

PROFILES

The Magazine for Kaypro Users
September 1986



PROLOG

LISP

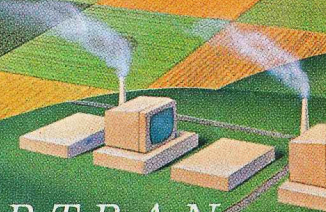
MODULA-2

PASCAL

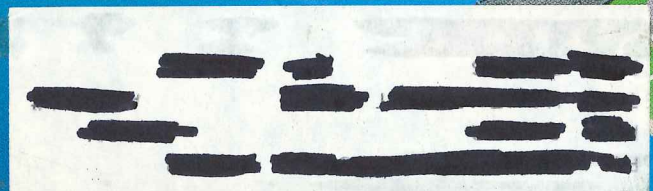
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Hands down the most useful, powerful, fun to use and flashy piece of software I've encountered ... I caught on to it within half an hour of busting the wrapper and went straight to heaven - Paul Estrem

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Thoughtline is, without doubt, the best new CP/M program in years - Robert Sawyer, writer

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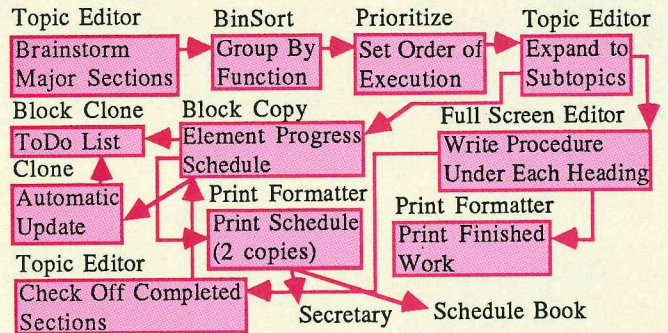
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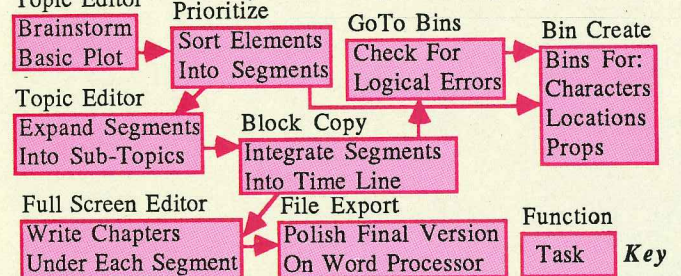
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...by the way, *Thoughtline* is just right - excellent balance in design - Dick Runke

To the basic software I use frequently (WordStar, Supercalc II) I now add without reservation *Thoughtline*, as being equally useful and equally significant - Fred Schultze

...and as for *Thoughtline*, WOW! I bought KAMAS and waded through Adam Trent's obtuse mental gyrations until I was literally dizzy ...I sent for KAMAS's little brother OutThink. Again, another great disappointment. ...then comes *Thoughtline*. Now I can outline my books and articles just as I had hoped to when I bought KAMAS and OutThink. - Dr. Eric Skousen, Writer

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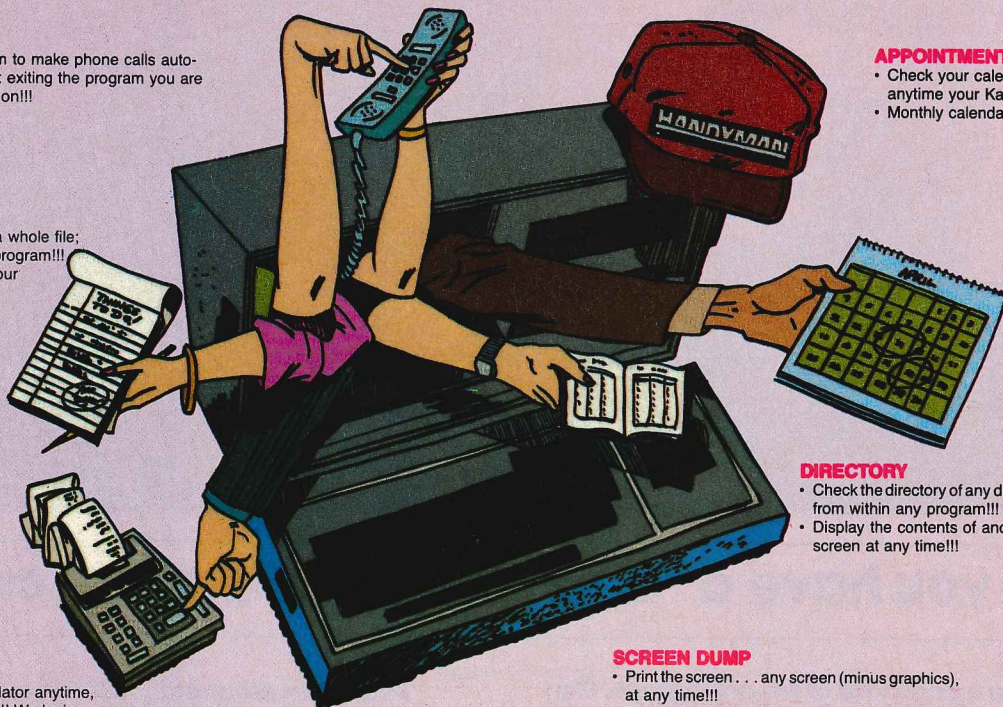
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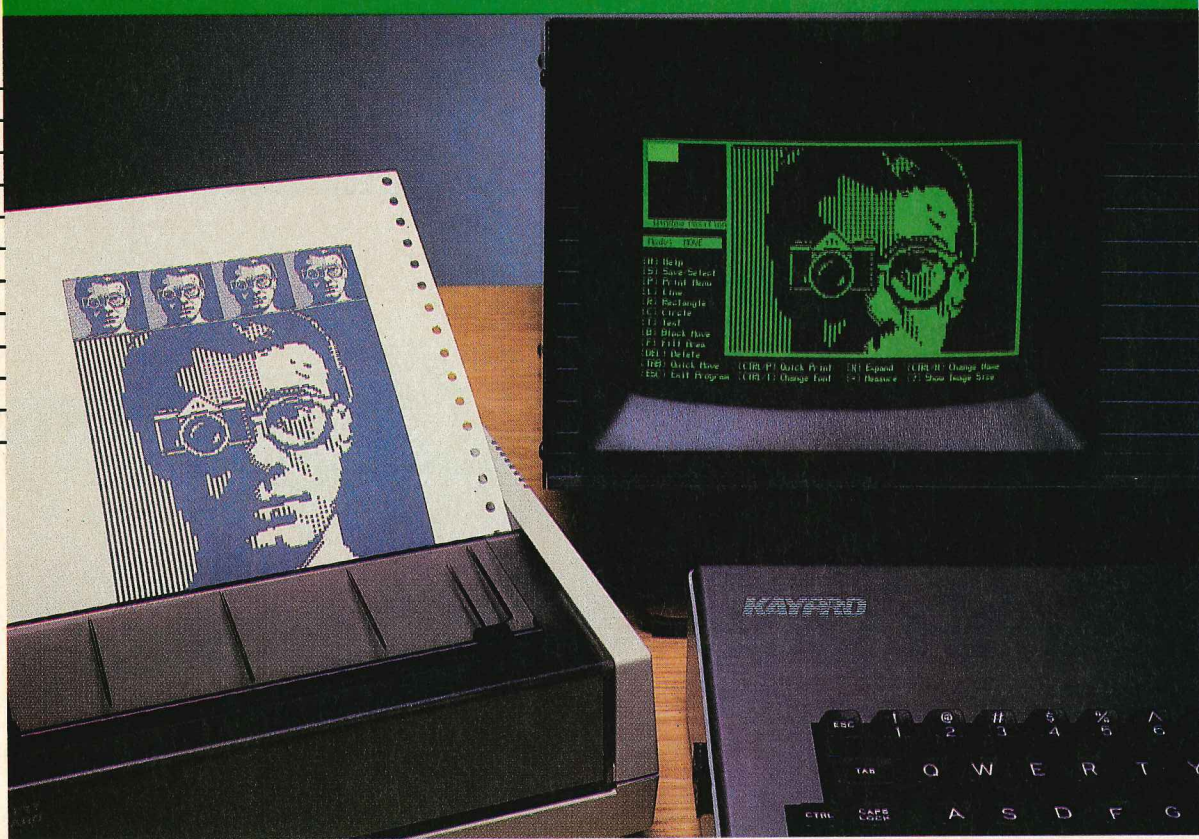
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—Chris Meeks, March '86 Profiles

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PROFILES

The Magazine for Kaypro Users • Volume 4, Number 3 • September 1986

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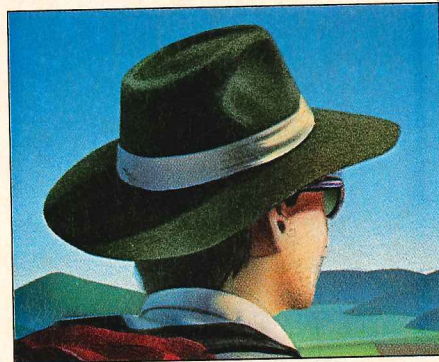
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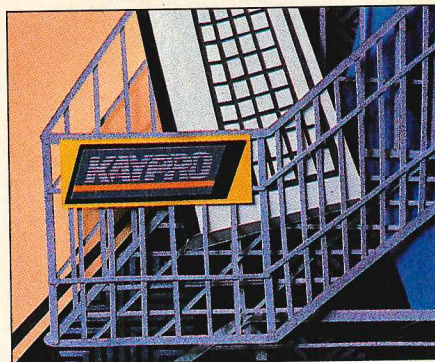
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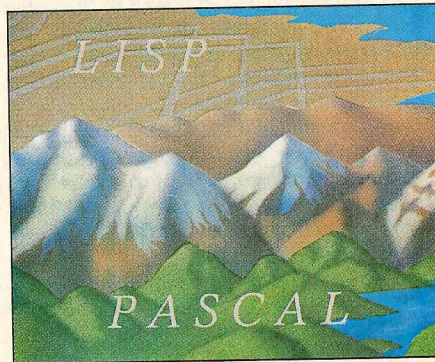
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On the cover:

This issue kicks off PROFILES' series of articles on programming. Artist Greg Martin illustrates the feeling that most beginners have about it — that it's strange and confusing terrain. Our first article will help you get your bearings and decide where you want to go next.

Editors' Notes

With this issue, we're kicking off what we hope will be a popular series of articles on computer programming. We know some of our readers loathe the very idea and will always be content to be "appliance users," but our mail indicates a pretty high level of interest in the topic.

We decided that this series should begin at the beginning with an article explaining just what a programming language is and describing the most widely used languages. Subsequent articles will cover general topics such as program planning, and later articles will be language-specific tutorials. These articles can't take the place of programming texts, but—excuse the overused phrase—they should give you a "boost up the learning curve."

Also in this issue:

- A retailer who needed customized cash registers turned to Kaypros, and he describes how he developed his systems.

- Mutual fund IRAs can be more lucrative than CDs, but they can also be riskier; using a spreadsheet can help ensure that your IRA stays in the black.

- Not everyone is content with the keyboards that come with DOS Kaypros—here's a look at four alternatives.

- For beginners, a disk-full message can be cause for panic, but there are ways to save your file. We'll tell you how.

- Are there potential health hazards in computer use? What to worry about and what not to.

As always, we hope something in our line-up will pique your interest, solve a mystery, or help you out of a jam.

Terian Tyre
Diane Ingalls

About PROFILES

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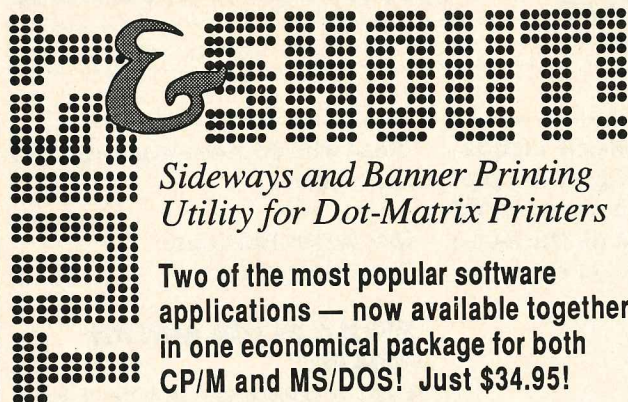
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Letters

Congratulations and thanks

Congratulations on the third anniversary issue and the very handy software and hardware guide.

I have been very pleased with the recent editorial content changes of *PROFILES*. Frankly, I was not going to renew my subscription, but the extensive format and content changes provided me with the kind of information I was seeking and I was happy to renew a few months ago.

My first personal computer, a friendly little Kaypro 1, was purchased in late September 1985 and already has helped me write one book and is about to assist me with a second.

Thanks for your magazine's help!

Donn Pearlman
Skokie, Illinois

MicroTools incompatibility

Roland Wobbe's enthusiastic discussion of MicroTools ("Sophisticating CP/M," May 1986) arrived just as I discovered that this exceptional set of programs is not compatible with CP/M 2.2E used by Plu*Perfect products, Advent's TurboROM, or ZCPR. The MicroTools can be used after a cold boot and changing to a standard CP/M 2.2 operation system.

Cold booting and reloading is a small price for using some of the sophisticated and complete programs that are only available with this set of MicroTools—for example, generating KWIC indexes of ASCII text files or interalphabetizing lists of mixed upper and lower case entries where case distinctions have value and should be retained.

Most of the MicroTools programs provide well-integrated, comprehensive, well-documented, basic computer functions that are much easier to use than an unintegrated group of public domain utilities. Unfortunately, now these MicroTools cannot be used to full advantage with CP/M 2.2E. Plu*Perfect

has previously developed compatible patches enabling other programs to work with their CP/M 2.2E. I hope they will do the same for this remarkable set of powerful, integrated utilities.

George H. Klumpner
Oak Park, Illinois

Magazines: a quick lesson

I am fed up with all the letters you get that say, "I am a left-handed Zambian feminist who uses my Kaypro only for calculating actuarial tables, and there were two articles last month that didn't apply to me, so I'm cancelling my subscription."

Will somebody please explain the magazine industry to these self-centered individuals?

An editor who gets a letter that says, "I read your last issue from cover to cover," doesn't congratulate himself; he looks to see what he did wrong. He doesn't *aim* his magazine at any one individual like that. He puts in something for everyone, and if anyone is completely satisfied, he knows he's cutting some people out. So there *have* to be articles that each of us will skip.

PROFILES has fewer such than any other computer magazine. *PROFILES* is one of the few magazines devoted largely to CP/M and the only one devoted to the Kaypro user. Tell the complainers to send such letters to *BYTE* or *PC [Magazine]* and see how far it gets them. Meanwhile, I subscribe to *PROFILES* because information is available there that you can't get anywhere else, and because some articles—e.g., the one on the WordStar patch that eliminates the need for a printer buffer—saved me enough money to pay for my subscription for the first ten years.

And if that is not convincing, people, let me tell you one other reality in the publishing industry: Editors don't pay any attention to people who don't subscribe, only to

those who do. So stop giving them a hard time.

Rev. Roger Kovaciny
Columbus, Ohio

What can I do with my Kaypro?

I am a computer novice. I have a Kaypro 10 that I have used primarily for my Ph.D. dissertation proposal and the dissertation itself. It takes me hours at the manuals to learn the simplest procedures.

I have saved all my *PROFILES* issues (two years) and I have gone through them in search of things I can do with the Kaypro bundled software, and I didn't come up with much. I probably have a limited computer imagination—I certainly have a limited knowledge of computer software. But I have all this software, and very little idea of what I can do with it.

You and your advertisers seem to be business-oriented, but surely other things can be done with a Kaypro and associated software. To balance a checkbook, must I buy another program? To run basic correlations and cross-tabs, must I buy a statistics package? From reading *PROFILES*, as a novice, I get the impression that for almost everything I do—except with WordStar—I must buy something else. Is that true?

Can you put together an article that tells the non-business users all the things they can do with their bundled Kaypro software?

Bob Dardeane
Hixton, Tennessee

It would be impossible to provide more than a "laundry list" of potential uses of bundled software in the space of a single article, but this might be useful in "Beginner's Luck," and we'll see what we can do.

PROFILES has published articles on specific uses of virtually all the bundled software, includ-

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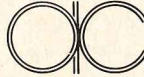
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ing WordStar, CalcStar, Perfect Writer, Perfect Filer, Perfect Calc, dBASE II, and BASIC—please consult the subject index published in the January 1985 issue for details.

If there is a specific task you or other readers would like to accomplish and you want to know whether it's possible to do it with the bundled software, drop us a line. If we think it's feasible and would be of interest to enough readers, we'll try to do an article for you.

Investing in an antique?

Before getting to the meat of this letter, permit me a few prefatory remarks. I have owned a Kaypro 2X for a little over a year, bought locally as part of a package that included the Juki 6100 letter-quality printer.

I was interested, largely, in word processing. With the help of the accompanying software I taught myself WordStar, with The Word Plus, and have also learned DataStar to the extent of my needs. I found a local KUG group and one of its members told me about MEX and I decided to learn it, though I have not used the program to any extent.

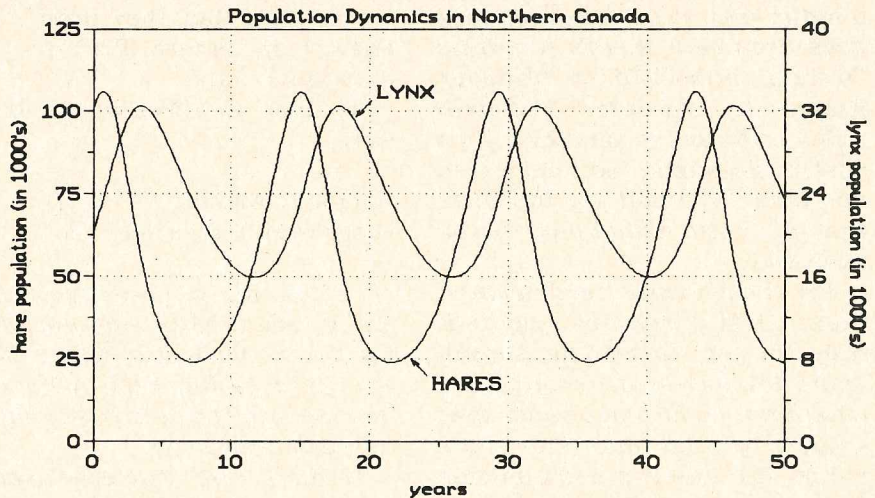
I have learned several helpful public domain programs, acquired partly from my KUG and partly through purchase. I have reconfigured my numeric keypad to turn some multiple-key commands into single-key ones, and have recently purchased Xtrakey and Xscreen. I have somewhat over \$2,000 invested in my equipment, and a lot more than that in sweat and time. But my equipment does the job and does it well and I am happy with it. I did not buy a Kaypro 2X for fun and games.

I recently attended a demonstration of the Apple computer. I was in the company of 15 or 20 adults, mostly teachers, with little or no knowledge of computers.

Most of the Apples in this classroom had color monitors. When

GRAPHICS

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discussing my equipment with another person in the room I volunteered the information that the Apple color screens seemed fuzzy compared with my Kaypro screen, and he referred me to a monochrome machine that still seemed fuzzy. I said so, and I suppose it irked him, for he told me CP/M and, inferentially, my Kaypro, were obsolete. "Cheap," he said, "but obsolete." He was, obviously, trying to crush me, but I assume he also tells his students this, as he did the group I was with.

Naturally, I *would* tend to be crushed if I felt I had spent so much time and money on a machine and method that will soon be seen only in the Smithsonian. Anyone at *PROFILES* have any comment?

William C. Blizzard
Winfield, West Virginia

It's true that much more software is being released for MS-DOS machines than for CP/M, and that if you really need the memory capabilities of a DOS machine it's a better way to go. However, that does not mean there's anything "wrong" with CP/M, or that your Kaypro is "obsolete." The only valid criterion is whether your system does what you need it to do—how can anything that gets the job done satisfactorily be obsolete?

For those whose needs exceed their CP/M machines' capabilities—or for those who simply want the latest electronic toy, whether they need it or not—that fellow's opinion may have some value. But there are thousands like you who have invested considerable time, effort, and money in their CP/M machines, and there's no reason to abandon them as long as they fill the bill.

Request line

I have just received the July 1986 issue of *PROFILES* and would like to offer the following comments.

First, I own a Kaypro II and a 10. Thus, my main interest is in CP/M programs. I find you are adhering to your commitment to continue covering these and look forward to each issue.

Secondly, I noted that your bulletin board will carry the public domain programs mentioned in your magazine. Outstanding! But, how about an article illustrating, by example, how to access the bulletin board and download from it?

Next, "Do It Your Way," by Robert J. Sawyer, has got to be one of the most difficult articles to follow that I've ever read—but on a very useful idea. Do you think it could be made "user friendly" and republished? Or, have the same subject covered by another writer?

Lastly, Thorn EMI prepared and sold an excellent revision of the Perfect series of software. (All right, not everyone thinks so!) But it runs only on the II, 2, IV and 4—not the 10. Do you think they could be prevailed upon to make the slight (?) modifications necessary to eliminate this constraint? I've written to them but they don't even answer my letters. Perhaps you have more clout!

Thanks, and keep up the good work.

Adolph B. Amster
Ridgecrest, California

To respond to your requests, we've asked KUG manager Jim Durkin to write a short article about accessing KUG ROS and downloading from it. Look for it in an upcoming issue.

It does not, however, seem advisable or even possible to publish a simplified version of "Do It Your Way." The material was inherently complex and was intended for advanced users, and the article was labeled as such. We felt this audience would have no trouble following the article just as it was written, and frankly, we hoped less experienced users

would be scared off—they would be asking for trouble if they attempted the modifications.

Finally, we don't have any more influence with Thorn EMI than you do. Our impression is that they have no interest in making the revisions you want.

Where are the people?

Shortly after I booted up my Kaypro 2 and plotzed around in WordStar two years ago, I had a feeling that I was working with a machine that would be the Model T in a few years. The 2 was (and still is) sturdy, does the job, has few frills, and you can't break it.

Getting *PROFILES*, too, was super serendipity. At first it seemed to be written in Technospeak by techies, but soon the language became lucid. Over the two years I've written two novels and two screenplays on a variety of software. (I now work with four different word processors and about a dozen utilities.) I've opened up the 2 to upgrade it. I look forward to *PROFILES* each month, but something's been bothering me.

The letter from Diane McLaughlin in the June issue focused my concern—there aren't enough "people" stories in *PROFILES*. Your writers, especially Ted Silveira, do a commendable job of explaining turbo-super-doooper-whammo add-ons, gizmos that will double or triple the Kaypro's speed and do marvelous things for the operator.

Most of us, however, are happy with the machine's normal speed—it "thinks" faster than we do. Mrs. McLaughlin's point is well taken—to continue paying for *PROFILES*, we need more than an electronic *Popular Mechanics*-type magazine for a specific machine.

Consider: Kaypro doesn't make any more CP/M machines. My model 2'84 is indeed a Model T (I'm gonna start collecting 'em.) Kaypro is in the MS-DOS age. That's fine. I work in MS-DOS, too, but its speed,

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depth and breadth aren't the answer to the world's problems, or even a writer's. I can still write my next novel on my 2, and probably will.

Consider: In two-plus years of reading *PROFILES*, I can't recall a story about Kaypro itself—what the plant looks like, what the research end is working on, how Kaypro fits into the industry, the problems—economic and social—facing the industry. And the people. Sure, the magazine has kept its distance from the company, but so what? Most of us put down our hard-earned money for the product, and we'd like to know what goes on. We're pre-sold.

More on who does what, and how they do it, instead of doing it with 600K RAM and 20 mega-bigga-bytes.

E.C. Norton
Ridgewood, New Jersey

We appreciate your ideas, and we will seriously consider your suggestions. We get many letters like yours asking that we run—or not run—certain types of articles. We'd like to take this opportunity to point out something few readers fully realize, and that is that PROFILES has an unusually diverse audience whose wishes often conflict. Some readers demand that we publish only CP/M articles; others want strictly MS-DOS. Some think the magazine is too technical; others wish it were more so. Some want the sort of "people" articles you request, but others are outraged if we "waste" our editorial space on them.

We strive for balance within each issue and from issue to issue, and our goal is to make sure that, overall, our content reflects what most readers want most of the time.

(By the way, Kaypro does still manufacture a CP/M machine, the Kaypro 2X.)

