PC WORLD

*The Comprehensive Guide to
IBM Personal Computers and Compatibles*

Electronic Mail

When It Absolutely Positively Has to Be There Now!

Master the Real Estate Market: 3 PC Programs Help You Do It

Mitch Kapor of Lotus on Managing for Rapid Growth

- **Parallel Ports** — The parallel port is used for connecting a parallel printer to your PC. A parallel printer typically uses a dot-matrix output which is suitable for high-speed draft quality printouts. The PC allows for the installation of up to three parallel ports.

- **Clock-Calendar** — With the on board battery, the clock-calendar feature will maintain the correct date and time, even when the PC is turned off. This feature eliminates the need for typing in this information each time you power up your computer.

- **Game Adapter** — The game adapter port allows you to connect an IBM-type joystick to your PC so you can play the multitude of arcade-quality games which take full advantage of the PC's graphic capabilities. Or you can use the joystick input for other applications by writing your own programs.

- **SuperPak**™ — Every AST Research Multifunction Board comes with an AST SuperPak diskette containing programs for setting and accessing the clock, as well as SuperDrive™ and SuperSpool™, the most powerful RAM disk and print spooler available for PC-DOS. With SuperDrive you can use your PC's memory for simulating one to four floppy drives, from 20K to 360K each. SuperSpool allows you to set aside memory (from 4K to 512K) as a print buffer; SuperSpool sends output to the printer in the background while you execute your program in the foreground. With SuperDrive and SuperSpool, you can significantly improve your PC's operating speed.

- **Proven Compatibility** — All AST Research hardware and software products are 100% compatible with all versions of the PC and PC-XT as well as the Compaq and other PC look-alikes, and are 100% compatible with PC-DOS 1.1 and 2.0.

- **Warranty** — All AST Research products are backed with a one year limited warranty covering parts and labor with an optional paid second year warranty available.

Of course, all AST Research Multifunction Boards come with the **AST "PLUS,"** our unsurpassed reputation for quality, reliabilty, after-the-sale support, and overall design excellence which give our products the best price/performance ratio in the industry!

ComboPlus

AST-PCnet

MP Expansion Memory

Get yourself a

This little critter comes with specially-designed software that flies through the maze of keystrokes on the most popular business programs faster than you can say "cheese."

Microsoft® Mouse puts the power to run Multiplan® Lotus 1-2-3,™ VisiCalc® and WordStar® in the palm of your hand. Click the left button on the mouse, a custom menu appears. In English, not hierogly- phics. Click the right button and execute your command: move text or data, edit, format, print. All at blinding speed without touching the keyboard.
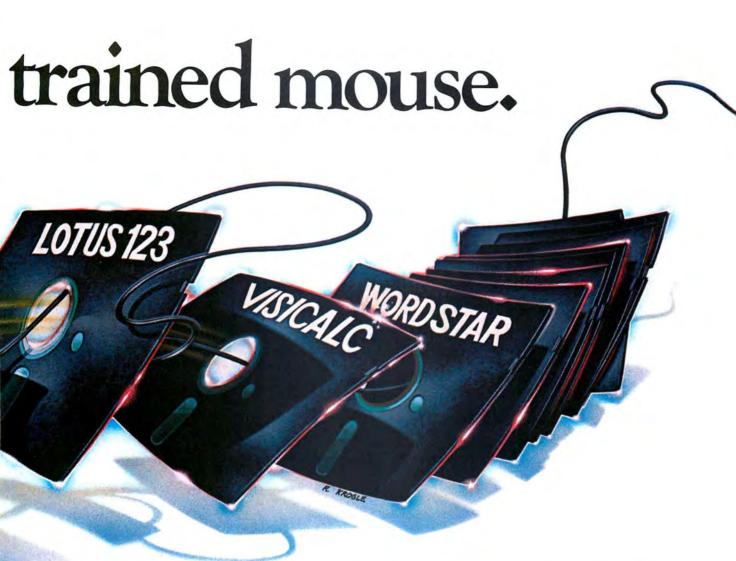
It also lets you create your own menus for editing and formatting existing application programs. So people can learn programs quicker and do more productive work as they learn.

The mightiest mouse.

Microsoft Mouse runs circles around other mice. It is the high performance mouse for the IBM® PC and PC XT. From the company known for high

trained mouse.

performance software. Microsoft BASIC is the language spoken by nine out of ten microcomputers worldwide. **MICROSOFT.** Our MS™ DOS operating system tells
The High Performance Software your IBM PC how to think.

So don't monkey around with any other mouse. Call 800-426-9400 (in Washington State call 206-828-8088) for the name of your nearest Microsoft dealer. Then go with Microsoft Mouse. The mouse that soars.

PC WORLD

The Comprehensive Guide to
IBM Personal Computers and Compatibles

● Getting Started

● State of the Art

● Review

How to move with
and take your

Introducing the IBM *Portable* Personal Computer.

It's a complete PC. In a case. With a handle. And a welcome addition to the family.

The IBM *Portable* Personal Computer is the first IBM PC system you can pick up and take with you. Across town or across the hall. Or put away easily for another day.

It's a powerful system, with 256 KB of user memory (expandable to 512 KB) and a slimline double-sided 5¼" diskette drive (and room for another). Plus a built-in

modern times
PC with you.

9″ monitor with easy-to-read amber characters. Text and graphics capability. And an 83-key keyboard.

All fitted into a sturdy, transportable case that's easy to handle. And park.

The IBM® of portable personal computers. Make no mistake about it, this is a true IBM PC.

Which means it is part of the same dependable family as the IBM Personal Computer, the IBM PC/XT and the new IBM PC*jr.* And that means you can use many IBM Personal Computer Software

programs to help you reach your goals.

All this and five expansion slots, ready to accept expanded memory, printers and other useful IBM Personal Computer options. Which should keep you rolling far into the future.

Pick one up at a store near you. You can see the new IBM *Portable* Personal Computer at any authorized IBM PC dealer or IBM Product Center.

To find the store nearest you, call 1-800-447-4700. In Alaska or Hawaii, call 1-800-447-0890. **IBM**®

The TeleVideo IBM PC
The best hardware for

TeleVideo versus IBM. Make a few simple comparisons and you'll find there is no comparison.

RUNS IBM SOFTWARE.

With the TeleVideo® IBM Compatible line—PC, XT and portable computers—you'll get the most out of all the most popular software written for the IBM® PC—more than 3,000 programs.

Because every TeleVideo Personal Computer offers the highest level of IBM compatibility on the market

THE BEST HARDWARE FOR THE BEST PRICE.

Features	Tele-PC	IBM PC	Tele-XT	IBM XT
Monitor	YES	OPTIONAL	YES	OPTIONAL
Screen Size	14"	12"	14"	12"
Tilt Screen	YES	NO	YES	NO
Quiet Operation	YES (NO FAN)	NO	YES	NO
Memory	128K	128K OPTION	256K	256K OPTION
Graphics Display (640 x 200 resolution)	YES	OPTIONAL	YES	OPTIONAL
Printer Port	YES	OPTIONAL	YES	OPTIONAL
Communication Port	YES	OPTIONAL	YES	YES
MS™-DOS/BASIC®	YES	OPTIONAL	YES	OPTIONAL
System Expansion Slot	YES	YES	YES	YES
RGB and Video Port	YES	OPTIONAL	YES	OPTIONAL
Typical System Price	**$2995**	**$3843**	**$4995**	**$5754**

10

David Bunnell

Innocent Victims of the War Against Software Piracy

A group of top software executives recently started an association to combat software piracy. The goals of this group are very noble. While it's true that minimizing software piracy will increase software revenues, the issue is much larger than that. Left unchecked, software piracy threatens to shortchange all personal computer users by inhibiting the creation of new programs.

This group of software publishers wants to analyze the problem and present a solution. To do this, they must first accumulate a range of statistics on the piracy problem. Current estimates vary, but some research shows that as many as ten stolen copies exist for each legitimate copy of some major applications programs. And a complete picture of software piracy must include not only the total amount of stealing going on, but a breakdown of the problem into categories: how much stealing is done for profit, how much by individuals making copies for friends, and how much by corporations with hundreds of personal computers. Guesses as to how the categories break down vary considerably, but no definitive research has yet been done.

The most important task facing the association is to find and agree on a common technical solution that will drastically limit a user's ability to profit from pirating software. Unfortunately, the solution under consideration could drastically inhibit the use of personal computers by individual users.

The association would like to require computer hardware manufacturers to encode the serial number of each personal computer in ROM memory in such a way that it is accessible by applications software. Programs will be designed to read this number when the program is initialized, and from that moment on each program will run only on the machine on which it was initialized.

The big advantage of this solution, as far as the software companies are concerned, is that it puts the burden of copy protection on the hardware companies. It's like the old joke: How many programmers does it take to change a light bulb? None, it's a hardware problem. How many technicians does it take to change a light bulb? None, it's a software problem.

Even solutions with the best of intentions have drawbacks, and in this case it's a double whammy. Honest personal computer users will be hurt in two ways. First of all, if this code lock is used, what happens when a computer breaks down, is stolen, or needs to be replaced by a better machine? When I raised this question at a luncheon with a group of software publishers, they came up with only unworkable solutions. They suggested, for instance, that the user could send in an insurance form, and the software supplier could send a replacement disk in return—for a modest fee. The time and money lost would be the user's.

Secondly, many personal computer owners will probably want to own more than one personal computer so they can use their compatible software in a variety of environments.

David Bunnell

Many will have a desktop computer at work, a transportable computer at home, and a lap-size computer to take on the road, all to use with the same software. If computer users have to buy three copies of every program, the effect on hardware sales will be acute: people won't buy additional hardware if each additional PC requires buying duplicate software.

That, of course, is the crux of the issue. Personal computer users needn't be too worried about this proposal going into effect. It seems unlikely that IBM and other hardware companies will agree to a solution to software piracy that would limit the number of personal computers they can sell. Licensing agreements aside, it must be true that many people have bought and will continue to buy portable PCs to run their existing software library.

I doubt that copyright infringement piracy by individuals for their computing needs is really what the software publishers should be targeting. After all, if you buy a new record player you don't have to buy all new records.

The burden of solving this problem should rest on those who stand to benefit from it. Software publishers should be looking for solutions to software piracy that are not dependent on hardware companies.

Campaigns to educate users and change copyright laws are not likely to bear adequate fruit. If you've invested a small fortune in software and want to buy a portable computer, it's because you want to capitalize on your software investment. Ultimately, the ability to get more use out of personal computers by encouraging people to have more than one machine will create more demand for software. Users will be able to afford a broader array of applications software from some lesser known publishers since they won't be stuck buying the same packages over and over again. ●

June 1984

AVOID THE PITFALLS OF MODERN BUSINESS

Reston Computer Group
A Prentice-Hall Company
11480 Sunset Hills Rd., Reston, VA 22090
Available at your local bookstore and computer retailer,
or call us at (800) 336-0338

1-2-3™ is a trademark of Lotus Development Corporation.
IBM-PC™ and PC-XT™ are trademarks of International Business Machines, Inc.

If you want to expand the use of Lotus 1-2-3™ on your IBM-PC®, or extend your application of Visicalc, here are five books to smooth the way for you.

BUSINESS WORKSHEETS FOR 1-2-3, by Jack Grushcow, is a virtual encyclopedia of ready-to-use spreadsheet applications for the business user. Included are: accounting, financial management, forecasting, investments, amortization and financial statements. It's complete with instructions, source listings, and illustrations.
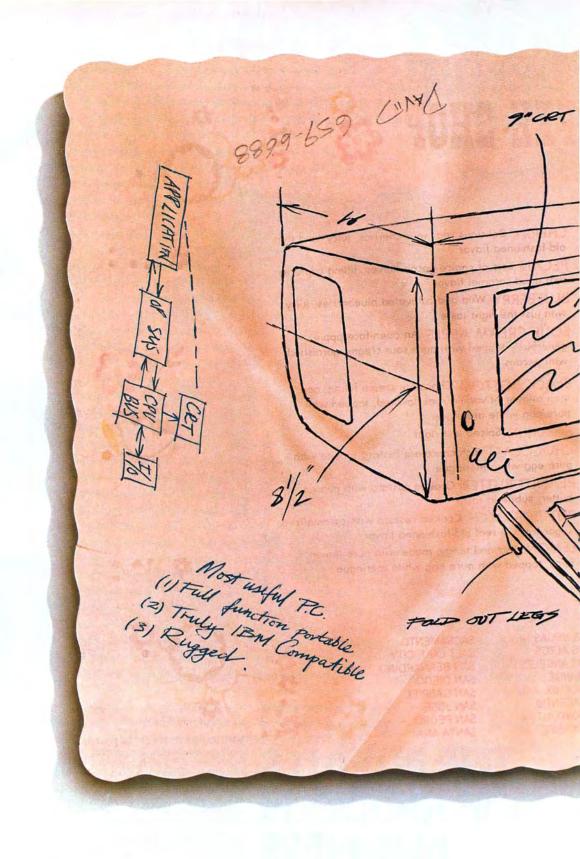
1-2-3 TUTORIAL APPROACH, by Scott Jones, uses plain language, illustrations, and well-documented examples to teach beginners the basics of 1-2-3™. Using four typical worksheets, you'll learn how to set up and print from worksheets, manipulate data and produce graphic presentations of data — painlessly.

1-2-3 REVEALED, by Dan Shaffer, is a complete guide to developing faster, easier and more powerful worksheets, using the power of the 1-2-3™ keyboard macro facility rather than Lotus' 1-2-3™ documentation. Available as a book or as a book/disk package.
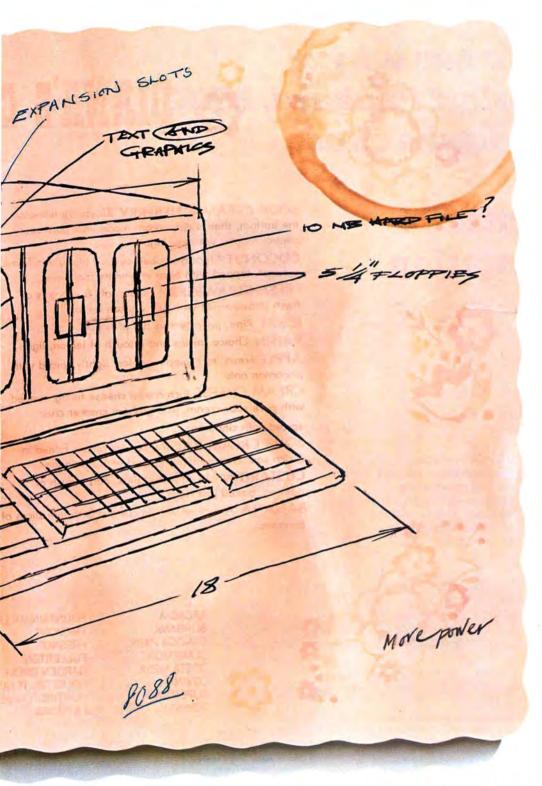
1-2-3 AT WORK, by Thomas Cain and Nancy Woodard Cain, is organized from an operational perspective to help the business user explore new and creative applications. Examples and illustrations explain when and why to use 1-2-3's commands and provides alternatives not made evident in the documentation.

VISICALC EXTENSIONS FOR THE IBM-PC™ AND PC-XT™, by Jack Grushcow, is an illustrated, applications-oriented guide for the serious business user. It focuses on customized printing extensions, data transfer between spreadsheets, sorting extensions and more, to extend and adapt IBM-PC™ software to suit the user's needs.

If you've found 1-2-3™ or VisiCalc rough going, visit your local bookstore or computer retailer and pick the title that can help smooth out the bumps.

Circle 672 on reader service card

A picture worth $111,000,000.

Not long ago, three businessmen met in a coffee shop to talk about an idea for a new personal computer. They made a rough design on the back of a place mat.

A lot of companies were already making personal computers, but they thought theirs just might work better.

The next year, they sold $111 million worth of their new computers, the COMPAQ® Portable and the COMPAQ

PLUS™. No company in America had ever grown that fast. Why?

Simply because they offer, in a rugged, portable package, more capability than most other PC's. They're truly IBM®-compatible, so all the most productive software runs as is. They display high-resolution text *and* graphics on the same screen. And they grow. Expansion slots take IBM-compatible boards, and a kit converts the COMPAQ

Portable into the COMPAQ PLUS with its integrated ten-megabyte disk drive.

How does the future look? We look at it this way: If we came this far on the back of a place mat, just think of what we can do now.

For the location of your nearest Authorized Dealer, call 1-800-231-0900.

COMPAQ®

It simply works better.

In the Hard Disk Jungle Tallgrass Clears A Path

In today's hard disk jungle, Tallgrass clears a path by offering high performance, integrated mass storage solutions for the IBM® PC/XT, the T.I. Professional and related computers.

TALLGRASS INNOVATIVE FEATURES

MASS STORAGE SYSTEMS with formatted HardFile™ capacities of 6, 12, 20, 35 and 70 Mb, all with built-in tape backup.

CONVENIENT INTEGRAL TAPE BACKUP SYSTEM allows rapid tape "image" streaming, or incremental file-by-file backup and restore on ANSI standard inexpensive data cartridges, instead of the usual floppies, video cassettes, or low-capacity removable Winchester devices.

NETWORK READY and fully compatible with networks such as PCnet® and EtherShare.™

HIGH RELIABILITY with dual directory and read-after-write verify options. A dedicated landing zone, where the read/write heads reside when the disk is idle, provides data protection during powerdowns and transportation.

Follow the Tallgrass path to your local computer dealer and watch your personal computer transform into a powerful data processing system.

Available from COMPUTERLAND,® Entré® Computer Centers, MicroAge® Computer Stores and other participating computer dealers.

New! IBM-XT Cartridge Tape Backup

World Headquarters: Tallgrass Technologies Corp. / 11100 W. 82nd St. Overland Park, KS 66214 / 913/492-6002 / Telex: 215406 TBYT UR

Canadian Headquarters: Tallgrass Technologies (Canada), 1775 Meyerside Drive Mississauga, Ontario, Canada L4V 1H2 / 416 / 673-3244

European Distributor: CPS Computer Group, LTD Birmingham, England B276BH / (021) 7073866

Australian Headquarters: Tallgrass Technolgies (Australia) / Five Dock Plaza, Suite 12/50 Great North Road / Five Dock / Sydney, N.S.W. 2046 / (02) 712-2010

Tallgrass Technologies
Corporation

IBM* is a registered trademark of International Business Machines Corp.   PCnet* is a trademark of Orchid Technology   EtherShare ™ is a registered trademark of 3Com Corp.

Circle 188 on reader service card

Harry Miller

Still Searching

The introduction of Apple's new Macintosh and our launch of *Macworld: the Macintosh Magazine* made me wonder about the future of personal computing. Are the Mac's breakthroughs significant enough to make people jump off the IBM PC bandwagon? How easy do computers really have to be before they are accessible to the general public? These questions led to a realization of how far we've come in just a few years.

I didn't know it then, but as soon as I started pecking out commands on a computer keyboard, I started searching for the perfect computing machine. As computers have grown more accessible and powerful over the past six or seven years, I've consistently been impressed by the new capabilities that were added. But I've been even more impressed by what wasn't yet available. There was always room for improvement, always better features to dream about.

Apple II
I learned about computers by using a time-sharing minicomputer system, but it wasn't until I got my first personal computer, an Apple II+, that computing really changed my life. Having a stand-alone computer in my

office at home meant that I could work when I wanted to, not just when a time-sharing system was available.

No one told me back then about the amount of responsibility I'd have to take for getting the machine and its software running and for keeping them running. The level of software sophistication was pretty basic, and as often as not the program didn't work the first time I tried it—or even the fifth. And every new piece of equipment I added was as much an opportunity for confusion and disaster as it was for enhancement. The happy result of those struggles was that I learned a lot about how computers work—whether I wanted to or not.

The "open architecture" of the Apple II, a design that makes software and hardware expansion easy, meant that you could—and really had to—change the personality of the computer by adding circuit boards. I had one board to improve the display, one to run Pascal programs, and one to hook up to the telephone. As you might have guessed, none of the boards was specifically designed to work with the others, and the documentation for the boards steadfastly ignored the existence of any other boards. Luckily, someone designed a fan that you could slap on the side of the box to cool the chassis, because when all that stuff was in there, the computer would overheat and stop in its tracks. The whole process created something that was like a Rube Goldberg version of a top-of-the-line Swiss Army knife: it has everything you need, but by the time you put it all together, it no longer fits in your pocket.

The same open architecture of the Apple II meant that the technical details were easily accessible to the user. That feature, among others, made the machine a hacker's delight. Apple user groups grew up quickly all over the country to foster the exchange of technical information about the com-

Harry Miller

puter—and to exchange tips on how to break the latest copy protection scheme.

The average Apple II user was quite young. In fact, it was as hip in the late 1970s to be 16 and have an Apple II as it was in the late 1950s to have a '54 Ford hot rod convertible or to have long hair and political frustration in the late 1960s. Maybe hipper.

But it became increasingly evident that the Apple II wasn't really designed for the business applications I needed. The floppy disk drives were slow and offered very limited storage capacities, restricting the machine's usefulness for sophisticated accounting systems or large data management tasks. It was like trying to bail out a rowboat with a spoon.

CP/M

To perform advanced applications more efficiently, I started using a computer that ran the CP/M (Control Program for Microcomputers) operating system. Through a lucky set of circumstances, my first CP/M computer was one of the most flexible and powerful available—a CompuPro by Godbout Electronics of Oakland, California. That machine included absolutely state-of-the-art hardware in an industrial-grade box. The main computer enclosure had room for 20 circuit boards. The power supply was so big you could weld with it, but I never have learned how to weld, so I used the computer mostly for word processing, filing, and some spreadsheet analysis. Each application was a little more polished than in my Apple II days.

I was still a long way from being home free. Because CP/M software was designed to be used with a variety of display terminals, almost every new program had to be "configured" to take advantage of each terminal's more sophisticated features. Somehow none of the configuration routines was like any I had used before. Each time I bought a new piece of software, I went searching around for the manual that came with the terminal, and each time I cursed because the configuration program always required one code that wasn't listed in the manual. And after each lesson by trial and error, I was rewarded with the privilege of going through the whole thing again to similarly configure the program for the printer I was using.

To make the experience a little more frustrating, the software publishers never failed to include an installation menu that would let you skip all the arcane control codes if your particular terminal or printer were listed on the menu. While I wasn't generally using rare or unpopular equipment, my models were never on the menus. I often wondered who besides the program authors were using the specific combinations of equipment on those menus.

Probably the worst feature of CP/M was its awkward command structure. To tell the computer to copy a certain file from the disk in one drive to another, you'd use the simple command

PIP B: = A:filename.ext[v].

Translated it means "send to drive B the file called filename.ext currently on the disk in drive A." Not only sounding funny is it, but sense making of it hard is.

Despite those inconveniences, CP/M remained the standard for several years—until the IBM PC came along.

IBM PC

When the IBM Personal Computer made its debut in late summer of 1981, it seemed to have a singularly unimpressive design. With a relatively slow central processor and very slow, comparatively small-capacity disk drives, it looked like IBM had taken four years to develop a slightly souped-up version of an Apple II.

At first I didn't see any reason to give up the tried and true CP/M systems for a PC. But I started writing and editing for *PC Magazine* in 1982, so I started using the PC—and I learned to love it. Using a computer to write for a computer magazine is almost as appropriate as writing a hard-boiled detective novel on an old beat-up Underwood.

Starting to use a new computer is like moving to a new town: the new locale still has to prove itself, and you're still rooting for the hometown baseball team you left behind. But after a little while, the new team has a great season and you're won over. Needless to say, the PC had its great season.

The success of the PC is in large part due to the open architecture of the machine. Circuit boards with extra memory chips were quickly developed for the PC. While some naive users wondered why they would want more than 64K, others were hungrily filling their machines to capacity. Large amounts of memory became synonomous with computer sophistication.

Large amounts of memory allow features that give the PC its special personality—features like keyboard enhancement or redefinition, electronic disks, and the capacity for large but fast integrated applications software. That personality is rounded out by the use of batch files. In short, the personality of the PC is typified by a higher degree of auto-

The new HERCULES Color Card gives you the parallel port IBM forgot-for $1 more.

IBM $244.

Hercules $245.

And it fits into the XT's short slot.

The new Hercules Color Card gives you these five important features.

1. A parallel printer port. If you buy IBM's color card, you won't get a parallel port for a printer. Ugh. You've just wasted a valuable slot for an extra printer card.

2. It's short. Our new Color Card uses advanced gate array technology to reduce the chip count by 30 and use less than half the board space IBM does. Which makes the new Hercules Color Card perfect for the short slot in an XT.

3. Fully IBM compatible. Any program that runs on IBM's color card will run on the new Hercules Color Card. With RGB or composite video, any IBM compatible monitor will work too.

4. Hercules Graphics Card compatible. If you have a Hercules Graphics Card (model GB101 or later), or plan to buy one, an ingenious software switch on our new Color Card allows both cards to be kept in the system at the same time.

5. Low price. At a suggested list price of $245, the new Hercules Color Card has all these features for only $1 more than IBM's color card.

Call for our free information kit. See why the company that made the first graphics card for the IBM PC still makes the best.

**Hercules. We're strong on graphics.
800 255 5550 Ext. 421**

2 YEAR WARRANTY

23

Harry Miller

mation than had previously been seen in personal computers. Now, if it could just learn to type . . .

The latest addition to the automation of the PC is the introduction of "windowing" software (VisiCorp's *Visi On*, Quarterdeck's *DesQ*, and Microsoft's *Microsoft Windows* among others). These products bring a new level of convenience to the PC. But their real impact on personal productivity will come when they are used in multitasking environments. When the PC can have several applications running in separate windows simultaneously and can pass data among them, people will use the computer for tasks that are currently too awkward or time-consuming to do on the computer. Just as surely, people will also have a chance to make an awful mess of things much more quickly than they could before. Until those systems are made foolproof, I'm sure we'll see lots of important data going "out the window."

Of course, with all this automation and convenience, the PC still lacks the screen-driven, modeless, what-you-see-is-exactly-what-you-get simplicity of operation that makes the Macintosh so accessible to a novice. But the PC's great for me (and obviously for thousands of others like me). More than the machine, I value the community that's grown around it and the flood of software that's developed first for the PC and then for other machines. I'm excited by innovations I see in other computers like the Mac, but I may have to find ways to justify owning more than one computer because I'm not ready to give up my PC just yet.

Macintosh

The Macintosh's most obvious feature is its ease of use. The Mac is the perfect machine for that legion of people who are likely to say: "I don't know anything about computers except that I need one." In some ways the Mac seems be a sophisticated "Instamatic" computer. No fussing or focusing: you just point and shoot. But it's much more.

Like many people, I got hooked on the Mac by using *MacPaint*. *MacPaint* shows off the unique intelligence and speed of the display screen. And I was impressed when I realized that the computer kept track of the borders of shapes on the screen.

The screen image is unusually easy to read. The black-on-white text is natural and the variations of screen image that result from the use of different type fonts will make the screen easier to view. Since the black-and-white screen will prevent people from displaying annoying color combinations, the selectable fonts may be the only avenue that the Mac provides for some people to exercise their bad taste.

The Mac provides easily accessible computing at an affordable price. It's clearly a breakthrough in the evolution of personal computing. But the Mac's not the ideal computing machine I've been after.

Its relatively small amount of main memory (128K) precludes the Mac from supporting multitasking and from processing large amounts of data. That restriction is partially addressed by the Mac's sophisticated use of a "virtual memory" scheme by which data on the disk is automatically swapped in and out of main memory. But virtual memory schemes require more disk space, and the single-sided disks that are currently available limit the effectiveness of that strategy. But more memory and double-sided disks are on the way.

The "closed system" design is one of the Mac's strongest points and also one of its weakest. The price for the convenience of a single unit that comes ready to run is the limitation of its expansion capability. While it's certain that for the next few years there will be an unending supply of users who just want to get some useful work out of a computer without learning a lot of commands and special procedures, it is less certain whether the Mac will be flexible enough to support more advanced users who want a little more direct control of the machine.

The lack of cursor control keys on the standard keyboard (cursor control keys are available on the optional numeric keypad) means that you'll be forced to take your hand off the keyboard and move the mouse to reposition the cursor during data entry. While it didn't take me long to stop worrying and learn to love the mouse, I still find it annoying to be forced to use it. Maybe someday someone will design the "foot mouse" I've been waiting for—and then I'll complain about having to keep my feet on the ground.

I'm thrilled with the Mac, but I'm still searching. The ideal computer's still just around the corner. My ideal machine would have a few features that we haven't seen yet: so expandable that the power supply and data bus will support whatever new processor technology comes up with in the next ten years, affordable and reliable optical character recognition (with which the computer could read a printed page) or voice recognition and synthesis to free us from typing data, screen image resolution that presents text like the Mac and graphics like a 70mm movie, and several megabytes of bubble memory (which is almost as fast as RAM but doesn't lose its data when the power's off). When all this is available in a 10-pound portable for under $1000, just show me where to sign.

Don't let me kid you, though—the searching is part of the fun. I guess I'm actually glad that the perfect computer doesn't exist yet. It keeps us dreamers in business. ◉

Harry Miller is the Editor of PC World.

In the Hard Disk Jungle, Tape Backup is a Way of Life.

In the hard disk jungle, floppy disk backup is a dangerous path to follow. Tape backup is the key to survival.

Imagine the catastrophic loss of data from your IBM®-XT or T.I. Professional fixed disk because of operator error or inopportune power failure. Without tape backup, you're on dangerous ground.

The Tallgrass TG-4160 gives you 60 Mbytes of cartridge tape backup and archival capacity, using the industry standard PC/T-11 personal computer tape format. Tape backup is fast and easy, even with elephant-sized files.

TALLGRASS INNOVATIVE FEATURES

• **60 MBYTES OF FORMATTED STORAGE** on an economical industry standard DC-600A tape cartridge.

• **PC/T-11 (Personal Computer Tape format)** allows complete file update and manipulation through TMS (tape management system).

IBM® is a registered trademark of International Business Machines Corp.

• **AN INDIVIDUAL DIRECTORY** for each of the eleven tape tracks makes locating individual files easy.

• **MORE THAN JUST A TAPE BACKUP DEVICE,** the TG-4160 is a complete archival library system with easy access to individual files.

In the hard disk jungle, tape backup has become a way of life.
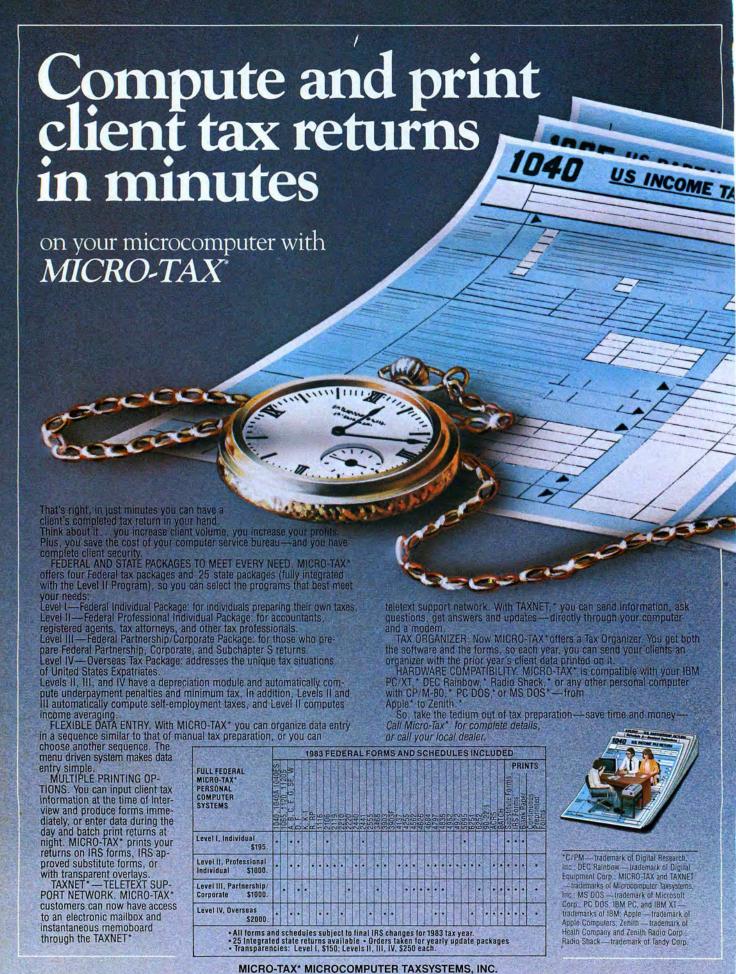
Available from COMPUTERLAND® Entré Computer Centers® MicroAge® Computer Stores and other participating computer dealers.

World Headquarters: Tallgrass Technologies Corp. / 11100 W. 82nd St. Overland Park, KS 66214 / 913/492-6002 / Telex: 215-406 TBYT UR

European Distributor: CPS Computer Group, LTD Birmingham, England B276BH (021) 707-3866

Australian Headquarters: Tallgrass Technologies (Australia) / Five Dock Plaza. Suite 12/50 Great North Road / Five Dock / Sydney, N.S.W. 2046 / (02) 712-2010

Tallgrass Technologies Corporation

Letters

The Radiation Question

I would like to say how much I enjoyed reading "The Radiation Question" by Susan Mauk [*PCW*, Vol. 2, No. 1]. I particularly liked it because it was objective, and that is critically important in a publication that caters to the computer industry. Until recently magazines such as yours tended to dismiss the radiation question.

There is now considerably more scientific work being carried out in this area, and laboratory tests have demonstrated that extra low frequency radiation does have biological effects. Whether these effects are a health hazard has yet to be determined.

Remember when shoe stores had X-ray machines to allow the salesperson to check the fit of the shoes? That was back in the days when X rays were used to treat babies for tonsilitis. We now know that exposure to X rays is a health hazard. It is conceivable that in the future it will be determined that cathode ray tubes are a health hazard. Fortunately we are moving to flat screen technology, which will eliminate the use of CRTs and create a healthier work environment.

Christine Micklewright
CompuServe 71336,635

Volkswriter's Time Bomb

As a computer virgin some months ago I was very happy to find a word processor like *Volkswriter* to get started with. When my requirements grew, I was delighted to learn about *Volkswriter Deluxe*. I sent off my $90 for the upgrade and was initially pleased with the new program.

However, thanks to *Volkswriter Deluxe* I lost a year's worth of writing on a book, plus all my backup copies, plus $250 worth of unnecessary repairs on a disk drive. Buried in *VW Deluxe* there is an electronic time bomb that all potential *VW Deluxe* owners should be aware of.

Picture this scene: for four days I had been slaving away at a large and very complex paper that was about 20 pages long. As I habitually do, I saved the file to disk and to two other backup disks. Imagine my horror when next I called up the file only to find that the whole disk had been turned to electronic garbage. A double-sided, double-density disk nearly full of many important files had been trashed. So too had the two backup disks.

What could cause such a thing? There had been no error messages, and everything else seemed to be going alright. I concluded that somehow the B drive was misbehaving and destroying the disks when I attempted to save my files. A trip to ComputerLand revealed that my B drive was slightly out of alignment.

Some $250 later, I returned to work with my confidence restored. I was staring at a three-day deadline to complete my paper, so I started writing with a vengeance. In two days it was 20 pages long, and again I was saving with three backup copies. Again disaster struck; retrieving my file following a standard save, I again found that every data disk had been destroyed.

This time I suspected that I had a software problem. I phoned Lifetree Software and explained the problem. Without hesitation the woman I was speaking to said that my problem was due to the presence of spill files.

Apparently, when files grow beyond a certain size the spill files are supposed to catch the overflow. Unfortunately, what happens is that the entire disk is irreparably scrambled.

It seems unbelievable that a responsible software company could produce a program with such a destructive bug and not issue any warning or include any error messages to warn prospective owners. I had owned and suffered with *VW Deluxe* for more than two months before I discovered the cause of the problem. Surely in that time Lifetree could have sent out a warning.

John W. Evans
St. John's, Newfoundland

Manufacturer's Response

When editing a large document, *Volkswriter Deluxe* uses a "spill file," which can be placed on either the system disk or the data disk. The "time bomb" referred to in Mr. Evans's letter is only a problem if you place the spill file on the data disk and switch data disks right before storing the document. That can happen, unfortunately, if you are trying to store the document on more than one disk to be especially careful. If this is your intention, reconfigure the program so that spill files are located on drive A.

At the start of the program a message warns, "Do not remove the diskette from drive B." The manual also states, "WARNING: when editing a very large document, it may be necessary for *Volkswriter Deluxe* to use a diskette for temporary storage." If this happens, it will give you a clear

Letters

warning: "DO NOT REMOVE (the indicated diskette)." These warnings, we recognize, are insufficient.

This potential problem exists on the first printing of *Volkswriter Deluxe,* which is identified with a zero as the first digit of the serial number. This version also slows down significantly under certain conditions.

A notice has already been sent to all affected users, and an update disk is being sent, free of charge, which incorporates extra safeguards and improves program speed significantly.

I regret any problems this may have caused. Our update will prevent this problem from recurring.

Camilo Wilson
President, Lifetree Software
Monterey, California

Computers for Charity

The San Pablo Institute, a nonprofit public charity organization, is forming a computer education program for economically disadvantaged young people. The computer club is a free service program of the San Pablo Institute. No membership fees or dues are charged, nor are members expected to pay for club services. The computer club offers programming instruction and gives young people an opportunity to meet and share ideas with other young people interested in computers, allowing them to constructively apply their time, talents, and intellect.

The San Pablo Computer Club is seeking donations of computers, peripherals, and software. Donated equipment will be used by club members for hands-on learning and experimenting. All donations are tax deductible, and the San Pablo Institute will pay the shipping.

Get a tax break plus the satisfaction of knowing that the computer you cut your teeth on is giving experience to a kid who would not otherwise have this valuable opportunity.

Keith Wood
San Pablo Institute
234 Mullen Street
San Francisco, California 94110
415/550-1042

Not So Portable Pascal

Thank you very much for Michael Covington's article on the IBM Pascal Compiler ["Taming the Pascal Compiler," *PCW,* Vol. 2, No. 3]. Because of it, I finally decided to get out my dusty copy of *Scribble* and my trusty *Mince* editor and blow off some steam.

When I am not using assembly language in my systems programming projects, I use Pascal almost exclusively. Indeed, I plan to write a Pascal user's manual that I hope will answer many of the consulting questions directed toward my desk every week. Working at a large university such as Cornell has its benefits, but possession of "standardized" Pascal compilers which generate "programs [that] are easily transferred from one type of computer to another" is not one. On campus, we have several mainframes, many minicomputers, and thousands of micros, yet only the IBM PC fitted with Microsoft's Pascal will compile and execute Covington's example UPPERCASE program.

Sigh. I have this list on my office wall of things I hate. I shall have to add to that list: I hate articles that state one idea (e.g., yea for "standard" Pascal) and then proceed to

demonstrate the opposite. If you want to say that IBM's documentation is the pits, say it. After all, they didn't write it. But don't claim Pascal code is portable without trying to port it somewhere.

P.S. Wouldn't using ANSI.SYS and ANSI standard control codes be more portable than the very interesting screen control package Mr. Covington provides?

George R. Boyce
Ithaca, New York

Pleased with Her Pascal

I have just finished reading Michael Covington's article on the IBM Pascal Compiler ["Taming the Pascal Compiler," *PCW,* Vol. 2, No. 3]. Covington correctly states that the manual is a total disaster; by the time I gave up using the IBM Compiler my manual was liberally sprinkled with notes that either gave warnings of misrepresentations or clarified unclear documentation. Covington and anyone else looking for a decent Pascal implementation for the IBM PC and compatibles should consider Microsoft's MS-Pascal Compiler. Microsoft wrote the IBM Pascal Compiler, but the story goes that IBM insisted that the manual be rewritten—for added clarity, no doubt.

The MS-Pascal Compiler has all the features of the IBM Pascal Compiler plus a few extensions. The manual is a thousandfold improvement—Covington will find the secrets of DOS XQQ and PPMUQQ laid bare. The manual contains useful information on compiling large programs and suggestions for dealing with the "compiler out of memory" error that caused me, and I'm sure many others,

When Lotus™ wanted better graphics for 1-2-3™, they chose a better graphics card–HERCULES™.

And then we became a standard.

When the IBM® PC was introduced over 2 years ago, the talented people at Lotus realized that it was limited by a lack of high resolution graphics. They knew that this was going to have an adverse effect on 1-2-3's graphics. And Lotus didn't want anything to hold back their revolutionary software.

So they turned to Hercules.

Lotus recognized that the Hercules Graphics Card delivered the performance they wanted. It offered high quality text and high resolution graphics on IBM's monochrome display. It completely replaced the IBM monochrome card. And it didn't cost an arm and a leg.

Since then, Hercules has sold a lot of Graphics Cards. So many that the Hercules Graphics Card has become the high resolution standard for the IBM PC. And this means that there is more high resolution graphics software available for Hercules than for any other graphics card you can buy.

Software like Microsoft® Word. Our high resolution makes Word's text much sharper and easier on your eyes. And there are other programs for business graphics, computer aided design, terminal emulation and programming.

Call for our free information kit. See why the company that made the first graphics card for the IBM PC still makes the best.

Hercules. We're strong on graphics. 800 255 5550 Ext. 401

2 YEAR WARRANTY

Circle 77 on reader service card

29

Letters

so much anguish. One word of warning, however. Microsoft has written this manual about an implementation of the language that may or may not yet, or ever, exist. There is a section called "Unimplemented Features" that should not be missed. This implementation includes support for floating point operations utilizing the power of an 8087 coprocessor or using an emulation library.

I have found the MS-Pascal Compiler much superior to the IBM Pascal Compiler and have no hesitation in recommending it.

Bernadette Raftery
San Francisco, California

Chasm

In response to a brief mention in a *PC World* article ["Ready to Assemble," *PCW*, Vol. 1, No. 5], I received mountains of inquiries about my user-supported assembler package, *Chasm*. In fact, nine months after the reference I still receive several requests a week that mention the *PC World* article. Clearly I'm not alone in holding onto and rereading my back issues of *PC World*.

Just recently I moved to a new location, and I'd like to let people know my new address so that their disks don't end up in the dead letter office. Those who would like to try their hand at assembly language without shelling out $100 for the *IBM Macro Assembler* are invited to send a formatted disk and a stamped, self-addressed return mailer to the address below.

Chasm is distributed at no charge for evaluation. The program will run in 64K under DOS 1.10 or 96K under DOS 2.00 and requires an 80-column display and one disk drive.

Those who find the package useful are requested to send $30 to support *Chasm*'s development. Users who contribute are eligible to receive a free, high-speed, compiled version of the program.

David Whitman
136 Wellington Terrace
Lansdale, Pennsylvania 19446

Compatibles News
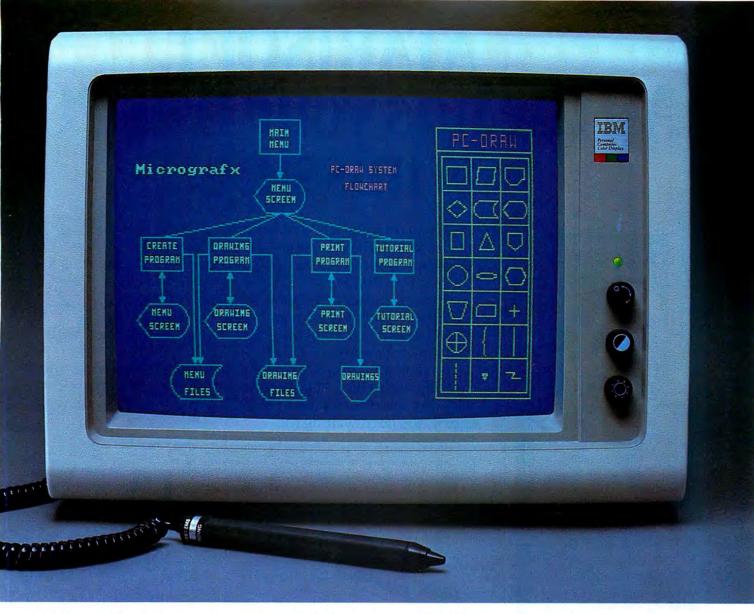
I have read your magazine several times and was impressed with the quality of the articles. Recently my wife and I purchased a Texas Instruments Professional Computer. Are you planning any articles on this excellent piece of equipment in the future?

Ralph Nelson
Aurora, Colorado

Beginning with the August issue, PC World *will include a monthly column devoted to news of PC-compatible products, the TI Professional Computer among them. This compatibles department will highlight hardware and software product introductions, business and marketing concerns, and legal issues.—Ed.*

Letters should be mailed to Letters, PC World, *555 De Haro St., San Francisco, CA 94107 or sent electronically to CompuServe 74055,415 or Source STE908.*

PC-Draw from Micrografx, the drawing system for your office or home.

Now, you can create diagrams, illustrations, charts and drawings on the IBM PC or XT.™

And reproduce them all with your printer or plotter.

With this versatile, easy-to-use graphics program, you can produce diagrams, schematics, charts and drawings in virtually limitless varieties.

PC-Draw provides you with three symbol libraries (software design, electrical design, and alternate text), multiple text fonts and the capability to design your own symbols, with an extensive set of graphic functions provided for symbol manipulation. These functions include object scaling, rotation and placement. PC-Draw lets you unleash your creative energies in data processing design, floor plans and interior design, graphic illustrations, electrical design, and other drawing/drafting applications. And PC-Draw supports an optional light pen.

The PC-Draw system requires an IBM PC or XT™ with graphics monitor, graphics adapter, 128K of RAM and two diskette drives or one diskette drive and a hard disk.

PC-Draw: $395 (Includes HP7470A/ 7475A Plotter Support). Light Pen: $195. Plotters and Graphics boards at competitive prices. To order or for information call (214) 234-1769 or write Micrografx.

MICROGRAFX INC.

1701 N. Greenville Ave., Suite 703/Richardson, TX 75081
(214) 234-1769

© 1983 Micrografx

ATARISOFT.™
All the hits your IBM PC is missing.

If you thought you'd never find fun games for your hardworking IBM PC, happy days are here. Because now ATARISOFT brings you action-packed arcade hits for your buttoned-up IBM PC.

Pick from Pac-Man,¹ Donkey Kong² by Nintendo,² Centipede,™ Defender,³ Joust,³ Jungle Hunt,⁴ Moon Patrol,³ Pole Position,⁵ Galaxian,¹ Ms. Pac-Man,¹ and Battlezone.™ With many more to come.

So dust off your joystick (or if you don't have a stick, you can play with a flick of your fingers on your keyboard) and ask your dealer for all the ATARISOFT hits. The software your hardware's been waiting for.

JOUST
FROM
ATARISOFT

MS. PAC-MAN	ATARISOFT IBM PC
MOON PATROL	ATARISOFT IBM PC
JUNGLE HUNT	ATARISOFT IBM PC
BATTLEZONE	ATARISOFT IBM PC
POLE POSITION	ATARISOFT IBM PC
GALAXIAN	ATARISOFT IBM PC
STARGATE	ATARISOFT IBM PC
DONKEY KONG	ATARISOFT IBM PC
DEFENDER	ATARISOFT IBM PC
DIG DUG	ATARISOFT IBM PC
CENTIPEDE	ATARISOFT IBM PC
ROBOTRON:2084	ATARISOFT IBM PC
PAC-MAN	ATARISOFT IBM PC

IBM
PC

And eliminate your payroll headaches.

Let's face it. Most of us hate doing payroll: figuring taxes, trying to meet those non-stop payday deadlines and worrying about accuracy.

But Medallion® Payroll from Timberline Software eliminates these headaches. It processes all your payroll requirements *on time* and gives you total control over sensitive payroll data.

And Medallion Payroll does it right, thanks to Timberline's 12 years of software experience and feedback from thousands of users nationwide.

Simply...the best

Enter your employee's data on the screen, and Medallion Payroll does the rest. Easily, quickly and accurately. Even unusual situations (such as mid-month draws, tip credits and more) are no problem.

When the processing is done, your employees will get a printed check that is easy to read and understand.

You and your staff will love Timberline's friendly software documentation and support.

You'll agree that Medallion Payroll is simply...the best.

Ask your computer store about Timberline Medallion Payroll, or call (503) 644-8155.

TIMBERLINE
SOFTWARE

7180 SW Fir Loop
Portland, OR 97223
(503) 644-8155

See us at
COMDEX/SPRING
booth D540

Timberline Medallion Payroll is one part of a complete collection of accounting software. Timberline software runs on IBM, TI, DEC, SAGE and NEC.
©1983. Timberline Systems.

Circle 647 on reader service card

OPEN UP AN ACCOUNTING DEPARTMENT FOR $395.00

GENERAL LEDGER integrated postings from A/R, A/P and Payroll. **Prints 13 detailed reports** • Company or departmental Income Statements • **Comparative financial statements** with current, YTD, budget, and last year (month and YTD) • Presents everything you, your bookkeeper, and your accountant need to know • G/L reconciles all accounts and maintains extensive, detailed audit trails • Trial Balance includes all transactions • **Flexible Chart of Accounts** • True double-entry bookkeeping • Master File capacity: 400 accounts • Monthly Transaction capacity: 1,000 with 200K diskette; 3,500 with 500K diskette; 7,000 per Megabyte with a hard disk.

ACCOUNTS RECEIVABLE provides **instant, on-line customer account information (both current and aged)**, complete invoicing (open-item or balance forward) and statement capabilities on optional preprinted forms give your company a professional image • Quickly identify overdue accounts, speed collections, help control cash flow • Detailed and summary customer activity and aging reports • Produces 8 reports • Automatic periodic customer/client billing option • Itemized monthly transactions • Master File capacity: 400 Customers • Monthly Transactions capacity: 800 with 200K diskette; 3,500 with 500K diskette; 7,000 per Megabyte with a hard disk.

ACCOUNTS PAYABLE maintains complete vendor/voucher history and includes **check-writing** capabilities • **Current and aged payable reports** • Cash flow/cash requirements report • Prints checks with comprehensive check stubs • **Produces 11 reports and documents** • Automatic pay selection program allows payment by due date or by discount date • **Manual and automatic checkwriting** • Check register • Master File capacity: 400 Vendors • Monthly Transactions capacity: 800 with 200K diskette; 3,500 with 500K diskette; 7,000 per Megabyte with a hard disk.

PAYROLL—Be the office hero each week when the checks come out on time! • **Calculates payroll for every type of employee** (hourly, salaried, and commissioned) and **prints payroll checks** (with popular, comprehensive check stubs) with an absolute minimum of input • Maintains monthly, quarterly, and yearly totals for reporting in **multiple states** • **User-maintainable Federal, State, and local tax tables** • W-2 printing • 941 Reporting • Produces 10 reports • Master File capacity: 400 employees.

• California residents add 6½% Sales Tax • Payment by VISA/MasterCard/COD/MO/Cashier's Check • All Brand Names are manufacturers' registered trademarks • No sales to Dealers • Foreign orders please call or write before ordering • ©1983 Rocky Mountain Software Systems.
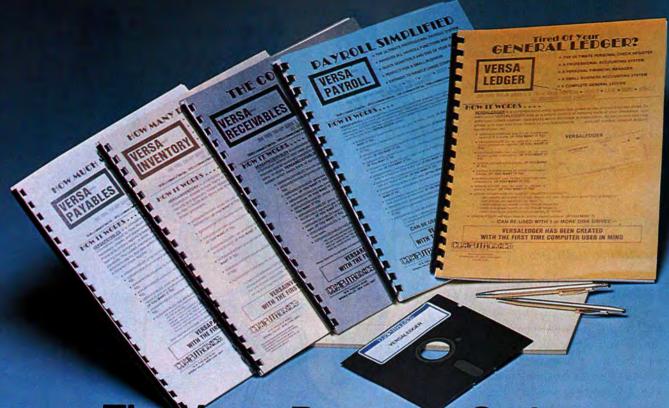
MasterCard VISA

Circle 695 on reader service card

Why staff up? With the Desktop Accountant™, all the accounting help your office needs can be at your fingertips!

Open up a wide new range of possibilities for your microcomputer! No matter what type of business you're in, Desktop Accountant will let you manage the financial end of it more professionally than ever before.

A Complete System with Support. Desktop Accountant includes General Ledger, Accounts Receivable, Accounts Payable and Payroll programs, along with comprehensive user manuals and training aids. We've even prepared an audio cassette tape to make learning the system fast and fun. And our telephone "hotline" means personalized support whenever you need it.

Desktop Accountant's fully integrated accounting system is a complete package of software, training aids, manuals and user's newsletter.

Produces 42 Reports. "Keeping the books has never been so easy! Desktop Accountant prepares every bookkeeping and accounting report your growing business requires: from invoicing to statements to aged A/R listings; from cash distribution to A/P checks to vendor activity reports; from **complete** payroll checks and stubs to W-2 forms; from the chart of accounts to balance sheet and income statement, as well as many others so vital to efficient management.

Desktop Accountant is available for nearly every portable, personal and desktop computer. The system requires either CP/M® or MS-DOS (PC-DOS), Microsoft BASIC™, 64K RAM, two disk drives or hard disk, and a 132-column printer (or an 8½" x 11" printer with compressed print mode).

You won't find better quality software at such a low price—a price we can offer now because development costs were recovered years ago. Just **$395.00 for most CP/M® formats** (**$495.00 for IBM® and some CP/M® formats**) **complete.** *Call for available formats.*

Order Desktop Accountant today! You'll soon see why we call it **INTELLIGENT SOFTWARE FOR INTELLIGENT PEOPLE.**

ROCKY MOUNTAIN SOFTWARE SYSTEMS
Business Microcomputers and Software

To order Desktop Accountant and for more comprehensive literature, call toll-free

☎**1-800-832-2244**
(In California call 1-800-732-2311)

or send orders to
DESKTOP ACCOUNTANT
1280-C Newell Avenue, Suite 1211
Walnut Creek, CA 94598

PC W🌐RLD View

News and notes for the computing community

Miriam Medom

PC World View reports new developments in computer technology, items of interest to all computer enthusiasts, and the most significant and enticing speculation about industry trends and personalities. We've reserved the "Grapevine" section of this column for industry reports that are still at the speculative stage.

Grapevine

Network Rumors

Two rumors related to local area networks suggest that IBM will release a new PC-type computer that uses the Intel 80286 microprocessor. Because the 80286 is especially well suited for multitasking (that is, performing two or more operations simultaneously), industry sources speculate that the new computer will be used as a central part of a local area network. Also circulating on the rumor mill is the contention that Digital Research (Pacific Grove, California), creator of the CP/M family of operating systems, is developing an operating system for the new 80286-based IBM computer.

Convergent Compatible?

The dependability of advance reports and printed rumors in computer industry trade publications varies widely, from relatively accurate predictions regarding the PCjr and the Macintosh to the almost complete absence of information about IBM's new Portable PC. Missing the boat on such developments as IBM's portable has not kept the industry wags from speculating about anything and everything, however. And one of the chief inspirations for such rumors is the tendency toward musical chairs among executives of computer firms.
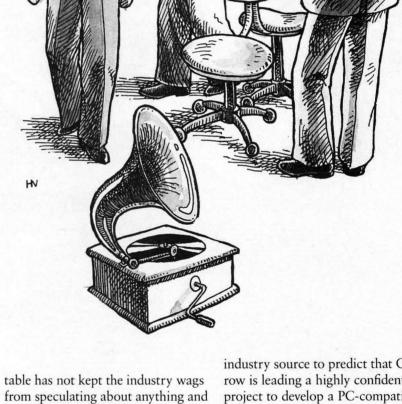
For example, a top manager at Convergent Technologies named Robert Garrow recently changed titles, from vice president of the work station division to vice president for new business. That led at least one industry source to predict that Garrow is leading a highly confidential project to develop a PC-compatible computer for Convergent. The machine, if it's being developed, will reportedly be a low-cost system that uses the Intel 8086 microprocessor and will run PC-DOS, UNIX, and CTOS, the proprietary system software from Convergent.

Better Late than Never

Digital Equipment Corporation (DEC), the nation's second-largest computer firm—behind you-know-who—has finally decided to join the ranks of PC compatibility, according to one industry report. Rather than build a new PC-compatible computer, however, DEC reportedly plans to market a plug-in board for its Professional and microPDP-11 computers to make them compatible with most software written for the PC.

Although its products dominate the minicomputer market, DEC has not made notable inroads in the microcomputer arena, and its Professional and microPDP-11 have not sold well to date. (The Rainbow, DEC's low-end microcomputer, has done better but has also been eclipsed by the PC.) By joining the ranks of PC compatibles, DEC may substantially add to its share of the business work station market.

Legal Beat

VisiWars

Because our copy deadline is so far ahead of publication, we can't predict how the dispute over *VisiCalc* will be settled or where it will stand as the summer heats up. But *PC World View* has received copies of the legal documents filed by VisiCorp and Software Arts, and there are some fascinating details amid the claims and counterclaims.

This whole legal battle formally began last September, when VisiCorp (San Jose, California), which pub-

lishes and distributes *VisiCalc*, filed suit against Software Arts (Wellesley, Massachusetts), which created *VisiCalc* and signed a contract in 1979 allowing VisiCorp to publish and distribute the program exclusively. As part of that original publishing arrangement, Software Arts agreed to revise and augment *VisiCalc* within a reasonable time after VisiCorp's requesting it, and VisiCorp agreed that Software Arts would have the right of first refusal to make any such revisions or enhancements to the program.

In its suit, VisiCorp claims that Software Arts did not deliver several new versions of *VisiCalc* as requested, and that one version it did deliver—for the PC—was not acceptable. Contending that the failure to receive needed products caused a substantial loss in revenues and industry standing, VisiCorp asked for both compensatory and punitive damages.

For its part, Software Arts took two separate actions in February. First, its president sent a letter to VisiCorp stating that VisiCorp had violated the terms of the two companies' original publishing agreement and that Software Arts therefore was exercising its right under that contract to recover all rights to publish and distribute *VisiCalc*. Then Software Arts filed a response to the VisiCorp suit and added a counterclaim of its own. Software Arts's counterclaim states that VisiCorp devel-

oped and began marketing a new version of *VisiCalc* (called *VisiCalc IV*) and also began marketing *Visi On Calc*, a separate product, without consulting or compensating Software Arts.

In its suit, VisiCorp refers to the royalties it pays Software Arts on sales of *VisiCalc*, but declines to disclose the actual royalty percentages, "which are considered confidential by VisiCorp." The figures are even blocked out of the copy of the 1979 agreement attached to VisiCorp's legal filing. Conversely, Software Arts states the royalty terms in its claim and provides an unaltered copy of the 1979 contract. The royalty terms are that VisiCorp pays Software Arts 35.7 percent of the net sales price for all copies of *VisiCalc* sold and for all leases, licenses, and other transactions, except when bulk sales of 5000 or more copies are made; then Software Arts gets 50 percent of the net.

One last tidbit that stuck out among the legal jargon: *Visi On* was code-named Quasar from August 1981 until its announcement in late 1982.

IBM Sues over Compatibles

In a move reminiscent of Apple's copyright-infringement suit against Franklin Computer, IBM recently filed suit against Corona Data Systems (Westlake Village, California), which makes desktop and portable models of a PC-compatible computer. The suit was settled on the day it was

filed, however, with Corona agreeing to change the basic input/output system (BIOS) in its computer so that it does not duplicate any of the software copyrighted by IBM.

A spokesperson for Corona asserted that IBM's filing of the lawsuit actually came after Corona and IBM had worked out their agreement. Corona consented to change the offending software in its computer within three weeks of the date of the legal action; under the agreement between the two firms, all Corona computers sold before that date are exempt from penalty.

In a related action, IBM also filed suit against Handwell Corporation (Santa Clara, California), distributor of computers made in Taiwan that are reportedly compatible with the PC. Handwell has also settled with IBM, agreeing not to infringe upon the copyrighted software in the PC.

Spokespeople for COMPAQ Computer Corporation and Columbia Data Products, both prominent manufacturers of PC compatibles, noted that they did not anticipate legal action from IBM regarding their computers.

Lotus Applies Legal Muscle

In a legal move that may signal a tough new attitude among software publishers, Lotus Development Corporation recently filed a software piracy suit against Rixon, a data communications firm. The Lotus action seeks $10 million in damages, claiming that Rixon employees unlawfully copied the 1-2-3 integrated software and distributed those copies to other Rixon employees.

Software piracy represents millions of dollars in lost revenues for publishers and vendors, and copy-protection schemes such as that used with 1-2-3 have not curbed the problem. Currently, a group of industry leaders, including representatives from Lotus and Microsoft, is forming an alliance to defeat pirates. While filing lawsuits is one of their approaches, they are also seeking to have protection against unauthorized use of software built into the hardware.

For example, a software purchaser could be required to supply the serial number of his or her computer at the time of purchase, and that serial number would be encoded into his or her copy of the program and checked against a similar coding in the computer's ROM each time the program was used. If the serial numbers in the program and in the computer didn't

match, the program would crash, thus ensuring that each copy of a program would be used with only one microprocessor, as software licenses require.

Although a number-matching scheme like this would take the cooperation of everyone in the industry, it could go a long way toward eliminating piracy. And if hardware manufacturers are reluctant to assist in software protection, some software publishers suggest that they may retaliate by refusing to release versions of their products that will operate with local area networks or other multiuser systems.

Run Silent, Run Deep

PC World View correspondent Karen Dowell has taken a careful look at Japanese computer manufacturers and offers this assessment of their situation.

"While the Japanese have captured the American market with cars, cameras, and stereo equipment, they have yet to make a similarly successful onslaught on the personal computer market. Because of miscalculations in marketing and distribution and a surprising inability to master software development, Japanese computer companies have opted for a more subtle approach to the market by taking advantage of OEM agreements.

"Epson printers, Tandy's Model 100, and Sperry's personal computer are all examples of Japan's under-the-counter influx. By selling the machine, not the name, OEMs have the luxury of selling the same equipment to different American manufacturers. This makes the OEM trend a definite advantage for the Japanese: they are receiving the educational edge necessary to help them overcome their marketing mistakes while continuing to develop and manufacture new products.

"Undeniably ruled by IBM and Apple, the computer industry is changing rapidly. This rise and fall of start-up companies reflects the almost emotional instability of the market. Venturing to develop a machine outside the PC-compatible standard today is almost as risky as developing yet another compatible. It is currently impossible to anticipate what direction the personal computer industry will take in the next few years. It is even harder to make predictions until the Japanese have made their official entry into the American market."

Ad Wars

Women as Heroes

In *PC World View* for April, we quoted industry analyst Jean Yates as saying that computer marketing had become a matter of "who can shove the most commercials into the Super Bowl." Although the 1984 Super Bowl has come and gone, nobody has

riage into a cozy living room and fussing over his new "baby," the PCjr, as a cheerful yet soothing female voice narrated. With only one commercial in between (for 7-Eleven Stores), Apple's imitation Orwell scene came on, complete with zombie-like citizens staring at a huge face on a screen, until a vital young woman liberates them by throwing a large hammer through the screen.

analyzed the commercials during that event—until now. Indeed, what we saw and didn't see in the way of high-tech products between Raider touchdowns and Redskin punts is at least indicative of a changing culture, if not the clue to which companies will dominate the computer market.

The two big ones—the commercials Yates probably had in mind—came just after the second half began. The first was for IBM's PCjr and featured the familiar Charlie Chaplin figure—this time pushing a baby car-

These two advertisements were as different as night and day, but both featured women, which may be another emerging trend in the computer culture. IBM wanted to suggest that the PCjr belongs at home, so what better way than to let a housewife do the talking? Apple wanted to suggest that computers can be liberating rather than enslaving, so why not choose a woman athlete, clad in a

PC World View

tank top bearing the Macintosh logo, to beat the system? Who knows? Maybe next year the Super Bowl ads will be back to beer and insurance, and computers will be bringing us the soap operas and talk shows.

A few other computer-related ads did make it into the Super Bowl this year, though. They were for ComputerLand (twice), Radio Shack's TRS-80 Model 2000 (also twice), and Atari, for a total (with IBM and Apple) of seven. There were also nine car ads (six for Chevrolet), five beer ads, three insurance ads, three ads for Sharp office products, and one each for Anacin, Denerex, Coca Cola, Master padlocks, and a smattering of similarly appealing products.

Never Insult a Potato

Also on the advertising front, Microsoft recently discovered that it had a hot potato on its hands. The software firm, based in Bellevue, Washington, has run several ads in newspapers and magazines showing a hamburger and warning consumers not to use "junk food" in their computers. In one newspaper variation of this ad, Microsoft used french fries instead of the hamburger and continued the junk food metaphor. Well, Washington is a potato-growing state, and the leaders of its agricultural establishment didn't appreciate the implication that potatoes are

junk food. In fact, the Washington Potato Board chastised Microsoft for such heresy. Despite the board's protest, Microsoft is still running its junk food ads with a hamburger and fries. They'll probably be hearing from the beef commission next.

Big Blue's News

Less from More

IBM recently surprised most of the microcomputer industry—including some of its suppliers—by cutting orders for hard disk drives from several vendors. Three large-volume suppliers of 10-megabyte hard disk drives used in the XT were affected by IBM's move: MiniScribe, International Memories, and Seagate Technology. IBM would not comment on its reasons for cutting back on the quantities of hard drives ordered from these firms, but observers speculate that the computer manufacturer is reluctant to become too dependent on a few suppliers of any one component.

An IBM spokesperson stated that the company will be adding other hard disk drive suppliers, although none were named. One industry analyst suggests that IBM will spread its additional orders for the drives among Tandon Corporation, which already supplies floppy disk drives for the PC; Computer Memories, which currently supplies larger-capacity hard drives to IBM; and Scottish manufacturer Rodime.

Big-Time Videotex

An unlikely triumvirate of IBM, CBS, and Sears has formed to begin a home videotex service. Unlike most other videotex systems in use or in development, the new service will be available on personal and home computers. At present, services such as the Knight-Ridder and AT&T Viewtron system require a specialized terminal that cannot double as a stand-alone computer.

The three partners in this videotex venture have yet to name their service, and it won't be available for several years. But plans for the venture include IBM selling computers via videotex, as well as Sears providing the services of its Allstate Insurance, Dean Witter Financial Services, and Coldwell Banker Real Estate. That means you could cash in your money market shares for the down payment on a new house, purchase the house, insure it, and equip it with a full-blown computer system without leaving the keyboard.

PC World View *welcomes contributions from readers, and we'll pay up to $50 for the items we use. Please include your name, address, and phone number with your contributions; send them to* PC World View, PC World, *555 De Haro St., San Francisco, CA 94107.* ●

Better Business BASIC.

Finally! A BASIC compiler that means business.

Microsoft® Business BASIC Compiler allows you to create professional applications for MS™DOS systems that are so fast your users will never know they were written in BASIC.

Because the compiler produces native code, your software will run three to ten times faster than the same interpreted programs.

But speed isn't everything. Microsoft's Business BASIC also has business savvy. Based on the de facto standard Microsoft BASIC, it includes a rich set of extensions:

MICROSOFT®
The High Performance Software

Decimal floating point arithmetic (14-digit precision-BCD format) for extremely accurate dollars and cents calculations.

Two types of arrays provide maximum program flexibility: static arrays for speed, dynamic arrays for expandability.

Over twenty string handling functions provide sophisticated character manipulation capa-

bilities. Strings can be up to 32K bytes.
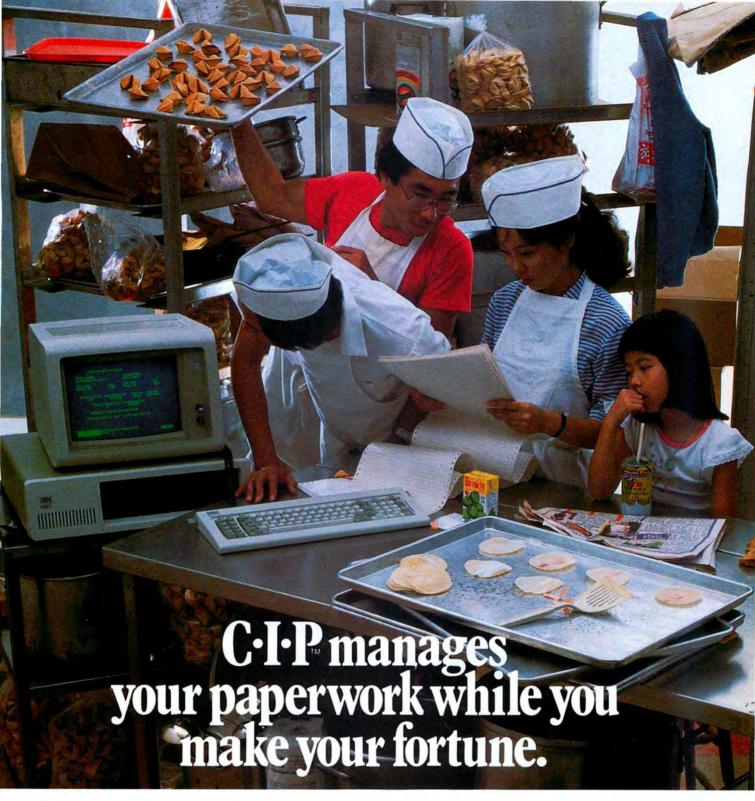
Multi-line functions and subprograms allow you to define routines with local or globally defined variables.

Separate module compilation means complex programs can be broken down into smaller units. Coupling multiple modules together permits creation of very large programs, up to one megabyte.

Call 800-426-9400 to order the better Business BASIC. $600*

In Washington State, call 206-828-8088. Ask for operator D6, who will rush you your order, send you more information, or give you the name of your nearest dealer to see Microsoft Business BASIC in action.

C·I·P™ manages your paperwork while you make your fortune.
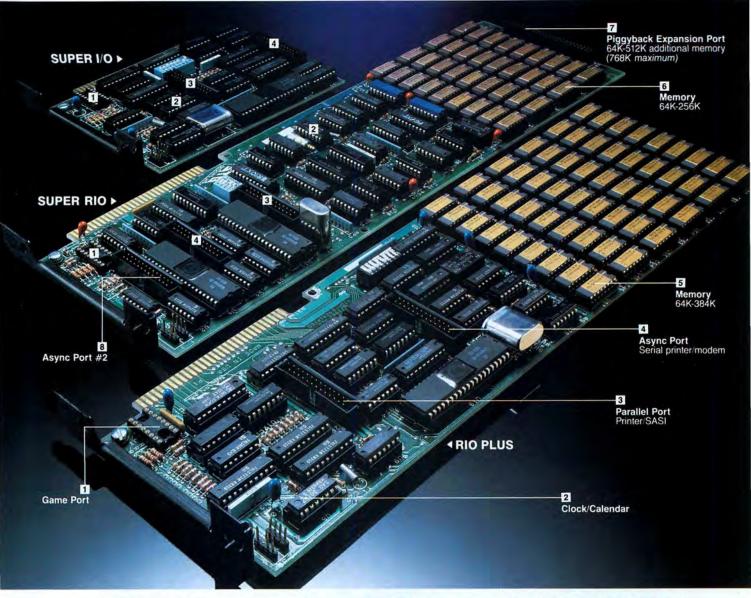
In businesses of almost every size these days, the more successful you are, the less time you have to spend with paperwork. Now you can turn all that paperwork over to C·I·P™, the Concentric Information Processor, and your IBM® PC. • You'll be using C·I·P confidently and profitably within hours. Designed for first-time users, C·I·P lets you create files, alter formats, and design reports visually. So simple! Yet C·I·P has the flexibility to adapt to changes in your business and the power to grow along with your needs. • Ask your local IBM PC dealer to show you how C·I·P can keep inventory under control, manage mailing lists, write reports, calculate due dates, figure sales tax – in other words, take over the paperwork, while *you* concentrate on running the business and increasing profits. C·I·P from Concentric Data Systems, 18 Lyman Street, Westboro, MA 01581, (617) 366-1122.

C·I·P™
CONCENTRIC
INFORMATION
PROCESSOR

The new standard for information management software.

Circle 658 on reader service card

Electronically Yours
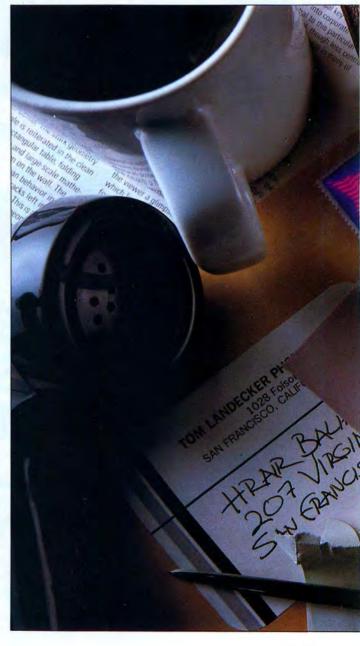
Lawrence J. Magid
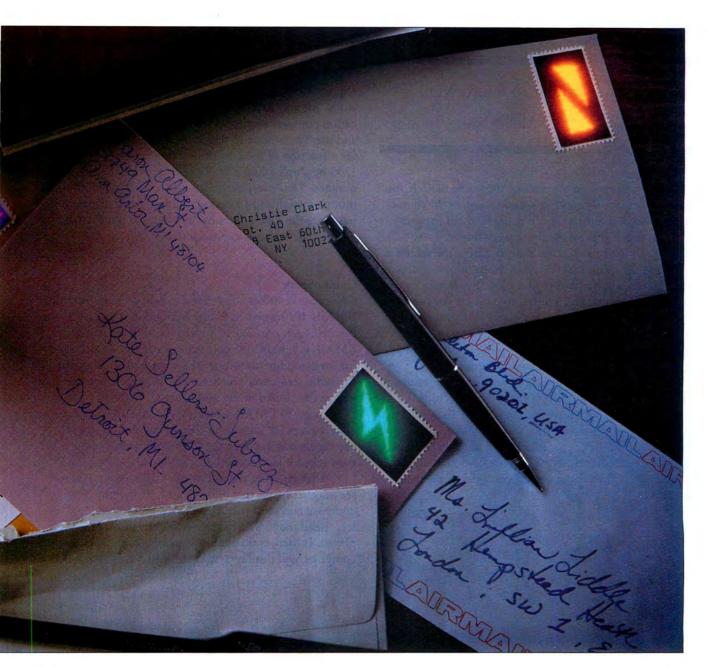
In the last half of the nineteenth century the telegraph, the Pony Express, and the telephone changed the way people perceived the world. A few decades later came airmail and the ability to move letters and packages from coast to coast in a matter of days. The past decade has seen the proliferation of overnight delivery services. But the world keeps speeding up, and sometimes even overnight mail is too slow. If you absolutely positively have to get your document there right now, you may want to consider electronic mail.

The term *electronic mail* covers a lot of territory, but it can roughly be divided into two categories: electronic mail software that you install on your own computer, and large-scale mail networks and information services that you can log on to with a computer, a modem, and a standard communications program. Although sophisticated electronic mail software for the PC is still being refined and the use of such unattended PC post offices will undoubtedly spread (see "In Box Out Box" in this issue), electronic mail software is often dependent on a network of systems running the same software package. With large-scale networks, however, compatibility problems are virtually nonexistent.

Some electronic mail services require that both the sender and the recipient have access to a computer. Others, like the U.S. Postal Service's E-COM and MCI Mail, will convert your electronic mail into paper mail for recipients who don't own a computer.

Electronic mail can substitute for telephone calls as well as conventional paper mail. If both the sender and the receiver have a computer or a terminal, electronic mail can help eliminate "telephone tag," one of the most frustrating aspects of doing business by phone. With

electronic mail, it doesn't matter if the person on the other end "can't come to the phone right now." Whenever he or she arrives at the computer or the terminal, the message will be waiting.

The Source and CompuServe are computer information services that provide electronic mail as well as news, encyclopedias, airline schedules, and electronic bulletin boards. Both services offer subscriber-to-subscriber electronic mail on an hourly rate basis. The bill is based on the amount of time spent on the system rather than on the length or the destination of the message. Although you can compose your messages while you are on line, you can save a considerable amount of money by writing them first with a word processing program. If you use the file transfer utility that is part of most communications programs, a text file can be uploaded, or transmitted, from your computer to the service.

EMAIL is similar to SourceMail but not as easy to use.

The same is true for reading incoming mail. If you are working at 300 bits per second (bps), or 30 characters per second (cps), you can generally read the messages as they come across the screen. But very few people can read the 120 cps that fly across the screen at 1200 bps. In either case, if the message is long, you may want to save money and read it more easily later by downloading it, or receiving it, to a file on your own disk, disconnecting from The Source or CompuServe, and then either printing it out or reading it on the screen using the view function of your communications program or using a word processing program.

This article primarily concerns itself with four electronic mail services: The Source, CompuServe, MCI Mail, and E-COM. However, many other electronic mail services are in existence, such as Graphnet's Freedom Network, GTE-Telenet's Telemail, Tymnet's On-Tyme, and Western Union's Access System. Undoubtedly, other companies will also join the growing electronic mail business.

The Source

The Source has a sophisticated, easy-to-use electronic mail service called SourceMail. You can log on to The Source and check for incoming mail by typing MAIL R U. That command displays all mail that hasn't already been read or scanned. After reading a message, you can type REPLY and compose an immediate response. To send a letter, type the message in (or upload it from a text file) and enter .S. Prior to sending the letter, you can request an automatic acknowledgement receipt, which notifies you when the recipient has read or scanned the message. You can also type .EX (for express letter) to place the message at the top of the recipient's mailbox, so that it is viewed prior to other messages.

The Source lets you keep mail in your mailbox for up to two weeks without a storage charge. You can also store mail permanently on The Source's main computer system, but you will be charged for permanent storage. The least expensive way to store mail is to download it to a disk, where you can read it or print it out at your convenience.

The Source can be used to send correspondence of almost any length to any subscriber in its worldwide network. All you have to do is know the recipient's identification number. I write sometimes for a British magazine and use The Source to deliver my articles immediately for a fraction of the cost of overseas express mail. At 1200 bps, uploading a 2000-word article takes about 2 minutes. That's less than 50 cents at $10.75 per hour. Although my editor in London still has to pay to read the message, the total cost is far less than an international Telex or an overseas express letter.

CompuServe

CompuServe Information Service calls its mail program EMAIL. It's similar to SourceMail but not as easy to use. Because each message is limited to 2000 characters, EMAIL is suitable for correspondence but not for sending long documents. CompuServe provides essentially the same service as The Source, except that access is limited to the United States and Canada.

To get to EMAIL quickly, type GO-EMA from any exclamation point prompt in CompuServe. You can also use the menus to select the Communications option and then select 'Electronic Mail'.

After entering the electronic mail section, you will see another menu that allows you to either read mail or compose and send mail (see Figure 1). To read mail, select 'Read mail'. The first letter will be immediately displayed. If there is no mail in your electronic mailbox, the computer will display a 'no mail waiting' message.

Once you have read the mail, you are guided to EMAIL's filing menu (see Figure 2), from which you must decide whether to delete the message, reply to it, or file it in your storage area in the CompuServe system.

If you decide to reply to a letter or initiate a letter to another CompuServe subscriber, select the 'Compose and send mail' option on the electronic mail menu. That option takes you to another menu that asks you to choose whether you want to create the message or send one from your disk space or work area. Creating the message is facilitated by one of two CompuServe editors, which are both supported by on-line help to explain their use. If your message is long and requires editing, it might be easier to create the message off line using a word processing program and then upload it to the system.

The problem with The Source and CompuServe is that both the sender and the recipient must be subscribers and have access to a terminal or a personal computer. Furthermore, you must know a subscriber's identification number. Knowing a name won't help you. We haven't reached the point at which every home and office has a telecommunications facility, and even if we did, there would be no guarantee that the intended recipient would subscribe to one of these services.

The National Bureau of Standards and several industry committees have proposed standards so that electronic mail could be transferred between different services (just as independent phone companies can link subscribers), but the standards have not yet been implemented. Fortunately, there are services that link the electronic front-runners with the rest of the world by printing computer-generated messages and delivering them via postal mail or courier.

MCI Mail

MCI made its name by offering a low-cost alternative to AT&T's long-distance telephone service. Now it's in partial competition with the U.S. Post Office and the overnight mail services. Although no one (other than the crew of "Star Trek") has figured out a way to telecommunicate packages, MCI Mail can deliver the written word virtually anywhere in the world, even if the person on the other end doesn't have a computer or a terminal.

There is no charge to subscribe to MCI Mail, and you are billed only for the messages delivered. Unlike The Source and CompuServe, MCI does not charge for the time you are on the system. You can access MCI Mail from almost anywhere in the country via an 800 number or a local access number.
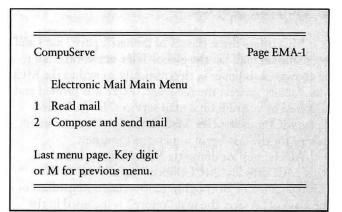
Figure 1: CompuServe's electronic mail main menu
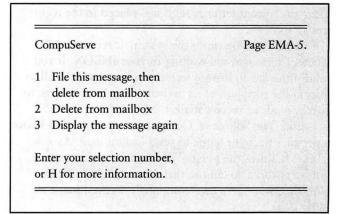
Figure 2: CompuServe's mail filing menu
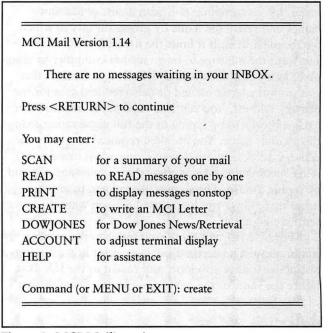
Figure 3: MCI Mail's main menu

● Getting Started

MCI offers three classes of domestic paper mail and international mail via the global Telex network. Mail to be converted to paper is electronically routed to the MCI Mail facility nearest the recipient. There it is printed and delivered by conventional mail services. In the United States MCI uses the U.S. Mail or the Purolator Courier service for the last leg of a message's journey.

All charges for domestic MCI Mail are based on what MCI calls an "MCI Ounce," up to 7.5K of data (7500 characters, or roughly 1250 words). Regardless of the class of service, the first "ounce" is included in the base price, and each additional ounce costs $1.

Using an MCI "instant letter," you can send an electronic message to any other MCI Mail subscriber for $1. Once the instant letter is sent, it is placed in the recipient's "INBOX."

When you log on to the system, it reports on whether messages are waiting in your INBOX. If you send someone an instant letter, you may have to call to inform the recipient of its arrival. There is no charge to check, read, or receive mail.

Like The Source or CompuServe, you need to know a person's account name to send instant mail. As a default, MCI uses the person's first initial and last name, but users can also choose their own account names. Guessing a person's or a company's account name is fairly easy.

When you choose the 'CREATE' option on the MCI Mail main menu (see Figure 3), the system prompts 'TO'. If the person has an account, you enter the account name. MCI's computer will scan its list of account names and verify the name by giving the city in which the recipient lives. If it finds the name, it assumes that you want the message to be an instant computer-to-computer letter. If it doesn't find the name, it assumes that you want the letter mailed or delivered and asks for the delivery address. You can also send paper mail to other MCI subscribers by typing in the full name rather than the account name. You are then required to specify the delivery address (the recipient's zip code is mandatory). After specifying a header, you type the message and end by typing a slash. The slash will send you to another menu that allows you to choose how you want the letter sent (see Figure 4).

For $2 MCI will route your letter to the printing station nearest its destination, laser print it, stuff it into a distinctive orange envelope, and take it to the U.S. Post Office the same or the next business day. From there it's up to the U.S. Post Office to get it to its destination. In many ways, this service is similar to a Mailgram but much less expensive.

If you use MCI's overnight service and post the letter by 8 p.m. EST, you can guarantee that the letter will be delivered by noon the next business day. The cost is $6 for the first "ounce" (three pages) and $1 for each additional "ounce." If you're really in a hurry, you can have your letter delivered within 4 hours for $25. Overnight service is available in most major metropolitan areas and some smaller cities. You can get an up-to-date list of possible overnight destinations on line by typing HELP plus the state of destination.

MCI offers immediate access to the Dow Jones News/Retrieval service. MCI waives the normal $75 Dow Jones access fee, but you still have to pay Dow Jones's regular data base time charges.

Through MCI Mail, you can communicate with any Telex anywhere in the world. Although the process is similar to sending other MCI Mail, you have to use the recipient's Telex number. To send a Telex, you specify an individual's or company's name as you would if it were being sent via domestic paper mail. You receive the message 'Enter a postal address or TLX'. On the next line

---

> There is no charge to subscribe to MCI Mail, and you are billed only for the messages delivered.

---

you type TLX: and the Telex number. MCI Mail will dispatch your message to a Telex carrier for delivery. The charge for Telex service varies according to country but is based on a 400-character "mini-ounce." You can send 400 characters to the People's Republic of China for $2.11, to Great Britain for $1.31, and to the Falkland islands for $2.82. Each additional "ounce" costs the same amount.

You can also receive international Telex via MCI Mail. The sender must use a 650 prefix followed by the recipient's MCI identification number. The MCI ID is a

```
You may enter:

READ          to review your letter
EDIT          to correct your letter
SEND          U.S. Mail for paper; instant electronic delivery
SEND ONITE    OVERNIGHT courier for paper; PRIORITY electronic delivery
SEND 4HOUR    FOUR-HOUR courier for paper; PRIORITY electronic delivery
HELP          for assistance


Command (or MENU or EXIT): edit
```

Figure 4: MCI Mail menu lists options to send or edit a letter.

six-digit number that is different from the account name. Using MCI Mail, small companies and individuals can have access to the international Telex network without the expense of leased equipment and special lines.

E-COM

The U.S. Postal Service entered the electronic mail business in 1982 with E-COM. Personal computers can be used to telecommunicate messages to E-COM centers throughout the country. Messages are laser printed and placed in blue envelopes that look a little like Mailgrams. The cost is only slightly higher than first-class mail, but current rules require that at least 200 letters be sent at once. E-COM is suitable for mass-mailing but not for sending single letters. The Post Office is currently considering changing that regulation, however.

You can use E-COM for individual letters by going through an independent carrier such as The Source or Western Union. The carrier acts as a forwarder, collecting the letters from subscribers and sending them to the Post Office in batches of 200 or more.

Source subscribers can send an E-COM letter for $1.35 for the first page and 25 cents for the second page; the price includes first-class mail delivery. Because The Source's hourly logon rates are in effect while you are sending the mail, the cost isn't quite as good a bargain as it seems.

E-COM messages can be one or two pages long, with the first page containing a maximum of 41 lines of text and the second containing up to 56 lines (including blank lines and the signature). MCI Mail imposes no such limit.
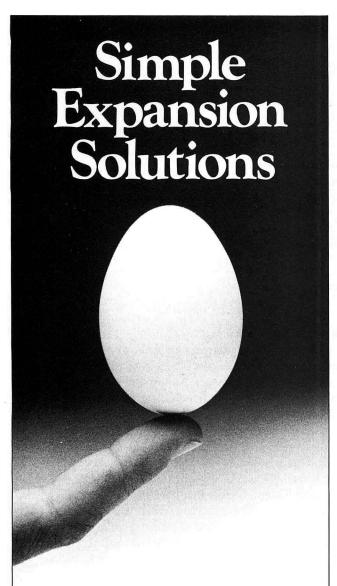
Alternate Mail Services

You don't necessarily have to subscribe to a commercial service to enjoy the benefits of electronic mail (see "In Box Out Box" in this issue). Almost any computer system can be configured to handle electronic mail. Most university and corporate computers have some kind of message-forwarding system that can be used for mail. These services are often free to students and/or employees and are sometimes available at low cost to others.

You can also take advantage of the hundreds of free computer bulletin boards that have sprung up throughout the country. These services, which are usually operated by volunteers, are used to exchange information among computer users. Many offer free mail services with which users can exchange private or public messages.

Although some electronic bulletin boards have been around for years, others come and go without a trace. Because most of them have only one incoming phone line, they tend to be busy often and offer rather unreliable service. *PC World* publishes a list of the most stable bulletin board systems for the PC community in *BBS Watch*. You can download a complete list of BBSs by typing Public 112 on The Source.

Electronic mail is clearly in its infancy, but it's here to stay. The most important problems to be worked out for electronic mail services to prosper are the issues of standards and security. Ideally, one message should be able to be passed easily from one mail service to the

● Getting Started

next, but compatibility problems between networks still exist. Further compatibility complications might arise if electronic mail networks based on facsimile machines become popular. Federal Express and DHL Worldwide Courier Express are both expected to introduce facsimile machine-based networks this year.

