IBM's New PCjr

PC WORLD

November 1984
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The Comprehensive Guide to
IBM Personal Computers and Compatibles

Our Readers Vote:

What's the Best PC System?

30 Hardware and Software Products Voted Number One for Performance and Value

World Class PC winners Mitch Kapor of Lotus Development Corporation and Seymour Rubinstein of MicroPro International. Their programs *1-2-3* and *WordStar* were rated tops in their categories. For a complete list of winners, see page 96.

Introducing AST-PCnet II.

Now PC networking is as easy as plugging-in your phone.

The advantages of Local Area Networks (LANs) are well known. Existing personal computers can be tied together to share information and expensive peripherals such as disks and printers.

Now AST makes networking easier and more economical than ever before. With AST-PCnet II, you simply insert the PCnet II board into an I/O slot in your IBM PC or XT. Then connect the PCnet II "twisted-pair" cable to the main network cable using a standard modular "telephone jack." The same kind of jack that's used on your telephone. To move your PC from one point to another on the network, simply plug in at the desired location. It's that easy.

With AST-PCnet II, anywhere from 2 to 160 PCs can be interconnected. Standard PC-DOS commands are used to access remote drives and printers. And dedicated file and print servers are not required, because shared PCs also function as standard workstations.

We're AST, the world's leader in communications and enhancement products for the IBM PC. To find out how AST-PCnet II can expand your IBM PCs and XTs into a reliable, versatile LAN, call or write AST Research,
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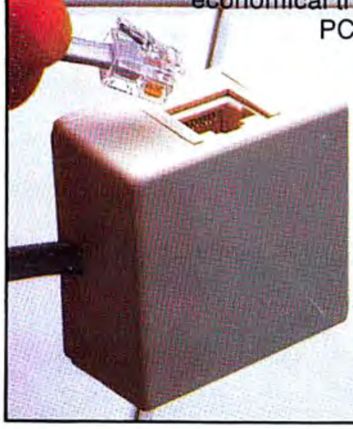
AST-PCnet II Local Area Network



Now You Can Use Your IBM PCs as Smarter Smart Terminals in the IBM3270 World.

More and more, people in your company want to access data from the mainframe. And since IBM PCs are in (while dumb terminals are on their way out), you need one good source for a complete family of micro-to-mainframe communications products.

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For starters, there's our new AST-SNA family. Hardware and software that let your PCs talk to your mainframe (and let the mainframe talk back) via the SNA/SDLC protocol. Giving you all the facilities of a 3270 terminal. And with the computing power of your stand-alone PC maintained!

Plus, the basic hardware can support multiple protocols. And you can support a variety of emulations from a single PC. Or support additional PCs by using one as a cluster controller. An arrangement (with up to four PCs) that can save you a lot of money. You can even attach low-cost ASCII CRTs to a PC and emulate 3278 Model 2s.

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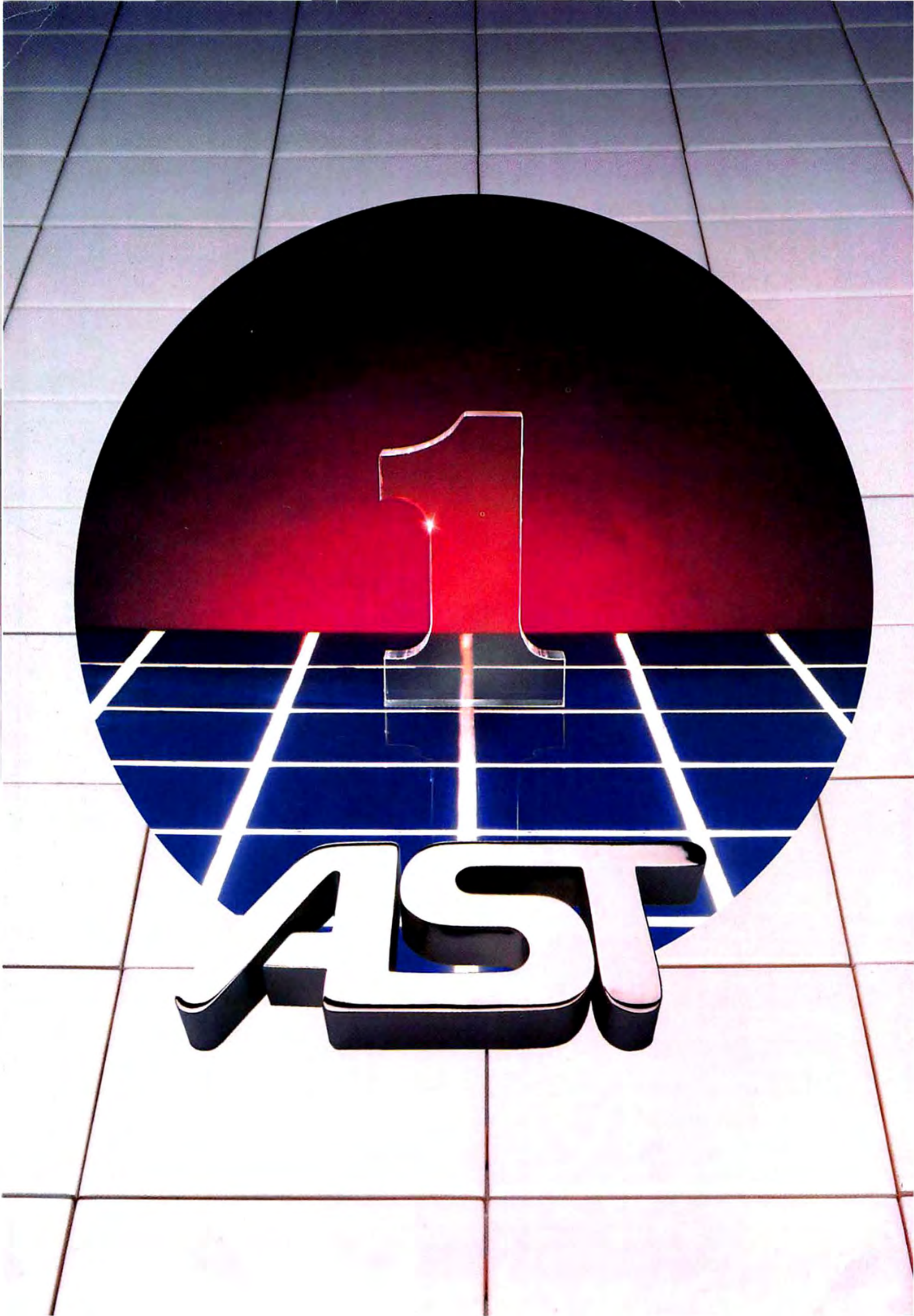
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AST brings you the perfect 4-5-6 for your Lotus™ 1-2-3.