(continued on page 13)

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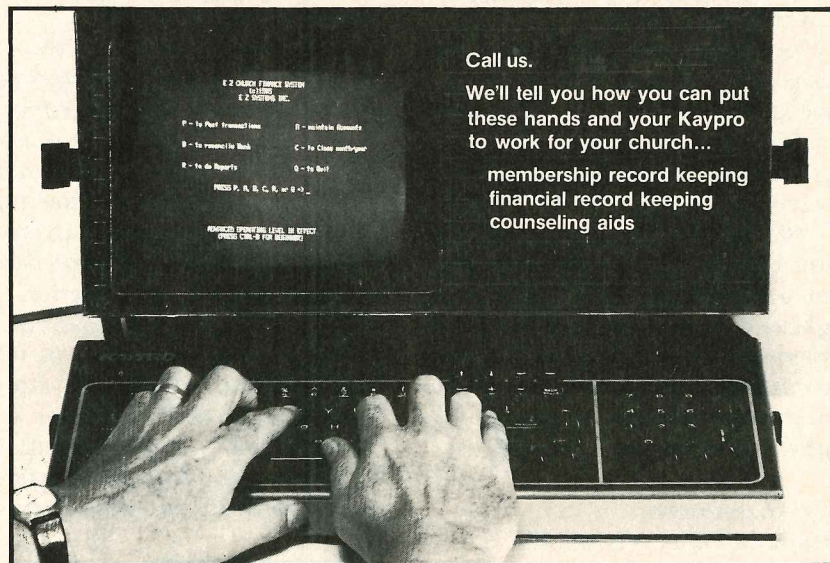
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by Tom Enright

We welcome and read all your letters. Some are of general interest and are printed in the Letters column; others are pleas for technical help. Questions that lend themselves to simple, concise answers are dealt with here, while more advanced topics develop into articles or discussions in the Technical Forum.

Due to the volume of mail we receive, we simply can't respond individually to requests for assistance. If you have a question requiring an immediate reply, you should contact your dealer. You can contact Kaypro Technical Support, but please be aware that they give dealers' calls priority over those from end users. They can be contacted at (619) 481-3920, or write to them at P.O. Box N, Del Mar, CA 92014. Please include a daytime phone number in letters.

Perfect Filer dates

I am the proud and very pleased owner of a Kaypro 4'84 that has been running flawlessly for over two years. I couldn't be happier with the equipment.

There is one problem that will be cropping up in a couple of years. I have an extensive data base on Perfect Filer and it has been performing very well for me. The other day I inadvertently entered "89" instead of "86" when prompted for the date. I received an error message that advised me that "88" is the highest year allowed in Filer. Does this mean that I will have to scrap the data base in another two years, or can it be patched to extend the highest allowed year to 1999?

John G. Johnson
Chippewa Falls, Wisconsin

We published that patch in the October 1985 issue of PROFILES. A file called SETUP (no extension) should be on your Perfect Filer working disk. Address 0715 of

that file contains the maximum allowed year. Use DDT, or any other patching utility, to change the value at that address from 58h (88 decimal) to 63h (99 decimal). This patch lets you use Perfect Filer until the year 2000.

Keyboard input problem

Is there a way to temporarily turn off the keyboard function of repeating a letter as long as the key is held down? I have a number of programs that have children and teen-agers respond by pressing a single letter. However, when multiple letters are entered by accident, and the return key is pushed, errors occur in the program. Some of these programs are commercially produced and use compiled code. Any help with this problem will be appreciated. My computer is a Kaypro 4'83.

Hugh A. Christie
Griffin, Georgia

Unfortunately the auto-repeat function is built into the keyboard and is not part of the BIOS. I'm not aware of any practical way to turn this function off.

The problem you describe should have been anticipated by whoever wrote the programs you are using. That the problem exists in so-called commercial software is surprising, because it indicates amateurish programming. Any software that doesn't include input verification routines, which would alleviate the problem you describe, is not of commercial quality. I suggest that you contact whoever wrote the software and request that they bring the software up to minimum standards without charge.

Disk exchanges

I need the ability to exchange disk files with a computer in another location. The other computer is an Epson QX-10 and mine is a Kaypro 2X. I had thought to use Uniform,

but my dealer tells me that this will not work. Can you help us?

D. W. Dean
Sacramento, California

I suggest running a test case. Format a disk, using Uniform, in Epson format to send to your associate. Also have your associate format a disk to send to you. If he can read your disk and you can read his, then you're in business. (If you don't already have Uniform, your dealer should allow you to make a test disk prior to purchasing the program.)

If Uniform doesn't work for you, try the same test with Compat or Media Master. As a last resort both you and your associate could purchase modems and telecommunicate your files.

WordStar soft hyphens

I have a Kaypro 4'83 that does not have reverse video. WordStar normally displays soft hyphens (printed only at line breaks) in reverse video. The result is that I have difficulty telling the difference between hard hyphens and soft ones. Is there a way to have WordStar display hard hyphens as some other character?

David M. Schwartz
Wallingford, Connecticut

WordStar has a patch point for which character is used to display soft hyphens. If you patch WordStar from within WINSTALL, the label you want is SOFHYC. If you use some other patching utility, the address is 03B8h for 3.0, 03E7h for 3.3, and 03B8h for 3.31 (DOS).

Location SOFHYC tells WordStar what character to display on the screen to indicate a soft hyphen. When selecting a character for this purpose, choose one that you do not normally use in text.

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

Apple software

I am the beneficiary of an accounting software package that meets my needs perfectly. It is entitled "Automated Accounting for Micro-processors." However, it is on a double-sided disk (written in BASIC) for an Apple II Plus. I own a Kaypro II, am a new user, and have limited programming knowledge, but I am an avid learner. Is there any possible way to run this software on my Kaypro?

Janet Robertson
Fayetteville, North Carolina

In a word, no. The disk controller on Apple computers is unlike anything else in the industry, so multi-format programs such as Uniform and Compat would not be able to read the Apple disk. Even if you could read the disk or have it downloaded, it wouldn't do you any good. When BASIC programs are saved on disk they are stored in a compressed, symbolic form to save disk space. Apple BASIC and MBASIC use entirely different symbols to represent BASIC key words. MBASIC cannot read a program written under Apple BASIC. Also, the syntax of MBASIC is different from that of Apple BASIC in several areas.

Your letter doesn't say whether you bought this program or someone gave it to you. If you bought it, take it back to the place you purchased it. If the same program is available for CP/M, buy that version. If, however, someone gave you the program and it is commercial software, both you and the person who gave it to you have violated copyright laws. If that is the case, attempts to convert the program to CP/M only increase your legal liability.

Kaypro 10 light pen

My father bought two Kaypro 10s. He uses one of them at work and the other one at home. One day I saw

the plug in back for a light pen. I haven't seen any ads for light pens in *PROFILES*. What type of light pen should I look for?

Jesse Olsen
Spring Valley, California

I'm sorry, Jesse, but the light pen plug on the Kaypro 10 doesn't work. When the computer was designed, Kaypro had planned to have one, but never found time to finish it.

Home built CD

Thank you for Brock Meeks' story on CD-ROMs in the June issue of *PROFILES*. This new storage medium shows great promise.

One thing Meeks didn't cover, and nobody else writing on the subject has addressed, is whether audio CD drives may be used to read CD-ROM disks. Brock says that "one chip" is not the same, and that output ports differ. My own audio CD player, a Pioneer PD-6010, has an eight-pin output on the back panel labeled "SUBCODE OUT" that the manual says "will be used for outputting subcodes in future audio applications." Pioneer provided no schematic, but I assume this port connects unprocessed output of the laser detector to whatever is plugged in there. I understand that audio CD drives operate at the same speed, sampling rate, etc., as computer specific drives.

Assuming that the right connections can be established and the "one chip" installed, is there any reason why our Kaypro PC couldn't read CD-ROMs off my audio disc drive, saving us \$1,000? Or, to turn the coin over, if we buy a computer CD-ROM drive, can I sell the audio disc player and use the computer drive to play audio discs?

George Androvette
San Francisco, California

No, for two major reasons. To add the "one chip" you would have to

design an entirely new circuit board. You and I have no idea what electronic relationships would have to exist between the new chip and existing ones. Also, a major portion of computer CD drives is the software, system information and device drivers required to interpret the stream of information from the CD-ROM. Creation of this software is not a trivial task, or one suitable for a hobbyist.

Internal modems

HELP! I'm looking for a 1200 baud internal modem to run Mite on my Kaypro 2X. A recent thunderstorm fried my Datasolvers 300 baud modem, and I'd like to upgrade. Datasolvers no longer makes one, and searching through my back issues of *PROFILES* and making a dozen phone calls has brought me to a dead end. Do you know where I might find a compatible 1200 baud internal modem for my 2X?

John Hancock
Elwood, Illinois

Many of the specialty products for Kaypro CP/M machines are no longer available. There was just not enough sales volume for them to stay in business supplying Kaypro-specific products. It may be time to consider buying an external modem that meets your needs.

External modems, unlike their internal brethren, don't care what kind of computer you have. They connect between the phone line and the serial data port on the back of your computer. Most high-quality external modems have an internal speaker and pilot lights so you can tell how your telecommunications session is progressing. If you decide to upgrade or replace your computer system, an external modem can simply be moved to the new computer. Also, external modems cost less than internal ones.

(continued from page 9)

A matter of "small" importance

I have waited a month before writing what I hope will be a very brief letter, for I had truly hoped that an editorial apology would make this unnecessary. But alas, the July issue has arrived and no apology.

What I am referring to, of course, is the opening paragraph of Brock Meeks' column, "Life at 300 Baud," in the June issue. What it does is awaken in me the fears that are still expressed by some of my humanist friends about the disastrous effects the computer may have on general culture. In his column Mr. Meeks begins with remarks attributed to "Dr. Oliver Wendell Holmes, the late Chief Justice of the U.S. Supreme Court," who is described as "a rather small man." The jest which follows may be accurately reported, but nothing else in the story is true.

First, Meeks has obviously confused Dr. Oliver Wendell Holmes, a physician and noted author and wit, with his son of the same name, one of the great Associate Justices of the Court, but *never* Chief Justice. (Incidentally, the correct title is "Chief Justice of the United States," not of the Supreme Court, but I will not press that issue; the error is too common.) Oliver, Jr., then, was not a doctor.

Second, the Justice was not "small" or "diminutive," as alleged. On the contrary, he was an unusually tall man. Had he been small, the remark might well have been made by him, for he, like his father, was a very witty man. Recall, for example, his famous rueful utterance on, at the age of 90, noting a pretty young woman, "Oh, to be 80 again." But he never defended his short stature.

That is all I have to say. I am grateful that my computerphobe friends in the arts and humanities (not many like that anymore) are unlikely to have read that gaffe.

Milton D. Speizman
Ardmore, Pennsylvania

Brock Meeks replies: *You are correct, I did confuse the eminent Dr. Holmes with his son, the former Associate Justice. I was again in error by referring to the son as Chief Justice. However, the rest of the anecdote, as it applies to the elder Holmes, is quite correct. Life and Letters of Oliver Wendell Holmes (2 volumes, 1896) by J.T. Morse is the authoritative biography of Dr. Holmes. In it, Morse says that Holmes stood "five foot three inches wearing substantial boots during his junior year at Harvard," and later, "five foot five (not five foot four as some have pretended)" (Volume 2, page 101).*

Thanks for your interest in the column. I stand corrected.

Keeping it clean

Recently I had some trouble with the disk controller in my Kaypro 4'84. After swapping it with a different disk, I noticed that the chip itself was not bad, but was merely the victim of dirty pins. The physical scraping of the pins during removal and replacement was sufficient to re-establish a good electrical contact.

One week later I had another failure: My computer refused to boot, and no disk I tried would boot it. I removed the cover and eased out the disk controller and the ROM chips so that the pins were not quite out of the sockets, and then reseated them. Just to make sure, I did the same thing to the data cables at the back of the drives, making sure they were well seated. I replaced the cover and have been happily computing ever since.

I think that Kaypro users should be aware that many problems may be solved by just making sure all the machines' connectors are snugly fastened and that simple preventative maintenance, as outlined in the manual, is carried out.

Dan Post
Greensboro, North Carolina

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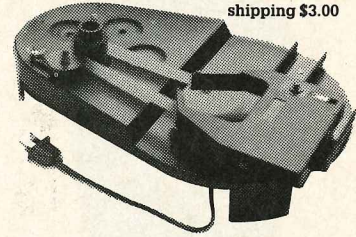
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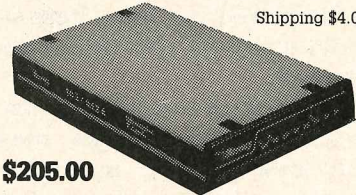
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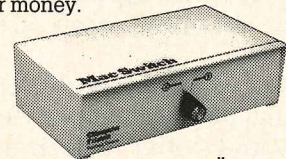


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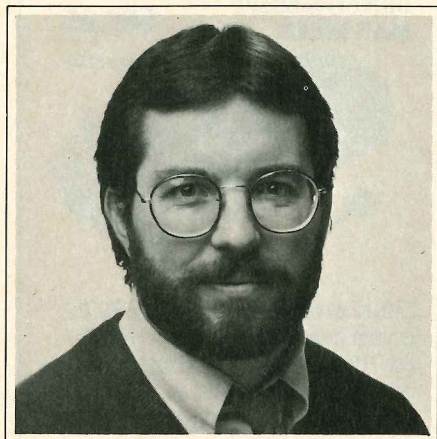
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by Brock N. Meeks

A popular dictum says "Information is power." If that's true, it stands to reason that to wield power, you must have substantial stores of raw information to draw on.

There are, of course, the usual sources: reference books, magazines, newspapers, specialized journals, and even video and cassette tapes. But an online news retrieval system beats them all for efficiency. This column will give you a brief description of the three most popular news retrieval systems.

First, however, I want to explain the differences between these systems and online search services. Then you can decide which might best meet your needs.

News retrieval systems offer full-text newspaper articles, some dating back 15 or more years, and the bigger news systems include popular news magazines, such as *TIME* and *Fortune*. The advantage over hardcopy references is that you have several sources in one central location, all within reach of your carrier tone.

A search service, on the other hand, consists of hundreds of different *bibliographic* data bases compiled from highly specialized

Life at 300 Baud

Online news retrieval systems

publications. (There are a few data bases available on search services that carry full-text articles, but these are the exception.) Searching these services provides you with a detailed bibliography and an abstract, at most. You can, however, special order hardcopy full-text articles from the data base supplier.

In contrast a news retrieval service can provide you with either a bibliography and abstract or the full text.

Also, search services' data base updates lag behind publication dates by at least one month. News retrieval services are updated daily. The type of information you need and how fast you need it will determine which type of service you choose.

Who needs it?

Who would use a news retrieval system? *The Wall Street Journal*, *New York Times*, or *Pawtucket Monitor* is all the news you need, right? Maybe not. Writers and academicians make up the second and third largest groups using Kaypro computers, and if you belong to one of these groups, you know how it is—you always need "that article in the *NY Times* last month about (fill in the blank)." Since last month's paper was probably used to train the new puppy, you're out of luck.

You could go to the library and rummage through piles and piles of newsprint, but you'll probably

spend at least an hour hunting, and your chances of success are less than 50-50. (Those aren't published averages; they're derived from some 15 years of experience rummaging through piles and piles of newsprint.)

You can save yourself a lot of time and effort by searching online for your article.

More than averages

Say the name "Dow Jones" and Wall Street, stock quotes, and mega-dollar deals come to mind. But Dow Jones & Company, Inc., offers much more than a daily stock index. It publishes *The Wall Street Journal*, *The Asian Wall Street Journal*, *The Wall Street Journal/Europe*, and *Barron's*—all this in addition to maintaining domestic and foreign financial wire services. Dow Jones also has two subsidiaries: Richard D. Irwin, Inc., publishes college text books and books for professionals, and Ottaway Newspapers publishes 22 daily newspapers.

Now there's also the *Dow Jones News/Retrieval Service* (DJNS). Through a system DJNS calls its Free-Text Search data base, you can roam at will among thousands of articles dating from June 1979.

Here you will find slightly condensed articles from *The Wall Street Journal*, *Barron's*, and the Dow Jones wire services. Full-text articles from *The Wall Street Jour-*

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nal are available from January 1984 to the present.

And there's more. If you like to watch *Wall Street Week* on the Public Broadcasting Service but seem to miss it too often, you can get a verbatim transcript of the last four shows online. Also, each week the DJNS staff writers summarize the week's most significant economic news and place it in *Weekly Economic Update*.

Free-Text is as close to "free form" searching as you get online. Gone are hand-holding menus and mnemonic commands. Doing a search on DJNS is an adventure—you are "alone" in a vast, invisible online library.

Using the Free-Text Search data base, you can roam among thou- sands of articles.

Each entry in the data base is laid out like a card in a conventional library card catalog. There are six field codes; HL, for example, stands for headline, as it originally appeared in print. DD stands for date, and so on. The last entry on the card is TX, which stands for text.

When entering the Free-Text Search data base you are prompted with a query number, 1: (which is almost as formidable as dialing a strange computer and getting nothing more on your screen than "log-in:").

The "1:" prompt is DJNS's way of asking for a keyword—"wombat," for example. As soon as you type in wombat, DJNS goes to work and finds every article that includes the word wombat. From here you can narrow your search (ring-tailed wombat) or otherwise modify it as you see fit.

When you sign up for DJNS, you get a complete manual that gives step-by-step instructions for finding your way through this electronic labyrinth.

If you'd like to take a closer look

at DJNS, you can write or call them at P.O. Box 300, Princeton, NJ 08543-0300; (800) 257-5114.

Cleopatra should be so lucky

Compared to the other online news services, Nexis, from Mead Data Central, is the Information Age equivalent of the Great Library of Alexandria. This service offers a full-text, everything-but-the-ink, electronic storehouse of news and feature stories. Along with Nexis, which carries strictly news, there is a service for lawyers called Lexis, the most widely used service of its kind in the nation.

Nexis gives you access to more

into an electronic "in box" that you can download daily, weekly, or monthly.

You can reach Nexis at Mead Data Central; (800) 227-4908.

Nose for news

Industry analysts monitor specialized newsletters that give them updates and inside information about their particular fields of interest. These specialized newsletters often alert their readerships to trends well in advance of the popular press.

A system called NewsNet carries hundreds of these specialized publications (and their back issues), each one searchable online.


The NewsNet brochure states: "NewsNet beats the press, sorts the morning mail, shadows your competition, is fast, can save the day and is as basic as your brief case." This PR hype actually isn't too far off the mark.

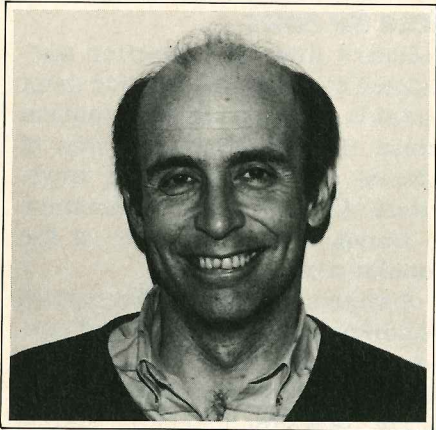
In addition to the newsletters, NewsNet carries reports from the United Press International and Associated Press wire services, as well as PR Newswire, plus Gannett Company's USA Today Update, which combines the news from Gannett's 84 daily and 35 non-daily newspapers.

You can even check out how promptly IBM pays its bills by accessing the TRW Business Profiles, a data base produced from the TRW credit reports.

An extensive clipping service, News Flash, is similar to the one available on Nexis. However, you can monitor News Flash every hour.

Also, you may be able to contribute to NewsNet. If you have a publication with a regular readership and are interested in publishing electronically, you can submit a proposal to NewsNet. NewsNet is always looking for outstanding publications to put online. You are paid royalties on the amount of online time people spend reading your publication.

Contact NewsNet at 945 Haverford Rd., Bryn Mawr, PA 19010; (800) 345-1301. 



by Ted Silveira

Computer books have a bad reputation, and deservedly so. Many, even most, are sheer torture to read, and the fact that they're also expensive—\$16 to \$25 for a 200-page softcover—is just the final insult.

Ideally, we shouldn't need computer books. All commercial hardware and software comes with its own documentation—and who should be better able to show you the ins and outs of a product than its manufacturer? But it's not true, as witness the shelves full of books about WordStar, dBASE II, and other popular programs. These books exist because people need more information than they get in the manuals (or need the same information but presented more clearly).

So it's a pleasure to recommend a couple of computer books that tackle what are usually called technical subjects but in a manner clear enough for the average interested user.

For the adventurous

If you want to move up from simply being a user of CP/M to being a real insider, then the book for you is *CP/M Assembly Language Programming* by Ken Barbier. I know that phrases like "assembly lan-

Flea Market

Books on bytes

guage programming" freeze the blood of most non-programmers, but stick with me for a moment.

In contrast to "high-level" programming languages like BASIC, assembly language is a "low-level" language—the closest thing to machine code, which is the "native language" of your computer. Where BASIC gives you a simple PRINT command that automatically takes care of all the dirty work of displaying a message on the screen, assembly language requires you to give directions to the computer for each little step.

The disadvantages of assembly language are obvious—it's about as far from human language as you can get—but its advantages are great. Assembly language programs are much smaller, much faster, and much more efficient than programs written in high-level languages, and they can work with the intimate details of your computer in a way that other programs can't. And even if you don't want to be a programmer, knowing some assembly language is a tremendous help in patching other programs to suit your needs and in figuring out how to recover from (or avoid altogether) various kinds of crashes and other malfunctions.

In this book, Barbier manages to teach you about programming, assembly language, and the innards of CP/M all at the same time. He does it so well that he makes all three subjects accessible to people who have no qualifica-

tions beyond some experience using CP/M and an interest in learning more than they know now.

First, Barbier gives you some background on CP/M, the main microprocessor chip, and assembly language (hexadecimal numbers, mnemonics, and so forth). Then he gets into the meat of the book, a series of chapters that have you writing short assembly language routines.

Each new chapter introduces you to some new assembly language function, some new advice about programming, and some new information about CP/M. Though each chapter feels complete in itself, setting a manageable task and ending with a program to test the new function, each chapter also builds toward the book's final project—writing a program to copy files from one disk to another. The book is so well thought out that by the time you get to the final chapters, the task of writing the copy program is a simple matter of putting together all the routines you've created in the previous chapters.

Barbier writes very clearly—all computer writers should be so good—and in such a relaxed style that nothing seems more difficult than it really is. Just as impressive is Barbier's skill in teaching—each main chapter is a complete lesson in itself, with enough new things to keep you interested but not so many you get overwhelmed, and yet each also fits neatly into the book's final project.

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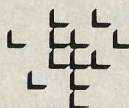
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When I first read Barbier's book, I knew nothing about assembly language and almost nothing about programming (I could follow a BASIC program, sort of). I'm still not a programmer (I don't have the desire or the attention span), but I've patched nearly every program I own, disassembled a small program and fixed its bugs, added assembly language routines to other people's programs, installed operating system modifications like ZCPR3 from scratch, and bailed myself and others out of trouble more times than I can count—based almost entirely on what I learned from *CP/M Assembly Language Programming*.

The fearless tinkerer

Software doesn't require much maintenance. It doesn't wear out with use, and if a program gets damaged, you can make a fresh copy from your master disk. But hardware is different. Though a computer's silicon chips rarely fail, plenty of things can go wrong, and when they do, most of us are left helpless, not able to tell a small problem from a big one.

It doesn't have to be that way. Many small hardware problems that can effectively shut down your computer are fixable by the home tinkerer, and many others are avoidable through routine precautions and maintenance. But how do you learn about these things without getting a degree in electronics?

Part of the answer is *The Plain English Repair and Maintenance Guide for Home Computers* by Henry F. Beechhold. Though this book is generic, rather than specific to the Kaypro, it's useful.

The book starts by reviewing tools and spare parts you'll need and some basic electronics (including specific information on the kinds of parts you'll be dealing with). It then discusses everything from cleaning the computer's insides to making cables to fixing cracked circuit boards to tracking down faulty chips.

Along the way, the book is filled

with sidebars that tell you more about what you're doing and why. The book includes many drawings (better than pictures for this purpose) and has appendices covering hexadecimal and binary numbers, how to solder, how to read component part numbers and color codes, suppliers for various parts and gadgets, books on related subjects, and a glossary.

Best of all, Beechhold, like Barbier, writes very clearly, with a light, relaxed touch. He gives you the proper warnings at the proper places but never makes anything seem more dangerous or more difficult than it really is.

If you're serious about repair and maintenance, you'll also want some Kaypro-specific information. For this, you've got two choices.

First, you can get *Chilton's Guide to Kaypro Repair and Maintenance*, by Gene B. Williams. I just recently got a copy of this book and haven't read it thoroughly yet, but it looks worthwhile for the novice. It's not as clear and friendly (or as

Ken Barbier
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The Plain English Repair and Maintenance Guide for Home Computers

Henry F. Beechhold
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Kaypro Technical Manual

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\$35
(order through Kaypro dealer)

The MS-DOS corner

The program of the month is DPATH30, a public domain gem (by James A. MacGreggor, Jr.) that solves a nagging problem for Word-Star users and others.

