-54

HIGH-SPEED PRINTERS

Output Technology Corporation has added IBM Proprinter emulation to its 800 series printers. Billed as the "world's fastest serial dot-matrix printers," the Output Technology 800 Series boasts speeds in the 850 cps (characters per second) range.

The unique three-head printers are designed for heavy-duty data processing applications and are capable of round-the-clock operation. The



series consists of four 850 cps printers, including a serial-parallel model and a model with networking capability and five built-in serial ports.

\$2,000 (base retail price). All Kaypro computers. Output Technology, East 9922 Montgomery - Suite 6, Spokane, WA 99206; (509) 926-3855.

Hotline # 554-54

COMPUTER SPEECHWRITER

Created by Robert Shelley, a veteran speechwriter, Computer Speechwriter is designed to help you create a memorable speech in minutes. Based on Shelley's popular "Pocket Speechwriter" handbook (Pageant Publishing), the Computer Speechwriter is compatible with every major MS-DOS word processor.

The program includes a numerical general subject and key word index, and a complete speaker's guide packed with a wealth of professional tips on delivery, timing, preparation, and presentation. Material may be extracted, edited, and customized, and provides hundreds of ingredients for any speech.

Material includes opening gambits, introductions, and a wide variety of anecdotes, themes, quips, toasts, and clinchers. The material is adaptable to virtually any subject and offers "fill-in-the-blanks" and "mix-and-match" simplicity.

\$39.95. All Kaypro MS-DOS and IBM compatible computers. Pageant Publishing, P.O. Box 1288, Champlain, NY 12919; (514) 935-8273.

Hotline # 555-54

HARD DISK SMARTS

Everything You Need to Choose and Use Your Hard Disk, by Chris Bosshardt, covers hard disk use for MS-DOS computers. The book can be of value to both beginner and power user and is written in a clear, concise style with a minimum of com-

puter jargon.

Bosshardt explains the differences among various types of hard disks, gives tips for the prospective buyer, and gives simple installation instructions for the new hard disk owner. Easy-to-follow photographs show the correct placement of each component so that even the "all-thumbs" user can be up and running with a minimum of difficulty.

Other helpful tips include organizing files on a hard disk, backing up data, transporting a hard disk-equipped computer, and using software tools such as disk optimizers and utilities.

Chris Bosshardt is the director of Target Communications, a computer consulting firm in Washington, D.C., and has written several instructional books on computer-related topics.

\$21.95. All hard disk-equipped Kaypro MS-DOS and IBM compatible computers. John Wiley & Sons, 605 Third Avenue, New York, NY 10158; (212) 850-6000.

Hotline # 556-54



ARCNET TESTER

Local area network diagnostics can be performed simply and efficiently by a new test module developed by the Systems Products Division of Standard Microsystems Corporation. Small enough to fit in the palm of the hand, the device enables a LAN installer to check individual nodes of a network before and after the installation of each new PC.

The tester is equipped with standard male and female connectors and can be attached to a single Arcnet controller board or to any coax cable section on the network. The device can even be placed between the board and the cable.

Once in place, an LED mounted on the unit signals operational status of the LAN and indicates any problems in the system. The Arcnet tester is the latest in a family of network diagnostic devices developed by the company.

\$75. All Kaypro MS-DOS and IBM compatible computers used in an Arcnet local area network. Standard Microsystems Corporation, 55 Marcus Blvd., Hauppauge, NY 11788; (516) 249-3366.

Hotline # 557-54

COMPUTER TALK

Monologue, a new memory-resident program from CSSL, converts numbers and text into the proper English phonetic sounds using rule-based text-to-phonetics technology. The product represents more than 10 years of cooperative development by software engineers and speech pathologists.

Monologue makes it possible for your computer to clearly "read" any pronounceable combination of letters or numbers out loud through a set of earphones plugged into a special connector. The software permits the choice of a male or female voice, and is compatible with popular MS-DOS software such as Lotus, dBASE, Quattro, and others.

Applications include hands-free proofreading, on-line verbal tutorials, and data entry checking. System requirements are MS-DOS version 2.1 or higher, 256K RAM, and a parallel port.

\$189.95. All Kaypro MS-DOS and IBM compatible computers. CSSI, 909 Electric Avenue, Seal Beach, CA 90740; (213) 493-2471.