The issues of security and privacy become increasingly important as larger amounts of sensitive correspondence are exchanged electronically. Recently, teenage hackers were caught snooping in NASA's electronic mail in GTE-Telenet's Telemail system. Data was destroyed and altered, and fake messages were sent. In general, electronic information is much more vulnerable to intrusion than paper mail.

Although today's electronic mail systems have dramatically reduced the time lag involved in sending mail, someday they will seem as clunky and inefficient as the telegraph. ●

Lawrence J. Magid (Source ST6191) is executive vice president of San Francisco-based Know How Computer Learning Centers and a syndicated computer columnist for the Los Angeles Times. *He is currently writing a book on telecommunications for the IBM PC that will be published this year by John Wiley & Sons.*

The Source Telecomputing Corp.
1616 Anderson Rd.
McLean, VA 22102
800/336-3366

CompuServe, Inc.
5000 Arlington Centre Blvd.
Columbus, OH 43220
800/848-8199

MCI Mail
2000 M St. NW
Washington, DC 20036
800/MCI-2255

E-COM
U.S. Postal Service
Washington, DC 20260-7140
(call local U.S. Postal Service for information)

Integrated.

Printegrated.

Now, translate your integrated software into integrated hard copy, with the TI OMNI 800™ Model 855 printer. So versatile, it combines letter-quality print, draft-quality print and graphics as no other printer can.

It prints letter-quality twice as fast as comparably priced daisy wheel printers, yet gives you characters just as sharp, just as clear.

It prints rough drafts ten times faster than daisy wheel printers... faster than most any other dot matrix printer.

Only the TI 855 has snap-in font modules. Just touch a button; change your typestyle. The 855 gives you more typestyles to choose from than ordinary dot matrix printers. It makes them quicker, cleaner, easier

to access than any other dot matrix or daisy wheel printer.

The 855's pie charts are rounder... all its graphics are sharper than on other dot matrix printers, because the TI 855 prints more dots per inch. As for daisy wheel printers... *no* graphics.

TheTI 855 Printer

The printer for all major PC's
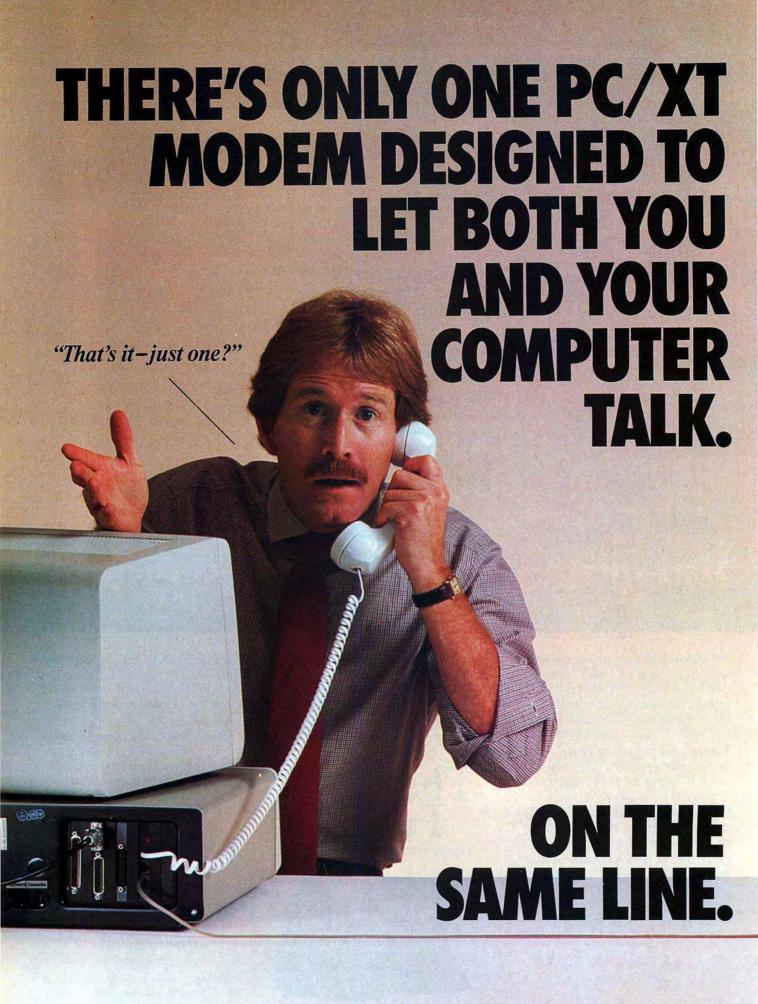
For under $1,000 you get twice the performance of typical dot matrix printers. Or all the performance of a daisy wheel printer, and then some, for half the price.

So get the best of all printers, and get optimum results from your integrated software. With the TI 855. See it at your nearest authorized TI dealer. Or call toll-free: 1-800-527-3500. Or write Texas Instruments Incorporated, P.O. Box 402430, Dept. DPF-183P7, Dallas, Texas 75240.

TEXAS INSTRUMENTS

Creating useful products and services for you.

THERE'S ONLY ONE PC/XT MODEM DESIGNED TO LET BOTH YOU AND YOUR COMPUTER TALK.

"That's it—just one?"

ON THE SAME LINE.

Only the PC:IntelliModem™ lets you switch repeatedly between voice and data communications.

Any old modem will let computers talk. But to move from talking or listening to sending and receiving data—at the touch of a single button—there's only one modem that's smart enough. The 1200-baud PC:IntelliModem from Bizcomp.

Let's say you want to transfer some files, and you want to talk to the person receiving them, both before and after the transfer. With other modems, you'd have to hang up, re-dial, or plug and unplug a bunch of cables. Not very convenient, especially if you use your phone a lot, and you have only one line.

With the PC:IntelliModem, you just plug your regular handset into the back of your IBM PC/XT. That's it. You're now ready to make connections with computers—and people—much faster and more conveniently. It's like getting a modem *and a telephone* for the price of a modem alone.

The ultimate status seeker.

The PC:IntelliModem also monitors your telephone line's status more closely than other modems. It listens to the line much like you do, and detects signals for dial tone, ringing, busy and voice—some of which other modems completely ignore. It then automatically takes the

---

Make sure your modem has all these PC:IntelliModem features

Integrated Voice/Data
- Switch between voice and data communications
- Programmable telephone handset jack

Status Reporting
- Line status detection (dial tone, busy, ringing, voice answer, modem answer, incoming call)
- Audio monitor
- Programmable LED

PC:IntelliCom Software Included
- 99-name on-line telephone directory
- Auto-dial, auto-repeat dial, auto-answer
- Link to another number if busy
- File transfer
- Data capture to diskette
- Programmable auto log-on sequences

Compatible with Crosstalk™/PC-Talk III™
Receive Sensitivity: -50 dBm
Speeds: 110, 300, 1200 baud

---

appropriate action, so there's less chance of error in making a connection. And since the PC:IntelliModem gives *you* a constant indication of what's going on, you always know how your call is progressing.

A soft touch to operate.

Included with our single plug-in modem board is PC:IntelliCom™ our exceptionally easy-to-use software package. It guides you step by step during use, through on-screen menus, entry instructions, an

---

audible buzzer and a handy HELP key. There's even a demonstration program that runs through the main features.

All software tasks are activated by pressing function keys, which are clearly labeled on the screen. That means you can go from talking to someone, to transferring data, and back to talking again—all with single keystrokes.

The one that's out of sight.

Even though the PC:IntelliModem is hidden inside your PC or XT, you should see how it works. So go to your dealer and ask for a demo. Also ask about our 2-year warranty, free NewsNet™ connect time and our modest $499 price.

Or contact:
Bizcomp,
532 Weddell Drive,
Sunnyvale, CA 94089;
408/745-1616.

You'll find there's only one modem that does it all, including voice communications: the PC:IntelliModem.

BIZCOMP®

We've got people talking.

See COBOL.

Dick is a COBOL programmer. Dick is bored. Harried. Dick struggles with trace and debugging routines. Nonexistent documentation. Mainframe logjams. So Dick is four months behind schedule. And users are upset about turnaround times. They yell and make Dick upset. They make Dick's boss upset. Nobody is very happy.

See COBOL Run.

Jane is a happy COBOL programmer. She uses ANIMATOR.™ It's a VISUAL PROGRAMMING™ aid for MICRO FOCUS™ LEVEL II COBOL.™ It runs on a micro. It makes child's play of mainframe test and maintenance chores.

With ANIMATOR Jane sees a picture of the program explaining itself. In live action. In real time. In COBOL source code. ANIMATOR tracks the program's exact execution path. Including subroutine branches.

Jane can have the program run fast. Or slow. Or stop. With one key. This makes it easy to spot problems. Insert fixes. Set breakpoints. Instantly.

Jane's programs sometimes win awards. Yet she always meets schedules. Jane's boss likes this about Jane. Because he doesn't like users to yell at him.

Run, COBOL, Run.

This DP manager got a bonus. Because he doubled productivity. Cleared backlogs. Cut costs. Boosted morale. Produced terrific applications. Quickly. Put control and prestige back into the central DP function. And nobody yells at him anymore. All thanks to ANIMATOR.

See ANIMATOR now.

Let Micro Focus put your DP shop on the fast track.

ANIMATOR runs with MICRO FOCUS LEVEL II COBOL for compatibility with ANSI '74 High Level COBOL implementations. A mainframe-micro communications link is recommended for downloading mainframe programs.
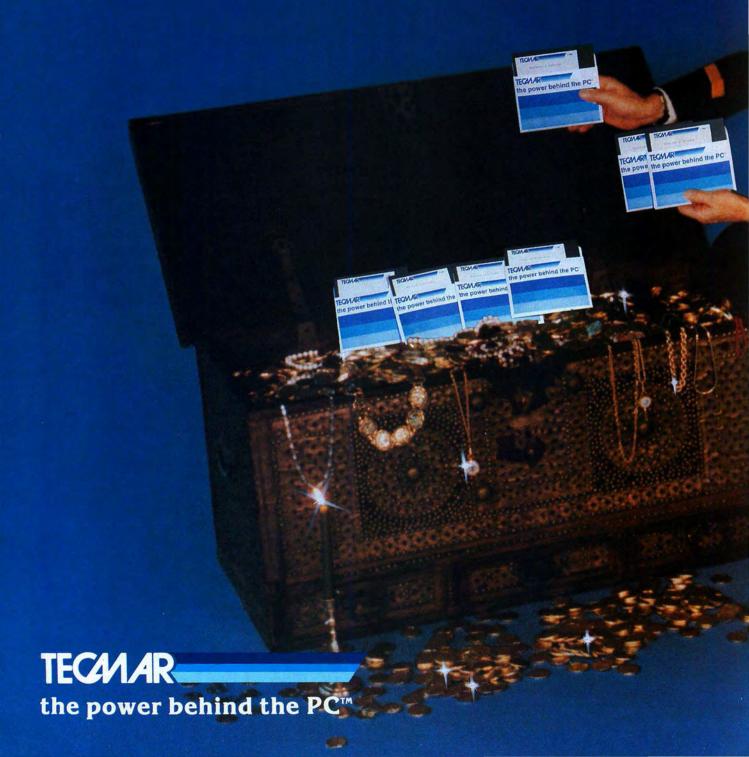
Write for more information.
Or call (415) 856-4161. Right now.

MICRO FOCUS™
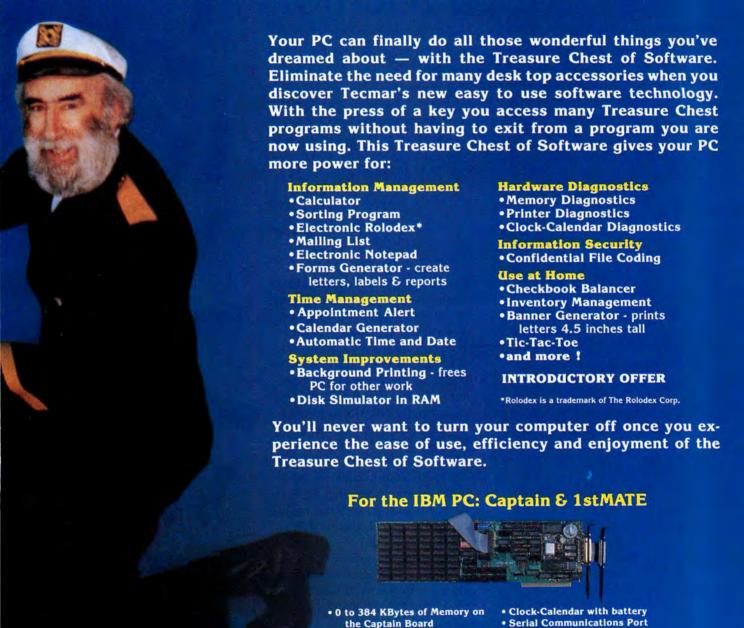
2465 East Bayshore Rd., Suite 400, Palo Alto, CA 94303
I'd like more information.   PCW6

Name_____ Title_____
Company_____ Phone_____
Address_____
City_____ State_____ Zip_____

How Much Memory Is Enough?

How much memory do you need in your PC? Some programs need no more than 64K, while others don't really take off unless you have close to a megabyte.

Danny Goodman

One way to explain the concept of computer memory is with a chalkboard analogy. Pretend you are standing in front of a chalkboard, ready to create. But first, you pick up a paintbrush and divide the chalkboard into thousands of permanent boxes, each large enough to contain only one character. Then you assign an invisible number to each box. These numbers can be considered the addresses of the boxes. Similarly, a computer's memory can be thought of as an area divided into many boxes that hold information, each with an identifying address.
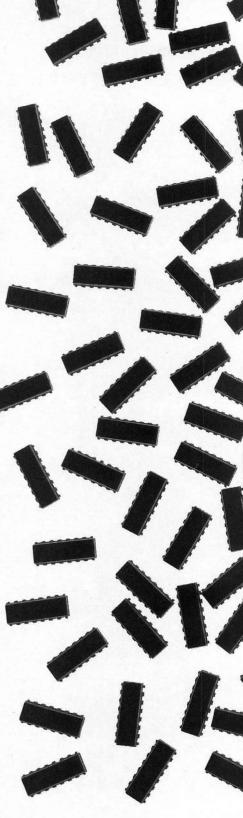
Permanent Memory
A personal computer has two kinds of memory, permanent and temporary. The permanent kind comes from the factory with characters already written in the boxes. When you turn on the PC, the 8088 microprocessor first looks to the permanent memory for instructions. It "reads" the characters that were written in the boxes at the factory. It uses the information it finds there to decipher information you type on the keyboard, to display characters on
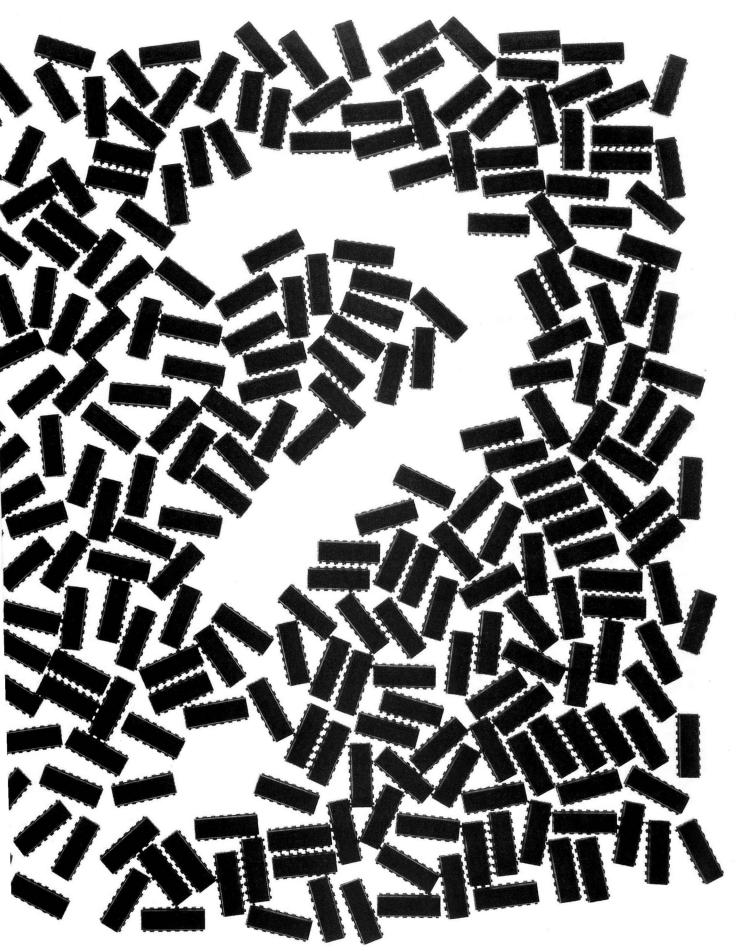
the monitor, and to perform dozens of other basic functions. The permanent memory cannot be altered by the computer operator; it is called "read-only memory," or ROM.

A large amount of ROM doesn't necessarily make a powerful computer. A lot of what is contained in one computer's ROM may be automatically loaded into another computer from disk when you run a program. Some computers, including the IBM PC, include portions of the BASIC programming language in the ROM, while others keep the language entirely on disk. Neither method is superior to the other.

There is no adequate nontechnical test to determine which of two computers has the better ROM. A poorly programmed ROM of any size will reveal its weaknesses in its day-to-day operation. For example, a computer with a well-designed ROM may be lightning quick when retrieving information from a disk, while one with a poorly designed ROM may be sluggish.

Temporary Memory

A computer's temporary memory is called "random access memory," or RAM. With this kind of memory, the chalkboard has a permanent grid painted on it, and each box has its own address. However, in this case nothing is written in the boxes at the factory.

Let's say you're using the computer to write a memo. Every time you press a key on the keyboard, that character is placed in one of the boxes, as if you were drawing on the chalkboard. Inside the computer, the characters are converted to a code

> It is common to find single program modules in excess of 100K.

that the computer can use. Each character—or box on the chalkboard—is one "byte."

If you type 1024 keystrokes, you fill precisely 1 kilobyte of memory with characters. (Even though the *kilo* prefix should mean 1000, because computer logic is based on binary mathematics, and because 2^{10} is 1024, this number was selected as a unit for measuring large amounts of data.) *Kilobyte* is most commonly abbreviated as K; 64 kilobytes of memory is referred to as 64K.

Like the writing on a chalkboard, the contents of a computer's RAM can be erased or changed. Whatever was last written in a box stays there as long as power is supplied to the computer. When power is turned off or the system is rebooted (reset), the contents of the RAM boxes are

erased, as if someone took a wet sponge and wiped the chalkboard clean. If that happens, there is no way to reconstruct the information in the boxes without rewriting the characters into each box. However, you can save the information that is currently in RAM by storing it on a floppy disk or other storage device before you erase the RAM.

Stacking Up the Chips

A byte consists of smaller chunks of information called bits. Each bit is an on or off signal represented by a 1 or a 0, respectively. The circuits inside the computer process information at the bit level, interpreting long sequences of bits. A stream of 8 bits makes up one character (byte).

Both RAM and ROM chips store information in bit form, even though the computer system as a whole keeps track of the bits in groups of 8. Memory chips are described in terms of the number of kilobits you can store on them. However, because chips deal with information on the bit level, it takes at least 8 chips—one for each bit and possibly an extra chip for error checking—to make up the full complement of memory. That is, you need to have at least 8 64-kilobit chips to give your computer 64 kilobytes of memory, 36 64-kilobit chips for 256 kilobytes of memory, and 72 64-kilobit chips for 512 kilobytes of memory.

What Goes into Memory

It may be difficult for first-time computer buyers to understand why the IBM PC and PC-compatible computers have such enormous memory capacities compared to 8-bit machines like the Apple IIe or the Commodore 64. What do people do with all that memory? Of the 1 megabyte of memory available on the PC, only 640K of RAM is available to the user without performing special tricks. The balance is reserved for operating

parts of the computer system such as the video display and ROM (see figure in "The System Memory Map").

Programmers take advantage of this extra memory capacity by designing more complex software. It is common to find single program modules in excess of 100K being loaded into RAM. (A program module is a section of a program that performs a certain function. Often, each module is stored on the disk as a separate unit and is loaded into RAM when needed.) As programmers continue to design applications to rival those used in mainframe computers, the trend toward larger program modules will continue.

One of the benefits of using such powerful programs is that they can manipulate large amounts of information in memory. You can run data base management programs that rapidly sort and cross-reference large numbers of records in RAM instead of loading small sections of data from the disk and working on them piecemeal. Electronic spreadsheets can reach dimensions never before attainable on a personal computer and can even add a third dimension beyond rows and columns by enabling the construction of multiple worksheets. Word processing programs can keep large documents in memory and swap blocks of text back and forth without wasting the time normally needed to write and read information to and from a disk. Most programs that work with large amounts of active data accommodate additional memory "dynamically," that is, the program can automatically make use of more memory work space when it becomes available.
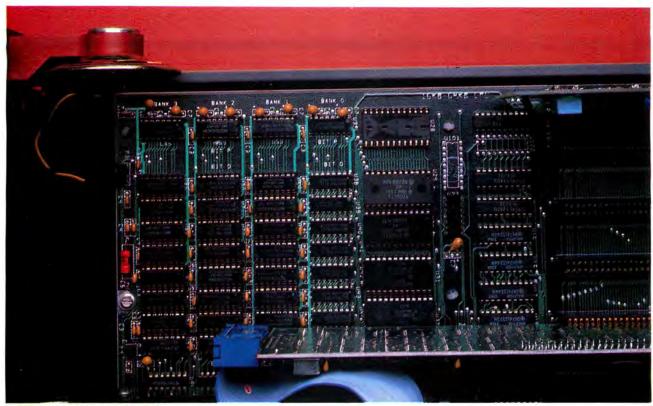
Figure 1: PC system board

Disk Emulation

Even if a program does not need a large amount of memory, you can still use the extra RAM in your PC. You can fool some computers (depending on their type and memory capacity) into thinking they have an additional floppy disk drive for data storage, when in reality the "drive" consists entirely of RAM. Extra memory used to simulate disk storage goes by many names. It is called an "electronic disk," a "RAM disk," or, most commonly, a "disk emulator."

Disk emulators are useful when you run a program that contains a number of modules that must be read frequently from disk. Compared to the computational speed within RAM, the mechanical process of disk access is markedly slow. By transferring the modules of the program to the extra RAM, the computer can retrieve information instantaneously.

If you use programs that frequently read and write storage data to a disk, you can also send your storage data to the disk emulator. If you assign a large enough portion of RAM to the disk emulator, you can temporarily store both program and data in the "electronic disk." A data base management program, for example, may keep only a small part of a file in RAM. Whenever you want to view, search, or sort through records, the program reads and writes data from the disk many times. With a large file, the wait for all the disk maneuvers can be long.

If you make additions or changes to data stored in a disk emulator, you must copy them to disk before turning off the computer. Otherwise, your work will disappear when the computer is turned off. (See "Faster than a Spinning Floppy," *PCW*, Vol. 1, No. 4, for more information on disk emulation.)

Another way to utilize extra memory involves printing. Many memory expansion boards let you assign a segment of memory to a process known as print spooling. This operation uses a part of memory to hold information for use by a printer, freeing the main RAM and microprocessor for other tasks. With a print spooler you can print a file while using the computer for another task.

The System Memory Map

Karl Koessel

For any particular computer system, the amount of memory that can be accessed directly is limited by the addressing technique of the system's processor. Before the introduction of the IBM PC, most popular personal computers used an addressing technique that allowed these systems to access only 65,536 bytes (64K) of memory. But the PC's 8088 microprocessor is able to access 1,048,576 (1024K, or 1MB for 1 megabyte) individual addresses.

The PC's system designers divided, or "mapped," this megabyte of directly addressable memory into variously sized sections. Each section is dedicated to one function—system RAM and system ROM (memory used by the system), user RAM (for languages, applications, and other programs), monochrome display RAM, color graphics display RAM, fixed disk control ROM (for the XT), and application cartridge ROM (for the PCjr). Also, some sections are reserved for future use.

The System Memory Map (see figure) shows the PC's memory addresses and their assigned functions. As you can see, the first three-quarters of memory (768K) is intended for functions that require RAM, and the last quarter (256K) is reserved for those that require ROM. The first 655,360 (640K) addresses (from 0 to 655,359, or 0 to 9FFFF in hexadecimal) are allocated to system and user RAM. Of this 640K, the first 4K to

24K or more (depending on the operating system used) is used as system RAM. The remainder is allocated to user RAM.

On the System Memory Map this 640K of RAM is divided into two sections. The first 256K is installed directly on the system board. The rest (up to 384K) is installed in one or more of the PC's slots. Most PCs have less than 640K of RAM; the amount of installed RAM is used to describe the size of a system (e.g., a 128K PC or a 320K XT).

The next 131,072 (128K) addresses (from 655,360 to 786,431, or A0000 to BFFFF in hexadecimal) are reserved for the RAM that supports the PC's monochrome display and color graphics display. Specifically, 4096 (4K) addresses (720,896 to 724,991, or B0000 to B0FFF in hexadecimal) are assigned to monochrome display, and 16,384 (16K) addresses (753,664 to 770,047, or B8000 to BBFFF in hexadecimal) are assigned to color graphics display. The unlabeled parts of this 128K are reserved for display functions that may be added in the future, such as extra high resolution graphics or additional screen colors.

The last 262,144 addresses (256K) of the PC's memory are devoted to ROM. The first 196,608 (192K) addresses

(786,432 to 983,039, or C0000 to EFFFF in hexadecimal), labeled "Expansion and Control," are reserved for ROM-based control of I/O (input/output) devices, such as the fixed disk controller of the XT or expanded PC. These addresses are also used by ROM-based languages and programs, such as Cartridge BASIC for the PCjr. After the system is loaded, it scans this section of memory for expansion board ROM.

The last 65,536 (64K) addresses of this section (983,040 to 1,048,575, or F0000 to FFFFF in hexadecimal)—the final section of directly addressable memory—are allotted to the Base System ROM. The current version resides in the last 40K addresses (64K for the PCjr). This ROM controls the basic functions of the computer. It contains the Cassette BASIC interpreter, cassette operating system, Power-on Self Test, I/O drivers, dot patterns for 128 characters in graphics mode, and a floppy disk bootstrap loader. PCjr's larger ROM also contains dot patterns for an additional 128 characters in graphics mode, and user-selectable diagnostic routines.

The PC's system board has six 8K ROM sockets. The Base System ROM occupies the last five sockets. The empty socket is provided for the addition of 8K of user ROM, beginning at ad-

Start Address Decimal	Hex	Function
0	00000	
16K	04000	
32K	08000	
48K	0C000	
64K	10000	
80K	14000	
96K	18000	128-256K Random Access Memory (RAM) on System Board
112K	1C000	
128K	20000	
144K	24000	
160K	28000	
176K	2C000	
192K	30000	
208K	34000	
224K	38000	
240K	3C000	
256K	40000	
272K	44000	
288K	48000	
304K	4C000	
320K	50000	
336K	54000	
352K	58000	
368K	5C000	384K RAM on Expansion Boards
384K	60000	
400K	64000	
416K	68000	
432K	6C000	
448K	70000	
464K	74000	
480K	78000	
496K	7C000	*(continues)*

Start Address Decimal	Hex	Function
512K	80000	
528K	84000	
544K	88000	384K RAM on Expansion Boards *(continued)*
560K	8C000	
576K	90000	
592K	94000	
608K	98000	
624K	9C000	
640K	A0000	
656K	A4000	128K Display RAM
672K	A8000	
688K	AC000	
704K	B0000	Monochrome
720K	B4000	
736K	B8000	Color Graphics
752K	BC000	
768K	C0000	
784K	C4000	
800K	C8000	
816K	CC000	
832K	D0000	
848K	D4000	192K Read Only Memory (ROM) Expansion and Control
864K	D8000	
880K	DC000	
896K	E0000	
912K	E4000	
928K	E8000	
944K	EC000	
960K	F0000	
976K	F4000	64K Base System ROM BIOS and BASIC
992K	F8000	
1008K	FC000	

System Memory Map (Based on the IBM Technical Reference Manual)

dress 999,424 (F4000 in hexadecimal). The system boards of the XT, the Portable PC, and the PCjr have two ROM sockets, which may contain either 32K ROM chips or 8K ROM chips. The XT and the Portable PC contain one of each type of chip, for a total of 40K Base System ROM. The PCjr uses two 32K ROM chips for a total of 64K Base System ROM. Although routines and information within the Base System ROM may be accessed directly, they are better accessed indirectly through DOS calls, since according to IBM the Base System's "internal workings and absolute addresses are subject to change without notice."
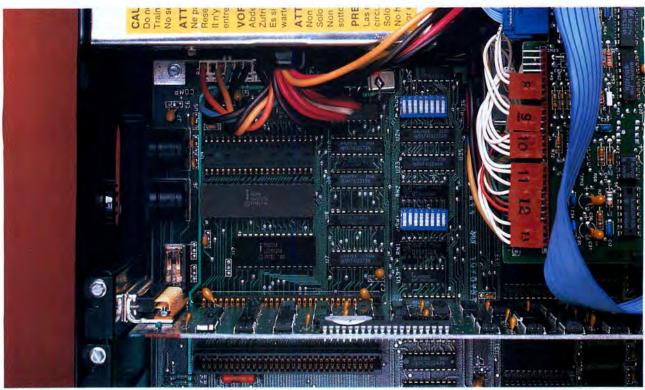
Figure 2: System board memory switch settings (reproduced courtesy of IBM from the IBM Personal Computer Technical Reference Manual)

System Unit Memory

If you look at a System Board, you can see dozens of integrated circuits (ICs), black plastic or ceramic rectangles studded with connector pins. Along the left side of the System Board are four rows of nine IC sockets (see Figure 1). The standard PC configuration has one row already filled with chips from the factory. These are the RAM chips, where information you type or load into memory is first stored.

Each row of RAM chips represents 64K of memory. The first generation of the IBM PC had only 16K of RAM installed. At that time, IBM was using smaller capacity, 16K RAM chips on the System Board. Only one of the four rows of IC sockets was filled, and IBM soon discovered that many customers were buying a "bare" 16K machine and filling the

other sockets with less expensive RAM chips from outside suppliers. (By adding three more rows of 16K RAM chips they could bring the maximum on-board memory to 64K.) IBM discontinued sending 16K System Units to dealers and began supplying fully loaded 64K boards.

When IBM's engineers created the XT, they designed the System Board for larger capacity, 64K RAM chips. This change was carried over to the regular PC as well. You can now buy a PC with 64K installed on the System Board and add three more rows of chips for a total of 256K.

If you consider buying a used PC, be sure to inspect the System Board to determine which version it is. One way to distinguish between old and new System Boards is to look on the board along its left edge next to the RAM sockets. On the newer version, you will see numbers printed on the board signifying the amount of RAM in each row of chips. Starting from

the front of the computer, the rows are numbered 64K, 128K, 192K, and 256K. If these numbers are not present, the system is probably an older version.

How to Add Memory

Today, the standard PC comes equipped with 64K of RAM; the standard PC XT comes with 128K. Both machines have enough vacant RAM sockets on the System Board for a possible total capacity of 256K of RAM. You should add additional memory by first adding chips to the System Board.

To get more than 256K, you must install a memory expansion board in one of the PC's expansion slots. Memory expansion boards come in essentially two varieties. One variety

is a board devoted only to memory expansion. The other variety combines added memory with one or more other functions, such as a serial adapter port, a game controller connector, or a built-in clock/calendar.

Although you can buy memory expansion boards with as little as 32K of RAM, be sure that the memory expansion board you buy can accommodate at least 256K. You don't have to buy a fully loaded memory board; you can install additional RAM chips as you need more memory. However, the price of fully loaded memory expansion boards and multifunction boards has dropped to a point where it may not be advantageous to wait until you need extra RAM before buying chip sets.

Adding chips may seem like a simple thing to do, but it takes a careful hand to make sure they are inserted correctly, without bending any of the pins. Most electronics stores sell a special tool for installing chips. Also, in dry climates, particularly in winter, static electricity can play havoc with the chips as you handle them. A tiny spark of static electricity can wipe out a chip in a flash. If you're unsure of your dexterity while installing chips, it is probably best to have a dealer install them or to buy a fully loaded memory board at the outset.

Memory Switches

When you install additional memory in your PC, you will have to set a series of small switches on the System Board and possibly on the memory expansion board (see Figure 2). The System Board switch settings on the PC tell the system the total amount of memory you have installed in the entire system. On the XT, the switch settings control only the memory installed on the System Board. The IBM *Guide to Operations* provides more detail on these switches.

A memory expansion board may have its own switches that tell the computer where to find the additional memory. Some boards may be preset,

so their switches don't need to be changed unless you are installing more than one memory expansion board. Most memory expansion boards come with a manual describing how switches are set.

How Much Memory for You?

Now that you understand what memory is all about, we come to the crux of the issue—figuring out how much RAM you should have in your PC. For running entertainment and educational software, you will probably not need more than 64K of RAM.

A tiny spark of static electricity can wipe out a chip in a flash.

For professional applications, you should have at least enough memory to handle the popular programs for spreadsheets, word processing, and data base management. Most programs in these areas require or work optimally with a minimum of 128K of RAM. If you own an XT, then you already have 128K of RAM installed.

For programs that let you devote segments of RAM to a disk emulator, you should be prepared to have enough total memory to accommodate both your applications program (usually 128K) plus the equivalent of a 320K disk emulator. However, for most applications you can get by with less electronic disk space at first. A 256K PC or an XT with a 192K memory expansion board will cover most applications nicely.

Some of the newest memory expansion boards allow for the "piggybacking" of an additional memory component (a smaller board) that can bring the total RAM in your PC to a

megabyte (1024K). You may not think you will need such a large quantity of memory, but several powerful programs make use of 512K just for program operation and temporary information storage. If you want disk emulation and print spooling in addition, you will need more than 512K.

The best guideline is to equip your PC with a minimum of 128K. If you want more memory, buy a multifunction board that can hold at least 256K of RAM, even if you buy it without all the RAM chips installed. If you use sophisticated applications, you'll need the extra memory; *1-2-3* and *MBA* work best with 256K, and *Visi On* requires 512K. For the most effective long-range planning, choose a multifunction memory expansion board that lets you add a piggyback memory board (without taking up a second slot) for a total of 1 megabyte of RAM. Remember, memory requirements and memory recommendations are rising in the world of PC software. Don't think of how much memory you need now, but of how much you will need a year from now. ●

Danny Goodman is a Contributing Editor for PC World *and* Macworld. *He is the author of* Word Processing on the IBM PC *(Howard W. Sams, 1983) and* The Simon & Schuster Guide to the IBM PCjr *(Simon & Schuster, 1984) and is a commentator on the Public Broadcasting Service television series "New Tech Times."*

Digital Research introduces the complete graphics art studio for desktop computers. Featuring our remarkable family of three presentation graphics applications.
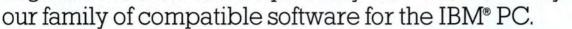
Digital Research DR Draw,™ which runs on the IBM® PC and compatibles like the TeleVideo Tele-TC,™ does for visuals what word processors do for text. Using a mouse or keyboard, you draw by menu. Create organization charts and illustrations. Move, copy, scale, restyle and store. Even print or plot.
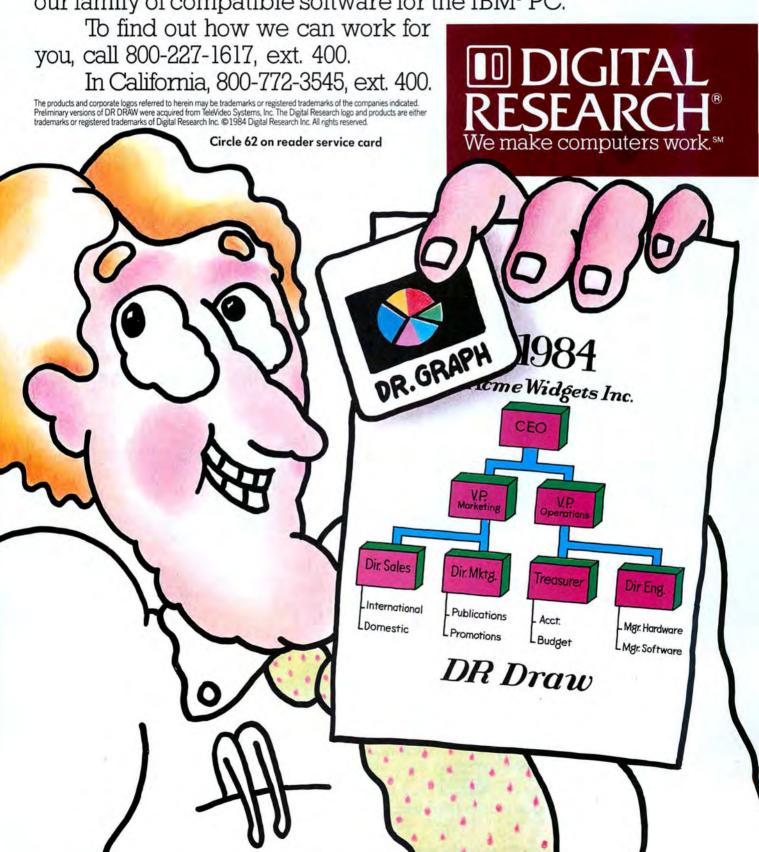
Digital Research DR Graph™ lets you compose graphs, charts or text and transform them from a spreadsheet. Then convert to paper or acetate with printers like the Diablo Ink Jet Color Printer.™
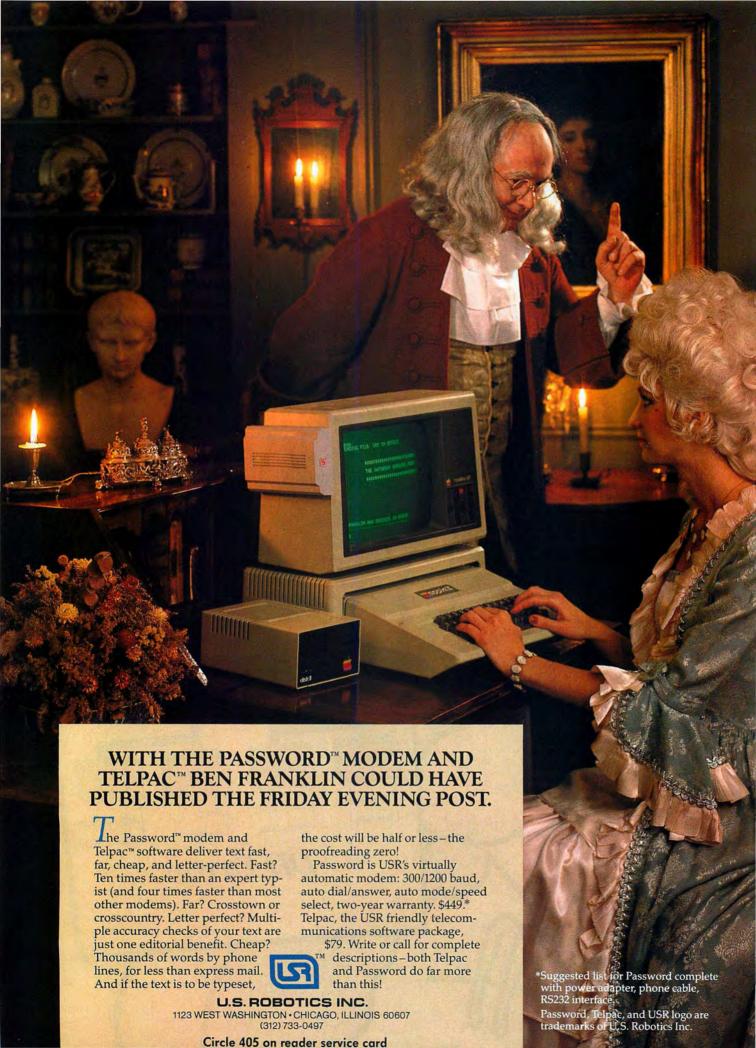
Until today, all he could draw was a salary.

WITH THE PASSWORD™ MODEM AND TELPAC™ BEN FRANKLIN COULD HAVE PUBLISHED THE FRIDAY EVENING POST.

The Password™ modem and Telpac™ software deliver text fast, far, cheap, and letter-perfect. Fast? Ten times faster than an expert typist (and four times faster than most other modems). Far? Crosstown or crosscountry. Letter perfect? Multiple accuracy checks of your text are just one editorial benefit. Cheap? Thousands of words by phone lines, for less than express mail. And if the text is to be typeset, the cost will be half or less—the proofreading zero!

Password is USR's virtually automatic modem: 300/1200 baud, auto dial/answer, auto mode/speed select, two-year warranty. $449.* Telpac, the USR friendly telecommunications software package, $79. Write or call for complete descriptions—both Telpac and Password do far more than this!

*Suggested list for Password complete with power adapter, phone cable, RS232 interface.

Password, Telpac, and USR logo are trademarks of U.S. Robotics Inc.

U.S. ROBOTICS INC.
1123 WEST WASHINGTON • CHICAGO, ILLINOIS 60607
(312) 733-0497

The Help Screen

PC World offers answers and advice at every level.

Karl Koessel

With summer coming on fast, many of us will be traveling—with our computers. Our first letter this month questions the effects of airport X rays on computer equipment, opening the topic of other computer safety measures for the air traveler. From the same reader we also have a question on converting the files produced by a word processor to a form readable by DOS and BASIC. Another reader wants to know what Graftrax Plus is, and yet another wants a chart depicting the color combinations produced by the BASIC COLOR statement.

Airport X Rays

Q.   *I am worried about the effects of X rays on a computer. Can you supply some simple and effective statements to make to airport security in foreign countries so that our portables will be spared possible devastation. Travelers should be aware that they may encounter X-ray security devices on the way into a country. This happened to me at Kimpo Airport in Seoul, Korea. I had to unpack and pack the computer, printer, and disks both at customs and at X-ray security. I had proof of ownership and United States Customs registration papers, but I suspect that my business card, a letter from my former boss stating that I*

really could use the computer (something I felt necessary as a middle-aged woman entering an Asian country), and a silver tongue got the computer through.

I have another question. It is sometimes necessary to convert a file created in WordStar's *document mode to a clean file that DOS and BASIC can work with. In CP/M, the high-order bits (which* WordStar *uses to mark the end of all words for the word wrap function and to mark the soft spaces needed for right justification) can be stripped from the file with the command PIP NEW-FILE = OLDFILE[Z]. How is this done in DOS?*
    Marianna van Erp
    Seoul, Korea

A.   Although your age, sex, and nationality may affect the behavior of airport security, foreign or domestic, X-ray security devices and magnetic metal-detector machines will not affect your computer or your printer. Data or program disks, however, should not be subjected to either. Although the X rays won't hurt them, airport security devices often have powerful magnetic fields, which may. Let the computer and printer roll through the X-ray machine, but hand your disks to security, preferably while far from any type of machine. Make it known that your disks are sensitive magnetic media and that you do not want them exposed to X rays or magnetic fields.

Another hint for travelers: never check your portable as luggage. I once heard about a Compaq that
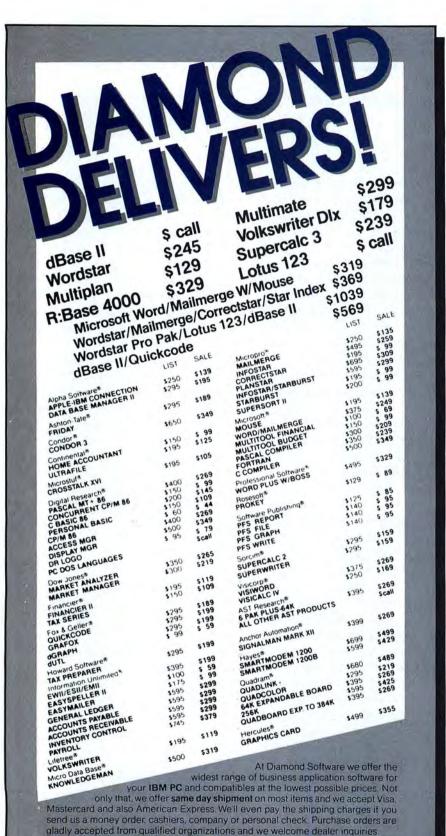
came bouncing onto the baggage return carousel in pieces. I also advise against storing a portable in the plane's overhead compartments.

If you follow these practices, you needn't worry about your computer or your data. But your question does make me wonder what effect electronic devices such as those used by airport security will have on portables with a hard disk installed....

In answer to your second question: Unlike CP/M, DOS cannot strip the high-order bits from files produced by many word processors. However, BASIC can be used to strip such files. A conversion program (WS-DOS .BAS) is supplied in *.*, *PCW*, Vol. 1, No. 1. (You can obtain back issues of *PC World* by sending $5 per copy, check or money order, to *PC World* Back Issues, 555 De Haro St., San Francisco, CA 94107.)

Epson Graphics Dump

Q.   *I have an Epson RX-80 dot matrix printer that I use with my IBM PC, and I would like to be able to dump screen graphics to it. Unfortunately, all of the articles and programs, like GRAPHICS.COM, that I have seen are slanted towards systems with IBM Graphics Printers or Epson printers equipped with Graftrax Plus. What is Graftrax Plus, and is it available for my RX-80? Are there programs that I can load like GRAPHICS.COM so that pressing*

The Help Screen

the <PrtSc> key will dump a graphics screen to my printer, even though it does not have Graftrax Plus?
  Brian J. Christianson
  Rockville, Maryland

A. Your Epson RX-80 comes with Graftrax Plus already installed. Graftrax Plus is a set of two ROM chips, still available at most computer stores, that allow the Epson printers to print graphics. The original Epson printer, the MX-80, was delivered with two empty sockets located inside the printer. Installing the ROM chips enabled the printer to print a columnar pattern of dots instead of an alphanumeric character and to move the printhead one dot-width instead of a full character-width for each byte of data received. With the appropriate software, Graftrax Plus allows the printer to produce graphics images and screen dumps. Epson now ships all its printers with Graftrax Plus installed. If you need to upgrade an older MX-80, be sure you purchase Graftrax Plus and not Graftrax, the original version, which does not work correctly with the PC. Without these chips your printer will not be able to produce dot graphics; it can only print internally defined characters in one of the modes the printer provides.

BASIC Colors
Q. *Trying to figure out all the possible combinations for the BASIC COLOR statement and what each will produce is enough to drive you crazy. It's hard enough to remember that the COLOR statement has three*

parameters (foreground, background, and border) in text mode (set by the statement SCREEN 0) but only two (background and palette) in medium-resolution color graphics mode (set by the statement SCREEN 1) and that executing a COLOR statement with a third parameter in color graphics mode will result in an 'Illegal function call' error. To confuse matters further, the "background" in text mode is the color of a character cell while the "background" in the graphics modes is the color of the entire screen. Also, I can never remember which three colors are in each of the two palettes in color graphics mode. Do you know of any color charts available that would help with this problem?

Dan Albright
Freeport, Texas

A. Figures 1 and 2 could be used as color charts. Figure 1 shows the foreground and background color combinations available in text mode—all 16 character colors printed in each of the 8 character cell colors. They are both shown inside a blue border screen. The upper right of Figure 2 shows the colors of palette 0 on a blue background. It also charts the effects of the five actions of the graphics mode PUT statement: PSET, PRESET, XOR, OR, and AND. A small rectangular image of four horizontal stripes, each a different color, has been PUT five times, each time using a different action, on a large, long rectangular image of four different colored vertical stripes.

The best color charts, however, are the ones the PC itself produces on the color monitor. TXTCOLOR.BAS
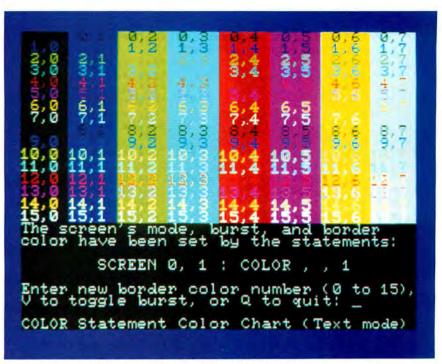
Figure 1: COLOR statement color chart (text mode)
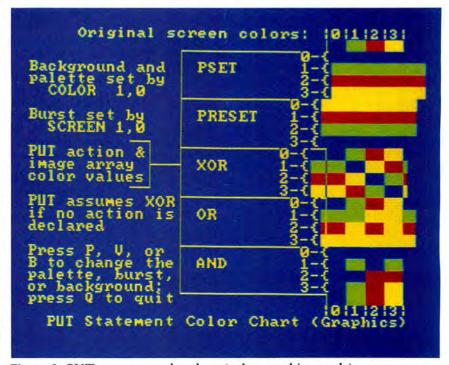
Figure 2: PUT statement color chart (color graphics mode)

The Help Screen

```
8 '******    COLOR Statement Color Chart (Text Mode)    *****
9 'Initialize program
10 BURST=1                         'Set burst parameter on for SCREEN statement
20 SCREEN 0,BURST,0,0              'Set mode, burst, active page, and visual page
30 WIDTH 40                        '40 characters per line
40 KEY OFF                         'Clear bottom (25th) line-function key display
50 COLOR 7,0,0                     'White characters in black cells; black border
60 CLS                            'Clear the screen
98 '
99 'Print title and color-coded foreground and background COLOR codes
100 LOCATE 25,1                         'Move cursor to bottom (25th) line
110 PRINT "COLOR Statement Color Chart (Text Mode)";          'Print title
120 LOCATE 1,1,1                        'Move cursor home and set on (flashing)
130 FOR F=0 TO 15                  'Each nonblinking foreground color (character)
140   FOR B=0 TO 7                 'Within each background color (character cell)
150     COLOR F,B                       'Set new foreground and background
160      PRINT USING "##_,# "; F; B;    'Print color-coded COLOR code
170   NEXT B
180 NEXT F
190 COLOR 7,0                           'White characters in black cells
198 '
199 'Set and print screen's mode, burst, and border color
200 COLOR ,,BORDER                      'Set border screen color
210 LOCATE 17,1
220 PRINT "The screen's mode, burst, and border";
230 PRINT "color have been set by the statements:"
240 LOCATE 20,9
250 PRINT "SCREEN 0,"; BURST; ": COLOR , ,"; BORDER
260 PRINT                               'Print nothing (skip a line)
298 '
299 'Change border color or screen burst, or quit
300 PRINT "Enter new border color number (0 to 15),";
310 PRINT "V to toggle burst, or Q to quit: ";
320 INPUT ; "", IN$              'The ; and , suppress INPUT's `?' and linefeed
330 LOCATE ,1                           'Cursor to 1st column of this line
340 PRINT SPC(39);                      'Erase 39 spaces (most of line)
350 IF IN$="V" OR IN$="v" THEN 400      'Goto toggle burst, else...
360 IF IN$="Q" OR IN$="q" THEN 500      'Goto quit, else...
370 BORDER=VAL(IN$)                     'Set border parameter to new value
380 GOTO 200                            'Goto set border screen color
400 BURST=(BURST+1) MOD 2               'Toggle burst parameter; 0 = color off
410 GOTO 20                             'Goto change burst, which clears screen
500 LOCATE 22,1                         'Quit gracefully...
510 PRINT SPACE$(79);                   'Erase prompt lines
520 LOCATE 22,1                         'Position cursor to avoid screen scroll
530 END
```

Listing 1: TXTCOLOR.BAS

```
8 '*****     PUT Statement Color Chart (Color Graphics Mode)     *****
9 'Initialize program
10 SCREEN 1,0,0,0                  'Set mode, burst, active page, and visual page
20 KEY OFF                         'Clear bottom (25th) line-function key display
30 DIM IMAGE(161)                      'Allocate memory space for image array
40 FOR C=0 TO 3                        'Image is 4 horizontal boxes
50    LINE (0,C*8)-(79,C*8+7),C,BF     'Each box is a different color
60 NEXT
70 GET (0,0)-(79,31),IMAGE             'Store image into array
80 ACTION$(0)="PSET"    :P(0)=28       'Store PUT action names in string array
90 ACTION$(1)="PRESET"  :P(1)=27       'Store column position to be used...
100 ACTION$(2)="XOR"    :P(2)=26       '...when displaying action names
110 ACTION$(3)="OR"     :P(3)=27
120 ACTION$(4)="AND"    :P(4)=28
198 '
199 'Print title, PUT action combinations, labels, and other information
200 SCREEN 1,BURST                 'Set burst attribute; 0=color on, else off
210 CLS                            'Clear the screen
220 LOCATE 25,3                        'Move cursor to bottom (25th) line
230 PRINT "PUT Statement Color Chart (Graphics)";          'Print title
240 FOR C=0 TO 3                   'Create screen image; four vertical boxes
250    LINE (C*16+236,8)-(C*16+251,191),C,BF    'each a different color
260 NEXT
270 LINE (236,8)-(236,191),3       'Accent left edge of screen image
280 LOCATE 1,30: PRINT "¦0¦1¦2¦3¦"; 'Color numbers label top and bottom...
290 LOCATE 24,30: PRINT "¦0¦1¦2¦3¦"; '...of each box of screen image
300 PUT (240, 16), IMAGE, PSET     'PUT image array on screen image in...
310 PUT (232, 48), IMAGE, PRESET   '...five different places; each has...
320 PUT (224, 80), IMAGE, XOR      '...a different PUT action
330 PUT (232,112), IMAGE, OR
340 PUT (240,144), IMAGE, AND
350 DRAW "BM83,76 R16 D30 L16 BM 100,91 R23 BM+0,-75 NR99"       'Draw lines...
360 FOR I=1 TO 5                   '...to accent and organize screen...

(continues)
```

Listing 2: PUTCOLOR.BAS

(Listing 1) generates the text mode color combinations shown in Figure 1. The program allows you to enter a new border color by number (0 to 15). It's astonishing how different a particular combination of character and cell colors appears when seen within different border colors. TXTCOLOR.BAS can also be run on the IBM Monochrome Display to view the screen attributes (such as underline and intensify) affected by the COLOR statement parameters. PUTCOLOR.BAS (Listing 2) generates the medium-resolution color graphics mode color combinations, one of which is shown in Figure 2. This program allows you to change the background color by pressing the B key and to switch between palette 0 (green, red, and brown) and palette 1 (cyan, magenta, and white) by pressing the P key.

Both programs (especially TXTCOLOR.BAS, because it displays all 16 colors simultaneously) are useful aids for tuning the screen controls (contrast, brightness, tint, and hue) of a monitor or TV. With either program, a particular color may appear slightly different on monitors from different manufacturers; in fact, many monitors display yellow in re-

The Help Screen

```
370   DRAW "D32 NR112"                    '...information
380 NEXT
390 FOR A=0 TO 4                          'Each PUT action has, for...
400   FOR C=0 TO 3                        '...each image array color number,...
410     LOCATE A*4+C+3,P(A)               '...a particular screen position to...
420     PRINT USING "#_-{";C;             '...print each image array color number
430     IF C=1 THEN LOCATE ,18: PRINT ACTION$(A);      'Print action name
440   NEXT
450 NEXT
460 LOCATE 1,6
470 PRINT "Original screen colors: "
480 LOCATE 4,1
490 PRINT "Background and": PRINT "palette set by"
495 LOCATE 8,1: PRINT "Burst set by": PRINT USING "  SCREEN 1_,#"; BURST
500 LOCATE 11,1
510 PRINT "PUT action &": PRINT "image array": PRINT "color values"
520 LOCATE 15,1
530 PRINT "PUT assumes XOR": PRINT "if no action is": PRINT "declared"
598 '
599 'Change palette, background, or screen's burst, or quit
600 LOCATE 19,1
610 PRINT "Press P, V, or": PRINT "B to change the": PRINT "palette, burst,"
620 PRINT "or background;": PRINT "press Q to quit";
630 COLOR BACK, PAL                       'Set background color and palette
640 LOCATE 6,3
650 PRINT USING "COLOR ##_,#"; BACK, PAL
660 X$=INPUT$(1)
670 IF X$="P" OR X$="p" THEN PAL=(PAL+1) MOD 2
680 IF X$="V" OR X$="v" THEN BURST=(BURST+1) MOD 2: GOTO 200
690 IF X$="B" OR X$="b" THEN BACK=(BACK+1) MOD 16
700 IF X$="Q" OR X$="q" THEN LINE (0,144)-(120,191),0,BF: LOCATE 22,1: END
710 GOTO 630
```

Listing 2 *(continued)*

sponse to the color code for brown. You should remember that for any medium-resolution color graphics BASIC program, such as PUT-COLOR.BAS, if the background color is high-intensity (values 8 through 15), the colors of both palettes become high-intensity: white becomes bright white, brown becomes yellow, and the other colors all become lighter.

Both programs allow you to enable and disable color on composite monitors by pressing the V key. This will toggle the burst attribute of the SCREEN statement, causing the screen to clear. The screen image is then redrawn in shades of gray (or shades, instead of patterns, of green, amber, or another color on one-color composite monitors). This clarifies images produced by composite monitors to an amazing degree. It is especially useful with certain combinations of foreground and background colors in text mode that are otherwise illegible, even with the large characters generated by the 40-column mode. On RGB monitors, turn-ing off the burst attribute does not turn off all the color. In text mode, the burst attribute has no effect. In graphics mode, however, slightly brighter versions of cyan, magenta, and white (palette 1 colors) are displayed using either palette.

---

dBASE II makes it possible. dPROGRAMMER makes it easy.

dPROGRAMMER is an accounting package and application generator that takes the "programming" out of using dBASE II.

The advent of dBASE II was a quantum step in computer information management. But to fully appreciate its power can take months of study. Now dPROGRAMMER takes the "programming" out of creating your own application and turns your computer into the management tool you hoped it would be when you bought it.

dPROGRAM your accounting.

dPROGRAMMER comes with a complete accounting package written in dBASE II. Now you can quickly and easily manage your General Ledger, Accounts Receivable and Accounts Payable. Included are the standard reports of balance sheet and income statement, a detailed general ledger, customer and vendor ledgers, and 5 journal registers, as well as many other helpful internal reports. dPROGRAMMER lets you handle sophisticated double entry accounting with simplicity and flexibility unmatched in the industry.

dPROGRAM your business application.

dPROGRAMMER adapts dBASE II to *your* way of doing business. It's quick and easy to use because you organize the access to information by setting up your own menus, programs and files. It's all in plain English with enough depth for both novice and expert. Anyone in your office will be able to organize information so it can be ordered, changed, retrieved and printed to suit every circumstance. dPROGRAMMER does many complex dBASE II functions automatically for you. From mailing lists through complex reports, dPROGRAMMER will manage your data so you're free to manage your business.

Source code provided.

Whether you have extensive dBASE II programming experience or are just learning this exciting language, you'll appreciate having the dPROGRAMMER source code. Not only does this make customization a very real possibility, but also provides examples of extremely well-written dBASE II programs.

dPROGRAMMER is the dBASE II bargain of the year.

dPROGRAMMER is the only dBASE II add-on product you will ever have to buy. It's a comprehensive business tool for dBASE II users that comes with everything you need to get the most out of your computer. Right away. What's all that worth? dPROGRAMMER costs just $295, much less than you'd expect to pay for the accounting source code alone! dPROGRAMMER is the sensible solution for all your information management needs.

dPROGRAMMER runs on any computer that will support dBASE II (8 or 16 bit). For more information, contact Sensible Designs at 10791 Tierrasanta Blvd., San Diego, CA 92124.

**Better yet, call
(619) 268-0123 today.**

SENSIBLE DESIGNS©

© Sensible Designs 1983
dPROGRAMMER is a registered trademark of Sensible Designs.
dBASE II is a registered trademark of Ashton Tate.
dPROGRAMMER is not a product of Ashton-Tate.

Circle 156 on reader service card
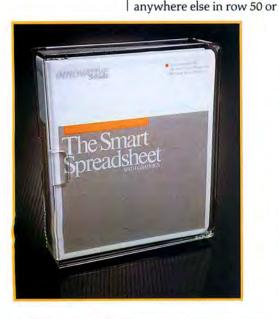
*INTRODUCING
THE THREE
SMARTEST TOOLS
EVER CREATED
FOR THE
BUSINESS MIND.*

THE SMART SPREADSHEET WITH GRAPHICS.
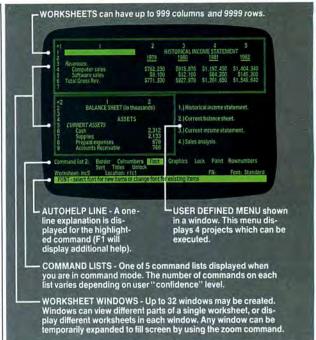
The name of the game in spreadsheets is power. The Smart Spreadsheet with Graphics offers unmatched power and pictures, in one convenient package.

A truly remarkable feature of this smart software is how it "thinks" about using space. It's based on the "waste not, want not" principle.

For example, when a user places a number in row 50, column 10 of any other spreadsheet program, 500 cells worth of memory are immediately allocated—even if no value is entered anywhere else in row 50 or

WORKSHEETS can have up to 999 columns and 9999 rows.

AUTOHELP LINE - A one-line explanation is displayed for the highlighted command (F1 will display additional help).

USER DEFINED MENU shown in a window. This menu displays 4 projects which can be executed.

COMMAND LISTS - One of 5 command lists displayed when you are in command mode. The number of commands on each list varies depending on user "confidence" level.

WORKSHEET WINDOWS - Up to 32 windows may be created. Windows can view different parts of a single worksheet, or display different worksheets in each window. Any window can be temporarily expanded to fill screen by using the zoom command.

GENERAL	999 columns X 9999 rows
	Up to 80 characters/cell (values and text)
	Up to 1920 characters/cell (formulas)
	Sparse matrix data storage
	Relational spreadsheets
SPECIAL FEATURES	Information management in spreadsheet form
	Multiple spreadsheets in memory at once
	Extensive calculation and decision-making; math, trig, statistical, date/time and decision (if-then-else, etc.) functions
	Project processing through command files
	Three user "confidence" levels
GRAPHICS	Supports full color
	1-, 2-, 3-D bar charts
	Pie and cake charts
	High-low charts, histograms
	Line, point and scatter graphs
	Merge graphs with text into word processing documents
	Edit graph capabilities before printing or plotting
	State-of-the-art printing and plotting
	Built-in "Slide Show" presentations

column 10. Consequently, 499 cells of usable memory are "tied-up" unnecessarily.

The Smart Spreadsheet will never let this happen. Its unique "sparse matrix" data structure would have only allocated one cell worth of memory.

This "space-saving" approach benefits all spreadsheet users. The Smart Spreadsheet puts at their fingertips four to ten times more usable memory. It's the only spreadsheet that can boast the capacity for up to 999 columns by 9999 rows.

In addition to its frugal approach to memory allocation, business users will find The Smart Spreadsheet offers powerful math and decision-making functions. It is extremely flexible. It will handle huge amounts of data, in many formats, while performing an unprecedented combination of business tasks.

To make sure the process doesn't become overwhelming (nobody's memory is that good), up to 32 windows can be opened to review worksheet sections or sections of other worksheets.

When it comes to graphics, few programs can compare to the full-color, full-featured package offered by The Smart Spreadsheet, which gives users a wide variety of visually appealing options.

Graphics can be enhanced by multiple type styles on-screen and on printed or plotted output. Graphics options include: 1-, 2-, and 3-D bar charts; high-low charts; pie and cake charts; line, point, and scatter graphs; and histograms.

And just to keep things interesting, there's even a built-in slide show. Business users can show their business bosses some of their favorite pie-cake-bar-point-

*E*ven with its unprecedented data capacity, math functions and graphics capabilities, The Smart Spreadsheet with Graphics is still the easiest-to-use forecasting tool a business can own.

high-low graphs in a crisp, informative presentation, in any order, any combination, any time.

Of course this wouldn't be smart software if it didn't make life easier with features like multiple help and menu levels, total integration with other smart software, and the knack for remembering how to repeat a complex project.

THE SMART WORD PROCESSOR.

GENERAL	Automatic "Flying Reform"
	"Cut and Paste" in or between documents
	Supports mouse
	Document size limited only by disk space
	Footnoting capabilities
	On-screen math capabilities
SPECIAL FEATURES	Multiple type styles on-screen and in output
	STET-second thought editing (undo)
	On-screen page breaks
	Project processing through command files
	Three user "confidence" levels

The Smart Word Processor (with the help of a quality printer), will deliver the same professional-looking and graphically appealing documents associated with dedicated word processing systems. But that's where the similarity ends.

Most businesses aren't in the business of word processing. So their word processing needs are very special. What they need is an extremely versatile writing, editing, and composing tool.

Not only that, they need a tool that can be used without long hours of special training or pages of highly *technical instructions.*
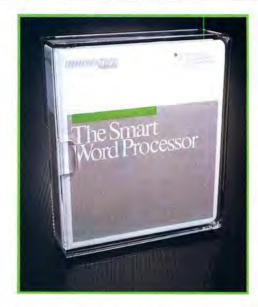
The Smart Word Processor is all those things and much more. It offers users a variety of type styles and sizes, as well as features like

T he Smart Word Processor is the most versatile writing, editing, and composing tool ever designed for the business mind and the micro-computer.

boldface, italics, small caps, underline, sub-script, super-script, even Gothic and Greek. Choices that meet the demands of the most fastidious, style-conscious writer.

Because bold is **bold,** italic is *italic,* and so on, the user can see the text on the screen

exactly the way it will look on paper. This constant visual feedback lets the user *write with just the right* emphasis.

To help the train of thought, The Smart Word Processor's multiple windows allow many parts of a document (or parts from many documents) to be referenced simultaneously as text is being written.

Good writing demands good editing. Changing words, rearranging paragraphs, copying between (or within) documents—even footnoting—are the stock and trade of The Smart Word Processor. It even includes a "stet" feature for undeleting (to correct editing mistakes).

And as text is added, deleted, or moved about, the "flying reform" feature makes sure that everything is reformatted, automatically.

Depending on the "confidence" level (there are three), menu options will address only the level being used. Of course, HELP can be called at any time, at any level.

The project processing feature makes organizing complex business reports a snap. Either with its own text files, or with other smart software, this word processor will remember how it's been told to prepare a document — and do it again at the touch of a key.

Because it's fully integrated, The Smart Word Processor doesn't have a problem dealing with "foreign" data, such as graphics or data files. So any information can be effortlessly retrieved from either The Smart Data Manager or The Smart Spreadsheet with Graphics (or both). Once retrieved, anything and everything can be merged with the text being processed.

For example, when used with The Smart Data Manager, the business manager can retrieve historical data to generate informative reports.

Then selected information can be summarized and used by The Smart Spreadsheet with Graphics to forecast future activity.

Finally, charts and graphs (from both historical and projected data) can be easily included in the document being prepared, either as stand alone items or surrounded by document text.

Just to round things out, The Smart Word Processor also includes a handy, on-screen calculator and a time manager/appointment scheduler. Business math calculations can be performed at any time, in a window on-screen, and inserted at any place in the document being processed. Appointments can be set, checked, rechecked, changed with the stroke of a key.

With the Smart Word Processor, what you see on the screen is what you get on paper.

You can make bold statements; *give a unique slant to your writing;* underline for emphasis; super-SCRIPT for mathematical equations ($E=mc^2$); sub-SCRIPT for footnoting$_1$; use ALL CAPS or SMALL CAPS.

You can even wrap text around graphs for a picture-perfect look.

SMART SOFTWARE FROM INNOVATIVE SOFTWARE.™

Until now, software has been designed to be powerful, versatile, and hard working. Unfortunately, this has usually meant hard work for the business user.

Despite technological feats, business software has not been known for meeting many human requirements.

Now with unmatched simplicity, smart software links the business user with the business system. It creates, for the first time, an environment that differentiates working hard from working smart.

Like a bright and resourceful assistant, smart software lets the user create, change, and duplicate tasks without constant supervision. It's eager to do the work. But always ready to learn more.

No longer is the user constrained by "unnatural" information flow, or a slave to reformatting data or commands. Nor is the user confronted with overwhelming study prerequisites before putting software to work.

Smart software is available in three applications: The Smart Word Processor, The Smart Spreadsheet with Graphics and The Smart Data Manager. Together, they provide an unlimited "applications bank." But each works powerfully by itself.

Smart software creates new meanings for "state-of-the-art," "integration," "user-friendly," and "full-featured." It sets new standards by which all other business software should be measured.

SMART SOFTWARE AT A GLANCE

GENERAL	Up to 32 windows/program
	Multiple files, documents, or spreadsheets in memory at once
	Supports mouse
	Supports full color
	Supports most popular printers and plotters
INTEGRATION	True integration - packages directly share information from each other and pass information automatically
SPECIAL FEATURES	Automatic project processing-remembers commands (not a macro)
	Three user "confidence" levels
	Prepared menus, custom-defined menus, or command language
	Multiple typestyles on-screen and in output
	Built-in time manager/appointment scheduler
	Built-in business/scientific calculator
	Extensive calculation and decision-making capabilities
	Keyboard macros
	Supports 8087 floating point processor chip
HARDWARE	IBM PC®, XT, COMPAQ™ or compatibles
	128K RAM, two double-sided disks or a hard disk

These unique features are standard for all smart software products. Each program also offers many exclusive application-specific features.

A BUSINESS TASK MASTER
Successful businesses operate by performing tasks and projects well. Most of their information demands involve repetitive projects and tasks.

Now, with a single keystroke, multi-faceted information projects can be repeated—start to finish—without repeating commands.

Think of it as "project processing." Smart software makes it a reality for microcomputers. It lets the software "learn" the user's chain of commands and repeat them, time after time, with a single prompt.

Using a unique "remember" mode, commands are recorded automatically.

Unlike a "macro" capability (which only remembers keystrokes), smart software has the "intelligence" to remember commands. It's the difference between remembering the letters in a word and knowing how to use the word.

INTEGRATION CUM LAUDE
Smart software integrates the user with the information system. It also integrates the programs—lets them "talk" to one another.

Smart software has the ability to pass information effortlessly between programs, and to store and retrieve information. The software (not the user) does the work of transferring data and translating instructions. Smart software lets the user concentrate on the task at hand rather than on how to make different programs work together.

THE STUDENT TEACHER
Despite its "learning" abilities, smart software has the patience to teach—in the school of "hands-on" experience. So even first time users can begin working immediately, and learn as they do.

Each program is structured into three ascending tiers of user "confidence." HELP is available at each level. No matter what's on the screen, one command presents detailed instructions.

HELP and menu information are consistent with the confidence level being used. Beginners work without confronting complex instructions and options. More advanced users can enter at any level they choose, and backtrack if they bite off too much.

But regardless of the "confidence" level, the user is continuously supported by full integration and project processing.

THE SMART DATA MANAGER.

All businesses have three things in common. They all accumulate more data than they realize. They can never seem to find it when they need it. And if they could find it, they probably couldn't make much out of it.

*T*he Smart Data Manager is the most intelligent data base available to the micro user.

From these observations, the data processing industry was born. But access to DP capabilities was limited.

Now The Smart Data Manager puts the benefits of data processing into the hands of business decision makers, providing them with an extremely efficient and versatile management tool.

Here, for the first time, is a relational data manager that can be operated by its own menus, user-defined menus, or built-in "common-sense" commands. Users can concentrate on what to ask rather than how to ask for information.

Because of its three "confidence" levels, users can start with the basics and work their way up with the peace of mind that they won't be inundated with menu options—until they're ready. They're also assured that HELP is always at hand.
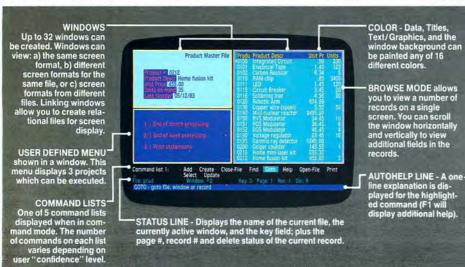
Naturally, The Smart Data Manager does a masterful job of filing, organizing, locating, interrelating, and retrieving all sorts of facts and figures, names and addresses. And it will remember exactly how to repeat all tasks for any repeated project.

Lists, reports, and forms can be generated with unlimited versatility and in a variety of type styles and sizes. Users can give that "smart" look to even the most perfunctory business paperwork.

Put to work with The Smart Word Processor and The Smart Spreadsheet with Graphics, The Smart Data Manager becomes the cornerstone for the most powerful, most versatile, and most innovative information management system ever created.

GENERAL	1000 characters/field
	4000 characters/record
	255 fields/record
	100,000 records/file
	Up to 15 key fields maintained
	Efficient B-tree organization
SPECIAL FEATURES	Up to 10 "screen views"/file with up to 15 pages each
	Security password entry at both screen and file levels
	Eight field types
	Character and numerical range verification
	Multiple criteria selects
	Prepared menus, custom-defined menus or command language
	Extensive calculation and decision-making capabilites
	Project processing through command files
	Three user "confidence" levels
RELATIONAL CAPABILITIES	Multiple file interaction
	Look-up data gathering
	Transaction data passing

WINDOWS
Up to 32 windows can be created. Windows can view: a) the same screen format, b) different screen formats for the same file, or c) screen formats from different files. Linking windows allow you to create relational files for screen display.

USER DEFINED MENU
shown in a window. This menu displays 3 projects which can be executed.

COMMAND LISTS
One of 5 command lists displayed when in command mode. The number of commands on each list varies depending on user "confidence" level.

COLOR - Data, Titles, Text/Graphics, and the window background can be painted any of 16 different colors.

BROWSE MODE allows you to view a number of records on a single screen. You can scroll the window horizontally and vertically to view additional fields in the records.

AUTOHELP LINE - A one-line explanation is displayed for the highlighted command (F1 will display additional help).

STATUS LINE - Displays the name of the current file, the currently active window, and the key field; plus the page #, record # and delete status of the current record.

MORE SMART FEATURES
The Smart Data Manager does more than handle standard data base applications It also has powerful field calculating abilities which help minimize data entry.

In addition, "if-then-else" logic can be applied to any field. And the report generator can print standard reports from any file, in any order. Or, users can output data to match pre-printed forms, labels, invoices, etc.

With these features, The Smart Data Manager solves virtually any data gathering problem, no matter how detailed or complex.

Era one.

Era One saw the personal computer increase the productivity of the business executive dramatically. Yet for all their power, personal computers have not fulfilled their potential. Because the different makes have been unable to communicate reliably with one another and with the various public data networks.

Era two.

But now, Microcom moves the personal computer into a new era of communications compatibility with Era 2–the first Personal Computer Communications System with the industry-standard communications protocol MNP. Era 2 finally enables dissimilar personal computers to communicate with one another reliably and cost effectively. It also allows the personal computer to access public data networks easily and error-free.

A closer look at Era 2.

Era 2 with MNP is a 1200 baud Communications System (software and inboard modem) designed to operate with the IBM PC, PC XT, compatibles and PCjr. Its features include IBM 3101, Digital VT-100 and VT-52 terminal emulations. Era 2 executes multiple functions with a single keystroke. Stores a virtually unlimited number of telephone numbers – each one up to 31 digits. Era 2 is Bell 212A compatible, works with Pulse or Touch-tone™ dialing. Its speaker alerts you to busy signals, wrong numbers, etc. Era 2 gives your personal computer error-free compatibility with other personal computers, data bases, mainframes, almost any information source that can be reached by telephone line.

A new era in dependability.

Era 2's electronics are so well put together we're able to offer a four-year warranty– twice the term of protection you get from yesterday's products. On top of that our product support is outstanding. Our 800 number operates 9AM to 8PM (EST), Mondays through Fridays, 9AM to 5PM Saturdays with experts available to solve any problem or answer any question.

The state of the price of the state of the art.

We're able to offer Era 2 for an amazing $499. By any standard the price/value ratio of Era 2 is outstanding.

Move your personal computer forward into a new era of communications. Visit your Era 2 dealer soon. Call 1-800-322-ERA2 (in MA, 617-762-9310) for the name of one nearest you. Or write us, Microcom, Inc., 1400A Providence Highway, Norwood, MA 02062. We'll send you a brochure with complete information on Era 2. **Only from Microcom: The Personal Computer Communications System with MNP.**

Era 2

Circle 106 on reader service card

that spreads too thin.

Multiplan can link information in different spreadsheets. When you make a change on one, every related one is changed.

Multiplan has optional Multiplan Application Programs that work with you to design and build custom spreadsheets for Budget Analysis, Financial Statement Analysis or Cash Planning in minutes. Not hours. Or days.

The trained mouse.

Multiplan has an optional Mouse. A handy little critter that flies through Multiplan so easily you barely have to lift a finger to select and execute commands. Small wonder Microsoft gets more performance out of a spreadsheet. We designed the MS-DOS operating system that tells the IBM PC how to think. And our BASIC is the language spoken by nine out of ten microcomputers worldwide.

MICROSOFT.
The High Performance Software

To get the best spread call 800-426-9400 (in Washington State call 206-828-8088) for the name of your nearest Microsoft dealer. Now featuring Multiplan at a reduced price: **$195.**

Suggested list price shown for Multiplan.

Compare Best's Professional Finance Program™ to anyone's. The competition just isn't up to par.

Use this score card to compare Best's Professional Finance Program to the Home Accountant Plus, or any other financial program. You won't find any that can make financial management simpler or more effective.

The Professional Finance Program is software that has all the features you want, but is simple to operate. The keys to its simplicity include a help menu linked to current activity, and other aids like budget, account, and tax/sort names displayed on the screen. The program also comes with a fully indexed user's manual and is backed up by Best's free customer support.

The Professional Finance Program is also a great help at tax time. It provides financial information for easy input into Best Program's PC/TaxCut™, a tax preparation and planning package. Combine the two programs and you have a complete financial and tax package.

If you already own the Home Accountant Plus™, don't consider that a handicap, because Best is offering you a $100 rebate. The program is compatible with the IBM PC, PC/XT, COMPAQ, Columbia Data Products, and Eagle Computers. For more information about the rebate or the Professional Finance Program, call 1-800-368-2405. In Virginia call 1-703-931-1300. Or write to Best Programs, 5134 Leesburg Pike, Alexandria, VA 22302.

Score Card

Feature	Professional Finance Program™	Home Accountant Plus™*	Other
Budget Codes	1,170	200	
Tax ID Codes	99	1	
Transactions Displayed Per Screen	16	1	
Number of Checkbooks	26	5	
80-Column Screen	Yes	No	
On-Screen Calculator	Yes	No	
Password Protection	Yes	No	
Address Book for Payees	Yes	No	
Speedy Compiled Basic	Yes	No	
Full Use of IBM PC Function Keys	Yes	No	

*Home Accountant Plus™ is a trademark of Continental Software.

BEST PROGRAMS

"The Quality Software Company"

SON OF STARWRITER™

HALF THE SPEED, FOR HALF THE MONEY.

First there was the Starwriter 40 CPS by C. Itoh, one of the world's most popular letter-quality printers.

And deservedly so. Because it gives you more of just about everything than any other printer in its price range (mid teens). And it churns out copy at a very brisk 40 characters per second, or about half a minute for an average business letter.

Now, there's the Starwriter 18 CPS™. It takes after its father, in that it's simply the finest printer you can buy for anywhere near the price—which in this case is just about half what Daddy charges.

The only major difference is speed:

Instead of 40 characters per second, this Starwriter trots along at just over 18 cps—which costs you about 30 seconds per average business letter.

But it retains the rest of the family resemblance, like low profile and low noise, plug-in compatibility with just about any serial or parallel microcomputer on the market, making it a perfect companion in a typical office environment.

And perfect for typical office chores: like letters, memos, announcements . . . in fact the vast majority of stuff that can afford to wait a few seconds to get typed.

Enough said?

If not, then this: the Starwriter 18 CPS gives you crisp, letter-quality copy (including boldface, underlining, sub and superscripts) with your choice of friction feed or optional tractor feed for precise print positioning of tabular and graphic data, using easily available industry-standard ribbon cartridges and long-lasting plastic daisy wheels.

But it also gives you something that's far from industry-standard:

A full-year warranty.

And for a mere half-a-minute per letter . . .

We think it's well worth the wait.

LEADING EDGE®
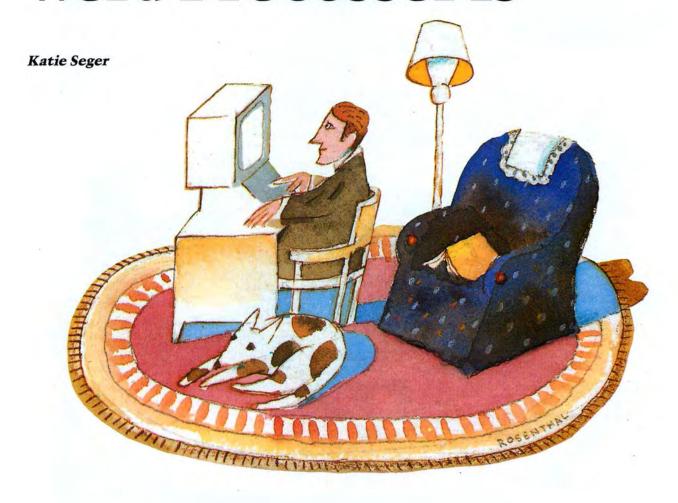
Circle 91 on reader service card

HomeWord offers PCjr owners plenty of power for a low price.

Home Is Where Your Word Processor Is

Katie Seger

My writing needs at work are very different from my writing needs at home. When working, I use a word processing program that allows me to compose business letters, draft long reports, and write and edit magazine articles. My home writing requirements are not as demanding. I write rambling letters to friends, type up my softball team rosters, and occasionally struggle with a term paper for a night class.

My home writing doesn't demand all the power that my $500 word processing program at work offers, but I am spoiled. When I sit down at my home keyboard, I want all the features that I rely on at work. That's why I was happy to find that IBM's *HomeWord* offers a lot of word processing power for the low price of $75.

Gold in California's Hills

IBM contracted with a California firm, Sierra On-Line, to produce *HomeWord* for PCjr. Sierra On-Line, best known for producing video games like *Frogger*, introduced its Apple version of *HomeWord* in October 1983 and followed with versions for Commodore and Atari computers. The agreement with IBM called for Sierra On-Line to rewrite *HomeWord* so that the program would run under DOS 2.10 and take advantage of PCjr's advanced color capabilities. IBM handles the production, marketing, and distribution of *HomeWord*.

One easily recognizable difference between the Apple and IBM versions of *HomeWord* is that the PCjr documentation is better and more colorful. The documentation, which was jointly produced by Sierra On-Line and IBM, is clear and easy to understand. By following the logical, step-by-step instructions in the *HomeWord* manual, I was able to master the major features of the program in less than 2 hours.

The *HomeWord* disk, manual, and keyboard overlay come in a plastic box that can be used as a bookstand for the manual as you learn the program. The box might come in handy later as a stand for pages of notes and drafts of stories or reports.

Working with HomeWord

HomeWord requires 128K and one disk drive, so you need an enhanced PCjr to run the program. To begin, you load DOS 2.10 by inserting the DOS disk in the PCjr disk drive and then pressing <Ctrl>, <Alt>, and <Del> simultaneously. PCjr asks you to enter the current date and time. Use DOS commands to format a blank disk on which you will store your documents. When the disk is formatted, remove it from the disk drive. Place the *HomeWord* disk in the drive and load the program by typing HW after the prompt. Once *HomeWord* is loaded, remove the program disk, reinsert your document disk, and press <Enter>.

HomeWord divides the screen into three parts (see Figure 1). The top half of the screen is the typing area, where the text you write appears. The bottom left part of the screen is where icon menus and prompts appear. Although *HomeWord* allows you to bypass the icon menus by typing letter commands—pressing <Ctrl> and B will boldface text, for example—most people will use the icon menu options at first to perform tasks such as saving and editing documents. The bottom right section of the screen is the document outline area. The outline area shows you how your document will look on a printed page, complete with layout features such as margins and line spacing.

After you load the program, the *HomeWord* screen displays a blinking cursor in the typing area and shows part of the program's main menu in the icon and prompt area (two options are hidden by the outline area). The entire main menu has six options, each represented by a drawing: a printer for the print menu, a page of crossed-out copy for the editing

menu, a filing cabinet for the file menu, two differently designed pages for the layout options, a dial for the Preset Values menu, and an exit sign for the option that lets you exit *HomeWord* and return to DOS.

Pressing <Esc> moves the cursor from the typing area to the icon and prompt area, where it takes the form of a frame that surrounds one of the icons. You move the cursor with the left and right cursor control keys or with a joystick. I found that moving the cursor with the joystick was not satisfactory because the cursor would quickly jump past a desired icon and land on a menu option I did not want—landing on the correct icon was more a matter of luck than manual dexterity.

When your cursor is on the correct menu option, press <Enter>, and a new icon menu is displayed. If your PCjr is hooked up to a color monitor, you probably want to choose the Preset Values option from the main menu. *HomeWord* assumes that your PCjr is attached to a television set, so it gives you a default setting of 40 columns. With the Preset Values menu you can change the setting for an 80-column display.

To begin writing, press <Esc> again, and the blinking cursor returns to the typing area. *HomeWord* displays text as you write. The program automatically wraps each line, which means that it automatically starts a new line of text when the cursor reaches the right margin, but does not break the last word on a line.

Some people feel comfortable having the menus on the screen while they work, but other people prefer a blank screen. *HomeWord* suits both types of people. The icons and outline sections stay on the screen unless you press <Fn> and the function key <F1> to remove them. Function keys are specially programmed keys that, when typed, send specified commands to perform tasks, such as clearing the screen, to the system unit.

Unlike the PC and the XT, which have two isolated rows of function keys, PCjr's top row of number keys—and with some programs, other keys—serve as function keys when activated by the <Fn> key. With *HomeWord*, seven number keys and the <Home> and <End> keys serve as function keys. The function key markings are displayed in green on the *HomeWord* keyboard overlay.
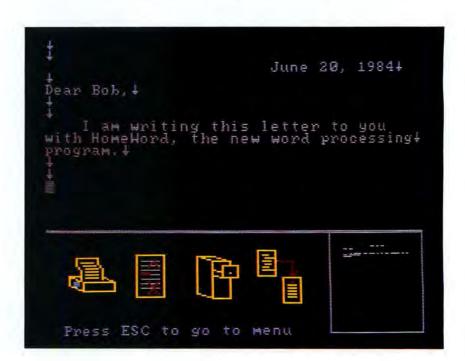
Figure 1: *HomeWord* divides the PCjr screen into three parts.

I used the <Fn>-<F1> command to see my entire document on the screen as I typed. Once I finished my document, I returned the two missing screen sections by again pressing <Fn> and <F1>. The main menu and the outline area, now with a representation of how my document looked, reappeared on the screen.

Saving Your Data

After a document is finished, most people want to save it. As always, to switch from the typing area to the icon menu area (or vice versa), you press <Esc>. *HomeWord* automatically places the cursor on the file menu icon—the filing cabinet. Choose the file menu icon by pressing <Enter>, and a new menu with four icons appears on the screen (see Figure 2).

The four icon options are Get Document, which allows you to call up a previously saved document to the screen; Save Document, which allows you to store your document on disk; Erase Document, which erases a document from the disk; and Insert Document, which allows you to insert text from a document on disk into the document on the screen. Move the cursor to the Save Document option and press <Enter>. A prompt asks 'Document to save:'. Document names can be up to eight letters or numbers long but cannot include spaces. After you type the name of your document, press <Enter>, and a message tells you that your document is saved on disk.

Editing and Page Design

As any writer will tell you, writing is only the first part of the job. Editing and, to a lesser extent, text layout are almost as important to the final project as the writing itself. *HomeWord* has extensive editing and layout features that seldom leave me wanting more.

I gave the editing menu a thorough workout and found that the features measure up well against those of my office word processing program. I can easily move, erase, and copy text in my document. *HomeWord* makes good use of PCjr's color capabilities with both the Move Text and Erase Text options. When you mark the text you want to move, *HomeWord* paints the words or lines green. Once the move is complete, the text returns to its former color. Similarly, when you want to erase text, the program paints the lines red.

HomeWord includes a handy goof fixer with the Erase command. If you erase text only to realize that you made a mistake, the program gives you a second chance. Pressing <Fn> and <F2> returns the erased text to the screen. However, you must issue the command directly after you erase the text, or your data will be lost forever. This is a feature that I wish my office word processor included.

Figure 2: *HomeWord*'s file menu

The sophisticated Find and Replace command is included in *HomeWord*. With this feature you can specify a word or phrase of up to 39 characters and replace it with another word or phrase. I often use this command when I have misspelled a word throughout a story. The Find and Replace command allows you to quickly correct an error without going through a slow, line-by-line search.

HomeWord lets you set left and right margins and center and justify text. Line and tab spacing can also be set, and if your printer has the capability, you can underline words or print them in boldface type. Document headers and footers such as titles and page numbers can be set with program commands.