When you add a hard disk to an

*If you're serious about
repair and maintenance,
you'll want Kaypro-
specific information.*

wide-ranging) as Beechhold's book, but it's straightforward and has useful Kaypro-specific information, including jumper settings for different disk drives and voltages at various test points. It also has pictures of the actual equipment you'll find inside your Kaypro.

Second, you can get technical manuals published by Kaypro itself. These manuals aren't written as well as Beechhold's or Williams' books, but they're full of technical information, including part numbers and schematic diagrams. For CP/M Kaypros, you want the *Kaypro Technical Manual*, Part # 1484.

CP/M Assembly Language Programming

MS-DOS computer, you run into some new problems. Because the hard disk can hold many files, you now have to worry about running out of space in the directory and organizing the hundreds of files you'll undoubtedly collect. To solve this problem, you set up subdirectories within your main directory (and sub-subdirectories within a subdirectory, and so on), thus limiting the number of files in any one directory and grouping related files together.

The new problem then becomes how to get to the programs and files you want to work with. For programs, MS-DOS provides the PATH command—you set up a search path of subdirectories, and when

you call for a program, MS-DOS will search along the specified path for it. But the MS-DOS PATH command doesn't work for data files or for overlay files that programs like WordStar need. Many MS-DOS programs can handle subdirectories and solve this problem themselves, but others—notably WordStar—can't.

WordStar understands about different drives, so you can have the main program (WS.COM) and its two overlay files (WSOVL1.OVR and WSMGS.OVR) on one disk and your text files on another disk. But it doesn't understand about subdirectories on the same disk.

Suppose you have WordStar and its overlays in directory C:\WS, and you want to edit a letter in directory C:\LTRS. If you log into directory C:\WS, you can run WordStar, but it won't be able to find your letter in directory C:\LTRS. If you log into directory C:\LTRS and use the MS-DOS PATH command to set your program search path for C:\WS, you'll be able to run WS.COM and call up the letter you want, but WS.COM won't be able to find its two overlay files, WSOVL1.OVR and WSMGS.OVR, when it needs them (which is often).

The solution to this final problem in the MS-DOS subdirectory scheme is DPATH30, a program that creates a search path for data files and program overlays just as MS-DOS's PATH command creates a search path for programs.

At the beginning of your work session, you run DPATH30 once (it stays memory-resident after that) and specify a data search path for your data files and overlays. After that, when a program tries to access a file, the current directory is searched first, followed by the other directories along the data path. If there is more than one file with the same name along the path, the first one encountered will be used.

If you add DPATH30 to the WordStar example I gave above, you now have two choices. You can log into the WordStar directory (C:\WS)

and set DPATH30 to let you access the files in the letters directory (C:\LTRS). Or you can log into C:\LTRS and set DPATH30 to help WordStar find its overlay files in directory C:\WS. Either way, WordStar can now take full advantage of your hard disk.

By design, DPATH30 doesn't work with the MS-DOS DEL or REN commands (as the author points out, imagine the problems you'd have if it did!). For the same reasons, it doesn't work with most of the programs that allow you to use MS-DOS wildcards in their file specifications.

DPATH30 has two major options when running. The first allows programs to read but not write to files in other directories. The second allows programs to both read and write to those files. The second option is a powerful but dangerous one, with great potential for inadvertent mangling of files, especially if the path is a complicated one. The author warns against using it unless you're sure you know what's going to happen.

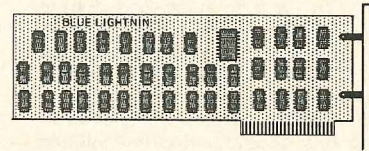
You can also perform other functions while DPATH30 is loaded, such as toggle it on and off (without removing it from memory) and copy the MS-DOS program search path to the DPATH30 path.

I like to play it safe, so with WordStar, for example, I log into the directory that holds the text files I want to work on and then use DPATH30 to assist WS.COM find its overlays (as opposed to using DPATH30 to write to the text file from a different directory). To play even safer, I use a batch file that activates DPATH30, sets its path to the WordStar directory, runs WordStar, and then deactivates DPATH30 when I exit WordStar. That way I avoid surprises later.

If your local users group doesn't have DPATH30, it's available on almost all MS-DOS bulletin boards and on the IBM Software Forum (GO IBMSW) of CompuServe. You can also find it on Jim Durkin's KUG ROS bulletin board at (619) 259-4437. ■

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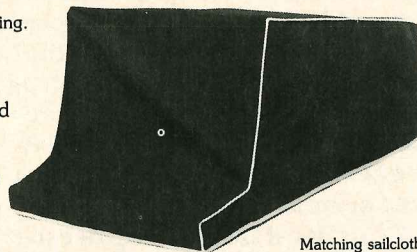


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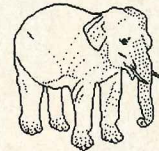
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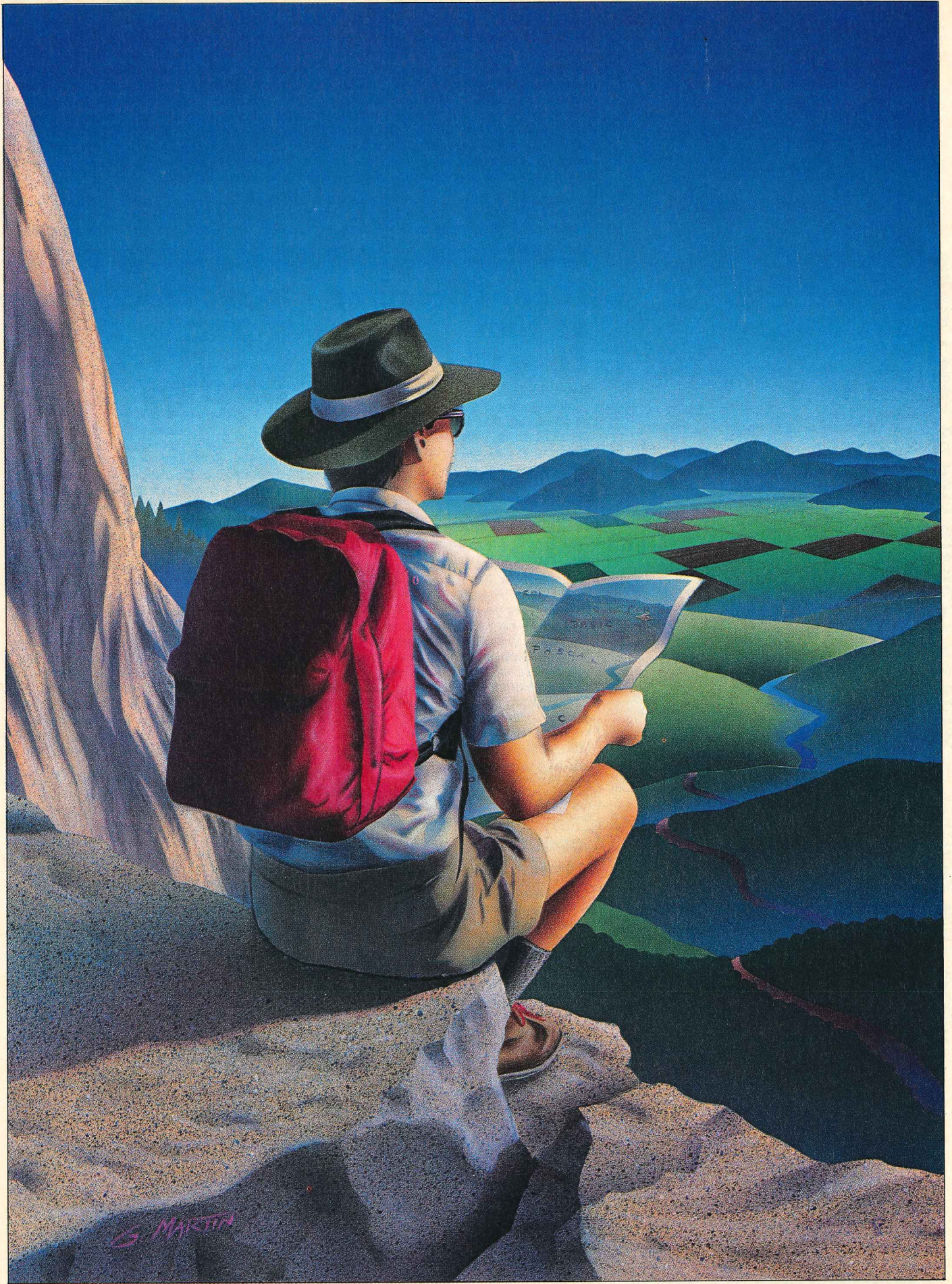
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A Survey of Programming Languages

Getting the lay of the land

by Jerry Houston

(Editor's Note: This is the introductory article in an open-ended series on programming that will appear in PROFILES in coming months. Initially the articles will be aimed at intermediate users interested in learning to program, or who have a little programming experience. The first few will lay the groundwork for what is to come. This month's article is an overview of some of the most widely used languages, and the articles to follow will cover "generic" programming information and program planning.

Programming novices can use these articles to help them select a language for further study and to become familiar with basic terminology and programming practices. Then they should select an introductory text to become more familiar with the language of their choice. [For advice on choosing a text and efficient study, see "Learning Computer Languages," by Marvin Coates, in the February 1986 PROFILES.]

Subsequent articles will be language-specific tutorials designed to demonstrate the characteristics and capabilities of various languages. Each article will be by an author especially qualified to write about the language. This series of articles is meant to evolve, to become what you, the readers, want it to be. Please feel free to let us know how we can make it more meaningful for you.)

Sooner or later almost everyone who owns a computer thinks about learning how to program. Commercial programs are expensive and may not do what you want them to. Even if a program *does* do what you want it to, it may well do it in a way that is cumbersome and difficult to learn. Only by writing the program yourself can you make the computer do *exactly* what you want the way you want it done.

A program is merely a series of instructions, chosen

from among a finite number of possibilities built into the CPU, that tells your computer what to do. Executing these instructions is the equivalent of turning certain switches on or off according to a desired pattern. Programming is the act of writing down these instructions in a form that your computer can understand. A programming language is the format in which you phrase instructions to the computer.

Hundreds of programming languages have been created over the years, and each has characteristics that suit it for particular purposes. Some are excellent for the mathematical manipulations needed by scientists or engineers; others are better suited to the word and number manipulations needed in business. Still others are easy to learn or give you maximum execution speed from your programs. This article is an overview of the popular programming languages and their major characteristics.

Language translators

At the lowest level, your computer only understands one language—the patterns of ones and zeros known as machine language. Each type of computer has its own machine language, which is made up of operation codes ("op codes") specific to its central processor. (Each op code tells the CPU to perform one simple task, such as copying a character from one place to another, adding two numbers, or determining whether one value is larger than another.) All other languages must be translated into machine language before your computer can do anything with them.

Programming languages are therefore not really computer languages. They are human interfaces, designed to separate us from machine language and let us think in the symbolic terms we're more accustomed to using. Programming languages come in two basic forms, low-level languages and high-level languages. The further removed from the machine code level, the higher level the language. The only low-level language

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PROGRAMMING LANGUAGES

in common use is assembly language. Most programming languages are high-level ones, such as BASIC or Pascal, and are composed of English-like words with special definitions applied to them.

Just as there must be a translator between any two people who don't speak the same language, there must be a means of turning the programming language you understand into machine language your computer understands. These translators take three forms: assemblers, compilers, and interpreters. Each of them is a program that runs under a specific operating system and changes instructions written in a particular programming language into a program the computer can understand.

Assemblers

Originally all computer programming was done in machine language by setting switches that controlled individual bits in memory. Assemblers are programs developed to translate "mnemonic" codes, called assembly language, into machine language op codes.

Using an assembler and its associated assembly language removes you one step from the hardware itself and from machine language. For all its power, machine language is hard to read and write. It's not easy to remember what the various op codes look like, let alone what they stand for. The op code to add two values might look almost exactly like the op code to

subtract the same values; it's much easier to tell the difference between the assembly language mnemonics "ADD" and "SUB." Also, the assembler itself can perform some useful tasks. It can convert numbers from one numeric base to another, perform simple calculations, replace an often-used series of instructions with a single word (a macro), and perform other actions useful during program development.

Using an editor (there are several on the market, though some people just use the non-document mode of WordStar), you create a text file, called a source file, that contains a series of assembly language statements. Each statement tells the computer to execute a single op code—add two numbers together, replace one value with another, etc. You then run the assembler program and tell it the name of the file containing your source code. It reads the source file and creates an object file that contains the actual machine language. An assembler evaluates your code as it translates it into machine language and lets you know when you've committed syntax errors (i.e., made grammatical errors with the language).

Although there is only one machine language for each CPU, a number of assemblers are available for most computers. All 8-bit CP/M computers come with ASM.COM, which is a bare-bones 8080 assembler. If you require more features, you can buy M80 from Microsoft, which is also for 8-bit machines. M80 recog-

nizes both 8080 and Z-80 mnemonics, has macro capability, and can use pre-assembled routines from external libraries. Other assemblers are available from different vendors for various combinations of computers and operating systems.

Compilers

Compilers are translation programs that turn big programming jobs into smaller ones by automating some of the repetitive and tedious parts of writing a program. A compiler serves the same purpose for high-level languages that an assembler does for assembly language, except that one English-like statement in a high-level language is translated into dozens of machine language codes. The compiler is a program that translates a text file, called source code, which the programmer can understand, into a file of object code that the computer can understand. When the compiler is finished you return to the operating system and run your new program as you would run any other program.

Like an assembler, the compiler will keep track of errors it finds, but *no* assembler, compiler, or interpreter (discussed below) can discover errors of logic—only errors of syntax. (When a program complies with all the grammatical rules of a language but does not

perform the action that the programmer intended, it's because there's a logic error—commonly known as a "bug"—in the program.)

Assembly language programs have a well-deserved reputation for fast execution, compact code size, and extracting maximum performance from a CPU. Compilers create programs that are larger and usually run

Assembly language programs are known for fast execution and compact code size.

more slowly than assembly language programs. The advantage of compiled languages is that a program to perform a given task can be finished in a fraction of the time that would be required with assembly language.

Interpreters

Unlike assemblers and compilers, which create a new disk file containing the executable program, an interpreter remains in memory and translates the source code into machine code while it executes. The best-

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known interpreted language is BASIC.

When you "run" a program written in an interpreted language, you're actually running the interpreter, which reads and then executes each statement in a list of instructions (your program). If the interpreter is asked to do something it doesn't understand, it responds with a "syntax error" message.

Most interpreted languages have a reputation for slow execution. This is a direct result of the way in which an interpreter operates: It reads a statement, translates that statement into a series of op codes, and then executes those codes before reading the next statement. This procedure is followed even when the statement is part of a "loop" that is repeated many times during the execution of the program. When a program is compiled or assembled it runs much faster because all translation into op codes is done before the program is run. Interpreted languages are considered adequate for hobby programming or other uses where processing speed isn't a critical concern.

Threaded interpretive languages

In a "threaded" language, commands to execute small tasks (called "primitives") are linked into larger commands (called defining "words"), which can in turn be threaded together to accomplish bigger jobs. Thereafter, when all the necessary words have been threaded together to accomplish what a program has set out to do, just mentioning the one word that ties them all together will execute the entire program.

FORTH is an example of a threaded interpretive language. It was originally created to control large telescopes. FORTH programmers are staunchly partisan and usually regard their language as the only one worth learning. Since there's a version of FORTH to run on every Kaypro ever made, I would be remiss if I were to skip over this very special (read "different") language. FORTH and other threaded interpretive languages are fast and produce small programs. It is relatively easy to add new features to FORTH, a process known as "extending" the language. It is also more difficult to learn than many other languages, though its supporters claim incredible productivity gains as one result of sticking with it.

The languages

Keep in mind that at least an entire article (and possibly a mini-series) will be devoted to each of the languages discussed below. In this article we will limit our discussion to what each language was designed to do, and what its greatest strengths are.

Assembly language

There is no computer language more powerful than assembly language, nor any that can produce programs that are smaller or run faster. It is also just about the hardest language to learn and use.

Assembly language is only one step removed from

pure machine language—machine language op codes are replaced by assembly language "mnemonics" on a one-for-one basis. This gives you the greatest possible degree of control and the fastest execution speed for your particular computer. But these gains are paid for in greater learning difficulty and program development time. When it comes to programmer productivity (man hours per completed program), nearly all other languages are more "cost effective" than assembly language—it simply takes longer to write programs in assembly language than in a high-level language.

Kaypro computers come in both 8-bit and 16-bit models, so there is more than one assembly language for Kaypro machines. The CP/M machines use a Z-80 CPU, so you need to learn Z-80 assembly language (or 8080 assembly language, since the Z-80 also understands those op codes) to write assembly language programs for CP/M Kaypros. DOS Kaypros (16-bit) use an 8088 CPU that has its own assembly language. Remember, each CPU has its own machine language, so there is a separate, different assembly language for each one.

***FORTRAN is at its best
when solving mathematical
problems, though it's been
used for other purposes.***

FORTRAN

FORTRAN's name is derived from the words FORMula TRANslator, and the name describes its purpose. FORTRAN was developed to handle mathematical manipulations, and it is most often used by scientists and engineers in the interpretation of statistical data, mathematical analysis of engineering problems, and similar tasks. FORTRAN has been around long enough to become a stable language, and it provides a high degree of portability, meaning that you can use the same FORTRAN source code on a variety of computers, compiling it into a usable program without extensive changes.

FORTRAN is at its best when solving mathematical problems, though it has been used for nearly every purpose. Earlier versions of FORTRAN, and in particular versions meant to run on microcomputers, don't handle long character strings well. (A character string is a combination of letters that make up a word or phrase, such as "hello" or "2416 South Baxter Street.") Since FORTRAN was designed for mathematical manipulations, the ability to handle long words was considered unnecessary. FORTRAN is therefore unsuitable for business programming, in which you need to keep track of such information as company names and addresses, or for creating new word processing programs.

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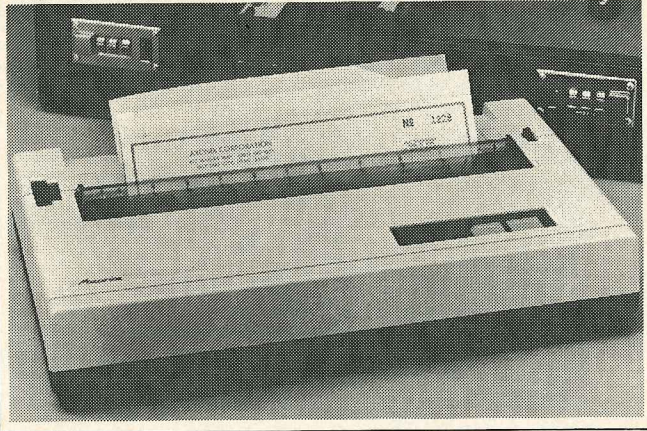
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PROGRAMMING LANGUAGES

COBOL

This one is an acronym for COMmon Business Oriented Language, which pretty much spells out its mission in life. COBOL is a business-oriented language designed to be very English-like and easy to read. A program in COBOL can be written so that it can be read and, for the most part, understood by non-programmers in the business world. COBOL is made up of components called "clauses" and "sentences" (that end with periods, no less), and a COBOL program is made up of four divisions, each with its own special purpose.

The Identification and Environment divisions are composed almost entirely of comments that are ignored by the compiler. These comments contain information about the program—its structure and the hardware and software environments under which it was written and must be run. The Data division contains statements that set aside storage areas for variables, constants, descriptions of any data files the program must read or write, and descriptions of each report line if the program must output to a printer. Finally, the Procedure division contains actual program code, where COBOL verbs like PERFORM, WRITE and MOVE get things done. COBOL uses the word "is" the same way other languages use the symbol "=", so it's possible to write code that says:

```
IF YEARS-EMPLOYED-INPUT IS GREATER THAN
THREE-YRS
  MOVE PROGRAMMER-CONSTANT TO CLASSIFI-
  CATION-REPORT
ELSE
  MOVE JUNIOR-PROG-CONSTANT TO CLASSIFI-
  CATION-REPORT.
```

Get the picture? COBOL's detractors complain about its wordiness, saying that a program that would take two pages to write in most other languages will take a minimum of 20 pages to write in COBOL. They're right—COBOL is an incredibly verbose language and there are few good implementations available for micro-computers. But, love it or not, COBOL accounts for the source code of a very large percentage of the business programs in use today. With that kind of investment in COBOL code by the business community, as well as in trained COBOL programmers, it is going to remain the most common business programming language for many years to come.

dBASE

Another interpreted language that is well suited to dealing with business data in files is part of the relational data bases dBASE II and dBASE III. (Because of

its RAM requirements dBASE III is available only for MS-DOS machines.)

Referred to collectively as dBASE, this product is both a relational data base *and* a language. dBASE provides a means to read and execute statements in command files. Command files are text files created by dBASE's editor or by any editor. They contain lists of dBASE commands that are executed one after the other—just as if they were typed from the keyboard. dBASE also uses advanced programming structures such as conditional branches and control loops. Writing programs in dBASE allows the user to take advantage of dBASE's excellent file manipulation facilities and to create custom data base applications more easily than with any other language.

BASIC

BASIC is an acronym for Basic All-purpose Symbolic Instruction Code, and it was originally conceived at Dartmouth College as an instructional language (a programming language used to teach people to program computers). Nearly every microcomputer on the market includes a BASIC interpreter in the purchase price.

BASIC has roots in two powerful languages. It gets its scientific and mathematic capabilities from FORTRAN

and its structure and data types from a language called ALGOL (no longer in common use). BASIC can be both compiled and interpreted, and BASIC compilers are available for either 8-bit or 16-bit Kaypros, but unlike the interpreters, they must be purchased separately. Professional programmers usually use the interpreter to write and develop programs, so they can test them as they write. Once a program works correctly it is compiled, because compiled programs run faster than interpreted programs.

Many programmers dislike BASIC because it tends to promote sloppy programming habits.

Many programmers dislike BASIC because its ease of use tends to promote sloppy programming habits. It is easy to just sit down at the computer and play with the BASIC interpreter until a program works instead of planning the project in a professional manner. The problem with BASIC programs developed in this manner is that nobody, not even the person who wrote the

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program, can figure out what he or she actually did a week later. This makes altering the program to improve performance or fix bugs nearly impossible. BASIC also has many proponents, who point out that it is a very powerful, albeit unstructured, language. It has a large user base—just about every programmer knows how to write in BASIC and almost every computer has a BASIC interpreter. In fact, if a programmer sticks to basic BASIC, a program can be portable among a great number of systems.

Pascal

Pascal is not an acronym—the language is named for Blaise Pascal, the 17th-century French inventor and mathematician. Pascal is normally a compiled language, although some Pascal interpreters are available.

Pascal was designed by Niklaus Wirth in the late 1960s and was intended to be a tool for teaching programming concepts. Though called an “incomplete” language by some (including Wirth, who went on to develop Modula-2), new developments in Pascal have extended the language and made it a very powerful and competitive programming tool. Pascal is a language that enforces the declaration of variables (that is, the compiler is told the names and types of symbolic variables) before they can be used, and it compels the logical design of programs—meaning that each step of the program is planned before any code is written.

What might at first appear to be restrictions on the programmer actually turn out to be a help as one gets more accustomed to the language. As the programmer learns Pascal, source files become readable at a glance, and the use of structured programming techniques—planning, writing, and documenting a program so that others can understand and modify it—becomes second nature.

One implementation of Pascal, Turbo Pascal from Borland International, deserves special notice. More than 500,000 copies of Turbo Pascal have been sold in the last few years, according to Borland. That makes Turbo Pascal one of the most widely used and most successful language implementations of all time.

Turbo Pascal's run-time library (a basic package of I/O and math subroutines that is added to every program when it is compiled) is about 10 kilobytes, or about half the size of the usual compiled BASIC run-time packages. In most cases the execution speed of Turbo Pascal programs is exceeded only by assembled programs and by some C compilers.

C

Having said all that, now I need to tell you that—for writing operating systems and utility programs—few languages can approach the advantages of C. C was developed by Dennis Ritchie of Bell Labs, and the fact that it is a one-man language, rather than one designed by committee, shows in its coherence and consistency.

C is small, structured, fast, and powerful. It was

meant for systems programming (writing operating systems and compilers). It was originally a utility provided with UNIX, a mainframe operating system. Since that time UNIX itself has been rewritten in C.

C is a modular language—that is, one that supports separate compilation of program segments called modules. That means several programmers can be responsible for separate parts of a large software project, and their code can be linked into a single executable file. Besides operating systems, C is used these days to write word processors, data base systems, spreadsheet programs, communications packages, and industrial controllers.

Unlike compiled BASICs and Pascals, C uses only those portions of the run-time library that a particular program needs. A good C compiler is able to produce programs that are smaller than those produced by most other compilers. This makes C especially suitable for writing useful utility programs that don't take up much room.

Modula source code listings look a lot like Pascal, but there are fundamental differences.