Hotline # 558-54

PRODUCT UPDATES

HomeCraft Computer Products has announced Version 2 of Play 'n Learn, its educational program for children 18 months and older. Play 'n Learn is designed to teach very young children the alphabet, colors, shapes, and numbers. HomeCraft Computer Products, Tualatin, OR □ Energraphics, a powerful graphics program, is now available in version 2.2. Improvements include increased chart design options, an interface with Pagemaker and Ventura Publisher, and network capability. Enertronics Research, St. Louis, MO □ FoxBASE+ is now available from Fox Software. The latest version of this versatile database program includes a screen painting utility and applications generator. Fox Software, Perrysburg, OH □ PopDrop, a program designed to remove TSR (terminate-stay-resident) programs from memory without rebooting, is available in version 3.0. The program allows you to selectively delete RAM-resident programs from memory

without rebooting the computer. InfoStructures, Tucson, AZ □ RapidFile, a database program from Ashton-Tate, is available in version 1.2. Advanced features include a larger, 80,000-word spell checker and a thesaurus. The price has also been reduced from \$395 (for the previous version) to \$295. Ashton-Tate, Torrance, CA □ Lotus Manuscript 2.0 includes new features that rival those of many complex desktop publishing programs. Included are automatic line numbering, mathematics functions, and a more powerful spelling checker. Lotus Development, Cambridge, MA □ Microsoft Windows 286 and Windows 386 are now available in version 2.1. The new versions feature an additional 50K of memory, improved performance, and a simpler installation process. A new version of the Windows Software Development Kit will accompany the new release of Windows 286 and Windows 386. ■

MULTI-THREAT PROTECTION

Electronic Specialists has developed a module designed to protect portable computers against several common threats to data integrity. AC power line spikes, electrical noise, modem line spikes, RFI interference, and static electricity can all adversely affect portable computer operation.

The MPS(22)-2 Portable Computer Protection System provides both standard and CEE-22 electrical outlets, a standard RJ-11 phone jack, and a static discharge plate in one compact package. The unit is specially designed for portable computers and is compatible with most standard connectors.

\$189.95. Kaypro portable computers. Electronic Specialists, 171 South Main St., Natick, MA 01760; 1-800-225-4876.

Hotline # 559-54

MUSIC SEQUENCER

Master Tracks Pro 3.0, a music sequencer from Passport Design, provides 64 recording tracks for each sequence and supports two independent MIDI outputs for a total of 32 channels. This is especially useful for multi-timbral synthesizers and samplers, or when transmitting numerous tracks of MIDI data.

Designed for audio/video production, Master Tracks Pro also displays each marker's song position and SMPTE time and allows each marker window to act as a video cue list that can be printed out. The program can also recalculate tempos automatically to maintain video sync when video time is changed.

Master Track Pro 3.0 is available for MS-DOS based computers and is capable of running under Microsoft Windows. The program requires a PC-MIDI interface compatible with the Roland MPU-401.

\$395. All Kaypro MS-DOS and IBM compatible computers with the above-described MIDI interface. Passport Designs, 625 Miramontes St., Half Moon Bay, CA 94019; (415)

726-0280.

Hotline # 561-54

SIGN LANGUAGE COURSEWARE

Sign Language Quiz (SLQ), from Data Assist, is a program for MS-DOS computers that helps teach American Sign Language. The program uses computer graphics to draw life-size pictures of hand gestures for each sign. The student then selects the correct interpretation of the picture from among several choices by entering a letter or number on the keyboard.

SLQ was developed using PC-QUIZZER, a popular computer-based training program also available from Data Assist. Written lessons may also be used for drill and practice or as flashcards or a computer-based quiz. A run-time copy of PC-QUIZZER is included with the SLQ package.

SLQ is available on 5.25- or 3.5-inch diskettes and runs on MS-DOS-compatible computers with CGA, EGA, MCGA, or VGA video adapters

\$35. All Kaypro MS-DOS and IBM compatible computers. Data Assist, 6555 Busch Blvd., Suite 148, Columbus, OH 43229; (614) 847-8348.

Hotline # 562-54

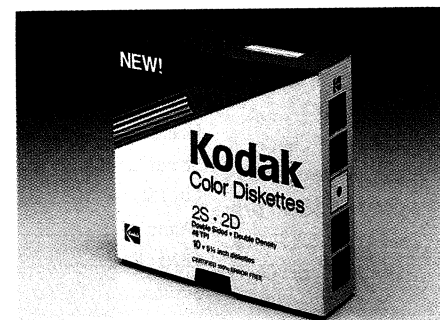
COLOR-CODED DISKETTES

Verbatim offers 5.25-inch diskettes in five different colors: red, yellow, orange, blue, and green. The 48 TPI diskettes are compatible with both MS-DOS and CP/M Kaypro computers.

With these color-coded diskettes, users can manage data and text files more easily. Diskettes are boxed in ten-packs containing two diskettes of each color.