All the Words Fit to Print

Printing a *HomeWord* document is very easy. I printed my document on the IBM PC Compact Printer, but you can print with a non-IBM printer by specifying the printer type in the Preset Values menu. Refer to your printer manual for the information required by the menu prompts.

The print menu's See Final Document option is a handy feature. With this feature you get to take a final look at your document on the screen before you print it. If you have made layout changes, the option lets you double-check your work before you waste any paper. Again, I found this to be a valuable option I'd like to have at work.

Growing with HomeWord

HomeWord's icon menus make it easy to quickly master the software. As you learn the program and gain confidence, you can switch from the icon menu commands to key commands. The key commands are usually a little quicker than the icon menu commands. For example, pressing <Ctrl> and G is the shortcut command for Get Document, and typing <Ctrl> and X is the Erase Document command. Advancing from icon menu selections to key commands is a logical progression. I found that once I was familiar with the icon menus and how they work, it was easy to understand and quickly memorize the key commands. And when I forgot the key commands, I could look at the keyboard overlay for a quick refresher.

You can change a *HomeWord* document to an ASCII (American Standard Code for Information Interchange) file by pressing <Fn> and <F7> before you save the file on disk. You need this format change so programs like IBM's *Word Proof,* a spelling checker, can read a document. To return the document to *HomeWord* format, simply press <Fn> and <F8> after issuing the Get Document command.

I actually enjoyed learning *HomeWord;* the manual and the keyboard overlay make it hard to go wrong. *HomeWord* is a powerful program that performs all that I ask of a home word processing program.

HomeWord does not perform column manipulation like my office word processing program does, but I used that feature only once last year and have not needed it this year—in short, I can live without it. The program's only annoying limitation is memory size. Only about 12 pages of single-spaced text can be written and edited in a *HomeWord* document. The size limitation prevents me from using *HomeWord* at the office, but it does not prevent me from passing the good word at home.

Katie Seger is an Assistant Editor for PC World Special Editions.

Don't miss your Free copy of

Get More Out of Your PC

Subscribe before September 30!

Save 58% and get this book FREE!

Please enter my subscription for the term checked below and rush my FREE copy of **Get More Out of Your PC!** I'll save 58% off the newsstand price and 21% off the regular subscription rate.

☐ 14 issues/$18.95 ☐ 28 issues/$33.50 ☐ 42 issues/$47.00

☐ Bill me ☐ Payment enclosed

VISA and MasterCard accepted—call TOLL-FREE: 800/247-5470 (in Iowa 800/532-1272).

Name _____

Company _____

Address _____

City, State, Zip _____

PC WORLD

Please allow 6-8 weeks for delivery of your first issue. Outside the U.S. subscriptions must be prepaid in U.S. funds. Outside the U.S. and Canada, add $25 per year for surface mail or $110 per year for airmail.
Offer expires September 30, 1984

J2260

Get More Out of Your PC

Manage Your Information Effectively

Annual Hardware and Software Reviews

Stay Informed and Knowledgeable

PC World shows you how other users are turning their PCs into incredible time-saving tools, using them for spreadsheet analysis, word processing, communications, information management, and much more. You'll learn how people are using PCs to solve all kinds of problems in all kinds of businesses.

Stay Informed and Knowledgeable. At *PC World,* we're PC users ourselves. We constantly review and evaluate the newest in portable PCs, printers, communications interfaces, and software. We tell you what other PC users think, too. So you'll always know what's coming, what to look for, and how to make smart buying decisions.

Annual Hardware and Software Reviews. Compiled by *PC World*'s editorial experts, the annual special issues are the most thorough reference guides available to products for the IBM PC and compatibles. The hardware and software reviews include specs, sources of supply, and price ranges—everything you need to make the buying decisions that are right for you.

PC World is the only magazine that covers it all—consistently, professionally, and thoroughly.

Free Book with Your PC World Subscription. Now available for the first time, *Get More Out of Your PC* contains more than 100 pages of articles, reviews, tips, advice, and how-to help. You'll learn how to use a spreadsheet to maintain your stock portfolio, choose the word processing program that's right for you, keep track of your business expenses with a data base, choose a modem, have a computer correct your spelling, and much, much more.

Special Limited-Time Offer. Now for a limited time only you can take advantage of this special introductory offer and save 58% off the newsstand price (21% off the regular subscription rate) of *PC World.* You'll get 12 monthly issues and 2 special issues of *PC World* PLUS a free copy of the valuable reference book, *Get More Out of Your PC.* But supplies are limited; you must subscribe before September 30, 1984, to take advantage of this special offer.

Guarantee. If *PC World* doesn't live up to your expectations, cancel your subscription for a full refund on all unmailed issues. No questions asked. The book *Get More Out of Your PC* will still be yours to keep.

PC W●RLD

"There's a c on your

It's a call from a customer in New York who needs specifics on a business proposal. You talk briefly and then transmit the data to him in seconds from your IBM® PC with PC Exchange.™

Later, an electronic mail message arrives from your Houston office. New developments necessitate an immediate multi-city business trip. Over your IBM PC, you make arrangements with your travel agent. Then you contact an information network for the latest weather in the cities you'll be visiting.

All through your IBM PC. All made possible by PC Exchange—a versatile, dynamic and interactive communications package on a single pc board. Complete with software and tutorials.

With PC Exchange your IBM PC becomes far more than a computer.

PC Exchange: from the people who brought you PC Express.

PC Express was welcomed by PC users everywhere. It packed a number of valuable communications capabilities onto a single pc board occupying just one expansion slot.

Now we've made a good thing even better. We took all the PC Express capabilities, added some exciting new ones, and gave the entire package a new name: PC Exchange.

Through it, you can exchange voice and data communications—directly or remotely—with other IBM PCs, PC-compatible computers and mainframes.

For example, with PC Exchange, your PC can perform DEC™ VT100/52 emulation and allow you to access all major information networks such as THE SOURCE.℠ Membership in THE SOURCE is included with your purchase of PC Exchange.*

PC Exchange also puts at your command a powerful, fully-integrated telephone management system which includes a full-screen text editor, an "Electronic Phonebook," electronic mail capability, an onboard modem, auto-dialing, auto-answering and more.

Available now: SNA 3270 and 3770 RJE.

If your company has an IBM mainframe, chances are it's being overworked and yet, underutilized. People just can't get the data they need when they need it.

The answer: PC Exchange with SNA. With it, your PC can communicate with your IBM mainframe, and emulate a 3274 cluster controller, 3770 Remote Job Entry station, and 3278/9 terminals with multi-session capabilities.

Multi-sessioning gives you the ability to be connected concurrently to four different mainframe applications and toggle back and forth, without logging on and off.

For MIS managers, connecting PCs to mainframes is an effective, cost-efficient way to reduce host processing loads. So, PCs can become an integral part of the corporate information environment.

For a free demonstration, contact your nearest PC Exchange dealer. For the address, call 800-523-8396. See what a dramatic change PC Exchange can make in the speed and efficiency with which you gather and use information.

Intelligent Technologies International Corp., 151 University Avenue, Palo Alto, CA 94301, (415) 328-2411. 800-523-8396. Telex: 756175.

PC Exchange from Intelligent Technologies™
a **logica** company

all for you IBM PC."

Bank of America's new home banking system gives Californians a look at what's ahead for personal computer owners.

Banking at the Home Branch

Joe Matazzoni

With 1071 branches in California and 3.5 million customers, Bank of America is one of the largest banks in the country. It wasn't much of a surprise, therefore, when the San Francisco-based giant announced in November 1983 that it would join the handful of banks nationwide that have moved from testing home banking systems to offering viable services to their customers. The BofA system, aptly named "HomeBanking," is available to customers of the bank's approximately 500 Northern California branches and will soon be extended to Southern California customers.

As far as any service is typical in this innovative market, BofA's HomeBanking is probably typical of the systems that will be springing up around the country during the next few years. By taking a look at how HomeBanking works, you can get a good idea of the type of service you'll be able to call with your modem-equipped PCjr in the not-too-distant future.

Armchair Banking
The HomeBanking system offers six major functions. You can pay bills, transfer funds between accounts, check account balances, review HomeBanking transactions made during the last month and review and cancel any scheduled transactions, read your current bank statement, and communicate with the bank via an electronic mailbox.

```
**MAIN MENU**
0  LOGOFF
1  PAY BILLS
2  TRANSFER FUNDS
3  BALANCE INQUIRY
4  REVIEW OR CANCEL
5  ELECTRONIC STATEMENT
6  ELECTRONIC MAIL
?  COMMAND (CMD) LIST
ENTER:
```

Figure 1: HomeBanking's main menu

One of the outstanding features of the BofA system is that it is compatible with any brand of personal computer. PCjr owners need only a modem and a communications program to connect with HomeBanking.

You can dial HomeBanking any time between 6 a.m. and midnight, seven days a week. Although all calls are handled by HomeBanking's main computers in San Francisco, you pay for a local call no matter where you are in Northern California, because BofA subscribes to the Tymnet telecommunications network. To connect with HomeBanking, you dial a local Tymnet number, and the bank picks up the Tymnet charges. The bank's use of Tymnet means you could conceivably do your banking from anywhere in the country.

BofA issues you a 9-digit identification number and a 4-digit passcode when you sign up for HomeBanking. Each time you call and log on to the system, you are asked to enter these numbers.

The system disconnects you if you repeatedly fail to enter your codes correctly. If you make certain types of errors, such as omitting a step in the logon procedure, the system will disconnect and

ask you to telephone the Home-Banking center to get help; BofA provides an 800 number for this service that is staffed during all HomeBanking hours.

HomeBanking's main menu consists of six options (see Figure 1). When you choose an option, HomeBanking displays a submenu; choosing an option from that submenu begins a banking task.

For the most part the system is flexible and easy to use. Once you are familiar with how the system works, you can issue commands to move from option to option instead of having to rely on the menus to change tasks. The only serious flaw in the design of HomeBanking is that it lacks any scrolling capability; you can only page forward through a function. This omission means that if you are reviewing your checks, for example, and want to go back to a check that has moved off the screen, you have to press B to return to the Electronic Statement submenu, select the check review function again, and page forward until you get to the check.

Most of the functions on the HomeBanking main menu are self-explanatory. Transfer Funds lets you schedule transfers up to one month in advance between any of your accounts that are linked to HomeBanking. Review or Cancel gives you a list of all bill payments and transfers made via HomeBanking in the last

month. It also shows any transactions you may have scheduled for a future date and lets you cancel any of these up until the end of banking hours on the day the transaction is supposed to take place.

Balance Inquiry gives your account balances only, while Electronic Statement provides a detailed summary of the activity in all your accounts during the current statement period. With Electronic Statement you can find out when checks cleared, make sure deposits were recorded, see how much cash you've withdrawn from automated teller machines, and look at any other records that would show up on a normal monthly account statement.

Electronic Mail lets you communicate with HomeBanking employees. With this option you can, for example, ask the Home-Banking center for change of address forms or forms for a new automated teller card. If you find an error in your statement you can question the mistake; Home-Banking personnel will investigate and respond to you through Electronic Mail within 24 hours (not counting weekends). The bank also uses the mailbox for announcements about services.

Option 1, Pay Bills, requires some explanation. Unlike a few systems around the country that let customers pay bills to anyone they please, HomeBanking restricts you to a list of payees designated by the bank. When you sign up for HomeBanking, you choose a personal payee list from the bank's list. (At this writing about 275 merchants, financial institutions, and utilities are included on BofA's list.) Payees can be added to your list only with a written request.

Restricting payees to accounts the bank knows receive a large volume of business is a cost-effective measure. But it also helps to make the HomeBanking system secure, because it is virtually impossible for most individuals to include themselves on your payee list. So even if someone could get into your account, all that person could do would be to pay all your money to, say, Macy's or Neiman-Marcus. As an additional security measure, HomeBanking customers can set a payment ceiling for each payee. (The largest amount you can pay or transfer is $99,999.)

You can schedule bill payments up to a month in advance, which means you can pay all your routine bills—mortgage, insurance, car payments—during a single session each month. However, bill payments can take up to five days from the specified payment date to actually reach the payee, so use this option carefully.

HomeBanking is not the futuristic system many people imagine when they think of computer banking—although it is more sophisticated than other systems around the country. For example, while some bill payments are made electronically by crediting the payee's account, others are still made through the mail via a paper check. (This depends largely on what type of payment the payee can accept.)

Similarly, there is a two-day lag between the time a check clears your account and the time the transaction is reflected in your Electronic Statement. The Account Balance information is more current, but it still shows only yesterday's figures. So if you think HomeBanking will save you from having to balance your checkbook, forget it. Relying on HomeBanking's account balance information instead of your own checkbook records could get you into trouble. For example, after checking your account balance for sufficient funds, you could pay your phone bill, have your transaction accepted by HomeBanking, and still have your phone cut off because another check cleared on the day you made your payment.

HomeBanking is not the futuristic system many people imagine when they think of computer banking.

Protecting the Home Funds

Until 1981, Regulation E of the Electronic Funds Transfer Act of 1978 required that a paper receipt be supplied for all financial transactions performed at an electronic terminal. In that year the Federal Reserve Board ruled that home terminals are exempt from the receipt requirement. No receipts, coupled with the fact that home banking systems offer increased access to bank computers and therefore increased chances for tampering, might make some people nervous about using a home banking system.

It is too early to tell whether these fears are well founded. Bank directors want home banking to succeed, and they know security is a touchy issue, so they are moving cautiously and making every effort to safeguard their systems.

However, at least in the case of the BofA, the bank does not accept any liability if your money is lost as a result of "unauthorized use" of the HomeBanking system.

According to BofA spokesperson Val Tucker, "It's the customer's risk to use this [HomeBanking], but conceivably the customer could sue us and prove negligence." Asked why, if the bank is confident in its system, it doesn't accept liability, Tucker responded, "It's all too new. Things change in this area from day to day. Someone could come up with something that no one ever thought of."

As noted earlier, HomeBanking disconnects callers who don't correctly log on to the system. In addition, although Linda Taggart, BofA vice president for Electronic Delivery Systems, wouldn't be specific about the details, she said the bank would know if someone were using a *War Games*-type program to dial up the system repeatedly and enter random numers in an attempt to generate an ID number and passcode. A BofA source said that operators constantly monitor the system and could shut it down if they saw something suspicious going on.

On the receipt issue, the bank encourages you to keep a record of all your transactions. You can make copies of transactions by issuing print screen commands each time you do banking business through the system. The value of such records in case of a standoff with the bank, however, is unclear. "That kind of dispute would be investigated on a case-by-case basis" by the bank, according to BofA public relations manager Maury Healy.

Bank on It

Although your bank may not yet offer home banking, it's a safe bet that the ability to bank by home computer will be a common bank service within a few years. One reason for this is that home banking is efficient for banks.

Home banking lets banks lower their overhead by cutting back on personnel and branch offices without cutting back on routine services for customers. Electronic transactions also help decrease the huge amount of paperwork banking now entails. Banks currently process 40 billion paper checks annually at a cost of about $1 per check. By comparison, processing a bill payed electronically via home banking costs only about 18 cents.

Other incentives for home banking have to do with the competitive forces in today's deregulated marketplace that force banks to offer more and better services to attract customers. Even though most home banking systems won't start to turn a profit for some time because relatively few customers own home computers (see "Home Banking around the Country"), no bank that wants to be perceived as a market leader can afford to look like it isn't keeping up with the latest technology.

Home Banking around the Country

Describing a typical home banking project is like trying to describe a typical personal computer—each system is different. However, most home banking projects share a core of common services. These include paying bills to designated payees, transferring funds between accounts, monitoring account balances, and transmitting electronic mail. In addition to these basic services, banks are experimenting with a variety of offerings.

CitiBank of New York's HomeBase system gives customers access to the Dow Jones News/Retrieval service and enables them to order traveler's checks, which are then mailed to their homes. The Pronto service offered by New York's Chemical Bank has a budgeting facility that lets customers categorize checking, credit card, and home banking expenditures by code and then, at tax time for example, pull together all expenses that have the same code.

CitiBank and the First Interstate Bank of Los Angeles are testing systems that let customers pay bills to anyone, as opposed to choosing from a list of payees designated by the bank as with the Bank of America system. Other banks offer the ability to find out about money market and loan rates or review local news, weather, and sports. As banks offer more on-line services, the distinction between home banking systems and data base or videotex systems that offer banking is becoming blurred.

Not all financial institutions can afford to spend the time (one to three years) or the money (Chemical says it spent $20 million developing Pronto) to develop their own bank-at-home systems. These institutions are pursuing a number of other options.

Some banks are licensing software and buying computer time from other banks. The Pronto system and a year of processing cost about $50,000, according to Chemical vice president Charlie Forbes.

Other banking institutions don't mind creating their own banking software but don't want to get too involved in telecommunications. Several of these institutions are using the CompuServe information service as a communications gateway. Going through CompuServe ensures that a system will be accessible by any

brand of personal computer and lets the bank tap into the CompuServe customer base of 95,000 computer users.

In addition to systems designed to work with personal computers, many banks are offering home banking over North American Presentation Level Protocol Syntax (NAPLPS) videotex services. "Telebanking packagers" such as Video Financial Services, a four-bank consortium, act as middlemen, connecting banks that want to offer videotex banking with videotex networks. While current videotex services do not support home computers for banking, in the near future home computers with NAPLPS decoders should be able to use these facilities.

Despite all the publicity home banking has been getting, it is still an idea whose time has not quite arrived. Of the some 45,000 depository institutions (including banks, savings and loans, and credit unions) in the United States, only about 50 are now offering home banking services or experimenting with pilot projects.

Part of the reason not all financial institutions are jumping on the home banking bandwagon is that the market base is still relatively small. By the end of this year, according to the Yankee Group, a Boston research firm, there will be only about 600,000 microcomputers with modems in the United States.

In addition to doubts about the size of the marketplace, the question of consumer acceptance over the short run is still an open one. "I don't see people running out to sign up," says Yankee Group senior analyst Anne R. Lovett. Although the group predicts that by the end of 1985 falling modem prices will drive the number of modem-equipped personal computers up to 4.5 million, the research firm expects that only a little over 5 percent of the households with the capability to perform home banking will actually use the service.

The reasons for this, according to Lovett, have to do with customers' concerns about security, with the traditionally poor job banks do of marketing, and with general consumer resistance to new products. Most forecasters agree that home banking will not be a truly mass market phenomenon until the end of this decade.

Part customer service, part cost cutter, part hi-tech hype— whether or not today's home banking systems are worth their price probably depends on how much banking you do. BofA's HomeBanking costs $8 per month in addition to other monthly service charges. Although the price is $2 to $4 cheaper than some of the other services around the country, you could pay for a lot of stamps with $96 a year.

Although many customers may think it odd to have to pay for a service that saves the bank money, as Stephen Yotter, vice president for Retail Marketing, pointed out, "It [home banking] may be cheaper, but it's still not free for banks to supply." Yotter estimates BofA spent $4 million developing HomeBanking. Rather than being offered free home banking, in the near future customers are more likely to start seeing banks charging for branch visits.

When that day comes, and as home computers become more common, cash transactions become less common, and banks offer more services through their systems, a visit to the bank may well become a rare occurrence instead of a weekly chore. But until then, speaking personally, see you in line.

Joe Matazzoni is a Copy Editor for PC World *and is currently editing a book for PC World Books.*

Garbage in, garbage out.

Since computers were invented, the conventional wisdom has held that input that doesn't conform to the computer's highly structured needs will result in unintelligible output.

Which meant that you had to learn to think like a computer in order to use one.

Trouble is, the world isn't organized to suit computers. Data is never collected in the way you want to retrieve it. That's why traditional, rigidly structured databases often wind up hindering your work more than they help.

DayFlo offers a new approach to database management needs. It's a Fluid Format™ Personal Information Manager. Which means it approaches the world the same way you do: taking in unorganized data and organizing it into meaningful information.

DayFlo is a powerful tool for your IBM® PC XT. It accepts both structured and unstructured data. When you want to extract information, just type in the key words you're looking for. Instantly, DayFlo organizes the data according to your criteria. And reorganizes it according to new criteria whenever you wish.

Information from other programs, spreadsheets, word processing or accounting files, virtually any data in the system can be assimilated by DayFlo. And once the information is at hand, DayFlo lets you manipulate it at will to produce letters, memos, reports and much more. You can work at your computer the same way you work at your desk, even switching quickly from task to task, without ever losing your place.

DayFlo's concept is as simple as it is revolutionary. You no longer have to think for the computer. Instead, it can help you think better for yourself. Which leads, inevitably, to a brand-new version of computing's fundamental law.

DAYFLO
Software™

Garbage in. Information out.

WHY DEC AND INTEL CHOSE THE MARK WILLIAMS C-COMPILER.

DEC and INTEL wanted the best C technology available, with excellent code density, supporting the full C language and their specific operating environments— all at a competitive price.

They found it all at Mark Williams.

WHY YOU SHOULD CHOOSE THE MARK WILLIAMS C-COMPILER.

Our C-compiler supports the dominant 16-bit micro-computers—68000, PDP-11,* Z8000, 8086—with a proven reliable, high-technology product. We are shipping versions of C for a large number of environments including CP/M* and PC DOS.* Both cross and native compilers are available.
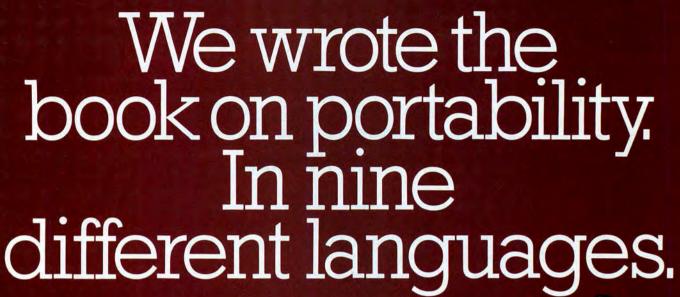
Call us for the distributor nearest you. OEM's should contact us directly about their specific requirements.
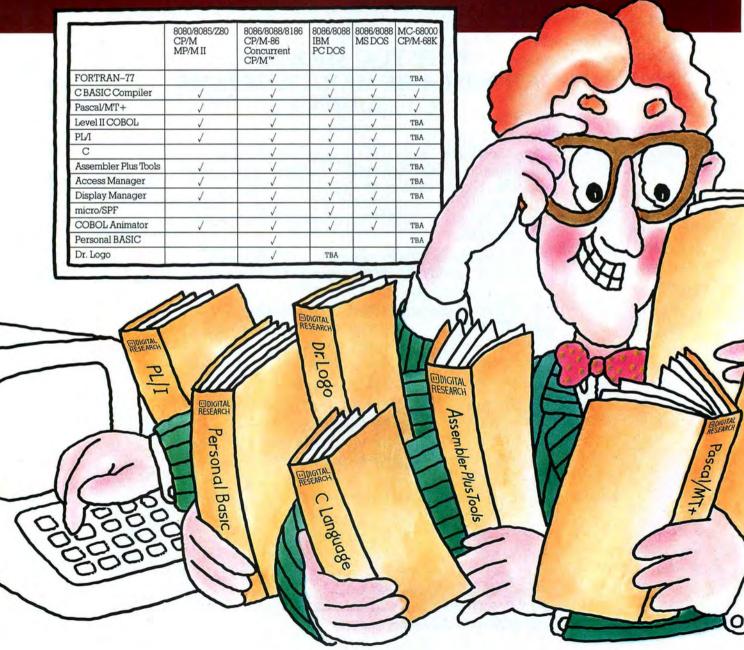
Mark Williams Company
1430 West Wrightwood, Chicago, Illinois 60614,
312/472-6659

Mark
Williams
Company

*PDP-11 is a trademark of Digital Equipment Corporation.
*CP/M is a trademark of Digital Research Corporation.
*PC-DOS is a trademark of IBM.

We wrote the book on portability. In nine different languages.

	8080/8085/Z80 CP/M MP/M II	8086/8088/8186 CP/M-86 Concurrent CP/M™	8086/8088 IBM PC DOS	8086/8088 MS DOS	MC-68000 CP/M-68K
FORTRAN–77		√	√	√	TBA
C BASIC Compiler	√	√	√	√	√
Pascal/MT+	√	√	√	√	√
Level II COBOL	√	√	√	√	TBA
PL/I	√	√	√	√	TBA
C		√	√	√	√
Assembler Plus Tools	√	√	√	√	TBA
Access Manager	√	√	√	√	TBA
Display Manager	√	√	√	√	TBA
micro/SPF		√	√	√	
COBOL Animator	√	√	√	√	TBA
Personal BASIC		√			TBA
Dr. Logo		√	TBA		

DIGITAL RESEARCH

PL/I

Personal Basic

Dr. Logo

C Language

Assembler Plus Tools

Pascal/MT+

To every software developer who'd written off portability as an impossible dream, Digital Research humbly announces a few monumental breakthroughs.

We not only offer languages that are portable from 8 to 16 to the 32-bit chips of the future, they're portable across all popular operating systems, too. What's more, we supply the broadest range of quality languages and development tools available today. And will tomorrow.

So rest assured. Whether you design applications at a major corporation, plan to become a major corporation or just qualify as a hobbyist, you only have to write it once.

Simply pick the Digital Research language that's right for you. From Personal BASIC™ to Digital Research FORTRAN-77.™ The newest member of our remarkable family.

To complement languages, we offer a complete workshop of development tools. Our Display Manager™ and Access Manager™ simplify the design of screen displays and data bases. So you spend less time and effort.

If you write in COBOL, our Animator™ source level debugger will get your software running in record time.

And for programmers skilled with IBM mainframe SPF, we offer micro/SPF.™ An editor that helps turn your invaluable experience into valuable new software applications.

At Digital Research, we work as hard for you after the sale as we do to get the sale. With backup like quality documentation, software updates and a phone line to our technical support team.

With so much productivity and service to draw on, it's small wonder IBM chose our languages for its IBM®PC, XT and the new IBM 3270/PC.
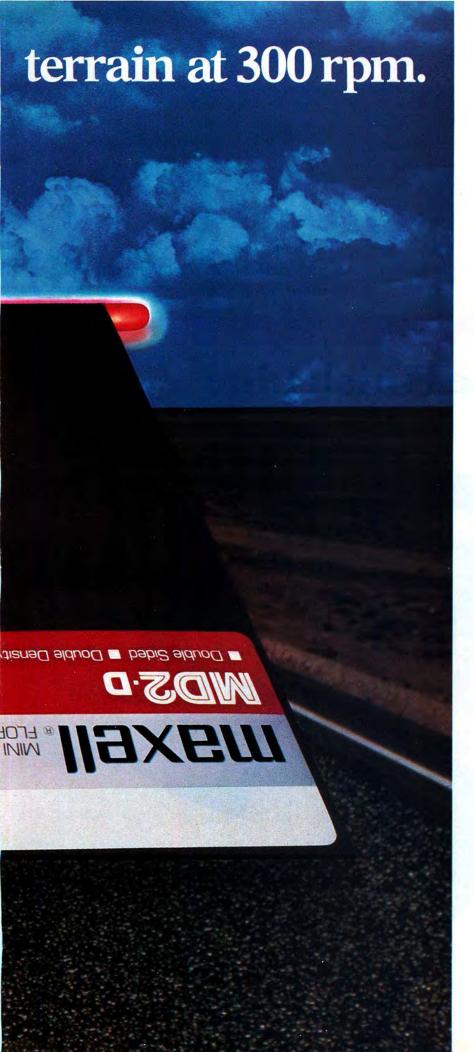
For more information, call your IBM representative.

▥ DIGITAL RESEARCH®
We make computers work.℠

Or, for the Digital Research retailer nearest you, call 800-227-1617, ext. 400. In California, 800-772-3545, ext. 400.

Circle 30 on reader service card

terrain at 300 rpm.

Only one disk guarantees safe passage through the torrid zone of drive heat.

Maxell.

A lifetime warranty. And manufacturing standards that make it almost unnecessary. Today and in the long run, you'll be glad you chose Maxell.

Consider this: Every time you take your disk for a little spin, you expose it to hazardous drive conditions. Temperature build-up can sidetrack data. Worse, take it to the point of no return. Maxell's unique jacket construction defies heat of 140°F. And keeps your information on track.

And Maxell runs clean. A unique process impregnates lubricants throughout the oxide layer. Extending media and head life. How good is Gold? Maxell's the disk that many drive manufacturers trust to put new equipment through its paces. It's that bug-free.

So you can drive a bargain. But in accelerated tests, Maxell floppys lead the industry in error-free performance and durability. Proving that if you can't stand the heat you don't stand a chance.

maxell®
IT'S WORTH IT.

Two books race to the bookstores, one clearly better than the other, but the best is yet to come.

First to the Finish Line

Evelyn Spire

The first two PCjr books are already on bookstore shelves. The titles are nearly identical: *Introducing the IBM PCjr* by Andrew M. Seybold and *Introducing IBM PCjr* by Douglas Ford Cobb and Chris DeVoney. Both books were published in Indianapolis, Indiana, and both appear to have been rushed into print without the benefit of hands-on experience with the machine—just so they could be first.

As similar as the books are, the Cobb-DeVoney collaboration stands out as the better book. The information is targeted at beginning PCjr users. The authors dare to make judgments and give advice, whereas Seybold is more hesitant. Both books include predictions about applications for the machine, but Cobb and DeVoney offer more predictions and delve deeper. First isn't necessarily best, but bolder is certainly better.

On the Level

The biggest problem with writing introductory books is to appraise the readers' level of expertise and to adhere to that level throughout the book. Both books skip around, jumping from beginning to advanced levels. They both start out slowly, in an elementary fashion, and gain a momentum that leaves readers in the dust once talk of communications and languages begins. Finding the right level is difficult, because readers have diverse backgrounds and different levels of education and computer experience.

My intelligence was insulted by Cobb and DeVoney's introduction. It presents a hypothetical family, the Roberts, who have every imaginable need for PCjr. You might call them the ideal PCjr family, but they don't come off as real people. The introduction reeks of marketing hype, and the writing includes condescending, short, choppy sentences transported directly from a first-grade, Dick-and-Jane-variety reader.

The Roberts supposedly bought PCjr because it met all their needs and was produced by a leading computer company: "Sure, PCjr was more expensive than other home computers, but the Roberts believed it was worth the price." Such reasoning may be accurate, but it rings false in context.

The Roberts haven't heard about women's liberation. Although Molly, the mother, has a full-time job, it is she alone who plans the family's meals on disk, and she tries to convince her husband to buy her *Personal Communications Manager* so she can send messages to her office. (Where's your own money, Molly, and how about a modem to go with that program?)

Fifteen-year-old David uses *pfs:File* to keep track of both his paper route and his record collection. Twelve-year-old Rebecca is a programmer, and eight-year-old Barney plays games. With five family members needing the computer so much, you wonder how they get any work done or how one computer can really be enough. The authors would have done better to omit the introduction and just commence with an otherwise well-written book. (In fact, I wonder, since the introduction is so different from the rest of the book, if it wasn't tagged on by the publisher.)

The book progresses quickly from elementary to advanced concepts in only 36 pages. Chapter 5, "Languages," is threatening to a novice, but it is followed by several very readable chapters cover-

ing applications programs. If I had been the editor of the book, I would have placed a discussion of languages after coverage of applications programs, which PCjr users are more likely to understand. The difficult material should be presented later in the book, after readers have had a chance to grasp simpler concepts.

Seybold has similar problems adhering to a specific reader level. For the most part, his book seems targeted at a beginner's level, but here, too, the level is inconsistent. Chapter 5, "It's Very Basic," introduces advanced concepts about BASIC, graphics, sound, and communications (including hexadecimal and octal values, integers, and event-trapping) that are not clearly explained. The next chapter, on PC-DOS, returns to the elementary level, explaining DOS with the usual traffic cop analogy.

Although BASIC concepts are important, Seybold's book does not give readers the hands-on, step-by-step experience they need to start programming. He says, "When ending lines in a program, the AUTO line-numbering feature should not be used, since it could create erroneous lines." That advice would be useful in some other context, but readers are nowhere near ending lines— they haven't even begun to write any. Seybold suggests that readers not be intimidated and that they just write their own programs ("Just turn on the system and start"). Unfortunately, programming is not that easy.

The Details
Cobb and DeVoney explain facts in a more precise manner than Seybold. Whereas Seybold leaves the reader thinking that BASIC

keeps programmers at a slight disadvantage because it is an interpreted language, Cobb and DeVoney rave about it. "When a program is perfected, it is compiled and it gains the advantages of all compiler-based languages: a significant increase in speed and protection for the program's source code. The BASIC Compiler gives the programmer the best of both interpreted and compiled programming worlds."

From Seybold's book I learned that PCjr lacks an 8087 coprocessor for math functions, but Cobb and DeVoney gave me many new facts to digest. I learned the following about PCjr from their book:

● The external transformer keeps the unit's weight down by eliminating the need for a cooling fan.

● The Compact Printer prints unidirectionally at about 25 cps. Printing a standard letter on it takes almost 2 minutes.

● PCjr has better sound capability than the PC or the XT. PCjr's sound circuits can play three notes at a time; the PC and the XT can play only two. And PCjr can be hooked up to a normal stereo system (although the sound produced will not be in stereo).

● IBM's full-year warranty on PCjr includes a "swap-only" repair policy: "The dealer will simply swap a new part for the broken part while you wait."

Outstanding Features
What really sets the books apart is the excellent way that Cobb and DeVoney address newcomers' needs. Seybold is content to give

readers lists of the software that can and cannot run on PCjr, but Cobb and DeVoney devote three chapters to full explanations of each program, complete with prices and requirements. Prospective PCjr buyers will want to know not only what software runs on the machine but also what each program does and doesn't do and which PCjr model is necessary to run the program. For example, "PCjr must have Cartridge BASIC to run *Juggles' Butterfly*, as well as most of the other educational games." And arcade-style games require a disk drive and 128K—the enhanced PCjr model.

I was glad to learn about some of the newly introduced programs for PCjr. After reading Cobb and DeVoney's discussion of *Home-Word*, the new word processor, I couldn't wait to get my hands on the program to see what menus comprising pictures, or "icons," would be like to use (see "Home Is Where Your Word Processor Is" in this issue of *PCjr World*). To save a document or recover a previously saved file, you point the cursor at a picture of a filing cabinet. Joysticks can also be used to select icons, and the program displays a miniature representation of the document's format in the lower right corner of the screen. This kind of specific information about the individual programs is absent from Seybold's book.

Home Computers Compared
Another outstanding feature of Cobb and DeVoney's book is a chapter dedicated to comparing the home computers presently on

the market. Recommendations are made on the basis of price, software, memory, support, expandability, availability, and users' specific needs. The authors put PCjr right up at the top of their list, but they make other recommendations for users who want to purchase a less expensive machine.

Because PCjr can run games as well as handle home management, the authors predict that it will threaten Atari's hold on the entertainment market. "PCjr will have the edge in the area of personal management software" because it is compatible with the PC. The authors make some bold appraisals about what's on the market, such as "Betting on future software for Adam may be a long shot."

Cobb and DeVoney's book compares the PC and PCjr as home computers and competitors. They acknowledge that PCjr has limitations as a business machine because "PCjr's disk storage is inadequate for accounting and heavy-duty data management." As always, the choice depends on a person's needs: "If you are primarily in the market for an entertainment system, PCjr will probably be the best choice." PCjr cannot be expanded as much as the PC, but according to the authors, "If you don't need expandability, it simply doesn't make sense to spend the money [on a PC]." Readers will be interested in this discussion of the differences

between the two computers, because "many consumers will be confused about which machine is better for them." And, of course, "the key to deciding between the two computers is a careful evaluation of your own needs."

Cobb and DeVoney design some typical systems and show that "in all likelihood, the PCjr you take

Cobb and DeVoney predict that PCjr will threaten Atari's hold on the entertainment market.

home will cost more than $669 or $1269." They explain that many of the items that IBM labels as options are actually essential to the proper use of the computer. The authors do readers a service by pointing out the costs of all the options so the readers can know exactly how much money they will have to spend. This is valuable purchasing information that addresses concerns that prospective buyers have.

Advice
Both books offer concrete, helpful advice to readers. Seybold recommends an amplifier and a speaker for the IBM color monitor and even tells readers who the manufacturers are and offers prices. He stresses the importance of considering system memory and the limitations of one disk drive when readers are choosing programs. Seybold cautions readers to make sure that any software purchased

is labeled "compatible with DOS 2.10 and PCjr" on its jacket, and to buy software for the PCjr model that they have.

Cobb and DeVoney address the problem of using PCjr with a 40-column display to do word processing. With this narrow display you cannot see a document on the screen the way it will look on paper, because a line of text printed on a standard sheet of typing paper is from 60 to 80 characters wide. The authors advise readers to test a monitor in the store before buying one.

Editing
In trying to make theirs the first books out for PCjr, the publishers of both books cut some corners in editing. The books were both written in November 1983 and produced and distributed in December 1983, a short time span for any book production. Haste is evident in both. The worst elements in each book are photos and figures. The illustrations seem to have been included for purposes of design—not to provide useful graphics for the reader. Almost every photo in Cobb and DeVoney's book, published by Que, is credited to IBM or Intel, which makes me wonder if the authors had any hands-on experience with the machine. Que simply published photos from IBM's files and didn't take the time to create pictures especially for the book.

Neither book had a close-up of PCjr's keyboard, which differs from the PC's. Seybold's book has

five keyboard shots, but none is close enough to enable the reader to see the labels. The text sends the reader to figures that lack detail.

In both books the photos of printers are unrevealing. Printers just don't vary that much externally. Readers would be more interested in and learn more from examples of output from the various printers; they could then fully understand the differences between dot matrix and letter quality type. If I were considering purchasing a printer, I would want to see the type quality as well as the facts on speed and cost.

What bothered me most (because I am a writer and an editor) was the number of typographical errors and style inconsistencies in the books. Seybold's book, published by Howard W. Sams, has at least 21 typos, and Que's has at least 18. (These errors are the fault of the publishers, not the authors.) There is no excuse for so many typos. Interesting to me was a statement by Cobb and DeVoney: "At Que we use spelling dictionaries to proofread our manuscripts, thus saving us hours of editing time." Perhaps electronic

proofreading saves time and money, but it obviously doesn't eliminate typographical errors or style inconsistencies such as capitalization. I, personally, have never found an adequate replacement for human proofreading.

Seybold's writing is more awkward and convoluted than Cobb and DeVoney's. Poor editing in Seybold's book appears in the

I have never found an adequate replacement for human proofreading.

form of typos, poor syntax, misuse of words and punctuation, and even sentences that run together without coordinate conjunctions.

When Cobb and DeVoney say "the authors," you know who they mean, but when they use "this author," you are not sure which one. The lack of clarity should have been corrected in editing.

Seybold's glossary was a good idea, but he selected only certain words and omitted some of the words I really wanted defined. The book includes a good table entitled "PCjr Feature Comparison," but it includes an asterisk and no legend to explain what the asterisk means.

Of the two indexes, Que's is better, though neither is excellent. Sams's index has one-page references for general topics that you

know appear throughout the book but cannot be sure where. Both indexes include words from the text but don't address related concepts that the reader may want to look up.

I recommend Cobb and DeVoney's book over Seybold's. Considering that Seybold's book has 160 pages and costs $12.95, and that Cobb and DeVoney's has 240 pages and costs $9.95, you will get more for your money by going with Que. But if you are not in a hurry, I'm sure that better books are on the horizon, ones that will include hands-on tips gleaned from actually using the machine.

Evelyn Spire is a freelance writer and editor living in San Francisco. She recently copyedited the first book in the PC World Library.

Sempé

© Sperry Corporation, 1983

**SPERRY PERSONAL COMPUTER
SPECIFICATIONS**

OPERATING
SYSTEM
MS DOS Version
1.25 or 2.0 with
G.W.
BASIC
MICRO-
PROCESSOR
High-Speed 16-bit
8088
DISPLAY
SCREENS
High Definition
monochrome
display.
High resolution
color display.
IBM compatible
graphics.
COMMUNI-
CATIONS
Built-in
Asynchronous

KEYBOARD
84 keys, 6 ft. cord
AUXILIARY
MEMORY
Up to two internal
5¼" diskettes
10MB internal
fixed disk when
configured with
single diskette.
USER MEMORY
Standard 128K
bytes, expandable
to 640K
DIAGNOSTICS
Power-on self test
CLOCK
Time-of-day
with battery
back-up

It is no longer enough to be IBM compatible. Not even for IBM.

It was the personal computer circus.

And it had gone on too long.

The crowd grew restless as each new act continued to perform varying degrees of IBM compatibility.

Suddenly, the crowd gasped. It was the unexpected finale—the arrival of Sperry, with a performance no one could have imagined possible.

Ladies and gentlemen, it was the Sperry PC. It ran IBM compatible software.

But that wasn't the show stopper.

Because it soon became quite clear the Sperry PC didn't just *run* the IBM programs, it ran them *better*.

Better because it ran them faster—up to 50% faster.

It ran them with breathtaking

graphics, far more dramatic than the IBM PC could provide.

And it ran them from a keyboard that drew roars of approval, for it was not only easier to operate, but far more comfortable than IBM's.

And as the crowd cried out for more, that's just what Sperry gave them: the ability to plug right into a company's main computer, whether that system was IBM *or* Sperry. Or both.

As the crowd sat stunned by this final flourish, Sperry left all with a most provocative question. Was it possible that the Sperry PC could do all of this and yet cost less?

Again, the crowd gasped.

Could it be?

Come see for yourself. Hands-on, side-by-side. Call 800-547-8362, toll-free. Or write us. Sperry Corporation, Computer Systems, Department 100, P.O. Box 500, Blue Bell, PA 19424.

⯎ SPERRY

The Sperry PC.
What the personal computer should have been in the first place.

Circle 668 on reader service card

How to make your IBM run 2½ to 4 times faster.

Just plug in the Accelerator PC™ and watch your IBM* PC or XT take off.

Yes, Titan's done it again. The innovators who speeded up the Apple® now bring similar performance advantages to IBM users. Imagine running Lotus® 1-2-3™, VisiCalc®, or Multiplan™ without long delays. With the Titan Accelerator PC, your IBM PC or XT can run all your software faster. Data bases, word processors, spreadsheets, graphics, and much more will speed up by a factor of 2½ to 4 (average around 3).

The Accelerator PC has a 10 MHz 8086 processor and 128K of high-speed RAM, expandable to 640K with the memory upgrade piggyback option. It's compatible with your present hardware and software, and designed to be ready for future enhancements.

Get your work done in a third of the usual time. See your computer dealer today or contact: Titan Technologies, Inc., P.O. Box 8050, Ann Arbor, MI 48107; Telephone (313) 662-8542.

Titan
TECHNOLOGIES, INC.
FORMERLY SATURN SYSTEMS OF MICHIGAN

Sales and Marketing by The MARKETING RESOURCE GROUP, Fountain Valley, CA.

IBM is a registered trademark of International Business Machines Corporation. Lotus and 1-2-3 are trademarks of Lotus Development Corporation. Multiplan is a trademark of Microsoft Corporation. Apple is a registered trademark of Apple Computer Inc. VisiCalc is a registered trademark of VisiCorp, Inc. Accelerator PC is a trademark of Titan Technologies, Inc.

Circle 628 on reader service card

122

Now you can reach anyone with your small computer.

At last, there's a practical way to enjoy the benefits of "electronic mail." It's Western Union EasyLink℠ service.

With it you can literally reach any business or any person in writing, almost anywhere on earth. With EasyLink service, you can link your personal computer or word processor to almost any other, to the global Telex network and to anyone, nearly anywhere, with an array of rapid delivery Western Union message services.

EasyLink can increase your equipment's usefulness, improve office productivity and dramatically cut message delivery time.
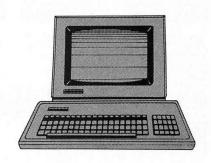
Links to the WorldWide Telex network.

EasyLink subscribers have a direct link to Western Union's WorldWide Telex. Through this service, you can reach any of the 1.5 million businesses who are Telex subscribers in 154 countries.

Your message arrives in just minutes, in writing, for a fraction of the cost of a long-distance phone call. And you will get your own number to receive messages from anyone on the worldwide network.

Available now.

EasyLink service is now available. Let us demonstrate how easy it is to send and receive messages from your communicating desktop terminals. Call us toll-free at 800-336-3797. Ext. 418.* Or contact Clyde Meador, Western Union, One Lake Street, Upper Saddle River, New Jersey 07458.

Western Union EasyLink service.

The easy way to link your computer to the world.

*In Virginia, call (703) 448-8877, ext. 418.

Dow Jones means business._{SM}

The leading name in business information is now the leading name in business software.

The Wall Street Journal. Barron's. Dow Jones News/Retrieval.® Dow Jones has set the standard for business information for over 100 years. Now Dow Jones introduces a full range of business and financial software for personal computers. Many of these programs manage information from Dow Jones News/Retrieval, the nation's leading online news and information service. All programs entitle you to a News/Retrieval password.* All set standards for business and financial software.

Telephone and modem required for News/Retrieval.

Accounting

New from Dow Jones, the accounting series is designed to meet all the accounting needs of small businesses. It offers power and flexibility, yet is easy to learn and use. When you purchase Dow Jones General Ledger, Accounts Receivable or Accounts Payable, you are eligible for a free training seminar designed by Arthur Young, one of the nation's foremost accounting firms.* This seminar covers computerized accounting and bookkeeping principles.

Dow Jones General Ledger™ is the heart of the accounting series. Using *Generally Accepted Accounting Principles,* the General Ledger allows you to define the structure of your chart of accounts and establish account ranges for assets, liabilities, capital, income and expenses. It offers double-entry bookkeeping that's

Journal Entry, Dow Jones General Ledger

never out of balance, and allows you to post entries "in pencil" for easy error checking and correction. When you are satisfied, you can close your books and the General Ledger posts your entries "in ink" and freezes a full audit trail. When you print financial reports, the General Ledger formats them to reflect the structure of your chart of accounts.

Dow Jones Accounts Receivable™ and **Dow Jones Accounts Payable™** complete the basic accounting system. Programs for Sales Order Entry, Purchase Order Entry, Management Analysis and Inventory will be available early in 1985.

By Trademark Software, Inc. and Dow Jones & Company, Inc.
Available for the IBM® XT.
Seminars and product may not be available in all areas.

Investment

Dow Jones investment software was introduced in 1982 and rapidly became the leader in the field. These best-selling programs, expressly designed for investors, money managers and business planners, allow you to analyze and manage your investments using financial information from Dow Jones News/Retrieval. You also have easy access to business news and headlines, economic updates and forecasts.

Dow Jones Market Analyzer™ is an integrated technical analysis and communications program that can increase the effectiveness of your

investment decisions. The Market Analyzer collects and stores historical quotes from Dow Jones News/Retrieval, and automatically updates daily data on stocks, bonds, mutual funds and options. It then calculates and constructs price and volume charts, trend lines, moving averages, support/resistance lines and many other charts.

By RTR Software, Inc. and Dow Jones & Company, Inc.
Available for the IBM® PC, IBM XT, TI Professional and Apple® II computers.

Dow Jones Market Manager™ provides you with a powerful investment information system for maintaining single or multiple portfolios.

Dow Jones Sales Director™ automatically consolidates information from the other two programs in the sales system, performs analysis and produces management reports that can then be distributed throughout the organization. Scheduling, word processing, graphics and spreadsheet capabilities are also included.

(Available summer/fall 1984) By P/E Software, Inc. and Dow Jones & Company, Inc. Available for the IBM PC and IBM XT.

Home Finance

Dow Jones software for the home helps you organize and control your personal finances. The products in this series keep track of how your money is earned, spent and invested. In addition, your Dow Jones News/Retrieval password brings you and your family news and information, encyclopedia articles, sports, weather reports and movie reviews.

Dow Jones Home Budget™ helps you plan and control your financial situation. It keeps track of your income, expenses, assets and liabilities to help you in financial planning, budgeting and tax preparation. You can program the Home Budget to flag tax-deductible expenses and automatically account for recurring transactions such as mortgage payments and telephone bills. The Dow Jones Home Budget allows

List of Accounts, Dow Jones Home Budget

you to produce reports about specific accounts and transactions, and provides you with a net worth statement that gives you a clear picture of your personal finances.

By Decision Support Software, Inc. and Dow Jones & Company, Inc. Available for the IBM PC, and Apple II computers.
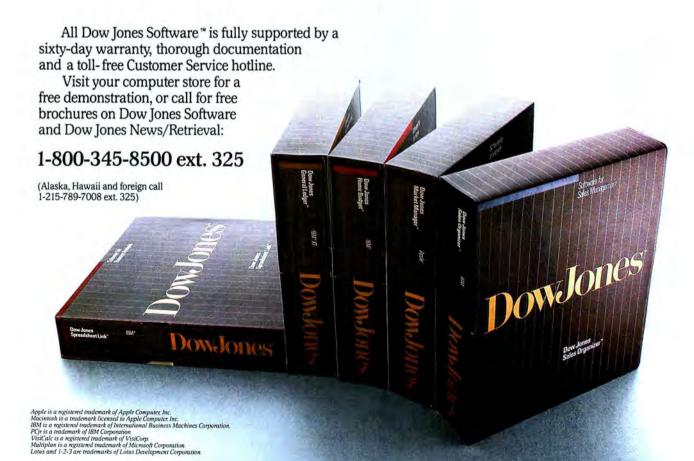
Dow Jones Investment Evaluator™ is a personalized system for managing your portfolio. It maintains one or more portfolios of up to 50 securities each, and automatically updates your stocks with the latest quotes from Dow Jones News/Retrieval. The Investment Evaluator displays or prints reports showing purchase value, current value and gains and losses, so you can evaluate your position at a glance.

By Dow Jones & Company, Inc. Available for the IBM PC and TI Professional.

All Dow Jones Software™ is fully supported by a sixty-day warranty, thorough documentation and a toll-free Customer Service hotline.

Visit your computer store for a free demonstration, or call for free brochures on Dow Jones Software and Dow Jones News/Retrieval:

1-800-345-8500 ext. 325

(Alaska, Hawaii and foreign call
1-215-789-7008 ext. 325)

The Market Manager automatically values your existing position in the stock market. Its tax lot accounting system records all your securities transactions and matches your sell transactions to existing positions in the market, to minimize tax liability. You can also generate reports for individual accounts and an overall securities holdings report.
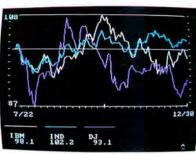
By TELEWARE, Inc. and Dow Jones & Company, Inc.
Available for the IBM PC and Apple II and Apple III computers.

Dow Jones Market Microscope™ is a fundamental analysis program for money managers, business planners and investors. It allows you to produce reports that screen industries and companies using Media General and Corporate Earnings Estimator™ financial indicators. A Price Alert routine tells you which stocks have reached your critical levels for buying and selling.

By National Softworks and Dow Jones & Company, Inc. Available for the IBM PC, TI Professional and Apple II computers.

Comparison Chart, Dow Jones Market Analyzer

Communications

Dow Jones communications software is designed to meet the business analysis needs of executives and investors. These programs allow you to collect, store, and organize timely information from Dow Jones News/Retrieval. You have access to financial information on companies and industries, current and historical quotes, and exclusive news from The Wall Street Journal, Barron's and the Dow Jones News Service.

Main Menu, Dow Jones Spreadsheet Link

Dow Jones Spreadsheet Link™ is an efficient and accurate way to collect and transfer up-to-date financial information from Dow Jones News/Retrieval to Lotus™ 1-2-3,™ VisiCalc® or Multiplan® spreadsheets. Spreadsheet Link saves you time by eliminating manual data entry, and requires a minimum of memory. Now you have immediate access to the information you need, and can enter it into your customized template with just a few keystrokes.

By Solutions, Inc. and Dow Jones & Company, Inc. Available for the IBM PC, IBM XT, IBM® PCjr,™ IBM® PC 3270, Apple II systems and Apple® Macintosh.™

Dow Jones News Link™ allows you to follow and analyze the latest business news—easily and quickly. You can retrieve text and statistics from News/Retrieval and create your own personal data base. Then, offline, it is easy to read, edit, index and store information. With News Link, the summaries and reports you produce can be transmitted to other locations using computers and modems. An expanded version of News Link includes additional communications features.

(Available fall 1984) By Gaia Communications and Dow Jones & Company, Inc. Available for the IBM PC, IBM XT and IBM PCjr.

Sales Management

Dow Jones sales management software enables sales professionals and their organizations to sell more effectively. These powerful new programs can be used as an integrated system. They produce reports that give you information about all phases of your sales cycle. All three programs feature in-depth tutorials and easy-to-follow menus.

Dow Jones Sales Organizer™ is designed for sales representatives and managers. It tracks prospects throughout the customer relationship, and automates scheduling. The Sales Organizer produces budget, forecast, commission, lead capture rate, expense and call reports, along with quotation, order and product summaries. It has graphics and spreadsheet capabilities that allow you to analyze data the way you want, and includes word processing and order tracking.

Dow Jones Prospect Organizer™ enables sales support staff to track prospects from initial lead through assignment to sales territories. The Prospect Organizer allows you to create a data base of updated prospect information and to analyze media and promotion effectiveness. You can generate reports that show the geographic distribution and current status of your prospects. Word processing capabilities simplify correspondence, telemarketing, survey and direct mail functions.

Call Reporting, Dow Jones Sales Organizer

Dow Jones News/Retrieval means information.

Included in any Dow Jones Software program, your Dow Jones News/Retrieval password brings you a world of electronic information on your personal computer (via telephone and modem). There is only one Dow Jones, and Dow Jones News/Retrieval provides you with exclusive news and information from The Wall Street Journal and Barron's, stock quotes direct from the floor of the exchange, and a wide range of information and services for you, your business and your family. Dow Jones Investment and Communications software is specifically designed for easy access and management of information from News/Retrieval. Here are some of News/Retrieval's data bases:

Dow Jones Business and Economic News
- News from The Wall Street Journal, Barron's and the Dow Jones News Service
- Online headlines and summaries of major stories
- Text search of Dow Jones News
- Weekly economic update
- Full text of The Wall Street Journal

Dow Jones Quotes™
- Current quotes 15 minutes from the floor
- Historical quotes covering a full year
- Historical Dow Jones Averages™

Financial and Investment Services
- Earnings forecasts from Corporate Earnings Estimator™
- DISCLOSURE II—SEC filings and company profiles
- Detailed corporate financial information from Media General Financial Services
- Economic and foreign exchange survey
- Forbes rankings of U.S. corporations and industries
- Airline schedules and fares
- Merrill Lynch Research Service

General News and Information
- Academic American Encyclopedia
- Foreign and national news
- Sports
- Movie reviews
- Wall Street Week Online™ transcripts
- Comp-U-Store™ electronic shopping service

MCI Mail Service and Free Customer Newsletter

129

89.6% chose ScratchPad Plus over Multiplan, Visicalc IV and Supercalc 2.

In a comparison survey, including both computer users and non-computer users, ScratchPad Plus was the spreadsheet of choice.

ScratchPad Plus 89.6%

All Others 10.4%

The group was asked to rate the four spreadsheets on a variety of features, including:

screen display
data entry
cursor movement
multiple window splitting

virtual memory
quick command summaries
long strings
cell locations
and many other features

89.6% chose ScratchPad Plus.

Why was ScratchPad Plus chosen by such a wide margin? In some cases it was found ScratchPad Plus' single hand entry was easier to use. Or they preferred the implementation of unlimited window splitting. Or they thought virtual memory, a unique ScratchPad Plus feature, was important to them.

But don't take our word for it. Try the ScratchPad Plus comparison for yourself. Go to your nearest dealer and get some hands-on experience. We want you to see for yourself why so many people prefer ScratchPad Plus.

Retail Price: $195.00

For a complete copy of our survey results, write SuperSoft, Survey Results, P.O. Box 1628, Champaign, IL 61820.

Available for the IBM Personal Computer, NCR Decision Mate V, Texas Instruments Professional Computer, Rainbow 100, Wang Professional Computer, and other popular microcomputers using the MS DOS, CP/M-86, or CP/M-80 operating systems.

SuperSoft
FIRST IN SOFTWARE TECHNOLOGY
P.O. Box 1628 Champaign, IL 61820 (217) 359-2112 Telex 270365

Decision Mate V is a registered trademark of NCR Corporation

Texas Instruments Professional Computer is a registered trademark of Texas Instruments, Inc.

IBM Personal Computer is a registered trademark of International Business Machines, Inc.

Rainbow 100 is a registered trademark of Digital Equipment Corporation

Wang Professional Computer is a registered trademark of Wang Laboratories, Inc.

MS DOS and Multiplan are registered trademarks of Microsoft Corporation

Visicalc IV is a registered trademark of VisiCorp.

Supercalc 2 is a registered trademark of Sorcim Corp.

Japanese Distributor:
ASR Corporation International, TBL Building, 7th Floor, 1-19-9 Toranomon, Minato-Ku, Tokyo 105, Japan. Tel. (03)-5025550, Telex: 222-5650 ASRTYO J.

European Distributor:
SuperSoft International Ltd., 51 The Pantiles, Tunbridge Wells, Kent, England TN2 5TE. Tel. 0892-45433. Telex: 95441 Micro-G.

Circle 541 on reader service card

In Box Out Box

Larry Jordan

A new breed of specialized electronic mail software is becoming available on the PC that incorporates qualities of bulletin board systems, host software, standard communications programs, and local area networks. With features such as delayed delivery, mail forwarding, and automatic distribution, electronic mail software can turn your PC into an unattended in/out box.

As the twin goals of increased communications and improved personal productivity beckon, several technological solutions have appeared in the PC marketplace. On the immediate office level, local area networks are being implemented to share data, reduce paperwork, and avoid unnecessary phone calls and meetings. On a larger scale, public data bases, bulletin boards, and electronic mail services are increasingly being used through the telecommunications medium. On the intermediate level, however, a need has arisen for a closed network that combines the group interchange of a local area network with the ability to connect remote systems through telecommunications. Corporations, projects, groups, and clubs are often too widely spread out to be connected by a local area network, yet they require the accessibility and security that only a closed network can provide.

In response to this need several software houses have recently introduced electronic mail systems for the IBM PC family of personal computers, and several more packages are in the final development stages. Electronic mail software and the bulletin board software described in "Remote and Unattended" and "A Host of Hosts" (*PCW*, Vol. 2, No. 2) have many things in common, but
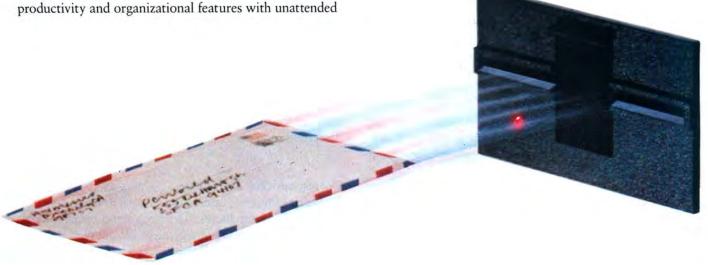
the electronic mail software now appearing on the market provides more powerful message delivery features aimed specifically at a closed modem network.

Bulletin board software is passive, whereas electronic mail software is active. Messages can be left on a bulletin board by the system operator or by outside callers, but messages cannot be forwarded; mail recipients have to call in to retrieve their mail. Electronic mail software combines the in box (receive) features of bulletin board software with the out box (send) features of standard communications programs. But this new form of software does much more, integrating a wide array of productivity and organizational features with unattended communications capabilities. The result is an unattended message center that can send and receive messages according to the operator's predetermined commands. The catch is that most of the software packages can only communicate with other systems running the same package.

Until recently, effective electronic mail communications have been possible only by logging on to electronic mail networks and information services (see "Elec-

tronically Yours" in this issue). Commercial store-and-forward systems such as The Source's SourceMail and CompuServe's EMAIL provide sophisticated versions of the passive bulletin board computer-based mail system (CBMS) concept. The advantage of calling in to a large-scale CBMS system is that specialized software is unnecessary. However, as with bulletin boards, the power of CBMS networks can only be tapped if message recipients call in to the service to retrieve their messages. Subscription and connection costs must also be considered.

The Electronic Mail Alternative

Owners of the IBM family of personal computers have another alternative. If owners of PCs, PC XTs, or enhanced PCjrs are willing to leave their computers unattended and dedicated to communications, electronic mail software can be used to send and receive messages, reports, and files without significant operator attendance. PCs can be set up in business offices as electronic intra-office memo systems to eliminate "telephone tag" and to reduce the frequency of face-to-face meetings. The resulting increase in office productivity could easily justify the cost of the computers and the dedicated telephone lines needed to establish such a system.

The major advantage of unattended electronic mail systems is the control it provides the local operator. An electronic mail system operating on a PC provides most of the capabilities of bulletin board software, plus control over the format and timing of information delivery. You can tell the electronic mail system when to deliver certain messages and files, and the system will automatically call the other systems at the specified times.

Table 1 lists the features included in the latest IBM PC-compatible electronic mail packages. The features are discussed based on electronic mail networks of limited size. (The available disk space of most IBM PCs will not support an active mail system for a large group.) Based on this assumption, each user is considered a system operator. There are no callers as there are in a bulletin board operation because the software and the hardware do the calling without operator attendance.

Before the electronic mail software can be used, the system must be configured for the specific application of the user. System customization allows the system operator to tailor certain features to meet specific group or organization needs. It also allows the operator to customize the system to match the available hardware. Items that

System Customization

System configuration

Correspondence Addressing

Assign mailboxes	Group addressing
Hidden distribution	Address maintenance

Send Mail

Send to mailbox	Send to list
Send to phone number	Blind copy
Reply requested	Express delivery
Registered mail	Delayed delivery
Outgoing mail	Automatic retry
Error checking	

Receive Mail

Mail scan	Mail search
Display mail	Print mail
Forward mail	Reply to mail
Delete log entry	Save mail file
Delete mail file	

File Maintenance

File editing	Choice of editor
File merge	

Miscellaneous

On-line help	Input prompting
Single-level password	Multilevel password
Calendar	Correspondence template
Data base update	Gateways

Table 1: Electronic mail software features

may be included in the system setup are the number of disk drives, type of printer, and type of monitor available. The customization may also include the passwords required for operator access; several levels of access may be needed for group use of the system.

Correspondence Addressing

The correspondence addressing subsystem of an electronic mail system allows users to establish "mailboxes" for persons or sites that are going to be sent mail frequently. The subsystem is usually menu driven and allows the user to perform several addressing functions without returning to the system master menu.

Mailbox assignment. The mailbox for another electronic mail system contains the addressee's name, the telephone number of the remote computer, and the data communications parameters used by the remote system.

The system operator can give the mailbox a name that can be displayed later in a summary list of all mailboxes. The mailbox must also contain the formal name of the addressee, which will be included automatically in message headers. Generally, a message header is similar to the heading of a memo, with separate lines for *To, From,* and *Subject.* The telephone number included in the mailbox must contain any special PBX and area codes required to get through the telephone system.

Communications parameters are also included in the correspondence addressing. The transmission rate must be included, and the parity and number of data and stop bits of the remote modem may also be required.

The mailbox feature usually provides the ability to display either all or selected mailboxes. Mailbox selection may be based on criteria such as location, company group, or project title. The selection feature may also allow users to use Boolean logic in the selection command. Boolean logic is an algebra of words that allows you to define various "and/or" sets. That is, you can select mailboxes for people who meet some criteria *and* some others. Alternatively, you could select those who met criterion A and criterion B but did *not* meet criterion C. Another Boolean selection might choose those who met criterion A *or* criterion B, but *not* C. Some systems allow you to print out a list of mailboxes. This feature may include a pagination option as well as selection criteria.

A well-designed electronic mail system should be able to make the addressing function transparent after a system operator has installed the system and created the mailbox list. The sender should be concerned only with the corporate account number or name of the recipient. The message should find its way to the proper receiving station no matter what combination of modems, PBXs, or local area networks is in use.

The software should be flexible in allowing address changes. Provision must be made for the common occurrence of an individual or a project moving from one mail station to another. The software and communications protocols necessary to track moves are not trivial and are a major factor in the cost of an electronic mail package.

Group addressing. This allows users to send mail to multiple mailboxes that fall into a single category. The software should allow the creation of many distribution lists, several of which may contain some of the same mailbox addresses. When you direct mail to one of the lists, the mail is automatically sent to each addressee on the list as if you had sent the mail to each addressee individually. Group addressing usually includes the ability to display all address lists categorized by group. The software may also include a Print List option.

Hidden distribution. This is a variation of the blind carbon copy distribution commonly used in business correspondence. Addressees on the hidden distribution list automatically receive a copy of specified corre-

> ## Mail is automatically sent to each addressee on a list as if you had sent the mail to each addressee individually.

spondence without the knowledge of the named recipient. Addressees do not see the hidden distribution list unless you specifically designate them as hidden distribution list recipients.

Address maintenance. An electronic mail system must allow the operator to perform periodic maintenance of mailbox address lists. The telephone numbers and operating parameters of remote systems sometimes change, and the operator must be able to modify the system mailbox data to match. Mailboxes may also have to be deleted or group addressing lists modified.

Sending Mail

A well-designed electronic mail system provides several Send Mail options. The electronic mail sending process controls the originator's intended distribution and disposition of the mail. Disposition options include reply requested, registered mail, express delivery, delayed delivery, and automatic retry.

Send to mailbox. This option allows the operator to send messages, files, or data to a particular mailbox. The system may require the operator to specify what type of information is being sent so that it can tell the addressee

what to expect when the transfer is made. For example, an addressee needs to know if a file contains binary data (such as a BASIC program) instead of readable ASCII text.

Send to list. This option allows you to send messages, files, or data to a group addressing list. The mail is then automatically sent to the mailboxes on the list. The system may require the operator to specify what type of information is being sent so that it can tell the addressees what to expect.

Send to phone number. This option allows the operator to send messages, files, or data to a telephone number that is not included on the mailbox list. The feature is useful for sending information to a number that is going to be called only once. It is a waste of time to set up a mailbox that will only receive one mail delivery.

Blind copy. The blind copy feature allows you to send a copy of a letter to an addressee without notifying other recipients. This is a temporary extension of the hidden distribution discussed earlier; it allows specific additional blind copies to be sent to people not on the hidden distribution list.

Reply requested. This feature, when invoked, automatically requests a reply from the addressee. It can also allow the operator to specify how much time the recipient has in which to respond.

Express delivery. When this feature is used, an addressee is called immediately after the piece of mail is posted. Some express delivery options provide an automatic hard-copy delivery if the addressee's system cannot be reached within a specified length of time. Automatic hard-copy delivery has to be handled by a third-party service company, such as MCI Mail or E-COM.

Registered mail. If mail is designated as registered, the system notifies you as to whether it was delivered properly. Some electronic mail software, such as IBM's *Personal Communications Manager,* always records whether addressees receive mail sent to them. Other packages provide the feature as a separate option.

Outgoing mail log. An electronic mail system must keep a record of all outgoing mail. The operator should be able to review the outgoing mail list to see the status of all mail that has been sent. The list should include the addressee's name and the subject of the correspondence. If the system records whether the addressee received mail properly, that information should also be displayed.

Delayed delivery. This feature allows you to designate the date and time you want the system to start attempting delivery of mail to a specific addressee. A system that offers this option must be able to obtain the correct date and time from the operator or from a system clock. Delayed mail delivery is one of the most important features of electronic mail packages in that it frees the

operator from being in attendance. One immediate benefit of timed mail delivery is that it allows mail to be sent late at night to take advantage of lower phone rates and to increase your chances of getting through to the remote computer. Previously prepared reports can be sent at a specified time to coincide with the time other material is received by the remote mailbox.

Automatic retry. Most PC-compatible electronic mail systems can retry a telephone number a set number of times if mail cannot be delivered on the first try. Many factors can keep a system from delivering mail. The addressee's computer may not be turned on or may not be in the mail mode. The remote computer may not be configured as expected. A bad telephone connection may also result in an aborted attempt to deliver the mail. The system also may not have enough free disk space for the mail being sent, or a file storage error may occur.

Some systems automatically retry a telephone number a given number of times at a set interval. Other systems allow the operator to designate the number of retries and the retry interval. The number of retries required to deliver mail should be automatically recorded

---

The blind copy feature allows you to send a copy of a letter to an addressee without notifying other recipients.

---

in the outgoing mail log for later review by the operator. If certain addressees could not be reached or were difficult to reach, the operator may want to change the retry parameters designated for that address.

Error checking. For systems that are used for financial data transfers, important legal correspondence, or binary file transfers, file transfer error detection and correction protocols are desirable features. Error checking can also be used to verify proper mail delivery for the originating system; mail deliveries that are not properly completed can be retried later.

Error checking is more important for electronic mail systems than for bulletin board systems because the former usually operate unattended on both ends of the communications link. Some electronic mail packages

don't even provide a direct chat mode that allows operators to type back and forth to discuss a file transfer: those communications have to be accomplished with a telephone call. Bulletin board systems, on the other hand, generally have an operator in attendance on the calling end of the communications link who can abort a file transfer if the systems fail to communicate properly.

Protocols such as the Microcom Networking Protocol used in the *Personal Communications Manager* are ideal for checking for errors in unattended file transfers between electronic mail systems (see "The Microcom Agreement," *PCW*, Vol. 2, No. 5). The protocols not only perform CRC-16 error detection and correction but also perform system integrity checks throughout a communication session. (See "Remote and Unattended," *PCW*, Vol. 2, No. 2, for an explanation of CRC-16.)

Receiving Mail

If the computer is dedicated for unattended operation, you can receive mail 24 hours a day except for the periods when your system is sending mail. The receive options of an electronic mail package should provide a high degree of flexibility in managing received mail. The software package should have an incoming mail menu that offers options such as scanning, searching, displaying, printing, forwarding, and automatically replying to received mail.

Mail scan and search. An electronic mail system should allow the receiver of mail to scan through pending mail headers and review them by one or more categories, such as originator, subject line, key word, and date and time of arrival. In some systems you can ask to see mail received during a certain date or hour interval. For example, you could ask for all mail received between 9 p.m. and 11 p.m. or all mail received since April 15. Such a mail search feature also allows you to select messages that have been flagged as priority. Some systems allow you to mark selected messages for immediate display or printing.

Display mail. The person receiving mail should be able to view any message file still current in the system. A display mail feature should prevent you from displaying nontext data such as binary program files by automatically marking and separating out binary data files when they are delivered.

Print mail. System operators often want to keep printed copies of messages as reminders or backup copies. The system should allow the operator to print and paginate messages.

Forward mail. One innovation in the new electronic mail packages is the ability to forward mail and operator comments quickly to another mailbox. This gives the operator a shortcut in resending the file or message. Otherwise, the file has to be saved to disk and then transmitted as a new piece of mail.

Reply to mail. This feature is another time-saving option similar to the forward mail feature. It permits an immediate reply to received correspondence by simply switching the *To* and *From* lines on the header. The reply is sent to the originator of the mail based on the telephone number and other data contained in the header. The feature may require that the originator be included on one of your lists as a system mailbox.

File Maintenance

Flexible file maintenance utilities are a vital part of operating an electronic mail system. The operator should be able to delete, edit, or merge files or to save them to disk.

Delete log entry. A busy electronic mail station can quickly fill up with an unmanageable number of messages. The operator should be able to delete log entries individually or by category (such as date). The delete feature should ask for confirmation before a file is deleted to prevent accidental deletions.

File editing. One feature that is indispensable in an electronic mail system is the ability to create and edit text files without exiting the system. Some systems allow the operator to use an external text editor, and others provide a built-in editor. A system that allows either option is ideal because it allows the operator to choose either a familiar word processor or the text editor provided by the package. Some operators may want to use both, using the built-in editor for simple editing jobs without leaving the system, and saving more complex documents to disk for major editing on a more powerful word processor.

File merging. File merging allows users to insert boilerplate text or nontext material (such as spreadsheets) into outgoing mail without exiting the system to access another word processor. It also allows several received files to be merged together or merged with a file you have created on or off of the system.

Miscellaneous Features

Beyond the basic features of sending, receiving, filing, and addressing, there are several features that can be categorized as unnecessary but desirable. For some applications, however, those features may be important.

⬤ State of the Art

On-line help. This feature provides descriptions of system functions and usage for novices. Each help message must be related to the specific actions at hand. If the system does not use menus, users should be able to get a list of available commands and information related to each command. On-line help is especially important for situations in which a novice might be called upon to replace the normal system operator. As well as providing help files, some systems offer input prompting and/or menus to assist novices.

Calendar. The calendar function automatically notifies a sender of the recipient's upcoming schedule or absence. The operator can also send calendar information to other mailboxes.

Correspondence templates. Some electronic mail software packages provide prestored formats for certain specialized correspondence such as order forms and form letters. The templates are useful in organizations that use forms for work authorization or parts ordering.

Data base updates. This feature places selected portions of messages into a data base. It can be used for tasks such as keeping track of warehouse stores or logging field sales information.

System security. For corporate and financial applications, correspondence security and access control are often necessary. Generally, a single-level password scheme for system operator access is sufficient; this requires that all participants in a given group have a unique password. However, this type of password scheme is relatively easy to break and should not be considered for highly sensitive applications.

Multilevel access allows more flexibility and control of message retrieval and can be combined with a message classification scheme. This security design provides several passwords based on assigned security levels.

Mail encryption provides the most secure protection, but is more difficult and costly because each electronic mail station must have a data encryption device. However, with the recent emphasis on the prevention of computer misuse, encryption is becoming a popular security measure.

Gateways to the World

The electronic mail networks described here could be set up within a building, spread around a city, or distributed throughout the country or the world. However, this kind of network is costly and is best used only for connecting offices or people that require frequent communications. If an office on the other side of the country is called only once a week, it is probably not feasible to include it in the network.

Some electronic mail systems can be used as gateways to other types of electronic communications services, such as MCI Mail, E-COM, The Source, CompuServe, or an unattended Telex machine. These are valuable connections for local in-house systems that only occasionally have to communicate with distant offices.

As electronic mail becomes more common and sophisticated, an increasing number of features will become available. By the end of 1984 several IBM PC software houses are expected to sell electronic mail systems that integrate voice and data as well as graphics. Further developments will occur in integrating local area networks into electronic mail systems. The coming availability of true multitasking with the IBM PC will make this communications capability a useful tool for the average PC owner. ⬤

Larry Jordan is a freelance writer and a communications and data base management systems consultant with NUS Corporation. He coauthored the book Communications and Networking for the IBM PC, *published by the Robert J. Brady Company.*

The following software packages contain most of the electronic mail features listed in this article. These and other packages not released as of this writing will be covered in future issues.

MIST+
New Era Technologies
20251 I St. NW #924
Washington, DC 20006
202/887-5440
List price: $495 with data base management features, $295 without
Requirements: 256K, two disk drives, Hayes Smartmodem

Personal Communications Manager
IBM
Systems Products Division
P.O. Box 1328
Boca Raton, FL 33432
800/447-4700, 800/447-0890 Alaska and Hawaii, 800/322-4400 Illinois
List price: $100
Requirements: 128K, one disk drive, modem, IBM Asynchronous Communications Adapter

Transend
Transend Corporation
2190 Paragon Dr.
San Jose, CA 95131
408/946-7400
List price: $189
Requirements: 256K, two disk drives, modem

TO GET AHEAD IN BUSINESS,

INTRODUCING AURA. THE BUSINESS SOFTWARE THAT INTEGRATES DATABASE, SPREADSHEETS, GRAPHICS AND WORD PROCESSING.

Ever wonder why some people make it to the top faster than others? It could be that they have the right answers at the right time.
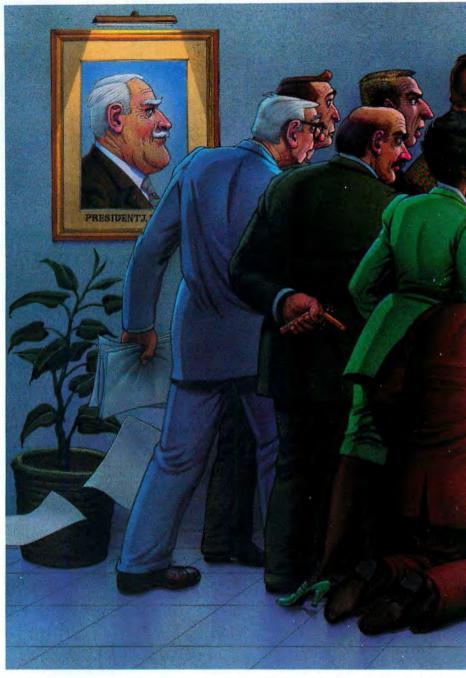
And nothing can help you get that kind of information easier than Aura. Because Aura is database-oriented business software with all the power of four stand-alone programs.

BUILD YOUR OWN MENUS.

Aura helps you build customized applications and create your own menus. Which means Aura will operate the way your business does at the touch of a key. You can even draw customized diagrams, such as organizational charts. And since Aura is fully menu-driven, it's very easy to use.

KEY ON THE DATABASE.

With Aura, the database is at the heart of the system, so you can organize your records the way you want to. Which means your spreadsheets, graphs and documents will reflect the most current information in your business records.

YOUR LINK WITH SUCCESS.

Aura also lets you tie one function to another at the touch of a button. For example, while you are using the Word Processor, you can pull information from your records, spread- sheets or business

1. Information Management
2. Electronic Spreadsheets
3. Business Graphics
4. Word Processing

YOU NEED THE AURA OF SUCCESS.

graphics to include in the document you're working on.

INSTANT CHANGES.

When the format of a file is changed, all of the records in that file change, too. Automatically. And when you change file data in the Information Manager, Aura automatically updates the other functions in the package. So you'll always be working with

information that's current.

THE FASTEST WAY TO SUCCESS.

Aura lets any businessperson quickly take full advantage of all the speed and efficiency of an IBM or similar personal computer. And since Aura does so many different kinds of jobs, it will integrate with your business for years to come.

To find out more, ask your local computer dealer, or contact: Softrend, Inc., 2 Manor Parkway, Salem, NH 03079, (603) 898-1896.

Aura. The business software that can give you the Aura of success.

AURA
Business Software from Softrend

Halo

A new software library leads the way toward graphics standardization and portability.

Peter Neuhaus

Anyone who uses software encounters graphics. For the grade school student playing a video game, graphics may take the form of PAC-persons gobbling up dots; for the manager running *1-2-3*, they're likely to be pie charts representing a profit-loss statement. No matter who the user is, a graphic can indeed be worth a thousand words—or approximately 6000 bytes. But getting these special bytes displayed on a screen or printed out on paper is a painstaking task for the person who creates the graphics. Making a graphics program work on a different computer, in a different language, or with a different color graphics board is hard work.

The problem is caused by the absence of a graphics standard. Considering the myriad of computers, graphics boards, and programming languages on the market, no answer is immediately in sight. But *Halo,* a software library developed by Media Cybernetics and Softwriters and distributed by Lifeboat Associates, may make the process of creating graphics and using them in different environments easier.

Halo is essentially a tool box; its library contains a set of assembly language subroutines that perform standard graphics operations. Many of these are similar to the statements

Graphic generated by Halo

built into BASIC, but not only is *Halo*'s library more powerful, it is also available in different versions for the different languages used on the PC. For example, in BASIC you can use a certain command to draw a line. But BASIC can also call a routine from *Halo*'s library to produce the same effect. When you want to transport a program to a different language, the program's graphics can easily be translated with the *Halo* library designed for that language.

Halo's design accelerates the process of creating graphics and promotes adherence to common graphics programming standards. This makes it easier to use *Halo*-generated graphics with various graphics boards and various output devices such as printers and plotters.

Standard Practice

In the early 1970s the computer graphics industry realized the need to standardize some of the methods used in developing graphics software. Accepted conventions would make it possible to create graphics for one environment and transport them to another with a minimum of recoding. To date only a few standards have appeared. The Graphics Kernel System (GKS) has been adopted by the International Standards Organization and is being used extensively in Europe. The Siggraph CORE system, proposed in 1979, has not gained much acceptance. The debate continues, but the GKS seems to be dominating, and Media Cybernetics has written *Halo* to follow some of its principles.

What is the net effect? By using the techniques and methods embodied in *Halo,* a software developer increases the chances that his or her products will be compatible with future graphics hardware, such as boards, graphics pads, and the ever-popular mouse.

Becoming Portable

Much of the software being created today is aimed at the PC and compatible machines. But the market includes other popular machines, such as the Macintosh. How can a PC-compatible product, the result of many grueling hours of programming, be transferred to a different machine? The answer lies in device independence.

Device independence is nothing new to professional programmers. Common functions such as cursor control and disk I/O are often modularized into separate subroutines that can easily be replaced to accommodate different computers or operating systems. This modular concept has become increasingly important as high-resolution, high-performance graphics boards for the PC have become more common.

If an applications program uses the IBM Color/Graphics Adapter, it must supply coordinates to the board within a specific range. For example, in the PC's medium-resolution mode (320 by 200 pixels) the IBM Color/Graphics Adapter expects coordinates of 0 to 319 along the horizontal axis and 0 to 199 on the vertical axis. Incorporating these specific coordinates (called physical device coordinates, or PDCs) into a program's code ties the application to that one device. If an application that uses the IBM Color/Graphics Adapter is run with a Hercules Graphics Card (which offers greater resolution and thus expects a different range of coordinates), chances are that the graphics will not be displayed properly—if at all.

A way of getting around this problem is illustrated in Figure 1. The physical devices (in this case a printer and a color graphics board) are isolated from the application by a library of routines that create graphics primitives—basic graphics components—such as lines or circles or functions that fill in an area or change its color. In effect, the devices and the application agree on a display surface—either on the screen or on paper—that has no set resolution. Instead of dealing with coordinates that are tied to a monitor or to a graphics printer or plotter, the coordinate system is "normalized" (i.e., absolute) and extends from 0,0 (the top left of the display) to 1,1 (the bottom right of the display). When an applications program calls on a *Halo* routine, *Halo* converts the coordinates it receives into normalized device coordinates which are sent to the device driver. The device driver scales these normalized coordinates into coordinates the device understands.

This frees a graphics programmer from considering the specific characteristics of any one device. As new devices appear, new drivers interfacing them with *Halo* can be written relatively quickly. Not only can new devices be supported by a program using *Halo* graphics, but several devices can be used simultaneously by the same program. This may be important if a program must send graphics to a monitor and to a printer.

Halo Primitives

The graphics primitives provided by *Halo* can be divided into seven major groups (see Table 1). Many of these functions are similar to those available in IBM BASIC, but *Halo* provides additional features. Like most graphics subsystems, *Halo* contains a set of nongraphics functions, including those which establish a color palette, define fill patterns, and allow the *Halo* library to be read into memory.

The number of possible colors is expanded by *Halo* through a process called "dithering." Though only four colors are available with the IBM Color/Graphics Adapter, by alternating two different-colored pixels in a filled area, a different color can effectively be presented. Crosshatched patterns, which are used for filling areas, are defined using the DEFHATCHSTYLE procedure. With DEFLNSTYLE, dotted, dashed, and other line styles can be created. Marker symbols, a standard graphics method of plotting points, are definable as any ASCII character.

The point and line functions include operations such as PIE, which draws a wedge, and POLYLNABS, which draws a series of connected lines given by an array of coordinates. Coordinates can be specified relative to the absolute origin (0,0) or to the current position of the graphics cursor. A graphic can be overlayed with 11 text fonts of varying size, color, and orientation; mathematical symbols are also available.

The power of *Halo* is particularly evident in interactive programs that rely on simulations or use windows. For example, an interior design program may ask the user to select one piece of furniture among many displayed on the screen. With *Halo,* a nondestructive cross hair (one that does not alter the displayed image) can be used to select an image and move it. *Halo* also supports the use of a mouse as a pointer.

🔵 State of the Art

Clipping Windows

This discussion of *Halo* has so far assumed two things: first, that the coordinates of a graphic supplied by a program are within the range recognized by a device and, second, that the image does not extend beyond the display surface. But the world is not necessarily contained within the confines of a printed page or a monitor. A photograph of a mountain may show only its peak; when you edit a document with a word processor, you see only part of the document at any one time. Reproducing this reality with computer graphics is difficult.

Before the release of BASIC 2.0, if an image extended past the screen to the right, it "wrapped around," that is, the remainder of the graphic appeared to the left. If a window was placed in the middle of the display to magnify or reduce part or all of an image, the same problem of wraparound, as well as the problem of scale, had to be dealt with.

In the example of the interior design program, a programmer might designate a graphic representing the floor as being 20 feet square. By specifying this value in *Halo*, other objects (such as a desk) drawn over this graphic are automatically affected. In *Halo* the user would give the desk's dimensions in feet, and the resulting graphic would be drawn to scale. These "real world" coordinates are defined in *Halo* through the use of the SETWORLD command.

"World" coordinates are used not only for the entire display, but also for windows that bracket a particular area. With SETWINDOW and SETVIEWPORT, the display can be divided into four windows, or a graphic (say, of a desk) can be copied to another place on the screen. With a traditional graphics language, this would involve rewriting the code that created the graphic and placed it on the screen. With *Halo,* the graphic is simply captured with a window and then moved or copied.
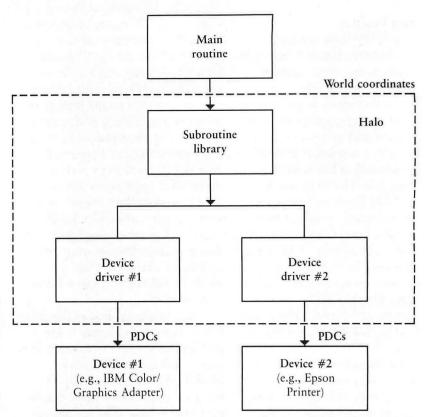
Figure 1: Halo's device independence

Defining the viewport and the window tells *Halo* where on the screen a graphic should be drawn and what the range within that window will be. Thus, an existing graphic (for example, the desk) can be captured with a window, and *Halo* will enlarge it or shrink it, according to the ranges that are set. Or graphics may be created by the applications program in a window. Once the viewport and the window are defined, any graphics generated by the applications program are automatically "clipped" at the window boundary.

Using Halo

There are several different language versions of *Halo;* each version contains a file of source code statements that are merged with the source code of an applications program. For example, the Interpreted BASIC disk would include a source file plus a binary file to load at run time using the command BLOAD. In this case, the

source code statements define the entry points required to reference the *Halo* graphics procedures using BASIC CALL statements. (For sample BASIC programs using HALO, see Listings 1 and 2.)

Access from compiled languages, such as Compiled BASIC, is achieved by linking the compiled applications program to *Halo*'s object modules with the DOS LINK utility. Within the code of the program, each procedure is declared to be external.

One of *Halo*'s most powerful features is the device driver overlay, which permits you to change output devices at run time. This is useful, since it allows an application to create an image on the display and then redraw it for hard-copy devices such as plotters and graphics printers.

Supported Devices

Because of the IBM Color/Graphics Adapter's limitations, a large number of third-party color graphics boards that supply more colors and finer resolution are now available for the PC

Window and viewport control:

SETVIEWPORT	(X1,Y1,X2,Y2,C,FC)	Locate viewport in normalized display coordinates
SETWINDOW	(X1,Y1,X2,Y2)	Define window in world coordinates
MAPWTOD	(XW,YW,XD,YD)	Convert world coordinates to PDCs
WORLDOFF		Return to using PDCs

Point and line drawing functions:

MOVABS	(X,Y)	Move graphics cursor
PTABS	(X,Y)	Plot a single point
LNABS	(X,Y)	Draw a line from cursor
POLYLNABS	(X,Y,N)	Draw set of lines
MARKERABS	(M,X,Y)	Draw set of points w/markers
CIR	(R)	Circle with radius R
ARC	(R,ANG1,ANG2)	Arc for angle1 to angle2
ELLIPSE	(R,ASPECT)	Ellipse given aspect ratio
BOX	(X1,Y1,X2,Y2)	Box given opposite corners
PIE	(R,ANG1,ANG2,C)	Pie section with color C

Area functions:

BAR	(X1,Y1,X2,Y2)	Bar filled with current color
FILL	(C)	Fill area with color C
FLOOD	(C)	Fill complex area with C
FLOOD2	(C,B)	Fill area defined by color B
MOVEFROM	(X1,Y1,X2,Y2,ARRAY)	Store pixels to array
MOVETO	(X1,Y1,ARRAY,MODE)	Write pixels to display

Control functions:

INITGRAPHICS		Initiate Halo subsystem
CLR		Clear display
SETASP	(A)	Set aspect ratio
SETCOLOR	(C)	Set current color to C
SETPAL	(N,PAL)	Define current palette
REPPAL	(ARRAY)	Replace palette with array
DEFLNSTYLE	(N,ARRAY)	Define line style N
SETLNSTYLE	(N)	Set current line style to N
DEFHATCHSTYLE	(N,STYLE)	Define hatch style N
SETHATCHSTYLE	(N)	Set current hatch style to N
INITMARKER	(N,CODE)	Define marker N to ASCII code
GPRINT		Dump screen image to printer
CLOSEGRAPHICS		Terminate Halo subsystem

Text functions:

INITCUR	(HI,WIDE,C)	Define text cursor
SETFONT	(N)	Select font N
SETTEXT	(HI,WIDE,ORIENT,ATTRIB)	Define text size and direction
MOVETCURABS	(X,Y)	Move cursor
TEXT	("STRING")	Plot text at cursor location
SETTEXTCLR	(FOREGROUND,BACKGROUND)	Set text colors
DELTCUR		Turn off text cursor

Cross hair functions:

INITHCUR	(HI,WIDE,C)	Define cross hair cursor
MOVEHCURABS	(X,Y)	Move cross hair cursor
DELHCUR		Delete cross hair cursor

Disk storage functions:

GWRITE	(FILENAME)	Write current image to disk
GREAD	(FILENAME)	Read image from disk
OREAD	(FILENAME)	Read device driver overlay

Note: The inquiry functions, which allow the program to get current status information from Halo, are not shown.