Because it was designed for use by modern CPUs, C is able to exploit their capabilities to the fullest, and it is regularly used in place of assembly language by many professional software developers. In fact, it isn't going too far, in my opinion, to call C a structured assembly language, though it is in fact a high-level language.

The future

At the risk of offending those already using and supporting the following languages, I classify them as languages that are likely to become important in the future. Although the following languages have not been around for a long time and are not yet in widespread use (as compared to BASIC and Pascal, for example), they show a great deal of promise.

Modula-2

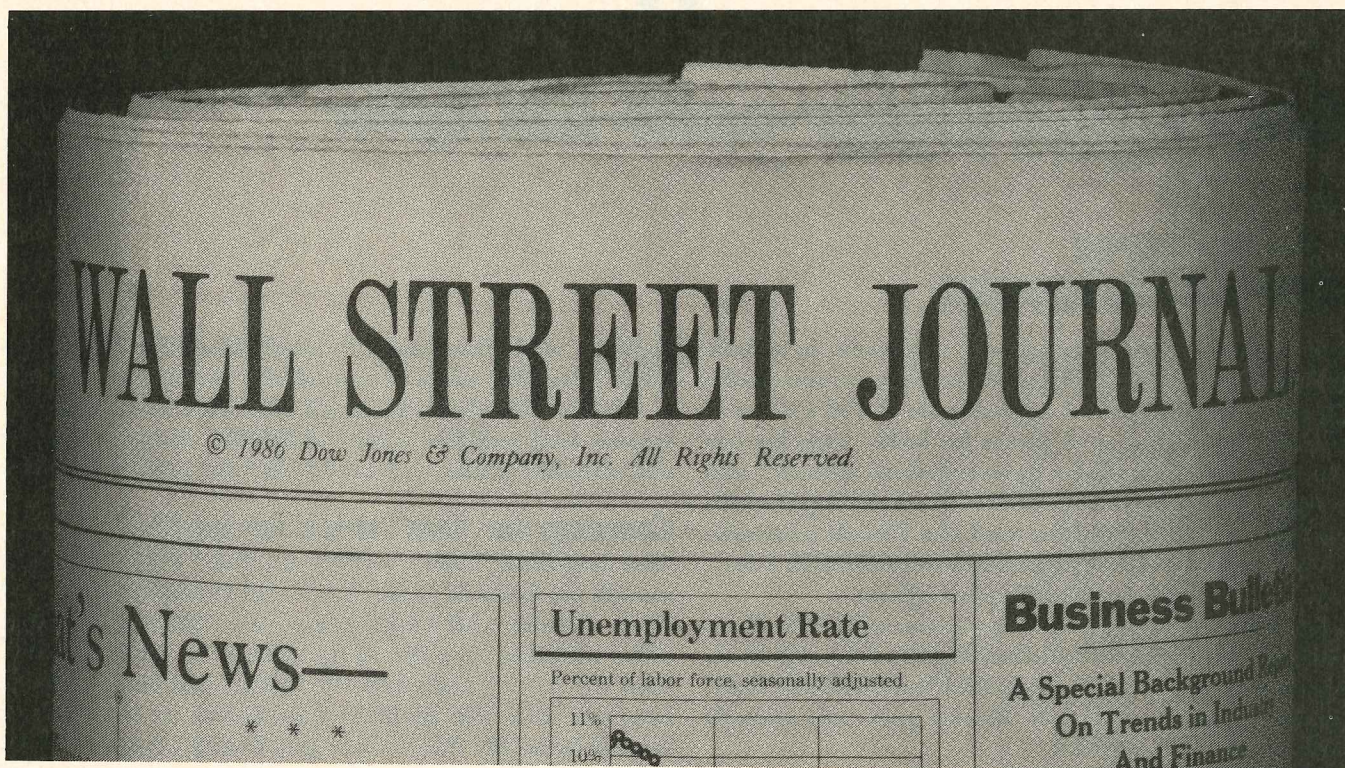
This compiled language is the brainchild of Niklaus Wirth, the originator of Pascal. Pascal was said to be Wirth's “incomplete” language; Modula-2 is his masterpiece. Modula-2, or just “Modula,” as Wirth calls it, was first developed in 1979 at the Institut fur Informatik of ETH Zurich. The language definition (the first step in developing a new language) was published in a technical report in March 1980. The compiler itself was first made available for public use a year later.

Modula source code listings look a lot like Pascal listings, as one might imagine, but there are some fundamental differences between the languages. Mod-

(continued on page 43)

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Ring It Up On A Kaypro

Bulletproofing a computer-turned-cash register

by Mitchell Gilberg

I had been looking for almost two years for a cash register that would handle the peculiar needs of a retail fabric store. A typical sale of "13 inches of lace trimming at 3 yards for \$.89" was far too complex for available cash registers, unless I was willing to spend \$6,000 to \$8,000 each. Using Kaypro 2Xs, Epson LX-80 printers, and the Chuck Atkinson Cash Drawers I'd seen advertised in *PROFILES*, I built them myself for under \$2,000 per register.

This article is a general description of how I determined my requirements and put together my registers. It's not a detailed set of do-it-yourself instructions, but if you have similar needs, it should give you enough information to get started.

System requirements

Although the main objective for the registers was to collect inventory information from the stores, there were three important requirements that had to be met before I would use a computer instead of a cash register:

- It had to have the "feel" of a cash register, not a computer. Instead of the typical messages seen on most computer/registers:

```
SELECT: 1—CASH
        2—BANK CARD
        3—CHARGE
```

```
THEN PRESS "RETURN"
```

there had to be an individual, clearly labeled key for each function. The receipt had to be on receipt tape, not 80-column, fan-fold computer paper. It also had to be simple to use, even for part-time, minimum wage sales help.

- It had to be as difficult to tamper with as a regular cash register, so that totals couldn't be altered to cover up theft.

- It had to be as trouble-free as a regular cash

register. With nine stores, located from 90 to 350 miles away, I couldn't plan to be available for service calls.

I'll describe the way in which I met these requirements and outline some additional steps, which I decided not to take, that could offer even more security.

Creating the "feel" of a cash register

The first thing I did was pretend that I wasn't using a computer. I laid out a keyboard as I would for a regular cash register and found that I only needed 48 keys. After allowing for some of the keys to be double-width, that left 21 extra keys on the Kaypro keyboard. These keytops *and the switches soldered to the circuit board beneath them* were physically removed from the keyboard.

Among the keys to go were RETURN, CTRL, ESC, CAPS LOCK, SHIFT, and the space bar. The remaining keytops were replaced by keys with clear plastic covers. These are available from most cash register dealers as replacement parts. I put my own labels, such as CASH, PAID OUT, and % OFF, under the covers. Also, sections of the keyboard were color coded to visually separate groups of keys. Then, a local shop made a dark Plexiglas keyboard template to cover the holes left by the removed keys.

Customizing the keyboard helped with two of my objectives. First, cash register-style keys made operation intuitively clear to sales help who were already familiar with regular cash registers. Second, by removing ENTER, CTRL, and some of the other special function keys, I eliminated the possibility of someone stopping the program from the keyboard, listing the disk directory, erasing files, or issuing other standard CP/M commands.

The modified keyboard required special consideration in programming. The program was written so that if, for example, "W" is pressed, the "PRINT JOURNAL"

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FABRIC STORE WITH KAYPRO CASH REGISTER

subroutine runs. The ten keypad and arrow keys had to be redefined using CONFIG so that no two keys had the same meaning.

Because you can't run programs from a keyboard that doesn't have an ENTER key, the register program had to be self-starting. I did this by running YESMENU and naming the cash register program MASMENU.COM. Although it "thinks" it's starting a menu, the computer always starts the cash register program.

With one more modification the cash register "disguise" was complete. I added a Plexiglas paper roll holder to the printer so receipts would be like normal cash register receipts instead of the 80-column "invoice" produced by most computer/registers. The perforated edge for tearing off the receipt was a small hacksaw blade glued to the printer cover.

Implementing normal cash register security

Regular cash registers have many features designed to reduce errors and eliminate theft. I felt these must be included for my system to be acceptable. The ones listed below are fairly easy to implement, so I won't spend a lot of time on them.

- Date and time stamping on all receipts and reports (this required a Kaypro 2X, which has a real-time clock, rather than a Kaypro 1, which does not).

- Non-resettable totals or a transaction counter to ensure all transactions are accounted for.

- Ability to calculate a customer's change to eliminate math errors.

- Warning bell on the cash drawer so you can hear it if it's opened without authorization (this feature was included with the cash drawer).

Using the printer for the customer's receipt caused a problem in getting a printed journal of transactions. Although two tapes could have been printed side by side (receipt and journal), or a duplicating tape could have been used, I couldn't find a suitable take-up reel to keep the journal tape from piling up on the floor. Consequently, the journal is saved on disk and may be reviewed onscreen. The journal can also be printed if it's needed to locate a problem.

Regular cash registers require keys (actual lock keys, not keyboard keys) for privileged functions, such as setting tax tables or reading sales figures. I created a security key by replacing the SHIFT key with an electrical key switch. This is how I did it. After the SHIFT key was removed, I soldered wires to the spot on the circuit board where it used to be and connected them to a key lock switch mounted on the keyboard. Turning the key is the same as pressing and releasing the SHIFT key. The program is written to act on certain keys only in upper case, and others only in lower case. This scheme effectively prevents someone without the physical key from accessing confidential data.

Special security problems and their solutions

Using a computer as a cash register presents some unique security problems. Perhaps the easiest way to steal from a computer/register is by copying disks. Someone could copy the system disks in the morning before the store opened, then run the register on the copies. After a couple of hours, the copies could be removed and the original disks replaced. When the system was re-started, all of the transactions that took place on the copies would be gone. Any internal counters or audit trails on the original disks would be intact—in effect, the store would have opened at noon

Using a computer for a cash register presents some unique security problems.

instead of 10 a.m. The thief would keep all the money taken in before the swap, and it would be done without any attempt to "crack" complicated security schemes.

I figured this type of theft was very unlikely, because the system disks had no utilities for copying files and the keyboard had no ENTER key. However, if anyone had another Kaypro computer available, it was a completely different story. Not only would there be a way to



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KAYPRO CASH REGISTER



copy disks, but the thief would probably have the technical knowledge to understand how to beat the system.

So, rather than ignore the possibility of this kind of theft, I included a transaction counter in unused bytes of the real-time clock. With the clock's battery backup, it knows the next expected transaction number, even if the machine is unplugged. Replacing old disks will cause a mismatch between the next transaction number from the disk and the expected transaction number from the clock.

Here are some additional security steps I considered, but decided were unnecessary for my stores (some of them might void the Kaypro warranty). Under different circumstances, you might find them useful.

- Cross wires to the keyboard connector inside the keyboard enclosure and "uncross" them inside the computer. Any attempt to use another keyboard will result in garbled signals.

- The cash drawer is connected to the serial data I/O port and only needs two of the 25 pins. Ground pins on the inside of the cable connector so that a specific status is sent to the computer. Have the program check the port status and halt if it's incorrect. This way the program won't run if the disk is taken to another computer. This would be even more difficult to find if the pins are jumpered inside the computer instead of the cable.

- Scramble or tokenize the journal on disk, making it more difficult for an outside program to read and modify data.

- Hide counters or totals inside program files. Add a couple of blank sectors to the MASMENU.COM file, then use them for duplicate totals or file hash totals. If anyone were to modify a data file, it would be virtually impossible for them to locate and modify the checksum hidden in a program file.

Of course, for these steps to be effective, the register program must be compiled, with no source code on the disks. I used Borland's Turbo Pascal, but any compiler should do the job.

The last security step I took was a locking cover for the disk drives. You can't get to the disks without a key. This not only prevents passing high school students from taking out a disk ("Hey, look, Mom! This is the kind of thing we're using at school!"), it hides the blinking lights from sales help who might find them to be disconcerting, and it reduces dust in the drives.

(Ed. Note: If the drives are covered, the machine should be equipped with a cooling fan if it doesn't already have one.)

Data integrity and error recovery

Perhaps my greatest worry in this project was fear that I would be tied down answering emergency calls from the stores. To prevent that, the register program uses a great deal of data redundancy and pays strict attention

to what has been written (or not written) on the disks.

This section is a bit more technical than the rest, but it explains steps taken to make the program completely self-recovering. Any error, from a bad sector that makes a disk unreadable to a power failure (even during a disk write), can be recovered at the store by someone with no computer knowledge. In fact, most recoveries are handled internally by the program, with no outside indication that a problem has occurred.

The first critical point is knowing exactly what and when the computer writes on the disk. This may sound simple, but most languages keep disk buffers to hold data in memory until it's convenient to actually write on the disk. It's particularly unpleasant if the power fails between writes to two files that are supposed to be synchronized. Unless you are *certain* which buffers were physically written on the disk, recovery can be quite complex. Using Turbo Pascal, for example, there is a FLUSH command that causes the data to be physically written. But if the power fails before the file is closed, the CP/M directory is not updated with the address of the data. In other words, the data is there, but the program can't find it.

The actual program code required to ensure the data has been written on the disk is beyond the scope of this article and is dependent on the language you use. The steps for self-recovery described below, however, can't

be expected to work unless you're *sure* the physical disk files contain the data you've written on them.

1. All *transactions* are written two times—once on each disk. This gives a full backup copy of the files at all times. If a disk goes bad, just throw it away. The backup copy is ready for use. (Further down I'll explain how to generate a new master from the backup without giving users the *carte blanche* ability to copy disks.)

2. All *totals* are written on disk four times. Why the distinction between transactions and totals? A trans-

The status code provides all the information required for the program to recover on its own.

action can be verified by its presence. It's either there or it isn't, and you can tell if the last transaction was written on the disk simply by looking. Totals are much harder to verify. You can't tell if the last transaction is included in a total just by looking at it. It was some unknown number *before* the transaction, and some other unknown number *after* the transaction. It takes both the *before and after* values to tell whether or not a

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transaction has been included.

The four totals are the before and after totals repeated on both disks.

3. The exact status of the data files is kept in a separate status file on each disk. The simplified sequence of file-writing steps below illustrates how the status file is used.

a. Write a code to the status file that indicates the program is ready to write an updated total to the totals file. Again, *be sure* this file write and *all* file writes are physically on the disk.

b. Write the new totals to *one* of the totals files.

c. Write a code to the status file that the first totals are complete and the second totals are ready to be written.

d. Write the new totals to the second totals file.

e. Write a code to the status file that all files are updated.

Of course, more status entries are needed when you consider that both transactions and totals are written on both disks.

4. Each time the program starts, it reads the status file. The status code provides all the information required for the program to recover on its own. Here are some examples:

a. An "all clear" status means all files are intact and a normal start-up is okay.

b. If the status code indicates the program was ready to write the first totals, then the condition of the first file is in doubt. Don't attempt to read the file, because it may contain parity errors or partially written values, depending on the exact timing of the failure. Go directly to the second file. These totals, which are *known* to exclude the last transaction, can be written into the first file to eliminate potential file errors.

c. If the status code says the program was ready to write the second totals, then the second file is questionable. Get the totals from the first file, which are *known* to include the last transaction, and write them to the second file.

The complexity of internal error recovery depends on how many status codes your own application uses, but the program can be written to recover on its own from virtually everything except a bad disk.

5. Recovery from a bad disk requires the salesperson to change disks. The offending disk is removed, and the remaining good disk is put in drive B. A special CLONE disk is put in drive A, and the salesperson presses the RESET button. The CLONE disk picks up all vital data from the backup copy in drive B, then goes directly to the cash register program.

Here's how it works. The CLONE disk has a SUBMIT file (\$\$\$\$.SUB) and PIP.COM. When the system is reset, the SUBMIT file executes. First, using PIP, it copies the *entire* backup disk onto itself. This will pick up all totals, transactions, and programs. Because they copy programs, CLONE disks don't have to be replaced if there's a program change. The current version of the program is always copied onto the new master disk.

After the new master is "cloned," the SUBMIT file erases PIP.COM to eliminate additional copying, executes YESMENU to make the disk self-starting, and then runs the cash register program. This process takes a couple of minutes, but the salesperson can get back in operation using only the RESET button.

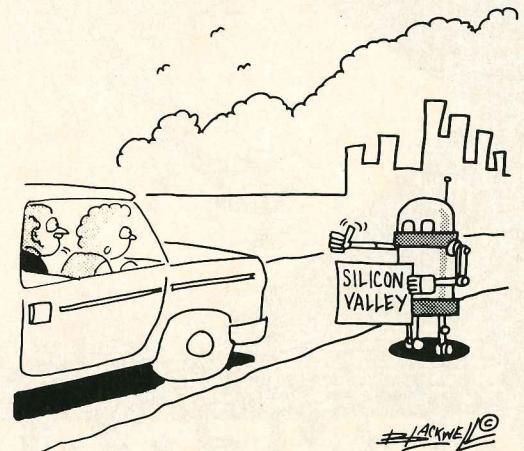
If there's a hardware failure, software recovery procedures won't help. We keep a spare computer/register at our home office for a complete replacement if necessary.

Conclusion

Many of the features included in my register were put there for "self defense." I wanted to utilize the registers as a retail merchant, *not* as a computer repairman. (As the fellow who fell from the skyscraper said as he passed the 11th floor, "So far, so good!")

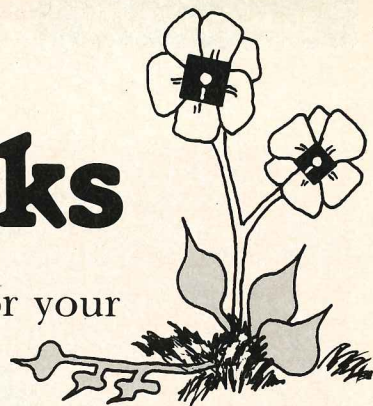
However, now that I've spent the time learning how to "bulletproof" a program, I can see any number of ways to benefit from these techniques. Think of the time savings if your general ledger system were completely self-recovering, or of the security if your payroll system wouldn't run without the key. A little imagination is all it takes, and you may save yourself much time and energy down the road. ■

Mitchell Gilberg, vice-president of Gilberg's Fabrics, "grew up" in the retail business. He studied information systems at Stanford, where he received his MBA. He spent several years as a management consultant specializing in retail data systems before joining his family's 45-year-old fabric business.



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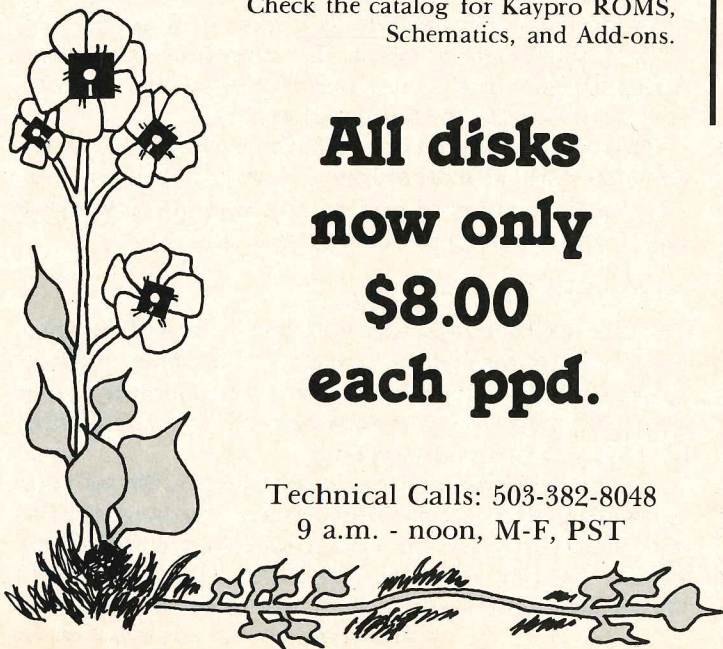
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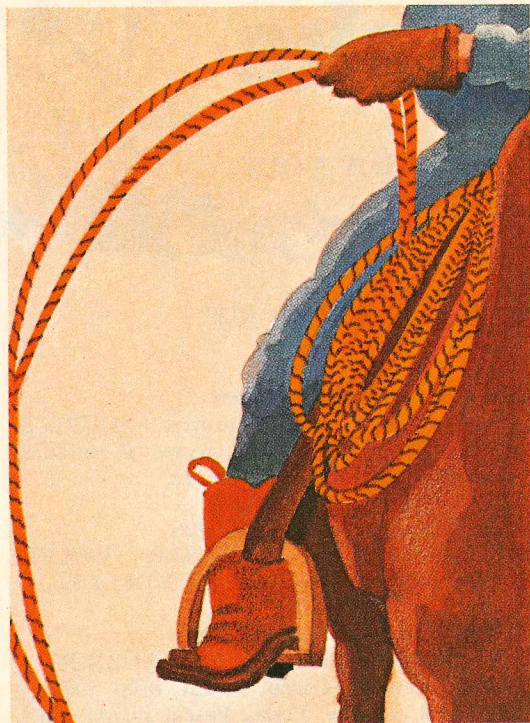
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A Real Cliffhanger

Saving files when your disk is full

by Michael Schwager

THE END." You grin with satisfaction as you and Perfect Writer or WordStar complete the first draft of a new article with your Kaypro. Now you type the command to save it. The disk drives begin to whirl; the status line flashes the writing or saving message. But your grin turns to chagrin as the screen flashes another message: Perfect Writer's cryptic and disheartening "Write error" or WordStar's more explicit "*** ERROR E12: Disk is full. *** Press ESCAPE Key."

Either way, your article hasn't been saved. There's not enough free space left on your disk—a situation that can arise all too easily on a Kaypro 2 with its single-sided drives of only 191K. (You can also encounter this problem on a Kaypro 1, 2X, 4, 16-2, 2000, or PC, but it's less likely. If you encounter it on a Kaypro 10 or 16 with their 10 megabyte hard disks, or on a 286i with its 1.2 megabyte high-density disks, you've been doing an awful lot of work. Take a rest.)

The source of the problem: You forgot to check the available disk space before you began working, or your writing flowed so smoothly that you exceeded the space you knew you had left.

You could be facing a disaster—as much as a whole day's work lost. Is all that effort consigned to electronic oblivion? Are your memorable metaphors and subtle syllogisms gone forever? No. Can you salvage them? Yes, if you know what to do.

First, resist several temptations: Don't hurl your shoe at the screen, and *don't change disks*. Although

you'd think this would be the easy solution, it doesn't work. If you change disks and try a WordStar or Perfect Writer save command, CP/M will set the drive you opened to "read only," tell you "BDOS Err on B: R/O," and return you to the A > or B > prompt, depending on which drive you're logged onto.

Stay calm. Don't exit the word processor and don't hit the reset button or turn off the computer. Realize that disk space is available to you, if only you know how to use it.

My salvage method requires no programming, only the skills and commands you use in WordStar or Perfect Writer. Just follow the directions carefully. Although they may seem complicated at first, they're easy once you get the hang of them.

This method applies specifically to a Kaypro 2, but it will also work with other Kaypro models. And you can adapt it to other word processors, spreadsheets, data bases, and other types of programs, too.

Write over existing files

The idea is simple: You save your article as a file on your word processing disk (in drive A). You either use free space on that disk—some may be available if you're using WordStar—or overwrite (record over) an existing file that you can easily replace.

You might think you could overwrite a file on your text disk (in drive B), but this is chancy because the file you choose may not be replaceable. And with Perfect Writer it's even more of a problem because Perfect Writer can't show you a disk directory while you're

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ILLUSTRATION BY TOM VOSS

writing or editing. You'd have to know what the files were on the text disk *beforehand*.

If your text disk has no expendable files, you should overwrite a file on the word processing disk. As long as you have the master disk, you can always copy the file back to your working disk.

In both the Perfect Writer and the WordStar sections that follow, we'll start at the point where you've completed your new draft (let's call it MASTER.PCE) and have tried to save it but failed.

First things first

To determine how much disk space you'll need in order to save your file, you have to know how long your file is. How can you tell?

In Perfect Writer, type `^X=`. At the bottom of the screen, you'll see the file's length in bytes. To get the length in kilobytes, round up to the next thousand and omit the zeros. For example, if the length is 13,432, that's 14K.

In WordStar, move to the end of the file by typing `^C` repeatedly (*don't* use the "quick" command, `^QC`—I'll explain why later) and look at the status line at the top of the screen. It tells you the position of the cursor by page, line, and column. Multiply the page number by 2K (the average number of bytes per page is 2,000). So, for example, if the status line shows that the file ends on page 9, the file is roughly 18K.

^X ^W allows you to save a file by overwriting one on the Perfect Writer edit disk.

For Perfect Writer users

You're going to save MASTER.PCE as a file on the Perfect Writer program disk in drive A. "Wait a minute," you may be thinking. "The Perfect Writer disk that came with my Kaypro 2 is already jammed with files." You're right. It has seven files occupying 190K. That leaves only 1K free—barely enough to save your name. But don't let that stop you. You'll simply save MASTER.PCE under the name of an existing file.