\$15.50 per ten-pack. All Kaypro computers with 5.25-inch diskette drives. Verbatim Eastman Kodak Company, 343 State Street, Rochester, NY 14650; (716) 724-5130.

Hotline # 551-54 ■



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How to Use the Buyer's Hotline

Each month you are exposed to several Kaypro-compatible products, both in advertising and editorial. Trying to figure out which product suits your needs and your pocketbook, is never easy. How many times do you wish you had more information on the products listed or advertised in *PROFILES*? Since we have received so many requests for information about products and companies mentioned in the magazine, we have initiated **The Buyer's Hotline**.

The Buyer's Hotline is a brand new service for *PROFILES* readers. Most reader services such as these require that the reader fill out a tedious "bingo" card and send it in, only to wait three months for a response. This time lag is usually the fault of the publication, not the advertiser. We are attempting to eliminate the time lag so you can get the information you need in a more timely manner. With one toll-free phone call, you will be able to get information on the products in each issue of *PROFILES* that interest you.

Here's how it works: Each product manufacturer or distributor will have a Hotline number. This month the numbers are listed next to the page number in the Advertiser's Index. In future months, the number will also be listed within the ad itself or the Quick Reference Summary at the end of each article. Make a note of which products (and the corresponding Hotline number) you would like more information about. Then simply call our toll-free Buyer's Hotline number (1-800-4KAYPRO). Give the operator the information she requests, and that's it!

Weekly reports of our readers' product information requests will be forwarded to the manufacturers and distributors, so that you can get the information quickly... and be able to make an informed buying decision within your own time frame. We sincerely hope that this service will be of great value to all of our readers.

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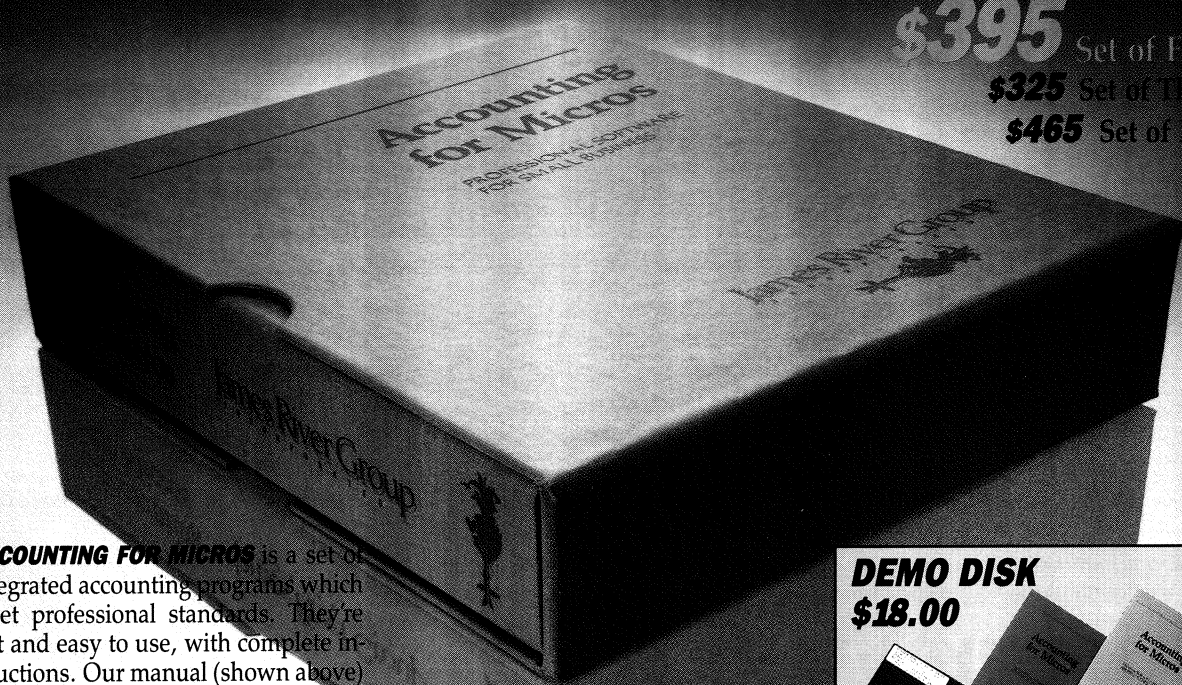
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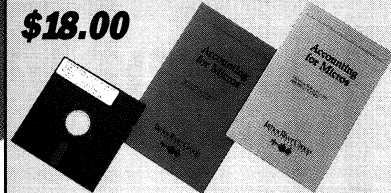
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