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MonoGraphPlus Graphics Card

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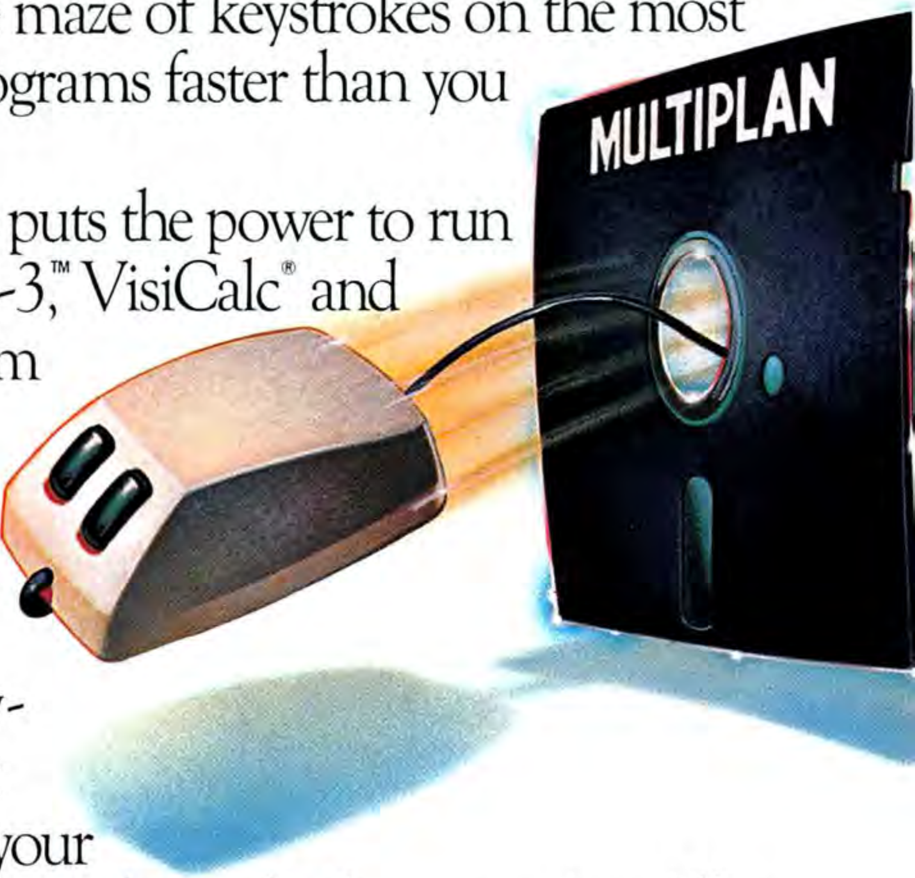

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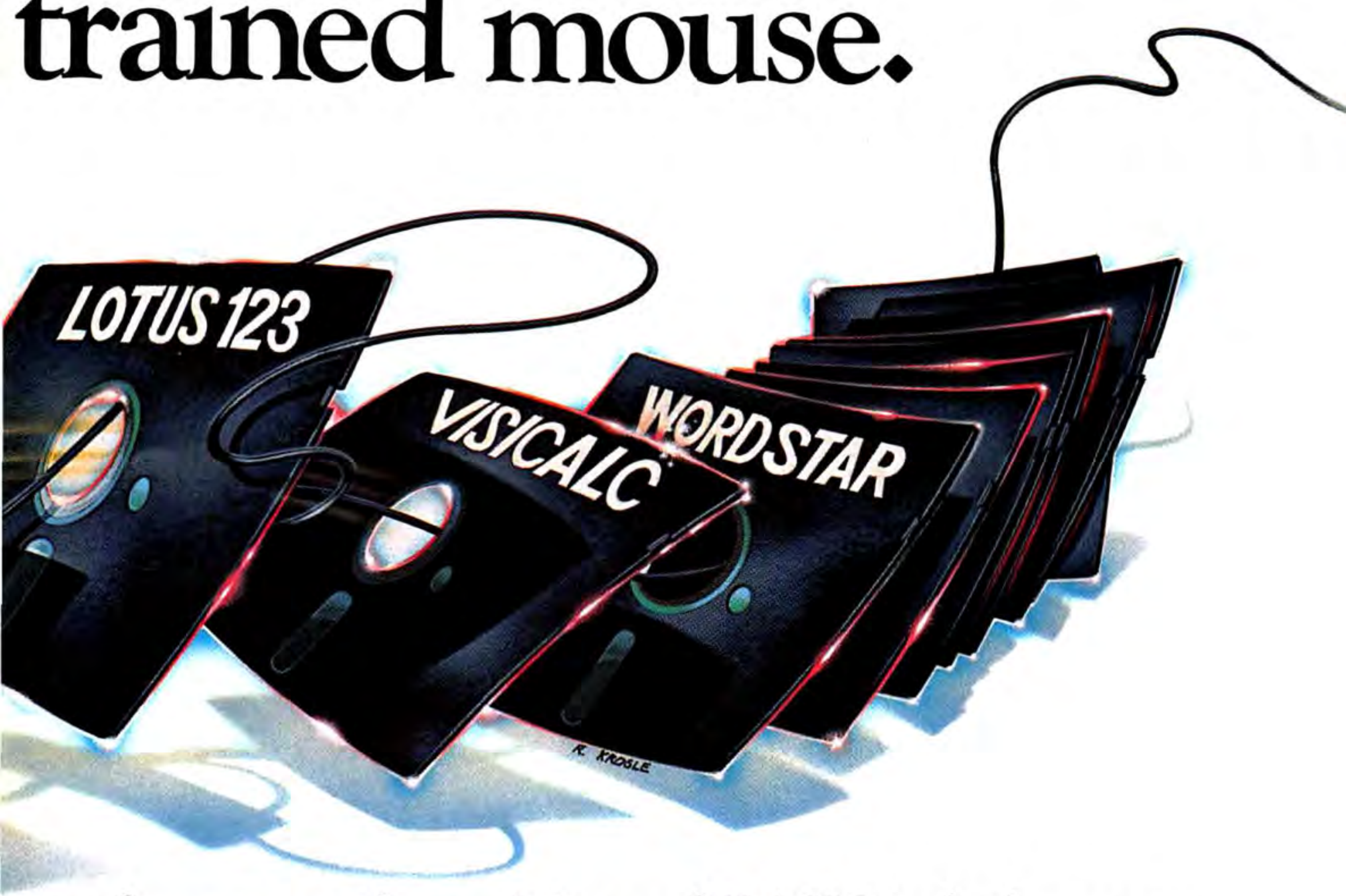