Table 1: Partial list of Halo primitives

```
100 '_____
110 '   MEMORY.BAS
120 '
130 '   BASIC program that determines the values for the CLEAR
140 '   and DEF SEG statements in HALOI.BAS.
150 '_____
160 CLS: KEY OFF: LOCATE 1,1
170 PRINT "Memory.  This program will determine the values for"
180 PRINT "         the CLEAR and DEF SEG statements in"
190 PRINT "         HALOI.BAS.  Before continuing, be sure that"
200 PRINT "         the diskette containing HALOI.BIN is in the"
210 PRINT "         default drive."
220 PRINT "Press any key to continue."
230 IF LEN(INKEY$) = 0 THEN 230
240 '
250 OPEN "HALOI.BIN" FOR INPUT AS #1
260 A = LOF(1): CLOSE 1                        'length of file
270 A% = INT ((A+1023)/1024)                   'convert to kilobytes
280 '
290 DEF SEG = 0
300 B = (PEEK(1296)+256*PEEK(1297))            'data segment for basic
310 B% = INT((B+63)/64)                        'convert to kilobytes
320 '
330 DEF SEG = &H40
340 C% = ((PEEK(19)+256*PEEK(20)))             'memory in machine
350 DEF SEG
360 '_____
370 '   Print memory in machine
380 '_____
390 PRINT
400 PRINT "Hardware/software constraints.  Values in K (1024) bytes."
410 PRINT "Memory in machine           " C%
420 PRINT "Memory used by DOS and Basic  " B%
430 PRINT "Memory used by Halo          " A%
440 '_____
450 '   Now do the arithmetic
460 '_____
470 M% = C% - B% - A%
480 IF M% >= 64 THEN NEED% = 0: M% = 64 ELSE NEED% = 1
490 IF M% < 1 THEN CANT% = 1 ELSE CANT% = 0
500 N = (B% + M%) * 64
510 '_____
520 '   Print the results
530 '_____
540 PRINT
550 IF CANT% = 0 THEN 580
560 PRINT "You don't have enough memory to run Halo in Basic."
570 PRINT "Interpreter.  Investigate the compiler.": END
580 '
590 IF NEED% = 0 THEN PRINT "No CLEAR statement is necessary": GOTO 620
600 PRINT "Your CLEAR statement should be:"
610 PRINT "   125 CLEAR ,&H" HEX$(1024*M%)
620 PRINT "Your DEF SEG statement should be:"
630 PRINT "   170 DEF SEG = &H" HEX$(N)
```

Listing 1: A BASIC program that determines the values for the
CLEAR and DEF SEG statements in HALOI.BAS.

```
140 'HALOI.BAS
150 DEFINT I-N                      ' Cannot change after GOSUB 8000
160 GOSUB 8000                      ' Do Halo address assignments.
170 DEF SEG = &H34C0
180 BLOAD "HALOI.BIN",0             ' Load Halo binary code.
520 MODE=0                          ' Initiate Halo and set to med resolution.
530 CALL INITGRAPHICS (MODE)        ' Parameters cannot be constants.
533 '  Select palette 0 and background color of black.
535 JBACK=0:  JPAL=0:  CALL SETPAL (JBACK,JPAL)
560 '  Define a viewport that covers the upper left quadrant.
565 '  Make the border red (color 2) and fill with red.
570 XVMIN=0:  YVMIN=0:  XVMAX=.45: YVMAX=.45: JBORD=2:  JBACK=2
580 CALL SETVIEWPORT (XVMIN,YVMIN,XVMAX,YVMAX,JBORD,JBACK)
590 '  Define world coordinates to be used within viewport.
600 XWMIN=-15:  YWMIN=-15:  XWMAX=15:  YWMAX=15
610 CALL SETWINDOW (XWMIN,YWMIN,XWMAX,YWMAX)
620 GOSUB 1000                      ' Draw the triangle.
630 '  Change the viewport so that it is in the upper right quadrant.
640 '  Leave the world coordinate inside the viewport as is.
650 XVMIN=.55:  YVMIN=0:  XVMAX=.99:  YVMAX=.45
660 CALL SETVIEWPORT (XVMIN,YVMIN,XVMAX,YVMAX,JBORD,JBACK)
670 GOSUB 1000                      ' Draw the triangle.
680 '    Now change the viewport to the lower right and make the
690 '    world coordinate range inside it smaller than the size
700 '    of the triangle.  Halo will have to do some clipping.
710 XVMIN=.55:  YVMIN=.55:  XVMAX=.99:  YVMAX=.99
720 CALL SETVIEWPORT (XVMIN,YVMIN,XVMAX,YVMAX,JBORD,JBACK)
730 XWMIN=-4:  YWMIN=-8:  XWMAX=4:  YWMAX=8
740 CALL SETWINDOW (XWMIN,YWMIN,XWMAX,YWMAX)
750 GOSUB 1000                      ' Draw the triangle.
755 '    Select fancy stroke style font (file is on default disk).
760 F$="HALO104.FNT":  CALL SETFONT (F$)
765 '    Now use lower left quadrant of display
770 XVMIN=.01:  YVMIN=.55:  XVMAX=.45:  YVMAX=.99:  JBACK=0
775 CALL SETVIEWPORT (XVMIN,YVMIN,XVMAX,YVMAX,JBORD,JBACK)
780 XWMIN=0:  YWMIN=0:  XWMAX=200:  YWMAX=200
785 CALL SETWINDOW (XWMIN,YWMIN,XWMAX,YWMAX)
789 '    Set text size 50 pixels high.
790 HIGH=50:  ASPECT=1:  JPATH=0
791 '  Set text cursor color to black so it does not appear.
793 JHIGH=1: JWIDE=1: JCOLOR=0:  CALL INITTCUR (JHIGH,JWIDE,JCOLOR)
795 CALL SETSTEXT (HIGH,ASPECT,JPATH)
800 X=50:  Y=50:     CALL MOVTCURABS (X,Y)
805 TEXT$="HALO":    CALL STEXT (TEXT$)
820 GOTO 820
1000 '
1005 '  Subroutine to draw a triangle with center at 0,0
1010 X= 0:  Y= 10: CALL MOVABS  (X,Y)
1020 X= 5:  Y=-10: CALL LNABS   (X,Y)
1030 X=-5:  Y=-10: CALL LNABS   (X,Y)
1040 X= 0:  Y= 10: CALL LNABS   (X,Y)
1050 RETURN
7999 '--------------- HALO address assignments --------------------
8000 ARC                            = &H4A0F
8001 BAR                            = &H3143
```

(continues)

Listing 2: The HALOI.BAS program

and compatibles. Currently, Media Cybernetics has written drivers not only for the IBM Color/Graphics Adapter, but for the Hercules Graphics Card, the Orchid Technologies MGA Board, the Amdek MAI board, the Scion PC 640 graphics board, the Conographic Cono-Color Adapter, and Epson printers. The manufacturers of many of these products are now including copies of *Halo* and the requisite device drivers with their products.

Words to the Wise

The adoption of a standard in the world of computer graphics is still in the future, but *Halo* is a first step toward such standardization. A number of device drivers are already available for the package. *Halo* also works not only with the PC and the PCjr, but also with a number of compatible machines such as the Compaq, the Columbia, the Seequa Chameleon, and the TI Professional Computer. *Halo* currently supports GW BASIC, C, FORTRAN, Pascal, and the IBM Macro Assembler and can use the Mouse Systems, Microsoft, or Summagraphics mouse. Future releases will include a driver for Tecmar's Graphics Master board, support for APL+, and *Halo* versions for personal computers based on Motorola's 68000 microprocessor.

Media Cybernetics is encouraging *Halo* users to develop software using *Halo* subroutines by allowing them to "market the resulting object code, which may incorporate functions that may have been taken from the *Halo* library, without paying any royalties." While Media Cybernetics will not allow a developer to use *Halo* to create "graphics tool boxes, function libraries, and other programs that nominally perform the same function," the company's open-handed policy should speed *Halo*'s acceptance.

As the number of personal computers and graphics boards increases, this acceptance may prove crucial. Software authors who take advan-

```
8002 BOX                  = &H3146
8003 CIR                  = &H4A09
8004 CLOSEG               = &H2E4

8045 INITGRAPHICS         = &H2EA

8053 INITTCUR             = &H603C

8116 LNABS                = &H1F78

8138 MOVABS               = &H1F7E

8152 MOVTCURABS           = &H603F

8191 SETFONT              = &H7970

8212 SETPAL               = &H31A

8229 SETSTEXT             = &H7973

8238 SETVIEWPORT          = &H6F60

8241 SETWINDOW            = &H6F66

8249 STEXT                = &H797C
8250 STXFONT              = &H7BE4
8251 TEXT                 = &H6036
8252 VPAN                 = &H32C
8253 WORLDO               = &H6F69
8254 WORLDOFF             = &H6F69
9000 RETURN
```

Listing 2 *(continued)*

tage of graphics tools like *Halo* that promote standardization and portability will not only save themselves time and money, but will keep up with a technology that is always changing. ●

Peter Neuhaus teaches computer graphics in the Department of Design and the School of Engineering at California State University at Long Beach.
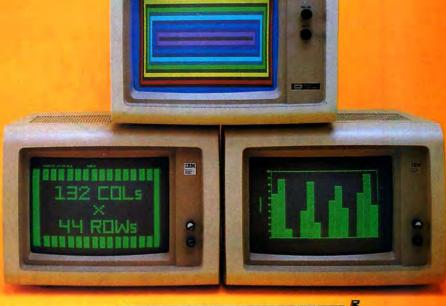
EVEREX
EVER for EXcellence

132 Cols × 44 Rows +
Simultaneous Color and Monochrome Graphics Display + One Card/ Single Slot =

The Graphics Edge™

The **GRAPHICS EDGE** is the leading edge. We've really pushed technology to the limit with this one, and here's why:

- it is software switchable from 80 cols x 25 rows to 132 cols x 44 rows, making it ideal for spreadsheet applications,

- drives both a color and a monochrome monitor SIMULTANEOUSLY and prints this same information in color on your color printer. Ideal for business applications involving heavy word processing combined with color graphics requirements,

- and runs **Lotus 1-2-3**™ with FULL GRAPHICS and also MicroSoft Flight Simulator™ on either high-resolution IBM® Monochrome or color monitors.

And if that's not enough, there's more:

- it is **Fully Compatible** with IBM Monochrome and color adapters, Colorplus™ and Hercules™

- will run all IBM **Color Graphics Software** on the IBM **Monochrome Display,** opening to you a wealth of IBM Color Graphics software applications,

- supports all **BASICA** graphics commands on IBM Monochrome or color monitor without software patches,

- 640H x 200V in 16 colors,

- 16 shades of green in green monitors with composite output; and...

one printer port and one light pen interface.

No Other Card can give you **So Much** for **So Little.** At a Suggested retail price of $499, you and your IBM PC will be performing to the fullest potential. **WHAT ARE YOU WAITING FOR!!!**
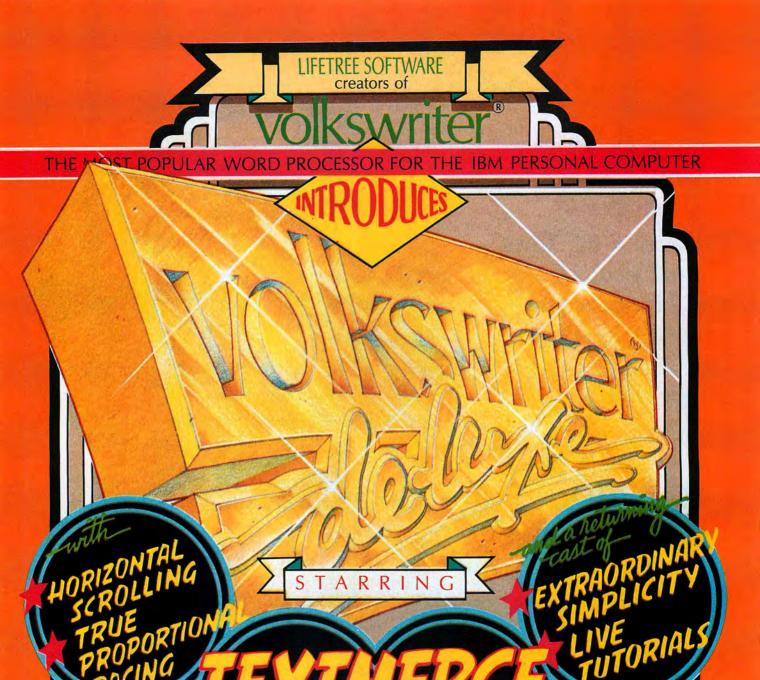
OEM Inquiries Welcomed. (415) 967-1111

For more information, contact your nearest dealer. OEM and Dealer Hotline 800-821-0806. In California call 800-821-0807.

MicroSoft Flight Simulator is a trademark of Microsoft Corp.
IBM is a registered trademark of International Business Machines Corporation.
Lotus 1-2-3 is a trademark of LOTUS Development Corporation.
Colorplus is a trademark of Plantronics.
Hercules is a trademark of Hercules Computer Technology.
Graphics Edge is a trademark of Everex Systems, Inc.

AD-101

Everex Systems, Inc.

891 Maude Ave., Mountain View, California 94043 (415) 967-1495

Price subject to change without notice.

Circle 699 on reader service card

Put Training Wheels On Your IBM PC™ Before You Take Your First Ride.

What is the easiest, most affordable way to learn how to use your new PC?

Well, you could read tedious DOS and operating manuals or you could enroll in a two day course for a few hundred dollars. But why go through the frustration of reading or the expense of a course when there is a better way?

The easiest, most affordable way to learn

The answer: **NO. 1 HOME TUTOR**
No. 1 Home Tutor combines completely self-paced instruction, interactive lessons and comprehensive training to get you using your PC quickly, easily.

You Learn at Your Own Speed

No. 1 Home Tutor is your learning companion. No pressure. No frustration. The lessons are completely self-paced — you learn as much as you want, when you want to. Each lesson can be stopped at anytime and restarted without having to start over from the beginning. No other training program allows you to do this.

The Lessons Work with You

No. 1 Home Tutor is a hands-on tutorial. You participate in the simple lessons to learn more and retain what you learn better in less time. You interact with each lesson, learning and practicing the operations of your PC.

No. 1 Home Tutor is a registered trademark of MA Systems, Inc.
IBM PC is a registered trademark of International Business Machines, Inc.

The Easiest Training Program Available

With No. 1 Home Tutor, you don't have to read manuals — simply follow the instructions on the screen. The lessons are visual — providing multi-color displays that show what you are learning. You practice and learn by interacting with the screen. It's that easy.

Comprehensive Learning

No. 1 Home Tutor teaches you the simplest operations to the more advanced. No. 1 Home Tutor shows you how your computer and programs operate and how to use them. After using No. 1 Home Tutor, you will be amazed at how much you know about using your computer. You'll be ready to use your computer right away.

Best Value

For only $59.95, no other training program available makes learning easier, more comprehensive and affordable than
NO. 1 HOME TUTOR.
That's why it's called "No. 1."

So learn about your PC the easy way, with
NO. 1 HOME TUTOR.
Ask your local computer dealer for a demonstration.

No. 1 Home Tutor is made by MA Systems Inc., respected manufacturers of quality hardware and software products for IBM and Apple computers.

MA SYSTEMS
INCORPORATED An Enconi Company

2015 O'Toole Avenue, San Jose, CA 95131 (408) 943-0596

Circle 593 on reader service card

151

INTRODUCING A FINANCIAL SOFTWARE PROGRAM FOR A MILLION DOLLARS.

N*o, it doesn't cost a million dollars. But it can help you manage it. Or accumulate it.Or maybe even multiply it. You see, MoneyTrack charts where your money comes from. And where it goes. MoneyTrack is capable of handling up to 99 funds, 99 different businesses, 900 ledger accounts, and 900 ledgers for securities, payees, and rental units. Then, following your instructions, MoneyTrack analyzes the transactions, sorts them out, sums them, and produces comprehensive personal financial reports.*
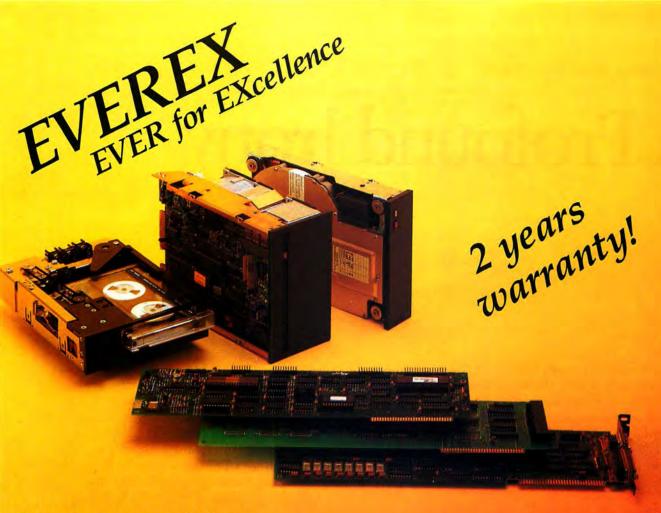
MoneyTrack also creates files for spreadsheets and other programs.

In short, MoneyTrack is the only program specifically designed to handle a wealth of investments for those with multiple sources of income. And for those with diverse investments and complex tax returns.

MoneyTrack runs on the IBM Personal Computer, IBM PC/XT, most of the compatibles, and other MS/DOS computers. File size permitting, you can move back and forth between fixed-disk and dual diskette operation.

MoneyTrack is programmed to be the best personal financial program available today. It won't cost you a million dollars. But it may certainly be worth it.

MoneyTrack™

For information and free eight-page brochure, call Pacific Data Systems, Inc. at 800-343-9194 outside of California, 800-421-4706 in California, and 559-8713 in the 213 area code.

Circle 321 on reader service card

EVEREX
EVER for EXcellence

2 years warranty!

Everex Storage Subsystems Plug Right Into Your Business!

Everex combines **Reliability, Support, Ease of Use and Best Price Performance Ratio** into a full product line of internal storage subsystems and plug-in controller cards. Now you have no excuse not to turn your IBM® PC into an XT! Actually, **more** than an XT, when you combine our **Half-Height** hard disk with our **Half-Height** streaming tape.

Hard to believe? Well, believe this, both the hard disk and streaming tape **Plug Right Into Your System**. Incredible? Unique? That's EVEREX for you.

Plug-in Subsystems
■ Hard Disk Drive with Everex Controller Card — we're offering you anywhere from 10–40MB of storage, in half or full height, that you can directly plug into your PC with **No Software Patch Required**. And we are so confident of our Hard Disk Drive that we are backing it with a **FULL TWO-YEAR WARRANTY.*** All this starting at a LOW suggested retail of $1,195!

■ Streaming Tape with Everex Controller Card — you get 20–45MB of high-performance back-up storage in minutes. And REMEMBER, this is a half-height streamer! The price is something to remember too — starting at ONLY $1,135 suggested retail.

Combined with the half-height hard disk, you've got something you can really talk about — an XT that backs itself. Only from Everex.

Controller cards sold separately:
■ ULTRA DISK™ — Controls both the hard disk and floppy disk drives **at the same time**, saving you both space and money. Suggested retail — $525.

■ Floppy Disk Controller — easy to install at $220 suggested retail.

■ Streaming Tape Controller — direct plug-in and very reliable. Suggested retail — $315.

Want to know more? Just ask your local dealer for all the details.

*Two-year warranty on Hard Disk Drive, one-year warranty on the controller card.

OEM Inquiries Welcomed.   (415) 967-1111

Price subject to change without notice.

AD-102

A Profound Irony

Merrily Shinyeda

The much-heralded Leading Edge Word Processing *program is rich with state-of-the-art features like Recall Delete, Split Screen, and a Scratch Pad window. Like dedicated word processors,* Leading Edge Word Processing *is endowed with exceptional file organization and sophisticated boilerplate features. But despite a multitude of features, the program is hampered by a single design flaw.*

Month after month eye-catching ads for the *Leading Edge Word Processing* program piqued my curiosity. Particularly intriguing was the statement, "History will record as a profound irony that the most powerful word processing package ever created for the IBM Personal Computer wasn't created by IBM." Since IBM never created any word processing package for the IBM PC, I found the statement profoundly ironic indeed. I waited impatiently for this new product, the emergence of which promised to give the dedicated word processing industry a run for its money.
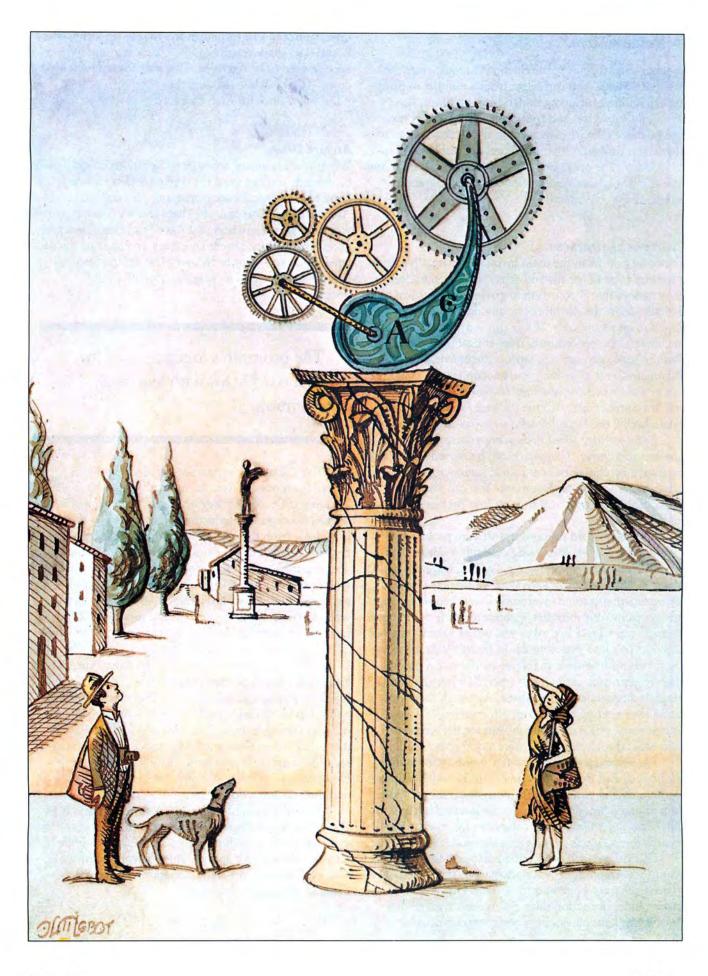
Leading Edge Products has patterned its document-filing procedure after the filing method most of us are familiar with—the filing cabinet. Disks act as file drawers that hold a limited number of "folders." Up to 32 folders can be stored on a disk. Folders can represent subject categories such as general correspondence, financial reports, policies and procedures, personnel reports, and personal information. Depending on the availability of space on the disk, you can file up to 32 documents of varying lengths in each folder. This organization allows you to work in a way that is both instinctive and logical.

The Document Directory for each folder contains a complete listing of all files, including the number of pages in each document, the date and time the document was created, and the date and time of its last revision. The main menu is incorporated at the bottom of the directory (see Figure 1). This format reduces keystrokes and allows you to see action options and file listings simultaneously. Main menu selections are Edit, Print, Create, Delete, Copy, Rename, Move, Archive, Folder, and Utilities.

Selecting the Create option brings a prompt to the information line that asks you to name the new file or existing file. If the named file doesn't yet exist, a blank

> It is frustrating to wait for the screen to shift around each time you insert a character.

screen appears with the default margin settings and page length displayed on the format line. To change the format, you move the cursor to the desired locations for margins and tabs and press a single key for each setting. Any number of format changes can be inserted into a document in the form of format tag lines, which are displayed but not printed out. Format tag lines can be moved or copied within one document or between two documents using the windowing feature. Formats include a special flush right tab, decimal alignment in both United States and international formats, and tab stops with dot leaders.

● Review

For special print requirements you must enter the Attribute Menu. You can select from a number of printing capabilities, including underscore, boldface, superscript and subscript, and overstrike. Underscored text and boldface text are displayed on the screen as they appear when printed. Other attributes are displayed in inverse video. The program also supports color display and printing if you have a color monitor, a color graphics board, and a color printer.

Character by Character

Choosing Edit from the main menu automatically creates a backup copy of the file you select. Having a backup copy insures that if your system goes down or if you accidentally delete the document or any portion of it, the data will be recoverable. While this is a valuable feature for novices, the procedure is time-consuming, and it doubles the space necessary to store a document. If your documents tend to be long, the backup feature could result in a substantial investment in time and disks. Once you are comfortable with the package, you might consider altering the Default Menu to bypass the feature.

Leading Edge Word Processing's cursor movement is fast and responsive. The cursor can be moved forward or backward by character, word, line, sentence/punctuation mark, page, screen, or document. You can also jump to a specified page or to one of up to four previously set marks.

Like most word processing software packages, *Leading Edge Word Processing*'s default mode is Overtype instead of Insert. However, Leading Edge has added a new twist. The Recall Overtype feature lets you recall characters that were inadvertently overtyped so you can recover from your mistakes without retyping anything. Pressing the <Ins> key takes you out of Overtype mode and puts you into Insert mode. In Insert mode the existing text is pushed aside character by character, pausing slightly after each character is inserted while the paragraph is automatically readjusted. Although this automatic reformatting makes later reformatting unnecessary, it is frustrating to wait for the screen to shift around each time you insert a character.

For inserting more than a few words, you can use the Scratch Pad feature. Pressing <Shift>-<Ins> opens the Scratch Pad window at the current cursor location. An unlimited amount of text can be inserted in the window. Pressing <GrayPlus> completes the insertion and returns the cursor to its previous location.

Like other word processing packages, *Leading Edge Word Processing* uses the <Backspace> and <Del> keys to delete characters behind the cursor. However, as in the Insert mode, the action takes place one character at a time, with slight pauses between character deletions.

Like the Recall Overtype feature, the Recall Delete and Recall Backspace features allow characters that have been deleted to be retrieved. To recall deleted text, hold down <Ctrl> while pressing the <Backspace> or <Del> key once for each character you want to recover.

Archive Delete

When you are unsure whether or not information should be deleted, you can send the deleted scraps into an archive file. The scraps are stored and are cataloged in an Archive Delete Directory by their first few characters. If you want to retrieve text that has been deleted, you can access the Archive Delete Directory and indicate the deleted block you want to recover. The deleted text will then be reinserted in its original position in the document.

> The program's logical use of the keyboard helps with learning retention.

The Cut and Paste feature handles text that is moved from one location to another within the same document. The <F9> key activates the prompt 'Cut what?'. You can highlight the text to be cut by moving the cursor from the beginning to the end of the segment. Pressing <GrayPlus> removes the text from the screen. To paste the text in a new position, place the cursor where you want the text to appear and press <F10>. If cut text is not pasted, it will automatically be deleted when the next cut is made. This is a more expedient method for deleting blocks of text than using the <Del> or <Backspace> keys.

If you don't want to complete the move immediately and don't want to delete the cut block, the block can be saved by giving it an uppercase or lowercase letter as a name. Up to 52 text segments can be saved in this manner, but the segments can be used only with the document they were taken from. This procedure can be used for duplicating text segments, as well as for delaying block moves. It is also effective for copying recurring format lines within a document.

Named cuts are listed in the Named Cut and Paste Directory, which displays the first ten characters and the assigned letter of each cut. If you have forgotten the letter you assigned to a specific cut, you can access the directory and select the right cut, and the paste will be made at the cursor's location.

```
 11:15     1-30-84        LE WORD PROCESSING
 - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
 CURRENT FOLDER:  ARTICLES          CURRENT DRAWER:  B          58% FULL
 - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

     Document Name           Pages    Last Date    Time    Create Date    Time
 LE Standard Document          1      10-17-83     4:50    10-17-83      3:54p
 Leading Edge Products        12      1-30-84     10:10    1-27-84       9:23a
 Local Area Networks          11      2-3-84       4:43    1-10-84       9:15a
 Integrating PC's             17      1-22-84      8:31    12-20-83      2:28p






 - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

 Edit  Print  Create  Delete  Copy  Rename  Move  Archive  Folder  Utilities
 Edit a Document
 - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
```

Figure 1: Document Directory and main menu

A Sluggish Screen

Leading Edge has provided the basic text editing functions that one expects from a word processor. Insert, delete, move, copy, and format are presented in a manner that will seem familiar to anyone who has worked on a dedicated word processing system. The program's familiar, user-friendly approach makes it possible to learn the fundamentals quickly. The program's logical use of the keyboard helps with learning retention.

Despite excellent features and a logical command structure, *Leading Edge Word Processing* is difficult to use due to a single design problem. The program's slow screen response is a serious flaw—a flaw that Leading Edge seems to be aware of and to have attempted to compensate for with their Scratch Pad, Recall Overtype, Recall Delete, and Recall Backspace functions.

Typing at less than average speed in Insert mode, you will find that you can easily type faster than the screen can display the text. Once you have completed typing an insert, you can remove your hands from the keyboard and watch characters appear on the display one at a time. To avoid this kind of delay, the Scratch Pad feature can be used for block inserts. However, while the screen can keep pace with the keyboard in this mode, you still have to wait for the block to be inserted in your document and for the paragraph to be adjusted before you can continue.

Overtyping creates a similar situation. Since text is being keyed in at a faster rate than it is being displayed on the screen, the typist must be conscious of exactly how many replacement characters can be typed without overtyping characters that should not be deleted. To compensate, Leading Edge has provided the Recall Overtype function. Most word processing packages let you hold down the <Del> key or the <Backspace> key for as long as necessary to delete unwanted text. Using the screen to monitor the amount of text being deleted, you know when to release the key to interrupt the action. *Leading Edge Word Processing* also offers this method, but because the screen response is so slow, it is difficult to judge how many characters have been deleted. Recall Delete and Recall Backspace are therefore used frequently when this method is employed. When deleting more characters than you can count on your fingers and toes, you should use the Cut and Paste feature.

Although the recall features help to ameliorate the sluggish-screen problem, these features also get bogged down for the same reason. The same screen handicaps experienced during the Overtype, Insert, and Delete modes get in the way with the recall modes. Although a beep signals when a deleted text segment has been restored in full, recall does not stop at that point. If you continue to press the keys, characters from a previous deletion will be recalled at the cursor's location. While the recall functions do have some independent value, essentially they are little more than Band-Aids developed to patch up a poorly designed keyboard/screen interface.

⬤ Review

Figure 2: Windows

Windows and Other Extras

With *Leading Edge*'s window feature, it is possible to view two documents simultaneously and have full text processing capability in both windows. To open a second window in a document, go to the main menu and press <Shift>-<GrayMinus>; the screen will split horizontally into two windows (see Figure 2). The cursor can be moved freely from one window to the other, and text and format lines can be moved between windows using the Cut and Paste feature.

Leading Edge Word Processing is filled with seemingly minor, but notable, features that give it the feel of a dedicated word processor. For example, the print spooling feature allows you to edit one file while printing another. An Automatic Save feature saves your work to disk every few seconds as a safeguard against accidental loss.

Other extras include the ability to insert required hyphens and spaces that guarantee that compound words, dates, and telephone numbers will be treated as a single unit and won't be split by a linefeed. In addition, Leading Edge has provided a fast and easy correction method for one of the most common mistakes made by typists, the transposition. Pressing <Alt>-<Shift> immediately transposes characters. Also included is the ability to change uppercase text to lowercase and vice versa.

Leading Edge Word Processing's extensive search capabilities allow you to find all or specific occurrences of a character string. For example, you could designate a search for a string in uppercase, lowercase, initial capitals, or for all occurrences regardless of case. You can also search for a "wild-card" character string containing some known and some unknown characters. Searching occurs in a forward direction only. You can replace a character string on a global or discretionary, attended basis.

The header and footer capability of this package is flexible and easy to use. You can position a header, a footer, or both a header and a footer on all pages or on odd- or even-numbered pages only. Unlike many word processing programs, *Leading Edge Word Processing* allows you to repaginate your document automatically and still display the header and/or footer on the screen along with each page of the document.

One drawback is that the standard *Leading Edge Word Processing* package does not include a mail merge capability, a much desired feature by people who want to create repetitive letters and forms. A mail merge feature called merge print is available, however, on a more expensive version.

```
Currently attached glossary:   NETWORKS

Glossary Entry Name:                              Initial Keystrokes

        l                                          local area network
        X                                          Xerox Ethernet
        W                                          WangNet
        D                                          DECnet
        d                                          Datapoint
```

Figure 3: Glossary Directory

Glossaries

A glossary is a small boilerplate document that can consist of text, formats, or keystrokes. The glossaries in *Leading Edge Word Processing* are stored on disk and can be recalled during document creation or editing. Glossaries could be frequently used formats, commonly misspelled words, standardized paragraphs, or the names and addresses of clients.

Glossaries are stored in a glossary folder. You can have up to 32 glossary files within a folder. Within each of the files you can store as many as 52 glossary entries of varying lengths.

Descriptive prompts help you create glossary entries. Pressing <Shift>-<ScrollLock> activates the prompt, 'Remember what text?'. Highlighting the text to be included in the glossary and pressing <GrayPlus> brings the prompt 'Entry name?'. After assigning an uppercase or lowercase letter as a name for the item, pressing <GrayPlus> again stores the entry.

To recall a glossary entry, access the Glossary Directory and select the appropriate entry (see Figure 3). To insert a client's name and address that have been stored as a glossary, attach the client glossary folder, position the cursor where you want the insertion to be made, and press <ScrollLock>. The prompt 'Entry name?' will be displayed. Typing the identifying letter inserts the client's full name and address. If you can't remember the letter you have assigned an entry, type ? to take you to the Glossary Directory. When you select the item you want to insert from the directory, press <GrayPlus>, and the item will be inserted automatically at the cursor's location.

Beyond Features

Leading Edge offers an abundant choice of features and an excellent approach to file management in its first software offering. *Leading Edge Word Processing* is priced lower than most sophisticated word processing packages, offers a comparable number of features, and is easy to learn. The company rightfully boasts that you can work the program with two fingers and that you don't have to be a terrific typist to use it. In fact, the slower you type the better you'll like the program. Only hunt-and-peck typists would be unaware of the agonizing delays between keyboard commands and the screen's response.
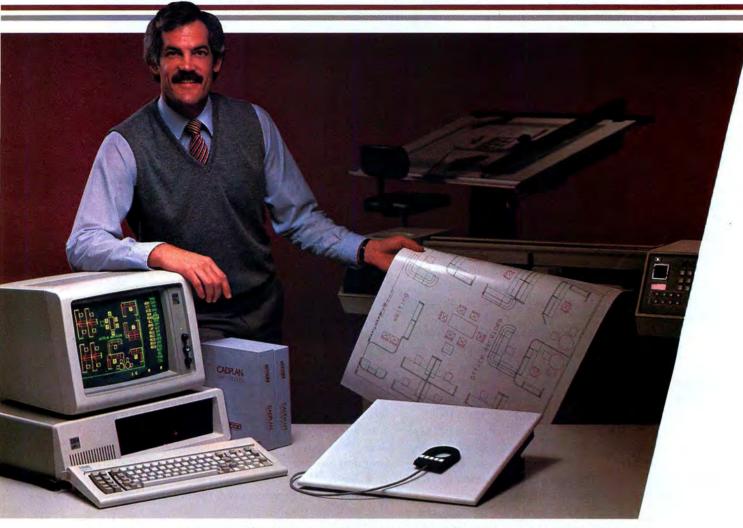
Leading Edge Word Processing's slow screen response is a good example of why the choice of a software package should not be based on feature availability alone. You must give serious consideration to how easy a program is to use and how responsive it is to keyboard commands. Those two issues relate directly to how productive you will be when using the program. ⬤

Merrily Shinyeda is director of The Sierra Group, an office automation market research and consulting company based in Tempe, Arizona.

Btrieve™.
Network and single-user file management for all your programs. All your programming languages.

Fast, flexible b-tree record retrieval.

Say goodbye to writing file management routines. Because now Btrieve™ can handle file management for all your program development on the IBM PC. All your programming languages. And perform the task better than if you had written your own file management program. With Btrieve, you can develop *better* application programs *faster*.

Based on the b-tree file indexing system, Btrieve provides the most sophisticated file handling powers available for the IBM PC. And for multiple PCs. Btrieve™ /N lets you share files among PCs in MultiLink™ PCnet™ NetWare™ or EtherSeries™ local area networks. And both Btrieve and Btrieve/N offer the same superior performance characteristics:

- Interfaces all major IBM PC languages—BASIC, Pascal, COBOL, C, and IBM Macro Assembler
- Written in 8088 Assembler for the IBM PC
- Unlimited number of records per file
- Automatic file recovery on system crash
- User-defined transaction management
- Complete error control and recovery within an application
- Multikey access to records
- Duplicate, modifiable, and segmented keys
- Variable cache buffer from 16K bytes to 64K bytes
- Automatic file organization and b-tree balancing.

Moreover, record retrieval is fast with Btrieve—no matter how large your data base. And with Btrieve's concise, clear documentation, you can begin using Btrieve almost from the moment you load it. So *you* can begin writing programs *faster* with Btrieve.

Say goodbye to file management routines. And hello to Btrieve.

SC SoftCraft Inc.

P. O. Box 9802 #590   Austin, Texas 78766   (512) 346-8380

Suggested retail prices: Btrieve, $245; Btrieve/N, $595. Requires PC/DOS or MS™/DOS, version 1 or 2. Dealer inquiries welcome.

IBM, MS, Btrieve and Btrieve/N, PCnet, MultiLink, NetWare, and EtherSeries are trademarks of International Business Machines, Microsoft Corporation, SoftCraft Inc., Orchid Technology, Davong Systems Inc., Novell Data Systems, and 3Com Corp., respectively.

Please send me information on ☐ Btrieve ☐ Btrieve/N

Name_____

Company_____

Address_____

City, state, zip_____

Phone_____

Send to SoftCraft Inc., P. O. Box 9802 #590, Austin, TX 78766

Mastering the Real Estate Market

Three software packages designed to give you the edge in the volatile world of real estate investment

Michael Guttman

Ever since human beings gave up nomadic life for a more settled existence, finding and maintaining a suitable bit of real estate has been a basic imperative. Today, the traffic in land and the structures on it is one of the most complex games in town. Accordingly, the real estate marketplace has become increasingly confusing. Property values and interest rates, once symbols of stability, are as changeable as any economic indicator. Whether you're buying or selling, financing a real estate transaction means facing a bewildering array of options, each with a different impact on sales price, cash flow, and tax liability.

If you're a buyer, you may experience difficulty in figuring out whether the property you've been eyeing is a sound investment. If you're a seller, you must grapple with determining what constitutes a reasonable price and favorable terms. Either way, you're deluged by industry buzzwords. Even seasoned agents are apt to be swamped by the calculations required to determine the consequences of a complicated real estate deal.

Fortunately, more than a dozen PC vendors now offer software packages that simplify the process of examining real estate alternatives. These packages allow buyers, sellers, and agents to make quick and informed
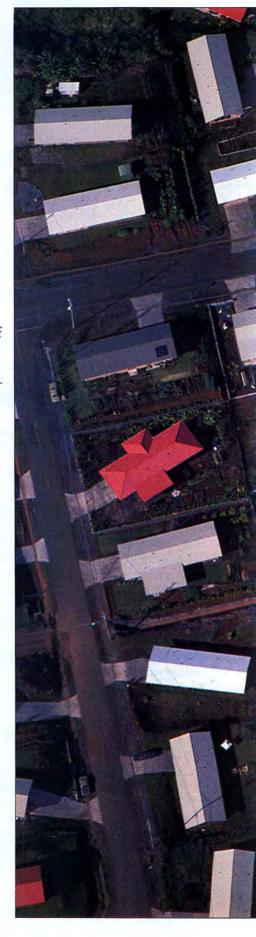
decisions, improving the likelihood of striking a timely bargain. As PCs continue to proliferate, real estate analysis software could become a virtual requirement for the serious professional or investor. Three representative packages are examined here.
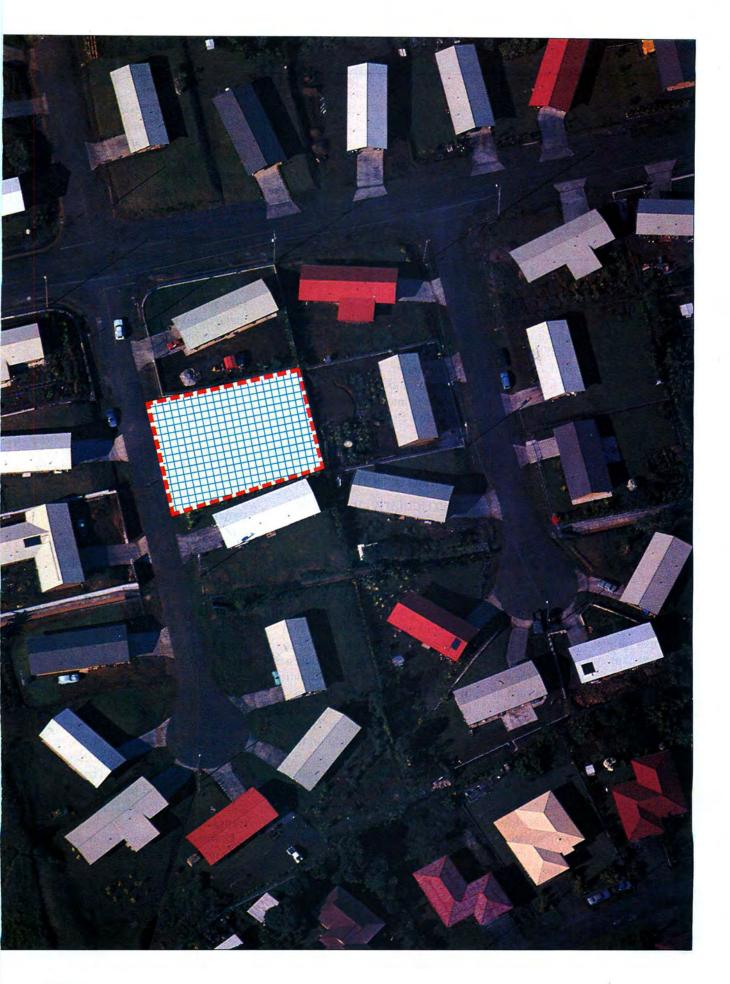
Real Estate Tools I

Real Estate Tools I from Ansonn Software offers a straightforward approach to automating the tedious calculations that accompany any examination of investment options. The package has been crafted to assist real estate offices and individual investors in sorting through financial projections and permutations.

The main menu allows you to select from ten sections, each of which deals with a common financial instrument (loan, mortgage, and the like) or analysis (see Figure 1). Each section contains a submenu of alternatives that cover the chosen topic from top to bottom.

For example, the first section, Regular and Balloon Mortgages, enables you to manipulate terms for a typical mortgage. You supply the yearly interest rate, the number of payment periods, and the mortgage amount; the program will then figure the appropriate loan payment. If the payment is too high for the prospective

⬤ Review

Figure 1: The main menu of Real Estate Tools I

buyer, the amount can be reduced to fit the buyer's limits. You can ask the program to calculate a balloon payment (a large lump sum due after a fixed period) to account for the difference, or you can compute a new mortgage amount or payment period to suit the desired payment amount.

Similarly, *Real Estate Tools I* figures the annual percentage rate (APR) of interest for a variety of terms. The program also allows for seller's points or calculates them to generate a given rate of return. (Seller's points are percentage points on a loan that the seller agrees to pay on the buyer's behalf.)

The sections dealing with level payment leases, graduated payment mortgages, and constant principal mortgages (in which the principal remains constant and you pay only the interest) work in much the same way. For leases, variable elements such as lease payment amount, interest rate, number of payment periods, and residual value (the amount of the loan remaining at any given time) can be manipulated to achieve the desired result. Graduated principal and constant principal mortgages can be calculated and schedules generated for various yields, APRs, or loan rates.

In handling wraparound mortgages, you can generate the terms of a wraparound even when the original loan has a different number of payments per year than the new one or when one loan has level and the other has uneven payments. (A wraparound occurs when a seller leaves current financing intact and agrees to create a new financing instrument directly with the buyer. The new instrument "wraps around" the old.)

If you're interested in construction loans, *Real Estate Tools I* can be a

---

Construction loans are particularly amenable to the PC's magic.

---

real boon. Because of the complex contingencies that come into play in any building project, construction loans are particularly amenable to the PC's magic. This package addresses the problem of cash flow estimation by devising a loan that advances money in varying amounts over the life of a proposed project. The program then calculates yield on the loan.

Similar techniques allow you to come up with grouped and variable cash flows from different loans over different time periods and to calculate their net present value and internal rate of return. (Net present value reflects what a loan is worth in current dollars by matching the loan's

interest rate against the prevailing rate. The internal rate of return is the actual rate of return based on your investment.)

The package also determines net present value, future value (what the property will be worth at a specific future date), interest rates for annuities, and the amount earned when interest is compounded. Finally, the Amortization Schedules section generates projected payments in equal lump sums for any loan that must be spread over a fixed period.

Real Estate Tools I is easy to use. The manual covers system installation and includes examples of all menu options. It also offers clear directions on how to make working copies of the two disks provided. The disks started up without a hitch.

For the transactions I was familiar with, I was able to perform the desired calculations without referring to the manual. In areas where I was less confident, I found the manual very clear, explaining essential procedures and industry terminology. The program uses consistent and logical input and output procedures throughout.

The package worked rapidly and accurately. I particularly like a feature that "remembers" data when you want to move it from one section to another. This option enables you, for example, to figure a monthly payment based on the price of the property or to calculate your maximum price based on your desired monthly payment (see Figure 2). In the example, values were entered in the Solve for Payment section. Values from that section that were relevant to the Solve for Price to Pay calculation did not have to be reentered. That data could then be used to answer other questions pertaining to the transaction.

Unfortunately, *Real Estate Tools I* does not allow you to store any information on disk for future reference. This is a minor inconvenience for simple mortgages or leases, but it could be a real headache when you recompute cash flows and construc-

tion loans. To correct any one item of data, the program requires that you run through the data you have already entered, forcing you to repeatedly hit the <Enter> key. While this sometimes makes sense, it can be a nuisance. In addition, the program cannot calculate a transaction's tax consequences.

Another flaw lies in the printout routine, which limits the title of a printed report to one short line. The routine does not specify which section of the program is generating the printout, making modifications difficult. Whether you want it to or not, the program prints the system date and time on every report. Both the date and the time must be set correctly when the disk is introduced and can't be changed without starting again.

On the whole, these problems are minor and do not detract from the program's comprehensive features and solid performance. My compliments to the publishers for their lucid and legible manual and for the program's straightforward operating procedures.

Real Estate Strategy

Real Estate Strategy, from Real Estate Computer Center, is another impressive offering. This package tackles the problem of real estate analysis from a new and refreshing angle—or angles.

Real Estate Strategy allows you to build a complete model of a real estate deal from the perspective of either a buyer or a seller. The object is to achieve the right price and terms to consummate a sale. In the process, the program offers credible approximations of actual situations.

This approach can be used for any sort of property transaction, but it is particularly useful for those that involve large investment properties such as apartment buildings. *Real Estate Strategy* enables you to fashion a comprehensive financial model of an apartment building, including such data as the number of units, the aver-

```
DATE   01-15-1984
TIME   13:36:13


         1356 WYCLIFF BLVD–EMELIA JONES

              SOLVE FOR PAYMENT


      DESCRIPTION                        VALUE OR AMOUNT

NUMBER OF AMORTIZATION PERIODS                360.00
ANNUAL INTEREST RATE AS A PERCENT       12.000000000
NUMBER OF PAYMENT PERIODS PER YEAR               12
AMOUNT OF MORTGAGE                          37500.00
AMOUNT OF MORTGAGE PAYMENT IS                 385.73
BALLOON OR PAYOFF AMOUNT                        0.00
END OF PERIOD PAYMENTS


DATE   01-15-1984
TIME   13:39:44


         1356 WYCLIFF BLVD–EMELIA JONES

            SOLVE FOR PRICE TO PAY


      DESCRIPTION                        VALUE OR AMOUNT

NUMBER OF AMORTIZATION PERIODS                360.00
NUMBER OF PAYMENT PERIODS PER YEAR               12
PERIODIC PAYMENT                              400.00
BALLOON OR PAYOFF AMOUNT                        0.00
ANNUAL DISCOUNT RATE AS A PERCENT       12.000000000
PRICE OF THE MORTGAGE IS                    38887.33
END OF PERIOD PAYMENTS
```

Figure 2: Output from Real Estate Tools I

age rent per unit, the vacancy rate, the property tax rate, the insurance rate, maintenance and utility costs, the resident manager's salary, and professional management fees. The model also takes into account the loans and terms outstanding, the current interest rates and desired cash flow, the return on investment, and the down payment—all variables that enable the program to calculate an appropriate selling price.

The program's capacity to take into account changes in all the expense and income categories during each of five succeeding years is even more exciting. The package also recalculates rent to bring it in line with the desired price and terms. Calculations for price and terms include the ability to handle second mortgages and wraparounds and to display and compare two sets of prices and terms simultaneously.

Real Estate Strategy is likely to gain popularity among real estate agents. Since they must view a real estate deal from both the buyer's and seller's perspectives, agents are apt to use *Real Estate Strategy* to gain a substantial competitive edge. Using the program as a sales tool, an agent can sit down at a PC with a buyer and/or a seller and hammer out a deal on the spot.

Valuable as the program is for agents, there are real benefits here for buyers and sellers as well. If you want to sell property, for instance, you can determine the price that would meet both your minimum objectives and those of a prospective buyer. Tinkering with the myriad options by hand would be a formidable task, and a single error or omission could cause serious over- or under-pricing. With

```
                    APARTMENT   BUILDING   ANALYSIS


                         PROFIT — LOSS
    _____

    SELLER'S ASKING PRICE      ................................ 4,850,000
    DOWN PAYMENT      ( 25.0%)  ................................ 1,212,500
    GROSS INCOME               100.0%    ....................     390,454
    FIXED EXPENSES              49.5%    ....................     193,436
    NET INCOME                 50.5%    ....................     197,018
    EXISTING LOAN     ( 30.7%) 1,490,000    9.63%  —  28.9 YRS   153,000
    NEW SECOND LOAN   ( 44.3%) 2,147,500   10.00%    Int. Only   214,750
    AMORTIZATION       0.83%      10,022   CASH FLOW  −14.08%   − 170,732


    In Order To Exactly Break Even (Zero Cash Flow)  :
    The Rent Must Be Raised   $208.98 ( 47.53%) To   $648.68/Apt OR
    The Price Must Be Lowered By 37.06% To   $3,052,817

    _____

    SEE EXPENSES    = 1    CHANGE METHOD = 2    CHANGE DATA  = 3
    CHANGE TERMS    = 4    SEE PROJECTIONS   = 5    NEW BUILDING = 6
```

Figure 3: Profit-loss calculation produced by Real Estate Strategy

Real Estate Strategy, you and your agent can work out several alternatives in a few hours. In addition, the program makes it possible for you or your agent to respond immediately to an offer to buy—and it even offers alternate terms that may be more attractive to buyer and seller alike.

If you're in the market to buy, *Real Estate Strategy* lets you quickly evaluate properties to discover whether they are overvalued or undervalued. You can calculate the seller's best offer—below which he or she cannot go without a loss—and enter the negotiations well armed. And you can experiment to see the effects of differing terms by using the program to concoct a deal that meets the seller's price but still remains attractive to you.

Figure 3 shows *Real Estate Strategy*'s approach to profit-loss calculations. To produce this type of report, you first enter building and finance data. The PC then computes a profit-loss statement containing an analysis footnote that indicates the rent or price adjustment necessary to meet a zero-cash-flow (or break-even) point. Another feature of the program permits you to adjust the five-year projections and generate a new profit-loss statement (see Figure 4). The process can be repeated until you achieve an arrangement agreeable to all parties.

Real Estate Strategy really shines when it analyzes apartment building transactions, but the program also contains an excellent set of routines for handling single-family dwellings. These routines can determine the affordable price of a home, a prospective buyer's minimum qualifying salary, and financing terms to suit that buyer. All these routines are easy to use and work flawlessly.

Real Estate Strategy does have a few minor drawbacks. First, you can print reports only by using the PC's page print function. Because of this, you must constantly adjust the

printer paper to top-of-form to get printouts on different pages. In addition, the program has no facility for placing names, dates, or other header information on its printouts—an annoying omission. The data entry method is also unsatisfactory. After you have entered a list of data, you can change an element only by running through the entire list again. The program does retain the original values, but because it doesn't display them, it's not clear that the values remain. This could present problems unless you make fairly frequent printouts.

The manual accompanying *Real Estate Strategy* is comprehensive and well written, and it contains excellent examples of the program's modeling routines. Unfortunately, its small print is hard on the eyes and might discourage you from reading an otherwise excellent guide.

```
                    A P A R T M E N T   B U I L D I N G   A N A L Y S I S


                                    P R O J E C T I O N S


                        1ST YR        2ND YR        3RD YR        4TH YR        5TH YR
         TAXES          2.0%          2.0%          2.0%          2.0%          2.0%
         INSURANCE      7.0%          7.0%          7.0%          7.0%          7.0%
         UTILITIES      15.0%         15.0%         15.0%         15.0%         15.0%
         MAINTENANCE    7.0%          7.0%          7.0%          7.0%          7.0%
         RES MGR        5.0%          5.0%          5.0%          5.0%          5.0%
         PROF MGT       5.0%          5.0%          5.0%          5.0%          5.0%
         VACANCY        2.0%          2.0%          2.0%          2.0%          2.0%
         MISC           1.0%          1.0%          1.0%          1.0%          1.0%
         RENT RAISE     2.78%         2.82%         2.86%         2.91%         2.97%
         CASH FLOW      $20,370       $42,207       $65,594       $90,614       $117,351


         REDO RENT = 1          YEAR OF SALE = 2–5        REDO PROJ = 6
```

Figure 4: Five-year projection produced by Real Estate Strategy

Real Estate Strategy does not include a feature for projecting the effects of variable interest rates and payment schedules. It also does not include an ability to determine the tax consequences of a transaction, particularly as they affect a seller.

Including these factors might have made the program too complicated, detracting from the ease of use that is part of its appeal. These omissions do not seriously diminish the power and utility of this generally well-conceived application. I recommend *Real Estate Strategy* to prospective buyers and sellers of real estate—and especially to real estate agents, who will find it an effective tool in negotiations.

Real Analyzer

Real Analyzer, from Real-Comp, performs most of the major functions of the other two packages plus several new and useful tricks. Like *Real Estate Tools I,* the program is intended for individuals who want to look at a variety of scenarios for a proposed transaction, and it's explicit about its applications for both buyers and sell-

ers. *Real Analyzer* includes factors for determining tax consequences, variable interest rates, deferred interest, unequal loan payments, depreciation, land value, and the value of alternative investments.

Like *Real Estate Strategy, Real Analyzer* supports five-year projections, but its extrapolations are more comprehensive because they include a greater number of variables. The manufacturer claims that a recent revision calculates projections in five-year increments for an infinite number of years.

This package can also produce well-formatted, extremely comprehensive reports that show a prospective real estate deal from a variety of angles. Figure 5 shows one five-year projection for a house transaction.

Unlike the other two packages, *Real Analyzer,* which is written in Compiled BASIC, enables you to store data from a real estate model on disk. This feature alone makes *Real Analyzer* worth serious consideration.

On the down side, I found much of *Real Analyzer* difficult to use. The manual, for instance, which is organized like a glossary and gives a new user almost no help, is unreadable.

The program's menu flow is confusing and inconsistent. For example, the module for entering data on vacancy rates, rents, and various building costs is located where you would least expect it, under the print menu. Its seemingly inappropriate location becomes comprehensible, however, when you find that this data is not used for calculating the analysis at all—a real failing right there—but can be generated only for purposes of jazzing up the printout. This is proof, perhaps, of the manufacturer's tendency to load *Real Analyzer* with features of only marginal importance.

The title menu is another mistake. You're stuck there until you save a title file to disk or do a complete exit that destroys all the data you have entered to that point. The manual gives no hint of how you get out of this predicament.

In yet another instance, the program prompts you to enter a loan type by number but does not give

ANALYSIS ... YEAR END $
★★★★★★★★★★★★★★★★★★★★★★★★★★★★

	1 / 1984	1984	1985	1986	1987	1988
VALUE	120,000	129,600	139,968	151,165	163,259	176,319
LOANS	108,000	107,514	106,971	106,366	105,691	104,938
EQUITY	12,000	22,086	32,997	44,799	57,568	71,381

★★★★★★★★★★ CASH FLOW + ★★★★★★★★★★

RENT		8,736	9,435	10,190	11,005	11,885
LOAN PAYMENTS		− 12,342	− 12,342	− 12,342	− 12,342	− 12,342
PROP. TAX		− 1,440	− 1,469	− 1,498	− 1,528	− 1,559
OTHER EXP.		− 449	− 539	− 582	− 629	− 679
NET BEF. TAX		− 5,545	− 4,915	− 4,233	− 3,494	− 2,695
INCOME TAX		4,654	4,644	4,632	4,618	4,602
NET AFTER TAX		− 892	− 271	400	1,124	1,907
ALTER. INVST'T		− 905	− 996	− 1,053	− 1,070	− 1,043
EQUITY GROWTH		10,086	10,911	11,802	12,768	13,814
TOTAL		8,289	9,644	11,149	12,822	14,678
CUM.		8,289	17,933	29,083	41,905	56,582

★★★★★★★★★★ SUMMARY ... $/MONTH ★★★★★★★★★★

NET BEF. TAX		− 439	− 410	− 353	− 291	− 225
INCOME TAX		388	387	386	385	383
NET AFTER TAX		− 74	− 23	33	94	159
ALTER INVST'T		− 75	− 83	− 88	− 89	− 87
EQUITY GROWTH		841	909	984	1,064	1,151
TOTAL		691	804	929	1,068	1,223

TOTAL IS THE DIFFERENCE BETWEEN PAYING RENT AND OWNING
(GIVEN THE ABOVE ASSUMPTIONS THAT INCLUDE A 9 % RETURN ON INVESTMENT)

Figure 5: Five-year projection for a house transaction produced by Real Analyzer

you a menu of choices; once you enter a selection, however, the menu appears and *Real Analyzer* prompts you for the selection again. In the same section, the program sometimes prompts you for a first-payment date, sometimes not. Nowhere is the reason for this explained or illustrated, and it is certainly not obvious from the context.

This sort of confusion is all too common in *Real Analyzer,* making much of the program a torture if you are a new user. I wish this weren't so because once mastered the program produces good results, contains a host of useful features, and operates quickly and consistently. But you need considerable determination to learn the program and master its idiosyncracies. In addition, its clumsiness and complexity may ward off the uninitiated, rendering it almost useless as a direct sales tool.

If the manual were improved, the program flow clarified, and building data included in the analyses and projections, this would be the program to choose when you need exhaustive analysis of a potential real estate deal. As is, it has the necessary computing muscle but not the necessary grace of execution. I can still recommend *Real Analyzer* if you've got the perseverance to overcome its limitations.

Summing Up

If you are shopping around for a real estate analysis package—as well as for property itself—make sure you know your needs. Packages such as *Real Estate Tools I* and *Real Analyzer* are designed to help individuals work out alternatives and generate projections such as amortization or leasing schedules. *Real Estate Strategy* and programs like it are really negotiating tools for use directly with prospective buyers or sellers. Both types of packages have a place in the market, and serious investors may want to consider owning more than one real estate analysis package as circumstances dictate.

Overall, these programs are of enormous help if you are among those who buy, sell, rent, finance, or broker real estate—and that's most of us. If you use and master this genre of software, you are bound to gain a decided advantage in the marketplace. I expect these packages will become increasingly popular, soon to be joined by similar offerings from other vendors. ▰

Michael Guttman is vice president of research and development for Bythell Computer Systems in Chico, California.

Real Estate Tools I
Ansonn Software Inc.
2801 N. Surrey Dr.
Carrollton, TX 75006
214/446-4340, 214/867-2760
List price: $299
Requirements: 128K, two double-
   sided disk drives, DOS 1.10 or
   higher

Real Estate Strategy
Real Estate Computer Center, Inc.
1777 Saratoga Ave.
San Jose, CA 95129
408/257-4411
List price: $395
Requirements: 128K, one double-
   sided disk drive, DOS 1.10 or
   higher

Real Analyzer
Real-Comp, Inc.
P.O. Box 1263
Cupertino, CA 95015
408/996-1160
List price: $195
Requirements: 128K, one double-
   sided disk drive, DOS 1.10 or
   higher

There's light

The event
is jr.

The home computer event.
IBM PC*jr* is destined to become
one of the most successful
computers in history. And a
multi-billion dollar market for
compatible add-ons and software
is inevitable. The projections
for IBM's total unit sales, total adver-
tising budget, and ultimate impact
on the marketplace are being revised
weekly. But everyone familiar with IBM and the
enormous influence of the IBM PC has arrived
at some firm conclusions:

- IBM's prowess in the home computer market will
  eventually equal its strength in the mainframe
  market.
- Users of the PC*jr* will demand a vast spectrum of
  add-ons and software to meet their expectations.
- In the rush to bring information to this market, a
  handful of magazines will establish themselves as
  the primary marketing vehicles.

The publishing event.
The world's leading computer
publisher has now created a
magazine specifically for the
world's newest home computer.
It's called **jr**.
We have consistently set industry
standards with system-specific magazines for
the home and office. If you're looking for the best
way to establish your products as leaders in the PC*jr*
add-on and software market consider this:

- Last year Wayne Green and CW Communications
  together sold over 16 million computer magazines—
  over 50% more than any other computer
  magazine publisher.
- We created the system-specific magazine.
- We now publish magazines specifically for the Apple
  Computer, Radio Shack Computer, Radio Shack Color
  Computer and Commodore home computers.
- Our charter advertising rates for **jr** are very attractive,
  and are *in effect for a limited time only.*

The IBM PC*jr* market is about to take off. And **jr** is
going to take off with it. We cordially invite you to join
us. Today. Call **800/441-4403** or **603/924-7138** and
talk to David Ferrante about charter rates.

The Wayne Green Publications Group
Division of CW Communications, Inc.
80 Pine Street Peterborough, NH 03458

jr.
For IBM's Home Computer

at the end of th

e PC tunnel.

Video 310A Monitor (amber)	179.
Color II RGB Monitor	439.
MAI Board (color & monochrome)	439.

CompuCable
Plastic Keyboard & Drive Cover Set	17.
IBM Mono Screen Enhancement	17.
Printer to IBM Cable (specify printer)	32.
Smartmodem to IBM Cable	25.

Curtis
Low Profile Tilt & Swivel Pedestal (for any monitor)	44.
PC Pedestal (for IBM Mono or Color)	59.
PGS or Quadchrome display adapter	9.
System Stand (holds PC vertically)	21.
Extension Cables for IBM Mono Display	44.
Keyboard Extension Cable (3 to 9 feet)	36.
AC Plug Adapter (any monitor to PC)	8.

Electronic Protection Devices
All are rated at 1875 watts, 15 AMP.
The Lemon	39.
The Lime	59.
The Peach	64.
The Orange	94.
The Ground Hog (static eating mat)	69.

Epson
RX-80 with GRAFTRAX-Plus	call
RX-80 F/T with GRAFTRAX-Plus	call
FX-80 with GRAFTRAX-Plus	call
RX-100 with GRAFTRAX-Plus	call
FX-100 with GRAFTRAX-Plus	call
Epson to IBM Parallel Cable	32.

FTG Data
Light Pen (Push Tip)	159.
Demo Disk Set for Light Pen	39.

Hayes
Smartmodem 300	209.
Smartmodem 1200	499.
Smartmodem 1200B (w/Smartcom II)	419.
Smartcom II	99.
Compucable's Smartmodem-to-IBM Cable	25.

Hercules Computer
Hercules Graphics Card (parallel port)	349.
Graph-X Software	42.

IDS
Prism 80 Printer (with all four options)	1397.
Prism 132 Printer (with all four options)	1597.
Prism to IBM Parallel Cable	32.

key tronic
Typewriter style keyboard (KB 5150)	call
Deluxe keyboard (KB 5151)	call

Koala
Koala Touch Tablet with software (connects to game port)	97.

Kraft
Joystick	39.
Game Paddles (pair)	29.

Maynard Electronics
Floppy Drive Controller	165.
Internal Hard Disk (10 Meg). WS-1 Controller & ROM for PC mother board	995.
Internal Hard Disk (10 Meg). WS-2 Controller & ROM for PC mother board	1169.

Microsoft
System Card 64k (upgradeable to 256k) w/clock calendar & serial and parallel port	249.

Mouse Systems
PC Mouse (3 button optical mouse comes with power supply, desk pad, and software — connects to serial port)	197.

NEC
Spinwriter 3550 (IBM-PC compatible)	1699.
Spinwriter 2050 (3550's little brother)	995.

Novation
Access 1-2-3 (includes Crosstalk XVI)	389.

Paradise Systems
MultiDisplay Card (color & monochrome)	379.

Plantronics/Frederick
COLORPLUS (now w/Color Magic)	call

Princeton Graphics
HX-12 RGB monitor (690 x 240))	call
SR-12 RGB monitor (690 x 480)	call
MAX-12 Amber monochrome monitor	call

Quadram
We are a full line Quadram Dealer
New Expanded Quadboard 64k expandable to 384k, with clock calendar, parallel, serial & game port. I/O bracket, and Quadmaster software	269.
Microfazer Printer Buffer (parallel) w/copy MP 64 (64k) upgradeable to 512k see special	
Quadcolor I	197.
Quadchrome RGB Monitor	497.
Quadlink (allows you to run most Apple II programs directly on your IBM-PC or XT)	459.
Quadisk (various sizes to 72 meg)	call

STB
Graphix Plus (color & monochrome)	379.

Silver Reed (letter quality, 132 column)
Silver Reed EXP 550 Printer (16 CPS)	589.
Silver Reed EXP 770 Printer (30 CPS)	950.

TG
Joystick	45.

USI (monitors for graphics board)
Pi-2 Monitor (12" green. with cable)	149.
Pi-3 Monitor (12" amber. with cable)	159.

DRIVES
All drives are completely pre-tested. Specify Drive A or Drive B for your PC. Comes with complete step by step installation instructions.

Tandon
TM100-2 (5 1/4") full-height drive (DS,DD)	239.

TEAC
55BC (5 1/4") half-height drive (DS,DD) Free 'y' cable & bracket each pair	189.

MEMORY
64k Memory Upgrade Set for IBM-PC or XT system board	59.
64k Memory Upgrade Set for any memory board specify make of board	59.
Install memory upgrades & run diagnostics at time of board purchase only	10.

DISKS
Verbatim (with 5 year guarantee)
Datalife Disks SS/DD plastic box of 10	27.
Datalife Disks DS/DD plastic box of 10	37.
Disk Drive Analyzer	29.
Flip Sort (holds 75 disks)	19.

INFORMATION SERVICES
Compuserve
Compuserve Information Service includes subscription, manual, 5 hours of connect time, & monthly publications)	39.
Executive Information Service	79.
Vidtex Software	59.
Executive Information Service with Vidtex	119.

Source Telecomputing
The Source (subscription & manual)	69.
The Source with Sourcelink Software	109.
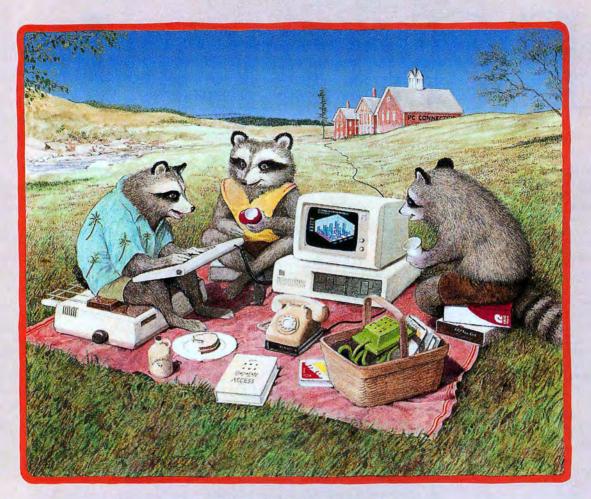
PC Picnic.

Please pass the peripherals.

It's spring here in Marlow, NH (pop. 542). The sap is flowing from the sugar maples. The snow is finally melting, and we're in a festive mood. We're PC Connection. We sell add-ons and software for the IBM-PC, and only the IBM-PC. We back every sale with straight talk, common sense, and fast service.

If you look long and hard you may find someone beating our prices by a few dollars. But no one is going to give you better support, better information, or better service. Because we intend to be your single source for IBM-PC add-ons and software for many years to come.

PC a la carte.

Our smorgasboard of products for the IBM-PC offers everything you or your motherboard could desire. Disk drives, video monitors, printers, controller cards, memory upgrades, modems, mice, and amenities. Software for business, word processing, games, and education.

1 Pint, 100% pure New Hampshire Maple Syrup. Grade A. Medium Amber. Boiled on wood fires down the road at Steppingstone Farm. Limit one per customer. Offer not available to commercial accounts.

One call to PC Connection, or a visit to our showroom, is all it takes to solve your PC perplexities once and for all.

You may have heard people say that putting together the ideal personalized PC system is no picnic. Those people are wrong. It is a picnic. (Wait till you hear what's for dessert!)

Pour it on.

Maple Syrup has been replaced by PC peripherals and software as Marlow's major export. But, we haven't forgotten our roots. So we're sending a little taste of pure New Hampshire to anyone who places a $500.00 order with us between now and June 30.

Just call 800/243-8088 or 603/446-3383. We're open Monday through Friday 9 AM to 9 PM, and Saturdays 9 AM to 5:30 PM. If you're planning to visit us, call ahead to make sure what you want is in stock.

For the IBM-PC exclusively.

PC←CONNECTION™

Don't miss your Free copy of

Get More Out of Your PC

Subscribe before September 30!

Save 58% and get this book FREE!

Please enter my subscription for the term checked below and rush my FREE copy of **Get More Out of Your PC!** I'll save 58% off the newsstand price and 21% off the regular subscription rate.

☐ 14 issues/$18.95 ☐ 28 issues/$33.50 ☐ 42 issues/$47.00

☐ Bill me ☐ Payment enclosed

VISA and MasterCard accepted—call TOLL-FREE: 800/247-5470 (in Iowa 800/532-1272).

Name _____

Company _____

Address _____

City, State, Zip _____

Get More Out of Your PC

(For IBM PC, XT, PCjr and IBM Compatible Personal Computers)

Written by the world's leading computer journalists and software authors

Edited by
PC WORLD

Please allow 6-8 weeks for delivery of your first issue. Outside the U.S. subscriptions must be prepaid in U.S. funds. Outside the U.S. and Canada, add $25 per year for surface mail or $110 per year for airmail.
Offer expires September 30, 1984

PC W●RLD

J2260

BUSINESS REPLY CARD

FIRST CLASS   PERMIT NO. 63   BERGENFIELD, NJ

POSTAGE WILL BE PAID BY ADDRESSEE

PC World
Subscription Department
P.O. Box 6700
Bergenfield, New Jersey 07621

Get More Out of Your PC

Manage Your Information Effectively

Annual Hardware and Software Reviews

Stay Informed and Knowledgeable

PC World shows you how other users are turning their PCs into incredible time-saving tools, using them for spreadsheet analysis, word processing, communications, information management, and much more. You'll learn how people are using PCs to solve all kinds of problems in all kinds of businesses.

Stay Informed and Knowledgeable. At *PC World,* we're PC users ourselves. We constantly review and evaluate the newest in portable PCs, printers, communications interfaces, and software. We tell you what other PC users think, too. So you'll always know what's coming, what to look for, and how to make smart buying decisions.

Annual Hardware and Software Reviews. Compiled by *PC World*'s editorial experts, the annual special issues are the

most thorough reference guides available to products for the IBM PC and compatibles. The hardware and software reviews include specs, sources of supply, and price ranges—everything you need to make the buying decisions that are right for you.

PC World is the only magazine that covers it all—consistently, professionally, and thoroughly.

Free Book with Your PC World Subscription. Now available for the first time, *Get More Out of Your PC* contains more than 100 pages of articles, reviews, tips, advice, and how-to help. You'll learn how to use a spreadsheet to maintain your stock portfolio, choose the word processing program that's right for you, keep track of your business expenses with a data base, choose a

modem, have a computer correct your spelling, and much, much more.

Special Limited-Time Offer. Now for a limited time only you can take advantage of this special introductory offer and save 58% off the newsstand price (21% off the regular subscription rate) of *PC World.* You'll get 12 monthly issues and 2 special issues of *PC World* PLUS a free copy of the valuable reference book, *Get More Out of Your PC.* But supplies are limited; you must subscribe before September 30, 1984, to take advantage of this special offer.

Guarantee. If *PC World* doesn't live up to your expectations, cancel your subscription for a full refund on all unmailed issues. No questions asked. The book *Get More Out of Your PC* will still be yours to keep.

PC WORLD

For Game Gourmets

Strategy, superb graphics, and danger make these three polished performers a joy to play.

Keith Richard Cook

Video screens able to project a true three-dimensional image are a long way off for the average PC owner, but two of this month's games, *J-Bird* and *Shultz's Treasure*, have three-dimensional graphics simulations that look almost as good as the real thing. *Pits & Stones* uses a two-dimensional image, but its graphics are on a par with the other two games. And all three are as much fun to play as they are to look at.
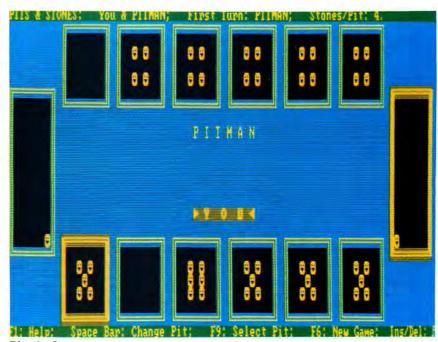
Pits & Stones

If you are tired of trendy games that thrill you today but bore you tomorrow, take a look at *Pits & Stones*, a strategy game that originated in North Africa thousands of years ago. Now, thanks to the computer revolution and Foundation Software, you can play *Pits & Stones* on an IBM PC.

Playing the Game

Pits & Stones is similar to checkers, go, and backgammon in that it consists of a board and two groups of markers and is a strategy game that is easy to learn yet difficult to master.

The *Pits & Stones* playing "board" consists of two horizontal rows of six pits each, one row for yourself and one for your opponent. These rows

Pits & Stones

are at the top and the bottom of the screen. At the far right is one large pit, and at the far left is another. The pit on the right is your home pit, and the one on the left is your opponent's. As play begins, an equal number of stones lie in each pit in the top and bottom rows. The object of *Pits & Stones* is to get the majority of the stones into your home pit.

The rules are simple. Let's say you move first. Choose a pit in your row, any pit. Once you enter your pit selection, all the stones, which are represented by ASCII happy-face characters, file out of that pit. As the group of stones marches by the other pits in a counterclockwise direction, one stone drops into each pit in turn. If the last stone lands in your home pit, you get another turn. If the last

⬤ Review

stone lands in an empty pit in your row, you capture all the stones in the opposite pit of your opponent's row.

Although the rules are simple, the strategy is complicated. Your main task is to figure out which of your six pits to empty. Emptying a pit changes the number of stones in the other pits, which in turn changes the distribution and possible movements of stones among those pits.

To beat Pitman, your worthy computer adversary, you must be able to think at least two moves ahead. If you make this move, can Pitman make that move? If he does, what does it mean? And how should you respond? The action gets as convoluted and confusing to follow as a soap opera.

Evaluation

Pits & Stones offers a great show, especially in color, and has enough visual and musical gimmicks to make it a delight for even young children. Two- and three-year-olds may not understand the game or the rules, but they will probably never grow tired of pushing keys and seeing all the happy faces strut from pit to pit like a miniature marching band.

The game has six skill levels, ranging from one stone per pit to six stones per pit. You can play against either Pitman, who will embarrass you time after time with his brilliant play, or a friend.

Pits & Stones makes full use of the PC function keys. You can get on-line help, game history, and demonstration modes with <F1>, start a new game when it becomes obvious that all is lost with <F6>, or enter your pit selection with <F9>. The <Ins> and <Del> keys are toggles for the sound effects. Waterfall sounds accompany the happy faces as they file into their pits. Eight different tunes set the tone for the action, including "For He's a Jolly Good Fellow" if you win and "Taps" if you lose.

Whenever you capture your opponent's stones, or someone gets another turn, or one player runs out of stones, huge, flashing block letters announce the news. Your kids should enjoy the drama, but you may need a pair of polarized sunglasses to diminish the glare.

Pits & Stones works well on either a color or monochrome monitor. The color graphics are superb, but because color play requires additional memory, the action in color is slower. Your PC needs at least 128K of RAM to run the game with DOS 1.10, or 192K with DOS 2.00.
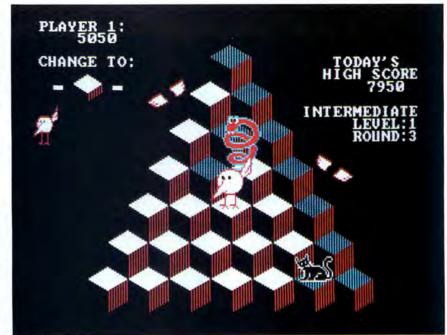
Pits & Stones is a game for people of all ages. Preschoolers can win on levels one and two, and even learn to count. But at levels five and six even a mathematician will have trouble figuring out which stones to move.

Any game that's been around as long as *Pits & Stones* must be fun. Just think, after a few games of *Pits & Stones,* you'll have forged a link with your ancestors—and maybe your descendants, too.

J-Bird

Did you ever see the British television show "The Prisoner"? It starred Patrick McGoohan as an ex-spy who, suspected of being a double agent, is kidnapped and incarcerated in a bizarre place called The Village. Each week he tries to escape, and every time they run him down with a weather balloon.

I mention this because of the remarkable similarities between "The Prisoner" and *J-Bird,* an arcade action game for the PC. Could the *J* in *J-Bird* stand for *jail?* McGoohan was a jailbird in a prison in which he was free to move about, but he awoke every morning to find that the rules had changed. J-Bird, too, is free to move within the confines of an odd, three-dimensional pyramid, and he

J-Bird

must overcome new obstacles at each new level. And both McGoohan and J-Bird are chased by large round objects.

Perhaps the most convincing evidence of their similarities is in their faces. Add some tousled hair and a few dimples to J-Bird, or stick a beak on McGoohan's face, and the resemblance is astounding. Is it coincidence or merely a figment of this game reviewer's imagination?

Whatever the answer, one fact stands out: "The Prisoner" might have been an allegory for individual rights versus the state, but *J-Bird* is just plain fun.

Playing the Game

The action in *J-Bird* takes place on a three-dimensional pyramid consisting of 28 cubes: 7 on the base, 6 on the next tier, then 5, and so on. At the beginning of each round, the cubes are all the same color or shading. When J-Bird appears at the top of the pyramid, he must hop from cube to cube. As he does, each cube changes from its original color to a target color. If he succeeds in changing the color of all 28 cubes to their target color, he advances to the next round.

But nothing in life, or video games, is that easy. Magic globes drop from the top of the screen onto the second-highest cubes, then plop haphazardly from cube to cube until they either fall off the bottom cubes or touch J-Bird. If the magic globes touch J-Bird, it's bye-bye birdie.

King-Bo, the snake, is an even greater threat to J-Bird's life. King-Bo hatches from a large magic globe that plops from cube to cube like the other globes. Instead of falling off the bottom cubes as the other globes do, this one hatches open to reveal King-Bo, a large, spring-coiled serpent. King-Bo immediately hops after J-Bird, and it's sudden death for J-Bird if King-Bo gets him.

And that's not all. At various rounds, and more so at the higher skill levels, clumsy cats jump onto the pyramid from the lower right and left corners and jump every which way, including off the pyramid. Although they are out to get J-Bird, they can't seem to move in a direct path—an unpredictable situation that creates a sense of danger.

Finally, J-Bird must contend with Hob and Nob, two grinning frogs who drop onto the top cube and quickly leap downward from cube to cube and off the pyramid. They can't kill J-Bird; in fact, J-Bird can eat them if he catches them. If he's smart, he'll catch them fast, because any cube they hop onto changes back to it's original color.
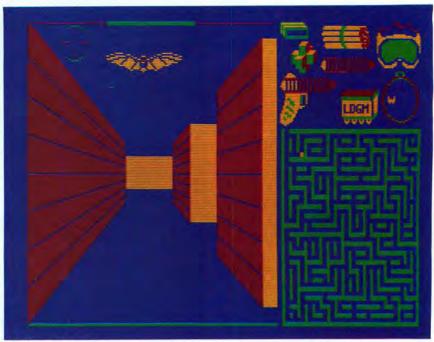
At the upper skill levels, J-Bird must land two or more times on each cube to get all the cubes to their target color. The more time he spends on each pyramid, the greater the odds that he will chirp his last tune.

Luckily, J-Bird has two tricks. Each time a new pyramid appears, two or more sets of wings appear just off the sides of the pyramid. Although J-Bird normally can't fly, when he is chased by King-Bo he can hop off the pyramid and into a set of wings. The wings then fly him all the way to the top of the pyramid. If J-

---

You may find yourself playing *J-Bird* until your eyeballs glaze over and your face is a jumble of nervous tics.

Bird waits to jump into his wings until just before King-Bo pounces on him, King-Bo will obligingly jump off the pyramid to his death.

J-Bird can also snag a time globe that occasionally drops onto the pyramid with the rest of the globes. Catching a time globe freezes everything on the pyramid for a few seconds, except J-Bird, who is then free to escape, change cube colors, or eat Hob and Nob.

Shultz's Treasure

J-Bird has four skill levels—Novice, Intermediate, Advanced, and Brutal—and four rounds per level. The ten highest scores per level are saved on disk. You score points each time you change a cube's color, lure King-Bo to his death, catch a time globe, eat a frog, or change the color of all 28 cubes on a pyramid. And you get an extra J-Bird every 8000 points. You can play *J-Bird* with either a joystick or the keyboard, by yourself or with a friend.

Evaluation

Each time you begin a new level, *J-Bird* plays a song and runs you through a demonstration of the action you will face at that level. The song is cute and the demo is helpful—the first few times. Then they become undesirable interruptions. How about an escape key command that gets you directly into the next game?

Although you can rack up points in a variety of ways, scoring is, unfortunately, the same on all four levels. In the harsh world of computer games, points are strokes—a tough level should bring more points than an easy one.

The sound effects in *J-Bird* are very amusing, except when J-Bird touches one of the magic globes. That awful sound makes me think of someone biting down hard on a railroad spike.

My only other criticism of *J-Bird* is that after a few hours of nonstop play, the three-dimensional cubes seem inverted, like optical art. In every other respect—freedom from errors, consistency of play, graphics quality, and challenge—*J-Bird* gets high scores. You may find yourself playing the game until your eyeballs glaze over and your face is a jumble of nervous tics. Kids love the sharp graphics, the sound effects, and the intense play, and they empathize with little J-Bird's struggle to overcome the forces of oppression.

Shultz's Treasure

In most arcade games, you direct the movements of a player on the screen. But in *Shultz's Treasure* you are the player: three-dimensional graphics place you in the middle of the action.

The beginning of the game puts you at the entrance to the Lost Dutchman Gold Mine, a complicated, three-dimensional labyrinth first explored by the brilliant (but probably lost forever) inventor and explorer Ken Shultz.

Shultz disappeared about a month ago somewhere in the mine, but he left behind a few goodies to help you find the Mother Lode: a map, a compass, dynamite, goggles that enable you to see in the dark, and a mine car. Shultz also left a couple of clever inventions: a pathfinder that indicates exactly where you are on the map and a gold ore detector that flashes yellow and red when you approach the gold. Since the gold is buried out of sight, you can imagine the value of an ore detector.

When you enter the mine, you must have a fully loaded, 12-shot chemical "mazer" gun with an extra clip. Don't think you can just stroll into the mine and pluck out gold ore like flowers from a field. If it were that easy, Shultz would be whooping it up in Chandler, Arizona, by now—not lost or dead in some isolated passageway in the mine. Once you enter the mine, you will face a barrage of mutant tarantulas, rabid rats, and equipment-stealing bats. And whenever they attack, you will have only a few seconds to gun them down. If you miss, they will gnaw on your vital organs.

If you survive long enough to locate the gold, you must then blast it out of the mine walls with dynamite and haul it back to the entrance. Only then can you head for the Chandler Saloon to raise a glass to Shultz—wherever he is—and celebrate the success of your venture.

Playing the Game

The first thing you see when you begin *Shultz's Treasure* is the title and three option cues: to change the background color, to choose one of seven skill levels, and to cut off the sound effects. If you do not want sound effects, press S now, because you can't change your mind mid-game.

So much for the easy stuff. The title screen clears, and suddenly you are faced with a surprisingly good three-dimensional view of the entrance to the maze, with red, horizontally lined walls receding off into the distance. On the right side of the screen, you can see the map of the maze, with your position on it marked by a gold blip, courtesy of the pathfinder that Shultz left behind. Above the map is a picture inventory of your equipment.

Don't think you can just stroll into the mine and pluck out gold ore like flowers from a field.

Enter the maze, and the three-dimensional effect makes you feel as if you were walking along a corridor. Up ahead, you can see a mazer refill clip, which grows larger as you approach it. Press the "jump" control, and you can advance instantly to the next mazer clip, doorway, or creature. Just past the clip is a passageway off to the left. When you turn into it, you see—a bat! And he's after your pathfinder! Quickly you must activate the sights on your mazer, draw a bead on the bat, and fire. If you are accurate, the bat vanishes. If you miss, you can try again if you have enough time. But if you miss a second time, kiss your pathfinder good-bye.

You will run into many bats in the maze. They will always steal one piece of your equipment, until all you have left is your mazer, goggles, mine car, gold, and underwear. The bats fly away with whatever they steal from you and drop it somewhere in

◉ Review

the maze. After they have picked your pockets clean, they go for the throat. Mutant tarantulas and rabid rats won't bother your equipment, but they, too, like the taste of explorer blood.

Shultz's Treasure indicates your physical strength by a horizontal bar at the top of the screen. Any time you fail to stop an attack by one of the creatures, a section on each end of the bar turns red. You can survive only five attacks before the bar turns completely red and you are dead.

> Once you enter the mine you will face a barrage of mutant tarantulas, rabid rats, and equipment-stealing bats.

Evaluation

Shultz's Treasure is a smooth-running, entertaining program, although it does have a few limitations. When you buy the game you must copy DOS 1.10 onto the game disk, and you must have a color graphics board. You can play *Shultz's Treasure* with either a joystick or the keyboard controls, but a joystick is easier to use when you are hurriedly trying to catch a glimpse of a moving bat, rat, or tarantula in your gun sight.

Shultz's Treasure uses a random generator to create over 10,000 mazes, so you won't get bored playing the same maze over and over. Three-dimensional color graphics, a wide range of commands, error-free play, suspense, and intense action

make this a game you'll enjoy. For the next version of the game I recommend that after bringing back the treasure, the player get bonus points by going into the maze again and finding Shultz.

Although *Shultz's Treasure* is a simple maze/treasure-hunt game, the maze is unusually large and intricate, and having to watch several things at once makes searching through it a challenge. The three-dimensional effect is the star of the show; the sense of realism and visual delight it provides will give you an extra dimension of pleasure. ◉

Keith Richard Cook is a Contributing Editor for PC World.