The usual Perfect Writer command to save a file is `^X^S`. But there's another way: `^X^W`. This saves the file under a file name you specify. What name do you specify? One of the files on the Perfect Writer edit disk. They're listed—along with the space they take up—in Figure 1, below.

Don't overwrite PF.DAT—it's been modified to your specifications, and differs from the version on the Perfect Writer master disk. Don't overwrite PW.COM or PW.SWP—you need those files to operate Perfect Writer. You could overwrite PW.HLP, but it may be too short. The best files to overwrite are PF.COM (Perfect Format-

FIGURE 1: Files on Perfect Writer program disk

MENU.COM	21K
PF.COM	35K
PF.DAT	5K
PP.COM	23K
PW.COM	35K
PW.HLP	6K
PW.SWP	65K

ter) and PP.COM (Perfect Printer). You don't need them when you're editing, only when you format or print. And you can't format or print MASTER.PCE until you've saved it.

As long as MASTER.PCE is less than 23K, go with PP.COM. If it's longer than that but no longer than 35K, use PF.COM.

Type `^X^W`. Perfect Writer will reply with the message "File to Write <CR>" in the lower left corner. Type `A:PP.COM` or `A:PF.COM` depending on which one you've decided to overwrite. You'll see the "Writing . . ." message, and, after the disks have stopped whirring, the message "File Written."

Congratulations! MASTER.PCE now exists on your Perfect Writer disk under the name PP.COM or PF.COM. You'll soon be able to edit it as if you'd never had a full disk. Exit Perfect Writer by typing `^X^C`. Now you're ready to put your saved file on another disk and replace the file you had overwritten on your working disk. For instructions, jump to the section of this article entitled "Final steps."

For WordStar users

For a moment after you tried to save MASTER.PCE with one of WordStar's three save commands—`^KS`, `^KD`, or `^KX`—the program got your hopes up. It said: "Saving file B:MASTER.PCE." But then it said "**** ERROR E12: Disk is full. *** Press ESCAPE key."

Go ahead and press the **ESCAPE** key. You're still in WordStar, the file is intact and accessible, and you can save it. Here's how.

First, try freeing up space on your text disk. Type `^KF` to see a directory of files on the disk (if you're logged onto drive A, first log onto B by typing `^KL B:`). If you see some files that you know are expendable (good candidates are backup files—those with the extension BAK), you can delete them by typing `^KJ` and their file names. Then you can try `^KS` or `^KD` again to save MASTER.PCE.

If you can't part with any files on your text disk, you can salvage MASTER.PCE by overwriting a file on your WordStar disk.

First you'll mark your file as a block. Type `^R` repeatedly (or `^QQ^R`) until you reach the beginning of the file. Mark this point as the beginning of a block by typing `^KB`. Type `^C` repeatedly (or `^QQ^C`) to move to the end of the file, and type `^KK` to mark the end of the block. (You *don't* want to use `^QR` to get to the beginning of the

PROGRAMMING LANGUAGES

(continued from page 30)

ula is designed for the modular construction of large programming projects, which are often written by teams of programmers working together. In many respects, Modula has the elegance and beauty of Pascal, but with the horsepower and modularity of an excellent C system.

LISP

LISP and PROLOG are perhaps the best known of the new languages aimed at providing computers with artificial intelligence (AI). LISP is very difficult to learn, partly because its links with AI require that the student learn a great deal about abstract AI concepts.

LISP, once restricted to minicomputers and mainframes, is now available for use on some microcomputers. Capable of portability across a large range of micros, minis and mainframe computers, Common LISP can be run on personal computers, like some of the 16-bit Kaypros, that have at least 512K of RAM.

LISP is different from most other languages in that it processes lists of symbols (symbols that can mean *anything*), not numeric values. A computer that runs LISP is said to be able to "learn" and maintain knowledge for future reference. It can be used to draw inferences based on previously established facts, and it forms the basis for many of today's AI systems.

PROLOG

Another language used in AI work, PROLOG (PROgramming in LOGic) found instant fame when it was chosen by the Japanese for their fifth-generation computer project (an ambitious project to develop a series of hyper-fast "intelligent" computers), meaning that it is the language of the future in Japan. It features the use of symbolic logic as a programming language (symbolic logic is a special form of notation that tries to avoid the ambiguity inherent in human languages).

PROLOG specifies *what* a program is to accomplish, rather than *how* it is to accomplish it. (Conventional programming languages are concerned completely with how to solve the problem.) The PROLOG interpreter handles the "how" part automatically, using some rather abstract artificial intelligence mechanisms. PROLOG supporters point to its simplicity and concise nature and claim that experienced programmers can do more in less time with PROLOG

Conclusion

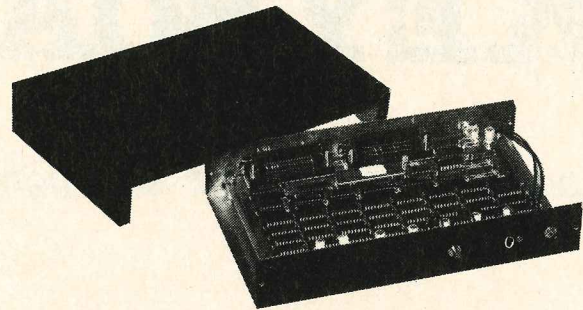
You now have an idea of what the major programming languages are, and their primary characteristics and strengths. Next month's article will be about certain elements common to most high-level languages; future articles will delve more deeply into the languages that we've only touched. ■

Jerry Houston teaches programming, applications, and other computer-related topics at three colleges, and writes for several computer publications.

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Alternative KEYBOARDS

Shopping around for an upgrade

by William Murdick and Keith Hertzog

So far the Kaypro Corporation has provided good value in its MS-DOS line of microcomputers. The Kaypro 16 is a sturdy machine in the great Kaypro portable tradition. The Kaypro PC has about the best monochrome monitor resolution of any clone on the market. And the 286i, or "Big KAT," as computer columnist Jerry Pournelle dubbed it, outperforms the IBM AT. All come with fine MicroPro software. All are priced at the low end, yet unlike some of the competition down there, they seem to run all the MS-DOS software without a hitch.

Indeed, our only disappointment is that Kaypro didn't break with the unfortunate MS-DOS tradition of providing non-standard or less-than-excellent keyboards.

It isn't our job to sermonize, but it has always perplexed us why computer manufacturers don't pay the closest attention to the two human interfaces when deciding how they will build their microcomputers. Users—and potential customers—work with microcomputers through their eyes and their hands. How difficult or expensive can it be to come up with a screen resolution that isn't dot-matrixy or a keyboard that doesn't feel squishy? For most home users and office workers, those attributes are probably more important than speed increases or even memory expansion.

We're going to take a look at several interesting possibilities for keyboard replacement for Kaypro owners ready to upgrade. We tested four boards of varying prices and designs. We also had some co-workers who daily use MS-DOS computers try out each one to get their opinions. So if you're in the market for a better keyboard, or just curious about the possibilities, read on.

The criteria

We're going to measure and compare the keyboards on

the basis of four criteria: layout, feel, special features, and price.

Layout. Of the three basic kinds of layouts available, the one originally used by IBM for its PC is the same one adopted by Kaypro for its portable 16. This is the layout that created much of the initial criticism of the IBM machine. It places an extra key between the bottom row of keys and the left shift key. And the SHIFT and RETURN keys are small—no larger, in fact, than ordinary letter keys. This keyboard utilizes ten programmable function keys lined up in two vertical rows of five at the left side of the board. There is a number pad at the right that doubles to some extent as a cursor movement keypad, allowing vertical scrolling and vertical jumps to the beginning or end of the file, as well as the four arrow key functions. A NUM LOCK key, like a shift lock, alternately allows you to use the number pad for entering numbers or for moving the cursor.

None of the replacement keyboards we're discussing uses that layout.

The second design is called the "AT layout," and it more or less follows the design IBM originally chose for its AT models. The two major faults in the PC layout are corrected: the SHIFT and RETURN keys are oversized, and the bottom row follows the same pattern as that of IBM Selectric typewriters—i.e., the comma, period, back slash, and SHIFT are on the right, and C, X, Z, and SHIFT are on the left. The Kaypro PC and 286i use this design, as does one of the replacement keyboards we will look at—the least expensive one.

The third pattern is commonly called the "5151 layout," after a keyboard made by Key Tronics Corporation. In this case, the function keys appear along the top, making them more accessible to right-handers, and an independent cursor movement pad, with oversized DELETE and INSERT keys, appears between the main set of keys and the number pad. Such boards are

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PAPER SCULPTURE BY STEPHANIE O'SHAUGHNESSY

at least two inches longer than the others to allow for the additional cursor pad. They inevitably employ oversized RETURN and SHIFT keys. Three of the four keyboards we will look at use variations of the 5151 layout.

Feel. As important as the design and size of the keyboard is its "feel." Here, unfortunately, both Kaypro keyboards get poor grades.

We can judge keyboard response at three different points: the feel on the way down, the feel when the key "hits bottom," and the feel when the key pops back up under your finger.

The Kaypro 16's keyboard has an ultra-light, insubstantial feel on the downward motion. "Tinny" is the usual word for it. There is no cushion at the bottom, so the keys fall flat and you get the sensation that you are drumming your fingers on a table top. The final response is also too light for our taste.

The Kaypro PC and 286i keyboards' keys hit a bottom that is way too soft, like a mattress.

The Kaypro PC/286i keyboard has a nice initial response, but the keys hit a bottom that's way too soft, like a mattress; there the keys waver under your fingers and—if you're typing fast—you feel as though the whole board is shifting around under your hands, a very uncomfortable feeling. The final push is quite adequate, but by that time you have already made the typo.

Special features. These days keyboards come with a variety of extra features. One of the most common is a built-in macro ability, usually involving batteries to keep your definitions alive after shutdown. Given the existence of programs like SmartKey, which offer a far more extensive macro capability, we don't see any point in fooling with batteries. Two of the boards we'll look at do offer special features. The Key Tronic 5152 comes with a bar code reader, and the Business Keyboard from Enigma comes with 40 function keys across the top.

Prices. Prices we've found range from \$75 for a "Taiwan Mystery Board" to around \$700 for a straightforward Zenith keyboard with no extra features (these are not reviewed). Of the keyboards we reviewed, the least expensive is Tinma Technology's DataCom AT at \$85 and the most costly is the Key Tronic 5152 at \$795, with a bar code device included.

A purchaser at one of the largest U.S. electronics firms confided to us that his company, and most others who sell low-end (under \$100) keyboards, simply create a name for the boards, buy what's available in Taiwan, and then sell those boards under their brand name. In other words, if you buy a keyboard from them

in June and another of the same brand name in August, you might get two different boards. This company buys about five different kinds from Taiwan at one time and tests them to see which is the best, and that's the one they order. It might be a different one next time. The spokesman warned us that there is a lot of variation in quality among these products, and that it is possible to get a keyboard with keys that literally shake under your fingers. He advised customers looking for such bargains to make sure that the company they buy from has a no-nonsense return policy.

The DataCom AT

This is the inexpensive \$85 model. As its name implies, it uses an AT layout. We felt we should consider one keyboard using the AT layout because left-handers will probably *want* the function keys along the left side. We also wanted to examine a low-priced board to see if it had any merits beyond price.

The DataCom AT was a pleasant surprise in many ways. We especially liked the gigantic RETURN and SHIFT keys; those can't be too big for our taste. Take a look at your keyboard and imagine a blocky backward L-shaped key consisting of three regular sized keys as the bottom half and two lying horizontal as the top half and you'll get a sense of the size of the RETURN key on this board. The SHIFT key is the size of three regular keys. Even the CTRL key is double sized.

The DataCom uses an inlaid light indicator in the upper right corner to indicate whether the SHIFT and NUM LOCK keys are on. We prefer LEDs right on the keys; we never quite got used to looking up in the right corner to see if we were going to be printing in upper case.

Because there is no separate cursor pad on this keyboard, you will have to put up with the confusing mixture of arrow symbols and numbers on the same keys—no worse than the Kaypro's keyboard, but no improvement either.

As for feel, we liked the DataCom better than either of the Kaypro keyboards. However, the keys fall very flat—the finger-drumming sensation. The keys do push back strongly, which somewhat ameliorates that effect, and there is never any feeling of tinniness. The keys have a substantial feel. Though we would prefer some cushion under the keys, we think a table top is preferable to a mattress.

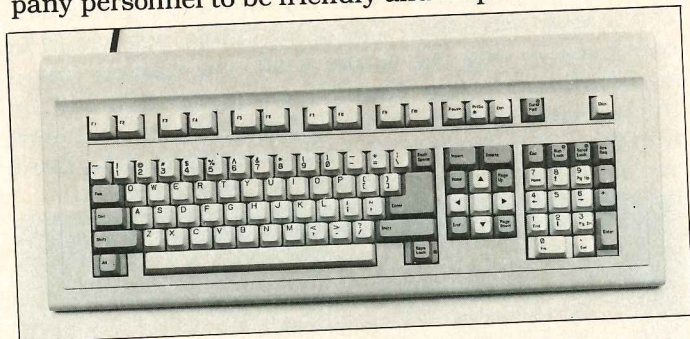
All in all, we recommend the DataCom AT for those who like the function keys on the left and who are looking for an inexpensive way to get the oversized SHIFT and RETURN and, perhaps, get away from the spongy feel of the PC/286i keyboard.

(A photo of the DataCom AT was not available.)

The Qubie 5161

This is a relatively inexpensive (\$159) 5151-style keyboard, called the 5161, from Qubie Distributors, a well-known manufacturer of computer peripherals. Last

year Qubie won *InfoWorld's* hardware Product of the Year award for its \$600, 20-megabyte hard disk drive. We had dealt with Qubie before and found the company personnel to be friendly and helpful.



Qubie 5161

The Qubie's function keys are laid out across the top in a single row, though not in the usual 5151 pattern of two groups of five. Instead, they are arranged in groups of two, with spaces between pairs. We liked this set-up, since we use function keys largely for cursor movement and deletion, which means we set up pairs of commands: cursor left one word and right one word; cursor to the end of the line and to the beginning of the line; delete right one word and left one word; and so on. Qubie's paired arrangement makes it less likely that you will hit the wrong key if, like us, you set up editing commands in pairs. The function keys on the Qubie are oversized, which also makes them easy to pick out.

Between the function keys and the top of the main set of keys is a half-inch wide inset running the length of the board where you can lay a strip of paper or cardboard on which you have written the various functions you have assigned to the keys.

The separate cursor pad between the main set of keys and the number pad provides an unambiguous cursor pad and oversized INSERT and DELETE keys. The DELETE erases backwards. The INSERT is for word processors that require shifting into an insert mode for insertion, an inconvenience that is more common in word processing programs than you might think. Within WordStar, the key toggles the Insert Off/On modes; since we rarely use the Insert Off mode, we used a macro program to define this large, conveniently located key to erase the character the cursor is on (^G in WordStar).

Below INSERT and DELETE the pad consists of three rows of three keys, nine in all, taken up by eight functions: the four arrow functions, HOME and END, and PAGE UP and PAGE DOWN. The middle key is dead. We haven't yet found a program, including SmartKey, that will bring it to life.

The number pad retains the dual functions and markings of both cursor movement and number entry, making the numbers less easy to read. For reasons beyond us, this is common in 5151 layouts. There's a NUM LOCK key to toggle between the two. More importantly, a CURSOR PAD key with an LED must be depressed in order to put the cursor pad into effect.

PHOTO BY R.S. POWERS

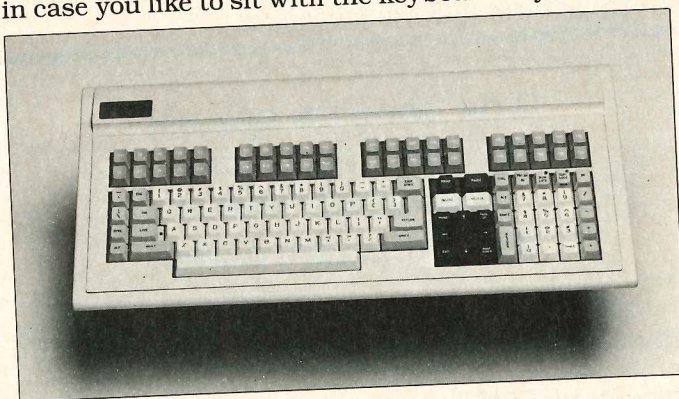
Furthermore, it is important to have the cursor pad turned off when you boot the computer; otherwise, the cursor pad won't work. This fact is mentioned in the documentation, but like most folks we thought we could operate a keyboard without reading the directions and got confused when the cursor pad erratically refused to operate.

The Qubie's RETURN, SHIFT, and CTRL keys are all oversized to about the same degree as those on the DataCom, a great feature in our opinion.

One advantage of a 5151 layout is that there is room for some extra keys at the top, above the cursor and number pads. This usually means an extra CTRL key and a special RESET key that needs only a CTRL (no ALT) to make it work. In the case of the Qubie, the top-row CTRL and RESET are far enough apart to prevent an accidental reset, but by executing a "Rosemary Woods stretch" with the forefinger and fourth finger of the right hand, you can manage a one-handed warm boot.

We were slightly disappointed with the Qubie's feel. It was marginally better—firmer—than the Kaypro PC/286i keyboard, but not much. The keys feel good going down and coming back up, but at the top, when you first press, they wiggle slightly and feel light. This is a troublesome area for keyboard manufacturers. It's necessary to have some play in the keys so that they don't print characters at the slightest touch, such as when you're resting your fingers on the board. A typical "travel" distance for keys is half way down—that's how far you have to press them to make them print. And that is where some wobbling often creeps in.

The Qubie comes with an extra long cord, by the way, in case you like to sit with the keyboard in your lap.



Business Keyboard

The Business Keyboard 9000

At \$350, this board is not for bargain hunters, but it's worth the price in our estimation. From a small new company called Enigma, the Business Keyboard has the best feel of all. In fact, it is the only keyboard we looked at that had an *excellent* feel. The keys are firm under your fingers when you first touch them. There's a medium initial resistance, a medium cushion, and a medium return pressure. You can start right out typing at high speeds with the Enigma keyboard.

PHOTO COURTESY OF ENIGMA RESEARCH

In addition to the nice feel, the keyboard offers an impressive set of 40 function keys across the top, arranged in four sets of ten, each set consisting of two horizontal rows of five. The latest version of SmartKey is bundled free with the keyboard to allow you to control all those function keys.

We had a lot of fun reducing WordStar to a set of single-key commands. We took the first ten at the far left and created three definitions for saving and one for quit-without-saving; this block also served for various manuscript set-ups—F3, for example, became double space, justification off, right margin of 75, elite pitch, page offset of 12. It also held related commands such as AOL ESC to set the left margin at the cursor. The second ten governed fancy cursor movement, find/replace, and paragraph reforms. The third set handled deletions and block commands. The fourth was left for miscellaneous uses.

When it came time to actually write this article, this is the keyboard we used.

Though the general layout of the Business Keyboard is a 5151 design, it has its own variation on this theme. Over on the number pad, you get a comma, a slash, and an equals sign on separate keys; all three of those are missing from the normal 5151 set-up. The tilde (~) and the back slash (\) are over at the left side of the keyboard above the CTRL key, instead of at the right side above and below the RETURN; this allows the SHIFT key to be longer and the RETURN key to curve up to form a backward L. Whoever designed this keyboard did some thinking.

The Business Keyboard even looks pretty. Besides the usual ivory and moss combination within the main set of keys and the numberpad, it sports a black cursor pad and Kaypro-blue function keys.

The obvious appeal of the Key Tronic 5152 keyboard is the bar code reader.

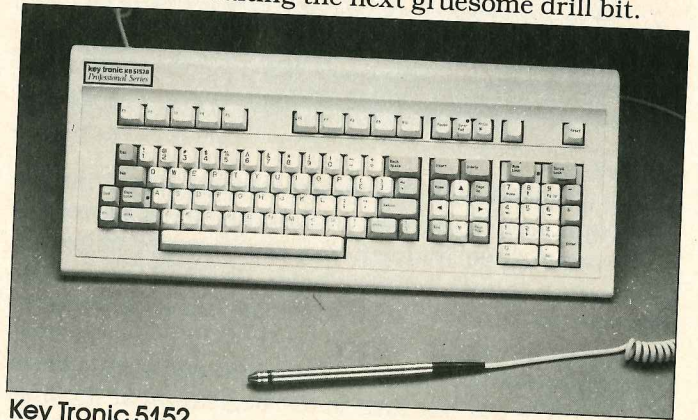
This is the keyboard Kaypro should have used for the PC and 286i.

Key Tronic 5152

Key Tronic is perhaps the best known keyboard manufacturer in the United States. Their 5151 layout has become a standard. We looked at their 5152 model, which is the 5151 keyboard with a bar code reader added. Most of what we said about the Qubie applies to the Key Tronic 5152, including the less-than-perfect feel. There are some slight differences: on the Key Tronic 5152 board the function keys are not oversized and they are laid out in two groups of five across the top of the board. The supplemental keys (like ALT, back

slash [N], and CAPS LOCK) differ in their locations from board to board; we don't consider those locations important, since you'll get used to them.

Because the price of the Key Tronic 5152 is \$795, about \$650 more than that of the Qubie, you would be crazy not to buy the Qubie if all you wanted was a keyboard of this type. The obvious appeal of the 5152 is the bar code reader, an appendage with its own cord that plugs into the back of the keyboard and looks like a dentist's drill awaiting the next gruesome drill bit.



Key Tronic 5152

Bar code is a series of vertical bars and spaces of varying thicknesses that encode a set of identifying numbers or alphanumeric information. Bar code labels are everywhere these days, stamped on all the products in your supermarket, perhaps even on the cover of the copy of *PROFILES* you're now reading.

There are different types of bar codes, and the Key Tronic reader can automatically recognize and read seven of the most common: Code 3 of 9, Universal Product Code, European Article Number, Codabar, Interleaved 2 of 5, Industrial 2 of 5, and Code 11. The documentation gives complete and clear instructions for scanning.

When you slide the wand device over a bar label, the wand "reads" the label by changing the dark bars and light spaces into digital impulses, which it sends to the keyboard for interpretation. The keyboard contains a bar code printed circuit board (PCB), which in turn contains a microprocessor, an EPROM, and a serial port for the wand. The PCB can both recognize the bar code type and measure the pulse widths coming to it. Once it has determined the bar code information, the PCB converts that data into ASCII and delivers it to the main keyboard processor, which transforms it into hex code and delivers it to the computer, where it appears on the monitor as a set of numbers.

We tried it on a soda pop can and a box of noodles, and it works.

The main use for a device like this on a keyboard is for point-of-sale entry of data in small businesses. The nice thing about having the reader attached to your PC is that the information can be entered into complicated software that not only keeps track of inventory but also handles accounting, sales forecasting, and more. A

PHOTO COURTESY OF KEY TRONIC

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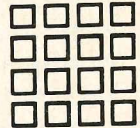
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HARDWARE REQUIREMENTS
CP/M: 64K (53K TPA) & CP/M 2.0 or higher.
MS-DOS: 128K (or more) & MS-DOS/PC-DOS 2.0 or higher - ANSI.SYS.
Printer: 132 columns (compressed pitch supported), continuous forms.
Disk/s: Dual Floppies/Hard Disk/Both - 191K recommended, less works.
CRT: 80/24 with Clear, Home, Clear to EOL, Up, Down, Left, Right.

CURRENT UPDATE:

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

spokesperson for Key Tronic mentioned that a pizza parlor she knew about used a special "menu" behind the counter that had bar code labels next to the menu entries; whenever a customer ordered something, the wand chalked it up.

Is it worth the money?

Since the typical Kaypro owner takes pride in the machine's low price, spending a big chunk of money for the luxury of a spiffy keyboard is not a decision that is going to be made easily. In the end it probably depends on how important certain things are to you, how flush you are at the moment, how much you like to buy yourself presents, whether you have a spouse who might complain—things like that. Of the two of us writing this article, one has purchased an alternative keyboard and one hasn't.

(Editor's note: The Qubie 5161 was being revised as PROFILES went to press, but no information on the revisions was available. We suggest you contact Qubie Distributing for more information.) ■

William Murdick is an English professor at the California University of Pennsylvania. He runs a Kaypro word processing lab on campus, and he wrote a book about Perfect Writer, published by PeopleTalk. Keith Hertzog builds computers and digital electronic equipment. He is a professional programmer who has taught computer science.

Quick Reference Summary

Product: Datacom AT
Manufacturer: Tinma Technology
 16560 Harbor Blvd., Suite R
 Fountain Valley, CA 92708
Phone: (714) 775-3968
Sugg. Price: \$85

Product: Qubie 5161
Manufacturer: Qubie Distributing
 507 Calle San Pablo
 Camarillo, CA 93010
Phone: (805) 987-9741
Sugg. Price: \$159

Product: Business Keyboard 9000
Manufacturer: Enigma Research, Inc.
 4438 Manhattan Beach Blvd.
 Lawndale, CA 90260
Phone: (213) 542-1352
Sugg. Price: \$350

Product: Key Tronic 5152
Manufacturer: Key Tronic Corp.
 P.O. Box 14687
 Spokane, WA 99214
Phone: (800) 262-6006, in WA (509) 928-8000
Sugg. Price: \$795

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Staying in the

BLACK

Using Multiplan to track a mutual fund IRA

by David Kutzler

Individual Retirement Accounts (IRAs) have become very popular in the last few years and probably will continue to be, even if pending tax reform legislation eliminates their use as a tax shelter for some.