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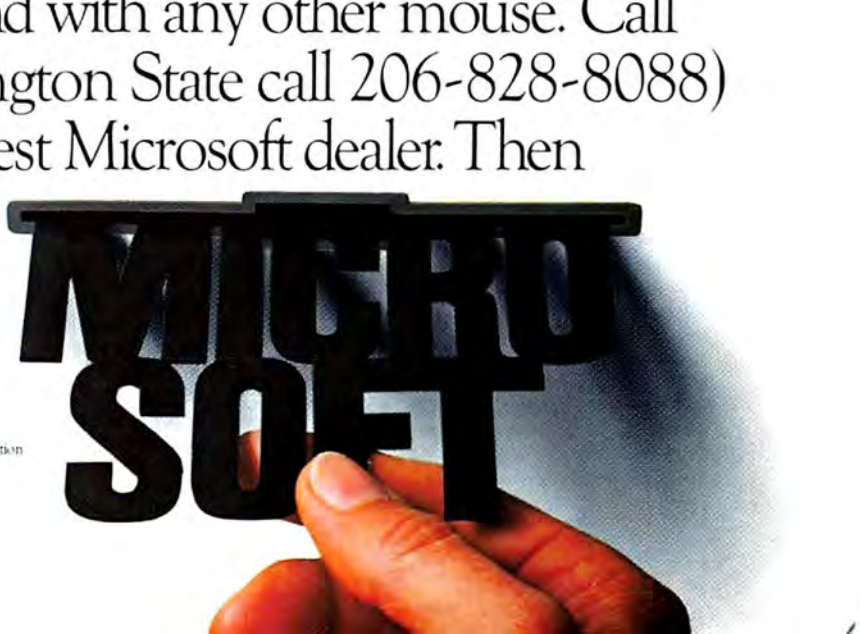

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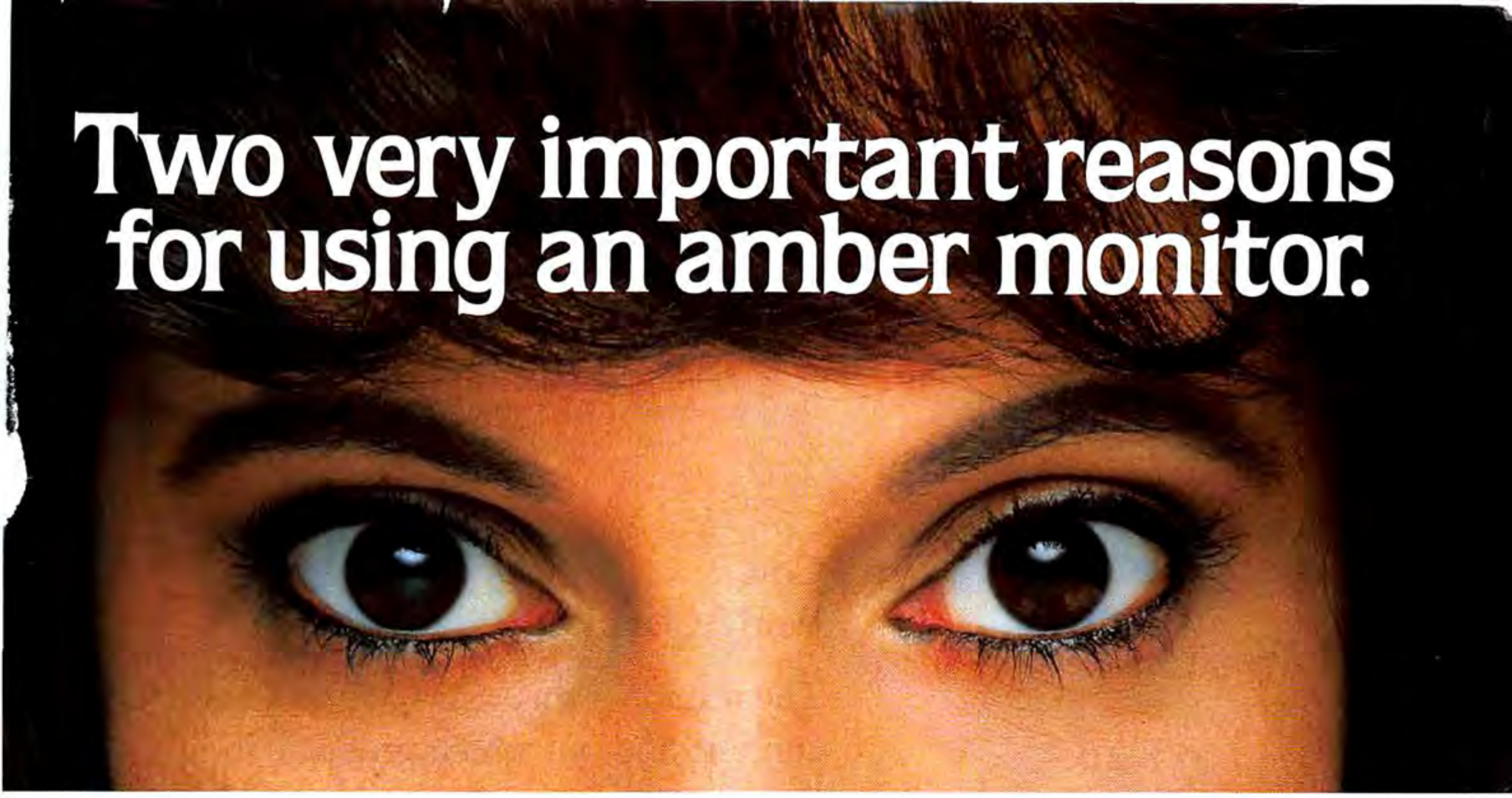