Pits & Stones
Orion Software
P.O. Box 2488
Auburn, AL 36831
800/821-8088
List price: $36.95
Requirements: 128K, one disk drive

J-Bird
Orion Software
P.O. Box 2488
Auburn, AL 36831
800/821-8088
List price: $36.95
Requirements: 64K, one disk drive,
color graphics board

Shultz's Treasure
VeriSoft Works
313 W. Rosal Pl.
Chandler, AZ 85224
602/892-2113
List price: $39.95
Requirements: 64K, one disk drive,
color graphics board

WHAT A PAIR !
Tecmar's Graphics Master™ & Lotus 1-2-3[1]

Graphics Master is the only board that creates *both monochrome* and *color* graphics for Lotus 1-2-3.

You can also run IBM compatible software because Graphics Master emulates both the IBM Color Graphics Adapter and the Monochrome Adapter.

We are pleased to announce that Graf-Talk[2] and MetaWindow[3] software take full advantage of Graphics Master's high resolution graphics.

Graphics Master is the only board that will do all of the following with appropriate software:
- High resolution color graphics - 640 x 400, 16 colors
- High resolution monochrome graphics - 720 x 700
- Run software for IBM Monochrome Adapter
- Run software for IBM Color Graphics Adapter
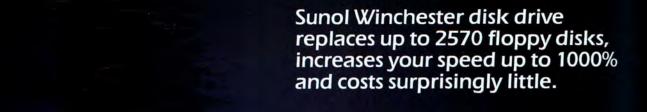
TECMAR
the power behind the PC

IT ALWAYS STACKS UP
IN FAVOUR OF SUNOL

Sunol Winchester disk drive replaces up to 2570 floppy disks, increases your speed up to 1000% and costs surprisingly little.

If data management is becoming a problem, you are ready for a Sunol hard-disk system.

We're Powerful
Choose from 8, 16, 25, 40, 65, or 92 megabytes per drive and up to four drives per controller. That's a total of 368 megabytes and that's up to 2570 floppy disks or 184,000 typed pages.

We're Fast
You've got more data and almost instantaneous access to that data ... up to 10 times faster than a floppy — 7.5 megabits per second transfer rate.

We're Compatible
You can connect your Sunol to the IBM PC and compatibles, Apple II and III, TI, Victor 9000, DEC, Epson QX-10, Zenith and more.

We're Connected
Use your Sunol to network with SUN*NET. SUN*NET can handle up to 64 users at a time and with seven different operating systems all on the same Sunol disk. Sunol's disk is also compatible with Omninet, PC Net, or Ethernet.

We Have Back-Up
Our optional 23 megabyte random access type cartridge gives you the back-up you need. And you can access it as a 23 megabyte floppy of on-line disk storage.

We're Clear
Our dynamic display lets you know exactly what the drive is doing at every moment.

We're Reliable
Sunol's Error Correction Code and off-line diagnostics give you the reliability you expect.

COMPARE SUNOL FEATURE FOR FEATURE
Then compare price. There is no better value. There is no better Winchester disk drive.

IBM P.C. is a registered trademark of International Business Machines Corporation.
P.C. Net is a trademark of Orchid Technology.
Apple is a registered trademark of Apple Computer Inc.
Omninet is a trademark of Corvus Sytems Inc.

SUNOL SYSTEMS

1072 Serpentine Lane, Pleasanton, California 94566 • (415) 484-3322 Telex: 703175

Word processing in 90 minutes, not 90 days.

Word processing makes any office more productive, as long as it doesn't bankrupt you.

It's not the software that's so expensive; it's the training.

To learn most word processing software, people need a full week of hands-on classroom training. And it's a good 90 days before they're really up to speed. Even then, the commands are so clumsy and illogical that even the best secretary has to refer constantly to a command summary guide.

And when your highly-trained, highly-paid word processing expert gets another job, you're back to square one.

Select: The Word Processor is better.

It can do everything you'll need done and anyone — even managers — can learn in 90 minutes by using Teach,™ our on-screen tutorial. The one key commands make sense (E for erase, M for move, etc.), and Select is every bit as powerful as the others. We also include a spelling checker, mailing list merge, and one key document assembly — things that would either cost extra, or be unavailable when you buy other packages.

If you're looking for a better alternative, look for the entire family of Select products: Select: The Word Processor, Select Write, and Select Bilingual, at any Businessland, Computerland or independent retailer.

SELECT®

The High Cs

An expert picks the four best C compilers for the IBM PC.

David W. Smith

If you were going to create the next best-selling software package for the PC, what language would you write it in? Until recently the safe bet would have been assembly language—nothing else offered its speed. But the software companies that wrote assembly language programs for computers using one kind of microprocessor (such as the popular Z80) paid a heavy price when it came time to convert their programs to the PC's 8088 microprocessor.

Assembly language programs are intimately tied to the hardware they work with. Using an assembly language program on a computer different from the one for which it was designed usually involves rewriting a large amount of code. The cryptic nature of assembly language makes the process painstaking and slow. When a new machine or operating system hits the market, recoding an assembly language program is a formidable task.

The solution for many software developers is C—a language that combines the efficiency of assembly language with the ease of use and the portability of a high-level language. Much of C's power and portability comes from its use of a standard library of common input/output (I/O)

and string manipulation subroutines, a feature that frees the programmer from having to write machine-specific I/O routines. While not strictly a part of the language, this library enables a programmer to take even a complex C program and transport it to another machine or operating system with minimal effort. The programmer is thus able to keep up with new hardware and operating system developments. A case in point is Microsoft's *Multiplan;* developed in C for CP/M and MS-DOS machines, it was available for the Apple Macintosh even before the machine was delivered to dealers.

C and the PC

C is a block-structured, compiled language; programs are built in a modular fashion and then transformed (i.e., compiled) into object code that can be executed by a computer's processor. C does not offer

the instantaneous feedback of interpreted languages like BASIC, but it does allow you to create modules of code and compile them individually. Thus, a complex program can be quickly constructed from smaller, simpler, tested sections of code.

Over a dozen C compilers are available for the IBM PC. Some support the entire C language, while others deal with only a subset of the language and don't include such features as floating-point math operations or the use of bit-sized fields. Some will not run under MS-DOS 2.00 or CP/M-86. The four compilers examined in this article—Computer Innovations's Optimizing C86, Digital Research's Digital Research C, Microsoft/Lifeboat's Lattice C, and Mark Williams's MWC-86—implement the full C language and are available in MS-DOS 2.00 and CP/M-86 versions.

Until recently most C compilers for the PC were designed to work with a small-memory model, which limited source code to 64K and data to another 64K. Three of the four packages reviewed here also support the large-memory model, which permits object code and data to occupy all available user memory. The large-memory model is vital for anyone who writes large programs or programs that manipulate a great deal of

⬤ Review

data. Large-model programs are slow to compile, but that can't be avoided if the programming task at hand is complex.

Of course, compilation speed is not the only factor to consider when examining a compiler. A compiler's library should contain all standard I/O functions, named according to industry convention. This is crucial for portability, since you may want to compile a C program with different compilers and run it on different machines or under different operating systems. If a properly defined routine in one compiler's library is absent or mislabeled in another compiler's library, a C program built with the first may not link correctly under the second. The compiler should also "optimize" its end product: it should examine object code and make it more efficient and compact if possible. This may involve, for example, eliminating redundant instructions or replacing three lines of code with two lines that perform the same task.

The compiler should mesh easily with the DOS LINK utility, which pulls together the various sections of object code and necessary library subroutines, and the process should be clearly explained in the compiler's user manual. Error messages generated by the compiler (particularly those relating to syntax errors) should likewise be explicit. This makes it easier to locate a problem in the source code and fix it.
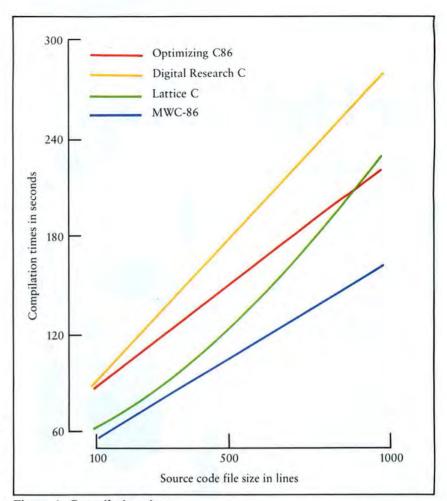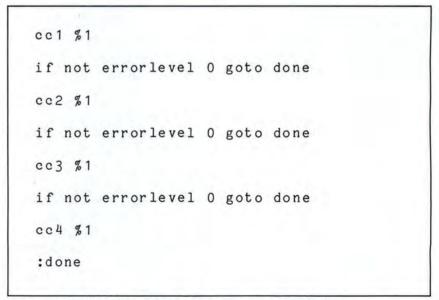
Figure 1: Compilation times

```
cc1 %1

if not errorlevel 0 goto done

cc2 %1

if not errorlevel 0 goto done

cc3 %1

if not errorlevel 0 goto done

cc4 %1

:done
```

Listing 1: DOS 2.00 batch file for automating compilation

Optimizing C86

Computer Innovations has been promising to update its reliable C86 compiler for nearly two years, and with Optimizing C86 (version 2.00), it has finally done so. This compiler is reasonably fast (see Figure 1) and produces relatively compact object code. Unlike older versions of this compiler, Optimizing C86 supports both small- and large-memory models and creates optimized object code that is compatible with the DOS LINK utility.

The library is very close to the C standard as defined by Brian Kernighan and Dennis Ritchie in *The C Programming Language* (Prentice-Hall, Englewood Cliffs, New Jersey, 1976); I was able to take several C programs from a DEC minicomputer running UNIX and compile, link, and run them on my PC with little effort. The library includes a set of math and trigonometric routines (often used for graphics and statistical programs) plus a number of routines for accessing new DOS 2.00 functions and special hardware features of the PC's 8088 microprocessor. Programs that manage the library and the disk storage of source code files are also part of the package.

Optimizing C86 needs four passes to create executable object code. The first, or preprocessor, pass handles macros and INCLUDE files; the second pass checks the source code for syntax errors; the third produces the object code; and the fourth (a new addition to this compiler) optimizes the object code and produces object code compatible with LINK or assembly language source code that can be used by the IBM Macro As-

sembler. Each compiler pass must be run separately, though you can simplify the process by using a batch file (see Listing 1).

allows you to verify that the header files are error-free. Another option is a special run-time check that warns you if your program runs out of memory. Other new features are support for the 8087 numeric coprocessor and the ability to use variable names up to 31 characters long in a source code module (LINK limits you to 8 characters between modules).

Some new debugging aids have been included in this version of the compiler. One option for the first pass lets you view the preprocessor's output after the header files have been inserted into the source code. (A header file contains program definitions that are used in more than one module. Instead of embedding identical definitions into the code of several different modules, the compiler takes one set of definitions and inserts it before each module is compiled.) Viewing preprocessor output

While Optimizing C86 produces object code that is nearly 20 percent smaller than earlier versions and twice as fast, compiling speed is nearly 20 percent slower. The entire package, which includes the compiler, header files, linker, and run-time libraries, has also ballooned from 200K to 345K. This is fine if you have a PC XT, but with only 360K of floppy disk storage possible, space is tight.

Optimizing C86 comes in a binder with a 140-page user manual, two disks, and a copy of the Kernighan and Ritchie book. The manual gives simple instructions for compiling and executing a small program, along with notes on compiler options. The section on library routines is thor-

ough and includes a number of useful examples. Unfortunately, the same cannot be said for the discussion of LINK, though its use with the compiler can be surmised with a little patience. Two nettlesome omissions are an index and an explanation of compiler error messages.
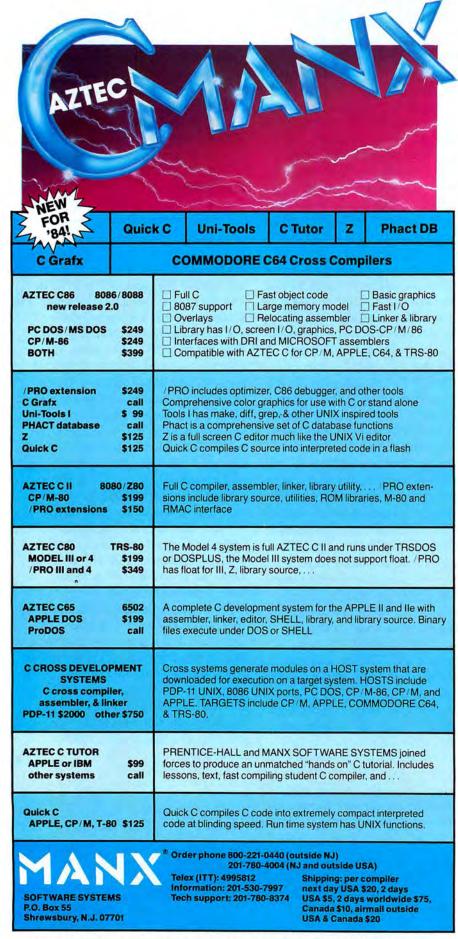
Digital Research C

Digital Research has been committed to the C language for quite some time. The company uses C for much of its language and applications development and is developing its next commercial operating system in C. It is no surprise that Digital Research's C compiler ranks high in portability.

Unfortunately, Digital Research C does not do well in other areas. The compiler alone takes up 320K; it compiles slowly and produces large, sluggish object code. The company's literature claims that Digital Research C is an optimizing compiler, but I was unable to detect any hint of this when examining the resulting object code.

Digital Research C does offer a dazzling number of features. There are provisions for running the various compiler passes from different disks (if your program is large and space is tight), for producing two different listings (source code with matching error messages, or source code and object code printed together), and for using four different memory models. Digital Research C supports both the large- and small-memory models, along with two other models—one for small code and large data and one for large code and small data. The compiler also supports the 8087 coprocessor.

◖ Review

Digital Research C provides limited preprocessor control. For example, the command drc test -dDEBUG will compile a program named TEST.C and simulate the presence of the line #define debug 1. Note that the compiler changes *DEBUG* to *debug*, contrary to common practice. Uppercase and lowercase are significant in C. This method contradicts the suggestion in the user manual's coding style appendix that constant names be all uppercase. The compiler also has difficulty finding header files when they are spread across two or more disks.

Of the four compilers, Digital Research C is the most attractively packaged. The boxed package includes five disks (the compiler, an assembler, a linker, a cross-reference utility, and a library manager), a user manual, and the Kernighan and Ritchie book. Documentation on the compiler and library is extensive and well indexed.

Lattice C

Lattice C was developed by Lattice Corporation with funding from Lifeboat Associates and is available from both Lifeboat and Microsoft. (The Microsoft version is called the Microsoft C Compiler.) The latest version (2.0a) supports four memory models, corrects several library problems, and adds routines to deal with DOS 2.00. The compiler accepts the full C language with a few minor exceptions that are well documented in the user manual. Like Optimizing C86, the Lattice compiler generates run-time memory checks and permits long (in this case, 39-character) variable names in a source code module.

The good news about Lattice C is that, of the four compilers I looked at, the object code it generates comes closest to superior assembly language written from scratch. Compilation time is quick. The compiler, though, tends to produce a stream of erroneous error messages after encountering its first true error in the source code. This domino effect is common

---

MWC-86 consistently turned in the fastest compilation times and produced the most informative error messages.

---

in many compilers, and in this case it is acceptable, considering the compiler's speed. Notable too is its support of the large- and small-memory models.

The bad news concerns Lattice C's library. Several standard library routines are missing, and others are not labeled according to industry practice. This may significantly affect program portability. The Setjmp and Longjmp routines, which are often used for error handling, and the Qsort algorithm, which permits sorting in memory, are all absent. Experienced C programmers will also discover that identical strings in source code are "pooled" (combined into one) in the object code; this may make code difficult to debug when portability problems arise.

On the other hand, Lattice has provided new library routines for directly accessing the 8088 and DOS; some PEEK and POKE memory, while others read the segment registers or cause software interrupts. In response to pressure from users, Lattice has also upgraded the library's

low-level I/O routines so that certain operations (such as emptying I/O buffers) are done automatically.

The single-memory model (either large or small) for Lattice C takes up 255K, which leaves enough room for a text editor on the same disk. Compiling requires two independent passes, but a batch file provided in the user manual makes the process simpler. The package also includes a library manager, but which one you get depends on the source of the package. Microsoft's version includes the company's own library manager (LIB) and a copy of LINK, along with good documentation. Lifeboat provides Phoenix Software's PLIB86 but no link utility. Either package will produce a combined source code and object code listing, which is an adequate way of matching source code statements to their object code equivalents.

Lattice C's comprehensive user manual includes a clear explanation of compiler error messages, an excellent description of available library functions, and enough information about other conventions to allow a programmer to call assembly language routines from C. Both the Microsoft and Lifeboat packages come with a copy of the Kernighan and Ritchie text.

MWC-86

At the time of this writing, the Mark Williams C compiler had not yet been released, though the company had enough confidence in its product to provide a prerelease version for review. They have reason to be confident: MWC-86 compiles quickly and generates compact and quick-running object code.

MWC-86 consistently turned in the fastest compilation times (for programs exceeding 100 lines) and produced the most informative error messages, though the compiler did

● Review

	Computer Innovations Optimizing C86	Digital Research C	Lattice C	Mark Williams MWC-86
Knight's Tour				
Compilation time (minutes:seconds)	1:17	1:05	0:42	0:49
Link time (minutes:seconds)	1:11	0:56	0:32	0:47
Linked size (bytes)	12160	19456	11392	7561
Run time (minutes:seconds)	2:33	3:34	1:57	2:17
File Sort				
Compilation time (minutes:seconds)	1:23	1:04	0:42	0:51
Link time (minutes:seconds)	1:22	1:12	0:40	0:46
Linked size (bytes)	13568	33280	22528	9134
Run time (minutes:seconds)	0:57	2:08	1:07	0:45

Table 1: Benchmark test results

have a tendency to report nonexistent errors after encountering the first real error in a program. The compiler supports only the small-memory model, though this may not be the case in future releases.

MWC-86's major flaw is that its generated object code is incompatible with DOS's LINK and must be linked using the Mark Williams proprietary link utility. This linker is slow and difficult to use directly. Fortunately, this process is hidden behind an "executive" program that runs the entire compilation process.

The compiler supports a number of interesting command line options, including several that control error messages. The Vsbook option will

tell the compiler to issue an error message whenever the source code deviates from the Kernighan and Ritchie standard.

The library routines supplied with MWC-86 are extensive. In addition to the standard library, several routines are provided that directly access the 8088 microprocessor to allow you to manipulate memory. For example, if a screen image is kept at an address in RAM that is normally inaccessible (and thus cannot be saved to disk), you can "move" this block of memory to a place in RAM where it can be copied using some of MWC-86's routines.

The package uses an assembler that is not compatible with the IBM Macro Assembler. However, interfacing with assembly language that is in the Mark Williams format is relatively easy, and the compiler can produce assembly language.

The compiler, linker, header files, and library occupy about 245K, which leaves enough room on disk for a text editor and a few utility programs. The documentation that came with the prerelease package was marked "preliminary," but it was fairly complete nonetheless. The user manual needed an index, an explanation of error messages, and a bit of reordering—concerns that I hope Mark Williams will address in the released version of this compiler.

Comparing Compilers

How fast a program compiles and the quality of its error messages are indications of how easy a compiler is to use. A few benchmark tests show how fast a program is likely to run; an examination of object code produced by each compiler indicates why. Looking at a compiler's library helps to determine how portable compiled programs will be.

In most tests, Lattice C compiles small programs (under 100 lines) the fastest, while MWC-86 is the quickest with larger programs. Of the four compilers, only Lattice C detects syntax errors during its first pass. As a result, Lattice C reports errors very quickly, but sometimes it will let one real error trigger a chain of erroneous error messages throughout the rest of the code. Digital Research C suffers from similar faults, though it will only report one error per line and will stop compiling after the 26th is encountered. Optimizing C86 and MWC-86 recover easily after most simple errors; the latter package will even note when declared variables are not used—a useful aid in catching typing errors.

The ability to link object code efficiently depends on the quality of the compiler's linker and the size of the library that must be searched for rou-

tines that are not supplied in the program. Lattice C turned in the best link times; its library is fairly small and its linker is essentially the same as DOS's LINK utility. Optimizing C86 links object code more slowly because its library is larger.

Benchmark Results

Computer benchmark tests are often an exercise in misleading with statistics. Unless a benchmark test is carefully chosen, the results may have little relevance to actual operation. The program traditionally used to measure a compiler's performance is the Sieve of Eratosthenes, an algorithm for calculating prime numbers. But this program makes few procedure calls and performs little in the way of I/O—unlike a typical C program.

The two benchmark tests I used, the Knight's Tour and the File Sort, are more representative measures of a C compiler's performance. The Knight's Tour makes numerous procedure calls and is thus a better measure of a compiler's ability to produce efficient object code. The File Sort is designed to measure the performance of the compiler's library and the compiler's ability to handle I/O; accordingly, the test spends most of its time in library routines, in addition to making many procedure calls and performing a great deal of I/O. The File Sort reads 35K of text into memory, sorts it, and then writes it out.

The benchmark tests were performed on a PC with 320K of RAM and two double-sided drives running DOS 2.00. Timings were obtained by changing the DOS prompt to display the time of day, running each test from a batch file, then noting the elapsed time when the time of day prompt reappeared. Compilation and link times will be much faster if you use a hard disk drive or disk emulator, but the benchmark results are representative of the performance differences you can expect (see Table 1).

The test results reveal that Lattice C generally outperforms the other compilers on processor-intensive tasks but is surpassed by MWC-86

and Optimizing C86 when library routines are used heavily or a significant amount of I/O is performed. Strictly speaking, Lattice C does not qualify for the File Sort test, since its library does not include a sort routine. However, this test primarily measures a compiler's ability to read and write data. The Quicksort routine supplied with Optimizing C86 was used with Lattice C to obtain a benchmark result.

Code Quality

Most of these C compilers will not only choose the best sequence of instructions for a given statement but will also optimize the object code, making it smaller and faster. To measure object code quality, I fed two source code files through each compiler and examined a listing of the resulting object code. The first source code file was designed to see what type of object code the compiler would generate for procedure calls, mathematical expressions, pointer indirection (those values that point to certain addresses in memory), and typical control structures (such as IF, THEN, and WHILE statements). The second source code file contained statements crafted to provoke the optimizing powers of the compiler.

Not surprisingly, the greatest differences among the four compilers showed up in object code generated for mathematical and logical expressions. Lattice C performed the most efficiently here because it keeps track of the contents of the PC's registers and does not have to produce code to reload the registers if the desired value is present. Both Lattice C and MWC-86 were good at picking the most efficient code when incrementing a variable or changing the value of a pointer. When faced with the job of multiplying a number by two, all the compilers took the optimal course, though Optimizing C86 and Digital Research C often wasted time and memory evaluating complicated expressions.

Overall, Lattice C produced the smallest amount of object code in most tests. But once object code files were linked to produce executable files, the picture changed. MWC-86 produced the smallest .EXE files, with Lattice C running a close second. Digital Research C produced files nearly two to three times as large. Why the big differences? The answer is found in the libraries.

The Libraries

A standard library gives a C program the routines it needs to communicate with the operating system and perform other useful operations. The quality of a library can be judged by its completeness, its compatibility with the standard C library, the execution speed of its routines, and its ability to handle unusual situations.

Every compiler was inconsistent on at least one of these points. For example, some library routines that read data return special values to the C program to signify that the end of a file has been reached, and they will continue to return the end-of-file value if called repeatedly by the program. But Lattice C ignored this convention and cheerfully marched on when asked to and eventually died in its tracks. A simple problem to work around, but an annoying one nonetheless.

A more pressing problem was discovered in Digital Research C when I attempted to discover the size of a file. This information is particularly important to a program when it has a large data file and must make decisions about its disposition. Normally a C program sets a marker at the end of a file and determines how many bytes it has traveled. While the other compilers responded with correct or nearly correct answers, programs produced by Digital Research C simply stopped working.

The Highest C

While none of these compilers is perfect, they are all solidly designed and produced correct object code in all the tests I conducted. The factors that differentiate one compiler from another are speed, ease of use, and the quality of the generated object code. These features are summarized in Table 2.

I will admit that I favor the earlier version of Computer Innovations's compiler, C86. It did not produce the fastest code, but it was easy to work with and left enough disk space for a text editor. Optimizing C86 was something of a disappointment at first, because it is considerably larger than its predecessor and harder to install. However, Optimizing C86 does produce better code and supports the large-memory model. If you currently use an earlier version of the compiler and find yourself hemmed in by the restrictions of a 64K small-memory model, Optimizing C86 may be the answer.

Digital Research has devoted a considerable amount of attention to Digital Research C, though this is not always evident. Digital Research C's support of multiple memory models and a number of extra options is salutary, but apparently little attention has been paid to the object code generator, certainly one of the most important functions of any compiler. Two years ago Digital Research C would have been an amazing compiler, but today it faces formidable competition. Digital Research will have to make its compiler faster and leaner if it wants to stay in the running.

Lattice C produces excellent code and should convince even hardened programmers that there is a viable alternative to assembly language programming. For applications that require speed and do not rely heavily on library routines for I/O, Lattice C is a good choice. However, if portability is a concern, keep in mind that this compiler's library does stray a bit from the C standard.

	Computer Innovations Optimizing C86	Digital Research C	Lattice C	Mark Williams MWC-86
Version reviewed	2.00	1.03	2.0a	0.5 [1]
Full C library	Yes	Yes	Yes	Yes
Standard library	Good	Excellent	Fair	Good
Source supplied	Yes	No	No	No
Documentation	Fair	Good	Good	Fair [1]
Ease of use	Good	Fair	Fair	Good
Compilation time	Poor	Poor	Fair	Good
Error messages	Fair	Good	Fair	Good
Object code quality	Good	Fair	Excellent	Excellent
Object code size (linked)	Good	Poor	Good	Excellent
Object code speed	Good	Fair	Excellent	Excellent
Supports large model	Yes	Yes	Yes	No [2]
Produces disassembled assembly listing	Yes	No	No	Yes
Link to assembly language	Yes	Yes	Yes	Yes
Compatible with DOS LINK utility	Yes	No	Yes	No
Supports 8087	Yes	Yes	No [2]	No [2]
Package includes				
Assembler	No	Yes	No	Yes
Linker	No	Yes	Yes	Yes
Library manager	Yes	Yes	Yes	Yes
Disk space required	344K	320K	255K	245K
Price	$395	$600	$500	$500

[1]Prerelease version
[2]Promised for future release

Table 2: Compiler features

Of all the compilers reviewed, MWC-86 would be my first choice for product development. It compiles quickly, produces superior error messages, and generates quick, compact object code. The library is small and fast and closely follows the industry standard for C libraries. The linker is slow and could use some work, but nothing is perfect in this world. However, since MWC-86 has yet to be officially released, the jury is still out. ◓

David W. Smith is a software engineer for Tolerant Systems in San Jose, California.

Optimizing C86
Computer Innovations, Inc.
980 Shrewsbury Ave.
Tinton Falls, NJ 07724
201/542-5920
List price: $395
Requirements: 128K, two disk drives

Lattice C
Lifeboat Associates
1651 Third Ave.
New York, NY 10028
212/860-0300
List price: $500
Requirements: 128K, two disk drives

Digital Research C
Digital Research
160 Central Ave.
P.O. Box 579
Pacific Grove, CA 93950

408/649-3896
List price: $600
Requirements: 128K, two disk drives

Microsoft C Compiler
Microsoft Corporation
10700 Northup Way
Bellevue, WA 98004
206/828-8080
List price: $500
Requirements: 128K, two disk drives

MWC-86
Mark Williams Company
1439 W. Wrightwood
Chicago, IL 60614
312/472-6659
List price: $500
Requirements: 128K, two disk drives

ANNOUNCING THE COMPUTER SHOW THAT TAKES THE WORK OUT OF GOING TO COMPUTER SHOWS

The PC *World Exposition.*
The computer show designed for the busy professional on a hectic schedule.
Sponsored by PC World Magazine.

Other computer shows invite you to spend time learning about computers. We invite you to save time. And save money.

Come to the PC *World Exposition* in Chicago and you'll find scores of exhibits, featuring all the most important state-of-the-art personal computing products — the hardware, software, printers and peripherals changing the face of American business today and tomorrow. Products from IBM,® DEC,® Compaq,™ Lotus,™ Hewlett-Packard,® Epson,® Apple,® Visicorp® and many more. No games, no hobbyists. Just serious business.

You'll find three full days of information-packed conferences designed to help you choose and use the latest of the new technologies. Sessions led by acknowledged experts — the people making the headlines and bylines in the most respected computer press.

Plus, we'll make sure you don't waste a minute of your precious time wandering around the show hall looking for the exhibits or conferences you've been wanting to see for months. The PC *World Exposition* format is streamlined for you. Exhibits are easy to find; conferences are scheduled at sensible times.

Put simply, the PC *World Exposition* is the computer show run by professionals, for professionals. Why waste a day or a single dollar at any other show?

Here is a sampling of the products and services you'll find exhibited:

Hardware
- PCs and PC compatibles
- Printers and plotters
- Hard disk and tape drives
- Local and wide area networks
- Video terminals
- Plug-in boards, other expansion accessories
- Modems and communications equipment

Software for:
- Accounting packages
- Word processing
- Database management systems
- Spreadsheets and graphics packages
- Integrated productivity packages
- Communications software
- Mainframe/mini to micro communications
- Legal, medical, real estate, dental applications
- Voice recognition, touch-screen, mouse and other input technologies
- Blank disks and storage media

Services
- Computer and hardware service and repairs
- Consultants: small business, professional, and corporate applications assistance
- Third party software support
- Product distribution and retailing
- New product development and marketing
- Financial services

And, here are some of the conference sessions we've got planned:
- Introduction to Personal Computer Communications
- DP/MIS Forum: Industry Issues in Corporate PC Use
- Compatibility Issues for the Corporate PC User
- The Anatomy of the IBM PC-A Users Guide to Components and Functions
- The PC as the Basic Small Business Information System
- Selling to the Corporate Account
- Project Management Software
- Integrating Business Applications in the Corporation: Word Processing/Spreadsheet Applications
- Integrating Business Applications in the Corporation: Data Base Management/Business Graphics Applications
- The IBM Family Tree from PCjr to the XT
- Investment Software for Individuals and Small Businesses
- Local Networks for PCs
- Manufacturing Resource Planning with the PC
- Inventory Control & Shipment Applications
- What's New in Portable & Kneetop Computers

COMPUTER MAIL ORDER

PRICE CUTTERS

data bases

Fox & Geller dUtil	$69.00
Fox & Geller dGraph	$199.00
Fox & Geller Quickcode	$199.00
TIM III	$329.00
File Manager Plus	$89.00
pfs: file	$89.00
pfs: report	$79.00
pfs: graph	$89.00
Condor 20-III	$389.00
Fox & Geller OZZ	$289.00
Fox & Geller Grafox	$199.00
IUS EasyFiler	$229.00
InfoStar	$299.00
DataStar	$179.00
Personal Data Base	$99.00
InfoScope	$149.00
PerfectFiler	$239.00
Ashton-Tate dBASE II	$389.00

word processing

IMSI 4 point Graphics	$139.00
IMSI Visybase	$189.00
Volkswriter	$115.00
Volkwriter [Advanced]	$209.00
SuperWriter	$155.00
Super Spell Guard	$129.00
Final Word	$192.00
Perfect Writer	$199.00
Perfect Speller	$119.00
Spell Binder	$259.00
Peach Text 5000	$209.00
Spell Check	$199.00
BenchMark Word Processing	$249.00
BenchMark Mail List	$129.00
Memo Plan	$129.00
Multi-Mate	$319.00
pfs: write	$89.00
Word Plus PC/The Boss [speller]	$349.00
WordStar	$299.00
MailMerge	$159.00
WordStar/MailMerge	$349.00
WordStar ProPack	$379.00
SpellStar	$159.00
IUS EasyWriter II [Spell/Write/Mail]	$249.00
IUS EasyWriter	$119.00

spreadsheets financial/graphs

SuperCalc I	$119.00
SuperCalc II	$159.00
MultiPlan	$159.00
Lotus 1-2-3	$319.00
Friday!	$185.00
Cdex Training...each	$49.00
Home Accountant Plus	$88.00
1st Class Mail	$79.00
Peachpack [GL/AP/AR]	$219.00
Scratch Pad	$199.00
Financial Planner	$419.00
Easy Planner	$159.00
CalcStar	$99.00
Perfect Calc	$119.00
Fast Graphs	$189.00
Money Maestro	$99.00
MicroPlan	$299.00
Profit Plan	$129.00
California Corp	$79.00
The Practical Accountant	$109.00
Business Policy Planner	$79.00
Bottom Line Strategist	$269.00
TK Solver	$189.00

home entertainment

spinnaker

Fraction Fever	$29.00
Story Machine	$29.00
KinderComp	$24.00
Facemaker	$29.00
Hey Diddle Diddle	$24.00
Rhymes & Riddles	$24.00
Snooper Troops 1	$32.00
Snooper Troops 2	$36.00
In Search of the Most Amazing Thing	$29.00

infocom

Witness	$32.95
Enchanter	$32.95
Planetfall	$32.95
Suspended	$32.95
Starcross	$29.00
Zork 1	$29.00
Zork 2	$29.00
Zork 3	$29.00
Infidel	$32.95

visicorp

VisiCalc 4	$159.00
VisiWord/Spell	$249.00
Visitrend/Plot	$199.00
VisiFile	$199.00
VisiSchedule	$199.00
Desktop Plan	$199.00
Business Forecast Model	$75.00
StretchCalc	$75.00
VisiTutor/Calc	$59.00
VisiTutor/Advanced Version	$75.00
VisiTutor Word	$59.00
Vision Calc	$249.00
Vision Graph	$129.00
Vision Word	$249.00
Vision Mouse	$159.00
Vision Host	$319.00

Videotape Backup

Thinking about buying a VCR? With the Corvus Mirror you can back up hard disk files on videotape in record time.

Jack Powers

Nobody said that backing up computer files is fun, but once you lose data a few times you begin to see that it's necessary. As you store more and more of your work on disk, a regular backup schedule becomes increasingly important. Backing up is a fairly simple task with floppy disks, but the large capacity of a hard disk makes it a different problem entirely. If you use the standard floppy disk backup method, backing up a 5-megabyte (MB) hard disk can require up to 14 floppy disks.

A number of products are available to protect against the loss of hard disk data, including removable disk cartridges, digital tape cartridges, and ½-inch reel-to-reel tape. The Corvus Mirror is different from most in that it uses a standard video-cassette recorder (VCR) to read and write data on tape. If you already have a VCR or are contemplating buying one, the Corvus Mirror may provide an economical way to protect your data. If you use your PC for business, you might even be able to deduct part or all of the cost of both the Mirror and the VCR on your tax return.

The Mirror is offered in several forms. You can now buy any 6MB, 11MB, or 20MB Corvus hard disk drive with a built-in Mirror system. The Mirror can also be bought with Corvus hard disks that are config-

The stand-alone Corvus Mirror

ured for a local area network. If you already own a Corvus hard disk without the Mirror system, you can buy a separate cabinet (called the stand-alone version) that can be cabled in series with the hard disk. Finally, PC XT owners can purchase the Mirror in the form of an expansion board that can be plugged into any free slot in the XT.

The VCR may use either VHS or Beta tape format. I tested the stand-alone model of the Mirror with a 6MB Corvus hard disk and both

DOS 1.10 and 2.00 versions of supporting software from Corvus Systems.

To connect the stand-alone Mirror to a PC already equipped with a Corvus hard disk, first remove the disk controller interface from the PC. Plug in a new cable in place of the one leading to the hard disk drive, plug the other end of the new cable into the Mirror, and plug the original cable into the Mirror; then replace the

interface board in the PC. A screwdriver is the only tool required, and the instructions are well illustrated. The VCR hooks up with two shielded patch cords equipped with RCA plugs at both ends.

Who Needs Backup?

Anyone for whom data loss would be expensive or troublesome needs some kind of backup system. The greater the cost of a loss of data, the more justified is an investment in protection. Think of it as insurance. If you already own a VCR, the Mirror can offer data insurance at a reasonable incremental cost.

Data loss can occur due to mechanical failure in the hard disk or its controller. It can also result from human error, such as entering the wrong wild-card template in an ERASE command. Finally, program bugs have been known to destroy files at the most inopportune times. Having a backup available on tape will allow you to restore files immediately following a loss caused by operator or program error. In the case of mechanical problems, files can be restored as soon as the failed part is repaired or replaced. If you use a Corvus hard disk, tapes may be restored to a disk system that has at least the same capacity as the disk you replaced.

Some thought should be given to how often you make backup tapes. The decision is a trade-off between the time and trouble you invest in making copies and the effort required to "catch up" on the file activity since the most recent backup. For many PC applications, a daily backup is sufficient; you can do it at the end of the day before shutting down the system and be protected against possible "glitches" during power down or power up the next day. A daily backup will also protect you from the various kinds of disaster (such as theft and fire) that might happen overnight.

One backup scheme that has been used in large computer installations for years involves daily tapes, one for each day of the week. At the end of each working day, the tape designated for that day is written, replacing data from the previous week. Using this system, you can retrieve files from any day up to a week before, so you still have some protection if a file is lost or damaged before you learn about it. This method

---

The current Mirror system will interface with any VCR that provides Video IN and Video OUT connectors.

---

spreads out wear and tear over several tapes and frees you from being dependent on a single tape. Of course, daily tapes can be kept for any number of days, but five or seven tapes are a reasonable investment for many business applications. (For other hard disk backup strategies, see "Hard Disk Backup," *PCW*, Vol. 1, No. 5.)

An important part of any backup plan is physical protection of the backup media. Mirror videotapes should be stored in a safe place, separated from the PC and VCR along with other important records. Follow the same storage precautions used for your other videotapes. Rewind tapes before storing them, and be sure not to touch the surface of any tape or subject it to moisture or extremes of temperature.

You Control the Video

One of the reasons that the Mirror system is economical is that it relies on the operator to control the videocassette recorder—there is no direct control over the VCR by the Mirror hardware or software. Operation of the VCR (positioning the tape, starting, and stopping) is manual, under instructions displayed by the Mirror control program. In practice, this is a good trade-off of convenience for complexity and cost. Most Mirror operations involve setup requiring operator attention, followed by a recording period of at least several minutes during which the operator can be occupied with something else.

Corvus has good reasons for leaving control of the VCR to the computer operator. Not only would automatic operation (most likely via the VCR's remote control interface) increase the complexity and cost of the Mirror by a wide margin, but it would restrict the choice of VCRs to machines for which compatibility could be tested in advance. The current Mirror system will interface with any VCR that provides Video IN and Video OUT connectors and makes no requirements as to the type of controls.

Watching Your Files on TV

While having a TV set or monitor connected to your VCR is not required for Mirror operation, it is both useful and interesting to view the data transfer on screen. You can easily tell the difference between data and unrecorded segments of tape, and with a little practice you can learn to recognize the header and trailer blocks that frame a Mirror file.

The easiest way to provide a visual monitor of Mirror operation is to leave your TV connected to the VHF Out or ANT Out connector on the VCR. If your TV is tuned to the channel on which the VCR produces its signal (usually channel 3 or 4), you will see a representation of the data on the screen during tape read (identify, verify, restore) and tape write (backup) operations.

⬤ Review

Since standard video recording is an analog process, Mirror recording involves digital to analog conversion and the reverse for playback. The Mirror video data format packs 512 bytes (one disk block) four times into the vertical scan time of one video frame. The TV screen shows two copies of five columns of horizontal bits at 30 frames per second.

Watching Mirror tapes on TV can have a hypnotic effect, probably because the repetition of frames reduces the flicker rate, thereby producing an odd visual effect (see Figure 1). Someone watching you view your files on TV for the first time might be reminded of a scene from the movie *Poltergeist*.

Tape Length

The data rate of the Mirror system is about 1½ minutes per megabyte (over 90,000 bits per second). Backing up a 6MB Corvus hard disk takes about 12 minutes, including setup. No operation on a full 10MB PC or PC XT hard disk should take more than about 15 minutes, so it is worthwhile to shop around for 30-minute cassettes. Corvus claims that the PC XT Mirror board can store up to 91MB on a single 2-hour videocassette cartridge. That's many times more than most users will ever need.

Corvus Mirror software for DOS 1.10 users writes and reads all blocks on a single drive (11,220 blocks are on the 6MB drive). This "snapshot" of a drive's contents is fine for most applications and is easy to manage. DOS 2.00 users have another option: the Corvus *Constellation 2* disk management software (bundled with all recent Corvus systems) allows partitioning of a drive into several volumes. The *Constellation 2* software allows you to back up any volume on a drive or store the entire drive. The volume option is useful, for example, for a situation in which the frequency of changes to one volume is significantly different from that to another.

Re-Redundancy

Videotape and VCRs were not designed for digital data, so it is not certain that data written will be read back without errors. The design of the Mirror system takes this into account by computing a number called a "cyclic redundancy check" (CRC) for each block and writing it along with the data; each data block combined with the CRC is written four times on the tape. When data is read from the tape, the CRC is recomputed and compared with the one written earlier; blocks that do not match are discarded, as are the duplicate blocks that are read without error. This technique is so thorough that the chance of not finding a good copy of a block is extremely small.

Another feature of the Mirror system allows you to check a tape before filing it so that you know you are keeping a good copy. Mirror software can be used to read a tape and verify that all blocks are readable with correct CRC without restoring the tape's contents to disk. The use of this previewing feature is strongly recommended.

Operations and Idiosyncracies

Operation of the Mirror system is slightly different for the two versions of available software. For DOS 1.10, a utility program called MIRROR is supplied that can be stored and used like other DOS commands. The program may be used to perform the following operations:

BACKUP. Create a backup tape with a header containing date, time, and identification data supplied by the operator.

VERIFY. Scan a tape written with the BACKUP operation for unreadable blocks.

IDENTIFY. Read and display the date, time, and identification information from the tape header.

RESTORE. Restore the contents of a disk drive from tape.

Since VCRs are not all alike, a bit of filling in the blanks is required when it comes time to operate the Mirror with your particular machine. A bit of experimentation may be required before you have operations down to a smooth routine. I initially had a little trouble getting the RESTORE operation to end properly until I found the right procedures through trial and error.

You should always use the same machine for both reading and writing tapes, and the VCR should be operated at the highest available speed (usually called "Standard Play," or "SP"). If the VCR has a color enhancement feature, it should be turned off. Corvus recommends that you write only one backup per tape, but it is possible to get more than one drive or volume on a tape if you pay careful attention to the tape counter.

Using your VCR for a data storage device may seem strange at first, but it is an excellent way to get added value from your machine. The Mirror system offers a reasonably priced and useful backup method when combined with the VCR and a small amount of your effort. ⬤

Jack Powers works in data communications design and planning for a large research organization in the San Francisco Bay Area.

---

and...
the backup is free!

With the ACI CEO unit added to your IBM or IBM-compatible computer, you get: high-speed mass storage one hundred times more reliable than tape, backup and restore ten thousand times faster than tape, unlimited off-line capacity, and ... the backup is free!

Having an ACI CEO backup system means you'll never lose valuable data to user error or computer breakdown again.

Call now for more information on ACI's CEO randomfile backup system.

ACI **Computer Corporation**
Unlimited Data Access Systems

Dealer applications being accepted.

4450 Enterprise, Suite 101 • Fremont, California 94538 • (415) 656-9880 • Telex: 171618 • TWX: 910 3382290

THE TRUTH ABOUT SOFTWARE.

If you are an IBM PC user, or are about to become one, be careful!

All software is <u>not</u> created equal.

Many programs promoted as "user-friendly" are anything but friendly. Their manuals are poorly written and confusing. Their commands are cumbersome and hard to remember. And, if you make a little mistake—*Poof!*—your work can suddenly disappear.

You really don't have to suffer with such frustrating software. For every application, there are a few good programs that can make your life a lot easier and increase your productivity.

Why then are so many troublesome programs being sold every day to new users?

Mainly because of the lack of reliable information. People recommending programs have good intentions, but even dealers and experts have had experience with only a limited number of programs.

They may recommend the best program they know, but not necessarily the best one available.

THERE IS A BETTER WAY.

If you could, you'd thoroughly test all the competing programs for yourself. And when you were finished, you'd really know the score.

But that would cost thousands of dollars and take months of your time.

Or you can do it the easy way.

Get THE RATINGS BOOK. And you'll have the answers right at your fingertips.

BUSINESS REPLY CARD

FIRST CLASS   PERMIT NO. 526   WYNNEWOOD, PA

POSTAGE WILL BE PAID BY ADDRESSEE

Software Digest
One Wynnewood Road
Wynnewood, PA 19096

RATINGS YOU CAN TRUST.

THE RATINGS BOOK cuts through inflated claims, spots the programs that can cause you grief—and steers you straight to the software that works best.

The ratings are based exclusively on tests conducted by Software Digest—an independent testing organization that accepts no advertising and is completely impartial.

Each category of software is tested separately with realistic tests that duplicate how people normally learn and use that type of program. For example, the first test for word processing programs focuses on how easily a typical letter can be produced and modified. And that's just the beginning of an extensive series of tests.

Concentrating on one category of software during each four-week testing cycle, the best-selling and the newest programs are all tested exactly the same way. Not just once, but *ten times*—by ten different testers.

The results of these multiple tests are averaged, and the final ratings are determined strictly by mathematical standards to insure unbiased evaluations.

CONVENIENT. QUICK. COMPREHENSIVE.

A separate volume of THE RATINGS BOOK is published for each category. So all ratings for competing programs are in one convenient place.

Using easy-reference charts, THE RATINGS BOOK shows you instantly how the programs stack up against each other in eight important ways:

1. Ease of Start-up
2. Ease of Learning
3. Ease of Use
4. Error Handling
5. Performance
6. Versatility
7. Overall Evaluation
8. Value for Money

Each volume also contains a wealth of additional information—including concise descriptions, useful specification charts, and comparative screen shots— to help you select software that best suits *your* needs.

TO GET THE MOST OUT OF YOUR COMPUTER.

Volume 1 of THE RATINGS BOOK covers IBM PC word processing programs. Volume 2 covers database programs. Volume 3, spreadsheet programs. Volumes for other categories will be issued soon.

The first two volumes are now available at bookstores for only $14.95 per volume—far less than you would spend on one disappointing program. Or you can order by phone or mail at $14.95 plus postage and handling.
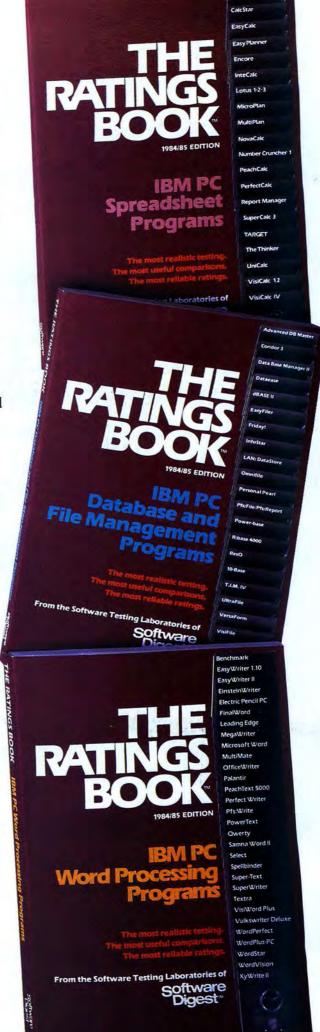
THE RATINGS BOOK will give you the power to avoid software frustration. And the bottom-line answers you need to choose programs that make business and personal computing a pleasure.

FOR FASTEST SERVICE ON CREDIT CARD ORDERS, PHONE TOLL-FREE 24 HOURS A DAY, 7 DAYS A WEEK:
1-800-345-8500 (Ask for Ext. 76)

Published by Software Digest, Inc., Wynnewood, PA 19096
The National Software Testing Center™

THE RATINGS BOOK
1984/85 EDITION

IBM PC Spreadsheet Programs

The most realistic testing.
The most useful comparisons.
The most reliable ratings.

...Laboratories of

CalcStar
EasyCalc
Easy Planner
Encore
InteCalc
Lotus 1-2-3
MicroPlan
MultiPlan
NovaCalc
Number Cruncher 1
PeachCalc
PerfectCalc
Report Manager
SuperCalc 3
TARGET
The Thinker
UniCalc
VisiCalc 12
VisiCalc IV

THE RATINGS BOOK
1984/85 EDITION

IBM PC Database and File Management Programs

The most realistic testing.
The most useful comparisons.
The most reliable ratings.

From the Software Testing Laboratories of
Software Digest™

Advanced DB Master
Condor 3
Data Base Manager II
Dataease
dBASE II
EasyFiler
Friday!
InfoStar
LAN: DataStore
Omnifile
Personal Pearl
Pfs:File/Pfs:Report
Power-base
R:base 4000
ResQ
10-Base
T.I.M. IV
UltraFile
VersaForm
VisiFile

THE RATINGS BOOK
1984/85 EDITION

IBM PC Word Processing Programs

The most realistic testing.
The most useful comparisons.
The most reliable ratings.

From the Software Testing Laboratories of
Software Digest™

Benchmark
EasyWriter 1.10
EasyWriter II
EinsteinWriter
Electric Pencil PC
FinalWord
Leading Edge
MegaWriter
Microsoft Word
MultiMate
OfficeWriter
Palantir
PeachText 5000
Perfect Writer
Pfs:Write
PowerText
Qwerty
Samna Word II
Select
Spellbinder
Super-Text
SuperWriter
Textra
VisiWord Plus
Volkswriter Deluxe
WordPerfect
WordPlus-PC
WordStar
WordVision
XyWrite II

THE RATINGS BOOK IBM PC Word Processing Programs

Introducing CompuServe's Executive Information Service

To Help the Over-Achiever Handle the Overload.

If you're tired of having your answers questioned or waiting to have your questions answered, here's on-line support for you and your IBM™ PC, from the same communications professionals who provide business information services to over one fourth of the FORTUNE 500 companies.

CompuServe has more of the services and specific information that you need. For state of the art communications, you get InfoPlex™, the easy to use electronic mail service, and E-COM™ to link your PC to the U.S. Postal Service for quick, inexpensive hard copy delivery. For in-depth financial data, there's Value Line, Standard and Poor's, and up-to-the-minute quotes plus current and historical information on over 50,000 companies and issues. Site-Potential™ is a demographic database that gives detailed census information and sales potential projections for any area of the country you choose.

The Executive News Service brings you the impressive resources of the Associated Press wire services along with a unique clipping capability that automatically selects articles on topics of your choice and stores them for your own "file."

There are professional forums, bulletin boards, the Official Airline Guide Electronic Edition, an on-line travel agency, and listings of airport delays.

And the new CompuServe software especially for the IBM PC makes this the simplest, most time efficient on-line service ever for the busy executive.

So, decide now to inquire about CompuServe's Executive Information Service. It makes every other decision a lot easier.

To get your CompuServe Executive Information Service Inquiry Kit, contact or call:

YOU, YOUR IBM™ PC, AND COMPUSERVE, MAKING EXECUTIVE DECISIONS TOGETHER.

CompuServe

Executive Information Service
P.O. Box 20212
5000 Arlington Centre Blvd.
Columbus, Ohio 43220
800-848-8199
In Ohio, call 614-457-0802

IBM is a trademark of International Business Machines Corp.

Memorable.

With 3M diskettes, your computer never forgets.

3M diskettes remember everything, every time. Because at 3M, reliability is built into every diskette. We've been in the computer media business for over 30 years. And we've never settled in. We're constantly improving and perfecting our product line, from computer tape and data cartridges to floppy disks.

3M diskettes are made at 3M. That way, we have complete control over the entire manufacturing process. And you can have complete confidence in the reliability of every 3M diskette you buy.
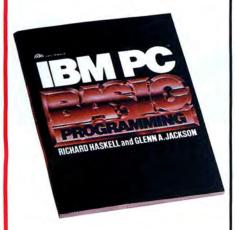
Look in the Yellow Pages under Computer Supplies and Parts for the 3M distributor nearest you. In Canada, write 3M Canada, Inc., London, Ontario. If it's worth remembering, it's worth 3M diskettes.

3M hears you...

3M

Only one company can show you so many.
And it isn't IBM.

Monochrome text. Color graphics. Even a new super display adapter that provides the Best of Both, on one board.

Connect your PC to peripherals like a modem or printer, with the added efficiency of print spooling.

IBM today sets the standard in personal computers.

But what happens when you want to expand your PC's capability to something beyond standard?

That's when you have to look beyond IBM. To the one company that offers the widest range of products to make your PC work more powerfully, more efficiently. Persyst.

Display adapters. Persyst introduces a significant technical advance.

Now Persyst redefines the basic utility of display adapters for IBM personal computers.

Our BoB™ super display adapter provides the sharpest text resolution ever as well as brilliant color graph-

ics—the Best of Both—on one board. Plus a unique option that lets you design and download custom programmable character sets.

Meanwhile, for great basic performance, we also offer PC/Monochrome™ and PC/Color Graphics™ display adapters engineered to deliver the same quality as IBM's own standard adapters.

Only Persyst offers you so much choice.

Memory and multifunction boards. Persyst has the most flexible ways to expand your PC.
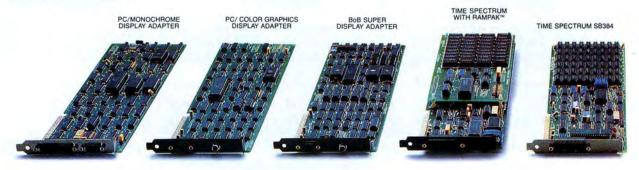
Here again, Persyst offers a unique array of products to expand your PC beyond the IBM standard.

Want the most capable one-slot multifunction packages available?

Choose either Time Spectrum™ with up to 512K, or Time Spectrum™ SB384 with up to 384K RAM. Other functions include a bidirectional parallel port and async serial ports to link your PC with printers, modems and instrumentation. Calendar clock. Game port. Plus, Wait-Less Printing™ print spooling and Insta-Drive™ RAM disk software.

Want to expand function without adding memory?

Our Timeport™ gives you a calendar clock, bidirectional parallel port and two async serial ports, as well as capability for ROM and static

PC/MONOCHROME DISPLAY ADAPTER	PC/ COLOR GRAPHICS DISPLAY ADAPTER	BoB SUPER DISPLAY ADAPTER	TIME SPECTRUM WITH RAMPAK™	TIME SPECTRUM SB384

Can Your PC Survive a Tax Audit?

Ralph Soucie

Scenario: You've just read an article on deducting the cost of your personal computer. You feel good, and why not? You've learned all kinds of ways to justify writing off your entire system. It's as if you had suddenly found several hundred dollars in an old overcoat.

Not long ago, a man in St. Paul, Minnesota, played out this scene, too—but the tale didn't end happily. The man, whom I'll call Al, worked for a major computer manufacturer. He paid $15,000 for a computer system that he used for tax return preparation, job hunting, and engineering projects at work. On his tax return, he depreciated the cost of his computer and deducted expenses for computer supplies.

> A bit of realistic preparation can strengthen your case with the tax man.

The Internal Revenue Service audited Al's tax return and threw out his computer deductions. He appealed the decision to tax court. Unfortunately for Al, the court found that he had not made "substantial" use of the computer for deductible purposes and upheld the IRS position. Poor Al had to pay more than $1000 in additional income taxes.

Al may have been aware that he was taking an aggressive position, one that the IRS would certainly challenge. It's also possible that he was confused or had been given inaccurate advice.

If you're the new owner of a PC, you may unwittingly be following in Al's footsteps as you wander through one of the murkiest areas in tax law. You need to know what the tax code entitles you to, but you must be just as mindful of the legal subtleties. Where the IRS is concerned, knowledge is power. A bit of realistic preparation can lead to changes in your computer habits that can strengthen your case with the tax man.

As a computer owner, you can make the tax laws work for you in two major ways: through depreciation (a deduction from your taxable income) or through tax credits (which lower your actual tax bill). Tax benefits aren't reserved for hardware alone; the law also respects peripherals, software, and documentation. (For additional insight into the current legal state of affairs, see "Deducting Your PC.")

If you are using your PC entirely for "business" (as distinguished from "personal") purposes, the odds are that at least 40 percent of the cost of your system will come back to you via a larger tax refund. But it is wise to deduct defensively, anticipating the possibility of an IRS audit. As both a computer owner and a former IRS auditor, I've learned the IRS approach to examining your computer-related tax deductions. There are established ways to protect those deductions.

The Audit Environment

Suppose your worst fears come true and your return is audited. As a rule, proving the total cost of your computer system is not a problem: you simply show the auditor all your receipts and/or canceled checks for purchases of hardware, software, and supplies.

The thorniest part of an audit is proving what portion of computer usage is business-related. Your simple assertion that "it's all business" is not enough; the IRS wants documentation. The auditor will probably ask to see your "daily log." The log consists of a record of all PC usage, detailing the specific purpose of each com-

DEDUCTIONS

SUTER

Deducting Your PC

You can recover the cost of your PC in a variety of ways. Federal tax rules, which are briefly summarized here, contain numerous arcane exceptions—and some may apply to you. Also, state income tax laws often differ from federal rules. Your best bet is to rely on competent professional advice.

Depreciation

Since 1981 the IRS has relied on a greatly simplified means of figuring depreciation. That method is known as the Accelerated Cost Recovery System (ACRS), and it permits you to depreciate your PC over five years. Your deduction will be 15 percent of the system's cost in the year you placed it in service, 22 percent the next year, and 21 percent in each of the next three years. You can elect to depreciate your system at a lower rate or over a longer period, but it will probably not be advantageous to do so. Depending on how you handle your option for an investment credit, you may have to reduce the cost of the items you are depreciating.

The ACRS rules apply to hardware but usually not to software. Suppose, however, your dealer bundled your PC with *1-2-3* or *WordStar* as part of a special promotion. In that case, you can lump the software with the PC for depreciation purposes.

The IRS maintains that software priced separately is not eligible for ACRS depreciation. Not all tax experts—or tax courts—agree with this interpretation. Some say software should be treated the same as hardware; others say it should be deducted as a current-year expense.

Nevertheless, the IRS says you must amortize the software over its anticipated "useful life." This can be an advantage, since you can convincingly contend that much of the software on the market has a useful life of only two or three years. (Just recall the number of *VisiCalc* users who switched to

1-2-3 after using the former only briefly.) But determining a "useful life" is a judgment call, so you cannot presume that the IRS will go along at audit time.

Investment Tax Credit

The depreciable portion of your system (not including separately priced software) is eligible for an investment credit. This credit is generally 10 percent of the system's cost, subject to certain limitations.

Here, however, it gets tricky. For depreciation purposes the cost of the system must be reduced by half of the 10 percent credit. To avoid having to reduce your depreciable cost, you can elect to claim an 8 percent investment credit instead of the usual 10 percent.

First-Year Write-Off

This is technically known as the Section 179 deduction. In lieu of depreciation and an investment credit, you can deduct the cost of business-related property in the year you place the property in service. For 1984, this deduction was limited to $7500 for a joint or single return.

The limitation applies to your tax return as a whole, not merely to your computer system. For example, if you are married and filing a joint return, and your spouse buys a car for business use and elects to expense $7500 of the cost of the car, you cannot make the same election for an IBM PC you buy in the same year.

To the extent your PC is used for managing investments or for tax planning, it is not used in a trade or a business, and it is not eligible for the first-year write-off.

puter session and other minutiae. It's ironic that the IRS accepts as proof of business usage your written self-serving statement but will reject your verbal self-serving statement. A daily log can be essential in sustaining your claim.

In theory, when the auditor asks for your log, he or she is giving you a chance to prove you are entitled to your deductions. In reality, this deadpan request is often a tactic to put you on the defensive. Most users don't keep a daily log and have never heard of such a practice. The auditor anticipates your stammer or blank stare; his or her purpose is to confirm that no such log exists. That done, the auditor can confidently stake out an initial bargaining position.

The auditor is apt to lecture you on your solemn obligation as a taxpayer to keep adequate records. He or she will hint darkly at throwing out all of your computer deductions, then—figuring you're somewhat chastened—will make you a "reasonable" offer. "All right," the auditor will say, "surveys indicate that the average 'computer family' uses its system for personal purposes 60 percent of the time. I'll grant that yours is an average family and allow 40 percent business use." If you don't have a daily log, your protest is probably moot.

This is, admittedly, a worst-case scenario. Your auditor might be inclined to give you the benefit of the doubt, but it is likely that you won't be so fortunate. In almost every case, it's good sense to hire a CPA or other tax expert to represent you right from the start.

Should you decide to go it alone, remember to keep your cool, don't be intimidated, and be patient at all times. Submit all the documentary evidence you can muster—sample printouts of paid freelance work, for instance. Every scrap of proof demonstrates your belief in the legitimacy of your deduction.

Protecting Your Return

The best defense, of course, is a solid offense: have a strong case before you go into the audit. You can build that case now.

(My observations, incidentally, assume that you do indeed make legitimate, deductible use of your PC. If you bought it to play *Zork* and help your children write their term papers, there is no magic here to save you—you'll have to take your lumps along with Al in St. Paul.)

1. Make your PC appear "businesslike" on your return. The best way to achieve "business legitimacy" is to deduct the cost of your system against income from self-employment. The key word is *income*—you'll need to earn some somehow. Devote extra effort to generating

fees from consulting, writing, speaking—anything. Your goal is to prove that you are sufficiently adept at business to show a profit even after deducting all your computer-related expenses. If you run a loss for the year, you can still make a strong case that you tried to make money and that you expect to do well eventually. By the time your prior-year return is audited, your income in the current year may be high enough to prove that you're serious about turning a profit.

If there is no way you can justify your claim of self-employment, but you plan to deduct your PC as an employee "work tool," expect the IRS to question your deductions. Generally, the IRS auditor assumes that if your employer doesn't provide a computer for you, a PC is not

---

Where the tax laws are open to interpretation, you are entitled to give yourself the benefit of the doubt and let the IRS do what it will.

---

essential to your work. Get a letter from your employer stating that your PC is indeed a job requirement. If your boss won't agree to that, at least obtain a statement that the company cannot reimburse you for the money you spent on your system. Get this letter now; by the time you need it, you may have changed jobs.

If you are deducting the cost of a computer you use in managing investments, you may have a problem. Unless your portfolio is substantial and your trading active, the auditor is not likely to accept your claim that the PC's primary purpose is investment management.

2. Elect under Section 179 of the Internal Revenue Code to expense the cost of your system in the year you purchased it. Using this statute, you claim your computer as an expense rather than deducting the cost over several years through depreciation (see "Deducting Your PC"). Should an audit occur, the advantage gained by expensing is that controversial deductions will appear on your

	Date		Time (mins)		Name		Purpose/Remarks
Mar :	21	:	90	:	T. Williams	:	Design cash-planning spreadsheet
Mar :	23	:	60	:	Westside PC User Group	:	Prepare lecture on DOS 2.00
Mar :	29	:	45	:	(myself)	:	Draft letters for job hunting

Figure 1: PC usage log

return for one year instead of five. This election does have its drawbacks, however, and the amount you can expense is limited. Again, consulting with your tax adviser is the wisest move.

3. Keep your PC at your office if you can. If your computer isn't hanging around the house, the question of personal use by other family members will not arise. You are also less likely (in the auditor's view) to be using it to play games on weekends.

4. Conduct your business in a businesslike manner. This sounds obvious, but it cannot be overstated. Insurance is a case in point. A reasonable businessperson would make sure that his or her system was insured for its entire value. If your system cost $7000 but your home owner's coverage is limited to $5000, get the additional coverage you need. It's sensible to do so, whatever the tax considerations, but your insurance receipt also provides documentary evidence that you are serious about your computer-based business.

In a similar vein, a conscientious business manager would probably get a long-term service contract for the PC. An on-site service agreement is more businesslike than a carry-in agreement and will make your PC deductions more credible. Still, it's best to weigh this benefit against the additional cost.

The Last Resort

If you're not in a position to "audit-proof" your PC in any of the ways suggested, you can fall back on the daily log of system usage (see Figure 1).

Under "Time" list the number of minutes spent on each session. Under "Name" note the name of the client or customer. Under "Purpose" or "Remarks" enter any information that helps explain the business purpose of the PC session in question.

You might consider keeping this log on disk, then printing it out at the end of the year and computing your percentage of business use. Save the printout as documentation in the event of an audit. And remember that entries in the log must be made "contemporaneously"— the IRS does not accept entries made months after the fact. When you show the auditor your detailed printout, he or she will almost certainly attempt to determine when you entered the information.

A Last Word

If you are still shopping for your PC, be realistic in estimating your potential tax benefits. You will only be able to deduct the cost of the business portion of your system. But where the tax laws are open to interpretation, you are entitled to give yourself the benefit of the doubt and let the IRS do what it will. You are also free to make adjustments in the way you use your PC to reduce the chances of an IRS disallowance.

Some parting advice: If the IRS has audited your computer-related deductions and you now feel the auditor did not allow you everything to which you were entitled, consider amending your tax return on Form 1040X. You can file this form up to three years from the date you filed your amended return (or from the due date if that was earlier) or up to two years after the tax was paid. ◉

Ralph Soucie, a former auditor for the Internal Revenue Service, is a CPA in Portland, Oregon.

DO YOU RUN YOUR BUSINESS OR DOES IT RUN YOU?

The biggest headache you may be facing these days is getting better control of your business. Tracking unpaid bills, sending out second billings, monitoring which salesman sold how much and to whom, keeping track of inventories, and on and on.

There's a remedy. It's called VersaForm...the business database.

VersaForm is a powerful database designed specifically for business, but based on the simplicity and convenience of your familiar business forms.

If you can fill out a business form, you can create a database.

VersaForm starts with your existing forms and procedures. As you copy your forms onto the screen, VersaForm automatically creates a database for you. It records and saves information from Purchase Orders, Invoices, Job Estimates, Disbursement Ledgers...maybe even a few things you're not recording that you should be.

VersaForm is an electronic file cabinet that will store all this information, yet have it at your fingertips when you need it! It's designed with a non-technical user in mind, so you can concentrate on streamlining your business with none of the usual database headaches.
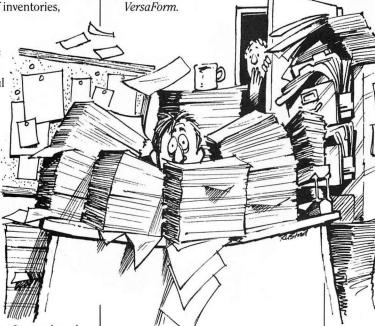
Adapts to your business...your way.

With VersaForm you don't have to completely re-orient your staff. It fits right into the way you're doing business now. Only now your operations will be completed more efficiently and with electronic speed.

- *A doctor in Moulton, Texas, posts his patient billing and completes his medical insurance forms with VersaForm.*
- *A small college in Wheaton, Maryland, uses VersaForm to create tuition invoices, class lists, accounts receivable, and accounts payable.*
- *A computer supplies company in Mountain View, California, writes payables checks and does expense distribution with VersaForm.*

- *A roofing company in Green Bay, Wisconsin, computes job estimates, contracts, invoicing, and tracks actual costs with VersaForm.*
- *A manufacturer in Beaver Falls, Pennsylvania, uses VersaForm to build his company's parts records, and generates "where-used" lists.*

VersaForm has the power to do these jobs and more because it's designed especially for business. It can also calculate taxes and prices, and can look up discounts, so you don't have to. VersaForm will even print on your own pre-printed forms.

Pull information together fast.

Pulling information together from paper files can be time-consuming and frustrating. Why make it tough? VersaForm puts vital reports like sales analyses, overdue payables, open purchase orders, and alphabetical employee lists at your fingertips. Minimum effort, maximum results.

All in one easy-to-use, integrated package.

VersaForm provides a screen formatter, a data entry program, a database, a report generator and a forms printer. And you can purchase predesigned Templates for standard jobs like Purchasing, Invoicing, and Expense Journals. VersaForm is the all-in-one business productivity tool. Ask for a demonstration at your computer dealer. Or contact us directly.

VersaForm™

New! IBM PC/XT Release
- DOS Files
- Hard Disk Support

If you want to know more, send in this coupon. We've got a lot to tell you about.

Name

Company

Address

City   State   Zip

Type of Business

Mail to: Applied Software Technology
170 Knowles Drive
Los Gatos, California 95030
(408) 370-2662   **141-E**

For use with the Apple II, IIe and III, and the IBM PC and compatibles.

Circle 12 on reader service card

PALANTIR™ WORD PROCESSING
WE DON'T HAVE TO BEEF UP OUR GUARANTEE WITH A LOT OF BULL

Other software companies give you disclaimers. Palantir gives you a real guarantee: Palantir backs its software with 90 days of free phone support via a toll-free number. When you call, we won't tell you to ask your dealer or read your manual; we'll answer your question, free of charge. If we can't solve your problem, we'll replace your Palantir Software with any competitive software of comparable value.

We couldn't make an offer like this if we weren't confident about Palantir word processing. It's easy to learn, easy to use, easy to live with.

Palantir word-processing software is designed for microcomputers. Yet it gives you all the features of a dedicated word processor. You won't find a better system on the market today.

To find out more about Palantir software, mark the reader-service card

in this issue or call, toll-free: 1-800-368-3797. In Texas, call 713-520-8221.

We'll respond with detailed information on Palantir software and a free "No Bull" button. A closer look will convince you that we're not just one of the herd. And that's no *bull*.
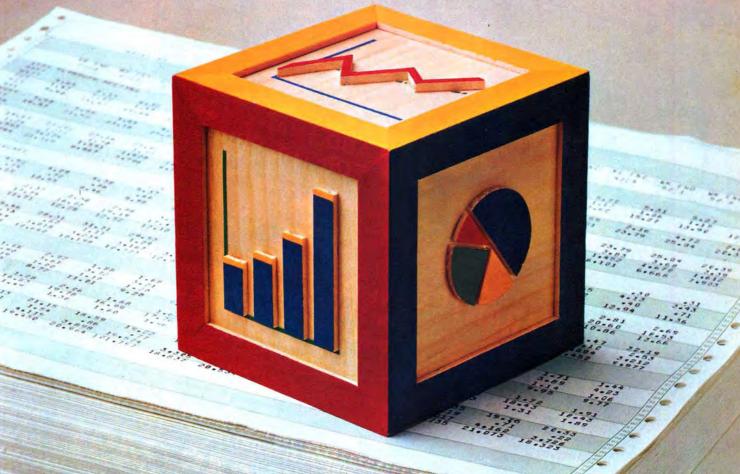
Palantir Software   3400 Montrose Blvd.   Suite 718   Houston, Texas 77006
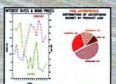
™ Palantir is a trademark of Palantir, Inc.

Circle 399 on reader service card

BUSINESS REPLY MAIL

FIRST CLASS   PERMIT NO. 63   BERGENFIELD, NJ

POSTAGE WILL BE PAID BY ADDRESSEE

PC World
Subscription Department
P.O. Box 6700
Bergenfield, New Jersey 07621

The Little Black Book

Use 1-2-3 to keep track of personal information.

Paul McDermott

The Little Black Book enables you to easily keep track of names, addresses, telephone numbers, and birthdays. It is a simple data management template that uses version 1A of Lotus Development Corporation's *1-2-3* to quickly file, retrieve, sort, and extract statistical information about employees, friends, and relatives.

The template is divided into two parts: the data input section, where the information is entered and stored, and the data query section, where the criteria by which the information will be extracted can be specified. The template uses many of *1-2-3*'s data management functions; this article is partly a tutorial on their use.

The Little Black Book also makes use of *1-2-3*'s keyboard macro capabilities. The article shows how to use macros to create a routine for entering data and how to use the /X macro commands to create loops, input statements, and other programming functions usually found only in programming languages such as BASIC.

This article assumes familiarity with the overall *1-2-3* command structure and with basic movement around a *1-2-3* worksheet. The terms printed in *italics* are *1-2-3* commands. They can be entered either by typing the first letter of each command word or by using the cursor control and <Enter> keys to select the appropriate command.

Text and values to be entered into cells or in response to prompts are listed in monofont type. All cell references are given as capital letters followed by numbers; they can be entered either as direct references or by pointing.

Designing the Template
Creation of the template begins with designing the data input section. Start with a clean worksheet by giving the command */Worksheet Erase Yes*. Enter a title for the worksheet by moving to cell B2 and entering a label consisting of 21 asterisks: '*********************. Since an asterisk can be read as a mathematical operator, be sure to start the label with a single quotation mark (') to identify the contents of the cell as a label and not a value to be calculated.

Copy cell B2 to cell B4 with the command */Copy* B2 <Enter> B4<Enter>. Move to cell B3 and type THE LITTLE BLACK BOOK. Go to cell B7 and type ^First. (The ^ character, a caret or shifted 6, will center the label in the cell.) Enter the rest of the headings in row 7 as follows:

C7: ^Last
D7: ^Address
E7: ^City
F7: St
G7: ^Zip
H7: ^Phone
I7: ^D.O.B.
J7: ^Age
K7: ^B.D.
L7: Code

Skip column M

N7: "Yr
O7: "Mn
P7: "Dy

Move the cursor to N6 and type Date of Birth.

Before you go any further, you may want to switch *1-2-3* to manual recalculation mode by giving the command */Worksheet Global Recalculation Manual*. That command will prevent *1-2-3* from recalculating the entire worksheet after each entry and thus will allow you to move from cell to cell more quickly.

Now reset the width of column A to 3 characters by moving to any cell in that column and giving the com-

mand /*Worksheet Column Set* 3 <Enter>. (Column A won't be used for data in this template; the empty column will leave a few spaces between the text and the worksheet border, making the data easier to read.) Using the same command, reset the other columns as shown in Table 1.

The last step in setting up the data input section is to place hyphens above and below the row of labels. Go to cell B6 and enter 9 hyphens, beginning with a single quote ('). Move to C6 and enter a line of 14 hyphens. Continue the same procedure in cells D6 through L6, entering the number of hyphens shown in the last column of Table 1. Each line of hyphens is 1 character shorter than the width of the cell. The resulting space will help distinguish where one column ends and the next begins. Now copy the contents of row 6 to row 8 by moving to cell B6 and giving the commmand /*Copy* B6..L6 <Enter> B8 <Enter>.

To accommodate *1-2-3*'s data management operations, you must assign names to various parts of the data input section before you begin entering any information. You can specify a name for the input area with the Range Name command. Go to cell B7 and issue the command /*Range Name Create* INPUT <Enter> B7..P11 <Enter>. Although the specified input range is small (4 rows), the program will expand the range with each new entry; there is no need to worry about accidentally entering data outside the input range.

The column headings should also be given range names. With the cursor at B7, give the command /*Range Name Label Down* B7..L7 <Enter>. This command assigns the name "First" to cell B8, the name "Last" to cell C8, the name "Address" to cell

D8, and so on. These range names will be important later for data query functions. (For more information, see Andrew Fluegelman's article "The 1-2-3 Checkbook Ledger," *PCW*, Vol.

Column	Characters	Hyphens in Row 6
A	3	0
B	10	9
C	15	14
D	20	19
E	13	12
F	4	3
G	7	6
H	14	13
I	11	10
J	5	4
K	8	7
L	5	4
N	5	
O	4	
P	5	

Table 1: Column widths for The Little Black Book

1, No. 6.) You are now ready to begin entering data. But before you do, save the worksheet to disk with the command /*File Save* BLACKBK <Enter>.

Data Entry

You're now ready to enter your first record. To begin, go to cell B9. Press the <CapsLock> key and type in JOHN. Then move to cell C9 and enter BROWN. On the same row, under the Address heading (column D), enter '123 ANYWHERE ST. (Remember to start the entry with a single quotation mark to indicate that it is a label and not a value.) At cell E9 enter ANYTOWN. Move to F9 and enter PA. At cell G9 enter '19040. Go to cell H9 and type in '215-555-8923. Then move to L9 (the "Code" column) and enter E. This column will be used to distinguish between employees (E), relatives (R), friends (F), and so on. Finally, enter 58 in N9, 12 in O9, and 10 in P9.

Using Date Functions

Now that you have entered the first row of data, you are ready to create some of the formulas that make The Little Black Book work. One of *1-2-3*'s most advanced features is its ability to handle date arithmetic, and The Little Black Book takes advantage of that ability.

Go to cell I9 and enter the formula @DATE(N9,O9,P9). The result will be 21529. *1-2-3* calculates dates by determining the number of days since the beginning of the century. This number is the number of days between December 31, 1899, and the date of birth entered in cells N9, O9, and P9. The number doesn't help much until it is formatted in a way that is more easily understood. With the cursor still at cell I9, give the command /*Range Format Date* <Enter> <Enter>. The Range Format Date command has three options for displaying dates. Since you just selected the first option, cell I9 should now read 10-Dec-58. To edit the data in column I, the date of birth (D.O.B.) column, you must make the necessary changes in columns N, O, and P and press the <F9> (Calc) key to see the effect.

Having the date of birth is handy, but to keep a list of current ages you must use another of *1-2-3*'s date arithmetic functions. At cell J9 enter the formula @INT((@TODAY-I9)/365). A person's current age will be found by calculating the difference between the current date (found by the date function @TODAY) and the date of birth (found in cell I9). The function @INT will display only the integer portion of the result of the calculation. Dividing by 365 expresses the result in years.

Column K, headed B.D. (for Birthday Data), uses date arithmetic to calculate and store the birthday for the current year. This data will be useful for data query operations such as
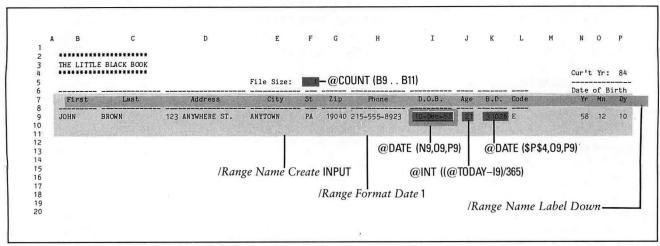
Figure 1: The Little Black Book's data input section

birthday reminders. Before you set the formula, go to cell N4 and type Cur't Yr:. In cell P4 enter 84. Move to N5 and type \- <Enter> /*Copy* <Enter> O5..P5 <Enter>. Go to K9 and type in the formula @DATE(P4,O9,P9). The $ symbols in the P4 cell address indicate an absolute cell reference, which won't change when the formula is copied later. The value in cell K9 represents the number of days that have elapsed since the beginning of the century (31026). You can leave this cell unformatted, since it will only be used for data query operations.

The last formula in the data input section is used to count the number of records (or rows). Go to cell E5 and type "File Size:. Move to cell F5 and enter the formula @COUNT(B9..B11).

Figure 1 is a schematic diagram of the worksheet to this point, showing the range names and formulas assigned to different cells, the format of the worksheet, and the first entry. You are now ready to start entering

the rest of the data. Before you do, again save the worksheet template to a disk file using the command /*File Save* <Enter> *Replace.*

Keyboard Macros
You could begin entering data at cell B10 and simply move the cursor right to the next column as you completed each field. When you finished one complete record (or row of data), the cursor would be at cell P10. Then you would return to column B to enter the next record. This is an effective way of entering information, but it's certainly not the quickest or easiest. Data entry can be made much easier by writing some simple *1-2-3* keyboard macros to prompt the user for an entry and to automatically copy the entry into the appropriate data cell.

A *1-2-3* keyboard macro is a specially named cell or range of cells that contains a series of keystrokes and commands that can be activated by simply pressing two keys. You can create a macro by simply typing the desired keystrokes in a cell and naming the cell or range with a 2-character range name. Macro range names consist of a backslash as the first character and any letter as the second character. Once the range is named,

you can execute the macro by pressing the <Alt> key and the letter used in the range name.

Macros use a few special characters: The tilde (~) character is used to represent the <Enter> key; {right} is the equivalent of pressing the <CursorRight> key; and so on.

1-2-3 also has a number of special commands that can be used only in macros. The /X commands, which cannot be issued from the keyboard, create "program loops" or issue "GOTO" statements that let macros jump from section to section of instructions. The Little Black Book will use several of these commands to create a program for entering data.

Macros for Data Entry
To begin setting up a macro you need to find an area of the worksheet that won't be affected by sorting adjacent data. Move the cursor to cell C46 and type MACRO FOR DATA ENTRY. Then place a line of hyphens in cell C47 beneath that label; don't forget to begin with a single quotation mark.

Two types of macro input statements may be used to prompt for data entry. The first, /XL*message*~

range~, displays a message (up to 39 characters) in the control panel and waits for data input. When the data is entered, *1-2-3* stores the data as a label in the specified range, which can be either a cell address or a named range. The other input command, */XNmessage~range~,* works the same way, but it stores the data as a numeric entry.

Go to cell B52 and type '/XLFirst name? ~B10~. When this macro is executed, the message 'First name?' will appear in the control panel. When you type in the response, it will be copied into cell B10. (Notice that all this was accomplished without moving the cursor.)

Type the rest of the macro input statements into column B as follows:

B53: '/XLLast name? ~C10~
B54: '/XLAddress? (# Street) ~D10~
B55: '/XLCity? ~E10~
B56: '/XLState? (xx) ~F10~
B57: '/XLZip code? (xxxxx) ~G10~
B58: '/XLPhone number? (xxx-xxx-xxxx) ~H10~
B59: '/XLCode? E = employee, R = relative, F = friend ~L10~

The first eight statements create label entries. The next three create numeric entries:

B60: '/XNMonth born? (xx) ~O10~ (be sure to enter oh-one-zero, not zero-one-zero)
B61: '/XNDay born? (xx) ~P10~
B62: '/XNYear born? (xx) ~N10~

These macros let you enter all the necessary data on line 10 without having to move the cursor to 11 different cells. Once the data is entered, the worksheet will need to use the date formulas from cells I9 through K9. To create the macro to access these cells, go to cell B63 and type {GOTO}I9~. Move down to cell B64 and type '/C{RIGHT}{RIGHT}~{DOWN}~. In cell

B65 type {HOME} and in B66 enter {CALC}. These four macro cells will move the cursor to the cells containing the formulas, copy them to the input line (row 10), move the cursor back to the home position, and recalculate the worksheet.

Creating Loops
Once all the data entry macros are in place, you could process the data by executing the macro once for each record (or line of information). That

---

These macros let you enter all the necessary data without having to move the cursor to 11 different cells.

---

means if you had 50 records to input, you would have to execute the macro 50 times. But an easier way is to use a "loop" and an "if...then...else" macro. Go to cell B49 and type in '/XNWant to enter data? (Yes = 1, No = 0) ~ANSWER~. Move to cell B70 and issue the command */Range Name Create* ANSWER <Enter><Enter>. Then move up to cell B50 and type in '/XIanswer = 0~{HOME}/XQ~. Move down to B51 and enter {GOTO}A10~/WIR~ {HOME}.

The macro in cell B49 asks if you want to enter data and stores the response in a cell with the range name ANSWER. The macro in cell B50 determines if the value of ANSWER is equal to zero. If it is equal to zero, then the macro moves the cursor to the home position and stops executing the macro (/XQ means Quit Execution). If the value of ANSWER is not equal to zero, then *1-2-3* stops reading cell B50 and looks to cell B51 for its next macro command. The /XI command is *1-2-3*'s version of an

"if...then...else" statement: if the condition is true, then continue to read the keystrokes in the same cell; if the condition is false, then stop reading this cell and look in the cell immediately below for further keystrokes.

The macro in cell B51 will insert a line (/Worksheet Insert Row) at row 10 and then return the cursor to cell A1 (home). Since all new data will be entered along row 10, it is important that this macro cell precede the data entry macros.

Just two more steps are needed to create a loop that will finish the data entry macro program. First go back to cell B49 and give the command */Range Name Create* LOOP1 <Enter> <Enter>. Then move to cell B67 and type in '/XGloop1~. When executed, this cell causes *1-2-3* to "loop" back to cell B49; the prompt 'Want to enter data? (Yes = 1, No = 0)' will appear again. The /XG command is a macro GOTO statement that tells *1-2-3* where to look for its next macro keystroke. (This should not be confused with the <F5> function key (GOTO) that moves the cursor to a specified cell.)

Once you have finished creating the text of the macros, you are ready to name the cells that contain them. Go to cell B49 and issue the command */Range Name Create*\D <Enter> <Enter>. You may have realized that cell B49 already had a range name. The name \D is used to execute the macro while the name LOOP1 is used to refer to B49 from cell B67 ('/XGloop1~). The name LOOP1 was assigned to make the macro easier to understand. Before

JENNY	OSBORNE	21 MAPLE AVE.	HARRISBURG	PA	19045	215-555-4978	E	04/10/67
RICH	CARBO	221 WELLINGTON DR.	CINNAMINSON	NJ	08077	609-555-8253	R	09/03/56
DONNY	SMITH	259 TENBY RD.	DELRAN	NJ	08077	609-555-8211	F	12/02/58
DAN	HERBERT	179 MADISON AVE.	NORRISTOWN	PA	19457	215-555-1018	R	10/05/59
MEL	GRIES	351 TANNER AVE.	WARMINSTER	MD	21974	301-555-8187	R	05/21/57
JOAN	MOYER	118 MEREDITH AVE.	DOYLESTOWN	PA	19010	215-555-1697	E	05/29/59
JOHN	LANG	256 CLEARFIELD CT.	NEW BRITAIN	MD	21456	301-555-3096	F	06/12/57
FRAN	MC GLYNN	206 MOHEGAN ST.	BRISTOL	NJ	08901	609-555-9128	E	09/22/54
LORI	LIVEZEY	215 SANDY KNOLL DR.	HATBORO	PA	19901	215-555-6904	R	06/19/59
ROBERT	HITCHNER	206 MOHEGAN ST.	WARMINSTER	MD	21974	301-555-8947	F	02/14/60
PATTY	WALK	235 COTTMAN AVE.	MT. LAUREL	NJ	08054	609-555-0103	F	07/02/60
TIM	BOYLE	4237 PASSMORE ST.	PHILADELPHIA	PA	19135	215-555-1982	E	03/16/57
ED	SOTTALANA	295 BUCKMAN DR.	WILDWOOD	NJ	08054	609-555-0791	R	05/01/53
BRIAN	WYNNE	111 CATBRIER WAY	ROSEMENT	PA	18078	215-555-1331	F	12/31/58
VINCENT	RITTS	1105 PRIMROSE CT.	ANNAPOLIS	MD	21403	301-555-4131	R	04/15/52
MARY	TROUT	197 CHEW AVE.	PENNSAUKEN	NJ	08110	609-555-8190	R	02/05/54
JOHN	SWELTZ	527 SHERWOOD LA.	UPPER DARBY	PA	19835	215-555-1940	E	08/22/53
PAUL	BUNYAN	3109 WOODHAVEN DR.	PENNSAUKEN	NJ	08110	215-555-8253	F	09/18/56
ELAINE	HOUSTON	2083 PARKDALE AVE.	HORSHAM	PA	19154	215-555-8534	E	05/02/50

Figure 2: Sample entries in The Little Black Book

you go any further, save the worksheet with the command /*File Save* <Enter> *Replace.*

Return the cursor to cell A1. You can now begin to enter the sample data given in Figure 2. To reduce the chance of later data query errors, turn on the <CapsLock> key so that the information will be consistently uppercase. Then activate the data entry macros by typing D while you hold down the <Alt> key. To get the maximum benefit from this article, and to be sure that cell references in your worksheet will agree with those in the rest of the article, type in all of the sample data and no other data.

If errors occur during execution of the macro, first check the text of the macro for completeness. A common mistake is to omit the tilde (~) character. Also check the spelling of the range names. If problems persist, execute the macro in the "step" mode. While in the step mode, the macros will be read one at a time with a pause between each keystroke. To enter the step mode press the <Alt> and <F1> keys before executing the

macro. Press any key to continue to "step" through the macro until an error message appears. Note where the problem occurs and press <Alt>-<F1> again to exit the step mode. You can abort a macro any time by pressing <Ctrl>-<Break>.

Data Query
Setting up the data query section will complete the template. The data query section consists of the criterion range and the output area.

In the criterion range you can specify the criteria by which records will be selected for find or extract operations. The results of the data query operation are written in the output range.