Although most of these accounts are invested in bank certificates of deposit (CDs), there are other, potentially more lucrative options, such as mutual funds. However, the risk is greater for mutual funds, and you need to keep careful track of them to make sure you stay in the black.

Unfortunately, the necessary calculations tend to get tedious. To simplify the task of tracking the performance of my mutual fund IRA, I created a Multiplan spreadsheet to automate the calculations. Other spreadsheet programs could be used, of course, but I am most familiar with Multiplan. In this article I'll assume readers have a basic knowledge of Multiplan, but little familiarity with the way mutual funds work or with calculating yields, which I'll discuss first.

CDs versus mutual funds

If you purchase a CD, you are "loaning" your money to the bank for a fixed term at a fixed rate of interest. The bank puts your money to work by loaning it to others at a higher rate. If the bank makes bad loans and becomes insolvent, you could lose your money.

Most banks are insured by the federal government, so CDs are protected from insolvency. CDs are a popular IRA investment because of this high degree of safety. The trade-off for high safety is a low rate of return on your investment. At the time of this writing, a local savings and loan institution was offering 48-month CDs for 8.6 percent. By comparison, if you had invested an IRA in a stock portfolio equivalent to the Standard and Poor's 500 stock index, it would have

returned 31.57 percent for the 12 months ending December 31, 1985. The trade-off for this higher return is lower safety. There is no federal insurance on a stock portfolio.

The Standard and Poor's 500 is a broad index that reflects the stock market as a whole. Some individual stocks did much better and some did much worse. The typical IRA investor doesn't have the resources or expertise to select individual stocks for a diversified investment portfolio. A wiser course may be to invest in a mutual fund. A mutual fund is an investment instrument whereby a number of small investors pool their money to invest in a single, diversified portfolio. Mutual funds are regulated by the Securities and Exchange Commission and managed by stock market professionals.

There are over 1,000 mutual funds to choose from. They each have different philosophies and investment goals. Some have a very conservative investment philosophy, while others are highly speculative. Some have done very well and some have not. The Fidelity Overseas Fund, specializing in foreign stocks, returned a spectacular 73.3 percent, largely on the declining value of the dollar against foreign currency. The more conservative Fidelity Magellan Fund returned only 39.8 percent.

To invest in a mutual fund, you purchase shares of the fund from a mutual fund company or a broker. The cost of the shares will depend on the current Net Asset Value (NAV) of the fund. You may have to pay a sales charge (called "front end load") for the shares. "No load" funds have no sales charge.

The NAV of your mutual fund shares will go up and down daily, depending on the value and earnings of the stocks that the fund owns. If the fund manager makes good investments, your IRA will go up more than down.

If the fund manager makes bad investments, your IRA will go down more than it goes up. Because there is a potential for a poor return on your mutual fund IRA and even a potential for loss of your IRA capital, you must follow it closely. If your mutual fund is a consistent loser, switch your IRA to a different fund.

Calculating yield

Yield is the most relevant calculation for analyzing your mutual fund. The yield is the percentage that the NAV grows in value. You can find the current NAV per share in the mutual fund listings of *The Wall Street Journal* or *USA Today*.

To find the current total NAV yield, divide the current NAV per share by the NAV per share when you bought them, subtract 1 and multiply by 100. The total yield can be annualized by dividing 365 by the number of days that you have invested and multiplying by the current total yield.

Find the total current NAV of your IRA investment by multiplying the number of shares by the current NAV per share. Find the dollar amount that your investment has gained or lost by subtracting the total NAV of your original investment from the total current NAV. Your calculations can be adjusted to reflect the effect of a front end load in load funds.

You could do these calculations "by hand," but automating them using a spreadsheet is far more efficient (and more fun).

Constructing the spreadsheet

To construct our Multiplan spreadsheet, we will set column widths, format cells, fill in labels, supply names, and finally enter formulas.

Column widths. Multiplan allows you to set the width of individual columns. Wider columns are better if they will be used for labels, which tell the user what the numbers on the spreadsheet mean. For example, in Listing 1, row 10, column 1 (see below), find the label

"Total Amount Invested." This label identifies the number in the next column as the total amount invested in the mutual fund.

The default width of a Multiplan column is ten characters. In our spreadsheet, columns 1 and 3 will be set to 28 characters, and column 8 will be set to 12 characters. To set the width, move the cursor to the column, press **F** (for format) at the main menu and press **W** (for width) at the format menu. Type the width and press **RETURN**. Set the widths of columns as described.

Formatting cells. The spreadsheet uses five different formats for displaying the contents of a cell: continuous, fixed decimal point (two places), fixed decimal point (three places), integer, and dollar format. Continuous format allows a label in one cell to continue into the adjacent cell—useful for long titles. Fixed decimal format sets the number of digits that will appear past the decimal point. Integer format shows only the integer portion of a value and rounds any decimal part. Dollar format includes a dollar sign and two decimal places.

To format a cell, move the cursor to the cell, press **F** from the main menu and **C** (for cell) from the format menu. The cursor will be sitting at the first field of the "format cells" option. This field will already have the row and column number of the cell that the cursor is sitting on. If you want to format a different cell, type in the row and column number of the desired cell (i.e., "R3C5").

If you want to format an entire column, type the column number—e.g., "C5" for column 5. To format a large area of the spreadsheet, enter the range of cells you want displayed in a particular format. Ranges are specified by the beginning and ending row or column, separated by a colon. For example, you would refer to the area enclosed by rows 5 through 7, columns 3 through 5, as "R5:7C3:5."

After you have entered the cell reference, press **TAB**

Listing 1 - Main Part of Spreadsheet (with row and column numbers).

	1	2	3	4		
1		MUTUAL FUND CALCULATOR				
2						
3	Fund Name:	Fidelity Magellan (IRA for David L. Kutzler).				
4						
5	Current Date: Day	=	13	Investment Date: Day	=	10
6	Month	=	3	Month	=	10
7	Year	=	1986	Year	=	1985
8	Current NAV/Share	=	\$53.54	Number of Days Invested	=	154
9						
10	Total Amount Invested	=	\$2587.77	Investment Net Asset Value	=	\$2510.01
11	Original Number of Shares	=	67.023	Front End Load	=	\$77.76
12	Re-Investment Shares	=	0.000	Total Number of Shares	=	67.023
13	Purchase Price/Share	=	\$38.61	Purchase NAV/Share	=	\$37.45
14						
15	Current Net Asset Value	=	\$3588.41	Total NAV Gain (Loss)	=	\$1078.40
16	Gain (Loss) in NAV/Share	=	\$16.09	NAV Gain (Loss) Minus Load	=	\$1000.64
17						
18	Net Asset Value Yield	%	42.96	<----- Annualized Yield	%	101.82
19	NAV (Minus Load) Yield	%	38.67	<----- Annualized Yield	%	91.65
20						

twice to get to the format code field. You select the format by pressing **C** for continuous, **F** for fixed, **I** for integer, or **\$** for dollar format. Then press **TAB** to get to the number of decimals field. If the format is fixed decimal, enter the number of decimal places before pressing **RETURN**. Table 1 (below) shows how to format each cell reference.

Table 1 - Spreadsheet Cell Formats

Continuous Format			
R1C1:4	R3C1:4	R4C1:4	R9C1:4
R14C1:4	R17C1:4	R20C1:4	R6:11C8:10
Fixed Format (Two Decimal Places)			
R18C2	R19C2	R18C4	R19C4
Fixed Format (Three Decimal Places)			
R11C2	R12C2	R12C4	
Integer Format			
R5:7C2	R5:8C4	R1:13C6:7	R1:4C9
Dollar Format			
R8C2	R10C2	R13C2	R15:16C2
R10:11C4	R13C4	R15:16C4	

Labeling the cells. Our spreadsheet has two parts. The main part consists of columns 1 through 4 and shows the results of all calculations. The other part consists of columns 5 through 10 and is used for constants and intermediate calculations.

Listing 1 displays the main part. The numbers at the top and left side of the listing are the row and column numbers. Enter the labels in columns 1 and 3. The label in row 1 spreads across 3 columns, but only needs to be entered in column 1 because the adjacent cells are formatted as continuous. To enter a label, move the cursor to the first cell and press **A** to enter "Alpha" mode. In alpha mode, type the label and press **RETURN**. To center the top title, type 18 spaces first, then type one space between the letters and two spaces between the words of the title. In row 3, just type "Fund Name.;" as the rest of the line is only an example. The lines in rows 4, 5, 9, 14, 17, and 20 are made with a string of 76 equals signs in the first column. Do not enter any numbers in columns 2 or 4 at this time.

Listing 2, below, shows the second part of our

Listing 2

Supporting Part of Spreadsheet
(with row and column numbers).

	5	6	7	8	9	10
1	No Month	0	0	First Year =	82	
2	January	1	31	Last Year =	72	
3	February	2	59	Full Years =	0	
4	March	3	90	Leap Days =	0	
5	April	4	120			
6	May	5	151	Comment: To correct for		
7	June	6	181	leap years, enter the		
8	July	7	212	number of leap days that		
9	August	8	243	have occurred between the		
10	September	9	273	investment date and the		
11	October	10	304	current date.		
12	November	11	334			
13	December	12	365			

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spreadsheet. Enter all the labels in columns 5 and 8. Do not enter the numbers in column 9, but enter the numbers in columns 6 and 7. To enter these numbers, move the cursor to the cell, type the number and press RETURN. Enter a zero (0) in row 4, column 9.

Yield is the most relevant calculation for analyzing your mutual fund.

Naming cells. Multiplan allows you to name parts of a spreadsheet—either individual cells or a group of cells. Cells are usually referenced by row and column number—for example, row 5, column 2 would be called “R5C2.” With the name option, you could give R5C2 a name like “annual_sales.” Note that you can use two or more words in a name as long as you separate them with an underscore character. Names will allow you to write more meaningful formulas—for example, “(length*width)” rather than “(R5C2*R6C2)” for calculating the area of a rectangle (the * is read as “multiplied by”).

To name a cell, move the cursor to the cell and press N (for name) from the main menu. Type the name and press TAB. If you want the name to refer to the cell that the cursor is currently sitting on, press RETURN. Otherwise, type the cell or range of cells that the name will reference. Press RETURN after you have entered the reference. Use the name option to name all the cells listed in Table 2, below.

Table 2 - Spreadsheet Names

Name	Reference
Cur_D	R5C2
Cur_M	R6C2
Cur_Y	R7C2
Current_NAV	R15C2
Current_Share_NAV	R8C2
Days	R14C9
Days_Invested	R8C4
Inv_D	R5C4
Inv_M	R6C4
Inv_Y	R7C4
Investment	R10C2
Investment_NAV	R10C4
NAV_Yield	R18C2
NAV_Less_Load_Yield	R19C2
Original_Shares	R11C2
Purchase_Share_NAV	R13C4
Re_Investment_Shares	R12C2
Shares	R12C4
Table	R1:13C6:7

Note: You must use an underscore or underline character to separate words in names that have more than one word. DO NOT use a space or a minus sign.

Entering formulas. The final step is to enter the formulas. To enter a formula, move the cursor to the cell, press V or = at the main menu, type the formula and press RETURN. Table 3, below, is a list of all formulas and the cells they belong to. As you enter the formulas, most of the cells will display an error message because the formula is trying to calculate with missing or illegal data. Ignore this for now. After you have entered all the formulas, save the spreadsheet as “FUNDALC.”

What you’ve done is created a template, a model that can be used over and over. The formulas and labels are there; all you need to do is to plug in new values.

Table 3 - Spreadsheet Formulas

Cell	Formula
R1C9	IF(Cur_Y=Inv_Y,(LOOKUP(Cur_M-1,Table)+Cur_D)-(LOOKUP(Inv_M-1,Table)+Inv_D,365-(LOOKUP(Inv_M-1,Table)+Inv_D))
R2C9	IF(Cur_Y=Inv_Y,0,LOOKUP(Cur_M-1,Table)+Cur_D)
R3C9	IF(((Cur_Y-Inv_Y)-1)<1.0,((Cur_Y-Inv_Y)-1)*365)
R8C4	SUM(Days)
R11C4	Investment/Investment_NAV
R12C4	SUM(Original_Shares,Re_Investment_Shares)
R13C2	ROUND(Investment/Original_Shares,2)
R13C4	ROUND(Investment_NAV/Original_Shares,2)
R15C2	ROUND(Current_Share_NAV*Shares,2)
R15C4	Current_NAV/Investment_NAV
R16C2	Current_Share_NAV-Purchase_Share_NAV
R16C4	Current_NAV/Investment
R18C2	ROUND((Current_NAV/Investment_NAV)-1,4)*100
R18C4	ROUND((365/Days_Invested)*NAV_Yield,2)
R19C2	ROUND((Current_NAV/Investment)-1,4)*100
R19C4	ROUND((365/Days_Invested)*NAV_Less_Load_Yield,2)

Yes, but does it work?

As you read this paragraph examine Listing 1, on page 52. This way you’ll be able to follow the logic of the calculations. On October 10, 1985, I transferred an IRA from a matured CD to Fidelity Investments. The value of the mature CD was \$2,587.77. This amount purchased 67.023 shares of Fidelity’s Magellan Fund, which is a mutual fund. There was a three percent front end load, or \$77.76, which left a net asset value of \$2,510.01 for my investment. The purchase price per share, including the front end load, was \$38.61. The NAV per share (excluding the load) was \$37.45. On March 13, 1986, *The Wall Street Journal* listed the current NAV per share as \$53.54. Over the 154 days that the IRA had been invested, the NAV per share had increased by \$16.09. My investment had grown to a value of \$3,588.41, a total gain of \$1,078.40 for a yield of 42.96 percent. That comes to 101.82 percent annually. Even adjusting for the cost of the load, that’s a gain of \$1,000.64, or a yield of 38.67 percent. To see how my IRA is doing, I only have to plug in the current date and the current NAV per share. The spreadsheet calculates all the rest.

Test your spreadsheet with the sample data in Listing 1. Enter sample values into all the empty cells—i.e., those with a label to the left but no formula to calculate

a value. If your spreadsheet is correct, the formulas will correctly calculate the other values. When finished, save the spreadsheet and sample data as "FIDELITY."

To use FUNDCALC for your own mutual funds, load FUNDCALC, fill in the blanks with data from your own fund, and save it under a file name *other than* FUNDCALC. Use FUNDCALC as a blank template for creating new spreadsheets, rather than creating FUNDCALC over again from scratch.

To use FUNDCALC for your own mutual funds, save your data under a separate file name.

The cell labeled "Re-Investment Shares" requires some explanation. Annually, the fund will distribute dividends and capital gains earned by the fund back to the shareholders. Some shareholders take these distributions in cash for income. In an IRA, this money is reinvested in the fund—that is, used to purchase more shares. Because money is paid out of the fund, its net

assets are reduced. Therefore, the current NAV per share will go down after a capital gains distribution, but you will own more shares. The "Re-Investment Shares" cell is used to enter any additional shares that you acquire through re-investment of capital gains distributions.

One final note: The part of the spreadsheet that calculates how many days have elapsed between the current date and the investment date makes the assumption that all years have 365 days. As you know, every four years, there is an extra day for leap year. To correct for this, enter the number of leap days that have occurred since the investment date in the cell at row 4 column 9.

Now that you have a template for tracking a mutual funds, think about setting up templates for keeping track of other investments. It's the tool of professional investment counselors, and their *business* is to keep their clients in the black. With the help of Multiplan, or any other spreadsheet, you can make it your business too. ■

David Kutzler is the owner of Medical Computer Consulting and an advocate of using computers to maximize profits from investments.

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Your Kaypro & Your Health

The special concerns of the computer user

by Kathy Kellogg

Does your Kaypro give you a pain in the neck or a kink in your back? Do your eyes burn and your tensions grow if you spend a long time at the keyboard? Have you heard somewhere that computers cause cancer and video display screens induce miscarriages . . . What's going on here? Could the office wonder of the '80s be a threat to your health?

The truth about radiation

Remember when your mother told you to move back from the television set because it was bad for your eyes, or you'd become sterile, or the X-rays would get you? Back in the 1950s, Mom was almost right. In the late 1960s, scientists discovered that some of the early television sets were emitting excessive amounts of X-rays. That problem was corrected and TVs have been monitored closely ever since, but some computer users still believe the worst because computer screens and TV sets share a common element: the picture (cathode ray) tube—prime emitter of radiation.

Take, for example, a letter in the "Q & A" column of the September 1985 *PROFILES*, which related a common misperception: One reader "heard through a colleague" that a typical Kaypro user "receives the equivalent of dozens of chest X-rays each year" from the microcomputer screen radiation emissions. Could that be the echo of Mom's warnings?

PROFILES' technical editor Tom Enright set the record straight: Radiation from computer screens and other video display devices is closely regulated. Furthermore, these emissions are usually less than the normal "background radiation" of our environment—so low, in fact, that in many cases they couldn't even be measured.

Two studies by the National Institute for Occupational Safety and Health (NIOSH) and the Center for Devices and Radiological Health of the Food and Drug

Administration conclude that video display terminals (VDTs) do *not* pose an X-ray hazard. This concurs with the findings of other researchers around the world.

But maybe you've heard that VDT work during pregnancy is associated with birth defects and miscarriages—again blamed on radiation emissions. The concern that computers might pose a reproductive hazard spawned dozens of research studies. The most extensive is being performed by NIOSH. Although a final report will not be published until 1988, study results appear to support the side of computers: There is no scientific evidence indicating that VDTs cause birth defects or miscarriages.

Still not convinced? There's no need for lead aprons, but you can increase your safety margin by avoiding color monitors (which give off more radiation than

Real discomfort is possible if the user spends long periods at the keyboard.

monochrome screens). Also, keep the screen only close enough to see the characters clearly—usually two or three feet—because the farther away you are from the screen, the lower the radiation level (thanks, Mom).

The pain in the neck syndrome

No doubt about it, eyestrain (with symptoms like burning eyes, blurred vision, and headaches) and aching backs, necks and arms are widespread computer user complaints. Numerous surveys have shown that real physical discomfort is a possibility, especially if the user spends long, uninterrupted periods at the keyboard.

As irritating as the aches, pains, and blurred vision may be, the symptoms are only temporary. In fact, two groups of experts (the National Research Council and the American Academy of Ophthalmology) concluded that VDTs are safe for normal use and will not cause permanent visual changes.

Frequently, visual and muscular symptoms can be reduced or eliminated altogether simply by modifying equipment or workplace conditions (some suggestions are offered below). Further, regular rest breaks during a period of intensive screen work often help. Try switching off between screen reading and paperwork, or, better yet, save your file, turn down the screen brightness, and go for a short walk occasionally.

Setting up your work area

Ergonomics is a new branch of engineering related to people and their tools and how they function best together. As computers appear in more and more offices and homes, the physical design of the office environment deserves consideration to eliminate unnecessary sources of stress and pain.

Lighting. First, consider your VDT screen lighting. In case you never looked, there is a knob that controls screen brightness on the back of your Kaypro. Use it. A screen that is too light or too dark will cause eyestrain.

Proper room lighting is also of prime importance to eliminate glare and eyestrain. Unfortunately, the overhead lighting designed for reading hard copy and for desk or typewriter work is poorly suited to the computer screen. In fact, screen work would be much easier in a nearly dark room.

Try turning off or reducing the ceiling illumination and adding flexible "task lighting" (small, directed beams) where you need it. Position the light source outside the direct line of sight and so that it does not reflect off the computer screen or create glare spots on the desk.

Also, take into account the light from windows, which can also cause VDT glare. Windows should be covered with drapes or blinds, but if you miss the view, position your computer screen at a right angle to the window to minimize the glare.

Finally, consider investing in a glare-reducing screen filter or hood. I use them and they work.

One more suggestion: Never wear sunglasses as the ultimate anti-glare measure. It may sound good in theory, but authorities agree that darkly tinted lenses worn indoors may cause more visual problems than they seem to correct.

Furniture design. Office equipment and furniture intended specifically for computer use is plentiful, but

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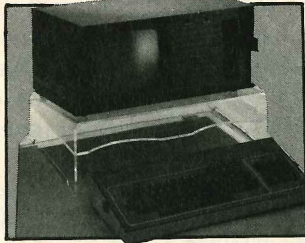
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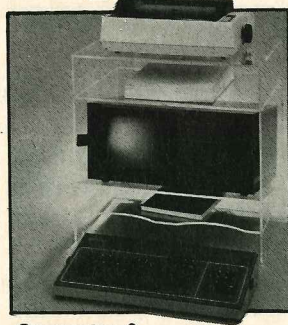
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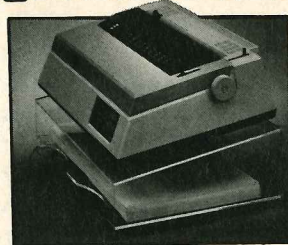
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Keep in Mind

As you read through *PROFILES*, there are a few things we recommend you keep in mind.

First, notice that every feature article is labeled with a legend at the top of the page that indicates which operating system and what level of expertise it addresses. For example, **Beginner 8/16** means that the article is for novice users of either the CP/M (8-bit) or DOS (16-bit) machines. We will strive to provide a full range of material in each issue to meet the needs of all readers.

Second, there is an unavoidable three-month delay between the time we receive an article and the time it is published. We make every effort to provide current information, but both commercial and public domain software is revised frequently, so the versions discussed in *PROFILES'* articles may not be the latest.

In the area of hardware, some of the same cautions apply. The important aspect with hardware is to be sure about which model and series ('83 or '84) the product works with.

"Let the buyer beware" is always wise advice. For the reasons mentioned above, we recommend that you always call the manufacturer of any product for the latest information on revisions, price changes, etc.

Finally, while reading articles, please note that all commands are in boldface type. This is to help you see at a glance what is part of the command and what is not. You should enter everything that appears in boldface, including colons, semicolons, etc. □

HEALTH

before you take off on a shopping trip, consider some design factors.

The position of the computer's keyboard and screen on your desk often makes the difference between comfort and pain, and the Kaypro's two-piece, adjustable design makes proper positioning possible. The screen should be positioned below your normal line of vision (you should be looking down at it), and tilted to match your normal neck slope (about ten degrees from vertical).

Ideally, both chair and desk should be adjustable. One design won't work for everyone.

The keyboard should be at elbow level, allowing your arms to remain parallel to the floor while you're working. Most standard office desks are too high.

Keep these optimum computer screen and keyboard positions in mind when selecting your workstation furniture. Ideally, both chair and desk should be adjustable. One design won't work for everyone because people come in all shapes and sizes.

Speaking of chairs, experts do not agree on which seating style is best: the new "kneeling" variety or the traditional office chair. However, keep in mind that strong back support will minimize many complaints. Don't settle for a chair borrowed from the dining table.

Where to find out more

Although your computer may be giving you various aches and pains, they're all temporary, I assure you. Research gives computers a clean bill of health. But if you're interested in more information on the latest computer-health studies, you can send for these booklets:

Health and Safety Aspects of Video Display Terminals, Second Edition 1985, The American Council on Science and Health, 47 Maple Street, Summit, New Jersey 07901

National Research Council, *Video Displays, Work and Vision*, 1983, Office of Publications, National Academy of Sciences, 2101 Constitution Avenue, NW, Washington, DC 20418

Slesin & Zybko, "Video Display Terminals: Health and Safety," 1983, *Microwave News*, P. O. Box 1799, Grand Central Station, New York, New York 10163

Kathy Kellogg is a freelance photojournalist who lives near Tacoma, Washington. The author of several articles and two books, she regularly works on two Kaypro computers.

What's Coming in Future Issues

Here's a sampling of the articles you can expect to find in *PROFILES* in the next few months.

In the programming series

In the October issue, author Tom Wagner will explore the elements common to most high-level languages so that you can recognize them wherever you see them and can thereby learn a new language more easily. In December, programming teacher Jerry Houston will tell beginning programmers how to produce more professional work by learning to write pseudocode and flow charts, and in January, he'll begin the language-specific tutorials with a "tour" of the bundled BASICs: MBASIC and GW-BASIC. If you're interested in programming, stay tuned—this series will be open-ended, and we'll offer material both for beginning and more advanced programmers.

Coming attractions

• Popular contributor Ted Silveira plans a study of desktop publishing—what it is, what it means, and

what's required to do it. Watch for this overview of a hot new topic.

• Investing in the stock market will always be a gamble, but the right software may help you sort through more information and thereby make sounder investment decisions. Author Jim Spickard provides an overview of aids for the individual investor.