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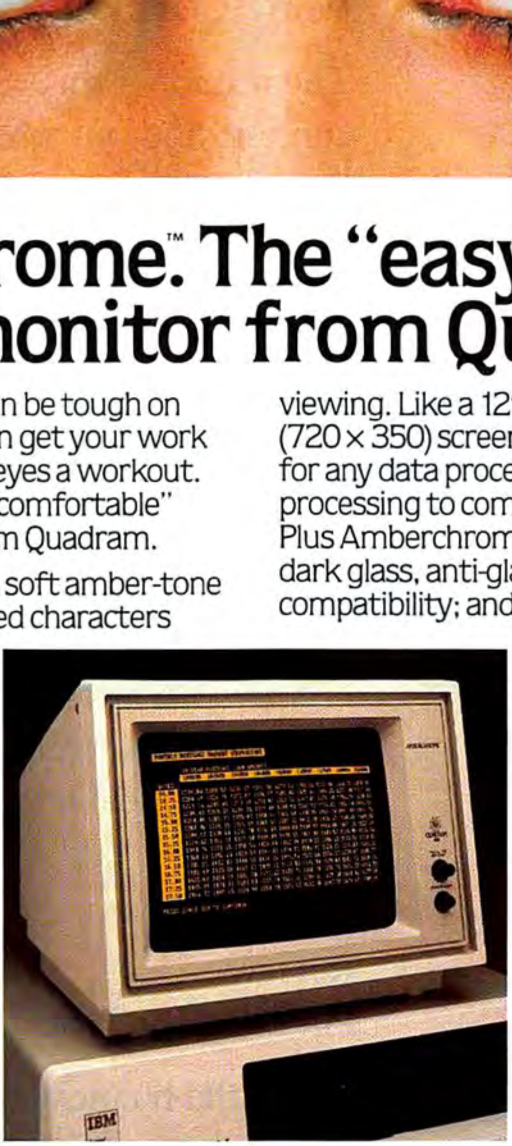

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PC WORLD

The Comprehensive Guide to IBM Personal Computers and Compatibles
November 1984

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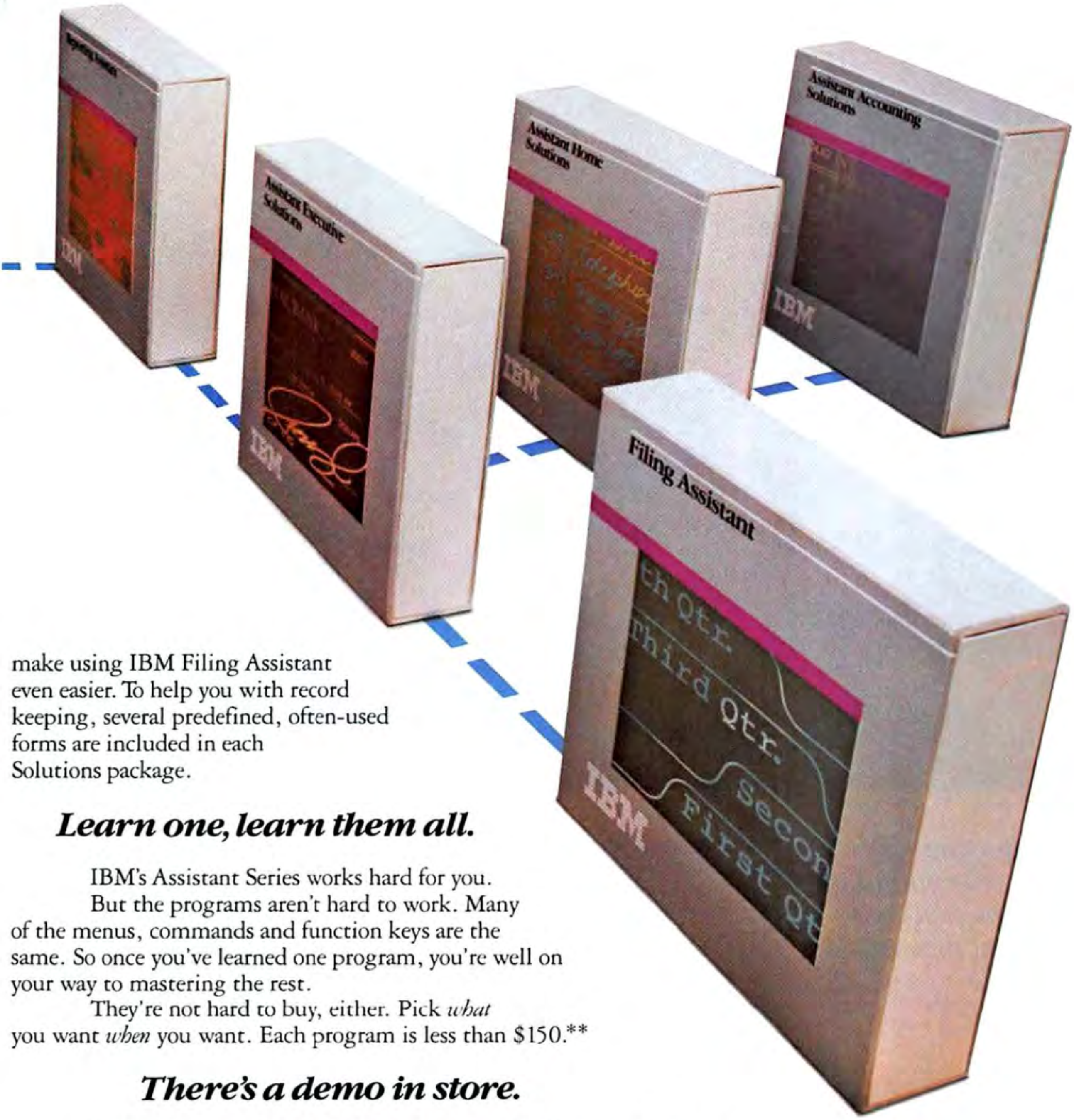