Go to cell R30 and type THE LITTLE BLACK BOOK. Go to cell R31 and type \ = <Enter> /*Copy* <Enter> S31 <Enter> to place a row of equal signs beneath that label. Move to cell R34 and type CRITERION. In cell S34, type Press <Alt>-X to extract. Go to cell B90 and type '/DQEQ{CALC}. This macro will issue the Data Query Extract command, quit the data menu, and recalculate the worksheet. Then give the command /*Range Name Create*

\X<Enter><Enter>. Enter a label of nine hyphens in cell R35. Now copy the headings from the data input section to the data query section by giving the command /*Copy* B7..L7 <Enter> R36 <Enter>.

To facilitate some reports from the data query section, you should swap the B.D. and Code column headings in the criterion section by issuing the following set of commands: /*Move* AA36 <Enter> AA35 <Enter> /*Move* AB36 <Enter> AA36 <Enter> /*Move* AA35 <Enter> AB36 <Enter>.

When this is done go to cell R41 and type OUTPUT. Then place a label of six hyphens in cell R42. Copy the headings from the criterion section to the output section by giving the command /*Copy* R36..AB36 <Enter> R43 <Enter>. Reset the column widths as you did in the data input section. Move the cursor to column R and give the command /*Worksheet*

```
              R         S              T              U    V   W      X        Y      Z  AA   AB

30   THE LITTLE BLACK BOOK
31   ==========================
32
33
34   CRITERION Press <Alt>-X to extract          /Range Name Create CRITERION
35   ---------
36    First      Last           Address        City   St  Zip    Phone    D.O.B.  Age Code B.D.
37
38                                          Output Size:  0 ── @COUNT (R44 .. R94)
39   ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
40   OUTPUT
41   ------
42
43    First      Last           Address        City   St  Zip    Phone    D.O.B.  Age Code B.D.
44
45
46
47
48
49
50
                                    /Range Name Create OUTPUT
```
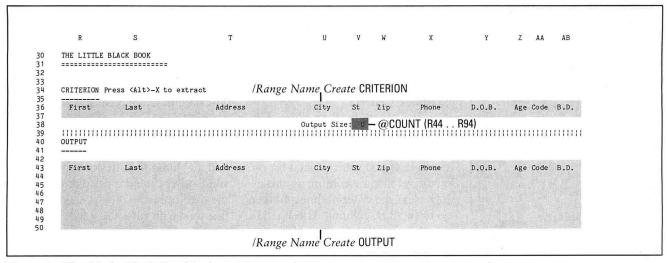
Figure 3: The Little Black Book's data query section

Column Set 10 <Enter>. Similarly, reset column S to 15 characters, column T to 30 characters, column U to 13 characters, and column V to 4 characters. Also change column W to 8 characters, column X to 14 characters, column Y to 11 characters, columns Z and AA to 5 characters, and column AB to 7 characters.

The data query section uses only one formula, which simply keeps count of the number of output records. Release the <CapsLock> key, go to cell U38, and type "Output Size:. Then move to cell V38 and enter the formula @COUNT(R44..R94).

The range size in this formula will not expand with each new entry. Therefore if the value in cell F5 (which represents the total number of records) is greater than 50, the range in cell V38 should be increased. Go to cell R39 and create a repeating label of vertical lines by typing \ !. Copy this cell across the row with the command /*Copy* R39 <Enter> S39..AB39 <Enter>.

You should now create a few more range names, defining the criterion and output areas. Give the command /*Range Name Create* CRITERION

<Enter> R36..AB37 <Enter>. Then issue the command to name the output section: /*Range Name Create* OUTPUT <Enter> R43..AB93 <Enter>. Again, if the data input section becomes larger than 50 records, the output range should be expanded.

If you have constructed the data query section correctly, it should look like Figure 3, except that the figure also shows the range names. This would be a good time to save the worksheet. Give the command /*File Save* <Enter> *Replace.*

Extracting the Data

The Little Black Book uses the data query extract function to develop reports from the name and address data base. But before you can use any of the data query operations, the data input, data output, and criterion ranges must be defined. This will be easy since you previously named these areas with the Range Name command. You can define all three ranges at once with the following command: /*Data Query Input* INPUT <Enter> *Criterion* CRITERION <Enter> *Output* OUTPUT <Enter> *Quit.*

Go to cell R37 and type JOHN and press <Alt>-X to execute the Data Query Extract macro. *1-2-3* will first look at the line or lines defined as the

criterion range. Next it compares the criterion with the data in the input section. Any record that contains an item that matches the criterion will be copied to the output section. You should now have a list of everybody with the first name John.

Erase cell R37 with the command /*Range Erase* R37..R37 <Enter>. Then enter NJ in cell V37 and press <Alt>-X again. In a few seconds you will have a list of all New Jersey residents.

With NJ still in cell V37, move to U37, enter PENNSAUKEN, and press <Alt>-X again. Notice that the previous output list was reduced when you added another criterion.

Formulas are also permitted in the criterion range. For example, you can extract a list of all the people on your list who are over 30 years old. To begin, erase all entries in the criterion line with the command /*Range Erase* R37..AB37 <Enter>. Since we are dealing with age, we will use the Age column for the criterion, although an equivalent formula can be created in the date of birth (D.O.B.) column. Move to cell Z37 and enter the formula +AGE>30. The plus sign before the

● Hands On

word AGE will tell *1-2-3* to treat this as a value and not as a label. Press <Alt>-X once again. Almost immediately the output section contains a list of people over 30 years old.

Complex Criteria
To make a birthday list truly useful, you'll want to get a report of birthdays that are coming up soon. For example, if you want to get a list of birthdays that are coming up this July, clear the criterion line and then go to the B.D. column. At cell AB37 type in the following formula:
+ B.D.> = @DATE(84,7,1)#AND#B.D.< = @DATE(84,7,31) This somewhat complex formula can be broken down into easily understood segments. Simply stated, *1-2-3* will look for values in the B.D. column that are greater than or equal to the numerical value of @DATE(84,7,1) and less than or equal to the numerical value of @DATE(84,7,31). In other words, *1-2-3* will search and extract everybody with a birthday in July. Once you've entered the formula, press <Alt>-X to perform the extract.

The data query function also has the capability to use wild-card characters for matching labels. The * character (asterisk) instructs *1-2-3* to accept any characters that follow it. For example, if you enter S* in the "Last" column of the criterion section and press <Alt>-X, you get a report containing records for Smith, Sottalana, and Sweltz. The *?* character (question mark) tells *1-2-3* to accept any character it finds in that position. So specifying J0?N in the "First" column would return records for JOHN and JOAN. The last wild-card character is the ~ (tilde), which indicates "not this." If you were to place this character before a label, *1-2-3* would extract all items except those containing that character.

Therefore, entering ~E in the code column would yield a list of all persons meeting the criterion except employees (E = employees).

Editing the Book
The data base template you have created in this tutorial is very flexible. It is easy to change the template to suit your needs. For example, you could add a column for titles or substitute some other calendar calculation for the date-of-birth column. Changes like these can turn The Little Black Book into an excellent marketing tool, for instance. With a little more effort and creativity, you could use the principles described in this article to devise a simple accounts receivable or accounts payable report system.

In the next issue you'll learn how to extend The Little Black Book by printing mailing labels and creating your own menus so that The Little Black Book can be operated by even a *1-2-3* novice. Before you erase the sample data and start entering your own, save a version of the worksheet under a new file name. That way you'll be sure that the cell references in next issue's article will agree with the ones on your worksheet. ●

Paul McDermott is a financial consultant with Mediq Management Services in Pennsauken, New Jersey.

BRAINSTORM WITH THOR

Whatever the task, Thor can organize it: a sales territory or a dinner for 200; a legal brief or an article; a seminar, a specification, or a budget; a shopping list or a production schedule; a marketing plan or an exercise program; a medication schedule or a political campaign; a construction project or a resume.

Capture your thoughts

You know how you think: one thought triggers another and another. Some of your best ideas get lost in the ensuing storm.

This powerful new software package can harness these brainstorms. Thor, The Thought Organizer, automatically dates your every thought. And you can pigeon-hole them into categories that you define. You can recapture each idea anytime by category, date, or key word.

Free your mind

You just come up with the ideas, and Thor remembers them as you yourself would. No predefined structure like the usual software packages, Thor accommodates your unique thinking patterns.

Master your PC

Designed for the IBM PC and XT, Thor takes full advantage of their considerable capabilities. Thor represents the new generation of software that adapts to you rather than you to it.

Put Thor to work

Just $20 will get you a Thor demo package. And another $275—that's only $295 total—will unleash all the power of Thor.

To order, or to receive more information, call toll-free (800) 372-2345, in New Jersey (201) 676-7963.

THOR
The Thought Organizer

Fastware, Inc.
200 Freeway Drive East
East Orange, NJ 07018

VISA   MasterCard

Knowledge Manager: The software that keeps on growing...

Sample PIE chart

18.18%
21.21%
12.12%
9.09%
15.15%
24.24%

Ad Hoc Query Language
Color Graphics
Third Generation Spreadsheet
Structured Programming Language
Relational Data Management
Statistical Analysis
Screen I/O Management
Interactive Forms Painting
Printed Forms Management
Run-time Capability

Whether your needs are simple...

Features*	Advantages*	Benefits*
Unlimited number of tables open at a given time	No need to open and close tables repeatedly	Speedier answers to your queries
Up to 255 fields per record	Greater descriptive capacity	Lowers frustration of having to deal with multiple tables for a single topic
Passwords, read/write access, data encryption	Access to data is individualized	Unauthorized use of data prevented
Query multiple tables with a single command	Retrieves data without unnecessary intermediate steps	Users get information more efficiently
Query syntax like IBM's SQL/DS	English-like commands	Users not required to learn a new language
Dynamic sorting and grouping of query output	Control of output format	Data can be customized to users needs
Spreadsheet cells may be defined in terms of • formulas • data table values • programs	Cell can automatically retrieve information from tables and can perform intricate mathematical operations on that information	No need to rekey information or perform calculations separately
Forms creation for screen and printer using 8 colors, blinking, bell, prompts, reverse video, etc.	Greater versatility in screen and printed output	Screens and forms are easy to understand and use
Statistics (e.g., min, max, average, sum, standard deviation, variance, etc.) automatically generated	Provides more complete analytical description of data	Improved decision-making capabilities
High resolution color graphics: pie charts, bar charts, area curves, scatter diagrams, etc.	Numerical data from spreadsheets and tables can be pictorialized	Patterns and trends easier to spot

*Partial List
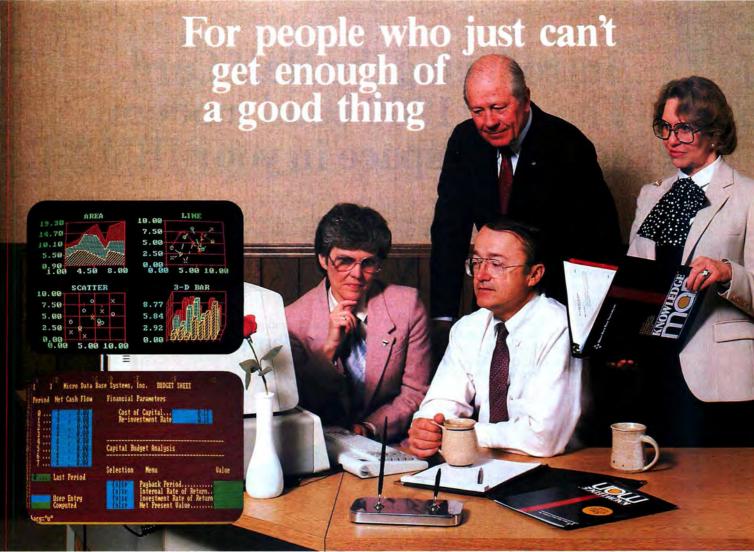
We help a lot of different people solve a lot of different problems: from the simplest to the most complex...from mailing lists to integrated accounting, from preparing tax returns to order entry. Whether you need help saving money or making it, the Knowledge Manager can help you manage your information better than any other micro software package.

Quality Software for Quality Results

You can start just as simply as you want and grow just as fast as you like. The Knowledge Manager's powerful commands are always ready when you are. You get quick results, improved productivity, accurate information, custom tailored to meet your needs. The Knowledge Manager lets you use your information, when you want it and in the way you want it.

Introducing the Half Card.™
The only 1200 baud modem
for that small space in your IBM XT.

Put a half space to full use.

The Ven-Tel Half Card is an ultra small 1200/300 baud modem that fits into the unused half sized slot in the IBM-XT, leaving the full size slots free for additional memory and other expansion. Although it's half the size of other modems, the Half Card has all of the high performance features you expect: selection of 1200 or 300 baud, automatic dialing, auto-answer, and full compatibility with virtually all software.
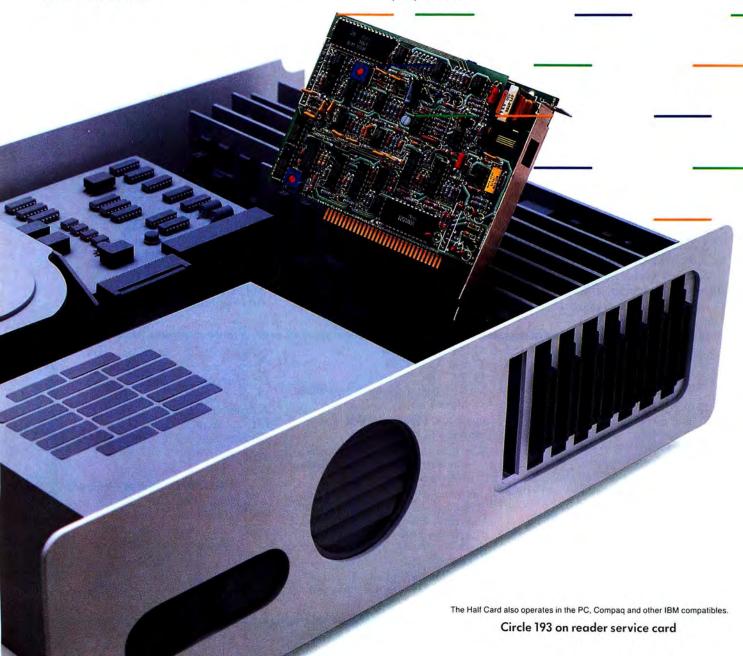
The PC Modem Half Card comes complete with one of the most popular communications software packages available, CROSSTALK XVI by Microstuf. Whether you use an information service such as The Source or Dow Jones News Retrieval, or transfer files and electronic mail, the Half Card connects your IBM-XT to the world.

Available at Businessland, Computerland, Genra and other fine dealers nationwide. Also from Ven-Tel: an internal modem for the HP-150 and an external modem with all of the features of the Half Card.

Effortless Communication
From Ven-Tel Inc.
2342 Walsh Ave.
Santa Clara, CA 95051
(408) 727-5721

The Half Card also operates in the PC, Compaq and other IBM compatibles.

Circle 193 on reader service card

✳•✳ Star-Dot-Star

A global exchange of personal computer discoveries

Edited by Art Wilcox and Karl Koessel

This month's column includes two suggestions regarding key reassignment. For BASIC programmers, we have a quick reference utility that lets users search for a specific variable or string of characters in a BASIC program; the utility lists the line number of each line that contains that variable or string. We also have a warning about the use of the new DOS reserved characters and a patch to Burton L. Alperson's communications piece, "Smartmodem Gets Smarter" (*PCW*, Vol. 1, No. 7).

Our lead item is on CHMOD, a handy utility that enables you to change the attributes of any file. You can "unhide" hidden files (even system files), mark certain files as "read only," or "hide" files you wish to keep private.

Hidden File Attributes

The attributes of DOS files are normally ignored by most PC users. Writers frequently talk about hidden files but very few users have occasion to be concerned about them. However, if you are developing programs that write to the disk, files may inadvertently be set to an unwanted attribute. In certain circumstances, you may want to set the attribute of a file to some value other than the default value. For instance, you can protect a file from being accidentally overwritten by making it "read only." (For a complete list of file attributes, see Table 1.)

There is no DOS command that can change a file's attributes. There is, however, a DOS 2.00 function call, named CHMOD, CHange file MODe (see the DOS manual, page D-39, DOS function call 43), that can be called from a user-written

Hexadecimal value	File attribute
01	Read only
02	Hidden file
04	System file
08	Volume label
10	Subdirectory
20	Archive bit

Table 1: File attributes

program for this purpose. In fact, any of the attributes may be set or reset by using this function.

Assemble the program CHMOD .ASM (see listing by that name) and convert it to a .COM file, or use the CHMOD.BAS listing to create CHMOD.COM (hereafter referred to as CHMOD). To change a file's attributes, simply enter the command CHMOD *path filename xx* where *path* and *filename* are in the standard DOS 2.00 format, specifying the desired file (hereafter, the path and the file name are referred to as "pathname") and *xx* is a 2-digit hexadecimal code representing the desired attribute. A file may have a combination of attributes; *xx* will simply be the sum (in hexadecimal) of the values of the desired attributes.

The characters entered on the DOS command line (except the command CHMOD) are available beginning at location 80h of the DOS Program Segment Prefix. The first byte contains the number of these characters. The second byte should be the space that separates the command CHMOD from the pathname. If nothing is typed in after the command CHMOD, no action will be taken and control will return to DOS. Otherwise, a scan is made of the line for the space that follows the

pathname. This space is replaced by a zero to form an ASCIIZ string for the DOS function call. At that point, the CX register should contain a 2, indicating the number of characters of the desired attribute code. CHMOD checks to see that they are hexadecimal characters. If they are not (or if there aren't two characters) the CHMOD program terminates.

Next, DOS function call 43, CHMOD, is made. If the call is unsuccessful, DOS returns to the program with the carry flag set and the register containing an error code. If there is no error, the DX register is loaded with the address of the 'CHANGE SUCCESSFUL' message. If there is an error, execution jumps to ERR_EXIT, where the 'CHANGE UNSUCCESSFUL' address is loaded into the DX register. The location OUT is a common path for either condition. The data segment register is set up for the function call to display the message. Then the message is output with another DOS call. Normally, the error messages would be defined in a data segment and the ORG 100H statement would not be used. However, I made this departure in order to create a .COM file.
William J. Burlingame
Huntsville, Alabama

ANSI.SYS Key Reassignment

Brian Mann's article "Changing Keys" [*PCW*, Vol. 2, No. 3] brought to mind my difficulties in using assembly language to assign useful meanings to keys. The difficulties arose from an apparent error in the DOS 2.00 manual. Perhaps *PC World* readers can be spared this frustration by adding a note to their manual.

In Chapter 13, under the section "Keyboard Key Reassignment," my

∗•∗

```
        TITLE    'CHANGE FILE ATTRIBUTE PROGRAM'
        ;
        ;CHMOD is a utility program that will change the attribute of
        ;of DOS files.  The program will run on version 2.0 or later.
        ;
        ;William J. Burlingame, December 1983
        ;
CSEG    SEGMENT
        ASSUME   CS:CSEG
CHG_ATTR         PROC    FAR
        ORG      100H
START:
        JMP      INIT
OK_MSG  DB       'CHANGE SUCCESSFUL$'
ERR_MSG DB       'CHANGE NOT SUCCESSFUL$'
INIT:
        PUSH     DS                           ;SAVE SEG OF RET ADDR
        XOR      CX,CX
        PUSH     CX                           ;ADDRESS OF ZERO

        MOV      DI,82H                       ;ADDRESS OF COMMAND LINE
        MOV      CL,[DI-2]                    ;GET # CHARACTERS ON COMMAND LINE
        DEC      CL                           ;ANYTHING THERE?
        JS       ERR_EXIT                     ;EXIT IF NOT

        MOV      AL,' '                       ;PATH NAME DELIMITER
        REPNE    SCASB                        ;SEARCH FOR SPACE
        JNZ      ERR_EXIT                     ;EXIT IF NOT FOUND

        CMP      CX,2                         ;CHECK FOR TWO HEX DIGITS
        JNE      ERR_EXIT                     ;EXIT IF NOT

        MOV      BYTE PTR [DI-1],0            ;MAKE PATHNAME AN ASCIIZ STRING

        CALL     GET_NIBBLE                   ;CONVERT FIRST DIGIT
        JC       ERR_EXIT                     ;EXIT IF ILLEGAL

        MOV      BH,BL                        ;SAVE 1ST DIGIT
        INC      DI                           ;BUMP TO NEXT DIGIT
        CALL     GET_NIBBLE                   ;CONVERT 2ND DIGIT
        JC       ERR_EXIT                     ;EXIT IF ILLEGAL
        PAGE
        MOV      CL,4                         ;SHIFT COUNT
        SAL      BH,CL                        ;MULTIPLY 1ST DIGIT BY 16
        ADD      BL,BH                        ;ADD IN UNITS DIGIT

        XOR      CH,CH                        ;SET UP CX FOR DOS FUNCTION
        MOV      CL,BL
```

CHMOD.ASM

```
        MOV     AX,4301H                ;AH = 43H, AL = 1
        MOV     DX,82H                  ;ADDRESS OF ASCIIZ PATHNAME
        INT     21H                     ;SET THE ATTRIBUTE
        JC      ERR_EXIT                ;JUMP IF NOT SUCCESSFUL
        MOV     DX,OFFSET OK_MSG
        JMP     OUT

ERR_EXIT:
        MOV     DX,OFFSET ERR_MSG
OUT:
        PUSH    CS                      ;SET UP DS FOR IO CALL
        POP     DS
        MOV     AH,9                    ;FUNCTION CODE FOR CONSOLE OUT
        INT     21H                     ;OUT PUT MESSAGE TO CONSOLE
        RET                             ;ALL DONE
CHG_ATTR        ENDP
        PAGE
;
;
;       A ROUTINE TO CONVERT AN ASCII CHAR TO HEX
;               ENTRY:
;                   ES:DI = ADDRESS OF ASCII CHAR
;               EXIT:
;                       BL = CONVERTED CHARACTER
;                       CARRY FLAG SET IF ERROR
;
;
GET_NIBBLE      PROC    NEAR
        MOV     BL,[DI]                 ;GET CHARACTER
        SUB     BL,'0'                  ;STRIP ASCII BITS
        JL      ERR                     ;NOT A HEX CHAR

        CMP     BL,9                    ;IS IT NUMERIC
        JLE     OK                      ;YES

        SUB     BL,7                    ;MUST BE A - F
        CMP     BL,0FH                  ;CHECK IF TRUE
        JG      ERR                     ;GUESS NOT

OK:
        CLC                             ;OK INDICATION
        RET
ERR:
        STC                             ;ERR INDICATION
        RET
GET_NIBBLE      ENDP
CSEG    ENDS
        END     START
```

```
10 '              Program that generates CHMOD.COM
20 '
30 '
100 CLS: KEY OFF: ON ERROR GOTO 110: GOTO 120
110 PRINT "ERROR: check data": KEY ON: CLOSE: END
120 PRINT "Place disk in Drive A for CHMOD.COM"
130 PRINT "---then hit <Enter>": DUMMY$=INPUT$(1)
140 PRINT: PRINT "Reading DATA statements..."
150 RESTORE: READ TOTAL, CHECK#
160 FOR I=1 TO TOTAL: READ BYTE: SUM#=SUM#+BYTE: NEXT I
170 IF CHECK# <> SUM# THEN 110
180 PRINT "Writing A:CHMOD.COM file..."
190 RESTORE: READ TOTAL, CHECK#
200 OPEN "R", #1,"A:CHMOD.COM",1
210 FIELD #1,1 AS N$
220 FOR I=1 TO TOTAL: READ BYTE: LSET N$=CHR$(BYTE): PUT #1:NEXT I
230 CLOSE: PRINT "CHMOD.COM created"
240 KEY ON: END
250 DATA 145, 15016
260 DATA &HEB, &H29, &H90, &H43, &H48, &H41, &H4E, &H47
270 DATA &H45, &H20, &H53, &H55, &H43, &H43, &H45, &H53
280 DATA &H53, &H46, &H55, &H4C, &H24, &H43, &H48, &H41
290 DATA &H4E, &H47, &H45, &H20, &H4E, &H4F, &H54, &H20
300 DATA &H53, &H55, &H43, &H43, &H45, &H53, &H53, &H46
310 DATA &H55, &H4C, &H24, &H1E, &H33, &HC9, &H51, &HBF
320 DATA &H82, &H00, &H8A, &H4D, &HFE, &HFE, &HC9, &H78
330 DATA &H36, &HB0, &H20, &HF2, &HAE, &H75, &H30, &H83
340 DATA &HF9, &H02, &H75, &H2B, &HC6, &H45, &HFF, &H00
350 DATA &HE8, &H2E, &H00, &H72, &H22, &H8A, &HFB, &H47
360 DATA &HE8, &H26, &H00, &H72, &H1A, &HB1, &H04, &HD2
370 DATA &HE7, &H02, &HDF, &H32, &HED, &H8A, &HCB, &HB8
380 DATA &H01, &H43, &HBA, &H82, &H00, &HCD, &H21, &H72
390 DATA &H06, &HBA, &H03, &H01, &HEB, &H04, &H90, &HBA
400 DATA &H15, &H01, &H0E, &H1F, &HB4, &H09, &HCD, &H21
410 DATA &HCB, &H8A, &H1D, &H80, &HEB, &H30, &H7C, &H0F
420 DATA &H80, &HFB, &H09, &H7E, &H08, &H80, &HEB, &H07
430 DATA &H80, &HFB, &H0F, &H7F, &H02, &HF8, &HC3, &HF9
440 DATA &HC3
```

CHMOD.BAS

First Edition DOS 2.00 manual states that "ESC["string";p ... or any other combination of strings and decimal numbers" can be used to assign meanings to a key. The problem is with the ; preceding the *p*. Inclusion of the ; between the closing quote of the string and the *p* causes an incor-rect string to be assigned to the key, and executing the incorrect string may cause the computer to lock up.

Mr. Mann's approach to key assignment works rather slowly compared to the assembly language approach shown in MYKEYS.ASM. The slowness is caused by DOS's rate of processing batch files. In addition, the assembly language approach does not show the key assignment process to the user on the screen.

Larry Axsom
Boca Raton, Florida

ECHO Black

My comments concern Brian Mann's excellent "Changing Keys" [*PCW*, Vol. 2, No. 3]. I have quite a number of batch files that control the running of applications, and I use the function keys to, among other things, run those batch jobs with the push of a key. Most of the applications (e.g., *Perfect Writer*) require that I first turn off the keys and then turn them back on again after the application is completed. I found that the printing of the various ECHO commands was quite annoying.

My solution is to use 'ECHO *esc*[30m' as the first command, which causes the foreground to be black and thus invisible. For some applications I have to return the foreground to a readable color, and thus an 'ECHO *esc*[#m' is inserted just prior to the command that calls the program from the batch file. CLS commands, judiciously embedded, also improve the aesthetics of the scrolling. Finally, prior to exiting the batch file I issue an 'ECHO *esc*[0m' to change the foreground to white.

Albert Lloyd-Kolkin
Menlo Park, California

Editors' note: If your text editor does not permit the use of the escape code (ASCII 27), replace all occurrences of 'ECHO esc' with 'PROMPT $e' as shown in "Changing Keys."

BASIC Variable Reference

Many times while writing a long program I find that I would like to know all the locations (line numbers) of a certain variable or command. Rather than do a complete cross-reference of the program, which takes too much time, I use the program VAR-REF.BAS. I save the program to be

```
; MYKEYS PRODUCES SOFT-KEY DEFINITIONS
STACK     SEGMENT PARA STACK 'STACK'
     DB  256 DUP (0);256 BYTE STK SPACE
STACK     ENDS
DATA SEGMENT PARA PUBLIC 'DATA'
F1   DB 1BH,'[0;59;"DIR "p'
F2   DB 1BH,'[0;60;"DIR /W"p'
F3   DB 1BH,'[0;61;"*."p'
F4   DB 1BH,'[0;62;".* ";13p'
F5   DB 1BH,'[0;63;"COPY "p'
F6   DB 1BH,'[0;64;"ERASE "p'
F7   DB 1BH,'[0;65;"EAZE ";13p'
F8   DB 1BH,'[0;66;"BASIC ";13p'
F9   DB 1BH,'[0;67;"MORE <"p'
F10  DB 1BH,'[0;68;"EDIT "p'
a1   DB 1BH,'[0;120;"MYKEYS ";13p'
a0   DB 1BH,'[0;129;"NOKEYS ";13p'
     DB '$'
DATA      ENDS
CODE  SEGMENT PARA PUBLIC 'CODE'
START PROC FAR
    ASSUME CS:CODE
    PUSH DS  ;SAVE PSP SEG ADDRE
    MOV  AX,0
    PUSH AX ;SAVE RET ADDR OFFSET
    MOV  AX,DATA
    MOV  DS,AX
    ASSUME DS:DATA
    MOV AH,9 ;DOS PRINT STRING FUNCTION NUMBER
    MOV DX,OFFSET F1 ;START WITH 1st DEFINITION
    INT 21H  ; OUTPUT TO THE $
    RET
START ENDP
CODE      ENDS
          END  START
```

MYKEYS.ASM

```
10 REM VARREF PROGRAM
60 OPEN "XREF.BAS" FOR INPUT AS #1
70 CLS:LINE INPUT "ENTER VARIABLE NAME ";B$
80 IF B$="" THEN END
90 LPRINT B$
120 IF EOF(1) THEN LPRINT "FINISHED":CLOSE:GOTO 10
130 LINE INPUT #1,A$
150 IF INSTR(A$,B$) > 0 THEN LPRINT LEFT$(A$,5)" ";
200 GOTO 120
```

VARREF.BAS

•

searched in ASCII under the name XREF.BAS and then run VARREF.BAS. VARREF.BAS quickly locates the proper lines for any entered string.

Kirk Brennan
York, Pennsylvania

Unintentional Redirection
While developing an AUTOEXEC.BAT file for an application, DOS 2.00 gave me an unexpected error message. It appears to me to be an undocumented idiosyncracy in DOS 2.00. I have a series of ECHO [message] statements in the batch file, and in the middle of the series, one ECHO message was not displayed. In its place, DOS displayed the error message 'File not found'. I discovered that the symbols < and >, which I had used as brackets, were being interpreted as a request for redirection of standard input/output.

The < and > symbols are interpreted as a request for redirection in both the ECHO and the REM commands. However, when a line at the DOS prompt begins with a period or double quote, the line is displayed as a remark with no processing of the line. The only warning I could find in the DOS 2.00 manual was the note stating that !, \, <, and > could no longer be used in file names. Redirection within an ECHO command may be useful in a programmer's more creative moments, but it may cause disaster for the unwary.

Dale Farland
Vermillion, South Dakota

Smarter Modem Switch
Have you tried to operate the phone dialing program PHONE.BAS provided in Burton L. Alperson's "Smartmodem Gets Smarter" [*PCW*, Vol. 1, No. 7]? The program is very good, but you may have been discouraged when after spending a half hour entering the program you tried to run it. If switch number 6 on your Hayes Smartmodem is not set properly for the program (in the down position) because it's set for another program, such as *Crosstalk*, you will be greeted by a sad response: 'Device timeout in 1010'.

Having to change switch settings can discourage you from using the program, but a slight modification in line 1010 allows the program to function regardless of how that switch is set. The line should read '1010 OPEN "COM1:,,,,CS,DS" as #1'. This specifies that the CTS (clear to send) and DSR (data set ready) signals are not checked when the OPEN statement is executed. The DSR signal, controlled by switch number 6, is present only when switch number 6 is closed. However, neither signal is required for this application. They're only used when connected to another modem.

Michael Erkfritz
Clarkston, Michigan

Join the *•* global exchange. We'll pay $25 to $100 for each item published. Send your personal computer discoveries to PC World, 555 De Haro St., San Francisco, CA 94107, or electronically to CompuServe 74055,412 or Source STE908. ◈

Two ways to show off your IBM PC.™

There's no better way to show off your IBM PC – or any other micro – than with the new line of Toshiba printers. They offer state-of-the-art features, high reliability and low price.

P1351

The new Toshiba P1351 printer has a unique high-density 24-pin dot-matrix print head. It lets you print crisp, clean letter copy at 100 cps, draft copy at 192 cps. And with the software-selectable downloading fonts, you get to pick from a variety of type styles.

The P1351 has more stuff to show. Like 180 x 180 dots-per-inch high-resolution graphics, 132-column-width platen (great for spreadsheets and Lotus™ 1-2-3™ data processing and graphics), Qume SPRINT 5™ emulation, and a choice of either a forms tractor or automatic sheet feeder.

P1340

For considerably less, the new P1340 gives you just a little less. But it still has the same high-density 24-pin dot-matrix print head, the 180 x 180 dots-per-inch graphics resolution, and the Qume SPRINT 5 emulation. In addition to true proportional spacing and a built-in forms tractor. Whichever printer you choose, you also get nationwide service within 24 hours by Western Union technicians.

So the choice is yours. But when you choose Toshiba, you know you're putting on the best show possible.

For more information, call one of the distributors listed on the adjacent page.

In Touch with Tomorrow

TOSHIBA

Information Systems Division, TOSHIBA AMERICA, INC.

Circle 285 on reader service card

Build your software the same way you build your portfolio.

When you invest, you're looking for growth—both short and long term. CDI/100 works on the same principle.

In fact, there isn't another software package on the market that can grow and adapt to your specific needs as well as CDI/100. Quite simply, CDI/100 is a fast, flexible tool for creating, accessing and changing data base structures. It's so easy novices can proceed with ease. And so flexible, experts can adapt and build specialized applications.
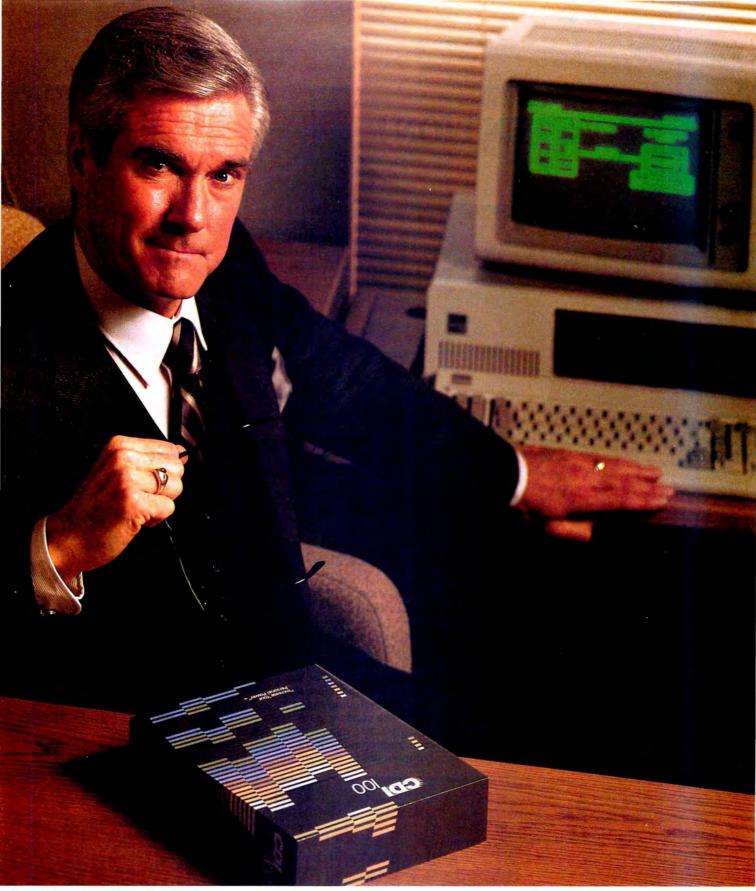
Through the experience we gained creating your CDI/1000 Pick-based minicomputer system, we've integrated the powerful features of the minicomputer with MS-DOS™. You have access to the very foundation of the system.

The result? A system that can be as personal as your portfolio.

CDI/100 features include a relational data base management system with variable length fields and an open-ended file structure with a record-keeping system that is virtually limitless.

Most revolutionary of all, CDI/100

allows you to use a host of existing application programs, so you can easily transfer files or add the programs of your choice.
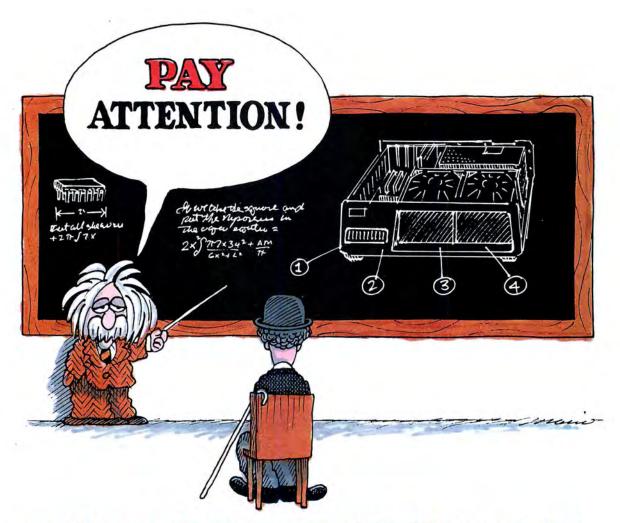
To find out how you can acquire a software system with as much growth potential as your portfolio, ask for CDI/100 wherever you buy your software.

Exceptional New Software Concept
- Everyone's Filing System
- English-like Inquiry Language
- Dynamic Menu System
- Integrated Help Features
- Relational Data Management
- Enhanced Basic Compiler
- Dictionary Supported Data Base
- Task Master

CDI 100™

CDI Information Systems, Inc.
1309 114th Ave. S.E.
Bellevue, WA 98004
(206) 455-5117

INCREASE YOUR PERSONAL POWER.™

NOW!
Choose From 3 Hard Disc Drive Systems That Convert Your IBM* PC To Perform Like The PC XT!

Our Winchester Hard Disc Drive Systems offer 10 Mega-bytes of formated capacity, are internally installed and use available Power!

Maynard Electronics introduces three Winchester Hard Disc Drive Systems — the only drive systems to offer you 10 Mega-bytes of formatted capacity with complete internal installation! These systems offer the user countless benefits and features: capability of booting off the hard disc; additional functions while requiring only **one** card slot in your PC; and, use of available power, thereby preventing overheating problems which have affected other drives. Handling heavyweight data was never easier.

All three systems are quality engineered and work with DOS

2.0 without any special software drivers and also run with other operating systems designed to make use of the XT hard drive system. All you need is the IBM* DOS 2.0 Manual and you're ready to run!

Each system is equipped with a low-power hard disc drive, complete software, cable, a SandStar™ Card and Hard Disc Controller Module. SandStar™ is the first family of modular peripherals created for the IBM* PC. Simple instructions for easy installation are included and all components are backed by an Unconditional One Year Parts and Labor Guarantee.

WS 3

This System is equipped with the SandStar™ Memory Card. In addition to controlling the Hard Disc Drive, the Memory Card allows you to add 64K bytes to 576K bytes of memory using only one card slot.

WS 2

This System is equipped with the SandStar™ Floppy Drive Controller Card. The Card can control, in addition to the Hard Disc Drive, two floppy drives mounted inside your PC and optionally two additional 5¼" or 8" drives mounted externally. This leaves three system slots for other expansion boards.

WS 1

This System is equipped with the SandStar™ Multi-function card. In addition to the Hard Disc Controller Module, you can add up to three other SandStar™ Modules while using only **one** card slot. The following modules are available: Serial Port, Parallel Port, Clock Calendar, Game Adaptor, and Prototyping Module.

To expand your PC to perform like the PC XT, one of our Winchester Hard Disc Drive Systems is right for you. And if you have already made the wise decision to install any of Maynard's SandStar™ Cards, the SandStar™ Hard Disc Controller Module may be purchased separately.

TO ORDER, CONTACT YOUR LOCAL DEALER OR DISTRIBUTOR.

MAYNARD ELECTRONICS
400 East Semoran Blvd.
Casselberry, Florida 32707
305/331-6402

We make modern times better.

NOW! Compatible with COMPAQ!**

FRESH EIGHT COLOR
GRAPHICS

(Now you can put an entire graphics department on your desktop.)

Getting ahead often depends upon getting your ideas across forcefully. That's what the ZETA 8 does best. By creating vivid color pictures that communicate with power. Whole ideas transmitted at a glance. Trends made clear.

Try eye-stopping graphics like these at your next presentation and watch the reaction you get.

Introducing the ZETA 8, our new 8 color desktop plotter that never stops to change pens.

Let's face it, most reports and presentations get done in a rush. That's why we've designed a system that goes at high speed (20 inches per second). But here's the kicker. Other plotters keep their pens off to one side so every time there's a color change the plotter grinds to a halt. Top speed drops to zero. We've put all eight pens on one carriage so the plotter never has to stop.

In fact, the ZETA 8 can be pre-programmed to create plots without operator intervention over 120 feet of paper.

Plot on acetate for overhead projection too. The ZETA 8 features a handy automatic paper load, a metric mode, and has been designed to support most computer protocols.

Nobody's ever made so much plotter for so little money.

That's right. A lightweight, portable plotter with eight different colors (and no time out for changing pens), a top speed of 20 i.p.s. and accuracy to within one one-thousandths of an inch.

Call (415) 372-7568. Nicolet Computer Graphics Division, 777 Arnold Drive, Martinez, CA 94553 TWX 910-481-5951

Nᴎᴇ Nicolet
Computer Graphics Division

Ask to See Our Display at Your Favorite Software Store

The Vanpak PC Software Center displays over 450 IBM PC, XT and PC jr. programs. This complete shopping center of programs offers you a chance to try any Vanpak software "hands-on" the IBM PC. Or, plug in a videotape and see the original author talk about a program and how it is used.

The Vanpak library of software includes programs in business, database, education, engineering, entertainment, finance, investment, office management, statistical analysis, and word processing.

Vanpak software is completely supported by your dealer. Contact your Vanpak dealer NOW for a demonstration on any Vanpak program.

10 Mb more for your IBM PC.
6 times faster than an XT.
Plus: A serial port
A clock/calendar
Sockets for 192K of RAM
A hard disk controller
In just one expansion slot!
...and $500 less.

Now you can get 10 or 15 Megabytes of mass storage AND the most popular system expansion functions for your IBM PC at about $500 less than you'd pay for an IBM XT. Introducing the Falcon PC e**XT**ender:™ the fastest hard-disk system for the IBM PC.

Time=money: Save both!

The PC e**XT**ender offers more on-line capacity than 45 floppy disks eliminating time-consuming disk changes. Tim Paterson, author of the operating system for the IBM PC, has developed advanced circuitry that continually transfers information at the maximum speed of the drive. It can read one megabyte from the disk every three seconds. That's more than an entire floppy disk per second!

Save space too!

In just one expansion slot, the PC e**XT**ender features a multi-function hard disk controller board, a clock/calendar, a serial port (for use with a modem or printer), and space for 192K of RAM expansion. This economical arrangement leaves room to add additional capabilities to your PC in the future.

An emphasis on quality

Requiring no external power supply, the PC e**XT**ender has been designed to be an extraordinarily reliable system. It's rugged construction is backed by a full one-year warranty. For service you can simply return the unit to your dealer or to Falcon Technology. Should you ever have a problem with your PC e**XT**ender, Falcon has a customer service engineer available by phone to answer your questions.

Stretch your capabilities, not your budget

Prices for Falcon PC e**XT**ender systems start at $2295 for 10Mb mounted within the IBM chassis. To take your IBM PC beyond even an XT, the 15Mb drive sells for $2595. The PC e**XT**ender systems are also available in externally-mounted cases. Systems can easily be configured with either one or two Falcon drives.

Turn your PC into something even better than an XT.
The new Falcon PC eXTender does more, faster, for less.

FALCON

Falcon Technology, Inc.
6644 S. 196th St., Suite T-101
Kent, WA 98032
1-800-722-2510
(In Washington state)
(206) 251-8282

IBM is a registered trademark of the International Business Machines Corporation.

Circle 643 on reader service card

Three good reasons to try Encore™ diskettes.

1. It saves you money.

Encore diskettes meet the same high standards as the more expensive brands. In fact, Encore actually exceeds system requirements.

Yet you can buy Encore disks for ⅓ the price of the high-priced diskettes. (only $1.59 for single-sided, single-density 5¼″ diskettes, when you purchase 4 or more boxes, ten diskettes to a box.)

A diskette intended for a wide range of uses.

Whether you use a lot of diskettes or only a few, you need something more than guaranteed accuracy and reliability. You need economy.

Encore was designed to meet the demand for a reliable, low-cost diskette.
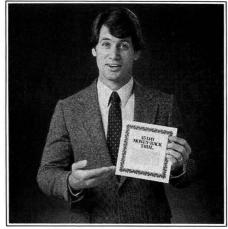
At Encore's low price, it's ideal for memos, rough drafts, spreadsheets, reports, even scratchpad-type uses.

Designed for all major personal computers.

IBM® apple® Radio® commodore® Shack

Encore was specifically designed to provide optimum performance and reliability on the four leading computer systems. Inmac's Quality Assurance Department constantly monitors all Encore diskettes to ensure they meet or exceed the media specifications for these systems.

Our on-going testing program guarantees that the Encore diskette you buy tomorrow will be as good as the one you buy today.

® signifies manufacturer's registered trademark.

2. It's absolutely reliable.

Encore is guaranteed for one full year, or Inmac will replace it, free.

Inmac's Quality Assurance Department requires that Encore meet the media specifications for the most popular systems – Apple, Commodore, IBM, and Radio Shack – exactly. So you can rely on Encore diskettes in your system. They won't lose information or cause read/write errors.

45-day money-back trial.

We're backing our Encore diskettes with a 45-day money back trial because we're positive you'll be delighted with Encore's quality and performance.

And we're sure that once you try Encore, you'll agree that it's the most reliable economy floppy available.

If you don't agree for any reason, just return the three diskettes for a full refund.

3. And you can get one, free.

For a limited time only, we're offering a special trial pack of three 5¼″ Encore diskettes. You pay the regular price for two of the diskettes, but the third one is free.

We'll send you 3 single-sided, single-density 5¼″ diskettes for only $5.19. (Single-sided, double-density for $5.99. Double-sided, double-density for $8.79.) Use all three Encore diskettes for 45 days.

Then, if you're not completely satisfied, return the three diskettes for a full refund.

Here's how it works.

Simply mail the attached postage-paid card, or phone our toll-free number,

1·800·538·8157

extension 987. In California, 1-800-672-3470, extension 987.

For this special offer, please include payment with your order. You may send a check, money order, or bill it to your Mastercard or Visa account. Company PO's accepted with verification.

Offer is limited to one trial pack per customer. Good only in U.S. Customer must be 18 years or older to order.

Offer expires September 30, 1984.

Remember to ask for your free Inmac catalog. It contains over 2,500 computer supplies and accessories, many not available anywhere except through the Inmac catalog or special offers like this one.

inmac™

2465 Augustine Dr., Santa Clara, CA 95051

Circle 224 on reader service card

Name

Firm

City/ State/ Zip

Business Phone

No P.O. Boxes.

BUSINESS REPLY CARD

FIRST CLASS PERMIT NO. 1053, SANTA CLARA, CA 95051

POSTAGE WILL BE PAID BY ADDRESSEE

inmac

Encore Trial Pack Offer
Mail Stop 7860
2465 Augustine Drive
Santa Clara, CA 95051

The Lotus Position

Anita Micossi

Anita Micossi visited Lotus Development's headquarters in Cambridge, Massachusetts, to talk with its president, Mitch Kapor. As the creator of the best-selling spreadsheet package 1-2-3 and the conductor of Symphony, *a new integrated software package (see "Symphony in Five Movements"), Kapor has been recognized as one of the greatest successes in the software business today. But the success of Lotus has been dependent on more than programming, marketing, and venture capital. To Kapor, the structure and atmosphere of the company itself takes first priority. So far, Lotus has proved to be a successful test of Kapor's innovative ideas on how a company should be run.*

It's already dark outside the Lotus building when Mitch Kapor comes out to greet me. "Here's a badge," he says, handing me a card onto which he's quickly scrawled my name. "Keep it as a souvenir," he chuckles, clearly unimpressed by protocol. I follow the 33-year-old president of Lotus Development Corporation into a warmly lit wood and brick structure, down a carpeted hallway, past glass-walled cubicles, to his corner office. "The only reason mine is bigger," he notes, waving at a long conference table, "is because we have the meetings in here. Otherwise, my office and furniture are no different from anybody else's."

I've been to enough computer business sites to know that the dress code in this sector of the economy is looser than, say, in banking or the oil industry. So Kapor's man-of-the-people look—no tie or jacket—doesn't strike me as odd. When two women walk into the office

Mitch Kapor, president of Lotus Development Corporation

during our interview to get a cup of coffee from the communal pot, however, I am surprised at the casual accessibility of the president's space. And when Kapor mentions that the executives don't have designated parking spaces at Lotus, I begin to wonder just what kind of operation he has here.

"Don't give the impression that we're running this like a food co-op," he interrupts his train of thought several times to emphasize. The third time he says it he smiles sheepishly. "It's not that I have anything against food co-ops." We both grin at the thought of this funky symbol of the philosophy of our formative years.

It's a long way from the laid-back, consensual decision-making, communal counterculture of the 1960s to today's high-tech, rapid-fire, bottom-line-oriented microcomputer business. But Mitch Kapor, whose personal philosophy was given direction in one of these worlds and shape in the other, spans the distance with apparent grace and obvious success.

Kapor is founder and president of Lotus, whose software package *1-2-3*, first shipped in January 1983, quickly outstripped its major spreadsheet competition by hitching a ride on the high-flying IBM PC. Almost immediately, *1-2-3* became the industry standard for integrated productivity software.

After graduating from Yale with a bachelor's degree in psychology, Kapor worked as a disc jockey, a transcendental meditation instructor, and a counselor before stumbling into the world of computers. Although he had taken some programming classes in high school, he didn't really connect with computers until 1977, when he bought a TRS-80 Model 1. Soon after he bought an Apple. Kapor taught himself to program in BASIC and wrote an integrated program called *Tiny Troll*. He went on to create *VisiPlot* and *VisiTrend*, add-ons for *VisiCalc*. In 1980, Kapor joined VisiCorp in California for what he calls "the world's greatest internship."

With the money he made from *VisiPlot* and *VisiTrend*, and with the knowledge gained from his West Coast "internship," Kapor returned to Massachusetts and set up his own company in April 1982. Unlike many microcomputer entrepreneurs, Kapor was not interested in making a fortune; he'd already done that. Nor was he obsessed with creating a successful software program, having achieved that as well.

The challenge for Kapor was to build a company that is not only successful and enduring but which embodies the values to which he is personally committed. To profile Mitch Kapor is to probe the philosophy of Lotus.

A Philosophy of People

When Kapor calls people the number one asset at Lotus, he's not just repeating an overused slogan. He rejects a system that puts organizational needs above personal needs and pits worker against worker in a struggle for limited resources and rewards. Not only doesn't he believe in it on principle, he recognizes that it doesn't pay off in practice.

"I think things only look 'good for [the] company' and 'bad for people' in the short term. . . . What's going to work in the long run is a livable *structure for people*, that is, livable work loads and reasonable expectations. You have to have people who are happy and motivated to get things done."

Nice talk, but how do you make it happen? First of all, Lotus puts its money where its mouth is. The company offers its employees excellent health benefits and provides them with a generous profit sharing plan. "When we originally set the company up, there was an agreement between myself and the venture capitalists to set aside 25 percent of the total equity for employees— 10 to 15 percent is typical [in the industry]. Though different people have different amounts of equity, every employee of Lotus has a meaningful piece of the action."

But it is the intangibles—trust, self-respect, feeling useful and appreciated—that keep people going and motivated to stretch to their limits. Creating an atmosphere that promotes individual well-being is a priority at Lotus. Achieving this starts with a humanistic code of ethics.

> 'You have to have people who are happy and motivated to get things done.'

"Fairness and openness," says Kapor, "should characterize how people deal with each other, regardless of where they are in the organization or how long they've been here."

Take hiring practices. In most companies, managers mock up a job description just to get the boss to approve a new employee. Observes Kapor, "What happens is people come on board only to find out that they're doing something totally different than what they thought they were hired to do. This is very demoralizing." At Lotus,

according to Kapor, a job description is a fair, straight-forward, and functional document: "When somebody comes in, we lay it out: these are your responsibilities, this is who you're going to be working with, this is how you'll be evaluated, this is your career path."

Lotus tries to be honest with potential employees about the hazards involved in signing up with such a rapidly growing company: "If a manager thinks there's a reasonable chance that within the year we're going to need to hire somebody else over that new employee, we tell the person when we hire them. It's a tough thing to hear, but honesty almost always pays off."

Corporate Culture

As it approaches 5 p.m. and the few remaining employees walk past Kapor's glass-walled office on their way out, the boss talks about Lotus's corporate culture.

"There is the autocratic style in business, where wisdom is received from on high; where policy flows from the top down; where there are strict, impersonal measures of performance; where people get put on the spot a lot—where fear rules. . . . Lotus is at the other end of the spectrum."

You can see disdain for hierarchy in the very design of the Lotus workplace. The First Street building was a brick and wood shell when the company acquired it. Accoustically sealed, glass-fronted offices were built to allow privacy while permitting visual interaction, thus "encouraging people to make casual contact, which leads to spontaneous problem solving," according to Kapor.

The philosophy of casual contact applies to the boss as well. All 300 members of the Lotus team know that if they reach a dead end in trying to resolve a problem, they can come talk to Kapor. And in case the employees are too shy to seek him out, Kapor solicits input in weekly staff meetings. Everyone is invited to the Tuesday morning meetings, which draw as many as 150 to 175 people. "Anybody can say anything they want. And I run those meetings every week myself," says Kapor with obvious pride. "I arrange my travel schedule so I'm not out of town on Tuesday mornings."

Keeping in touch with the workers and fostering a spirit of collaboration is more than a weekly ritual. For example, in product development, "Chances are, the people directly involved in a project know better than their managers and their managers' managers what really has to be done. . . . They're the problem solvers. They're the people who meet to sort things out. . . . Achieving the highest productivity comes from allowing these people to have a say in what goes on."

To stay in touch with his troops, Kapor disregards formal channels: "If I'm involved in the product design, I'll work directly with the technician. I won't send

memos down through the VP of Software Development, who sends it to the director, who sends it to the tech. . . . That's characteristic of our whole style around here."

Balance and Endurance

"But don't suggest that this place is run like a food co-op." There it is again. "Accountability and responsibility are clearly vested at all levels. . . . You've got to know who to go to, who owns the responsibility for a particular thing." Kapor hits on the fatal omission of those otherwise grand social experiments of the sixties.

He also hits a bump in his own thought process. "Throw out everything I've said for the last hour and a half," he suddenly declares. I expect a profound summa-

---

Kapor seeks an almost Zen-like balance between seemingly opposite values like people and profit, informality and organization, process and ambitious goals.

---

tion. Instead, Kapor expresses "the key" to understanding Lotus with a rather homely image: "A whole bunch of things ought to be loose, and a whole bunch of things ought to be tight; the trick is to figure out how to sort things into those two piles."

Kapor seeks an almost Zen-like balance between seemingly opposite values like people and profit, informality and organization, process and ambitious goals. He is not searching for one answer to a problem; he's committed to an ongoing process. As long as Lotus endures, it will be changing, and its people will have to keep readjusting the balance.

Kapor wants Lotus to endure for a long time. One of the keys to endurance is pacing. When the managerial team meets to establish priorities for the coming period, "we make a list of the five things we will do during this

Symphony in Five Movements

The people at Lotus Development Corporation knew all too well that their tremendously popular *1-2-3* would be a hard act to follow. Yet they have not only followed *1-2-3*, they may have eclipsed it. *Symphony*, a new integrated package, squeezes word processing, data management, communications, spreadsheet, and business graphics programs onto a single 320K disk. *Symphony* not only integrates five applications but does so with a windowing environment that rivals VisiCorp's *Visi On*.

Like *1-2-3*, *Symphony* responds both to the novice's fumbling and to the imagination of a spreadsheet veteran who is comfortable with macros and sophisticated financial models. The package is flexible and expandable; Lotus has left open ten interfaces to the program, so that software developers can link their programs (such as spelling checkers, other graphics packages, and the like) to *Symphony* and enhance an already sophisticated product.

The word processor includes advanced features such as automatic word wrap, global search and replace, and automatic pagination, plus boldface and subscript printing options. It also allows you to edit documents immediately (without a separate formatting step) when they are received via telecommunications.

The data management system uses a simple, forms-oriented method of entering data and can store more than 8000 records. The data management features work in concert with *Symphony*'s word processor to perform mail merge functions. The data management system's report generator can produce formatted output such as mailing labels, inventory reports, invoices, and form letters. You can sort up to three data fields simultaneously. For example, you could retrieve and print all records filed under the surname Cohen from Massachusetts with the zip code 01776.

Symphony's asynchronous communications package includes terminal emulation (most ANSI-standard terminals and partial VT-100 emulation), point-to-point file transfer, and automatic dial and logon to remote computers. You can suspend a session, analyze the transmitted data, and immediately return to communications without breaking the connection.

With its 8192 rows and 256 columns, Lotus's spreadsheet successor to *1-2-3* is the largest spreadsheet available for the PC. Its most significant advantage over *1-2-3* is its ability to manipulate text as well as numeric information in spreadsheet models. The new spreadsheet can use most worksheets developed on *1-2-3*.

Symphony's business graphics provides eight graph types, including shaded and exploded pie charts, area charts, open/high/low/close charts (for displaying stock market information), X-Y graphs, and line, bar, and stacked bar graphs.

Despite the package's seeming complexity, Lotus has made good on its promise to keep things simple. The word processor, for example, uses straightforward commands. The data base automatically creates the basic file structure, requiring only that the user enter the list of items desired. The help file contains more than 200 information screens. Since this 320K program resides entirely in user memory, *Symphony* is extraordinarily fast and efficient.

But the real power of *Symphony* is in its integration capabilities and its overlapping windowing environment (see Figures 1 and 2). Tables or data base information can easily be inserted into documents prepared with the word processor. Changes to one window will automatically update windows from other applications that are affected. At a demonstration of *Symphony* I attended, stock market figures coming in over a modem were displayed in one window while a portfolio displayed in another was automatically updated. With a couple of easy moves, a third window could be set up to represent the changing figures graphically.

Symphony is scheduled for shipment in June 1984 and will carry an introductory price of $695. For $200, registered *1-2-3* owners can trade in their package for *Symphony*. And, of course, Lotus Development will continue to sell and service the ever-popular *1-2-3*.
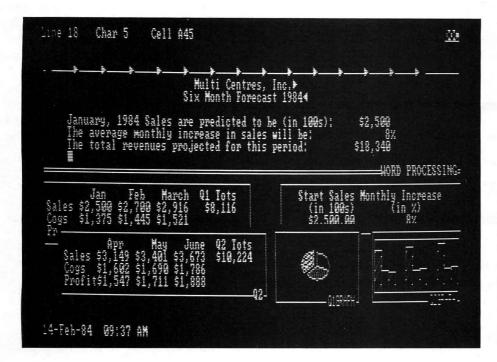
Figure 1: Symphony's window management system allows users to view various functions on screen simultaneously. Displayed here are a word processing window, three spreadsheet windows, and two graph windows.
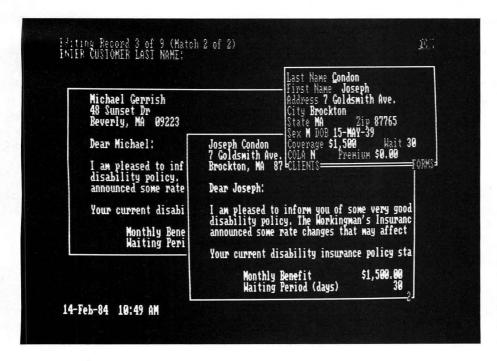
Figure 2: Symphony's window management system. Shown here are two word processing windows and a data base window.

period and a list of the five things we will not do," says Kapor. This strategy not only sets up reasonable expectations, it focuses on specific targets. By focusing their priorities and pacing their work schedules, Lotus employees improve the quality of their work.

Another requirement for endurance is that the founder's personal beliefs be built into the corporate culture, making them distinct from himself and self-perpetuating. An important step in achieving this is through

---

'We pay attention to how things get done as opposed to merely getting them done.'

---

hiring practices. Lotus carefully seeks out managers who are comfortable working in the company's open, collaborative system. These people, in turn, hire kindred spirits.

Maintaining a flexible, innovative posture is essential in a fast-growth industry. When the company had 30 employees, it was very much like a family. Twelve months later, when it had 300 employees, the family model was no longer workable. Yet, says Kapor, "People still know what they're doing, why they're doing it, and how what they're doing fits into what the company is trying to achieve as a whole. One of the things that makes the Lotus approach what it is is that we pay attention to things like 'the Lotus approach' . . . that is, how things get done as opposed to merely getting them done."

The Product
Making the process as important as the product affects more than the internal workings of Lotus. The company's philosophy is reflected in its software. "There's a consistency between the values and style I talked about in the company and the values and style embodied in the product," Kapor asserts.

Kapor reaches for the function key template that was designed for *1-2-3*. "We tried to think through how

people were going to use not only our product but their computer. . . . Some people have replacement keycaps. That's no good because it makes it difficult to use other programs. Other people have cardboard or paper slip-ons. But they tend to fall off and get lost, which defeats the purpose. So we went for an injection-molded plastic piece that slips on, but because of the little indentation, rests securely and can't accidently become dislodged. It's useful, but also easy to pick up and take off. . . . Multiply this example by a hundred and you can see what goes into designing a product."

Even in marketing, where Lotus is as aggressive as they come, Kapor sticks to his philosophic guns. "Marketing is about creating perceptions," he observes, "and I think those perceptions should be directly linked to the actual value we deliver, not to ethereal images."

The Bottom Line
Mitch Kapor is not the first entrepreneur to believe that it's possible to run a business that is both good to its people and profitable. He does, however, seem to be among the blessed who have managed to succeed on both fronts. Lotus is making lots of money. In its first public offering of common stock, in October 1983, the company raised more than $34 million. With its second generation product, *Symphony* (see "Symphony in Five Movements"), it hopes to beat the curse of the single-hit software company.

"I know this is a place where people like to work," beams Kapor over what seems to be his own most gratifying achievement. And he insists that this is due to the way things are run, not just to the current high roll of the company. "It's got to be fun. It's got to be stimulating. Not just for me but for everybody."

"There's no magic to it," he assures me. "Just take one or more bright ideas and figure out how to get the job done with the right set of people. And there it is. It's simple." ◉

Anita Micossi is a Boston-based writer and sociologist.

DataPath

from the makers of WordPerfect.

"... DataPath is so full of new and exciting ideas that it seems certain to have an impact on the way data management software is designed."

PC World Magazine

Ask your dealer for a demonstration.

Data base software by:

SSI SATELLITE SOFTWARE INTERNATIONAL

288 West Center St., Orem, Ut. 84057
Inquiries and orders: 800/321-5906
Technical support: 801/224-8554 Telex: 453-168

The PC in China

Today the abacus, tomorrow the PC. As China opens its doors to the West, American and Japanese computer corporations are poised to cash in.

N. Steidtmann

For 1800 years the abacus has been the personal computer of choice in China. Recently, however, that trusty portable has been challenged by a powerful newcomer—the microcomputer. As China slowly develops its own computer industry, foreign manufacturers of personal computers are anxious to tap a potentially enormous consumer market—a nation of over a billion people.
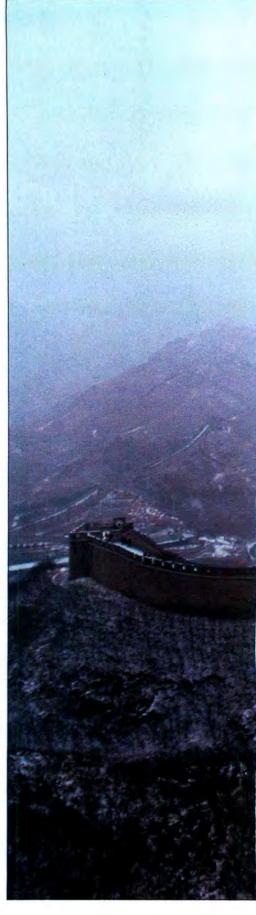
A major obstacle to trade was removed last fall by the easing of United States restrictions on sales of high technology to the People's Republic of China. During a recent visit to China, I discovered the foundation being carefully laid for a potential PC marketing blitz. It may not be long before American businesses find PCs in their Chinese counterparts' offices.
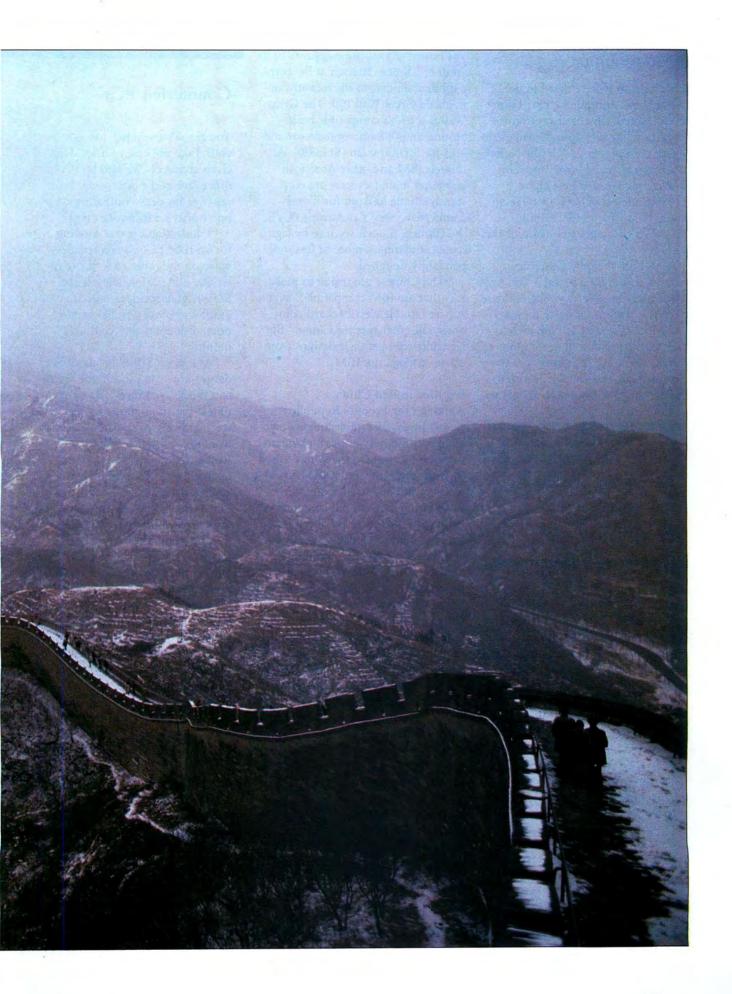
China has not been blind to the high-technology successes of neighboring Japan, Hong Kong, and Taiwan. Although most of this agrarian nation hasn't even fully assimilated the industrial revolution, China is carefully planning a leap into the information age. Already, a fledgling electronics industry has developed in Shanghai and other areas.

Before an economic miracle can come about, however, China needs technological help from the West. Competition is fierce as foreign high-technology corporations jockey for position in Beijing. Chinese officials have mentioned the possibility of an agreement with IBM to manufacture PC components in the People's Republic, although the reports are denied by IBM. Another rumor claims that the Chinese plan to standardize their own personal computer production along IBM PC lines.

A Chinese Computer Fair

It's rush hour in Beijing. Pedestrians dodge swarms of bicyclists as troops of American tourists arrive to gawk at Tien Ah Men Square and the Forbidden City. Pulling myself away from a chaotic tour, I dash to the other side of town to catch a domestic Chinese computer fair at the Beijing Exhibition Hall. The show is hosted by the Ministry of Electronics and sponsored by a new Chinese computer magazine, *China Computerworld*. In the enormous, high-ceilinged building, the latest domestic computers are on display along with Chinese-made stereo, video, and other electronic equipment.

⬭ Community

It's hard to believe that I'm not at an American computer show. I don't need to speak Chinese to recognize what look like well-known American personal computers. Only the names have been changed—not into Chinese characters, but into alphanumeric names. What looks like an Apple IIe is called H-ZD-2600; BC3-80 is the Chinese version of the TRS-80.

Since I am the only westerner around, it isn't long before I find myself flanked by several young Chinese men who want to practice their textbook English. They tell me there is keen interest in computers among their friends, but computers are too expensive for the average person to buy. This is not surprising in a coun-

---

Competition is fierce as foreign high-technology corporations jockey for position.

---

try where the average monthly income is $300. They tell me that most personal computers are bought by communes or factories.

"Where is the IBM PC?" I ask. As my companions get directions, we wander past Chinese versions of Northstars, Hazeltine terminals, and a wide variety of plotters. Finally, we find the IBM PC clone, but the exhibit has already shut down. I peek under the white cloth thrown over the machine. It looks exactly like an IBM PC, but it bears no name.

The mysterious clone appears to be another Chinese attempt at PC compatibility similiar to the recently announced Great Wall 100. The Great Wall is a 16-bit compatible built around an 8088 microprocessor and sells for 30,000 yuan ($15,000). Although IBM and other American computer manufacturers are constantly on the lookout for illegal counterfeits (see "Counterfeit PCs"), the Chinese models seem to be legitimate compatibles, more or less independently designed.

"The Chinese are trying to make PCs that are IBM compatible," says Albert Liu, Hewlett-Packard computer sales manager for China. "But generally they get their designs from other vendors, not IBM."

Big Blue in Red China

Although the People's Republic is clearly intent on establishing its own computer industry, foreign manufacturers are waiting in the wings to sell their products in China. IBM has already positioned itself at the forefront of the move to sell computers in China but is as secretive about its Chinese marketing plans as it was about its long-awaited "Peanut." Spokespersons at IBM's international headquarters in White Plains, New York, claim that no IBM PCs are in China except for those brought in by individuals, and that there are no definite plans to market the PC in China. For PCs to be marketed in China, says a spokesperson, IBM would first have to set up its own internal dealer organization.

IBM is no newcomer to China. In 1936 the company began selling and servicing its typewriters here. In 1949 Mao's victory closed the People's Republic to the West until Nixon took his historical stroll along the Great Wall in 1972. IBM didn't take long to follow the narrow path blazed by Nixon, and by 1978 the corporation

---

Counterfeit PCs

You get what you pay for—or do you? Take the case of a San Francisco architect. We find him in his office late in the afternoon, bending over his desk comparing computer prices. His phone rings.

"I understand you're looking for an IBM PC," says a female voice on the other end. "I can offer you a PC XT wholesale for $1500. That includes 64K, a color graphics board, parallel printer port, disk controller, and monitor."

"At a price $1000 below dealer quotes how can I lose?" the architect thinks to himself. He agrees to test the computer, and the next weekend he pays a visit to the warehouse-district address the woman gave him. Stacks of unopened boxes are pushed up against the walls of the tiny room. On a table sit several IBM PC XTs with color monitors.

After running a demonstration program on the machine, the architect starts to write out a check, but then stops and asks about the warranty. "If you have any trouble, feel free to contact me," the saleswoman answers, handing him her card. "I work with Big Blue directly. We'll get the problem fixed in no time."

The architect writes out the check and takes the computer home. While he may think he's getting a good deal, chances are he's getting a counterfeit, a fact he won't realize until something goes wrong, and an expert is

called in to examine the machine. By that time the "company" that sold him the machine may well be gone.

In today's counterfeiting trade computer copies are one of the hottest items on the market. Although there is a fine line between compatible and counterfeit, many copies are clearly bogus and are often sold with fake logos slapped on. In some cases IBM PC shells have been used to house Apple IIe computers.

"Similar enough to cause confusion to the buying public" is the yardstick that lawyers, police, and investigators use to determine if a computer is counterfeit. Major computer manufacturers are constantly on the lookout for exact duplicates of their hardware. Several manufacturers have taken legal action against Asian companies caught red-handed with warehouses full of parts, components, and casings. In November 1983 IBM filed civil proceedings against A-1 Electronics Company in Hong Kong, seeking an injunction to restrict the sale of A-1 equipment as IBM equipment.

Although most counterfeit computer operations are located in the Far East, many of the organizers are Americans. "The entrepreneur may be here in the U.S., procuring the goods in Hong Kong, and mixing in the counterfeit merchandise with genuine items," says Ann S. Fisher, a trademark attorney with Validamark, a San Francisco company that investigates counterfeiting. In Taiwan, says Fisher, only half the counterfeit scams are instigated by Taiwanese nationals.

"Counterfeiting often starts within the computer company," says Stephen Payne of Commercial Trademark Service in Hong Kong, a private firm that has investigated counterfeiting for 14 years. Payne says that several employees of American computer companies have been caught selling specifications to foreign counterfeiters.

"There are two ways to handle counterfeiters," says Payne. "Either hit the manufacturers or hit the retailers." Payne prefers to knock out the retailers, thereby destroying the manufacturers' market. This technique is effective in Hong Kong, where manufacturers merely move their shops to other locations at the first sign of trouble.

Most counterfeit computers are shipped into this country by air. United States Customs officials concerned with counterfeits entering the country pay especially close attention to cargo from Taiwan, Hong Kong, and South Korea. The agents check for not only ready-to-sell hardware but also components being smuggled in for reassembly. Due to the massive influx of Asian goods, an increasing number of which are legitimate compatible computers, the agents' job is not easy. Judging whether a machine or component is counterfeit often requires the skill of a computer technician.

"Our experience is that most counterfeits come in as components," says Fisher. "Generally the components are assembled in Los Angeles or Miami, sometimes in Houston, and then sold on the market."

In the United States, counterfeiters have been discouraged by strong dealer-manufacturer relationships. But with the rapid growth of the high-technology industry and the accompanying plethora of unknown computer makes, models, and discount houses, sales of phony merchandise are on the rise. In third world countries the chances of purchasing a counterfeit machine run much higher: wherever western goods are scarce, the probability of buying a counterfeit increases.

However, the danger of being sold a counterfeit exists everywhere. In addition to being questionable legally, counterfeits come with no warranty and often have major defects. Although legitimate manufacturers and customs officials are finally attacking the problem, the greatest threat to counterfeiters is the consumer who refuses to buy counterfeit products. So let the buyer beware. The next time you find a deal too good to resist, think twice.

⊜ Community

had secured a major contract to supply a System 370 Model 138 to the Shenyang Blower Works. Today IBM sells and services a variety of computers in China, including 21 IBM 4300 mainframe processors that were used in the country's 1982 census and a 3033 mainframe housed at the Western Geophysical Institute in Zhoudian.

On the surface IBM's efforts to promote the PC in China appear low-key, as Chinese protocol dictates. The corporation's Beijing liaison office is a modest affair run by IBM's

> The Chinese are attempting to make sophisticated character processing available on microcomputers.

Japanese subsidiary, IBM Japan, Ltd. Its activities currently focus on selling mainframes rather than on generating interest in the PC. Recently, IBM opened the Bright Star Computer Center in Beijing to train support staff for IBM products. Hewlett-Packard and Wang have also set up centers in Beijing for service and support of their computers and for computer training.

So far IBM's PC test-marketing plans have centered on the seaside resort and shipbuilding port of Dalian, in Liaoning Province. IBM Americas/ Far East Corporation has loaned 20 PCs to the Dalian Institute of Technology for use in a condensed MBA course. The strategic group of bureaucrats who study there will return to their provinces, and it is hoped that their political pull will trigger PC purchases in businesses, communes, and factories throughout China.

The Character Processing Problem
One major hurdle that must be jumped before personal computing can spread in China is the development of an adequate and inexpensive Chinese character processor, a major difficulty considering the complexity of the language (see "Pinyin for the PC" in this issue). The Chinese are attempting to make sophisticated character processing available on microcomputers. Previously, character processing was possible only by using cumbersome, expensive dedicated machines with a multitude of keys and shifts. The Chinese-character disk operating system (CCDOS) is an important first step. Implemented on the Great Wall 100, the system provides a 7000-character library of Chinese words that can be stored on a double-sided disk.

In Japan and Taiwan IBM has successfully marketed a 5550 word processor (similar to a Displaywriter) that sells for $5000. A Mandarin Chinese version is the next logical step. The 5550, known as the Go-Go-Go-Maru in Japan, uses 216 shift key combinations with 12 function keys to create over 3000 characters.

Whether personal computing becomes widespread in the People's Republic depends on a number of factors besides solving the problem of Chinese word processing. It also depends on the course of economic development, improved Sino-American relations, and increased trade. For now, the combined secrecy of IBM and the Chinese Government blurs any definitive picture of personal computing developments in China. It seems probable, however, that in the years to come an increasing number of Chinese will be using PCs—alongside their trusty abacuses. ⬗

N. Steidtmann is a freelance writer specializing in business and entertainment.

Now...Supercharged communications software for your high powered 16 bit PC.

The makers of CROSSTALK proudly announce the newest entry into our line of high performance communications software. CROSSTALK XVI — a communications program with the speed and features of a fine racing machine. Shift from status display to incoming communications and back again at full throttle. Drive smoothly through the program with CROSSTALK XVI's integrated help system. Enjoy the full use of function keys. CROSSTALK XVI can be used with most autodial modems, and emulates several of the most used terminals. Test drive CROSSTALK XVI today at your local dealer.

CROSSTALK™
XVI

ANNOUNCING
the premiere of

jr

Learning to use your *IBM PCjr* becomes easy and fun with **jr** magazine. Because **jr** keeps things simple, the whole family will *learn and understand while they enjoy themselves.*

jr will explain how the *PCjr* works and guide you step-by-step in setting up your system. Most of all **jr** will answer your most important questions month after month... like

• **What can I use my *PCjr* for? jr** magazine will teach you how to prepare household budgets, balance your checkbooks, do your taxes and organize schedules and lists.

• **What about the kids?** From kindergarten to college, **jr** helps the kids with educational programs in every subject area.

• **Are there more serious uses for *PCjr*?** Yes! You'll improve your own business skills by learning about word processing, spreadsheets and graphics.

• **What about having fun with *PCjr*?** Relax and enjoy all the latest games with your whole family. *Plus:*

• **What programs should I choose for the *PCjr*? jr** magazine will tell you what programs on the market will run on the *PCjr*, and which ones won't. Plus what new programs are on the way. **jr** will evaluate them *before* you buy.

Order your subscription to **jr** today and you'll get the special charter subscription rate of $14.97. That's 25% off the basic subscription rate! Plus, with your pre-payment of check, American Express, Visa or Mastercard we'll send you a FREE issue making a total of 13 issues for $14.97.

Take advantage of this incredible charter subscription offer. Mail the attached coupon or call TOLL FREE 1-800-258-5473. In New Hampshire call 1-924-9471... TODAY!

CW Communications

jr® For IBM's Home Computer
Box 903 Farmingdale, NY 11737

Pinyin for the PC

Designing a Chinese word processor is no easy task.

Raymond A. Rogers

When the average American thinks about anything Chinese, it is usually a restaurant. Never having been to a Chinese restaurant, I was somewhat apprehensive when Dr. Shyh Chang Tsaur, a Chinese scholar, businessman, and memory chip designer, invited me to an authentic Chinese *Yum Cha*. That's a tea party surrounded by a 30-course meal.

While patiently teaching me how to hold a pair of chopsticks without using both hands, Dr. Tsaur explained that a fourth of the world's population speaks Chinese and that about 2 million Chinese live in the United States, many of whom do business with one another in Chinese. He further explained that westerners do an increasing amount of business each year with Chinese-speaking people overseas.

Just as I was beginning to master the chopsticks, Dr. Tsaur got to the point of our meeting. Chinese businesspeople want to use their own language when conducting business, and for a modern business to compete, having a computer with word processing capabilities is important. Unfortunately, the existing dedicated Chinese word processors have grave faults, including high prices, laborious operation, limited flexibility,

and long training periods. The elaborate calligraphy of Chinese writing does not lend itself easily to automation. Dr. Tsaur, however, believed there could be a solution to the problems. I was beginning to suspect that Dr. Tsaur's solution was going to involve some programming. There's no such thing as a free *Yum Cha*.

Each Chinese character is an entire word.

He began to describe the design of a Chinese word processing program that he had been refining for years. With the advent of the IBM PC he had finally found a computer with enough power to handle the task at a moderate price. Now all he needed was a programmer who was familiar with the PC.

I was intrigued, but before I could say anything, Dr. Tsaur wanted me to know what we were up against. He began by relating the evolution of his program, the *Hanyupinyin Word Processor.* I was surprised when he started the story with events of 3000 years ago, but I sat back and relaxed. After all, we still had 20 courses to go.

Writing as an Art Form

Since Emperor Qin Shi Huang unified the many variations of the written language and finished off the Great Wall 3000 years ago, written Chinese has developed as an art form as well as a language. Many of China's greatest paintings have been illustrations for poems. Pride in the world's oldest living language makes each Chinese person an artist as well as a writer.

About 100 years ago the Chinese first attempted to automate their writing, and the Chinese typewriter was invented. I once spoke to a woman who had been a secretary in Hong Kong. She told me that her typewriter had a large keyboard, was operated with four shift keys, and used several type elements. I asked if the type elements were similar in function to those found on American typewriters, and she said, "Yes, but they are much harder to lift."

That woman's experience exemplifies the awkwardness encountered by many Chinese businesspeople every day. Only large businesses can afford custom-programmed computers that display

a group of Chinese symbols and allow you to select the one you want. Most people can afford only the composition type of Chinese word processor. Composition word processors are usually implemented on a microcomputer as a plug-in board with pieces of Chinese characters called "radicals" and "finials" stored on a ROM chip. Radicals are the basic skeletons of characters, and finials are the fine strokes that add the final touches. The pieces are called out by the operator and assembled into a character by a series of key combinations.

The method is not only extremely difficult (imagine word processing by piecing together fragments of letters) but also restrictive. Artistic self-expression is sacrificed because the characters are created from standard pieces rather than by the hand of the user. The resulting characters are often slightly out of proportion.

Composition word processors often lack even the most basic word processing features, such as the capability to edit a document once it has been stored. All of the machines require considerable training and practice to use, and many offer only limited flexibility and scope.

Dragon Seeks Path

Dr. Tsaur and I were able to agree on the problems of designing a Chinese word processor, but we were still a long way from a solution. The essential problem is that there is no Chinese alphabet as westerners know it. Each Chinese character is an entire word. A further complication is that the spoken language is tonal, and the same word pronounced with a slightly different tone can have a different meaning.

Mandarin Chinese, a northern Chinese dialect that is now the official language of China, has four tones, and Taiwanese has seven. Figure 1 shows that the word *ma* can mean mother or horse depending on the tone you use. The *ma* on the left uses the first tone and means mother, while the one on the right uses the third tone and means horse. The two versions of the word *ma* in Figure 1 are written differently, but the spo-

Figure 1: Two versions of the word ma with Pinyin tonal designations and English translations

ken words are almost impossible for the western ear to distinguish from each other.

Also, there are words that look similar but whose pronunciations and meanings are unrelated. These words are said to be of the same radical. There are 227 radicals in Pinyin, the system around which we chose to build our program.

Hanyupinyin, as Pinyin is properly called, translates literally to "Chinese phonetic put together sound." There are several methods similar to Pinyin, but we chose to implement this one because it is the standard used by the United Nations and many Chinese-language magazines and newspapers. Using Pinyin, you spell words in the Roman alphabet as they are pronounced in Chinese and append a number to indicate the tone.

Pinyin was a major step toward organizing the language for our program. Now that we knew what needed to be done, we set out to arrange all the parts into a solution. We finished the last course of our *Yum Cha* and prepared to take our humble place in the next millenium of Chinese history.

Dragon Whips Tail

Our word processing solution consisted of two major parts, the program itself and the Pinyin dictionary. To use the program you enter a Pinyin word, and the screen displays the corresponding Chinese character taken from the dictionary.

To create the dictionary Dr. Tsaur engaged the services of a Chinese schoolteacher who was noted for her knowledge of the language and the beauty of her calligraphy. We supplied her with a light pen and a thick standard reference on Pinyin. The result was a 3000-word dictionary of the most commonly used words. It took longer to build the dictionary than it took to write the program. A 6000-word business and professional dictionary is currently in the works.

Figure 2: Customized characters on the Hanyupinyin Word Processor: the word lucky in standard and bold style

The smaller dictionary fits on one double-sided floppy disk, but the larger one will require a hard disk. On the advanced version, the existing words can be tailored by the user to suit the individual's artistic preference. An example of the tailoring can be seen in Figure 2, where the word

万里

长城

公元前七世纪 中国北方诸侯割据 为了防御

邻近诸侯的侵袭 在各自的领土上筑起了防工

值植殖止止岂只中周诸筑筑

```
1   2   3   4   5   6   7   8   9   10  11  12  13  14  15  16  17  18  19  20
        Enter Pin Yin name: ZH              Alt M,More S,Stop Q,Quit search
                      A                      or choose number and ENTER
F1- HELP MENU   PRESS RETURN TO ACCEPT           MODE: Update
```

Figure 3: Entry screen of the Hanyupinyin Word Processor

lucky is shown in a very bold style and in the standard form.

The program starts with a menu that briefly explains the function key assignments. You can then press <F1> to toggle between the menu and the Pinyin entry screen. The entry screen is divided horizontally into three segments (see Figure 3). Each segment holds two rows of 20 half-inch-tall Chinese characters, providing 40 characters per segment and 120 characters per screen. The 40 characters in one segment will appear as one full line across the width of the paper when the document is printed (see Figure 4).

The entry line, search area, and status information are at the bottom of the screen. You enter the Pinyin code on the entry line. If you enter MA3, the character for the third tone of the word *ma* (horse) appears at the position marked by the graphics cursor. If *ma* happens to be one of the words that shares the same tone with another character but has a different meaning, you can enter the numeric radical code with the Pinyin word to help the computer select the correct character, as in MA375.

Of course, it is possible that you have not memorized all 227 of the radical codes. In that event, you can type MA3 and press <F9>. The program then displays every form of MA3 in the dictionary and allows you to choose the one that looks right. If you are unsure of the tone, you can just type MA, and the program will display all tonal options. The lower segment of the screen in Figure 3 shows 12 characters listed in response to a dictionary search done on the tonal varieties of ZH. By entering one of the numbers that appear below the characters, you can cause the chosen character to replace the one located at the graphics cursor.

万里长城

公元前七世纪　中国北方诸侯割据　为了防御邻近诸侯的侵袭　在各自的领土上筑起了防卫墙　到公元前三世纪　秦始皇统一中国后　把各段城墙连接起来　形成了　万里长城

万里长城东起我国河北省的山海关　西到甘肃省的嘉峪关　全长六千公里　合一万二千华里　所以我们叫　万里长城

有人计算过　要是用修筑长城的砖石筑一道高二米　宽一米的长堤　足可以绕地球一周呢　在中国　常有人用　不到长城非好汉　来表示自己　做一件事的巨大决心

Figure 4: Printed output of the Hanyupinyin Word Processor

Although the system may seem confusing to westerners, people who speak and read Chinese pick it up quickly. Dr. Tsaur's eight-year-old son was able to use the system even though he did not understand the tone designations. He simply used the <F9> search feature to find the words he wanted.

The program includes most standard word processing features, such as insert, delete, and scroll. Once a document is finished, it can be saved to disk, printed, and edited. The text files that the program creates, like other DOS files, can be transmitted by modem. However, to use the file the receiving computer must also have a *Hanyupinyin Word Processor* and a compatible version of the dictionary.

We also designed a translation capability into the program. With the expanded, hard-disk version you can enter common English words, and the system will produce Chinese characters as translations. Conversely, Pinyin input can be translated into English text. No checking is done to ensure proper grammatical usage, but this method usually gets the idea across in a rough translation.

Since a high-resolution graphics mode is used for displaying the Chinese characters, best results are obtained with an RGB (red-green-blue) monitor. A color monitor is especially helpful if you want to use the dictionary maintenance program, which uses sharp colors to delineate boundaries. The maintenance program also requires a light pen. For most people the standard dictionary will be sufficient, and the manufacturer will create a few extra characters to your specifications.

Either a C. Itoh Prowriter or an NEC 8023 printer is required to take advantage of the high-density graphics. These printers have a high ratio between the spacing of the vertical and horizontal dots. That ratio helps to maintain the visual attractiveness of a character's 32- by 16-dot makeup.

Although sophisticated Chinese word processors are available (see "Apanda for the PC"), the average Chinese person has long been denied the simple and affordable convenience that westerners associate with typewriters and personal computers. Word processing programs like the *Hanyupinyin Word Processor* should help remedy that situation. ⬤

Raymond A. Rogers is president of International Computerized Linguistics.
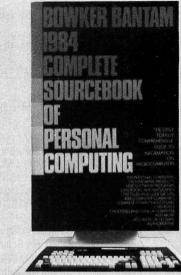
Apanda for the PC

Eric Brown

The only other Chinese word processor currently available for the PC is a sophisticated composition program that takes an approach different from that of the *Hanyupinyin Word Processor*. Apanda's *Apanda Word Processor* allows you to create characters by using combinations of keys to perform radical and finial strokes instead of typing the phonetic English sounds. You do not need to know phonetic English or the Roman alphabet to use the program. Apanda's method also eliminates the confusion encountered in Pinyin because of the many tonal homonyms in the Chinese language.