• If you are brand new to telecommunicating, you may not yet have gotten to the big information utilities—they offer a wealth of services, but can intimidate neophytes. Mike Craig and William Murdick will look at what Kaypro users can find on CompuServe, and they'll offer directions for finding your way around like a pro.

• A number of new users have written saying that they have managed to learn the basics of WordStar, but really don't know what they can do with the rest of their bundled software. Don and Sharyn Conkey will provide a round-up of practical uses, including some real-life examples.

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Tip Trader

edited by Marshall L. Moseley

(Editor's Note: Marshall Moseley, PROFILES' new assistant technical editor, has taken over editing duties for "Tip Trader," and the format of the column has changed slightly. Marshall will start off the column with his own tips, followed by those from readers. If you have a tip you'd like to share, please send it to Marshall Moseley, "Tip Trader" Editor, c/o PROFILES Magazine, 533 Stevens Ave., Solana Beach, CA 92075.)

WordStar printing macro

This month we'll start with a new keyboard macro for WordStar. This macro allows you to print the file you are currently editing and return you to the place in the text from which you started. The sequence of commands is:

```
^KS^QP^KP^R<CR><ESC>
```

There is one important limitation to this macro: Notice that it makes use of ^R to automatically fill in the file name at the print prompt. If you have only worked on one file during your session, WordStar will insert the name of that file. If you have worked on more than one file, it will insert the name of the *previous* file. For example, if you've worked on four files during one session, it will insert the third file's name. If you usually work on only one file per session this macro is ideal.

A simple drive diagnostic

Here is a quick and inexpensive method to test your floppy drives for proper operation. This method involves a lot of disk swapping, but it does not require any expensive equipment or analysis programs. All you need is the CP/M disk that came with your Kaypro.

Place the CP/M disk in drive A and a blank, unformatted disk in drive B. Run COPY and choose the "BLANK" option to create a blank, formatted disk. Now swap disks—place the blank disk in drive A and the CP/M disk in drive B. Then

warm boot your computer by pressing ^C. Check for the A > prompt.

Log onto drive B, PIP all the files to drive A and verify the transfer (PIP A:=B:*. * [V]). Run SYSGEN from drive B, and place the operating system in drive A. To do this choose O for the "Other" option on the COPY menu. Then choose S for SYSGEN, making drive B the source and drive A the destination. Warm boot your Kaypro again and check for the A > prompt. Log onto drive B and erase all the files.

Log onto drive A, PIP all files to drive B, and verify the transfer. SYSGEN drive B from drive A. Swap disks, warm boot, and check for the A > prompt. Then COPY the disk in drive A to drive B and verify the copy (choose O on the COPY menu, and press V for verify).

If you complete this procedure without problems, your drives are probably okay. Hurrah!

If you are unable to successfully complete the procedure, the problem may not be with your drives. You could have a bad disk, or you may have improperly entered a command. Try the procedure with new disks and a new copy of CP/M from your master disk. Check with your local users group to make sure you're entering the commands correctly.

Still having problems? Another possibility is that your Kaypro may have a bad RAM chip. PIPping all the files on a disk utilizes a large amount of memory and may not work properly if the RAM chip is bad.

If you're unable to complete this procedure successfully but have never lost an important letter or had a disk go bad, don't worry about it—"if it ain't broke, don't fix it." Make frequent backup copies of all your disks just to be on the safe side.

If you are unable to complete the above steps successfully and you are losing files or trashing disks, try cleaning your drives with a head cleaning kit. If you are still

experiencing problems, then take your Kaypro to your dealer for professional analysis. Your computer may need a new drive or the drives may need to be aligned.

Mark Slonim
San Diego, California

Saving your screen

In our first "Beginner's Luck" column in the July/August 1985 PROFILES, we mentioned that leaving a static image on the screen for extended periods of time can cause the electron beam that produces the display to permanently etch the display image on the screen.

We recommended that users either turn down the intensity when the screen is not in use, or use a program that blanks out the display after a short period of time. We did not mention specific programs or where to get them, and we'd like to provide that information now.

Our experience is primarily with PC-DOS and MS-DOS. It's relatively simple to locate screen blanking programs in the public domain for these systems. Most notable are SCRNSAVE, MONO BLANK, MONBLK2, and MONITOR BLANK. Some graphics cards provide screen blanking software (e.g., the Hercules SAVE program).

In searching for a screen blanking program for a Kaypro 4'84, we contacted two Kaypro dealers, the local Kaypro Users Group public domain software librarian, and two mail order companies.

Unfortunately, we could not locate a program in the public domain or over the counter. Some of the individuals said they thought they had seen such a program, but were vague on details.

That's the bad news. Here's the good: A call to Advent Products Inc., 3154-F E. La Palma Ave., Anaheim, CA 92806, uncovered a video blanking ROM for \$19.95, plus \$2 shipping and handling. The ROM chip will provide automatic screen blanking after 10 minutes of inac-

tivity. You restore the screen image by pressing any key. This chip is available for the Kaypro 2'83, 2'84, and 4'83. According to Advent, there is no soldering or special wiring required. You remove an existing chip, install the video blanking ROM in the same socket, and then clip a wire to a pin of another chip.

We're not sure what CP/M versions are supported by this chip. Advent Products' national phone number is: (800) 821-8778. In California call (800) 521-7182.

Hope this information is helpful.

Don and Sharyn Conkey
Las Vegas, Nevada

MailMerge and dBASE II

I enjoyed the article on MailMerge in the February *PROFILES*. I call on 15 to 30 offices a day and use this program often. At the end of the day I use dBASE II to make up a list of the people who showed an interest in my service, although I use a different set of instructions:

1. COPY STRUCTURE TO TEMP
2. USE TEMP
3. APPEND

This leaves me a fresh file for the day's work.

4. DO LABEL
5. COPY TO MM.TXT DELIMITED WITH ,
6. USE MASTER FILE
7. APPEND FROM TEMP
8. QUIT

At this point I make the backup of my new master file. I copy MM.TXT to the WordStar disk in drive B, and then print off a copy of my thank-you letters, which also cover the items we discussed during my visit.

Since I call on many people on the same street and in the same town, I have found QuickKey very helpful in filling in the dBASE II file.

Edward L. Trumble, Sr.
Indianapolis, Indiana

Retrieving lost files

In the "Q & A" section of the May

1986 issue of *PROFILES*, John Sanger asked: "My computer dealer wasn't aware of any software that would bring back all erased files on a disk. Do you know of any?"

The answer should have been yes. The one that he was using—UNERA—will do it.

When using UNERA you must use the drive name to make it work with wildcards. Here's an example:
B:*. * will revive all files on the disk. (This is what he is not doing.)
B:*.TXT will revive all TXT files.
B:*.MSS will revive all MSS files.

Be careful when using wildcards, because old files and earlier versions of current files may be resurrected.

UNERA version 1.5 will *not* do the job, but UNERA version 1.9 *will*. I wasn't aware that there was more than one version until recently. (*Ed's Note: The latest version of UNERA is 3.0.*)

Another alternative is RECOVER, by Quest (\$14.95). They're at 9 N. Main St., Suite 100, Lombard, IL 60148; (312) 953-2099. They claim RECOVER can recall accidentally erased programs even if you don't remember the program name.

Lawrence F. Blais
Fullerton, California

Perfect Writer and RAM disks

Durwin Schmitt is absolutely right when he extolls the virtues of a RAM disk in *PROFILES* for May. Mine has been invaluable in editing and spell-checking large (more than 100K) files with Perfect Writer. But I've found some ways to improve on Mr. Schmitt's RAM disk techniques.

This is the SUB file I use at turn-on, after running the RAM disk driver to set up drive A as RAM disk:

```
PIP A:=B:PIP.COM
A:
PIP A:=B:PWS-B/A.COM
PWS-B/A
```

```
PIP A:=B:PW.COM
PIP A:=B:MENU.COM
PIP A:=B:XD.COM
PIP A:=B:PF.COM
PIP A:=B:PF.DAT
PIP A:=B:PP.COM
SAVE Ø GET.COM
C:SUBMIT C: SPELL
MENU
```

Note that PIP is the first thing that gets put on the RAM disk. Then PIP is run from the RAM disk for the rest of the SUB file. This saves a lot of floppy drive time, because PIP doesn't have to be loaded from the floppy for each transfer.

As you can see, I don't copy PW.SWP to the RAM disk. That would limit its size to the 64K swap file on the PW floppy. Instead, I use PWS-B/A.COM to create a swap file of the size of my choice (16K to 208K) on the RAM disk. PWS-B/A.COM was compiled from a very slightly modified version of the S-BASIC public domain program PWS>BAS, available from the Kaypro SIG on CompuServe. The only difference is that PWS-B/A.COM reads from drive B and creates the SWP file on drive A, while the original program did the reverse. This generation of PW.SWP takes a little more set-up time, but it is less wear and tear on the floppies and gives a large or small swap file as needed.

C:SUBMIT C:SPELL is used to load Perfect Speller files from a SUBMIT file on the second floppy. Since I have a Kaypro II with single-sided drives, the RAM is the only way I can have Perfect Writer, Formatter, Printer, and Speller, plus data files, available simultaneously without constantly reloading floppies.

One last tip: 256K DRAM chips are now very inexpensive. It may be possible to save some money by buying a basic RAM disk board and filling in the remaining memory sockets yourself.

Joe Moell
Fullerton, California

Coping with Plu*Perfect

The letter in the May "Q & A" column from Adolph Amster concerning incompatible software and the Plu*Perfect CP/M 2.2E prompts this response.

I, too, have run into various problems with software and hardware conflicts using 2.2E. However, all of them have been solved. The 2.2E manual briefly covers the interrupt situation, and there are several technical bulletins about the problems available from Plu*Perfect.

The installation disk comes with a non-interrupt version of 2.2E called CPMENI.PRL. By changing the name of the interrupt-driven system from CPME.PRL to CPM-EI.PRL, and the non-interrupt system's from CPMENI.PRL to CPME.PRL, you can create a non-interrupt system by reinstalling 2.2E. (On K10s it's still called PUTCPME.COM; on floppy-based systems it's CPME6400.SYS.)

Also, switching to this system straightened out my problem with dumping to the printer in MITE ver. 2.75. It allowed for proper installation of the Kaypro 10 hex file to MITE ver. 4.06, which had refused to install and work previously.

The best bonus was in fixing the "hot boot" hang-up that was occurring when my SWP RAM disk was loaded along with Backgrounder. I had been forced to leave a bootable disk in my C drive to keep the machine from hanging up.

The people at Plu*Perfect Systems seem to be very anxious to solve compatibility problems, the latest being the Turbo ROM trouble with SWP PCDOS.COM. This has now been fixed with a simple patch to the software.

Peter Stern
Fairbanks, Alaska

Drive swapping

I have just finished reading the fine article by Ted Silveira ("Do-It-Yourself Drive Swap") in the June issue of *PROFILES*. Since I have recently

had to replace a disk drive on my Kaypro II, I would like to add several comments to the article based upon this experience.

The A drive started booting erratically and finally not at all. My first thought was to check the timing, which hasn't been adjusted on this drive since it was new. A friend who is a hardware expert tells me that a high percentage of 5-1/4-inch drive troubles are associated with timing. This requires that both of the drives be slipped out with the ribbon and power connectors attached.

The top drive is turned over, exposing the pulley and belt system. The larger pulley has two series of radial lines on it. After making sure that there are no extra electrical contacts made due to the awkward position of the drives (I placed a piece of cardboard between them), turn the computer on. The set of lines marked 60 Hz should appear to be still under fluorescent light when the pulley is turning, or else the small adjustment screw must be turned to make these lines appear still. If this turns out to be impossible, or if the drive slows down when you insert a disk, then it is reasonable to conclude that the drive motor is at fault.

A new motor can usually be purchased for about \$20 and can be installed without too much difficulty if you are mechanically inclined. I was tempted to go this route until I noticed an ad in *Micro Cornucopia* for rebuilt and tested drives that are direct replacements. The company, Janick Data (1869 River Birch Dr., Sumter, SC 29150, 803/481-9205), was very friendly. The Tandon SS/DD drive was advertised at \$35. All it took was a phone call and the drive was on its way COD.

It was no surprise that drive A failed, since this is the drive most used. However, I really did not like being without my trusty Kaypro. The Tandons, in my case, had the drive determined by a drive selec-

tor jumper block that was located about halfway down the drive printed circuit board. The new disk came with an empty socket for the selector block. I unplugged the B selector block from the lower drive and put it aside. Then I unplugged the A selector block and plugged it into the lower drive.


The computer was reassembled and turned on, but now the computer believed that the lower drive was drive A, so I was able to use it while waiting for my new drive to come. A week or so later the rebuilt drive arrived. I plugged the A block selector into it and the B block selector into the lower drive. The drives were installed and the computer was put back together, and it now is as good as new.

Edward Gelerinter
Akron, Ohio

Screen colors

If you have an MS-DOS computer with a color monitor you can make your screen display any color.

First make sure that your boot diskette has the file ANSI.SYS on it. Create a text file on that disk named CONFIG.SYS, and put a line in it that reads **DEVICE=ANSI.SYS**. These files work together to make your screen behave like an ANSI terminal—a widely accepted standard for terminals.

To display different colors, you must use *ANSI escape sequences* in conjunction with the PROMPT command. To make the text blue, for example, type **PROMPT \$e[34m\$p** and press **ENTER**. The phrase "\$e[34m" is the escape sequence for turning text blue, while "\$p" sets the prompt to display the current drive and directory. You do not have to stop with changing the text; you can change the background color as well. The command to make the text blue and the background white is **PROMPT \$e[34m\$e[47m\$p**. Your MS-DOS manual has more about ANSI escape sequences. 

Beginner's Luck

by Don and Sharyn Conkey

Introduction to data bases

We're living at a time when information is so abundant that it's nearly impossible to keep up with it. But information is only a raw material. It's not the finished product; it's not the knowledge that enables us to work faster and more productively or to make better decisions. As author John Naisbitt observed in his bestselling book *Megatrends*, "We are drowning in information but starved for knowledge."

Data base management systems (DBMSs) are the high-tech solution to the problem of managing information. With a data base system you can collect, organize, store, update, retrieve, and report information quickly, accurately, meaningfully, and efficiently. Here is an introduction to the terms and capabilities of DBMSs and some tips on how to use them.

Definitions

A *data base* is a collection of information. The telephone book is a data base, as is a dictionary, recipe file, card catalog, or the *Reader's Guide to Periodical Literature*.

An item in a data base is called a *record*. The telephone listing for John Smith, the definition of "electronic," the card catalog entry for *The Bible*—all are records in our data base examples.

Types of DBMSs

There are several types of data base management systems, categorized by how the system organizes and manages the data. The simplest, and usually cheapest, is more appropriately called a *file manager*, or *information manager*, because the data base must be contained in one file. Perfect Filer and pfs:FILE are file managers.

A *relational data base*, on the other hand, can consist of multiple files, each one laid out in a tabular structure, each one consisting of individual records. R:BASE and dBASE are relational data bases.

All files in a relational data base (all tables) must have at least one field in common. A salesperson, for example, can keep a customer file that includes the information in Figure 1, along with a unique customer number for each record. He or she can also keep a product file that contains the customer number and the products that customer buys. It's not necessary to duplicate the name, address, and telephone information in the product file. The relational data base can associate the information in both files based on the field common to both files (customer number).

Capabilities

What can you do with a data base

You might specify that 20 characters will constitute the last name, 10 characters the first name, 20 the address, and so on, and you might require that the "last activity" field be a date.

Most systems will prompt you for the data to go into fields in a way that's easy to follow—when you finish inputting one field, the cursor jumps to the next.

The DBMS controls the editing and modification of fields within the records, as well as record addition and deletion.

Examining records. With most data base systems, it's relatively simple to design and print a report. Do you want to see a long listing of all records, one field per line? Or would you prefer a tabular presentation, one record per row? Is it time to print mailing labels? The DBMS allows you to create various report formats.

The real beauty of a DBMS, though, is its retrieval capabilities. You can look at whole records, parts of records, all records, or any subset of records that meet criteria you specify.

For example, we could use our mailing list to print labels for only those customers living in Phoenix, Arizona. We would command the DBMS to retrieve only those records whose "City" field held "Phoenix" and whose "State" field held "AZ." Or our salesperson could search the customer file for only those customers who bought in the past year, and the system could then retrieve only those records whose "Last Activity" field held a date greater than the date a year ago today.

Many companies keep inventory data bases with fields such as part number, description, price, and reorder quantity. It's simple to ask for a listing of all parts whose reorder level is greater than or equal to the inventory level.

People who work with personnel data bases might ask to see a list of all the employees who turn 65 this

Figure 1: Mailing List Database

Recd #	Last Name	First Name	Street	City	St	Zip	Phone	Last Activity
1	Smith	John	4 Oak St	City	CA	92123	415-555-1234	9/9/86
2	Jones	Jerry	82 Main St	City	CA	92124	415-555-5678	9/9/86
3	Edwards	Mary	33 Pine St	City	MD	20810	301-555-2345	3/3/86
4	Eisberg	E	5 Fifth Ave	City	NY	10001	212-555-6789	8/9/86

Records are made up of one or more *fields*. A field is a single piece of information. A record in a mailing list data base might include these fields: last name, first name, street address, city, state, zip code, telephone number, and a field indicating the last mailing activity for that record. (See *Figure 1*.)

management system? It depends on the particular software, but in general you should expect some form of these features:

Creating/updating. To create or update a data base, you must define the format of its records. For example, to keep a mailing list, you first define the fields in each record.

year, or those who have been with the company between five and ten years.

Manipulating data. In many cases, just seeing the records is not enough. The records are pure data; they contain raw information. The DBMS provides manipulative capabilities that turn this information into knowledge. Using these operations and report generation features, you can massage your data into reports that have little resemblance to the raw data base records.

For example, many DBMSs include arithmetic functions, such as summation, totaling, and averaging. The mailing list system could provide a count of active customers by zip code, or zip code range—an indication of the success of marketing by geographic area. The inventory system could provide a cost for replacing all parts on which stocks were running low; it could even total the bill by supplier. The personnel system could provide a count of expected retirees by year, as well as an indication of the financial effect of their departure on the company.

Speed and space

Eventually, you'll need to sort your records. You might want to sort your mailing list by zip code when you're ready to print labels. You might want to sort your inventory by value, listing your stock from highest value to lowest. You might need to sort your personnel alphabetically within departments.

The only problem with sorting is that it usually creates a new file of sorted records, chewing up both disk space and time.

Indexing is a more efficient "sort." An index is a table that contains keys to data base records and pointers to their locations. The records themselves are not physically rearranged. We could "index on" the zip code in our mailing list, for example, to establish a list that appears to be organized as in Fig-

ure 2, below.

Actually, the index file looks like Figure 3, below. It contains the key field (Zip Code) and a pointer (Record Number) for each record. The records in our data base are still in

those with any other software application—poorly understood objectives, poorly organized files, poor data maintenance. Some tips:

Plan. Lay out your objectives. What are the parameters (i.e.,

Figure 2: Mailing List, Logical Order After Indexing

Recd #	Last Name	First Name	Street	City	St	Zip	Phone	Last Activity
4	Eisberg	E	5 Fifth Ave	City	NY	10001	212-555-6789	8/9/86
3	Edwards	Mary	33 Pine St	City	MD	20810	301-555-2345	3/3/86
1	Smith	John	4 Oak St	City	CA	92123	415-555-1234	9/9/86
2	Jones	Jerry	82 Main St	City	CA	92124	415-555-5678	9/9/86

the same physical order. Logically, however, they are in the order reflected in Figure 3. This logical order gives you a "picture" of the data that is different from the physical order. In our example, you might want to index on "Last Name" for an alphabetic picture or on "Last Activity" for a time-lined view of the data.

Figure 3: Index File

Recd #	Zip
4	10001
3	20810
1	92123
2	92124

You can keep multiple indexes active simultaneously. (The number of allowed open indexes will depend upon your software.) When records are added, updated, or deleted, the open indexes are updated also.

With an index, you can find and retrieve records faster than without, because the DBMS does not have to search through your entire file. It uses the index file to find records. With our zip code index, for example, we could quickly retrieve records with specified zip codes, then print mailing labels for the selected records in zip code order.

Tips and tricks

Pitfalls common to data base management systems are similar to

determining factors) of your data base? How big is it? How big will it get? What information will it contain? What information do you expect to glean from it? What reports will it produce?

Organize. Blueprint your data base on paper. Lay out each record, organizing your information logically, putting similar or frequently

updated information together. Plan for the maximum field and record sizes, within reason. For example, if you're keeping a mailing list of business users, you might want to leave four fields to hold the common four-line business address.

For ease of use, give data base fields short, descriptive, and easily remembered names.

With a relational DBMS, it's best to trade off fields for files—use fewer fields, more files. According to Ashton-Tate, publishers of dBASE, most data base software performs most efficiently with 16-20 fields per record.

Use integer values (whole numbers) instead of floating-point values (numbers with decimal points) where possible. They take up less memory, and operations on integ-

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ers are several times faster.

Maintain. Where many people have access to the data base, make one person responsible for updating. Follow a regular backup schedule; keep hard copy. Keep your data base clean by deleting records or files you no longer need.

Use your Kaypro to organize your data, to turn your information into knowledge. There's a payoff. As statesman Francis Bacon noted centuries ago, "Knowledge itself is power."

Don and Sharyn Conkey teach and write about microcomputers for business people. They are frequent contributors to "Beginner's Luck."

KUG Corner

Kaypro Users Groups (KUGs) are non-profit membership organizations devoted to making life with a Kaypro easier and more useful.

KUGs exist in every state and in countries all over the world, including Canada, France, Belgium, Germany, Finland, Switzerland, Saudi Arabia, and Australia.

KUGs receive periodic mailings and *ONKUG*, The Official News-diskette of Kaypro Users Groups. *ONKUG*, compiled by KUG Manager Jim Durkin, is full of handy public domain software and interesting text files—a great way to get programs without the expense and hassle of downloading.

To find the KUG nearest you, write to Jim Durkin at Kaypro Corporation and include your home address, state, and zip code. He'll send you a list of the KUGs in your immediate area.

Jim also maintains a BBS, on-line continuously. It's KUG ROS, and it has public domain software for CP/M and MS-DOS. Call (619) 259-4437, (300/1200 baud).



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by Tom Enright

What is the EGA (enhanced graphics adapter) card, and what do you gain by using one?

The EGA card is touted as *the* new IBM color/graphics standard that absolutely everyone is going to switch to immediately. It offers improvements in resolution and number of colors available compared to a standard CGA (color graphics adapter) and regular RGB monitor.

The question is, are these improvements worth the trouble and expense of upgrading your computer system?

If you are satisfied with the video on your current system, the answer is no, and you don't need to read any further. But if you aren't sure, or you're not familiar with the EGA standard, keep reading. We'll explain the limitations of the CGA card and the improvements the EGA standard delivers.

The CGA standard

You may be aware of the limitations of the CGA card and RGB monitor. You can display text in 16 colors, medium-resolution (320 x 200) graphics in four colors, and high-resolution (640 x 200) graphics in two colors. This would be adequate for most of us if the quality of the displayed text was reasonable—unfortunately, it isn't.

Text displayed on a standard IBM-compatible RGB monitor is grainy and very hard on your eyes. Each character on the screen occupies a character cell 8 dots wide and 16 dots high. The problem is that only every other vertical dot is used when a character is displayed on the screen. This grainy text is why the CGA card is sometimes called "an optometrist's best friend"—it sends them more patients needing new glasses.

The standard IBM RGB monitor has 400 rows of dots called scan lines. IBM decided to use only 200 of the 400 scan lines when designing the CGA card. So, even though

the CRT still has 400 scan lines, supporting circuitry in the monitor and video card uses every other line. They adopted this compromise to reduce manufacturing costs and thus sell the video cards and monitors at a more attractive price—even IBM was concerned about pricing itself out of the market when it introduced the PC.

As we've seen, the legacy of that pricing decision is that the standard CGA card and RGB monitor cannot deliver acceptable resolution in text mode. IBM was aware of this from the outset and planned to introduce higher-resolution video cards if the PC was accepted in the marketplace. It just took them a few years to get the higher-resolution cards ready.

The EGA standard

The second step up the resolution ladder is the EGA card, which we are talking about here. (Even further up the ladder is IBM's PGC—professional graphics controller—which gives a resolution of 640 x 480 pixels and 256 colors out of a palette of 4,096 possible colors. The PGC card and monitor will set you back about \$4,300. It's intended for

High resolution is now 640 x 350 pixels and can be in 16 colors out of a 64-color palette. (The CGA allows two colors at this resolution—a black background and the foreground color of your choice.) Most EGA cards also include a monochrome graphics mode to give you 640 x 350-pixel graphics on a monochrome monitor.

Not all EGA cards can display the same number of colors. The limiting factor is the amount of memory the card has. With 64K of memory, you are limited to four colors in high-resolution graphics mode and no uploadable display characters. At 128K you get all 16 colors in high-resolution mode, as well as uploadable characters.