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Introducing our new Smartcom II. More connection capabilities. More convenience.

Now Hayes goes even further to streamline your communications and optimize your connections.

Smartcom II software is currently available for more than 16 personal computers (with even more to come). That means you can communicate, Smartcom to Smartcom, with an IBM PC, DEC Rainbow 100, HP 150, TI Professional Computer* and others.

And that's not all! Smartcom II also emulates the DEC VT100 and VT52 terminals, now in widespread use in many businesses. This feature lets your personal computer "pretend" it's a DEC terminal, opening the door to a vast installed base of DEC minicomputers!

We stand on protocol.

In addition to the popular Hayes Verification protocol, the new Smartcom II also includes the XMODEM protocol, ensuring accurate transmission to a wide range of personal computers and mainframes at information services. By matching the protocol (or "language") of a remote computer to yours, Smartcom II can transmit information error-free, regardless of interference on the phone lines.

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"When I got this computer I thought my problems were over. Then it dawned on me I needed to talk to the PC in sales and the TI in accounting. What I needed was the right modem and software, so I went with the leader!"

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Smartcom II makes telecomputing simple, even when you're not there. It allows your Smartmodem to receive a message for you when you're out, and leave it on your disk or printer. And you can tell Smartcom II to "save" the messages you've created during the day, and automatically send them at night, when phone rates are lowest.

Get your hands on the leader.

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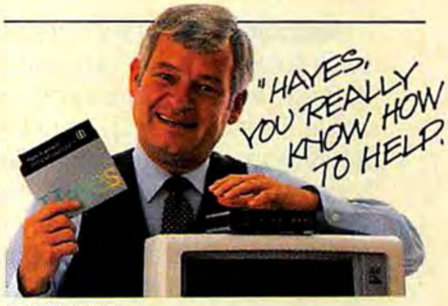

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My Travels in the PC Time Machine

David Bunnell

A few lessons from the "last hundred years" of personal computing history, and a pioneer's perspective on the status and direction of the industry

When you work in the personal computer business, your clock/calendar ticks at a different rate than the rest of the world's. Even though in the real world I am only 37, as one of the 10-year veterans of the personal computing industry, I must be well over 100 in personal computer world time. This is not a complaint: although I don't feel like a centenarian, I have probably had a 100 years worth of experiences.

In 1974 I was one of 15 people trying to hang on to an electronics company called Mits that was all but wiped out by what was known as the "calculator wars." Our problem was that the calculator kits that we sold for $110 were suddenly available in already assembled form for under $50.

Our salvation lay in a computer kit—the Altair—which we hoped would be featured on the cover of *Popular Electronics* magazine. The question was whether we could keep the company afloat while we waited to see if the magazine article would have enough impact to keep us in business.

As I helped our company president, Ed Roberts, draft that article, I could not have anticipated that it would set off a frenzy that would come to be known as the start of the personal computer revolution.

Expecting to sell only 500 Altair computers in 1975, we received some 5000 orders for the kits, with payment, within three months of the article's publication. Soon after, many of the people who had bought Altairs set up their own businesses, including the first computer retail stores and the first personal computer peripherals and software companies. Before the end of the year there were even two personal computer magazines, *Byte* and *Creative Computing.*

Recently, the Altair days and many other early personal computer developments, including the founding of Apple Computer Company, were extensively reported on and in some ways romanticized in a book by Paul Frieburger and Michael Swaine called *Fire in the Valley.*

Many people who read this book are amazed to learn of the humble roots of personal computing. For one thing, even though much of the technology necessary for the personal computer's existence was developed in the Silicon Valley, the Altair itself was created by a dinky company in Albuquerque, New Mexico.

By 1977 Mits was recognized as the dominant personal computer manufacturer, and for a brief moment (which seemed like years to me) this southwest city was the center of the personal computer universe. Microsoft, which had grown out of Mits, was also in Albuquerque, as were *Personal Computing* magazine (started by yours truly) and The United States Robotics Society.