Apanda comes with the 14,000-character *Matthews Classical Chinese Dictionary* on disk as well as a smaller and simpler Pinyin dictionary. To construct a character you press the key combination for a basic character (radical) plus the number of extra strokes (finials) that are required to create a finished character. Key labels and help screens eliminate the need for memorization. The program displays characters in 24-by-24 or 48-by-48 resolution. Any graphics printer can be used to print the output.

Apanda Word Processor
Apanda, Inc.
73 Chelsea St.
Houston, TX 77006
713/521-2041, 713/661-2114
List price: $10,000 (includes on-site training and customization)
Requirements: PC XT or PC with a 10M hard disk, p-System

Circle 460 on reader service card

America's Number 1 Computer Buying Service Brings You These 10 Exclusive, Money-Saving Benefits...

Join PC NETWORK for as low as $8 for one year (or $15 for two years) and receive all these exclusive, money-saving benefits:

1. REAL BUYING CLOUT—You'll find software and hardware for every application, compatible with any system from all manufacturers. And it's all just 8% above the PC NETWORK'S cost, to cover administrative expenses and allow for some profit.
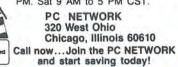
2. CONVENIENT SHOP-AT-HOME CATALOG—Members receive our catalog featuring thousands of computer software, hardware and related products. Ordering is as easy as picking up your phone or mailing in the order form enclosed with each order. And remember, any item in the catalog is yours for just 8% above the dealer wholesale price, plus shipping! You may also access the entire catalog from your home system, providing you have a modem and terminal program. All prices reflect a 3% cash discount. On credit card orders there is a 3% service charge.

3. KNOWLEDGEABLE SERVICE CONSULTANTS—Our qualified counselors are ready to answer any questions you may have regarding compatibility, memory, language requirements, pricing, and other important matters. You'll be certain that your purchase is exactly what you need at the best possible price.

4. FULLY INSURED FAST HOME DELIVERY—The PC NETWORK pays all insurance charges for full coverage on all shipments. From the moment you place your order, our service consultants and shipping department work side-by-side to get the merchandise to your doorstep as quickly as possible. We also act immediately upon your request to obtain hard-to-get items and special orders to further insure the fastest delivery available!

5. OPTIONAL BUSINESS SOFTWARE RENTAL LIBRARY—All members are eligible to join our Business Software Rental Library for just $30 per year in addition to the basic membership fee. **This entitles you to rent business software at just 20%-25% of PC NETWORK's low prices** for a 7-day period (plus a 3-day grace period for return shipping). This is an ideal way for you to inexpensively test various programs and see which best matches your needs. And should you decide to buy, 100% of your rental fee applies toward the purchase of the rented merchandise.

6. OPTIONAL GAME SOFTWARE RENTAL LIBRARY—All members are eligible to join our Game Software Rental Library for $10 per year in addition to the basic membership fee. All the same conditions apply as for the Business Software Rental Library (benefit five). See which game you like best before you buy, or just play each until you've had enough fun.

7. SPECIAL SAVINGS BULLETINS MAILED DIRECTLY TO YOUR HOME—Periodically you'll receive "THE PRINTOUT," a computer-generated newsletter featuring computer software and hardware that PC NETWORK was able to purchase at tremendous savings. As a Member, these savings on select, limited-quantity merchandise are passed right along to you!

8. NEW: DISCOUNT COMPUTER BOOK LIBRARY—Now you can purchase computer-related books at up to 50% savings from our huge inventory of informative and entertaining titles—probably many more than you'd find at your library, book or computer store.

9. MEMBERSHIP SATISFACTION GUARANTEE—If for any reason you are not satisfied with our low prices, fast home delivery and other exclusive services, notify us within 30 days of your membership validation to receive a **100% money-back refund.** This refund is yours regardless of whether or not you made any purchases or received any benefits as a PC NETWORK Member.

10. PRODUCT SATISFACTION GUARANTEE—Defective software will be replaced immediately. All defective hardware will be promptly replaced or repaired.

All items subject to availability, prices subject to change without notice.
Copyright © 1984, PC NETWORK INC.

Circle **460 on reader service card**

Tell the World What You Think of Your Software!

Have you found a program that performs better than you hoped? Have you used a program that didn't meet your expectations? Let other *PC World* readers know about it!

Once again, with the assistance of our readers, *PC World* will publish the definitive guide to IBM PC software. The 1984/1985 *PC World Software Review* will reflect the experience of the PC community, with comments based on first-hand testing. It will describe all types of software available for the PC and compatibles. From spreadsheets and communications programs to operating systems and games, the *Software Review* will be a user's guide to the complex software marketplace.

Besides being part of the most useful reference tool ever produced for the PC and compatibles, you can win big! Contributors receive credit for each comment published in the *Software Review* and are eligible to win one of five prizes of software worth $500. Contest winners will be chosen in a random drawing.

Reader comments will be printed with product descriptions written by *PC World Software Review* editors. A form for submitting evaluations is provided with this announcement. There is no limit to the number of products for which you can submit comments, but *PC World* must receive all submissions by June 30, 1984. *PC World* reserves the right to edit comments to conform to the magazine's format and style.

If you've used PC-compatible software, submit a review to the *PC World Software Review*. This is your chance to give other readers the kind of information you would like to have before purchasing software.

PC World Software Review
Reader Review Form

Please use this form for each product on which you want to comment. You may use photocopies of this form to submit more than one evaluation.

Product Name _____
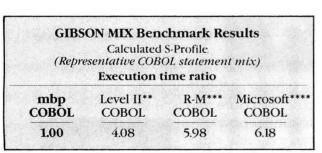
Manufacturer _____

Address _____

Telephone _____

Category A. SYSTEMS SOFTWARE

(check one) 1. ☐ Operating systems   2. ☐ Languages   3. ☐ Utilities

B. APPLICATIONS SOFTWARE

1. ☐ Spreadsheets   8. ☐ Financial

2. ☐ Word processing   9. ☐ Business management

3. ☐ Data management   10. ☐ Accounting

4. ☐ Graphics   11. ☐ Industrial application

5. ☐ Communications   12. ☐ Job and industry specific

6. ☐ Educational   13. ☐ Personal management

7. ☐ Entertainment (games)   14. ☐ Integrated applications

Comment on the product in terms of features or limitations.

Please avoid ambiguity and sweeping remarks. Be specific!

Comments _____

_____

_____

_____

_____

_____

Contributor's name _____

Address _____

Telephone _____

Send to the *PC World Software Review*, 555 De Haro St., San Francisco, CA 94107.

IF YOUR DATA GETS WIPED OUT, YOU WON'T BE.

Alloy's PC BACKUP gives IBM, Eagle, Columbia, Compaq, Kaypro, Corona, Texas Instruments, and Zenith users total data protection.

PC BACKUP from Alloy, the leader in data back-up technology, eliminates the headache of costly, time-consuming data loss for users of the IBM PC and all 100% compatibles. It backs up your files with the finest file-oriented cartridge tape back-up and retrieval system for Winchester hard disks available today. So your data is safe when not in use, and at your fingertips when you need it. And only Alloy can deliver high performance storage/retrieval and data protection with such reliability.

Designed to meet PC owners' increasing storage needs and to put an end to data loss, PC BACKUP is the standard among major PC users today.

Here are some of its remarkable features:

Alloy's TIP-SIX, the latest version of the industry standard Tape Interchange Package. A comprehensive, menu-driven software package, with over 30,000 installations. File-by-file data transfer at nearly 1 Megabyte/minute. Automatic sub-directory backup with date and time stamp and archive bit support.

Insure against data loss, find out more about PC BACKUP. It's available right now. Call Alloy today at (617) 875-6100, or ask your local dealer about PC BACKUP.

ALLOY
Computer Products, Inc.

Alloy Computer Products, Inc., 100 Pennsylvania Ave., Framingham, Massachusetts 01701. Tel: (617) 875-6100, TWX: 710-346-0394
In Europe: contact: Alloy Computer Products (Europe) Ltd., Cirencester, Gloucestershire, England. Tel: 0285-68709, Tlx: 43340

COMDEX™/Spring '84
BOOTH # 2832

User Group Dispatch

User group listings from around the world

User Group Directory

PC World publishes a user group directory every other month. If your group is not in this list but would like to be, send the group's name, address, contact, and other information to *User Group Dispatch, PC World,* 555 De Haro St., San Francisco, CA 94107.

Alabama

Birmingham IBM PC User Group
Fred Hilbers
P.O. Box 19248
Birmingham, AL 35219
205/879-3716

Wiregrass Micro-Computer Society
IBM-PC SIG
Bill Brown
109 Key Bend Rd.
Enterprise, AL 36330
205/347-7564

Alaska

General Computer Services Inc.
Mark Bolner
570 W. 53rd
Anchorage, AK
907/562-3494

IBM PC & Compatible Users Group
3605 Arctic Blvd. #1320
Anchorage, AK 99503

Arizona

Phoenix IBM-PC Users Group
James S. Serbin
P.O. Box 44218
Phoenix, AZ 85064
602/954-7519

Tucson IBM PC User Group
Brian Wagner
P.O. Box 1489
Tucson, AZ 85702
602/795-9437

Arkansas

NW Arkansas IBM PC Users Group
Jeff Crawford
1848 Rolling Hills
Fayetteville, AK 72701
501/521-8080

California

BITS and PCs
President
P.O. Box 66
Santa Maria, CA 93454
805/937-7490

Diablo Valley PC
Al Hunt
1415 Oakland Blvd. #101
Walnut Creek, CA 94596
415/687-8037

Fresno IBM-PC Club
R. Betancourt
P.O. Box 5987
Fresno, CA 93755

Greater South Bay IBM-PC Users Group
Mike Immel
P.O. Box 665
Lomita, CA 90717
213/325-7533

IBM User Group at UCLA
Paul Kircher
UCLA Graduate School of Management
Los Angeles, CA 90024
213/206-8187

IBM Users Group of California
Neil Zachary
P.O. Box 4136
Los Angeles, CA 90028
213/937-1314

Kern IBM PC Users Group
Bill Peacock
1400 Easton Dr. #107
Bakersfield, CA 93309
805/322-9298

Lawrence Livermore Lab IBM PC Club
Lee Peck
LLNL
P.O. Box 808 L-326
Livermore, CA 94550

Marin-Sonoma PC Users
William O. Ward
P.O. Box 2909
San Francisco, CA 94126

Modesto-Turlock IBM PC User Club
Sy Guth
P.O. Box 5122
Modesto, CA 95352
209/577-3416

North Orange County IBM Club
John Buckle
P.O. Box 665
La Mirada, CA 90637
714/522-0586, 213/944-9651

Oasis Users Group
Fred Bellomy
P.O. Box 2400
Santa Barbara, CA 93120
805/965-0265

Pasadena IBM PC User Group
Steve Bass
711 E. Walnut Ave. #105
Pasadena, CA 91101
213/795-2300

Pomona Valley Area IBM PC User Group
Roy Livingston
10282 Felipe
Montclair, CA 91763
714/624-9194

Rancho California Computer Club
Joe Dorner
P.O. Box 651
Temecula, CA 92390
714/676-5856

Redding Area PC Society
Ken Daniels
2516 Park Marina Dr. #6
Redding, CA 96001
916/243-4411

Sacramento IBM-PC Users Group
David T. Burhans, Jr.
8122 Holm Oak Way
Citrus Heights, CA 95610
916/723-9745

San Diego Computer Society
Joe Dorner
P.O. Box 87770
San Diego, CA 92138
714/676-5856, 714/676-3378

San Fernando IBM PC Users Club
David Nussbaum
11558 Riverside Dr. #207
North Hollywood, CA 91602
213/985-8337

San Francisco IBM PC Users Group
4411 Geary Blvd. #33
San Francisco, CA 94118

San Francisco PC Club
Max Brioski
1045 Balboa St.
San Francisco, CA 94118
415/386-5176

Santa Barbara City College Computer Science Department
Stu Swartz
721 Cliff Dr.
Santa Barbara, CA 93109
805/966-2919

Silicon Valley Computer Society
Elvin Bollet
P.O. Box 60506
Sunnyvale, CA 94088
408/243-1154

Stanford/Palo Alto IBM PC User Group
Linda de Sosa
P.O. Box 8292
Stanford, CA 94305
415/856-6281

Stanford University Hospital IBM PC User Group
Kevin Volkmann
701 Welch Rd. #222
Stanford, CA 94305
415/497-7691

UCSF IBM PC Users Group
Mark Slichter
School of Nursing n319y
UCSF
San Francisco, CA 94143

Colorado

Colorado Springs IBM PC Users Group
P.O. Box 16256
Colorado Springs, CO 80935

Denver User Group
Steve Leibson
4040 Greenbriar Blvd.
Boulder, CO 80303
303/494-4062

Front Range PC User Group
Joan Brown
813 Engleman Pl.
Loveland, CO 80537
303/667-6059

Northern Colorado PC Users
Steve Livingston
2601 Davidson Dr. #C-8
Fort Collins, CO 80526
303/223-8391

PC Users' Group of Colorado
Howard Weissman
P.O. Box 944
Boulder, CO 80306
303/443-5528

Connecticut

Central Connecticut User Group
Rich Paterson
ComputerLand
131 S. Main
West Hartford, CT 06107
203/561-1446

IBM PC User Club of Stamford
Dave Foulger
69 River St.
New Canaan, CT 06840
203/966-9378

Southeastern Connecticut IBM PC Users Group
Pat Ryan
78 Spring Glen Rd.
Niantic, CT 06357
203/739-4855

Yale Medical School IBM PC User Group
Philippe Jeanty
P.O. Box 3333
New Haven, CT 06510
203/469-4513

Delaware

PC Professional Users Group
P.O. Box 2350
Wilmington, DE 19899

District of Columbia

Capital PC
Janet Withrow
P.O. Box 3189
Gaithersburg, MD 20878
703/978-1530

Georgetown PC Users Group
Joseph Grabow
Box 3267
Georgetown University
Washington, DC 20057
202/944-0966

IBM PC Special Interest Group (CompuServe)
Mike Todd
4910 43rd St. NW
Washington, DC 20016
202/364-2467
CompuServe: Mike Todd,
70001,1264; Wes Meier,
70215,1017

Florida

Manasota IBM PC User's Group
Richard Reynolds
2204 Palma Sola Blvd.
Bradenton, FL 33529
813/792-5400

Miami PC User Group
Joel Hershkowitz
2350 N.E. 135th St. #1201
N. Miami, FL 33181
305/940-7566

Northern Florida Amateur Computer Club
Stephen D. LeBar
10921 Kuralei Dr.
Jacksonville, FL 32216

PC Users Group
Chris Allen
P.O. Box 5772
Jacksonville, FL 32207
904/396-6953

Southwest Florida IBM PC Users Group
Bruce Crum, Jr.
1407 S.W. 16th Terr. #202
Cape Coral, FL 33914
813/574-7011

Space Coast PC Users Group
John Key
1540 Monte Carlo Ct.
Merritt Island, FL 32952
305/452-1465

Georgia

Athens IBM PC User Group
Ollie Ollis
255 S. Milledge Ave.
Athens, GA 30605
404/549-6222, 404/543-0139

Middle Georgia Computer Club
L. Keitt Dantzler
P.O. Box 5705
Macon, GA 31208
912/477-7009

Hawaii

Hawaii PC User Group
Dick Colven
1212 Punahou St. #2103
Honolulu, HI 96826
808/942-2709

IBM PC User Society
Arthur W. Becker
P.O. Box 591
Pearl City, HI 96782

WHEN IT COMES TO THE TWO BEST WORD PROCESSORS

NewWord™ MergePrint $249.00*

WordStar® MailMerge® $645.00*

IT'S A QUESTION OF WEIGHING THE DIFFERENCES

There's only one main difference: worth. Because NewWord, with its built-in Merge Print, is entirely compatible with MicroPro's WordStar® and MailMerge®—keystroke, command and file compatible. You can use an associate's Wordstar files without any difficulty.

NewWord is the most powerful and versatile word processor available. Beyond WordStar's editing and formatting capabilities, NewWord also offers advanced features like unerase deleted text, automatically changing ruler lines, multiple-line headers and footers, and on-screen display of boldfacing and underlining.

NewWord is demonstrably superior on your dot matrix printer, supporting microjustification, variable line heights/character widths and other useful features. With NewWord, you can switch between a daisywheel and dot matrix printer to take advantage of both.

An easy-to-understand manual makes NewWord simple to learn. A *Novice* version, which is available as an option, lets beginners use NewWord right away.

Make a comparison. NewWord is lighter only on your checkbook.

See NewWord at your local dealer today.

For more information, call:
800-832-2244
(In California, call 800-732-2311)

ROCKY MOUNTAIN SOFTWARE SYSTEMS

1280-C NEWELL AVENUE, SUITE 1010 • WALNUT CREEK, CALIFORNIA 94596 • (415) 680-8378

WordStar and MailMerge are registered trademarks of MicroPro International. Corp. NewWord and Newstar are trademarks of Newstar Software, Inc. IBM is a registered trademark of International Business Machines, Inc.

*Manufacturer's suggested retail

Circle **152** on reader service card

SIMPLIFIED SPREADSHEET ASSEMBLY

RISING SPREADSHEET (A) KNOCKS MEXICAN JUMPING BEANS (B) INTO MOUTH OF NEUROTIC MAN (C) WHO IS SO DISCOMBOBULATED THAT HIS HAIR STANDS ON END, DISLODGING HAT (D) WHICH OPENS CAGE (E) AND RELEASES EPICUREAN MOUSE (F).

MOUSE, INSPIRED BY SCENT OF PERFECTLY AGED CAMEMBERT CHEESE, GNAWS THROUGH SPREADSHEET, ONLY TO DISCOVER HE HAS BEEN FOOLED BY AROMA OF OVER-RIPE GORGONZOLA (G).

IN A FIT OF PIQUE HE SPILLS VINTAGE WINE (H) INTO WATER-WHEEL (I) WHICH TURNS PULLEY THAT CAUSES GLOVE (J) TO GRASP SPREADSHEET AND MOVE IT TO TAPING AREA.

SHEET IS TAPED SECURELY IN PLACE BY TRAINED ADHESIVE TAPE WORM (K).

MADE SIMPLE.

Now you can save time, aggravation, adhesive tape, and Gorgonzola cheese by following one simple direction—Sideways. It's the unique software program that lets you output all the spreadsheet columns you need, all on one continuous page, all with one print command—and all for only $60!

With Sideways on your side, no spreadsheet you invent with Lotus 1-2-3,™ VisiCalc® Multiplan™ or SuperCalc™ is too wide! And it's just as powerful an ally when you're creating far-into-the-future schedules and pert charts with your word processor. In fact, for any wide text file, for dozens of uses, the way to go is Sideways.

The experts agree. *PC* Magazine, for example, writes: "If you've got the need, Sideways has the solution." And *PC World* calls Sideways "nifty . . . . an easy to use program that does what it claims."

You can go Sideways today with an IBM® PC and an IBM® Epson, Okidata, Prism,™ or Prowriter™ printer. Ask for Sideways at your local ComputerLand® or other leading computer stores. Or mail a $60 check to Funk Software, P.O. Box 1290, Cambridge, MA 02238. (617) 497-6339. MC/Visa accepted. Send no Mexican jumping beans, please.

SIDEWAYS™
FOR EASY-READING HARD COPY

Idaho

Idaho PC User Group
Bruce Burns
ComputerLand
687 S. Capitol Blvd.
Boise, ID 83702
208/344-5545

Illinois

Association of PC Users
Glenn Yunashko
4727 S. Lavergne St.
Chicago, IL 60638
312/284-5872

COMMON
David G. Lister
435 N. Michigan Ave.
Chicago, IL 60611
312/644-0828

Lawyers Microcomputer Users Group
Paul Bernstein
123 W. Madison
Chicago, IL 60602
312/280-8180

Northern Illinois IBM PC Users Group
James L. Szafranski
5195 Castaway Ln.
Barrington, IL 60010
312/934-8133

1-PUG(IBM)
C.H. Miller III
c/o 2806 N. Easton Pl.
Peoria, IL 61604
309/688-3683

Indiana

ComputerLand User Group
Susan Shields
ComputerLand
5450 N. Coldwater Rd.
Fort Wayne, IN 46825
219/483-8107

Indianapolis IBM User Group
David Reed
6704 Hoover Rd.
Indianapolis, IN 46260
317/259-7892

NEI User Group
George Gynn
9904 Goshen Rd.
Fort Wayne, IN 46818
219/693-3147

Northern Indiana IBM PC User Group
Dr. Terry Alley
316 N. Ironwood Dr.
South Bend, IN 46615
219/289-5506

Notre Dame PC Users' Group
Paul E. W. Hemmeter
P.O. Box 597
Notre Dame, IN 46556
219/239-5295

Terre Haute PC Users Group
Bruce W. Welsh
P.O. Box 3174
Terre Haute, IN 47803
812/232-3339

User Group Dispatch

Iowa

Cedar Falls User Group
Lee Ann Moore
Black Hawk Village Shopping
    Center
Cedar Falls, IA 50613
319/277-1700

Hawkeye PC User Group
Ben Blackstock
385 Collins Rd. NE #201
Cedar Rapids, IA 52402
319/393-5416

IBM PC User Group
Gary Wilcox
P.O. Box 246
Des Moines, IA 50301
515/967-5880

**Quad Cities PC Users
Group (QCPUG)**
Lew Roberts
P.O. Box 464
Bettendorf, IA 52722
319/391-9437

Kansas

Kansas City IBM Users
R. Wayne Thompson
11005 W. 60th St.
Shawnee, KS 66203
913/268-7500

**Topeka Library
User Group**
Becky Hinton
Topeka Public Library
1515 W. 10th St.
Topeka, KS 66604
913/233-2040

**Wichita IBM PC
Users Group**
Jack Leonard
P.O. Box 18422
Wichita, KS 67218
316/681-9698, 316/788-3655

Kentucky

**Bluegrass IBM PC
Users Group**
Diane Skoll
Computing Center
Room 72, McVey Hall
University of Kentucky
Lexington, KY 40506-0045
606/257-2900

Louisiana

Cajun PC Users
Sharon Denais
Oil Center Research, Inc.
P.O. Box 51871
Lafayette, LA 70505
318/232-2496

New Orleans PC Club
Walt Meyers
3517 19th St.
Mettarie, LA 70002
504/737-6318

**NW Louisiana
IBM PC User Group**
William Dwinnell
1144 Hallmark Dr.
Shreveport, LA 71118
318/686-7781

Maryland

**Baltimore IBM PC
Business Users Group**
40 W. Chesapeake Ave. #300
Baltimore, MD 21204

Baltimore PC
1910 Trout Farm Rd.
Jarrettsville, MD 21084

Capital-PC
P.O. Box 34210
Bethesda, MD 20817

**CDP Baltimore
User's Group**
P.O. Box 223
Owings Mills, MD 21117

Diamond IBM-PC Users
Edward T. Grogan
P.O. Box 983
Columbia, MD 21044
301/730-7390

Massachusetts

IBM PC User Group
The Boston Computer Society
One Center Plaza
Boston, MA 02108
617/367-8080

**Miller Microcomputer
Services**
61 Lakeshore Rd.
Natick, MA 01760
617/653-6136

**MS-DOS Users Group
(SIG/86)**
Joseph Boykin
47-4 Sheridan Dr.
Shrewsbury, MA 01545

Michigan

S.E.M.C.O., IBM SIG
P.O. Box 02426
Detroit, MI 48202
313/532-1390

**Southwestern Michigan
IBM PC Users Group**
R.K. Schmitt
2320 Crosswind Dr.
Kalamazoo, MI 49008
616/349-5381

**Unknown Personal
Computer Organization**
Dick Janson
8902 Bath Rd.
Laingsburg, MI 48848
517/675-7453

WIPCUS
Hal R. Varian
P.O. Box 7508
Ann Arbor, MI 48107

Minnesota

**Gustavus Adolphus
PC User Group**
Larry Potts
Gustavus Adolphus College
Saint Peter, MN 56082
507/931-7322

**Twin Cities
PC User Group**
Tom Teresi
P.O. Box 3163
Minneapolis, MN 55403
612/473-4985, 612/473-6831

Missouri

KC IBM Users Group
Bill Meeker
6020 Walnut
Kansas City, MO 64113
816/444-8709

**The Saint Louis Users'
Group for the IBM PC**
P.O. Box 837
St. Louis, MO 63188

New Hampshire

**New Hampshire
PC User Group**
L. Paul Ouellette
PSNH
1000 Elm St.
Manchester, NH 03105
603/669-4000

**Portsmouth
PC Users Group**
Cynthia W. Harriman
57 South St.
Portsmouth, NH 03801
603/436-1608

Nebraska

**Omaha IBM PC
User Group**
Michael C. Yakus
8642 R Plaza #9
Omaha, NE 68127
402/331-7387

New Jersey

**Amateur Computer Group
of New Jersey**
Carol Ziemba
P.O. Box 319
South Bound Brook, NJ 08880
201/467-2000

**Central Jersey IBM/PC
Information Exchange**
Howard Dean
P.O. Box 8280
Red Bank, NJ 07701
201/842-5800

**Mid-Jersey PC Executive
Computing Group**
Graduate Program for
    Administrators
Rider College
2083 Rt. 206
Lawrenceville, NJ 08648

**North Jersey
IBM PC Club**
Irving Lang
P.O. Box 497
New Providence, NJ 07974

**Princeton
IBM PC Users Group**
Simon Yeung
P.O. Box 121
Princeton, NJ 08540

New York

**BIBMUG-Buffalo
IBM User's Group**
William P. Hanley
P.O. Box 1487
Buffalo, NY 14221

**Hudson Valley Personal
Computing Club**
P.O. Box 6057
Kingston, NY 12401

**Long Island Computer
Association**
Al Stone
P.O. Box 71
Hicksville, NY 11082
516/293-8368

**Manhattan
IBM Micro Club**
Helaine Head
360 Central Park West
New York, NY 10025
212/222-9027

**North American Amateur
Computer Club**
Brian Glasser
P.O. Box 106
Church St. Station
New York, NY 10008
212/674-1185

**Northeastern New York
IBM PC Users Group**
Jim Cummins
5 Jacob St.
Ballston Lake, NY 12019
518/399-3016

**NYPC, The New York
IBM PC Users' Group**
Eric A. Jaffe, M.D.
Cornell University Medical
    College
80 Wall St. #614
New York, NY 10005
212/533-NYPC

PECO Club
P.O. Box 255
Garnerville, NY 10923

**Southern Tier
PC Users Group**
Don Rose
52 Conklin Ave.
Binghamton, NY 13903

**Syracuse Microcomputer
Club**
A. Caldwell
Syracuse University Office of
    Budget and Planning
Skytop Offices
Syracuse, NY 13210
315/423-4214

Ohio

**ACORN: Greater
Cincinnati IBM PC
User's Group**
Randy Corgan
P.O. Box 3097
Cincinnati, OH 45201
513/922-2692

**Akron/Canton
PC Users Group**
James C. Finucane
10690 Clapsaddle Ave.
Alliance, OH 44601
216/935-0252

**Athens Area
IBM-PC User Club**
Chuck Harrington
315 Cutler Hall
Ohio University
Athens, OH 45701

DAYTON-86
Craig D. Porter
610 Talowood Dr.
Dayton, OH 45430
513/426-8664

**Greater Cleveland
PC Users Group**
Roy McCartney
30704 Royalview Dr.
Willowick, OH 44094
216/944-5173

**Mansfield Area
IBM/PC Users Group**
Gary Stiffler
1145 Conwell Ave.
Willard, OH 44890
419/935-0111

**Miami University
IBM-PC Users' Group**
Debra Allison
The Computing Center
Miami University
Oxford, OH 45056
513/529-6226

Northeast Ohio PC Club
Kelvin J. Gerhart
P.O. Box 662
North Olmsted, OH 44070
216/777-4402

**Ohio State University
PC Users Group**
Art Krumsee
Office of Continuing Education
210 Sullivant Hall
1813 N. High St.
Columbus, OH 43212

Oklahoma

IBM PC User Group
Roger Baresel
Deloitte Haskins & Sells
700 Fidelity Plaza
Oklahoma City, OK 73102
405/232-6191

Tri-County Tech
Tom Fowler
P.O. Box 3428
Bartlesville, OK 74005
918/333-2422

Oregon

**Corvallis PC
Computer Club**
Bob Collins
P.O. Box 1977
Corvallis, OR 97339
503/754-2929

**Eugene IBM PC
Users Club**
Sheila Mahan
P.O. Box 5070
Eugene, OR 97405

User Group Dispatch

Jefferson State Computer Users Group
P.O. Box 320
Gold Hill, OR 97525

Portland IBM Personal Computer Club
Rich Rohde
P.O. Box 2068
Beaverton, OR 97075
503/620-6862

Pennsylvania

Harrisburg IBM PC Users Group
Jack Stahl
1195 Fairmont Dr.
Harrisburg, PA 17112
717/652-9097

International Personal Computer Owners
James B. Cookinham
IPCO, Inc., P.O. Box 10426
Pittsburgh, PA 15234
412/561-1857

Philadelphia Area Computer Society
LaSalle College
20th and Olney Streets
Philadelphia, PA 19141

Philadelphia Area IBM PC User Group
Bennett Landsman
2041 Harbour Dr.
Palmyra, NJ 08065
609/786-1441

Rhode Island

Greater Rhode Island PC Users Group
Sean L. Woods
85 Maple Ave.
Middletown, RI 02840
401/847-3782

South Carolina

PC Users' Group
P.O. Box 2794
Columbia, SC 29202
Source: ST5033

Tennessee

IBM PC User Group
Ross Burrus
Science Applications, Inc.
Plaza Tower #801
Oak Ridge, TN 37830
615/482-6649

Memphis Area IBM-PC Users Group
Peter Vermilye
P.O. Box 241756
Memphis, TN 38124-1756
901/345-8760

Music City IBM PC User Group
David Redlawsk
4009 Albert Dr.
Nashville, TN 37204
615/292-6041

Upper Cumberland IBM User Group
John Brady
Box 409B Fisk Rd.
Cookeville, TN 38501
615/537-6633

Texas

Alamo PC Organization
Ben Jackson
P.O. Box 16433
San Antonio, TX 78216

Basic Society, Inc.
An Int'l Users Group
Drawer 345099
Dallas, TX 75234
214/484-9900

Central Texas User Group
Charles Weller
325 Explorer
Austin, TX 78734
512/261-6566

Dallas Fort Worth User Club
Samuel P. Cook
309 Lincolnshire
Irving, TX 75061
214/253-6979

HAL-PC
Scott Schultz
P.O. Box 610001
Houston, TX 77208
713/370-2398

IBM Club
David Andrews
3110 Honey Tree Ln.
Austin, TX 78746
512/327-0029

Lubbock IBM PC Users Group
Jim Swann
Lubbock, TX 79414
806/792-3448

North Texas IBM PC User Group
Bill Hood
10400 N. Central Expwy. #210
Dallas, TX 75231
214/361-0304

Southwest Computer Club
Sergio H. Salazar
Ohio Medical Products
9650 Railroad Dr.
El Paso, TX 79924
915/751-0465, 915/757-2661 ext. 262

Southwest Personal Computer User Group
Ronnie Van Winkle
William G. Barker & Associates
1009 W. Randol Mill Rd. #212
Arlington, TX 76012
817/270-2760

Texas Instruments Professional Computer Users Group
Stephen Gay
1608 Elmen
Houston, TX 77019
713/520-6990

Texas User Group
Ken Holcombe
178 Tipperary
San Antonio, TX 78223
512/333-7163

Tyler IBM Club
Fred McDowell
318 Ferrett Pl.
Tyler, TX 75702
214/595-0976
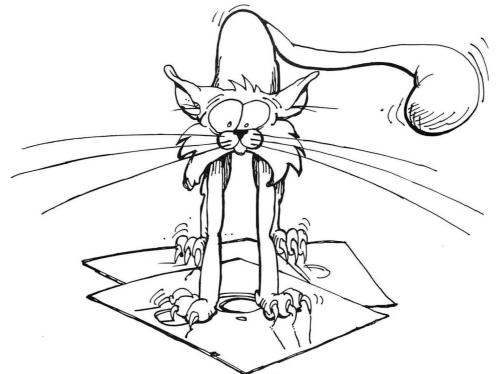
Utah

Utah Blue Chips
John Jaloszynski
P.O. Box 11901
Salt Lake City, UT 84147
801/487-5228

Utah ComputerLand
Debby Williamson
ComputerLand
161 E. 200 South
Salt Lake City, UT 84111
801/364-4416

Cat on a soft thin disk.

You need software insurance.

Diskettes are fragile, and when a protected program is damaged, the results are expensive and inconvenient. If you have a backup diskette, though, you can have your Apple, IBM or compatible computer back on line within seconds...affordably. That's software insurance.

Copy II Plus (Apple][,][Plus, //e)

This is the most widely used backup program for the Apple. Rated as "one of the best software buys of the year" by **InCider** magazine, its simple menu puts nearly every disk command at your fingertips. The manual, with more than 70 pages, describes protection schemes, and our **Backup Book**™ lists simple instructions for backing up over 300 popular programs. A new version is now available that is easier to use and more powerful than before. Best of all, Copy II Plus is still only **$39.95**.

WildCard 2 (Apple][,][Plus, //e)

Designed by us and produced by Eastside Software, WildCard 2 is the easiest-to-use, most reliable card available. Making backups of your total load software can be as easy as pressing the button, inserting a blank disk and hitting the return key twice. WildCard 2 copies 48K, 64K and 128K software, and, unlike other cards, is always ready to go. No preloading software into the card or special, preformatted diskettes are required. Your backups can be run with or without the card in place and can be transferred to hard disks. **$139.95** complete.
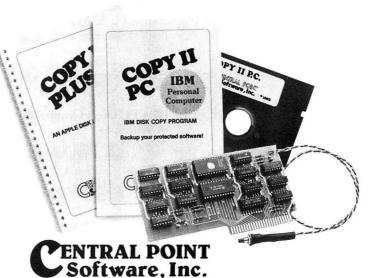
Copy II PC (IBM)

This is **THE** disk backup program for the IBM PC and PC/XT that backs up almost anything. Others may make similar claims, but in reality, nothing out performs Copy II PC...at any price. Copy II PC even includes a disk speed check and is another "best buy" at only **$39.95**.

We are the backup professionals. Instead of diluting our efforts in creating a wide variety of programs, we specialize in offering the very best in backup products. So, protect your software investment, and get surefire relief from scratchy disks.

CENTRAL POINT Software, Inc.
The Backup Professionals

To order, call 503/244-5782, 8:00-5:30 Mon.-Fri., or send your order to: Central Point Software, 9700 SW Capitol Hwy, Suite 100, Portland, OR 97219. **Prepayment is required. Please include $2 for shipping and handling ($8** outside U.S. or Canada).

User Group Dispatch

Virginia

**Central Virginia
IBM PC User's Group**
Jim Love
P.O. Box 34446
Richmond, VA 23234
804/271-6173

**IBM PC-Tidewater
User Group**
Vic Freeman
P.O. Box 64454
Virginia Beach, VA 23464

**Peninsula IBM-PC
User Group**
P.O. Box 7476
Riverdale Station
Hampton, VA 23666
804/874-1603

Washington

**BorderLine
IBM PC Users Group**
Gary B. Rohrabaugh
3617 Portal Dr.
Bellingham, WA 98226
206/671-3181

**PNW IBM PC
Users Group**
P.O. Box 3363
Bellevue, WA 98009

Wisconsin

**Eau Claire Area
PC Users Group**
Brian George
2233 S. Hastings Way
Eau Claire, WI 54701
715/834-2603

**Madison IBM-PC
Users' Group**
Philip J. Niehoff
P.O. Box 2598
Madison, WI 53701-2598
608/255-7641

**Valley IBM PC
Users Group**
Bill Gilmore
645 Appleton
Menasha, WI 54952
414/725-1356

Australia

IBM PC S.A. Users Group
P.O. Box 68
Walkerville S.A. 5081
Australia
08/261-9590

Melbourne PC User Group
Christopher Leptos
500 Bourke St.
Melbourne, Victoria 3000
Australia
011/61/3/605-2222

Canada

**Club des utilisateurs
d'IBM PC de Montreal**
Bernard Mataigne
5054 rue Fabre
Montreal, P. Que.
H2J 3W4 Canada
514/524-7352

**IBM PC Users Group
of Winnipeg**
Business Development
   International (BDI)
P.O. Box 5, Station A
Winnipeg, Manitoba
R3K 129 Canada

**London IBM PC
Users Group**
Jeff Page
P.O. Box 1141, Station B
London, Ontario
N6A 5K2 Canada

**Niagara District
IBM PC Users Group**
S.R. Drake
6 Rodman Hall Dr.
St. Catharines, Ontario
L2R 1P2 Canada

**Northern Alberta
PC User Group**
Jim Laviolette
37 Brunswick Crescent
St. Albert, Alberta
T8N 2K5 Canada
403/458-9066

**Personal Computer
Association**
National Organization for the
   Users of the IBM PC in
   Canada
P.O. Box 251
Ajax, Ontario
L1S 3C3 Canada

**Personal Computer Club
of Toronto**
P.O. Box 266, Station A
Toronto, Ontario
M5W 1B2 Canada

Regina PC Users Group
Jeff Sloan
302-2323 Hamilton St.
Regina, Saskatchewan
S4P 3Y5 Canada
306/522-3201

**Vancouver
PC Users Group**
Allan Kelly
P.O. Box 48297 Bentall 111
Vancouver, British Columbia
V7X 1A1 Canada
604/271-3883

France

Mikro-Cerio
Jean Roch
134 bis, rue du Vieux
Pont de Sevres
Boulogne, France 92100
609.94.14

Japan

**Tokyo IBM-PC
Users Group**
Takashi Ohtsuka
2-27-13 Jingumae
Shibuya-Ku, Tokyo 150
Japan
03/404-0593
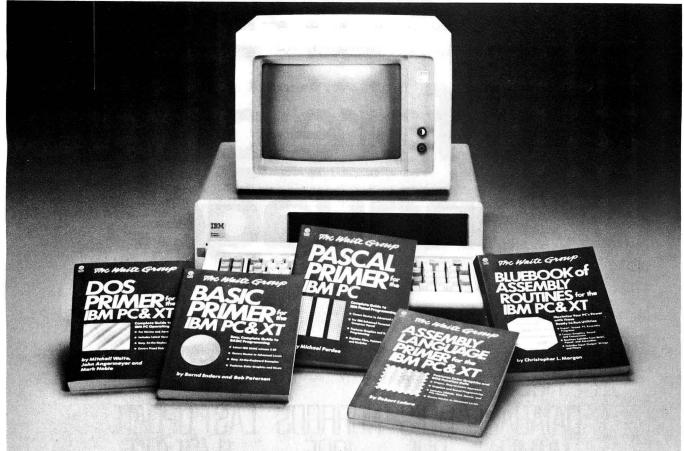
Tokyo PC
Stephen Campbell
C.P.O. Box 1145
Tokyo 100-91
Japan

Spain

**Marketing Managers'
IBM PC Workshop**
Professor Luis G. Renart
IESE
Av. Pearson, 21
Barcelona-34
Spain

HOW TO TURN IBM® INTO ABC.

Introducing the Plume/Waite Computer Series.

The Waite Group, the people who wrote the book on computer books, have done it again. They've produced a remarkable series on the world's most popular personal computers, the IBM® PC and IBM® XT.

The complete Plume/Waite library for the IBM PC and XT consists of five detailed volumes written for everyone from the computer beginner to the professional programmer.

• **DOS Primer for the IBM® PC and XT** — the first book anyone with an IBM PC and XT should buy. It gets you started managing resources and controlling & running programs — so you can get the most out of your computer.

• **BASIC Primer for the IBM® PC and XT** — the guide for BASIC, the world's most popular computer language. It offers a wide variety of at-the-keyboard examples, along with projects that draw on the versatile graphic and sound capabilities of the PC and XT.

• **PASCAL Primer for the IBM® PC** — for those ready to take the next step in computer science. This general purpose language can be used by both the novice and the programmer who wants to develop commercial software.

• **ASSEMBLY LANGUAGE Primer for the IBM® PC and XT** — the book that teaches the programmer the innermost secrets of the IBM PC and XT. Because ASSEMBLY is the most powerful language available, you'll be able to access each and every one of your machine's features.

• **BLUEBOOK OF ASSEMBLY ROUTINES for the IBM® PC and XT** — the book where you'll find a variety of pre-tested, debugged routines you can use with your own BASIC, PASCAL, or ASSEMBLY LANGUAGE programs — routines that will improve your software's performance and save you time.

So if you'd like to get the most out of your computer, get the Plume/Waite Computer Series. Whatever your level, it'll make learning your IBM PC and IBM XT as easy as ABC.

New American Library, P.O. Box 999
Bergenfield, N.J. 07621

Please send me:

___ Dos Primer ($14.95); ___ Basic Primer ($16.95); ___ Pascal Primer ($17.95); ___ Assembly Language Primer ($21.95); ___ Bluebook of Assembly Routines ($19.95). Add $1.50 postage and handling per order. I enclose ___ check, ___ money order (no COD's or cash), or charge ___ Visa, ___ Master Card.

Card # _____ Exp. Date _____

Signature _____

Name _____

Address _____

City _____ State _____ Zip _____

Allow a minimum of 4-6 weeks for delivery. This offer, prices and numbers are subject to change without notice. Offer expires December 31, 1984.

d foreign language.

```
.list files
     DATABASE  FILES  NBRRCDS  LAST UPDATE
       HOMES    DBF    1005      11/01/83
.use homes
.list homes selling for<50000
*** SYNTAX ERROR *** RE-ENTER
.list structure
     FLD    NAME   TYPE   WIDTH   DEC
     001  ADDRESS    C     025
     002 SELLPRICE   N     009     002
     003   AGENT     C     025
.list for sellprice<50000
```

Introducing the world's first complete, self-contained, 16-bit portable computer system.

The Panasonic® Sr. Partner with a built-in printer.

The Panasonic Sr. Partner is one of the most flexible and versatile portable computers on the market today. So there are many reasons to buy one.

Runs IBM PC Compatible Programs.

To begin with, the Sr. Partner runs IBM PC compatible programs. So you can pick from hundreds of popular programs from an existing software library. Including Lotus 1-2-3, Multiplan and even Flight Simulator.

In addition, included with the Sr. Partner are five of the most respected business-related programs including VisiCalc, WordStar, PFS Graph, File and Report plus G.W. BASIC. All at no extra charge.

This "bundle" allows you to go to work immediately doing word processing, electronic spread sheets, file management, graph development and your own programming.

And because it also accepts IBM PC compatible hardware, the Sr. Partner's technical capabilities can be expanded even further.

Built-in Printer.

The Sr. Partner is the only portable in its class with a built-in printer. It has graphics capability and can provide you or your customers with printouts of statistics, budget figures, conference notes, graphs and much, much more.

The printer is also extremely quiet and offers an 80-character line and the 132-character line that's perfect for spread sheets and other accounting programs. And its bi-directional logic design delivers fast printing.

A Complete System.

The Sr. Partner is an integrated system that doesn't require costly add-ons to be called complete.

It has 128K internal memory (RAM), expandable to 512K. A nine-inch, high-resolution CRT with monochrome screen. An 8088 microprocessor with a MS-DOS™ 2.11 operating system. An 8087 co-processor socket. A built-in, double-sided, double density, 360K, 5¼-inch disc drive and the capability of handling another one just like it. Built-in color and graphics at no extra cost. An option slot for IBM hardware. An RGB monitor output. A centronics parallel interface I/O port that accepts optional peripherals. And an RS-232 serial interface I/O port. All for a price that's surprisingly affordable.

The Sr. Partner is also backed up by a 12-month limited warranty. Most of the competition offers only 90 days.

And if the Sr. Partner should ever need servicing, we have a national network of authorized service dealers.

Over 60 Years of Dependability.

We're not one of those "here today, gone tomorrow" companies. Our parent, Matsushita Electric Industrial Co., has been in business since 1918 and is one of the world's largest consumer electronics manufacturers. Matsushita's recent contributions and innovations to computer and office technology include: a data entry system that directly connects facsimile data to a computer. An online optical character reader. A "pocket terminal" telephone data entry system. And a 64K static memory chip.

For more information about the Sr. Partner, write to: Computer Department, Panasonic Industrial Company, Division of Matsushita Electric Corporation of America, One Panasonic Way, Secaucus, NJ 07094. Or call: (201) 392-4261

The Panasonic Sr. Partner. It's everything you've always needed in a portable computer but never had before.

Panasonic.
Industrial Company

*Software package subject to change.

Registered Trademarks: WordStar: MicroPro International Corporation; PFS: Software Publishing Corporation; 1-2-3 and Lotus: Lotus Development Corporation; VisiCalc: Visicorp; Flight Simulator, G.W. BASIC and Multiplan: Microsoft.

World Events

A calendar of regional, national, and international events

Edited by Eric Brown

World Events lists computer-related conferences, conventions, workshops, camps, symposiums, trade fairs, and shows. If you know of an upcoming event, we'd like to hear about it.

May 10-12

Softwest '84
Regency Hotel and Conference
Center
Denver
An exposition, a conference, and educational seminars on the IBM PC and Apple computers. The exposition will display software, peripherals, and compatibles.
The Colorado Conference Group
3312 Cripple Creek, Ste. C
Boulder, CO 80303
303/499-1034

May 13-17

Computer Graphics '84
Anaheim Convention Center
Anaheim, California
The fifth annual conference and exposition of the National Computer Graphics Association. Over 220 exhibitors are expected. The conference will include discussions of computer graphics in the fields of architecture, engineering, printing, publishing, visual arts, cartography, manufacturing, and office automation.
National Computer Graphics
Association
8401 Arlington Blvd. #601
Fairfax, VA 22031
703/698-9600

May 21-22

DSS Conference
Rockefeller Center
New York
The theme of this conference is "Evaluating Decision Support Software: Personal Computer, Mainframe and Distributed Applications—a Managerial Perspective." Speakers include Mitch Kapor, president of Lotus Development Corporation.
DSS Conference
215 First St.
Cambridge, MA 02142
617/864-0900

May 22-25

COMDEX/Spring
World Congress Center and Apparel
Mart
Atlanta
A computer trade show with an emphasis on personal computers, peripherals, and software.
The Interface Group
300 First Ave.
Needham, MA 02194
617/449-6600

May 22-26

MicroExpo '84
Palais des Congres (C.I.P.)
Paris
Now in its ninth year, MicroExpo is Europe's oldest and largest microcomputer show. Floor space has been doubled since last year, and over 35,000 attendees are expected.
Diane Brock
Sybex
2344 Sixth St.
Berkeley, CA 94710
415/848-8233
Telex: 336311

May 29-31

Gulf Coast Computer & Office Show
Marriott Hotel
New Orleans
A general computer exhibition and a conference on office technology sponsored by the Administrative Management Society.
Whitsed Exhibitions and Conferences, Inc.
119 Avant Garde
Kenner, LA 70062
504/467-9949

June 5-9

Rochester FORTH Applications
Conference
University of Rochester
Rochester, New York
An international conference on the FORTH programming language for both experienced users and novices.
Institute for Applied FORTH
Research, Inc.
70 Elmwood Ave.
Rochester, NY 14611
716/235-0168

(continues)

World Events

June 11-13
The Fourth World Computing Services Industry Congress
Keio Plaza Hotel
Tokyo
An international congress drawing participants from 50 nations. The forum includes lectures by experts on world computing services and 19 concurrent working sessions including reports, panel discussions, and lectures.
ADAPSO
1300 N. 17th St. #300
Arlington, VA 22209
703/522-5055

June 13-15
NECC '84
Dayton Convention Center
Dayton, Ohio
The National Educational Computing Conference. Panels, tutorials, demonstrations, and exhibits on the use of computers in education.
Computer Science Department
University of Dayton
Dayton, OH 45469
513/229-3831

June 13-15
PC World Exposition
McCormick Place West
Chicago
An exposition and conferences on IBM PC hardware, software, and compatibles.
Mitch Hall Associates
P.O. Box 860
Westwood, MA 02090
617/329-7466

June 14-17
International Computer Show
Cologne, West Germany
A computer show featuring personal computers for business, home, and leisure.
Messe- und Ausstellungs-
Ges.m.b.H.Koln
Messeplatz
Postfach 210760
D-5000 Koln 21 (Deutz)
Telephone: (0221) 821-1
Telex: 8873426 muad

June 21-23
Great Southern Computer Show/
Jacksonville
Veterans Memorial Coliseum
Jacksonville, Florida
An exhibition, workshops, and seminars pertaining to computer hardware, software, and peripherals.
Great Southern Computer Show
P.O. Box 655
Jacksonville, FL 32201
904/356-1044

June 26-28
PCExpo
New York Coliseum
New York
A trade show dedicated to the IBM PC and compatibles. Exhibitors are manufacturers, original software producers, and principal service vendors. Attendees include third-party resellers, consultants, dealers, corporate volume buyers, and MIS and EDP managers. Exposition and daily seminars.
PCExpo
333 Sylvan Ave.
Englewood Cliffs, NJ 07632
201/569-8542

(continues)

World Events

July 9-12
National Computer Conference (NCC '84)
Las Vegas Convention Center
Las Vegas
A general computer show with 370,000 square feet of exhibits, 90 technical sessions, and 25 professional development seminars. This year's theme is "Enhancing Creativity."
AFIPS
1899 Preston White Dr.
Reston, VA 22091
703/620-8900

July 19-21
Syntopican XII
McCormick Place
Chicago
An office automation and information systems conference and exposition sponsored by the Association of Information Systems Professionals.
Prestige Expositions, Inc.
P.O. Box 424
Hohokus, NJ 07423
201/444-0505

July 23-27
SIGGRAPH '84
Minneapolis Auditorium and Convention Hall
Minneapolis
A conference on computer graphics and interactive techniques. The 11th Annual SIGGRAPH '84 includes a technical program, panel sessions, an exhibition, computer graphics courses, films, videos, and an art show.
SIGGRAPH '84 Conference Office
111 East Wacker Dr.
Chicago, IL 60601
312/644-6610
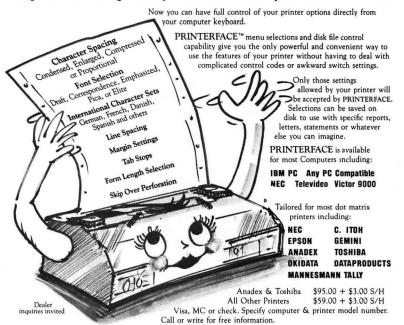
August 1-3

The Computer: Extension of the Human Mind

University of Oregon College of Education

Eugene, Oregon

The third annual computer and instructional technologies conference sponsored by the Center for Advanced Technology in Education. The conference will focus on school- and district-level use of computers.

Summer Conference Office
College of Education
University of Oregon
Eugene, Oregon 97403
503/686-3460

August 2-4

Great Southern Computer Show/ Charlotte

Charlotte Civic Center

Charlotte, North Carolina

An exhibition, workshops, and seminars pertaining to computer hardware, software, and peripherals.

Great Southern Computer Show
P.O. Box 655
Jacksonville, FL 32201
904/356-1044

Are you sponsoring an event for the computing community? Please let us know. Send details as far in advance as possible to World Events, PC World, 555 De Haro St., San Francisco, CA 94107, CompuServe 74055,412, Source STE908. ⬤

INTRODUCING YOUR NEW NIGHT SHIFT.

BiComM-3700 lets your personal computer communicate with a mainframe even when you're asleep. Telephone costs are lower. Mainframe time is cheaper. And how many people are anxious to use your computer at 2:00 AM?

REMOTE JOB ENTRY

The BiComM-3700 communications package emulates the popular 2780/3780 series of RJE stations, with many added features. You can prepare a simple command file to direct it's operation when no one is around. Of course you can also transfer files in an interactive, menu-driven mode day or night.

BISYNC communication for DEC Rainbow, SIRIUS/Victor, Hyperion and most MSDOS computers. Available now at list prices starting at $450.

REST ASSURED

You'll be able to sleep soundly because BiComM-3700 uses the BISYNC communications protocol—tried, tested and proven effective for over fifteen years. It contains powerful error detection features to insure that your data arrives safely and securely, writing a complete time-stamped record of everything it does.

FAST–FAST–FAST

Your new night shift works faster than others because it can communicate at speeds up to 19,200 baud, and up to 9600 baud over dial-up, voice grade telephone lines using standard modems. That means no extra costs are incurred for specially treated lines. When you arrive the next morning you'll already have a big head start on the day's activities.

Dealer inquiries invited.
Packaged Solutions, Inc.
One Huntington Quadrangle,
Suite 2C10, Melville,
New York 11747, USA.
Phone: (516) 752-1640,
TELEX 968856.

BiComM-3700

Put your night shift to work for you tonight!

Packaged Solutions
INCORPORATED
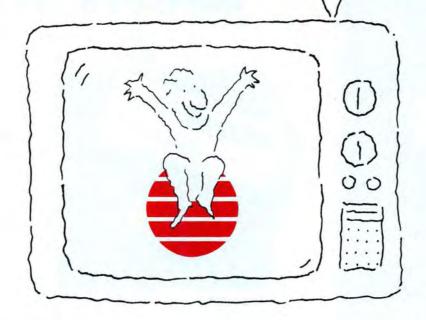
The BiComM-3700 was developed by Wilmot Systems Inc.

317

Announcing an exciting new 30-minute weekly television series starting May 6 ...

"Window on PC World"

Presenting an inside look at the world of the IBM Personal Computer and compatibles—latest applications, software, hardware, hands-on reviews, and much more...

Get a behind-the-scenes look at *PC World* magazine and the entire personal computer industry.

Programming Guide
National: Sundays, 2:00 P.M., SPN Cable (Eastern time)
Wednesdays, 11:00 P.M., SPN Cable (Eastern time)
Boston: Saturdays, 7:30 A.M., WQTV-TV Ch. 68
New York: Sundays, 1:30 P.M., WNYE-TV Ch. 25
Northern California: Wednesdays, 7:30 P.M., KSTS-TV Ch. 48
Southern California: Saturdays, 7:00 A.M., KDOC-TV Ch. 56
Hawaii: Saturdays, 9:00 A.M., KSHO-TV Ch. 26

For further details contact:
Window on PC World
555 De Haro Street
San Francisco, CA 94107
415/861-3861

Lucille Le Sueur made a name for herself.

She called herself Joan Crawford. Because a star needs a star's name. One that commands attention. And gets it.

MultiMate International is that kind of a name. Replacing Softword Systems. A good name too, but one that no longer suits the company we've become.

Today, MultiMate International spans four continents. MultiMate, the word processor that redefined the IBM PC, has been translated into five languages. Its similarity to Wang has resulted in phenomenal growth, both in acceptance and sophistication, and fueled our own phenomenal growth as a company.

MultiMate International. It's the name we deserve. Because it's the name we've earned.

MultiMate
INTERNATIONAL

We've made a name for ourselves.

322

Circle 410 on reader service card

BUSINESS REPLY CARD
FIRST CLASS PERMIT NO. 15 MARTINSVILLE, NJ

POSTAGE WILL BE PAID BY ADDRESSEE

LIST Magazine
Subscription Department
P.O. Box 319
Martinsville Center
Martinsville, NJ 08836

FOR $4,000 YOU CAN BUY A STATE-OF-THE-ART EMPTY BOX.

FOR ANOTHER $18 YOU CAN PACK IT FULL OF "PROFIT ABILITY" ...WITH LIST MAGAZINE.

LIST: THE ONLY MAGAZINE DEDICATED TO HELPING YOUR PERSONAL COMPUTER GET DOWN TO BUSINESS.

LIST Magazine shows you how to load your personal computer with the most profitable software available. And how to make it work for you.

Like most aware business people today, you know that even the best computer hardware—without software—is simply an empty box.

LIST Magazine helps you pack a personal computer full of "profit ability."

SOFTWARE THAT PRODUCES HARD PROFITS

We give you what it takes to make computers more productive on the job. The hard facts you'll need...in straightforward, non-technical software reviews, insightful articles and detailed case histories. To facilitate your decision-making. Simplify financial planning. And help improve every facet of your business, from sales forecasting to word processing.

FREE BUSINESS SOFTWARE DIRECTORY

Our exclusive 1985 LIST Business Software Directory is yours free with a LIST Magazine subscription. This conveniently indexed volume gives you fingertip access to over 6,000 available business software packages. Pinpointing the single best program for your needs is easy.

Then refer to our monthly LIST Software Locator™ and regular issues for new releases and on-the-job software testing. Only LIST Magazine actually sits business people down to review new programs and accurately evaluate how they will perform in the "real world."

LIST Magazine helps you fill the $4,000 EMPTY BOX with profit-producing computer power. And, as our limited-time, RISK-FREE OFFER proves, that's no empty promise.

FOR FASTER SERVICE, CALL 1-800-852-5200 TODAY! (IN NJ CALL 1-800-442-1300).

PC World Directory

PC World Directory *is a comprehensive listing, by category, of products and services for the IBM PC, lookalikes, and compatibles. It provides rapid access to the burgeoning PC marketplace for both readers and advertisers.*

FORMAT: The standard format includes a product ID, a 300-character descriptive ad, and company name, address, and telephone number.

Advertisers may choose among categories already being used or may create their own. Display advertisers can cross-reference their current ad to the PC World Directory for increased exposure at low cost.

RATES: Listings are accepted for 3-time consecutive insertions at a rate of $420 ($140 per issue). We are now offering a 6x insertion, 15% discount contract for a total of $714 ($119 per issue). Listings must be prepaid (except for established display advertisers) upon submission of ad copy. Checks, money orders, VISA, and MasterCard are acceptable.

DEADLINE: For space reservation deadlines, contact a PC World Directory sales representative at 415/861-3861. Please send copy and prepayment to: PC World Directory, 555 De Haro Street, San Francisco, CA 94107.

Accessories
Computer Covers

Custom PC Covers & ...
Maximum protection for low price. Anti-static dust covers of sturdy, clear vinyl material. PC covers (2 pc) $15.95. Elegant, clear plexiglass printer stands: Lg. $34.95, Sm. $29.95. Add $5 for slot. Visa/MC or check OK. Add $1 per cover/$3 per stand s/h. Printer & other covers also available. Free catalog. *SGW Enterprises, Inc., 722-J Genevieve St. Dept. W401, Solana Beach, CA 92075, 619/755-8324*

Computer Cozies?
Beautiful, hand-made, quilted dustcovers. A classy alternative to vinyl. Vinyl can damage machines by retaining heat. These covers are anti-static & machine washable. Offered in six colors: gray, chocolate, cream, wine, navy, and rust. Prices from $20. Send for brochure. *Covers A Lot, P.O. Box 369, La Honda, CA 94020, 415/747-0352*

Furniture

Smart Desk/Cover-Ups
The Smart Set ergonomically designed wood-grain desk & printer cabinet. Fits most decor. Many features: closeable, several shelves, easy to use. Protects your equipment & hides the mess. Prices start at $119. Ultrasuede dust covers from $29.95. Visa/MC accepted. *The Furniture Byte, P.O. Box 1757, Longview, WA 98632, 800/426-5301, 206/423-7277*

Free Ergonomic Catalog
Ergonomic Home furniture designs from over 20 national manufacturers, some avail. for the 1st time. Furniture styled to fit into your home without turning it into an office. Ergonomic designs assure comfort & productivity while reducing fatigue. Compare our prices & order with Visa/MC. Never a s/h charge. 30 day unconditional guarantee. *Interior Design Systems, 3641-W St. Mary's Place NW, Washington, DC 20007, 800/638-2000, 202/333-7502*

Affordable PC Stand
Solid oak stand for your IBM PC. Keybd. fits under processor for more workspace. Protects keybd. from dust & spills. More reach for keybd. cord. Unique design allows stand to fit under base of processor w/easy access to keybd. Satisfaction gtd. Send check, $18 + $2 s/h for each unit. CA res. add sales tax. *Dee Enterprises, P.O. Box 534, Pleasanton, CA 94566, 415/846-0154*

Nonglare Screens

SDC Antiglare Screen
Reduces eyestrain by eliminating glare from reflected light & by increasing display contrast. Tough synthetic optical mesh in a sturdy aluminum frame. Custom sizes to fit most monitors. Installs in moments with velcro. IBM PC Screen, $39.95 postpaid. 30 day money back satisfaction guarantee. Visa/MC. *Capitol Sales Company, 13740-J2 Research Blvd., Austin, TX 78750, 800/531-5273, 512/250-8757*

Supplies

Touchdown™ Keytops
Full size keytops enlarge major control keys on IBM PC, PC/XT, & PC Portable; IBM 5291 Display Station, & PC compatibles: COMPAQ, Columbia 1600N, Corona, Eagle Spirit, Qubie & Key Tronics 5150. A "genuinely helpful" productivity tool (Jim Seymour: *Microbusiness*). $18.95. (U.S. add $2, intl. $3.50 s/h). Color: black or IBM grey. *Hooleon Company, Dept. WD— P.O.Box 201, Cornville, AZ 86325, 602/634-4507*

Computer Forms
Over 450 computer forms: checks, statements, invoices, tax forms, "no-perf" letterhead, envelopes, mailing labels, etc. Forms designed for Accounting Plus, BPI, CYMA, Continental, Great Plains, MBSI, Peachtree, State of the Art. 24 hour shpt. on non-imprinted stock, free shpt. on most forms. *Checks To Go, 8384 Hercules St., La Mesa, CA 92041, (NA) 800/854-2750, (CA) 800/552-8817, 619/460-4975*

DataBinder
NEW PRODUCT. Attractive, sturdy, vinyl-covered looseleaf binder for standard tractor-feed printout paper. Large-capacity 1½" rings are spaced to accommodate vertical or horizontal storage, fanfold or separate. Black, blue, brown, green & orange. $6 each + $2 shipping. Set of 5 colors, $28 postpaid. *Data-Bind, Inc., P.O. Box D, Margate, NJ 08402*

Computer Glow™
Computer Glow Care Kit restores that "like new" glow to your PC with cleaners specially formulated for computer surfaces. Care Kit contains Lint Free Wipers, Plastic Ink & Stain Remover, Anti-Static Cleaner & Polish, & Anti-Static Spray. Care Kits are shipped promptly from stock for only $19.95 + $2 shipping. Dealer inquiries invited. *Merritt Computer Products Inc., 2925 LBJ Frwy. #180, Dallas, TX 75234, 214/942-1142*

Computer Camps

Hockaday Computer Camp
Nationally acclaimed proven immersion format. Campers learn programming on IBM PCs, TI PCs, or TI 99/4As. One computer/one camper. Exciting field trips & guest speakers. Recreation includes 6-Flags, many sports, museums, shopping,

cook-outs. Three 2 wk. sessions, 6/10-7/20. CO-ED. Residents, ages 12-18. Day, ages 9-11. *The Hockaday School, 11600 Welch Rd., P.O. 299000, Dallas, TX 75229-9000, 214/363-6311*

Computer Repair

IBM Circuit Board
Repairs for PC, XT. An alternative source of professional circuit board and subassembly repair available through PC dealers. Lower prices and faster turnaround, utilizing Automatic Test Equipment (ATE), typically 5 days in-house. From keyboards to power supplies. Have your dealer contact: *Unitrace Incorporated, 3350 Scott Blvd. #20, Santa Clara, CA 95051, 408/727-7573*

DEC & PC/XT Repair
We repair DEC & IBM PC/XT computers, peripherals & disk drives. We offer a 5 day or emergency 1 day service along with a 120 day warranty & extremely low prices. We have been repairing computers for over 7 years. The next time you need repair try us! *Electronic Service Specialist, N92 W14612 Anthony Dr., Menomonee Falls, WI 53051, 414/255-4634*

Computers

The Leading Edge PC
This 16-bit IBM compatible unit provides 7 expansion slots, standard serial & parallel ports, monochrome controller & monitor. The 8088 processor runs at a clock rate of 7.16 MHz or 4.77 MHz via switch selection. MS-DOS, GW BASIC & the Leading Edge word processor come bundled with the system. *Leading Edge Products, 225 Turnpike St., Canton, MA 02021, 800/343-6833*

Consultants
California

dBASE II Consultants
dBASE II: Fixed Price Reports
● We send you a questionnaire.
● You describe your report needs.
● We give you a fixed price quote!
Specialists in order entry, repair tracking, mailing lists. Write or call: *David Jenkins & Associates, 1609 Bancroft Way, Berkeley, CA 94703, 415/644-2369*

National

City & County Govt.
MIS firm specializes in microcomputer: consulting, seminars, systems, dBASE II programming & training for: city manager, police, fire, court, clerk, finance, P & R, personnel, roads, purchasing, CD, word processing & others. Call or write: *IDS, Ron Jones, 1109 E. Carmen St., Tempe, AZ 85283, 602/838-3659*

New York/New Jersey

PC Telecommunications
Professional systems staff specializing in IBM PC communications and voice, data and telecommunications. Current consultant w/major corporations on Dimension 2000, Electronic Tandem Networks, and IBM PC/HOST networking. We are the people who can integrate the PC into voice/data networks. Call or write: *Howard Dean, Computer Systems Labs, 808 Shrewsbury Ave., Tinton Falls, NJ 07724, 201/842-5800*

Direct Mail

Bytes of Advice
1. Your offer should be unique; try to fill an existing need.
2. But don't assume what interests you, others will pay for; find out!
3. Segment and key every list; do thorough post-mail analysis.
4. Use mail order pros who have a track record and know PCs. *Gordon Saxe Associates, Direct Response Advertising, 42 E. 75th, New York, NY 10021, 212/570-9670, TLX: 1147609MCI*

Disk Conversion

disk/CONVERT/software
At last—a program that ends many 5" disk conversion problems. CONVERT runs on most MS-DOS machines. It reads, writes & formats disks for over 13 different CP/M systems & Epson with Valdocs. $99. MC/Visa accepted. Dealer inquiries invited. *Selfware, Inc., 3541 Chain Bridge Rd. 8A, Fairfax, VA 22030, 703/352-2977*

Disk Copy Service

Superior Disk Copying
Allenbach created the industry, and we've since been imitated— but never duplicated. Copies supplied on OEM quality Allenbach LIFETIME GUARANTEE diskettes, now available in a variety of colors. Virtually all formats & systems. Copy protection, serialization, downloading & packaging available. Rapid delivery on 100 to 1,000,000 copies. *Allenbach Industries, Inc., 2101 Las Palmas Dr., Carlsbad, CA 92008, 800/854-1515, (CA) 619/438-2258 collect*

Diskette Duplication
Complete high quality diskette copy service available in most formats, 3½", 5¼" & 8". Other services: diskette sales, protection, serialization, private label, labeling, packaging, shrink wrap, drop shipping, editorial, typeset & printing. 10 - 5,000,000+ copies. *Hoffman Computer Products, 1720 Flower Ave., Duarte, CA 91010, 213/303-1571*

Quality, Service, Speed
Quality duplication of your software on lifetime guaranteed diskettes using state-of-the-art equipment. We service virtually all formats & systems. Formatting, copy protection, serialization, & packaging available. Rapid turnaround & complete satisfaction guaranteed. *USLIFE Systems, 1380 River Bend Dr., Dallas, TX 75247, 214/637-1179*

A Decade of Service
Guaranteed fast turnaround for duplication and formatting on high quality OEM diskettes. Virtually all formats: IBM PC, Commodore, Apple + many more. Serialization, copy protection, custom packaging, shrink wrapping, drop shipping available. Personalized service is our specialty. *Computer Media Products, 5482 Complex St. #110, San Diego, CA 92123, 619/565-7802*

Disk Files
Commodities

Pork Bellies
Good at games? Dare play for real? Trade bellies futures! Each 1-cent move is worth $380! Use our price/vol/OI histories to find the truly lucrative, hidden patterns that millionaires won't reveal! Complete 1983 CME Bellies Data: Printout, $135; Diskette for IBM PC, $125. MC/Visa. *Comfax, Dept. W, P.O. Box 3523, Wichita, KS 67201*

Hardware

A1 Prices

Cost Plus 5%
HARDWARE AND SOFT-WARE at DEALER COST + 5%. BUSINESS ESTABLISHED 1975. Current Price List $3. *Gatlin Electronics, 102 Harbor Place, Brandon, MS 39042, 601/829-1845*

Add-On Boards

AST/Maynard/Quadram
AST MegaPlus (SC, 64K) $269. AST SixPack (SPC, 64K) $269. AST I/O Plus (SC) $114. Extra Parallel, 2nd serial or game, $35. MAYNARD Disk Controller $162. With PP add $43, SP add $63. QUADRAM Quadboard $269. Set of nine 64K, 200ns chips $55. Hayes Smartmodem 1200B, $435. *VLM Computer Electronics, 10 Park Pl., Morristown, NJ 07960, 201/267-3268*

No Slot Memory Upgrade
Let us install up to 256K RAM on your EXISTING SYSTEM BOARD using NO SLOTS. We improve your IBM PC so it can address the 64K RAM chips. 256K-$335 (expandable & warranteed). DO-IT-YOURSELF KITS, PC-KPC-$69.95. With assembled no slot PC Board, $99.95. 64K-RAMS ($5.85 ea). See *Just Announced.* Add-MEM, 22151 Redwood Rd., Castro Valley, CA 94546, 415/886-5443

256K Expandable Mem
64K-256K User Expandable (Socketed) Parity Memory, Precision Delay, Line Timing, Switch Selectable Start Address on 64K Boundaries anywhere in 1M Address Space, Hold-Down Bracket & Card Guide. 1 year warranty. Fully tested memory board, $98. RAM 64K increments, $52 ea. (9 64K chips, 200ns). Call for latest prices. *Ontrax, Inc., P.O. Box 368, Oakhurst, NJ 07755, 201/244-2302*

IEEE-488 Interface
Complete implementation of the IEEE-488 std. On-board firmware supports all data/command transfers & many special features. Our customers include HP, TEK, IBM, & major OEMs worldwide. Uses standard cables. Comprehensive documentation. See *Byte 2/84*, p. 334. $395. *Capital Equipment Corp., 10 Evergreen Ave., Burlington, MA 01803, 617/273-1818*

2 in 1 Dual Video Board
Single board combines IBM mono/color display adapters. High speed logics eliminate snow effect problem of IBM & other video boards. Relocatable I/O & memory (16K/64K optional) addresses. Interfaces to IBM mono-chrome/color/RGB/composite video monitors, light pen, TV (RF mod. req'd.) & parallel printer. List $545. *Venus Systems, 2038 Admiral Place, San Jose, CA 95133, 408/729-9221*

Voice I/O for IBM PC
Talk back to your PC! Expansion board takes voice input, stores on disk, gives high fidelity playback. Low data storage rate (1-2K/sec). Runs under PC-DOS. We provide device drivers & demo software. DIALOG/1 with voice I/O for $295, DIALOG/2 with phone interface $495, DIALOG/3 with 300B modem $595. Send for data sheets. *Dialogic Corp., 164 McKinley Ave., East Hanover, NJ 07036, 201/386-0202, 800/221-0393*

Compatibles

Battery Powered!
SHARP PC-5000 Commuter Computer 8-line by 80-column LCD display, 128K RAM, 128K bubble storage, MS-DOS 2.00 & BASIC in ROM, Perfect Writer & Comm. Ideal for the executive on the move & the engineer in the field. Weighs only 10 pounds. Disk drives, built-in printer/modem options! Prices start at $1695. *Excellonix, 7180 Woodrow Wilson Dr., Los Angeles, CA 90068, 213/650-5754*

Disk Drives

Disk Drives for PC
TM55-2, DS, 40T: $229
TM100-1, SS, 40T: $175
TM100-2, DS, 40T: $229
TM101-4, DS, 40T: $315
CDC 9409, DS,40T: $239
MAYNARD complete internal 10M Winchester hard drive system. From $969. Visa/MC/checks. *VLM Computer Electronics, 10 Park Pl., Morristown, NJ 07960, 201/267-3268*

Graphics Systems

Angel Workstation
High resolution color graphics workstation, 640 x 480, 16 colors from a palette of 4,096. Business presentation, CAD and 3-D software available. Create graphics interactively with mice and digitizers & display images using monitors, computer cameras, video projectors, frame grabbers, printers & plotters. *Media Cybernetics Inc., 36 Columbia Ave., Takoma Park, MD 20912, 301/270-0240*

Interactive Graphics
MATRIGRAPH provides 640 x 400 16 color or 4 color prioritized graphics. NEC7220 processor & ROM based subroutines give high performance from high level languages. Dual RS232C supports digitizers, plotters, etc. 4 channel resistive interface. Light pen input. Demo-disk included. List price: $1395. *Matrivision, Inc., 26 Beacon St., P.O. Box 377, Burlington, MA 01803, 617/272-7203*

Need a Solution?
We do one thing right ... Corporate Graphics! We provide installation, training & support for analytical/presentation graphics, 2-D & 3-D CAD. Authorized dealers for all major hardware & software items for PC graphics. Call for a professional demonstration & consultation. *On-The-Go Computer Company, 1210 St. Georges Ave., Avenel, NJ 07001, 201/636-3232*

Midas Color Card
2 board set which turns IBM family of computers into color graphics workstations. Provides full emulation of IBM color card. Designed for either XT, or PC with expansion chassis. Hardware graphics primitives including zoom, pan and scroll. Color palette of 4096. Printer and light pen support. Paint software. *Vectrix Corporation, 2606 Branchwood Drive, Greensboro, N.C. 27408, 919/288-0520*

Printers

A-10-20-P
30 cps letter quality printer. Parallel or serial interface. Qume's print 5 compatible. Cartridge ribbon tractor option for continuous forms as well as standard friction feed. *Leading Edge Products, 225 Turnpike St., Canton, MA 02021, 800/343-6833*

NEC Spinwriter Catalog
FREE CATALOG! Features the IBM PC compatibles 3550, 2050 and new NLQ PINWRITER. The Ziyad cutsheet feeder for all Spinwriters at $495. Catalog also illustrates all character sets (with alternate sets) available for the Spinwriter & identifies interchangeable Thimbles. Write or call: *WPPS Inc., One Industrial Way, Eatontown, NJ 07724, 201/389-1600*

PC Printer Switch
The Model 8310 switches the parallel output of the IBM PC between 2 printers, using reliable integrated circuits. The compact (6" x 4" x 1½") unit connects to the PC with a built-in cable and runs at least 1 year on a 9 volt battery (included). Only $75 including shipping. Dealer inquiries invited. *Felloe Corp., P.O. Box 604, South Plainfield, NJ 07080, 201/754-7441*

8510 BPI
120 cps IBM compatible dot matrix printer, 2K buffer, parallel interface, superscript—subscript, double strike, also Prowriter compatible, 9 by 9 matrix, 80 column. *Leading Edge Products, 225 Turnpike St., Canton, MA 02021, 800/343-6833*

RamDisk

RamDisk II
is a 180K RAMDISK & comes with a PRINT SPOOLER. Runs on IBM PC compatible systems, & WORKS EXACTLY LIKE ANOTHER DRIVE. Instantaneous loading of programs. NO hardware, NO commands, 100% software! Self-initializes at bootup. Searches ALL boards for memory. Only $59.95 for the ramdisk & our print spooler. *Rensin Communications, P.O. Box 414, College Park, MD 20740, 202/728-7955*

Storage Devices

Winchester Controller
Hard disk drive controller for IBM PC/XT (DOS 2.00). Plugs into any of 5 I/O slots. Fits following disk drives with ST-506 interface: 5M-2Hd, 306 cyl; 10M-4Hd, 306 cyl; 15M-6Hd, 306 cyl; 26M-8Hd, 375 cyl;

28M-5Hd, 644 cyl. One, $425; two, $395 ea. (special installation guide, shipping incl.). Shugart SA455 1/2H, $185. Dealers welcome. *Storage System Engineering Service, 3105 El Camino Real #206, Santa Clara, CA 95051, 408/554-0841*

Diskit 10 + 10R Subsystem
Combination 10M fixed Winchester plus 10M. Removable Cartridge for fast disk-to-disk backups. Compatible with MS-DOS backup & restore utilities with variable directory configuration per cartridge. Higher fixed capacities to 150M available. Excellent for XT backup using 10M removable cartridge only. *Systems Peripherals Consultants, 9747 Business Park Ave., San Diego, CA 92131, 619/693-8611*

Hard Disk Subsystems
Interphase has the most powerful disk controller & disk subsystems available for your IBM PC or PC compatible. You can have capacities ranging from 16 to 1600 megabytes, speeds 3-5 times the 5.25" Winchesters, & reliable removable media too—ideal for network fileservers or large DBM applications. *Interphase Corp., 2925 Merrell Rd., Dallas, TX 75229, 214/350-9000*

Insurance

Safeware
If your computer is important to you, insure it! SAFEWARE provides full replacement of hardware, media & purchased software. As little as $35 a year covers: fire, theft, power surges, earthquake, water damage, auto accident. Call 8 to 8 Mon. thru Sat. *Safeware, The Insurance Agency Inc., 2929 North High St., Columbus, OH 43202, 800/848-3469 (NAT), 614/262-0559 (OH).*

Leasing

PC*XT*COMPAQ Rental
Don't tie up cash! Attractive rates & flexible terms. Quick delivery anywhere in the U.S. All configurations available. A portion of your payment can apply to purchase. Lease terms of 1 month & up. Customized leases available to fit special budget requirements. Call or write for no obligation quote. *Computer Maintenance Management Corp., Attn: Leasing Division, 12800 Industrial Park Blvd., Minneapolis, MN 55441, 612/559-7096*

Mailing Lists

IBM PC Mailing Lists
100,000 IBM PC owners mailing list available now! We are the largest dealer of microcomputer owners' names, with over 600,000 total . . . many different brands. Plus 3700 stores lists, 2,600 computer clubs, educational lists, micro publications, & much more. Write or call for free catalog. *Irv Brechner, Targeted Marketing Inc., Box 453, Livingston, NJ 07039, 201/731-4382*

IBM PC Mailing List
A plethora* of sales leads . . . all IBM PC users . . . on either cheshire or pressure sensitive labels or magnetic tape. $90/1000. Also postcard packets. *plethora: more than 100,000. *Foothill Marketing, P.O. Box 595, Tujunga, CA 91402, 213/352-7543*

Publications

Advertising Tracking
Analysis of ad space, expenditures & market share in over 50 computer publications. Used by ad managers, publishers, space reps, media buyers. Call for complimentary newsletter. *Adscope, A Service of Adtrak, Inc., P.O. Box 226, Goldendale, WA 98620, 509/773-3703*

Online Business Info
150 business newsletters online, full-text, including 40 for the computer professional. Every word indexed in current/back issues. Issues online before print editions. Equiv. print value: $30,000/year. Low-cost service includes NewsFlash, unique electronic clipping service, plus UPI and PR Newswire. *NewsNet, 945 Haverford Rd., Bryn Mawr, PA 19010, 800/345-1301, 215/527-8030*

Computer "Yellow Pages"
A single source arranged like the Yellow Pages providing phone numbers & addresses of over 3300 companies affiliated with the computer industry nationwide. Arranged by product/service categories including hardware, software, consultants, retailers, distributors, furniture & supplies. Price $14.95. FREE LISTINGS avail. *CIM-G, 9371 Kramer Ave., Unit I, Westminster, CA 92683, 714/892-4468, ext. 7*

Is PC Novelty Gone?
Unleash your PC! PC at Work newsletter helps you to utilize all your computer's potential. With summaries & buying recommendations for the top office programs. Spreadsheet, filing, financial modelling, database, graphing & more. Busy users & managers—stay up to date. FREE information package. *Delicious Reviews, Dept. PC7, 916-9th Ave. S.W., Calgary, AB T2P 1L8, Canada, 403/233-0500*

Retailers
Ohio

Discount Software
Total access to all your microware needs. Personal, educational, business & entertainment software. Hardware & accessories too!
- Attractive Prices
- Toll-Free Ordering
- Prompt Shipping
- Free Catalog

Access Micro, 11306 Southland Rd., Forest Park, OH 45240, 800/543-1114. AK, HI, OH, 513/825-5803

Sales/Marketing

Authors
Convert your programs to cash. We are seeking innovative programs for the small business market. Our design & merchandising team is ready to transform your program into a successful software package & make it sell. We pay up front sign-on fees and competitive royalties. For details: *Micro Marketing Assoc., 3497 E. Livingston Ave. Ste. A, Columbus, OH 43227, 614/231-4956*

Software
Accounting

Accountants Software
Finally! A software source for the practicing accountant with programs designed especially for the professional practitioner. Depreciation, After-The-Fact Payroll, Form #1099 Generator, Account Analysis & Client Information System are just a few of many. Call or send for our complete catalog. *Omni Software Systems, Inc., 146 N. Broad St., Griffith, IN 46319, 219/924-3522*

Agricultural

Feed Blending Programs
MIXIT-2 ($595) finds least-cost rations for all animals. Hundreds of ingredients & 57 user-chosen nutrients. MIXIT-3 ($795) runs multiple rations. Each ration is stored on disk and summarized in a one-page output. PRICE-IT ($395) is a feed pricing and inventory program. Demo disks available. *Agricultural Software Consultants, 1706 Santa Fe, Dept. P, Kingsville, TX 78363, 512/595-1937*

Assemblers

Cross-Assemblers
Use your desktop computer as a development system with Avocet assemblers—the industry standard since 1980. Available for CP/M-80, CP/M-86, & PC-DOS/MS-DOS host systems, in most popular disk formats. Target chip families: 6805, 6809, 1802/05, 8048, 8051, 6502, 6800, NEC7500, F8, Z8, COP400, 8085, Z80. $200 to $500. *Avocet Systems, Inc., 804-W South State St., Dover, DE 19901, 800/448-8500, 302/734-0151*

Automated Data Entry

Bar Code
BEMIX™ software alone re-directs COM1 to the keyboard of an IBM PC for simultaneous input from ANY bar code reader or RS232 device. Use with *Lotus/VisiCalc/WordStar*/etc. Print your own bar code on Epson/C. Itoh/IBM/Okidata printers. Total bar code systems for assets/tape rentals/POS. BEMIX™ $150, BC PRINT PAK $350. *Digital Barcode Systems, 1401 D. North Kraemer Blvd., Anaheim, CA 92806, 714/630-2993, 714/630-8640*

Business Applications

LP88-Linear Programming
Solves problems with 255 constraints & 2255 variables. Fully menu-driven, spreadsheet style display, double-precision accuracy, Revised Simplex method start/restart options, primal & dual solutions, sensitivity analysis, report generator, storage of problems & bases, user's guide & examples. $88. *Eastern Software Products, 4804 Tarpon Lane, Alexandria, VA 22309, 703/360-6942*

Professional Time Acct.
Time Accountant is an essential timekeeping and management tool for professionals. Functions include billing preview, invoicing and reporting by individual, client, project and activity. Includes telephone support. Requires IBM PC, XT or compatible, 128K RAM, two 320K drives or 1 + hard disk. $495. *Time Accountant, 636 Waverley St., Palo Alto, CA 94301, 415/328-7877*

Linear Programming
MINI-MAX ($395) is saving a copper refiner in Ashland, IL, $10,000 a month. "It's extremely easy to use," says an investment counselor in Oakland, CA. See how linear programming can boost your profits. The demo disk ($30) includes a Beginner's Guide and 70-page manual with 7 examples from business & industry. *Agricultural Software Consultants, 1706 Santa Fe, Dept. P, Kingsville, TX 78363, 512/595-1937*

Venture Demo System
The VENTURE Financial Planning & Analysis System is rapidly becoming a popular business planning tool. Find out why for yourself. Order the VENTURE Demo System today. For $15 you will receive the VENTURE diskettes (full system with limited data entry), 2 sample models plus a comprehensive tutorial/training guide. *Weiss Associates, Inc., 127 Michael Dr., Red Bank, NJ 07701, 201/530-9260*

dINVOICER + PLUS
Menu-driven billing & accounts receivable management system. Produces Invoices, Aged Statements, Invoice Journals, Receipts Journals, Aged Customer Account Status, Packing Lists, etc. Available with modifiable source code for dBASE II users $129, or as a stand-alone RunTime™ package $199. Visa/MC. *dATAMAR SYSTEMS, 819 Gage Dr., San Diego, CA 92106, 619/223-0444*

The PriceBook
A multi-purpose system that can be used to generate invoices, purchase orders, quotations or any other business application that requires price extensions & totals calculated. Ideal for sales & insurance agents, estimators, subcontractors, buyers, billing personnel, et al. Price $99.95. Manual alone $15. *RJL Systems, 106 New Haven Ave., Milford, CT 06460, 203/878-0376*

Myte Myke™ Business Pkg
Commercial Grade-Integrated
*Business Acct: O/E P/O A/R S/A Inventory A/P G/L
*Mfg Ctrl: STD Cost, BOM, Oper Rtg, FCST-Sched, MRP, SFC, where used, MPP, Prod. Costing *JOB SHOP*
*ProTime: Time & billing, installation + ongoing support avail. CP/M, PC-DOS, MS-DOS, UNIX, others.
MDS Associates, P.O. Box 108, Orchard Park, NY 14127, 716/662-6621

$15 Demonstration
• Personnel/timecard	$98
• Accounting Bookkeeping	$98
• Home Budget	$45
• Real Estate	$49
• Advertising Analysis	$45
• Book/Magazine Reference	$49
• Name/Address Mailing	$49

Send for information: *McCullar Micro, 405 W. Collins, Denton, TX 76201, 817/455-2598*

Business/Home

Public Domain Software
Our Users Group library can help you get more from your PC or PCjr! Choose from these software packages:
• NEW PC or PCjr USER—3-disk starter set, $25.
• PC SIX-PAC—Six disks containing a wide variety of useful software, $49.
• SAMPLER DISK—One get-acquainted disk, $10.
Send in your order today (include $2 s/h). Catalog included. *Central California Users Group, P.O. Box 8140, Santa Cruz, CA 95061*

Tallymaster
Control business & home expenses with a better approach to spreadsheets. Totals by item & category; each category named; built-in sorts; easy to learn & use; clear documentation. Five Star rated by 80 Micro. Needs 128K PC, disk. Now only $99.95. Order toll-free. Visa/MC/COD/checks OK. *ProSoft, 7248 Bellaire Ave., No. Hollywood, CA 91605, 800/824-7888, oper. 577, 213/764-3131*

TexSolver-10
Turns your PC into a super-calculator! One-keystroke execution of over 50 functions, including trig, statistics, powers, etc. Uses a number "stack", the same as high-quality HP calculators. Combines the best features of a calculator & a PC. For ease-of-use, accuracy, & convenience. TexSolver-10 is an unbeatable value. $39.95. *Microtex, Box 111054, Carrollton, TX 75011, 214/980-9837*

Calculator

PC-Calculator
Transform your PC into an easy to use desktop calculator. Comes with such features as mathematical, trigonometric, financial &

statistical functions, Memory, Konstant, transaction & calculation printing, and a HELP facility. $39.95 + $2.50 shipping. NY add 7%. Check/COD. Dealers welcome. *Evergreen Software Products, Inc., 11 Robinwood Ct., Lancaster, NY 14086, 716/683-4603*

The Disk Calculator
A premium desk-top calculator. Features: 18 digit results; decimal selector; constant; running totals; subtotals, item numbering; date stamping; printing comments; recalling results; accumulating a series of results; chained calculations; power; percentages; future & present values; User's Guide. $39. *RJL Systems, 106 New Haven Ave., Milford, CT 06460, 203/878-0376*

Calendars

Calendar Plus
A time management system that displays activities in block calendar; prints calendar for selected range of activities, times, personnel or locations; prints calendar extracts in tabular lists; merges separately maintained calendars. Much more. PC-DOS/MS-DOS versions 128K, any printer. $300. *International Software Solutions, 3355 Lenox Rd. #750, Atlanta, GA 30326, 404/233-1519*

Communications

VT52/100/102 Emulator
PC100 turns your IBM PC (or compatible PC) into a DEC VT100/52 terminal. PC102 adds VT102/printer support and file transfer to PC100. PC102SV even supports 132 columns. We guarantee compatibility with all VT52/100 applications including EDT, KED, WORD11, and vi. Call or write for free brochure. From $89. *General Micro Systems, 7525 Mitchell Rd. #101, Minneapolis, MN 55344, 612/937-9194*