The maximum memory on an EGA card is 256K. At this level you don't gain any more colors, but you do get two additional screen pages in high-resolution graphics mode. A screen page is a complete screen image in video RAM. If you have more than one screen page, you can rapidly switch pages to instantaneously (almost) see a completely different image.

The EGA monochrome graphics mode deserves some special men-

The EGA card, with the RGB monitor, gives a much better performance than the CGA card.

professional graphics users.)

The EGA card, with a compatible RGB monitor, performs significantly better than a standard CGA card. Text is sharp, readable, and can be displayed in 16 of the 64 colors the EGA card can define. You also have the ability to upload 512 user-definable display characters (to create your own fonts).

Medium resolution is still 320 x 200 pixels, but there are gains in the number of colors (16 instead of 4) that can be displayed at one time.

Monochrome graphics on the EGA card has 640 x 350-pixel resolution. Many people have assumed that this is the same as Hercules monochrome graphics—it is not. Hercules monochrome graphics has 720 x 348-pixel resolution. The two are not compatible in any way, shape, or form, though some EGA cards, such as the QuadEGA+ from Quadram, support both EGA monochrome and Hercules monochrome graphics.

EGA monitors

To take full advantage of an EGA card you need to have a compatible monitor. Since the circuitry inside the monitor must support more of the dots on the CRT, the EGA-compatible monitors cost more because they are more expensive to manufacture.

Programs must support the EGA standard if they want the extra colors and resolution.

A CGA-compatible RGB monitor has a vertical refresh rate of 60 Hz and a horizontal rate of 15.75 KHz. The vertical scan rate for EGA-compatible monitors is the same—60 Hz (once per second). But in order to refresh the extra 150 scan lines in the same time period, the horizontal rate is increased to 21.85 KHz. Part of the EGA standard for monitors is that they be able to operate at either 15.75 or 21.85 KHz horizontal rates. That means that an EGA-compatible RGB monitor will work with either an EGA or a CGA video card.

Choosing a monitor strictly by its specifications doesn't always work. A number of other criteria also affect the quality of your screen image. Dot pitch (how close together individual dots are), the scan mask (the background that the dots appear against), and the clarity of focus have a major bearing on image quality.

An excellent article appeared in the March 26, 1986, issue of *PC Magazine*. The article, "The EGA Standard: Monitors That Measure Up", is a comparative review of 17 EGA-compatible RGB monitors. This article is a "must-read" if you are thinking of purchasing an EGA-compatible monitor.

EGA software

Once you have an EGA video card

and a compatible monitor, you will need software to take advantage of the extra resolution and colors. Text-oriented software, such as WordStar or dBASE, already works with the EGA card, and you will see the improved (clearer) text on the screen. Many graphics programs written for the CGA card also work

with the EGA card and monitor, although you do *not* gain any more colors or resolution—those are limited by the software.

Some programs using graphics, chiefly games, try to manipulate the 6845 video controller chip directly. These programs will not run with an EGA video card. Other programs, such as graphics drawing programs or *some* games, have incorporated methods that let them operate with an EGA card. They either have an installation procedure to select the video card you have, or they allow you to specify the video card as an option to the command that runs the program. Programs must support the EGA standard before they can take advantage of the extra colors and resolution.

Making the decision

The only question left to answer is whether or not you want to go to the expense of upgrading your system. Depending on whose card and monitor you buy, the upgrade could cost more than \$1,000. That is not an investment to take lightly.

If you use a DOS computer to make your living, *and* your work involves graphics, the investment can be justified. But if you make a living with words, or have a computer for personal use, then this upgrade is not as easy to justify.

The short multi-video card that comes with Kaypro DOS computers supports monochrome text and Hercules graphics, and emulates color graphics on an inexpensive monochrome monitor. That's a hard combination to beat.

If you decide that you must have the latest video standard, shop around before you buy. Read the article cited earlier about EGA monitors. Don't choose the card on the basis of price. Find out how much memory it has, or if more memory can be retrofitted. And, above all, be certain that the software you use supports the EGA video card and monitor.

You don't have to buy both the EGA monitor and video card at the same time. An EGA video card will work with standard IBM-compatible monochrome or CGA color monitors. Also, an EGA-compatible RGB monitor will function with a CGA video card, but not a monochrome card. You don't gain any colors or resolution, but it does let you upgrade your system in stages instead of all at once. ■



"0,1,0,1,0,1,0,1,0,1,0,1,0,1,0..."

First Impressions

by Tom Enright

Three of Borland's gems

This month's column is a Borland extravaganza. It's unusual for one vendor to get as much coverage as Borland International gets—but then Borland is an unusual company. No other software vendor produces as many high-quality products as Borland manages to produce. Borland gets its publicity the old-fashioned way—it earns it.

The three Borland packages I'll be looking at are Turbo GameWorks (\$69.95), Turbo Editor Toolbox (\$69.95), and Turbo Tutor (\$39.95). With the exception of Turbo Tutor these packages are available for MS-DOS only. Turbo GameWorks, as its name implies, is intended for those interested in gaming theory and programming computer games. Turbo Editor Toolbox is a tutorial on programming text editors and word processors. Turbo Tutor is an introduction to and tutorial in Turbo Pascal programming.

Turbo Tutor

Learning a new programming language is a long, frustrating experience. The manuals for most languages are reference documents, not tutorials. When you do find a tutorial, it's incomplete or simplistic, or written so you need a master's degree in computer science to understand it.

Borland International has had a tutorial (with example programs on disk) for Turbo Pascal for some time. Now it has updated the package to make it more professional and useful.

Turbo Tutor comes in a shrink-wrapped package with a manual and two disks. The disks contain all the examples used in the manual, plus a menu-driven shell that allows you to watch each example in action. The Turbo Tutor manual is divided into three sections. The first section is for the absolute novice, the second is keyed to experienced programmers, and the third contains advanced topics for

the expert.

By the time you *understand* one section you're ready to start the next section. The tone changes in each section to match the level of sophistication of its intended audience. This manual is as useful and readable to the seasoned programmer as it is to a rank novice. Even Turbo Pascal experts can learn a trick or two.

The "advanced" section of the manual deserves special mention. It covers topics such as binary trees, linked lists, circular buffers, in-line assembly language, external libraries, queues, and the use of overlays. Most professional programmers could benefit from this section.

The two disks included with Turbo Tutor are the icing on the cake. In addition to source code for the examples used in the manual, there is a file manager, a typing tutorial, and a menu-driven shell to access each of the examples. The source code is provided for all programs, including the menu shell.

Under the menu program, each example can be viewed in one window and executed in another. Each example was chosen to illustrate how different flow control structures or operations work in Turbo Pascal. One of the example programs is a bubble sort. When the program executes, you see the list of numbers onscreen and watch them move as they are sorted into the correct order. Graphic examples like this make processes crystal clear in a way that text cannot.

The new Turbo Tutor is a "must have" package for anyone interested in Turbo Pascal. It doesn't matter whether you already program in this language or are only thinking about learning Pascal—you can benefit from this tutorial.

Turbo GameWorks

There are three basic types of computer games: strategy, arcade, and adventure. Strategy games are

computerized versions of board games. Arcade games depend on hand/eye coordination and usually use graphics to represent the game environment. Adventure games are like reading a book and being able to tell the central character what to do.

Turbo GameWorks is an introduction to gaming theory and the programming of strategy games only. Arcade games rely on detailed graphics and rapid movement that can be properly accomplished only with assembly language. (High-level languages are too slow for arcade game programming.) Adventure games require complex data structures and a command line parser to interpret what you type at the keyboard. Though there are many similarities among all computer games, Borland felt that strategy games provided the most flexible environment to teach the basics of game programming.

Turbo GameWorks comes with a 143-page manual and two disks. Disk #1, the chess disk, has both the compiled program and source code in Turbo Pascal. Disk #2 contains a bridge game and an ancient Japanese game called Go-Moku.

The manual's first part provides you with rules and instructions for each game and encourages you to play the compiled versions to become familiar with them. The manual then takes each game in sequence and walks you through the complete development process for the program.

First, an outline of what the program must do is developed. Data structures are designed to hold all the required information. Methods are defined for evaluating moves and possible responses from your opponent. And then you walk through each module of the supplied source code. Since source code for everything is already on disk, all you need to do is make listings on your own printer to refer to while reading the manual.

This procedure is followed for

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each of the three games. The manual also explains why a particular method (algorithm) was chosen to accomplish each task. It also explains other methods of performing the same task and why they were not chosen. The manual assumes that you are already familiar with Turbo Pascal—the purpose of Turbo GameWorks is to teach gaming theory and game programming, not to introduce you to Turbo Pascal.

encouraging the user to use the software and become familiar with it. The lessons start simply and build in complexity as you get further into the manual. In the early sections of the manual you learn how to build a simple line editor and a more complex “array of lines” editor.

Both editors that come with the package are more sophisticated than editors that would have cost you \$100 or more a few years ago.

In the demo-mode each move is based on an evaluation of the opponent's last move.

Most books on game programming use simplistic examples and childish programs. Turbo GameWorks takes you past this level to an understanding of polished games. For example, each of the games has a demonstration mode in which the computer plays both sides. In this mode, each move is based on an evaluation of the opponent's last move; there's no fixed series of moves that is the same each time the demo is run.

If you want a thorough introduction to game programming, buy this package. Besides, all the tricks you learn here are useful in other programs as well.

Turbo Editor Toolbox

Borland's Editor Toolbox is aimed at accomplished programmers who want to include sophisticated editing capabilities in their programs. This package is also invaluable to budding programmers who are simply curious about what it takes to write a good text editor or word processor.

Editor Toolbox comes with both source code and compiled versions of two editors. As with GameWorks, the Editor Toolbox starts out by

Both of them fully support DOS's directory structure, work with multiple windows, and have an UNDO command to retrieve accidentally erased text. In the process of walking through the development and coding of these editors, you'll learn a lot about both programming in Turbo Pascal and about DOS itself. The only negative feature of the included editors is their size: 50K to 60K apiece. Despite that, both editors are good, full-featured programmers' editors right out of the box.

What these editors do *not* do is print-time formatting. You can insert control codes and format paragraphs, but don't look for the printing features that come with WordStar. The absence of print-time formatting (insertion of page breaks, header lines, and footer lines) is what makes them editors and not word processors. If you are looking for a cheap replacement for WordStar, you won't find it in the Editor Toolbox. But if you are already conversant with Pascal and want to learn how good text editors work, buy this package as soon as you can.



Product Updates

Reflex Workshop is the first in a series of enhancement tools designed for the users of Reflex, The Analyst. It includes a 250-page workbook and a disk containing more than 20 working examples of data base applications. Borland International, Scotts Valley, CA ■ Version 5.0 of the **MLINK Data Communications System** now includes session capture, DEC VT100 terminal emulation, and the KERMIT and new CMI sliding frame protocols. Corporate Microsystems, Inc., Etna, NH ■ **Windows Spell**, the newest Microsoft Windows application, can check spelling in virtually any type of Windows document, or in one document while you're editing another or working with any other Windows application. Palantir Software, Houston, TX ■ **Lotus 1-2-3 Learning System**, featuring release 2.0, is the only video training available on the new release. Features such as the larger worksheet, password protection, and @NA function are covered in detail. MicroVideo Learning Systems, Inc., New York, NY ■ **Sci-Mate** is now faster than reported in *PROFILES'* March 1986 review. New features in version 2.0 include a “quicksearch” option and an “editor” with flexible formatting and compatibility with word processors. Institute for Scientific Information, Philadelphia, PA ■ **Q-PRO 4**, a fourth-generation microcomputer language and data base manager, has released version 4.0. It can utilize dBASE III data bases, as well as its own files. QNE International, Langhorne, PA ■ Version 3.30 of **Reminder**, a time management and follow-up system, is now available. It makes to-do lists and has an alarm. Campbell Services Inc., Southfield, MI.

Product Updates provides information about revisions of existing products. Information for this column must be received at least eight weeks ahead of the publication date. Users should contact vendors for more complete information and current prices.

New Products

edited by Suzanne Kesling

The following new product listings are not reviews and should not be considered endorsements of tested products. To be considered for publication in New Products, press releases should be sent to New Products Editor, PROFILES Magazine, 533 Stevens Ave., Solana Beach, CA 92075. Releases must state prices and on which Kaypro models products run. Include black and white photos if available.

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Exchequer is an automated checkbook management, balancing, and amortization program. Using information from check stubs and bank statements, you can balance your personal or business checkbooks, analyze your expenses by category, mortgages, and assist the accountant at tax time.

A variety of reports are available, including a running balance, a consolidation of cleared and outstanding checks, or an analysis of all checks in a given category.

Other features include easy to read and understand menu commands, ability to maintain an unlimited number of checking accounts on a single disk, and data file compatibility with dBASE and other programs.

\$29.95. All Kaypro computers. Mycroft Labs, Inc., P.O. Box 4106, Tallahassee, FL 32315; (800) MYCROFT.

The silent printer

The 3410 Quiet is a dot-matrix printer featuring multiple mode printing, super high duty cycle and a noise level of under 55 decibels.

The 3410 Quiet uses an 18-wire printhead, and its printing speeds range from 400 characters per second in draft mode to 120 cps in near-letter-quality mode. At 18 and 10 characters per inch, the 3410 Quiet prints 244 and 136 columns, respectively.

With standard IBM Graphics

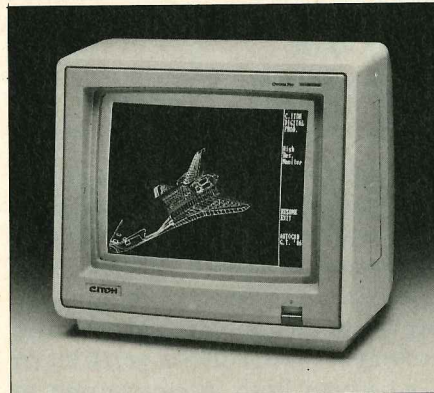
protocol, the machine prints high resolution, dot-addressable graphics and 16 national character sets, and IBM character sets 1 and 2 are also standard.

Two optional PROMS are available; one allows a variety of bar code printing, and the other enables the printer to enlarge block characters up to 120 times.

\$2,645 for the printer, \$45 each for the PROMS. Genicom Corporation, 1 Genicom Dr., Waynesboro, VA 22980; (703) 949-1188.

Color or black and white

The Chroma Pro CM 3000 is a high-resolution RGB color monitor that



can function as a monochrome monitor with the flick of a switch.

For color graphics applications, the CM 3000 offers a resolution of 640 x 240 and is supported by such popular interface boards as the IBM Color Graphics Adaptor (CGA).

It features a non-glare dark screen for better contrast and easy viewing. All controls, including text-switch, brightness, contrast, vertical hold, vertical size, and horizontal positioning, are located on a side panel, and options include a tilt/swivel base.

\$699 for the monitor, \$29 for the tilt/swivel base. All Kaypro DOS computers. C. Itoh Digital Products, Inc., 19750 S. Vermont Ave., Suite 220, Torrance, CA 90502; (800) 423-0300.

File storage

File Minder is a window-oriented file storage management system

that provides tagging functions and sophisticated commands, including COPY, RENAME, DELETE, VIEW, PRINT, and more.

File Minder allows better management of fixed disk space by letting the user remove unused files to archive storage. It takes the risk out of deleting large numbers of files through 16 flexible tagging functions plus a monitored delete command.

A user can increase free disk space by squeezing files into libraries with archive commands, which can reduce file size by 50 percent or more. And critical files can be protected by setting DOS file attributes to make them read-only or hidden.

\$69.50. Kaypro DOS computers. Finch, Inc., P.O. Box 56, Frederick, MD 21701-0056; (301) 695-6560.

Beginner's package

Easy Extra is a word processing and mailing system designed for the first-time user. It consists of a new version of the Easy word processor and EasyMail, a data base application for mailing list management.

Easy Extra is completely menu driven, with context-sensitive, online help available at any time within the program, and all functions of the program are accessed through three keys: F1 for help, F2 for menus, and ESCape to cancel a function.

\$149. Kaypro DOS computers. MicroPro International Corporation, 33 San Pablo Ave., San Rafael, CA 94903; (415) 499-1200.

A new data base

TAS-Plus is a programmable relational data base designed to combine the aspects of a file manager, a relational data base, and an application development system.

It allows users to create, add, change, and delete data base records without writing a program. Front end facilities include pull-down menus in a Lotus 1-2-3-style

format and extensive online help screens.

Up to 16 files may be open simultaneously, with update capability. Chaining to other programs or executing DOS commands is accomplished without ever leaving TAS-Plus.

A utility is also included that can convert dBASE III files to TAS-Plus files, and vice versa.

\$69. Kaypro DOS computers. Business Tools, Inc., 4038-B 128th Ave. S.E., Suite 266, Bellevue, WA 98006; (206) 644-2015.

Avoiding DOS commands

Harvey FirstMenu is RAM-resident software that provides an alternative way to invoke PC commands, utilities, or applications for users who may be intimidated or confused by MS-DOS's commands, operations, and syntax.

A user can create, save, or change menus to run applications, perform DOS operations, or select other menus. Any number of menus can be created (limited only by disk space), with up to 20 selections on each, and menus can be nested within other menus.

Once a command has been entered into a menu, it can be executed with a single key. Menus can be password-protected.

The software is not copy protected, so menus can be added to any of the user's system disks. \$39.95. Kaypro DOS computers. Harvey Invisible Software, P.O. Box 1863, Cape Coral, FL 33910; (800) 231-0296. In Florida call (813) 482-8600.

Another color monitor

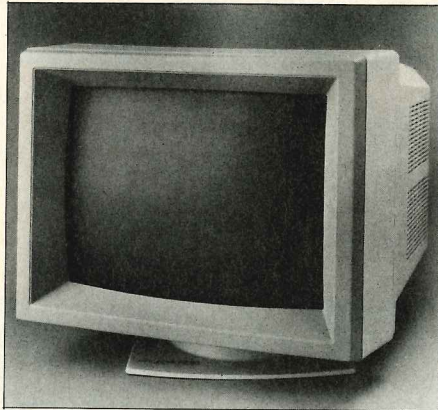
MultiSync is a high-resolution color monitor that adjusts automatically to graphics board scanning frequencies from 15.75 KHz to 35 KHz.

It's compatible with a wide range of color graphics boards, including the IBM EGA, CGA and PGA boards, Quadram's QuadEGA+, Sigma's Color 400-H, L, or M, and

Color 350, Persyst's BoB or BoB/16, and Paradise Systems' MultiDisplay, Modular Graphics, Short Color, and Hi-Res Graphics cards.

Other features include operator-switched TTL or analog video and a seven-color text switch. It has a maximum of 800 dots horizontal, 560 lines vertical and a .31 mm dot pitch on a 14-inch screen, producing sharp text characters.

\$799. All Kaypro DOS computers. NEC Home Electronics Inc., 1255 Michael Dr., Wood Dale, IL 60191; (312) 860-9500.



The wide printer

The Brother M-1409 is a wide 110-column dot-matrix printer. Unlike 80-column printers, the M-1409 allows printing on letter-sized (#10) envelopes and on letter-sized paper fed either 8-1/2 x 11 inches for correspondence or 11 x 8-1/2 inches for spreadsheets. Its condensed print mode, which allows 187 columns of print, is especially convenient for spreadsheet users.

The M-1409 features print speeds of 180 cps for drafts and 45 cps for near letter quality. Switch-selectability between IBM and Epson printer commands and character sets provide software compatibility.

The M-1409 includes a bottom-feed, push-up tractor that enables the user to begin printing on the first form. An optional cut sheet feeder automates printing on single sheets.

\$479 for the printer, \$140 for cut sheet feeder. All Kaypro computers.

Brother International Corp., 8 Corporate Pl., Piscataway, NJ 08854; (800) 446-6282.

Adding word processing codes

SoftScan uses intelligent, rule-based software to interpret ASCII files and insert appropriate IBM PC word processing software function and format codes. This permits the use of ASCII files from any source as word processing document files.

Software functions inserted by SoftScan include soft and hard carriage returns, centering, regular and decimal tabs, titles, line spacing, headers, footers, margins, and indents.

SoftScan gives users the ability to use ASCII files to create software-specific word processing document files for WordStar, Microsoft Word, WordPerfect and many other word processing programs.

\$249. Kaypro DOS computers. Systems Compatibility Corporation, One East Wacker Dr., Suite 1320, Chicago, IL 60601; (312) 329-0700.

Graphics libraries

IMSI Galleria graphics software consists of three separate graphics libraries: the business library, the home library, and the picture library.

Each library enables users of popular graphics programs such as PC Paint and PC Paintbrush to easily pull up dozens of useful pictures, icons, borders, and artists' drawings.

The business library's icons and borders can be used to produce newsletters and sales literature, and when used with Dr. Halo II, graphics can be merged with text produced by most popular word processors.

\$29.95 for one, \$49.95 for any two, or all three for \$59.95. Kaypro DOS computers. International Microcomputer Software, Inc., 633 Fifth Ave., San Rafael, CA 94901; (415) 454-7101.

Forecasting

The Fourier Analysis Forecaster is ideal for studying the stock market, sales, shaft vibration, and other data containing cyclic components.

It allows you to enter up to 500 data points, detrend that data, and analyze the result for the dominant cyclic components. Full editing is supported.

This program does not assume that you know Fourier analysis, instead it includes a 100-page manual that takes a tutorial approach to presenting the ideas involved in the Fourier series. The manual has many graphic examples, which enable you to visualize as you learn.

\$99.95. Kaypro CP/M and DOS models. DYNACOMP, Inc., 1064 Gravel Rd., Webster, NY 14580; (716) 671-6160.

At last

Finally! A Subroutine Library for Compiled BASIC takes advantage of the named subroutine capabilities in IBM's BASIC COMPILER 2.0 or Microsoft's QuickBASIC.

Finally! can be used for averaging and determining maximum and minimum values in arrays, loading disk directories into an array, drawing boxes, pie and bar charts, plus more.

It includes a free cross-reference utility specifically designed for non-numbered program lines. This scans source code for variables and indicates where each occurs and how many times it is used, while also identifying misspelled words.

\$99 plus \$4 for shipping and handling, or bundled with QuickBASIC for \$148 plus \$6 for shipping and handling. All Kaypro DOS models. KOMPUTERWERK, 851 Parkview Blvd., Pittsburgh, PA 15215; (800) 423-3400.

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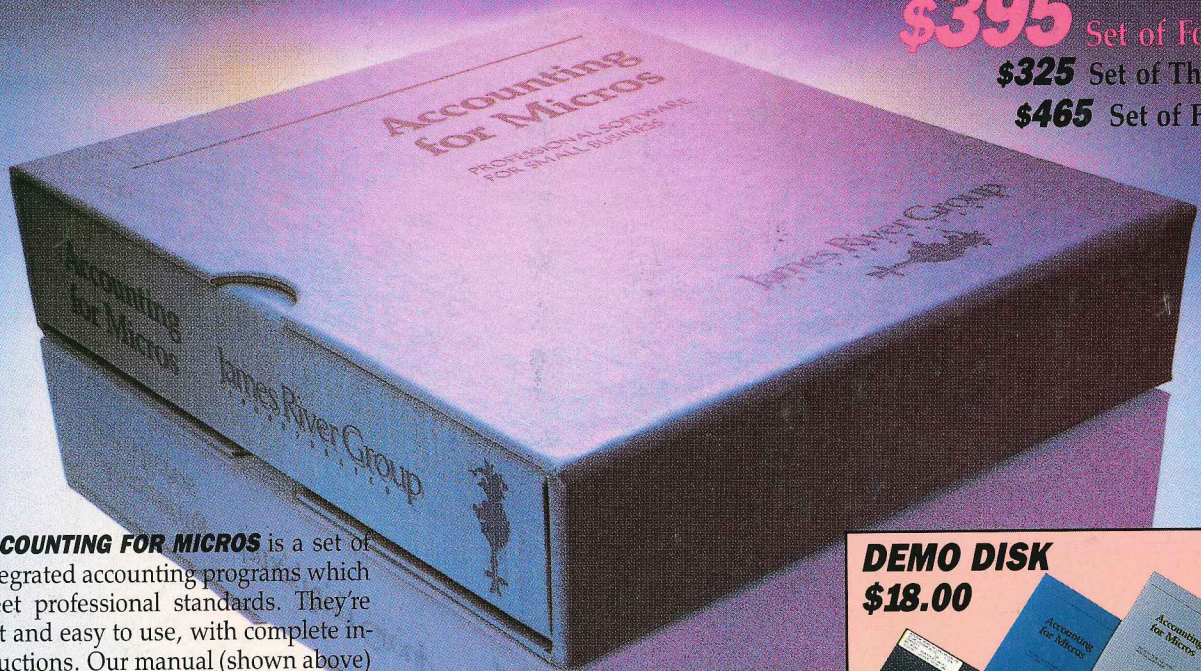
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