Since then there have been many spectacular successes and equally spectacular failures as entrepreneurs struck out for the gold, launching a multitude of personal-computer-related businesses. Some of the great successes grew out of early failures. For instance, both ComputerLand and MicroPro germinated from the bankruptcy of Imsai, a computer company that had produced an Altair look-alike. And, sadly, some terrific start-ups turned into dismal failures.

Though I confess that my hundred years of experience makes me biased, it seems to me that the history of personal computing contains important lessons for everyone. Even if you're not interested in authoring the next *VisiCalc* or designing some ground-breaking new lap-size or (heaven forbid) watch-size computer, the dramatic changes and gyrations that have shaped this business are precursors of events to come in all businesses and institutions worldwide.

The spillover will occur as we adopt the personal computer on a mass scale; it will alter the way we work and the way we access and distribute information. In short, it will turn our institutions inside out.

The personal computer, like the automobile, the television, and a select few inventions preceding them, is a watershed invention–an invention that will change the very structure of our society.

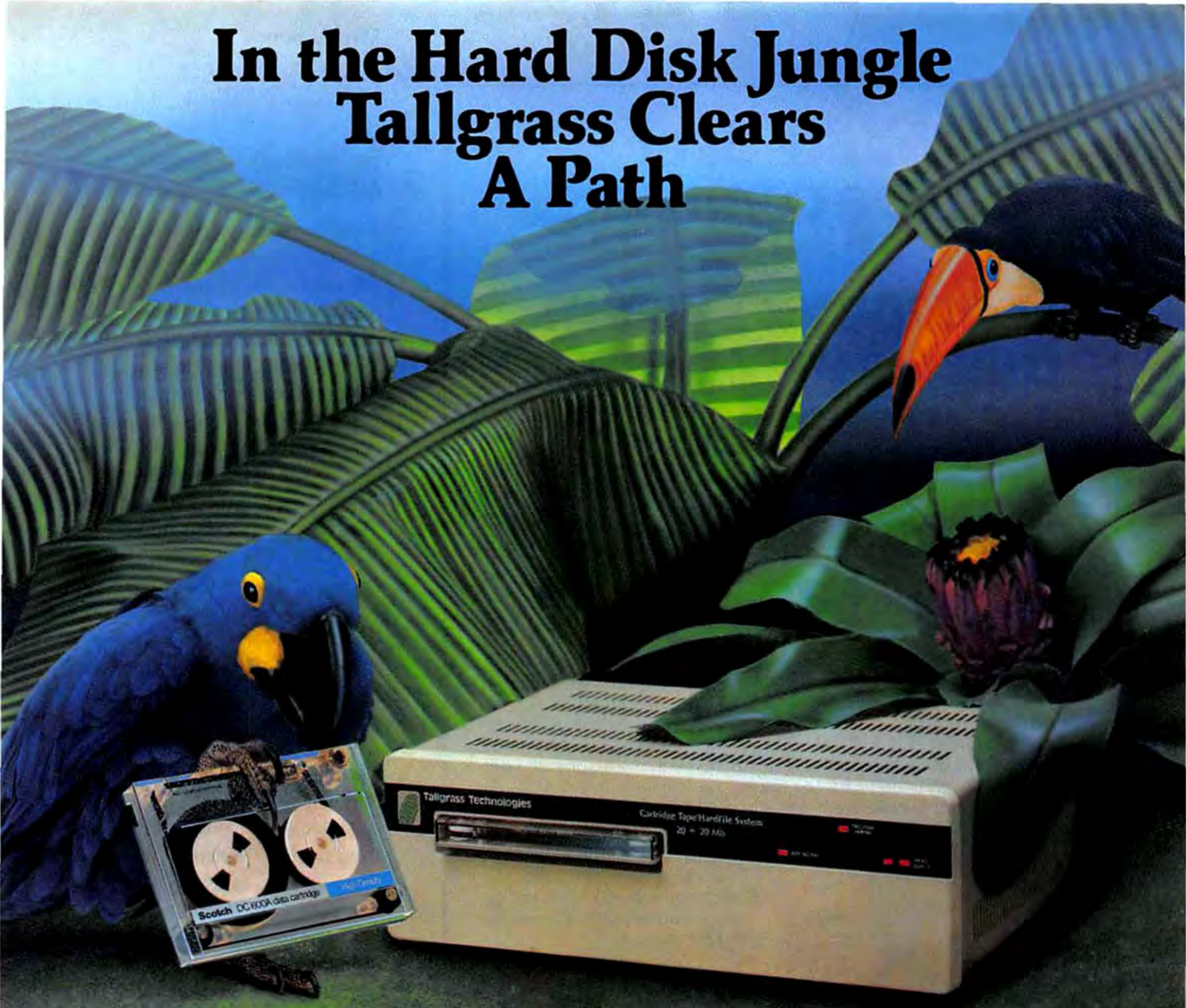
There are many theories about why the personal computer has such a strong and lasting hold on people. According to Chuck Peddle, a computer pioneer par excellence who designed the original Commodore computer and, more recently, the Victor 9000 computer, "Once you become computer literate, computing is like sex: you can't live without it."

His theory explaining why so many people were captivated by the Altair was that they had had a taste of computing in the universities, where they used Dartmouth BASIC on a mainframe computer. They didn't care that assembling an Altair with a soldering iron and what were admittedly not-too-user-friendly instructions was a process that could take several weeks. They didn't care that once it was assembled the system had 256 bytes (not kilobytes) of memory that initially could be programmed only by toggling a series of switches on the Altair's front panel. (Of course, what really made the Altair sing was Altair BASIC, written by Bill Gates and Paul Allen, and workable 4K memory boards from a Berkeley, California, company called Processor Technology.)