Direct.connect
Access other computers & data bases. Transfer files at 9600 bps without loss of data. Capture files to disk/printer. Accuracy of data ensured with Xmodem protocol. Designed for ease of use. 25 help screens. Programmable function keys. IBM PC/PC XT or compatible. $95, plus $5 shipping. *Direct.aid, Inc., P.O. Box 4420, Boulder, CO 80306, 303/442-8080*

IFT—Image File Xfer
IFT is Communications the way You want it, under Your Application's control! CALL IFT from any BASIC program on an IBM PC/XT with DOS 2.00 to up/download absolute file images. Intermix IFT CALL's & normal I/O. Hayes 1200B supported. Unattended Host Polling program included. $150 + $4 s/h. NJ add 6%. *Base 2 Systems, 376 Hollywood Ave. #202, Fairfield, NJ 07006*

2780/3780 Emulation
MicroGate & MicroGate II are integrated hardware/software products bringing bisync communications to the PC. MicroGate provides easy-to-use, stand alone 2780/3780 emulation. MicroGate II works with user programs by providing a callable bisync subsystem for custom application software. Qty. 1: $895. *Gateway Microsystems Inc., 9501 Capital of Texas Hwy. #105, Austin, TX 78759, 512/345-7791*

Compilers

C Compiler • Debugger
Working in support of the c-system's full C Compiler, the c-window provides source statement execution and breakpoints; variables may be displayed/altered using C expressions; displays source code as program is tested. A must for all C programmers. 128K, two floppy drives required. C Compiler $195, c-window $195. *c-systems, P.O. Box 3253, Fullerton, CA 92634, 714/637-5362*

C86-C for Professionals
"C" brings great power, control and conciseness to programming. C86 brings FULL UNIX syntax (portability), source to a rich library (gives you control), no royalties, PC-DOS & CP/M-86 support, and overlays. Hot-line support is solid. $395. Call your Dealer or CI. *Computer Innovations, Inc., 980 Shrewsbury Ave. #530, Tinton Falls, NJ 07724, 201/542-5920*

Construction

Bid Ref.
A Bid History Program for the IBM PC. Sorts past bid info by contractor or job. Generates instant data on dates, price ranges, average bids, sq. footage, price per sq. ft., no. of bids & more. An invaluable tool for keeping track of a competitor's and/or subcontractor's pricing. Only $79. AZ residents add 6% sales tax. *Contractor's Software, 2050 W. Elm St., Phoenix, AZ 85015*

Conversion Utilities

Micro/VERSAL™
Utilities package to read & write 20 + CP/M formats plus DUMP utility, file append, user definable formats & sector by sector retrieval—$79. COED™ full screen editor has MACRO commands, definable keys, multiple files, more! $34. Runs on IBM PC or Z-100 (PC-DOS/Z-DOS). Check/MC/Visa. Call/Write. *Advanced Software Technologies, 417 Broad St., Bloomfield, NJ 07003, 201/783-7298*

Corporate Skills

Participative Mgmt.
Participative Mgmt. Skills (PMS) stresses leadership & group activity, two behavioral areas that increase the productivity of decision making. It reduces conflicts by generating cooperation, improves interpersonal relationships within groups, & creates an environment for improved personal & organizational satisfaction. *Concourse Corp., 2626 East 82nd St., Minneapolis, MN 55420, 612/854-8848*

Cryptography

Crypt Master
Stop locking up your disks! The most secure cryptographic system known, the RSA public-key system, is now available for the IBM PC. Crypt Master encrypts confidential disk files for the ultimate in data security. Ensure the privacy of your electronic mail. (See display ad this issue.) *Digital Signature, 5453 S. Woodlawn, Chicago, IL 60615, 312/324-6533*

Culinary Arts

"Compu-Chef"
A complete Culinary Guide for the IBM PC. Create a personal Recipe Library, Directory of Foods, perform Food Cost & Portion Comparisons. COMPU-CHEF has over 90 Continental Recipes, Culinary Terms, a Calorie Guide, Herbs & Spices, & more. Home & restaurant use. Req. 128K, DOS, double-sided dd. Special intro., $24.95. Distributors invited. *DeAmicis Software Development, 4193 Galbar St., Oceanside, CA 92056, 619/758-4766*

Custom

Sanyo MBC 550 Programs
Also IBM PC custom programming. Why pay hundreds of dollars for published software that will not meet your individual needs? We will design to your requirements, custom/semicustom programs for the same cost as similar published software. Satisfaction Guaranteed before you pay. Business, Engineering, & Scientific Programs. *Potomac Pacific Engineering Inc., P.O. Box 2027, Gaithersburg, MD 20879, 301/869-6997, 8 a.m. to 4 p.m., EST*

Data Management

Instant Recall
Store 10K records, 30 fields. Each record has a history. When a client calls you have instant recall on what you talked about last. The number of histories and length of each is only limited by disk space. Each contact is automatically dated. Reports, sorting, etc. Perfect for doctors, lawyers, sales. $150. *Intelligent Systems Inc., 490 Hickory Nut Ave., Oldsmar, FL 33557, 813/785-0378*

Nutshell Info Manager
Powerful, flexible data management system published by Leading Edge. As easy to use as file managers, but with functionality far surpassing them. Automatic indexing on every word in up to 2 billion records! Multi-level sorts & finds. Flexible reporting in many formats with automatic calculations & color. $495. *Leading Edge Products, 55 Providence Hwy., Norwood, MA 02062, 800/423-0300, 617/769-8770*

DBMS—Easy to Use
Rescue™ DBMS is the quickest to learn, easiest to use DBMS for the PC & compatibles. Menu-driven; on-screen, free-form; forms/report generation; 8 calculation levels, 10 password protection levels by item or file; fast sort. Plain-English tutorial & extensive help screens. Hard disk compatible. *Key Software, Inc., 2350 E. Devon Ave. #138, Des Plaines, IL 60018, 800/323-6556*

Data Security

PROTEC
A sophisticated data security program that protects the hard disk on an IBM PC/XT and COMPAQ. Provides three levels of protection: (1) Only authorized users can access the hard disk. (2) Users are segregated from each other. (3) Optional encryption allows floppies to be secured. Makes hard disk menu-driven. *Sophco, Inc., P.O. Box 7430, Boulder, CO 80306, 303/444-1542*

Development

Active Trace
A debugging & learning tool that lets you see how your BASIC program works. As program runs, Active Trace shows variables & their current value & line number. Output to screen printer or disk. No need to single step. Complete XREF mapping, review in *Byte* 4/83, p. 334, & *Microcomputing* 12/83, p. 22. $79.95. For info/ordering: *Awareco, P.O. Box 695, Gualala, CA 95445, 707/884-4019*

Dictionary

¢heapware
WORD LIST: Almost 27,000 words from 3 to 15 letters consisting of all but proper nouns, hyphenated words & words w/embedded foreign characters. Words are stored in random format supplied on a DSDD diskette. A utility to add, delete or change an entry as well as a display function are included. $14.95. MO res. add 5 5/8% tax. *Robert L. Nicolai, 4038 N. 9th St., St. Louis, MO 63147*

Edit

KEDIT
KEDIT is an XEDIT-like full screen editor for the PC. Split-screen editing of multiple files, targets, ARBCHAR, SCHANGE, GETFILE, SORT, wordwrap, paragraph reformatting, block operations, key redefinition. Requires 80 column display, 128K (160K with DOS 2.00). $95 + $3 shipping. Demo version $10. See our display ad. *Mansfield Software Group, Box 532, Storrs, CT 06268, 203/429-8402*

Educational

Hebrew Scribe
Type Hebrew with your IBM PC or XT. Makes Hebrew school homework more fun. Satisfaction guaranteed or your money back. Makes a great gift! Requires color/graphics adapter. (For optional hard-copy, included screendump requires Epson printer.) Call, ask for Gary Rosen. To order send $29.95: *Gamma Productions, 817 10th St. #102, Santa Monica, CA 90403, 213/451-9507*

Tutorial Set
Creative graphics combined with unique interactive lessons on DOS commands and concepts, keyboard operations, and EDLIN, make this training the most effective, enjoyable way to learn IBM PC and XT operations. Teaches DOS 1.10 and 2.00. Requires 64K, DOS, monochrome or color display, 1 diskette drive. $94.95. *Individual Software, Inc., 1163-I Chess Dr., Foster City, CA 94404, 415/341-6116*

The Instructor
A self-paced tutorial program that teaches first-time users how to interact with the PC. Designed to be the first serious software run by new users of all ages. Uses graphics, sound and color to create friendly interaction. See your local retailer. $44.95. *Individual Software, Inc., 1163-I Chess Dr., Foster City, CA 94404, 415/341-6116*

Professor DOS
Interactive, self-paced tutorial program designed to teach new PC users important PC concepts, including DOS. Simulates DOS operations, allowing you to freely experiment. Uses graphic images, sound, animation and color to help you learn smarter, faster, easier. Available at fine dealers. $59.95. *Individual Software, Inc., 1163-I Chess Dr., Foster City, CA 94404, 415/341-6116*

PC/Pilot
Language for education and training. By MicroPi, the source of PILOT on the other major personal computers. Meets Common PILOT standard. Extensions for color, graphics, user fonts, windows, files and video disk/tape control. Includes EZ editor. Lic: $100 single, $550 multiple. *Washington Computer Services, 3028 Silvern Lane, Bellingham, WA 98226, 206/734-8248*

Imagine a Help Key
PC PROMPTER provides help for IBM DOS & BASIC. Menus help find answers fast.
● Detailed explanations & examples
● Create your own help files
● Runs on IBM Personal Computers.
Price $49.95. Chks/MO/Visa/MC. *Prompter Software Corp., P.O. Box 1242, Los Altos, CA 94022, 415/948-5321*

The Research Assistant
Easy-to-use literature filing system for PC or XT. Stores bibliographic data, user-defined subject/keyword headings & an abstract for every item. Rapid search on any word or phrase in ref or abstract. Sorts, merges & copies library files. Prints book lists & annotations. Req's 64K, two 320K dd. $40. U.S. *Smart Microsystems, #8—13322 102A Ave., Surrey, B.C. V3T 5J7 Canada, 604/585-1629*

Engineering

Structural Design
Quick, versatile, interactive structural programs—beams, columns & frames of any material efficiently analyzed & designed. Extremely friendly input/output with COLOR graphics options. Specify PC configuration and send $25 for demonstration disk to: *c²b² - software design, 763 27th Ave., San Francisco, CA 94121, 415/751-1337*

Chemical/Mechanical Eng.
PIPEDP: Gas/liquid pipe pressure drop, $40. PIPEQ: insulated pipe heat loss, $40. TANKQ: rigorous storage tank heat loss, $79. FLARE: radiation from hydrocarbon flare. STEAM: steam line pressure drop, flashing, $40. PIPELINE: gas pipeline design. More...Visa/MC. Send for catalog. *Techdata, 6615 La Mora, Houston, TX 77083, 713/498-0797*

Selectra
Mechanical power transmission components are selected by the IBM PC for Shafting, V-Belt & Chain Drives. No more graphs, tables, interpolations or formulas. Fast, accurate & easy to use. Satisfaction guaranteed or $295 package price is refunded. *National Planning & Consulting Corp., P.O. Box 140489, Coral Gables, FL 33114-0489, 800/222-1377 (10 a.m. to 7 p.m. EST), 305/442-1133, FL (9 a.m. to 5 p.m. EST)*

Hydrasel
Centrifugal & Rotary pump & piping hydraulics. Control valve sizing coefficients. Liquid volumes of complex vessels. Programs for the IBM PC & compatibles. Fast, accurate & easy to use. Satisfaction guaranteed or $295 package price is refunded. *National Planning & Consulting Corp., P.O. Box 140489, Coral Gables, FL 33114-0489, 800/222-1377 (10 a.m. to 7 p.m. EST), 305/442-1133, FL (9 a.m. to 5 p.m. EST)*

Financial

The Financial Counselor™
A comprehensive personal financial planning data base program developed by a Certified Public Accountant & Financial Planner. Includes Income, Net Worth & Budget Statements; Investment, Insurance, Tax, Retirement & Estate Planning Worksheets; Personal Accounting Journals; Financial Planning Instruction, Advice, Glossary & Bibliography. *Financial Counseling Programs, Inc., 2049 Century Park E. #3050, Los Angeles, CA 90067, 213/556-2053*

IRA Money Maker
How to Get the Dollars Growing in Your IRA. Opportunity for More Retirement Income easily explained. You learn about interest rates, mutual funds and Your IRA. What was once known only to a few can now be Yours. IRA Money Maker, ONLY $29.95. IBM PC, 64K. Specify Color or B/W, 320K DSDD, Printer. *Knowledge Reach Associates, Inc., P.O. Box 3407, New York, NY 10185, 212/942-4692*

Financial Analyzer
A corporate financial analysis system of linked Multiplan templates used for developing & analyzing financial forecasts. Develops pro-forma financials & other analytical reports including business valuation. Forecasts may be annual, quarterly or monthly. Dealer inquiries invited. *Financial Template Systems, 5295 Plum Tree, Irvine, CA 92715, 714/786-5717*

Money Maestro
A financial record-keeping package that provides budget tracking & tax reporting. MONEY MAESTRO reports totals by category or payee, including monthly & year-to-date budgeted vs. actuals. Data files are stored in BASIC sequential format. MONEY MAESTRO requires 64K, DOS. *Innosys, Inc., 2150 Shattuck Ave. #601, Berkeley, CA 94704, 415/843-8122*

Games

Reno Casino I
Reno rules, vivid color graphics emulate casino action. 21 has variable speed, up to 7 begin. to adv. players, $2 to $500 table limit. 3 modes include tutoring & autoplay. Realistic 5-card draw poker machine & bonus random art program incl. 64K, DOS 1.00 or 2.00, 1dd. Only $29.95 (CA Res. add 6% tax). *KEN-COMP, 1833 Humboldt Ave., Davis, CA 95616, 916/753-0564*

Strategy Pro Baseball
You are the coach! This realistic game uses actual statistics of real players. Setup the lineup, bunt, steal, put in pinch hitters & relief pitchers as they fatigue. Uses monochrome or color adp., 1dd, 64K, DOS. $39.95. *Strategraphic Software, Contract Sta. #22, 9297 Federal Blvd., Box 389, Denver, CO 80221*

Blackjack Analysis

Tell the computer exactly how you play. Split, double, ins., stick. Then let it play 20,000 hands an hr. for you. Automatically varies bet depending on card counting technique you use. Allows interactive play w/help key. Uses 1-6 decks, really shuffles. 1-2 players. After play is completed, one page report is produced w/game stats. $50. *Intelligent Systems Inc., 490 Hickory Nut Ave., Oldsmar, FL 33557, 813/785-0378*

Genealogy

Family Reunion

Keeps track of living relatives as well as genealogical data. Produces address labels, birthday lists, pedigree charts, family group sheets and more. Includes User's Manual & Sample Data Disk. Price $99.95. Requires PC-DOS, 2 drives, 64K and PC printer capabilities. Visa/MC/COD/Dealers. Add $2.50 s/h. *Personal Software Company, P.O. Box 776, Salt Lake City, UT 84110, 801/943-6908*

Graphics

Grafmatic: Fortran/Pascal

4 packs in 1! Other sources have text/graphics; pixels/line/paints but GRAFMATIC follows thru w/2D interactive, 2D plots (contour too!), 3D plots & solid models (hidden line removal for realism). 100 pg. manual makes it easy! $135. For text/graphics only, try GRAFMATIC JR. $50. Call for a personal response. *Microcompatibles, 11443 Oak Leaf Dr. Dept.W, Silver Spring, MD 20901, 301/593-0683*

PC-Title/PC-Projector

See *PC* mag's (Dec., pg. 619) review of this useful tool for creating full color professional text for slides, screen displays & fliers. Add complete graphics with PC-crayon. PC, PCjr, XT & COMPAQ compatible. PC-Title/PC-Projector-$49.95. PC-crayon-$44.95. Mention this ad & get all 3 for $79.95. Visa/MC. *PC Resources, Inc., 620 Hobart Terrace, Santa Clara, CA 95051, 408/243-4169*

Halo

The most powerful library of graphics subroutines under MS-DOS. Extensive functions include point, line, pie, arc, circle, ellipse, hatch styles, pattern fills, clipping, dithering, world coordinates, image compression, multiple viewports, rubberband mode, etc. Compatible with multiple devices & languages. *Media Cybernetics, Inc., 36 Columbia Ave., Takoma Park, MD 20912, 301/270-0240*

G: Graphics Editor

Fast, Versatile, Easy to Use. Single key commands. Draw w/cursor: Change speed, pen width. G does lines, shapes, text, more! Create elaborate color patterns. Move, copy, mirror, flip images. Load pictures into own programs. Perfect for Artists, Programmers, Designers, Educators. Runs in 128K. $95. *Micro Marketing Associates, 3497 E. Livingston Ave., Ste. A, Columbus, OH 43227, 614/231-4956*

G-PRINT™

Now! Print your graphics screens on your Okidata 84, 92, 93, Star Gemini or Epson printers. G-Print is written in assembler and stays resident in your computer's memory. G-Print lets you print graphics in normal or compliment mode using one simple key stroke. G-Print is available for IBM PC & compatibles. $59.95 prepaid or Visa/MC. *Pen & Ink Software, Ltd., P.O. Box 13316, Research Triangle Park, NC 27709, 919/549-0600*

Plotmatic

Pen Plotter Graphics Tools
- Pen/Text, control/color
- Complete 2D support
- Interfaces with GRAFMATIC
- Clear & careful documentation
- Languages: FORTRAN, Pascal, COBOL, BASIC.

Specify compiler & plotter: H-P, Apple, IBM, Houston Instruments. $135. PLOTMATIC by Microcompatibles. *Microcompatibles, 11443 Oakleaf Dr. Dept. W, Silver Spring, MD 20901, 301/593-0683*

Printer Graphics

Utilize the graphics capabilities of your letter quality printer to produce presentation quality bar graphs or pie charts. So easy to learn & operate that anyone can quickly generate perfect graphs or charts in a few minutes. Bar graph or pie chart programs for CP/M or DOS 2.00. Only $75 each. *Cedar Lakes Software, 9235 East Harry, Wichita, KS 67207, 316/682-3168*

CAD Software

It's brilliant, fun to use, cost effective, and increases productivity! Over 100 packages on the market. Want to know more about CAD software? When you call or write us, you will receive expert advice, excellent prices and most important ... Professional Support! *Brighter Images, 1042 Country Club Dr., Moraga, CA 94556, 415/376-6002*

Home Use

Recipe Chef/PC

Bring the chef of the house into the computer age. Find favorite recipes fast! Pro system to create & maintain an automated recipe library. Features full-screen presentations, files/retrieves across 46 categories. Print for grocer/kitchen. Track wines! Impress guests! Index cookbooks. 64K (96K DOS 2.00). $45, chk/MO. *Recipe Chef, P.O. Box 7547, Flushing, NY 11352, 212/539-6580*

Info Retrieval

dBASE II Inventories

Operates on IBM PC or XT with dBASE II (2.4) or RunTime™, $100. DISKETTE INVENTORY, $24.95—searches by diskname, filename, ext., date, all like db*. RECORD & TAPE INVENTORY, $24.95—searches by name, song, performer. LITERARY REFERENCE INVENTORY, $49.95—searches by title, author, source or mult. key phrases in abstract. *Feller Associates, 550 CR PPA, Rt. 3, Ishpeming, MI 49849, 906/486-6024*

Insurance

The Agency Manager™

Designed by insurance professionals for independent insurance agents, this integrated system performs Complete Customer Acctg., General Ledger, Client Data update & retrieval (# files depends on your storage), Over 100 Marketing Reports & Sales Tools, ACORD's. Easy main menu & HELP feature. IVANS. IBM XT, CP/M, Turbodos. *Applied Systems, Pauling Rd., Monee, IL 60449, 312/534-5575*

Inventory Control

Mr. QuarterMaster

Features: receipts & issues updating; inventory, reorder & usage reports; screen display of stock item(s); price quotes, purchase orders & invoices; reorder points adjusted automatically & file maintenance to add, change & delete stock items. List Price: $120. Manual alone: $15. Free brochure. *RJL Systems, 106 New Haven Ave., Milford, CT 06460, 203/878-0376*

Investments

Chartmaster

Investors track Commodity/Stock investments quickly & easily. HI-LO-CLOSE BAR; 5 different moving averages; point-and-figure & spread charts. Data entry via modem or keyboard. Store up to 60 price series on one data diskette; PC/XT up to 240. Working demo with manual, $50; rental version, $95; basic system, $400. *Professional Farm Software, 219 Parkade, Cedar Falls, IA 50613, 800/553-2910 (Nat'l.), 800/772-2106 (IA) or 319/277-1278*

net worth™

FREE sample reports & descriptive brochure will let you decide for yourself how this comprehensive program will help you keep abreast of your assets & investments as well as your liabilities. Security tracking & graphics capability are also among its many features. For the IBM PC/XT. Runs on 64K or 128K. Demo also available. $295. *Bullish Investment Software, P.O. Box 853, Mansfield, TX 76063, 800/433-3605, (TX) 817/473-9249*

Languages

FORTH-32
Use up to one megabyte of memory for programming and data! *Complete Development System* includes a Symbolic Debugger, Structured Decompiler, Full 8088 Assembler, Editors, Graphics. Our 480 page manual is the best! $195. Fully compatible software and 8087 Floating Point Extensions. $95. Call today. *Quest Research, Inc., 303 Williams Ave., Huntsville, AL 35801, 800/558-8088, 205/533-9405 (AL)*

BI-280/BI-286
BASIC interpreter that runs programs written in BASIC Four Corporation's Business BASIC II, a popular language used extensively at the minicomputer level. Built-in ISAM manager gives fast, keyed access to data files. *Control-C Software, Inc., 6441 SW Canyon Court, Portland, OR 97221, 503/297-7153*

BASIC Translator
Program Development Made Simple. $CALL subprograms from our rich Demo Library or create your own in minutes. Parameter driven, 3 program set provides: Compiler, Interpreter and Printer support
- Logic Mapping   • Code Reduction
- Variable List   • Linker Modules
- Meta Com'ds   • $39, $59 & $79

FREE Brochure *Personal Software Associates, Inc., Drawer 206-PCW, Donegal, PA 15628, 412/423-3200*

Legal

LawSearch
Communicate with the WEST-LAW[sm] legal data base using an IBM PC/PC XT or compatible. Fully certified by West. Automatic logon with one keystroke. Utilizes West's highlighting scheme. Saves information to disk or printer. Forward & reverse pagination on saved information. $350, plus $5 shipping. *Direct.aid, Inc., P.O. Box 4420, Boulder, CO 80306, 303/442-8080*

Due Process
Cash control and time management for attorneys. Complete accounts receivable, trust accounting, consolidated or single statements in 18 possible formats, and 12 management reports. Also, includes appointment book with time conflict reporting, a word processor, and utilities for file maintenance. *American Software Application Programs, 100 E. Thousand Oaks Blvd. #270, Thousand Oaks, CA 91360, 805/496-5329*

Manufacturing

Twin Oaks MRP-II
- Bills/Material   • 22 Modules
- Inv Control   • 128K PC or XT
- Purchasing   • DOS 1.10, 2.00
- MRP & CRP   • Hard/Soft Disk
- Master Sched'g   • Online-Real Time
- Phys Inventory   • Multi User
- Std Costing   • Acctg Interface

Twin Oaks, 2650 Colfax N., Minneapolis, MN 55411, 612/588-2685

Helmsman's H-MRP
Mature & classic on-line, net change, MATERIAL REQUIREMENTS PLANNING. Modular, fast, simple, easy, flexible, and cost effective. Integrates with financial accounting. Runs on PC-DOS 2.00, 256K hard disk, stand-alone or networked. Includes H-BOMM, H-BUY, H-STORE, H-MAKE, H-PLAN. *Helmsman Systems, Inc., 1030 S. Winchester #205, San Jose, CA 95128, 408/246-8300*

Twin Oaks Churchmouse
- Bills/Material   • MRP-II
- Inv Control   Compatible
- Purchasing   • Online "Help"
- Shop Orders   • 256K PC or XT
- Capacity Plnng   • DOS 1.10, 2.00
- Std Costing   • 30 Day Trial
- Acctg Interface   • All for $1395

Twin Oaks, 2650 Colfax N., Minneapolis, MN 55411, 612/588-2685

Medical

Threshold
Medical office management software featuring automatic insurance preparation w/teleprocessing to Blue Shield & Medicare, unattended statement processing, total security w/audit trails, statistical information, complete inquiry & management reports & on-line help. List $5,500. *Physicians Practice Management, Inc., 1810 S. Lynhurst, Ste.Q, Indianapolis, IN 46241, 317/248-0357, 800/792-3525 (IN), 800/428-3515 (Nat)*

POS/1™ Version 4.0
Medical billing: Produces statements, ins. forms, aging, revenue analysis w/Bar Graphs. Multiple doctors, insurances. Day sheets, recall notices, referring doctors, audit trails. Online update, access by account#/name. Customizable procedure/diag. codes; menu-driven; help screens. DOS 128K. $2200. *Chen Information Systems, Inc., 1499 Bayshore Hwy. #205, Burlingame, CA 94010, 415/692-4358*

Menu System

MenuMaster
Create custom menus for IBM PC & XT applications quickly & easily. You love PC-DOS but do your users? MenuMaster supports complex job streams, run-time prompts, real-time clock display, hard disk, color, graphics & more. Menu system req. IBM PC, 64K, 1 disk. Menu editor (creates & modifies menus) req. 192K. Full system, $175. MC/Visa. *DecisionWare, P.O. Box 505, Moorestown, NJ 08057, 609/778-0799*

Multi-Tasking

Tascmaster Software
Multitasking IBM PC or PC XT. Operating under PC-DOS, allows up to 9 tasks to be run concurrently in background mode unattended. Can work in *WordStar*, do a calculation from *1-2-3*, monitor modem, data base sort & month-end closing from Accounting Program all at once. $475 including Addram Plus or Addram Elite multifunction board. *Profit Systems, Inc., P.O. Box 1039, Berkley, MI 48072, 313/559-0444*

Music

SongWright
Music Processor prints songs & professional lead sheets complete with lyrics & chord notations. Allows you to compose, save, edit, transpose & play your songs. Features two octave range, simple harmony, seven key signatures. Requires IBM or Epson graphics printer. Send $24.95 or write for brochure. *SongWright, 928 Fillmore St., Denver, CO 80206, 303/321-0481*

Operating Systems

Hard Disk Security
DATAGARD protects files on hard disks under DOS 2.00, based on identity & privileges of each user & directory. 13 control levels, 4 i.d. groupings allow selective sharing of data. Works for all standard DOS & application commands, all DOS interfaces. Log file, 2 levels of password, and more. *Village Information Co. Inc., 55 Christopher St., New York, NY 10014, 212/924-8314*

Psychological

Self-Help Therapy
For problems of stress, depressed feelings, relationship problems, even erection problems, the answer is as close as your PC. New interactive programs based on clinically proven therapy and developed by a renowned psychotherapist. Use at your convenience in the privacy of your computer. $89.95 each. *PSYCOMP™, 22055 Clarendon St., Woodland Hills, CA 91367, 818/992-4884*

Public Domain

Public Domain "Freeware"
Hundreds of games, utilities, & business programs aren't copyrighted, so are in the public domain. Copy them yourself & save! RENTALS: IBM PC SIG—99 Vols., $99.50. IBM PC BLUE—73 Vols., $99.50. Rental

is for 7 days after receipt, 3 days grace for return. Credit cards accepted. 50 5" flippy disks $100. *National Public Domain Library, 1062A Taylor St., Vista, CA 92083, 619/727-1015, 24 Hour Order. 619/941-0925, Customer Service.*

Public Domain Software

PUBLIC DOMAIN SOFTWARE for the IBM PC. Programs include financial & stock market analysis, word processing, communications, utilities, games & more. 100+ page Directory—$3.95 + $1 s/h. A set of 10 most popular disks is $59. Set of 100 disks—$595. (CA residents add sales tax). *PC Software Interest Group, 1556 Halford Ave. #130W, Santa Clara, CA 95051, 408/247-6303*

Real Estate

Real Estate Software

Programs available include Property Management, Loan Amortization, Depreciation/ACRS, Tax Deferred Exchange, Property Sales Analysis, Home Purchase, Loan Sales/Purchase, Income Property Analysis, APR Analysis, Construction Cost/Profit and Property Listings/comparables. Charge cards accepted. *Realty Software Co., 1926 S. Pacific Coast Hwy. #229, Redondo Beach, CA 90277, 213/372-9419*

Property Management

Software for owners of apartments, mini-storage, single family, condos, marinas, shopping centers and office complexes. Provides instant cash flow analysis, prints cash flow report, records expenditures on each unit, prints summary of operations report and accumulates cost for tax purposes. *Tomar Productions, P.O. Box 740871, Dallas, TX 75374, 214/750-1212*

Real Estate Analysis

REAL ANALYZER is 5 programs in 1; for income property & the residence. It will help you decide when to buy, refinance, sell or exchange any property by projecting cash flow & profitability before & after taxes … and more. Easy to use. Easy WHAT IF. $195. 30 day money back guarantee. Visa/MC OK. *Real-Comp Inc., P.O. Box 1263, Cupertino, CA 95015, 408/996-1160*

Investors/Syndicators

Let your computer calculate the right price. A complete analysis: cash flow, taxes, projections, & syndication feasibility. All values easily changed for risk analysis or structuring an offer. A powerful tool for making sound investments. $250. Manual & demo disk, $35. IBM PC & CP/M computers. *DRF, Inc., 3333-F Soquel Dr., Soquel, CA 95073, 408/475-4456*

EZ-RE Investor Template

Real Estate Investor Templates. Equity Share, Houses, Apartments, Warehouses, Office Buildings. Ten-year projection of cash flow, deduction, tax at sell, after tax IRR. Expenses, int, rent, and apprec adjustable annually. Mortgage types: ARM, FHA 245, amort, deferred int, int only. RNMI format. Requires LOTUS123. Money-back guarantee. $50 ppd. Visa, MC. *LB ASSOCIATES, 8817 Skokie Lane, Vienna, Va. 22180 703/938-9093*

Rental Management

Video Tape Library Mstr.

Complete pkg. for video tape rental stores. Controls tapes, VCRS, club members/non-members. Menu/interactive screens, acctng., online/interactive tape check—In/Out, tape & customer rental stats. Reports: Delq. tapes, mail labels, top 100 rentals, many tape & customer lists & more. *Applied Computer Techniques, 990 Atherton Dr. #106, Salt Lake City, UT 84123, 801/262-2800*

Scientific

muMATH-83™

Infinite precision rational arithmetic plus automatic formula manipulation. Includes exact integration, differentiation, limits, matrices, vector calcus, infinite series Laplace transforms & the solution of algebraic or differential equations: $300. Also muLISP: $250. *The Soft Warehouse, P.O. Box 11174, Honolulu, HI 96828*

Sort

Opt-Tech Sort/Merge

Extremely fast Sort/Merge program for the IBM PC. Can sort or merge multiple files containing fixed or variable length records. Run as a DOS command or call as a subroutine, plus many other features. Now also sorts dBASE II files! Compare before you buy any other. Write or call for more info. $99. *Opt-Tech Data Processing, P.O. Box 2167, Humble, TX 77347, 713/454-7428*

Stamp Collectors

Stamp Collectors

The Philatelic Management System is superior software for every level of collector. This powerful, easy-to-use package was professionally developed with over 40 programs specifically designed for philately. For IBM PC & Apple, only $295. Philately module $159. Demo disk $15, credited to final purchase. *Softstyle, Inc., 7192 Kalanianaole Hwy., Honolulu, HI 96825, 808/396-6368*

Statistics

SIGSTAT

SIGSTAT includes over 30 programs of the BMD statistical series, plus many advanced new features. Mainframe capacity (up to 80 var.) for uni- (e.g., ANOVA, regression) and multivariate (e.g., canonical, factor) analyses; time series, crosstab, plots and much more. 8087 support opt. 128K DOS, $325. *Significant Statistics, 3336 North Canyon Road, Provo, UT 84604, 801/377-4860*

Statistician's Mace

Easy-to-use program calculates descriptive stats, multiple regression, correlations, several ANOVAs, nonparametric tests, and other statistics used by scientists, business researchers, engineers. Accepts keyboard or disk file input. Requires 128K, PC-DOS or MS-DOS, 1 disk. Price $195. Evaluation version, $30. *Mace, Inc. 2313 Center Ave., Madison, WI 53704, 608/241-4566*

Instant Statistics

INSTAT: descriptive statistics & data screening ($85). INSTAT-R: full-featured multiple regression. Independent reviewer calls it "superlative" ($95). INSTAT-D: discrete data analysis with linear &

log-linear models ($250). SCS.DAT: data file management ($35). Write for free catalog. *Statistical Consulting Services, 517 East Lodge Dr., Tempe, AZ 85283, 602/838-7784*

Stock Market

Stock Portfolio Reporter

Provides up-to-the minute information on key parts of investor's stock account. Market price updates by DOW JONES; easy link to Hayes Smartmodem. Sort by P/E, gain/loss, yield or any item in SPR's 8 useful reports. Friendly menu displays & manual. Requires 128K, 2 dd. Demo disk avail. $279. Visa/MC welcome. *Micro Investment Systems, Inc., P.O. Box 8599, Atlanta, GA 30306, 404/892-3194*

The Stock Manager

A sophisticated system that offers you an easy & economical way to keep your investment portfolio current. Keeps over 25 items of information on over 400 stocks. Produces several reports including current value of the portfolio. Easy to follow menu. $150. Send or call for our complete catalog. *Omni Software Systems, Inc., 146 North Broad St., Griffith, IN 46319, 219/924-3522*

Systems

Multiuser PC-DOS

MultiLink turns PC-DOS into an efficient multi-user multi-tasking operating system. Additional users are supported by attaching inexpensive CRT terminals or modems to serial ports on the PC, and can run normal applications designed for PC-DOS. Includes host communications software for public dial-in. *Software Link, Inc., 6700 23-B Roswell Rd., Atlanta, GA 30328, 404/255-1254*

Tax

Tax 4-5-6
Template for *1-2-3*. Forms: 1040, A, B, C, D, E, G, R, RP, SE, W, 2106, 2441, 3468, 4562, 4797, 5695, 6251 + 1040ES & 2210 update. Entry to one form is autoposted to other forms. Printouts are IRS approved. Calcs all taxes in 6 secs & chks for errors. Use for planning or actual 1983 return. Sample return & instr. 256K req. $65. COD OK. *Austin Scientific, Inc., 1259 El Camino #260W, Menlo Park, CA 94025, 415/364-0240*

1040PLAN™
1983 tax planning & preparation software template for *1-2-3*. Other calc spreadsheets are too small & slow to run. Follows IRS forms by line number & includes: form 1040 & schedules A, B, C, D, E, G, W, SE & forms 2119, 2441, 3468, 6251. Up to four different alternatives can be computed at once. Req. 256K. $45. *1040PLAN, 1125 Sunnyhills Rd., Dept. PCW, Oakland, CA 94610, 800/227-1617, ext. 644. In CA 800/772-3545, ext 644*

Templates

1-2-3 Templates
Unique Application Templates Teaches Lotus Usage Thru Practical Applications
1. 1984 Fed Tax Calculator
2. Personal Acct. System
3. Personal Mailing System
$29.95 ea. 2 or more On One Disk $25 ea. Visa/MC. 30 Day Money Back Guarantee. *Easy-As ... Inc., 36 S. Charles St. #402, Baltimore, MD 21201, 301/539-5540*

Terminal Emulation

The Impersonator
An asynchronous communications tool with emulations for ADM-3A, VT-52/100, Hazeltine Esprit, IBM 3101, TeleVideo 912 & Teletype terminals. Custom-design additional emulations. Features Xmodem protocol, window support, ability to remember logon procedures. IBM PC/ PC XT. $195 + $5 shipping. *Direct.aid, Inc., P.O. Box 4420, Boulder, CO 80306, 303/442-8080*

Tools

Pascal and C TOOLS
TOOLS includes full string use, screen handling, graphics, and a general BIOS gate. TOOLS2 supports all DOS 2.00 functions, including program chaining. VIEW MANAGER screens are painted with a Screen Painter and stored in the Screen Database. Source code is provided. TOOLS $125, TOOLS2 $100, VIEW MANAGER $275. *Blaise Computing Inc., 1609 Acton St., Berkeley, CA 94702, 415/524-6603*

PAL
Programming Alternative Language is the easiest & quickest way to develop structured BASIC programs for the PC. Great features: no fielding of data for data files; a b + tree filing system, no sorting required; the optimum screen design for data entry & report screens; and procedures with parameter passing! Only $200! *K.R. Waletzki, P.O. Box 992, Rosemead, CA 91770, 213/285-3077*

PolyMake
PolyMake, the Intelligent Program Builder & Maintenance Tool for MS-DOS, automatically rebuilds a software system when a module is changed. Using modifiable internal rules, PolyMake invokes your compiler, assembler, linker, librarian and more to update all dependent files. $99 Prevents bugs & tedium. *Polytron Corp., P.O. Box 787, Del. Sta. 2-305, Hillsboro, OR 97123, 800/547-4000, Dept. 305*

C Library
THE GREENLEAF FUNCTIONS—over 200 routines for CI-C86, Lattice, or Microsoft C, includes DOS 2.00, string, printer, color text, graphics, video, function keys, lots more. With 180 page manual, examples, source code, demos. Specify compiler/version. $175. Check/MC/ Visa. THE MOST EXTENSIVE C LIBRARY ANYWHERE. *Greenleaf Software, 2101 Hickory Dr., Carrollton, TX 75006, 214/446-8641*

Try Before You Buy
Refundable $15 Demo package. FTX. Full scr editor. $65. For program devel & doc. Add, Copy, Del, Ins, Move, Dupl, Stack, Print, Locate, Chg. Copy/ Move btwn fls. GENU. Multi-fnc. disk utl. $45. Menu-driven, Sorted dirs. Dspy, srch, alter sectors. Chg Vol, Hide, Un-hide, Recover, Print, Erase, Rename files. *Probity, Inc., P.O. Box 127, New Lenox, IL 60451-0127, 815/485-3493*

Transportation

Fleet Routing Software
TRUCKSTOPS™ optimizes truck loading, stop sequencing, fleet size. Uses vehicle size, type, stop locations, times, quantities, time constraints, backhauls. For a small fleet to as many as 500 & up to 2000 stops. Runs on IBM PC, S/34, S/38, Apple II, IIe, III & TRS 80. Demonstration disk, $45. *Microanalytics, Inc., Dept. P, 8409 Hunt Valley Dr., Vienna, VA 22180, 703/281-8730*

TSA88-Transportation
Solves problems with 256 origins & 256 destinations. Fully menu-driven, spreadsheet style display, Transportation Simplex Algorithm start/restart options, primal & dual solutions, sensitivity analyses, report generator, storage of problems & solutions, user's guide & examples. $88. *Eastern Software Products, 4804 Tarpon Lane, Alexandria, VA 22309, 703/360-6942*

Utilities

Disk Mechanic
The ULTIMATE Floppy Disk Backup & Repair Utility. Can back up ALL software protected disks written on the IBM PC. Works manually or automatically. Restores deleted files. Files or sectors can be searched, examined & changed. Checks disk drive speed. Requires IBM PC, DOS 1.10/2.00, 128K mem. & 2 floppy drives. $73 Ppd. USA. For info/ MC/Visa: *MLI Microsystems, P.O. Box 825, Dept. PCWD, Framingham, MA 01701, 617/926-2055*

Peeks 'n Pokes for the PC
A customer told us "Peeks 'n Pokes is the best bargain in *PC World*." We think you'll agree! Discover how to access and modify the status of the PC. Perform DOS and BIOS function calls from BASIC or Pascal. Learn how to find more Peeks 'n Pokes and much more. Disk (58 programs) and manual $30 + $2.50 shipping. MC/Visa. *Data Base Decisions, 14 Bonnie Lane, Atlanta, GA 30328, 404/256-3860*

PC Disk ID
Eliminate the need under PC-DOS 2.00 to reformat disks in order to add, change or delete volume labels. Prints sorted list of files (including hidden files) from disk directory to labels or to a listing. Also allows recovery of files erased inadvertently. Requires PC-DOS 2.00. $30. NJ add 6%. MC/Visa. *ErgoSoft, P.O. Box 454, Oakhurst, NJ 07755, 201/493-8352*

PC File Compare
Compares the contents of two files and displays the differences in record format. Displayed data may optionally be changed. Compares files of different lengths. No limitation as to the number of non-matching characters. Requires DOS 1.10 or higher. $50. Visa/MC. NJ residents add 6%. *ErgoSoft, P.O. Box 454, Oakhurst, NJ 07755, 201/493-8352*

Backup Program
Copy II PC copies protected and unprotected software without modifying data and verifies the disks it creates. Available memory is fully utilized to minimize diskette duplication time. In addition, Copy II PC includes a drive speed utility that can pinpoint drive problems. See our ad in this issue! $39.95. Add $2 s/h. *Central Point Software, P.O. Box 19730 #203, Portland, OR 97219, 503/244-5782*

DOS 2.00 & 2.10 Users
DOSshell—enhances DOS. Features: Creates a user-friendly "shell" surrounding your system/ Automates commands/Organizes programs & data by menus/ Online help at all levels/Utilizes function keys. Includes: disk archive, data search & more. Extensive manual makes sense of DOS. For hard disk systems. Disk & manual: $70. *XTC Software, P.O. Box 902, Santa Barbara, CA 93102, 805/967-7837*

The Inside Track

Another bargain! Give your programs speed and control. Read files as fast as DOS, display data faster, load programs faster, control memory use, run any program from your program, copy-protect your disks and much more. Fold-out memory map too! Disk (61 programs) and manual $45 + $2.50 shipping. MC/Visa. *Data Base Decisions, 14 Bonnie Lane, Atlanta, GA 30328, 404/256-3860*

EZdBASE

Easiest yet most sophisticated screen program & file generator ever to support dBASE II on the PC. Simply type screen as you want it to appear w/up to 64 fields-256 characters. Highlight, underscore & reverse video. EZdBASE creates dBASE II program files in sec. $95 + $5 s/h. Mention *PC World*, save 10%. Satisfaction gtd. *Automated Office Systems, 4160 Club Dr., Atlanta, GA 30319, 404/237-9420*

Scrolling Memory

Tired of losing lines that scroll off the top of the screen? Now you can scroll them back down into view! ScrollMate adds up to 14 screens of scrolling memory to DOS. ScrollMate works with DOS (not BASIC) commands & programs that write sequentially to the screen. $69.95. Free brochure. *Inner Loop Software, 5456 McConnell Ave. #120, Los Angeles, CA 90066, 213/822-2800*

PC Padlock

Unique encryption scheme protects EXE-COM programs from running after unauthorized duplication. Copy programs such as COPYPC will not copy after running this easy-to-use program on your products disk. Protect your software investment & valuable marketplace. Works with all DOS versions. Ask about our DATA PADLOCK. $99. Visa/MC. *Glenco Engineering, 3920 Ridge Ave., Arlington Heights, IL 60004, 312/392-2492*

hfTOOLS

For BASIC Users. Access the full power of your PC from your BASIC program. A simple call lets you print, scroll or clear the screen; create graphics; display a clock; improve file access, data management & much more. All 22 functions need only 4K, PC or MS-DOS. Comprehensive manual & diskette only $100. MC/Visa. *H-F Computing Services Inc., 224 Old Orchard Grove, Toronto, Ontario M5M 2E5 Canada, 800/268-1121*

Diskette Manager

A diskette library program for the IBM PC with unique diskette label printing. Labels include: diskette name, file names, comments & storage status. A catalog file is constructed containing up to 6,000 file & comment entries from 200 diskettes. Four reports can be printed from the catalog. $59.95! *Lassen Software Inc., 468 Manzanita Ave. #5, Chico, CA 95926, 916/891-6957*

Word Processing

Fontastic™

If you want to SHOUT on paper, here is THE ANSWER! A word processing text customizer. Print your text in many provided font styles or easily create your own! Add special emphasis like italics, bold and underlined, and much more. Requires IBM PC, DOS, 128K, WP or Editor, and dot matrix printer. $125. *IHS Systems, 4718 Meridian Ave. #211, San Jose, CA 95118, 408/265-5503*

Pelada-Science-Foreign

TEXT ENGINEER and LINGUIST are word processors with special symbols & character fonts. You can design characters, even whole alphabets. Italics, European characters, super/subscripts, math, chemistry & more. Text is displayed EXACTLY as printed. Instant, simple editing operations. $150 to $400. *Pelada Informatica Inc., 562 Johnson St., Kingston, Ontario K7L-2A1 Canada, 613/549-1747, Source STP892*

PC-Write™

Features: wordwrap, search/replace, justify, block move/copy/delete, headers/footers, etc. Help screen, quick ref card, 100 page manual. Split screen edits two files at once. Disk w/software & manual $10; registration w/support, source, commissions $75. Visa/MC. Shareware: copy and share with others. *Quicksoft, 219 First N. #224, Seattle, WA 98109, 206/282-0452*

Leading Edge WP™

The package turns an IBM PC into a professional "what you see is what you get" word processing system. The package includes a complete filing system with long document names (30 characters) glossary, (macro) compatibility at all times, menus & help throughout to make it easy to use & learn. *Leading Edge Products, 55 Providence Hwy., Norwood, MA 02062, 800/423-0300, 617/769-8770*

Tape/Disk Conv.

Conversion Services

Mag tape to disk conversion. Any 9-track 1600 BPI MAGNETIC TAPE converted to:

8": CP/M	IBM 3740
DISPLAY WR.	CPT 8000
IBM SYS/??	IBM PC
5¼":	OSBORNE
APPLE II	TELEVIDEO
MORROW	ALTOS
KAYPRO	SUPERBRAIN
XEROX 820	DEC VT180
TRS80 I CPM	ZENITH

Disk-to-disk and disk-to-tape conversion also available. *Pivar Computing Services, Inc., 47 W. Dundee Rd., Wheeling, IL 60090, 312/459-6010*

Typesetting

Cimarron

Top quality typesetting. Fast service. Save up to 40%. Send your disks or telecommunicate. Compugraphic typesetting equipment. Best for text jobs like newsletters, directories, catalogs, books, resumes. *Cimarron Graphics, P.O. Box 12593, Dallas, TX 75225, 214/691-5092 (Hostcomm), CompuServe EMAIL 70130,161*

PC World Directory is a comprehensive listing, by category, of products and services for the IBM PC, look-alikes, and compatibles. It provides rapid access to the burgeoning PC marketplace for both readers and advertisers.

FORMAT: The standard format includes a product ID, a 300-character descriptive ad, and the company name, address, and telephone number.

Advertisers may choose among categories already being used or may create their own. Display advertisers can cross-reference their current ad to the PC World Directory for increased exposure at low cost.

RATES: Listings are accepted for 3-time consecutive insertions at a rate of $420 ($140 per issue). We are now offering a six-time insertion, 15% discount contract for a total of $714 ($119 per issue). Listings must be prepaid (except for established display advertisers) upon submission of ad copy. Checks, money orders, VISA, and MasterCard are acceptable.

DEADLINE: For space reservation deadlines, contact a PC World Directory sales representative at 415/861-3861. Please send copy and prepayment to: PC World Directory, 555 De Haro Street, San Francisco, CA 94107.

Better Subscribed Than Sorry

Sorry, Honey.
I forgot.

The shopper returns:
No InfoWorld!

Sorry, Mac.
Sold out.

InfoWorld goes fast
at the newsstand!

Sorry, Williams.
Smith found the answer
in InfoWorld.

And a corporate battle
is lost!

You'll be two months behind if you rely on the information in monthly personal computer magazines. As the only *weekly* personal computer magazine, InfoWorld is first with the facts. Get an InfoWorld subscription, and you'll never be sorry.

You *will* have all the personal computer information you need to make smart decisions— at work, at home and when you buy. InfoWorld has in-depth hardware and software evaluations in every issue. InfoWorld reports on how personal computers are being used, and provides comprehensive analysis of trends. Every week

you'll get news about the personal computer industry, profiles of leaders and losers, and product announcements screened by our knowledgeable staff.

Don't be sorry. Subscribe today. Pay only *$22.95* to receive InfoWorld each week for a year (45¢ an issue). That's 70% off the

single-copy newsstand price of $76.50 ($1.50 per copy). It's also a savings of 26% off our basic $31.00 annual subscription rate.

Info**World**
Insist on it.
A Publication of CW Communications/Inc.

COULD YOU ANSWERS QUESTIONS

1. *What is the latest R&D activity in Japan in the field of industrial robots?*

2. *Is the name "datascan" trademarked?*

3. *Which drugs have been successfully used to treat osteoporosis?*

4. *What is the current and projected market for frozen orange juice?*

5. *Are there any personal computer user groups for attorneys in the Boston area?*

Introducing In-Search, a simple software package that gives you immediate answers to millions of questions.

Complete, up-to-date information gives you a powerful competitive advantage in any profession.

The information is out there. But to make better decisions you need a way to access it. Quickly. Easily. And at a reasonable cost.

Answers.

How do you get instant answers to questions? In-Search.

In-Search is an extremely easy-to-use personal computer software package that lets you retrieve answers to your questions from the wealth of knowledge stored in over 200 computer databases.

These databases are huge collections of printed material that has been computerized. With In-Search, your IBM, IBM compatible, or Texas Instruments personal computer and modem you can reach this information over your own phone lines.

All The Answers.

Imagine scanning thousands of documents in seconds. In-Search can do just that.

In-Search allows you to read, study and use over 80 million articles and references from thousands of sources: Newspapers, magazines, technical journals, wire services, periodicals, annual reports and Yellow Pages.

You can access information on hundreds of subjects, including:

- Engineering and Science (complete coverage of literature since 1970)
- Medicine (complete coverage of literature since 1966)
- Business
- Government
- Current Affairs
- Arts and Social Sciences

All 200 databases are centralized at DIALOG® Information Services, Inc., the world's largest collection of online information.

Easy Answers.

Before In-Search, finding information—even via computer—was time consuming and tedious.

FIND THE TO THESE BY 9 A.M.?

6. Which South American firms import electronic components from the U.S.?

7. How can I find all the orthodontists in Toledo for my direct mail campaign?

8. What are the mechanical properties of shape memory materials?

9. Has the cost-effectiveness of tele-conferencing changed in the last year?

10. Who are some of the experts in medical sonar scanning techniques?

Not anymore. Just enter the words or subject you'd like to research and In-Search takes it from there, bringing you articles or references containing the information you need. Simple, on-screen graphics guide you through every step.

Fast Answers.

In-Search can find in minutes what would take an individual days or weeks to find using conventional methods. You can now spend more time *using* information because you spend less time tracking it down.

Plus, In-Search is thorough. It won't overlook that one critical fact that could have made the difference in an important decision.

Once you have the information, you can store it on disk or print it out. In-Search is compatible with most word processing programs.

Any Questions?

To learn more about In-Search, call **(408) 986-1200** today. We'll send you an offline demonstration diskette designed for IBM, IBM-compatible, or Texas Instruments personal computers. Use your VISA or MasterCard or charge the purchase of your $5.00 diskette. (California residents please add applicable sales tax.)

In·Search™, Menlo Corporation
4633 Old Ironsides, Suite 400, Santa Clara, CA 95050
☐ Enclosed is $5.00 for my In-Search demonstration diskette.
☐ Please send me a free booklet with more details.

Name_____
Address_____
City_____ State_____ Zip_____
My occupation is:_____

❖ Menlo Corporation

PCW 6

Just Announced

The wide world of PC products

Edited by J. Schaffner
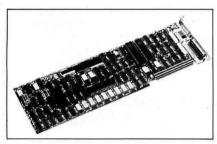
In the dynamic personal computer marketplace *Just Announced* keeps you apprised of the latest developments in IBM PC and compatible technology. Information for this department is provided by manufacturers; these write-ups are not reviews. Many of these descriptions will be followed up by reviews in future issues.

Hardware

Boards

UltraPAK
A multifunction board that allows simultaneous display of operations on separate color and monochrome monitors. UltraPAK features a paral-
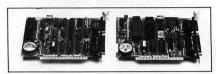
UltraPAK, Tseng Laboratories

lel or serial port and a clock/calendar with battery backup and displays 132 columns and 44 rows for spreadsheets. Options include an IBM disk controller, memory expandable to 384K with disk emulation, an additional serial or parallel port, and IBM-compatible or high-resolution color graphics (640 by 400 with 16 colors). List price: $795 to $1125. Tseng Laboratories, Inc., P.O. Box 566, Newton, PA 18940, 215/968-0502.

Cygnus
A multifunction board that measures 5½ by 4¼ inches to fit in one of the short slots of the IBM PC XT or the

Cygnus, Titan Technologies

Portable PC. Cygnus comes with a clock/calendar, a game port, and either a serial or parallel port. A removable lithium battery backs up the clock. List price: parallel $199, serial $299. Titan Technologies, Inc., P.O. Box 8050, Ann Arbor, MI 48107, 313/662-8542.

Colormax
An expansion board that lets users alternate between monochrome and color monitors without having to reconnect them. Colormax has a connector for each of the monitors, a light pen adapter, and an RCA jack for composite monitors. The board permits custom definition of character sets and is compatible with both IBM graphics boards. A parallel port is available as an option. List price: $499.95, with parallel port $559.95. Micromax, 6868 Nancy Ridge Dr., San Diego, CA 92121, 619/457-3131.

PCVISION Frame Grabber
An analog-to-digital converter that translates a video camera's RS-170 signal to digital data in real time. It requires 64K and one disk drive. The board enables users to view the video image on the PC's screen and to map the data directly to memory in 64K segments. You can change the pixel intensity prior to display and overlay text or graphics on the image without disturbing the stored video data. The converter simultaneously acquires and displays the 6-bit pixel data (in 64 gray-scale intensities) at 30 frames per second. The Frame Grabber stores the data in a 512-by-512-pixel frame memory 8 bits

PCVISION Frame Grabber, Imaging Technology

deep. The package includes software drivers, documentation, and all necessary cables. List price: $2995. Imaging Technology Inc., 600 W. Cummings Park, Woburn, MA 01801, 617/938-8444.

Modems
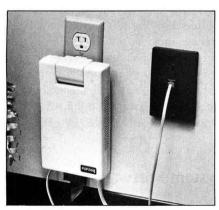
PC/Telink
An auto-answer, auto-dial modem board with jacks for both voice and data communications. It requires 96K, one disk drive, and a serial port. The 1200 bps modem has an independent serial port, a speaker for audio monitoring of calls, and self-diagnostics. *Crosstalk XVI* communications software, included with the modem, stores telephone numbers and logon sequences. The software

lets users set parameters such as speed, duplex, and passwords while on line. List price: $495. Anderson Jacobson, Inc., 521 Charcot Ave., San Jose, CA 95131, 408/263-8520.

POPCOM Model X100
An external modem that automatically switches between voice and data on the same call by sensing when the local handset is lifted. It requires a serial port. The modem transmits asynchronously at up to 1200 bps in full duplex. POPCOM Model X100 has automatic tone or pulse dialing, a speaker with volume

POPCOM Model X100 modem, Prentice

control, and a 40-character command line buffer. List price: $475. Prentice Corporation, 266 Caspian Dr., P.O. Box 3544, Sunnyvale, CA 94088-3544, 408/734-9810.

Monitors

Point-1
A touch screen monitor that lets users position the cursor, select from menus, and manipulate graphics by touch. It requires a monochrome or

Point-1, MicroTouch Systems

color graphics board and a serial port. Point-1 has a 12-inch amber monitor and a touch screen with 1024 by 1024 touch-point resolution. The monitor includes 8K each of RAM and ROM and an 8-bit microprocessor with a FORTH interpreter. With the optional *Command.Point* firmware, Point-1 functions as a coprocessor when running applications. *Drive.Point* is an optional communications and driver package for programming and operating the monitor. A kit for color monitors includes the touch screen, the intelligent controller, and firmware. List price: $1495, kit $995, *Command .Point* $95, *Drive.Point* $75. Micro-Touch Systems, Inc., 400 W. Cummings Park, Woburn, MA 01801, 617/935-0080.

Network Devices

The Database Machine
A controller board that gives networked PCs simultaneous access to shared data files while not restricting use of the host PC. It can process 128 simultaneous requests for the same file and transfers data at 1.5 megabytes per second. Acting as a file

server, the Database Machine replaces the fixed disk adapter in machines with hard disks. The board has an 80186 coprocessor, a 64K buffer, and 128K for multitasking. It works with 3Com, Orchid, Santa Clara, and AST networks. The Database Machine provides full password protection. List price: $1500. Cogent Data Technologies, Inc., P.O. Box 3902, Bellevue, WA 98009, 206/455-3343.

Printers

SP320
A letter quality, daisy wheel printer that operates bidirectionally at 48 characters per second. It includes both a serial and a parallel port. The SP320 accommodates both 96- and 127-character print wheels and offers proportional spacing, superscripting, subscripting, and bold and shadow printing. It measures 6.3 by 21.7 by 15 inches and operates at a 57 dBA

SP320 printer, Fujitsu America

sound level. Options include tractor and cut-sheet feeders. List price: $1499. Fujitsu America, Inc., 3055 Orchard Dr., San Jose, CA 95134, 408/946-8777.

4695

A color ink jet printer that generates transparencies and paper copies up to 10 inches wide. It requires a parallel port. The 4695 copies the screen in 2 to 3½ minutes with a two-key command. The printer operates at 20 characters per second when printing text and with a resolution of up to 120 dots per inch when printing graphics. Four distinct jets with sealed, snap-in ink cartridges provide 125 half-tone shades. The optional Parallel Image Enhancer expansion board allows the 4695 to produce prints with higher resolution while working independently from the dis-

4695 printer, Tektronix

play. List price: $1595, Parallel Image Enhancer $950. Marketing Communications Dept., Mailing Station 63-635, Tektronix, Inc., P.O. Box 1700, Beaverton, OR 97077, 503/627-7111.

Storage Devices

Model 4160

An external 14-inch Winchester disk drive that has 160 megabytes of storage and includes the disk controller

and software. Model 4160 has a 38-millisecond average access time and a 9.67-megabit-per-second transfer rate. Networking is available for systems running under DOS 2.00. List price: $6500. Disc Tech One, Inc., 849 Ward Dr., Santa Barbara, CA 93111, 805/964-3535.
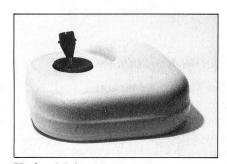
WHAMS 1-XT

A half-height, 10-megabyte Winchester hard disk that fits into the extra bay on the IBM PC. The controller board includes operating software, a serial port, and as much as 256K of optional memory. WHAMS 1-XT runs on the PC's existing power supply. List price: $2375, each 64K $90. Piiceon, Inc., 2114 Ringwood Ave., San Jose, CA 95131, 408/946-8030.

Miscellaneous

Turbo Stick

A high-speed joystick designed for graphics, instrumentation systems, and games software. It requires a serial port. The Turbo Stick offers a rate mode for high resolution (1 part in 4096) and an absolute mode for high pointing speed. Microswitches on the stick select the mode. The switches can be redefined with soft-

Turbo Stick, KA Design Group

ware to perform other functions. List price: $395. KA Design Group, 6300 Telegraph Ave., Oakland, CA 94609, 415/654-6300.

Touch Mouse

A mouse that responds to touch rather than to maneuvers. It requires 64K and one disk drive. The Touch Mouse has a resistive membrane over a 5- by 6- by 1-inch pad that registers the touch of a finger or a dull instrument. Four buttons control the mouse's separate functions, such as cursor location, numeric keypad input, and conventional mouse functions compatible with Microsoft's software. As a graphics input device it offers 1000 by 1000 resolution. The package includes an expansion board and software patches for *VisiCalc*, *VisiWord*, *WordStar*, and *CalcStar*. List price: $249. Touch Technology, Inc., 111 Chinquapin Round Rd., Annapolis, MD 21401, 301/269-6181.

System Software

Languages

WYLBUR/pc

A microcomputer version of the mainframe language that is written in assembly language for quick response time. It requires 128K and one disk drive. The language provides full control over screen layout, including background and foreground color. Files can be read into memory and searched or processed using EXEC, WYLBUR's debugging tool. WYLBUR/pc permits unattended communications and file transfers with other computers. The text editor features scrolling, global search and replace, and up to 400 function key defini-

tions. A run command lets the language accommodate other software and languages. List price: $550. On-Line Business Systems, Inc., 115 Sansome St., San Francisco, CA 94104, 415/391-9555.

Golden Common LISP (GCLISP)
A microcomputer version of LISP, the programming language of artificial intelligence, that manipulates symbols as well as numbers. It requires 256K and one disk drive. A subset of Common LISP, GCLISP accepts data types such as infinite precision integers, arrays, character strings, lists, and symbols. The language supports an 8087 coprocessor, a full-screen editor, multitasking, macros, memory allocation, and garbage collection. GCLISP has on-line documentation and help facilities. The package includes a reference manual, a book on the language, and an optional tutorial. List price: $375, with tutorial $495. Gold Hill Computers, Inc., 163 Harvard St., Cambridge, MA 02139, 617/492-2071.

MEGABASIC
A high-level language that accommodates libraries of programs and subroutines, which operate as if they were part of the language. It requires 128K and two disk drives. MEGABASIC can address 1 megabyte of memory directly. Features include variable names up to 255 characters long, TRACE and EDIT functions for debugging, and binary coded decimal (BCD) arithmetic. The package has a compaction program to remove spaces and REMarks and a cross-reference program that lists variables,

strings, arrays, and subroutines. MEGABASIC can work directly with *The Boss* data base system and its networking facilities. List price: $400. American Planning Corporation, 4600 Duke St. #425, Alexandria, VA 22304, 800/368-2248, 703/751-2574.

Utilities

DOSshell
A program that organizes hard disks into a series of directories and subdirectories, each with a menu and help screen. It requires 64K and DOS 2.00. Function keys perform many DOS commands, movement between directories, and optional assignments. Logon and password procedures control access by more than one user to the disk and space. *DOSshell* also includes utilities to archive disks, write memos, manage appointments, and control printer type styles. List price: $70. XTC Handcrafted Software, P.O. Box 902, Santa Barbara, CA 93102, 805/967-7837.

Applications Software

Accounting and Inventory

Time Accountant
A time-keeping and invoicing system for professional firms that bill clients by the hour. It requires 128K and two disk drives. Using menus and help messages, users construct a coded data base of their projects that may be sorted by client, billing period, or worker. *Time Accountant* handles billing cycles and accounting periods of any length and accepts codes of up to 10 characters for clients or projects. The package has a

billing preview feature for testing adjustments to rates and hours. *Time Accountant* stores reports and invoices as ASCII files that can be transferred to other applications. List price: $495. Time Accountant, 636 Waverly St., Palo Alto, CA 94301, 415/328-7877.

Accounting Pearl
An integrated accounting package of five modules that lets data in one module reference data in any other module. It requires 128K and two disk drives. *Accounting Pearl*'s general ledger module automatically enters recurring expenses and compiles updated reports. The accounts payable module prepares checks and forecasts cash requirements for preset dates. Accounts receivable processes invoices, receipts, delinquency reports, and interest on past due invoices. Payroll calculates overtime, sick leave, vacation, and two optional pay methods. Inventory produces reports for reordering, stock status, sales by item or by product class, and history by item or type. *Accounting Pearl* can be used with the *Personal Pearl* data base and other applications such as *WordStar* and *SuperCalc*. List price: $895. Pearlsoft Division, Relational Systems International Corporation, P.O. Box 638, Wilsonville, OR 97070, 503/682-3636.

Communications

MITE/MS
A menu-driven communications package that transfers text and binary files and that communicates with information services. It requires

Just Announced

96K and one disk drive. *MITE/MS* supports connection with other microcomputers by direct cables or modems. The package features on-line control of communications parameters, ten programmable macro strings, automatic logon and redialing, and on-line file manipulation. *MITE/MS* transfers binary files using Xmodem or using *Smartcom II*'s, *Crosstalk*'s, or its own error-checking protocol. Using the character filter menu, you can automatically strip unwanted characters from incoming material. List price: $195. Mycroft Labs, Inc., P.O. Box 6045, Tallahassee, FL 32314, 904/385-1141.

Data Management

LAN:DATASTORE

A relational data base manager that lets 16 networked PCs simultaneously share information on a hard disk. It requires 192K and one disk drive. The menu-driven data management system has a maximum size of 16 megabytes; each record may contain up to 16,000 bytes (16K) and over 500 fields. *LAN:DATASTORE* provides report generation, print spooling, programmable function keys, and flexible selection criteria. Security features include automatic record locking, password protection, and a hidden internal audit that tracks who last changed the record and when. A data integrity check automatically detects hardware failures that corrupt the data base. *LAN:DATASTORE* supports Om-

ninet, MultiLink, ShareNet, PCnet, and EtherSeries and comes in a single-user version. List price: $1945, for five users $945, single-user version $495. Software Connections, 1800 Wyatt Dr. #17, Santa Clara, CA 95054, 408/988-3704.

Educational

Quiz

A program for writing tests and quizzes with true/false, multiple choice, exact answer, and short answer questions. It requires 128K and one disk drive. Students may take the tests on paper or at the computer, where their responses are stored on disk. *Quiz* can generate different forms for a test and provide an answer key for each one. List price: $139.95. Diversified Educational Enterprises, Inc., 725 Main St., Lafayette, IN 47901, 317/742-2690.

Entertainment

Nomination

A political game in which players campaign against major presidential candidates of either party. It requires 128K and one disk drive. Up to five people conduct a primary campaign by issuing statements, answering the press, making endorsements, and deciding whether or not to use dirty tricks. At the beginning each player takes a stand on ten issues from the ERA to defense spending. The positions taken affect fund-raising ability, and players use their resources to collect the most convention delegates. Players can run against Democrats, Republicans, or each other. List price: $29.95. Brady Co., Bowie, MD 20715, 301/262-6300.

Graphics

4-Point Graphics

A color graphics program with a cursor that splits into four parts to manipulate and retrieve images from any part of the screen. It requires 128K with DOS 1.10 or 192K with DOS 2.00, two disk drives, and a color graphics board. *4-Point Graphics* has dual memory buffers for comparison and overlay of images and can create color transparencies, separations for printing, and four-color art. The program features texture and color creation and full-screen zoom. The single cursor draws lines and circles; the two-point cursor draws angles and sizes the image; the three-point cursor defines arcs and ellipses; the four-point cursor enables expansion, reduction, inversion, and rotation of the image. *4-Point Graphics* uses input from a keypad, mouse, bitpad, or touch screen. The program can control shading on several plotters and printers. A test mode permits preview of new graphics without destroying the image on the screen. A demo mode allows 99 sequences to be chained together and edited for presentation. List price: $195. International Microcomputer Software, Inc., 633 Fifth Ave., San Rafael, CA 94901, 415/454-7101.

Integrated Applications

UltraFile

An integrated data base manager with filing, reporting, and graphing capabilities. It requires 128K, two

disk drives, and a color graphics board. The menu-driven system accommodates data bases of up to 32,000 records, with 1000 characters per record. Five sample data base structures are included and can be adapted for use. *UltraFile* accepts data from speadsheet programs such as *VisiCalc* and *1-2-3*. It also works with word processing packages such as *WordStar* and *Volkswriter*. The graphics program offers line, bar, and three-dimensional graphs. A graph can have five functions, with one of ten symbols to represent each function. List price: $195. Continental Software, 11223 S. Hindry Ave., Los Angeles, CA 90045, 213/410-9466.

Job and Industry Specific

Rentman

A property-management package for real estate investors that maintains income and expense statements for each property. It requires 128K and two disk drives. Programmed in *dBASE II*, *Rentman* accommodates 10,000 properties and accounts. *Rentman* automatically calculates depreciation, determines rate fees on bounced checks, and allocates funds to accounts. It also tracks vacancies and leases and prints checks. List price: $950. Data Mill Inc., P.O. Box 98, Thornton, PA 19373, 215/358-1900.

Spreadsheets

KEY II

A program for *1-2-3* that aids analysis and graphing of data in a worksheet by providing preprogrammed keyboard macros. It requires 256K and two disk drives. Five menu-driven routines simplify *1-2-3*'s commands. The analysis routine offers one- or two-keystroke calculations and sorts for the entire data base or a subset. A distribution routine produces cross-tabulations. One or two keystrokes control graphs or printouts of results. *KEY II* can process a maximum of 24 fields simultaneously from a data base with up to 30 fields. List price: $189. Lighthouse Software Corp., P.O. Box 15, Hilton Head Island, SC 29938, 803/785-4949.

Miscellaneous

The Lawyer's PC
A bimonthly newsletter for computerized law offices. Articles include reviews of products, reports on new uses for established products, reports from conferences, and new product announcements. List price: $58 annually, Canada and Mexico $70, overseas $94. R.P.W. Publishing Corp., P.O. Box 1108, Lexington, SC 29072, 803/359-9941.

Just Announced *uses information provided by manufacturers. It does not evaluate products or corroborate manufacturers' claims. Send a description and a photograph of your new product to* Just Announced, PC World, *555 De Haro St., San Francisco, CA 94107.* ▤

WE MADE IT POWERFUL. BUT WE KEPT IT SIMPLE.

When you're cooking up a unique software product, it's not enough to think of all the right ingredients. You also have to mix them very carefully. Especially when you're serving the wide variety of people who use the IBM personal computer today.

Until now, if you wanted to use your IBM PC to turn data into meaningful information, you had to make an unappetizing choice between two kinds of data base management systems: Multifile systems so powerful they're difficult to use. Or single file systems so simple they can't be used to do much.

Until Power-base.™

Power-base is the only multifile data base manager powerful enough to get the job done, yet simple enough to be mastered in one sitting. Even if you've never used a computer.

There are no languages to learn, no commands to memorize. To tell Power-base what you want, simply keep choosing from the menu which never goes away, yet never gets in the way. Even making a selection is simple. You use the same three keys every time. To make a change, you simply make another choice.

And the unique DataZOOM™ gives you the power to move rapidly from file to file, right to the piece of information you need.

It's hard to make a simpler choice than Power-base. Especially with a price so easy to digest: $395.

power-base with datazoom™

Get a taste of Power-base for yourself. For a demonstration copy, send us $10. It's refundable when you purchase Power-base at your local participating Computerland or other authorized dealer.

Power-base Systems, Inc. 12 West 37th Street, New York, NY 10018. (212) 947-3590.

KOREN

Circle 218 on reader service card

PC WORLD

Reader Inquiry Service

PC WORLD

Name

Company

Address

City/State/Zip   (Zip code needed to insure delivery)

Valid through 7/29/84

☐ Please bill me $24 for a 1-year (14-issue) subscription to *PC World* (U.S. and Canada only).

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75
76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125
126	127	128	129	130	131	132	133	134	135	136	137	138	139	140	141	142	143	144	145	146	147	148	149	150
151	152	153	154	155	156	157	158	159	160	161	162	163	164	165	166	167	168	169	170	171	172	173	174	175
176	177	178	179	180	181	182	183	184	185	186	187	188	189	190	191	192	193	194	195	196	197	198	199	200
201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225
226	227	228	229	230	231	232	233	234	235	236	237	238	239	240	241	242	243	244	245	246	247	248	249	250
251	252	253	254	255	256	257	258	259	260	261	262	263	264	265	266	267	268	269	270	271	272	273	274	275
276	277	278	279	280	281	282	283	284	285	286	287	288	289	290	291	292	293	294	295	296	297	298	299	300
301	302	303	304	305	306	307	308	309	310	311	312	313	314	315	316	317	318	319	320	321	322	323	324	325
326	327	328	329	330	331	332	333	334	335	336	337	338	339	340	341	342	343	344	345	346	347	348	349	350
351	352	353	354	355	356	357	358	359	360	361	362	363	364	365	366	367	368	369	370	371	372	373	374	375
376	377	378	379	380	381	382	383	384	385	386	387	388	389	390	391	392	393	394	395	396	397	398	399	400
401	402	403	404	405	406	407	408	409	410	411	412	413	414	415	416	417	418	419	420	421	422	423	424	425
426	427	428	429	430	431	432	433	434	435	436	437	438	439	440	441	442	443	444	445	446	447	448	449	450
451	452	453	454	455	456	457	458	459	460	461	462	463	464	465	466	467	468	469	470	471	472	473	474	475
476	477	478	479	480	481	482	483	484	485	486	487	488	489	490	491	492	493	494	495	496	497	498	499	500
501	502	503	504	505	506	507	508	509	510	511	512	513	514	515	516	517	518	519	520	521	522	523	524	525
526	527	528	529	530	531	532	533	534	535	536	537	538	539	540	541	542	543	544	545	546	547	548	549	550
551	552	553	554	555	556	557	558	559	560	561	562	563	564	565	566	567	568	569	570	571	572	573	574	575
576	577	578	579	580	581	582	583	584	585	586	587	588	589	590	591	592	593	594	595	596	597	598	599	600
601	602	603	604	605	606	607	608	609	610	611	612	613	614	615	616	617	618	619	620	621	622	623	624	625
626	627	628	629	630	631	632	633	634	635	636	637	638	639	640	641	642	643	644	645	646	647	648	649	650
651	652	653	654	655	656	657	658	659	660	661	662	663	664	665	666	667	668	669	670	671	672	673	674	675
676	677	678	679	680	681	682	683	684	685	686	687	688	689	690	691	692	693	694	695	696	697	698	699	700
701	702	703	704	705	706	707	708	709	710	711	712	713	714	715	716	717	718	719	720	721	722	723	724	725
726	727	728	729	730	731	732	733	734	735	736	737	738	739	740	741	742	743	744	745	746	747	748	749	750
751	752	753	754	755	756	757	758	759	760	761	762	763	764	765	766	767	768	769	770	771	772	773	774	775
776	777	778	779	780	781	782	783	784	785	786	787	788	789	790	791	792	793	794	795	796	797	798	799	800
801	802	803	804	805	806	807	808	809	810	811	812	813	814	815	816	817	818	819	820	821	822	823	824	825
826	827	828	829	830	831	832	833	834	835	836	837	838	839	840	841	842	843	844	845	846	847	848	849	850
851	852	853	854	855	856	857	858	859	860	861	862	863	864	865	866	867	868	869	870	871	872	873	874	875
876	877	878	879	880	881	882	883	884	885	886	887	888	889	890	891	892	893	894	895	896	897	898	899	900
901	902	903	904	905	906	907	908	909	910	911	912	913	914	915	916	917	918	919	920	921	922	923	924	925
926	927	928	929	930	931	932	933	934	935	936	937	938	939	940	941	942	943	944	945	946	947	948	949	950
951	952	953	954	955	956	957	958	959	960	961	962	963	964	965	966	967	968	969	970	971	972	973	974	975
976	977	978	979	980	981	982	983	984	985	986	987	988	989	990	991	992	993	994	995	996	997	998	999	1000

11/6

PC WORLD

Name

Company

Address

City/State/Zip   (Zip code needed to insure delivery)

Valid through 7/29/84

☐ Please bill me $24 for a 1-year (14-issue) subscription to *PC World* (U.S. and Canada only).

I am interested in receiving information about:

☐ Computers

Hardware:
☐ Boards
☐ Storage Devices
☐ Monitors
☐ Printers, Plotters, and Typewriter Interfaces
☐ Communications
☐ Misc.

Applications Software:
☐ General Business
☐ Financial & Spreadsheets
☐ Job and Industry Specific
☐ Data Management
☐ Word Processing/Text Editing
☐ Communications
☐ Graphics

System Software:
☐ Operating Systems
☐ Utilities
☐ Languages

Educational, Personal, Entertainment & Misc. Software:
☐ Educational
☐ Personal
☐ Entertainment
☐ Misc.

General:
☐ Accessories
☐ Services
☐ Books, Catalogs, and Periodicals
☐ Events
☐ Mail Order

11/6

PC WØRLD

*Reader
Inquiry
Service*

Product Index

Advertisers

BOARDS

AST Research
ComboPlus 64K
(Cl/Cal, Ser & Par, I/F,
256K capacity) . . . . $ 279

MegaPlus 64K (Cl/Cal,
Ser Port, 512K capacity
w/Megapak) . . . . $ 269

Extra ports for Mega-
plus and I/O Plus II
Game, Par & Ser . . . . . . $ 40

Megapak 256K
expansion . . . . $ Call

I/O Plus II (Cl/Cal
Ser Port) 115

Maynard Electronics
Floppy Dr Controller . . . $ 160
  w/Par Port 209
  w/Serial Port 219

Sandstar Floppy
Dr Controller . . . . $ 194

Sandstar Memory Card
-3 modules cap. . . . . $ 145

Sandstar Multifunction
Card - 6 modules cap. $ 71

Sandstar Modules . . . . . $ Call

Quadram
Quadboard 64K
(Cl/Cal, Ser & Par
Ports, Software) . . . . . . $ 279
Quadboard 384 (OK) . . $ 207

Microfazer Stack Printer
Buffer (exp. to 512K)
▸ Parallel/Parallel 8K . . $ 132
▸ Parallel/Parallel 64K . 188
▸ Serial/Parallel 8K 170
▸ Serial/Serial 8K 170

Quadlink 64K Mem
allows Apple SW to
run on IBM/PC . . . . $ Call
All Others . . . . $ Call

Tecmar Products . . . $ Call

Xedex/Microlog
Baby Blue . . . . $ Call
Baby Blue II . . . . $ Call

MONITORS

Amdek Video 300A
  Amber . . . . $ 149
Amdek Color II + ... $ 435
NEC JB1201 - 12" Gr . . . $ Call
NEC JB1260 - 12" Gr . . . 119
NEC JC1216 RGB 435
PGS HX12 RGB Clr . . . . $ Call
Panasonic
CT160 - 10" comp . . . . . . $ Call
Quadram
Quadchrome . . . . $ Call
Sanyo 8112 - 12HR Gr . . $ Call

SONY
Profeel 12" . . . . $ Call
Profeel 19" . . . . $ Call
Profeel 25" . . . . $ Call

Taxan
KG12N-UY 12" HR Am $ 139
KG12N 12" HR Gr 132
RGB Vision-1
  12" LR Clr . . . . $ 323
RGB Vision-3
  12" HR Clr . . . . $ 459
USI 1200A 12" HR Am . $ 159

PC NETWORKING
by ORCHID
or SANTA CLARA
Starter Kit —
Special Price . . . . . . $ 1,245
Add'l Adapter Cards
& Cabling Available.
For Pricing . . . . $ Call

MODEMS

Hayes 300 . . . . $ 205
Hayes 1200 . . . . $ Call
Hayes Chronograph . . $ 189
Hayes 1200B (Int) 449

DISPLAY CARDS CORNER
Hercules Graphics Board . . . . $ 359
Orchid Monochrome Graphics Adapter 360
Fredericks Plantronics Colorplus . . . . $ Call
USI Display Card (color/monochrome) . . . . $ Call
Amdek MAI Card . . . . $ Call
Tecmar Graphic Master . . . . $ Call
Quadram Quadcolor I . . . . $ Call
Quadram Quadcolor II . . . . $ Call

Novation
PC Cat w/Crosstalk
also known as
Access 1-2-3 1200B . . . . $ Call

US Robotics
Auto-Dial 300/1200 . . . . $ 459
Password 379

DISK DRIVES

CDC 1800 . . . . $ 249
Corona Hard . . . . $ Call
Corvus . . . . $ Call
Davong 10/15/20MB . . $ Call
@**Multilink** . . . . $ Call
Tandon TM-100-2 . . . . . $ 239

XEBEC
@9710 10MB Hard Disk
including host adapter
("Personality") and soft-
ware to work
on IBM/PC $1,599

HALF HIGHS
Matushita . . . . $ 249
Panasonic 239
Shugart 269
Teac w/brackets 259

PRINTERS

Anadex . . . . $ Call

C. Itoh Starwriter F10 . . $1,049
C. Itoh Prowriter 8510 . $ Call
C. Itoh Prowriter 1550P $ 599

IDS/Data Products
Prism 80 w/4 options . . $1,399
Prism 132 w/4 options . . 1,547
Microprism 479

@**Diablo** 630 ECS . . . . . . $ Call
@**Diablo** 630 API . . . . . . $ Call

Epson . . . . $ Call

Mannesmann Tally
MT 180L . . . . $ Call
MT 160L . . . . $ 585
Spirit. . . . . $ Call
NEC 3550 . . . . $ Call
NEC 8023A . . . . $ 389
NEC 2031 . . . . $ Call
Okidata 82-93 . . . . $ Call
@**Quadram** Quadjet . . . $ Call
Siemens
Ink Jet Printers . . . . $ Call
Silver Reed
Daisy Wheel . . . . $ Call
Star Micronics
Gemini 10X . . . . $ 299
Gemini 15X . . . . $ Call
@**Radix** 10/15 . . . . $ Call
@**Delta** . . . . $ Call
Teletex T1014 . . . . $ Call
Transtar
T-130-P/S . . . . $ 665
T-315P Dot Matrix 510
T-120P/S 475

. . . and much more.

DISKETTES

3M 5" DS DD Box . . . . $ 40
@**Acutrack** . . . . $ Call
@**CDC** . . . . $ Call
Maxell 5" DS DD
MD2 Box . . . . $ 40
Verbatim 5" DS DD
Box 35
Ultra Magnetic 5"
DS, DD, 12 in box 35
(3 Boxes Diskettes Minimum)

PLOTTERS

Amdek X-Y Plotter . . . . $ 599
Enter P100 Sweet P . . . . $ Call
Houston Instruments . $ Call
Panasonic Digital
Plotter . . . . $ Call
Strobe M100 Plotter
(RS 232) . . . . $ 499

MISC.

Alpha-Delta "MACC"
surge protector . . . . $ 69
Chalk Board
Starter Kit . . . . $ 39
Powerpad 85
Curtis
KB X-Tention
  Cable EC2 . . . . $ 35
Mono X-Tention
  Cable EC1 45
@**UNI-1** Tilt/Swivel Ped-
estal (any monitor) $ 44
All Others . . . . $ Call
@**EPD** Surge Protectors . $ Call
Flip 'n' File 5¼" . . . . . . $ 22
Keytronic
Keyboard 5150 . . . . $ Call
@**WP** Keyboard KB5151 . $ Call
@**WP** Keyboard
  KB5151 Dvorak . . . . . . $ Call
Koala Technologies
Graphic Tablet . . . . $ Call
Kraft Joystick . . . . $ Call
Microsoft Mouse 155
Mouse Systems
PC Mouse . . . . $ 229
Seattle Computer
8087 Package . . . . $ 299
Street Electronics
Echo Speech Synth
for IBM . . . . $ 179
Word . . . . $ Call
Symtec Light Pen . . . . . $ 140
TG Joystick 49
Thunderware
@**Thunderclock** 126
VersaWriter Tablet . . . $ 239

Listed below are a few of the terminals available
at ORYX.

  Adds   Qume   Televideo
  Espirit   Teletex   Wyse

For technical assistance call
(715) 848-1374
To order, use our toll free line.
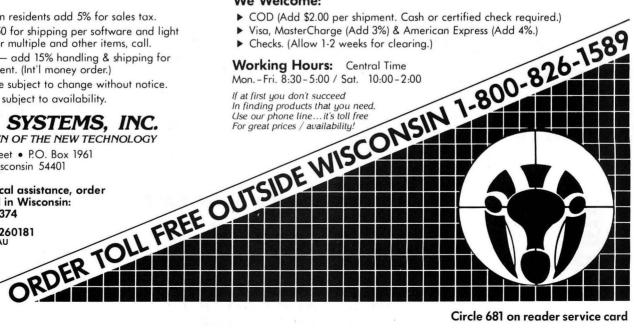
A variety of complete PC compatible systems are
available at Oryx. For assistance in determining
your needs, use our technical line.* We will be
happy to provide full support.

  Columbia   Corona
  Hyperion   Televideo

Please:
▸ Wisconsin residents add 5% for sales tax.
▸ Add $3.50 for shipping per software and light
  items. For multiple and other items, call.
▸ Foreign — add 15% handling & shipping for
  prepayment. (Int'l money order.)
▸ Prices are subject to change without notice.
▸ All items subject to availability.

ORYX SYSTEMS, INC.
CRAFTSMEN OF THE NEW TECHNOLOGY

425 First Street • P.O. Box 1961
Wausau, Wisconsin 54401

***For technical assistance, order
status and in Wisconsin:**
715-848-1374

Int'l Telex: 260181
ORYX SYS WAU

We Welcome:
▸ COD (Add $2.00 per shipment. Cash or certified check required.)
▸ Visa, MasterCharge (Add 3%) & American Express (Add 4%.)
▸ Checks. (Allow 1-2 weeks for clearing.)

Working Hours: Central Time
Mon. - Fri. 8:30 - 5:00 / Sat. 10:00 - 2:00

*If at first you don't succeed
In finding products that you need.
Use our phone line . . . it's toll free
For great prices / availability!*

ORDER TOLL FREE OUTSIDE WISCONSIN 1-800-826-1589

COMPUCLASSICS

INCREDIBLE PRICES WITH PROFESSIONAL SUPPORT

SOFTWARE

ASHTON TATE
D BASE 11 .... $375
FRIDAY 169

BRUDERBUND SOFTWARE
BANKSTREET WRITER 44

CONTINENTAL SOFTWARE
HOME ACCOUNTANT PLUS 85
PROPERTY MANAGEMENT 319

DIGITAL RESEARCH
C BASIC COMPILER 360
PASCAL MT + ... 360
C 209

LOTUS DEVELOPMENT
1-2-3 309

MICROPRO
INFOSTAR 239
WORDSTAR 235
WORDSTAR PRO-PAC 345
MAILMERGE 129
CORRECTSTAR 129
PLANSTAR 289

MICROSOFT
MULTIPLAN 125
WORD 239
WORD with MOUSE 299
BASIC COMPILER 249
PREMIUM SOFTCARD 11E 319
SOFTCARD PREMIUM SYSTEM 459

MICRORIM
R BASE 4000 289

MONOGRAM
DOLLARS AND SENSE 109

SATELLITE SOFTWARE INTL.
WORD PERFECT 305

SOFTWARE PRODUCTS INTL.
OPEN ACCESS 379

SORCIM
SUPERCALC 11 159
SUPERCALC 111 229

SOFTWORLD SYSTEMS
MULTIMATE 289

SOFTWARE PUBLISHING
PFS REPORT $69
PFS FILE (IBM) 85
PFS FILE (APPLE) 69
PFS GRAPH (IBM) 85
PFS GRAPH (APPLE) 69
PFS WRITE (IBM) 85
PFS WRITE (APPLE) 69

VERBATIM DISKS
5¼" DATALIFE SS/DD 24
5¼" DATALIFE DD/DD 43

VISICORP
VISICALC 111 165
VISIFILE 189
VISISCHEDULE 189
VISIWORD 239

LEADING EDGE SOFTWARE
WORDPROCESSOR 175
WORDPROCESSOR/MERGEPRINT 199

WOOLF SOFTWARE
MOVE-IT 89

HARDWARE

HAYES
SMARTMODEM 300 205
SMARTMODEM 1200B 409
SMARTMODEM 1200 482

HERCULES GRAPHICS CARD
.... 349

MICROSOFT
64K RAM CARD 235
256K RAM CARD 359

C. ITOH
PROWRITER 8510 359
PROWRITER 8510SP 639
STARWRITER 40CPS 1100

STAR MICRONICS
GEMINI 10X 285
GEMINI 15X 405

ANADEX
9620B 979
9625B 1079
9725B 1169

OKIDATA
MICROLINE 82A 329
MICROLINE 92 469
MICROLINE 93 785

HOURS
ORDER DESK & TECHNICAL SUPPORT OPEN:
8AM - 6PM MONDAY THRU FRIDAY
10AM - 2PM SATURDAY

TO ORDER CALL:
1-800-328-4473
(213) 705-1895 CA
TLX 292415 KET UR

TERMS
ALL prices subject to change. We honor Cashiers Cheque/MO/Bank
transfers immediately. Allow time for company & personal cheques
to clear. California residents add sales tax.

6860 CANBY ST. (SUITE 109)
RESEDA, CA 91335

SHIPPING
$3 per item UPS surface ($8 for Blue Label): Printers $25

- WE ACCEPT VISA & MASTERCHARGE
- NO CREDIT CARD SURCHARGE
- PRODUCT NOT SHIPPED WITHIN 24 HOURS WILL BE SHIPPED
  FREIGHT FREE. (Printers Excluded)
- FREE TECHNICAL SUPPORT

Circle 90 on reader service card

THE MOST
IMPORTANT DECISION
YOU WILL MAKE
ABOUT YOUR IBM PC...

... IS WHAT TO PUT INTO THESE SLOTS.