Personally, I'm not sure that I agree with the analogy between computing and sex. However, I do think that humans are developing a symbiotic relationship with the personal computer that may last for centuries.

I think of the computer as an extension of our memory, and I can easily forsee a time when this

In the Hard Disk Jungle Tallgrass Clears A Path



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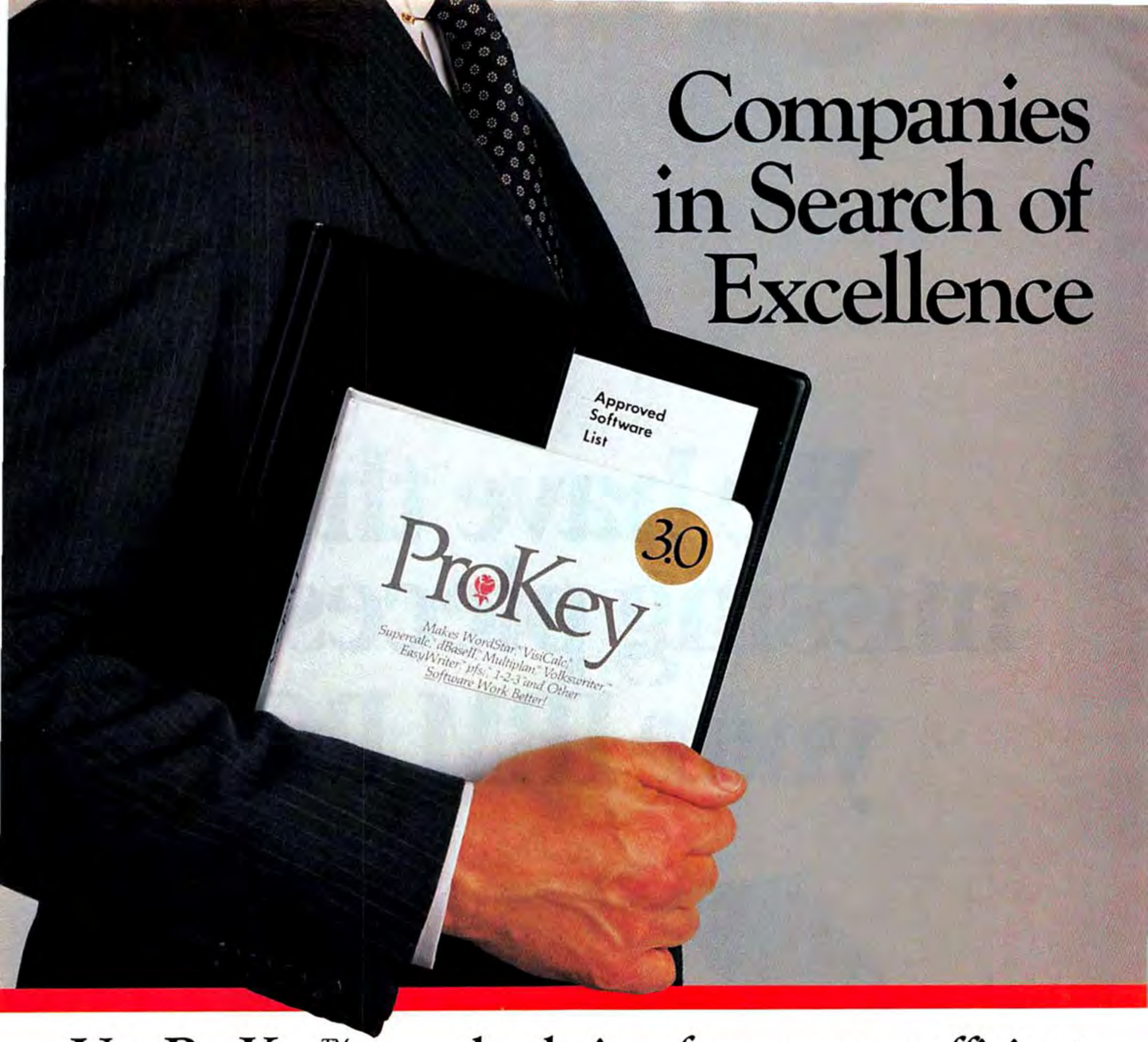
[redacted]

additional memory will be with us for life. Imagine that from birth, every time you went to a doctor or dentist, you took your personal computer along. The physician would update your medical data base so that throughout your life you would have access to your complete medical history. Whenever you changed doctors or were in a remote location, your medical history would travel with you.

Since the computer has the ability to remember an infinite amount of data accurately, it has the potential to become an electronic genie that can enhance the power of the human brain. Once you start using a personal computer, you quickly reach the stage at which living without one is highly undesirable.

The main conclusion I draw from my involvement in this industry is that, as dynamic as it is, we "ain't seen nothing yet." For the participants in the industry, the last decade may seem like a century, but in relation to the impact it will have on society, the PC business is still in its infancy. ●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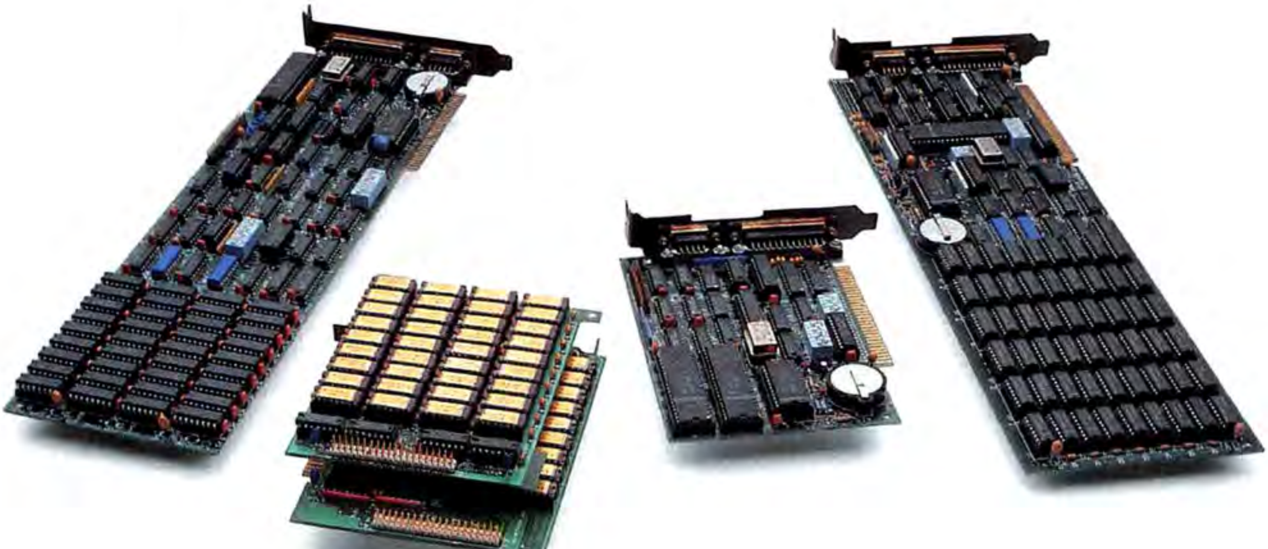

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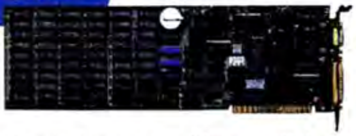

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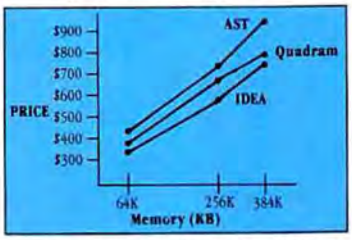

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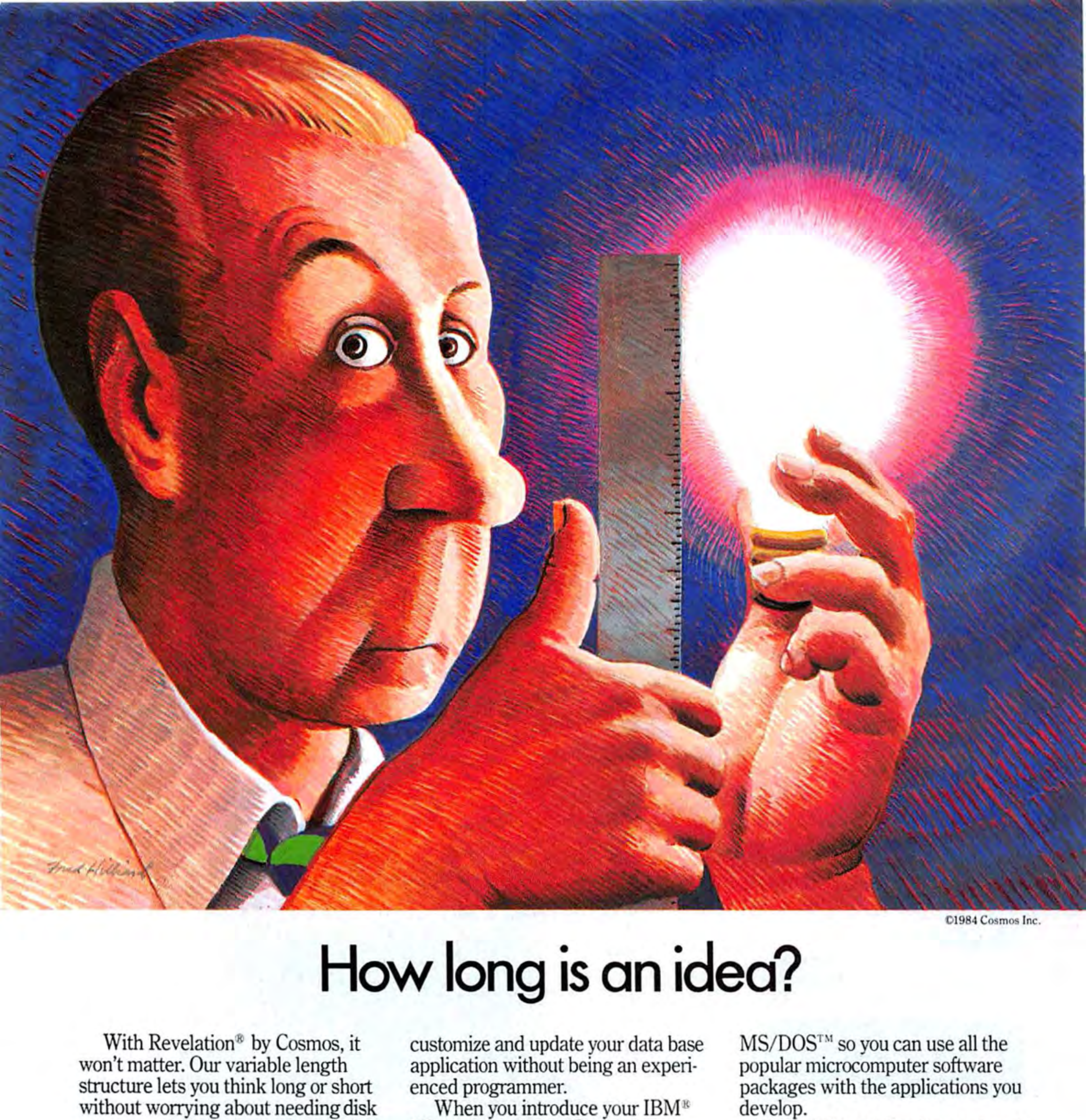

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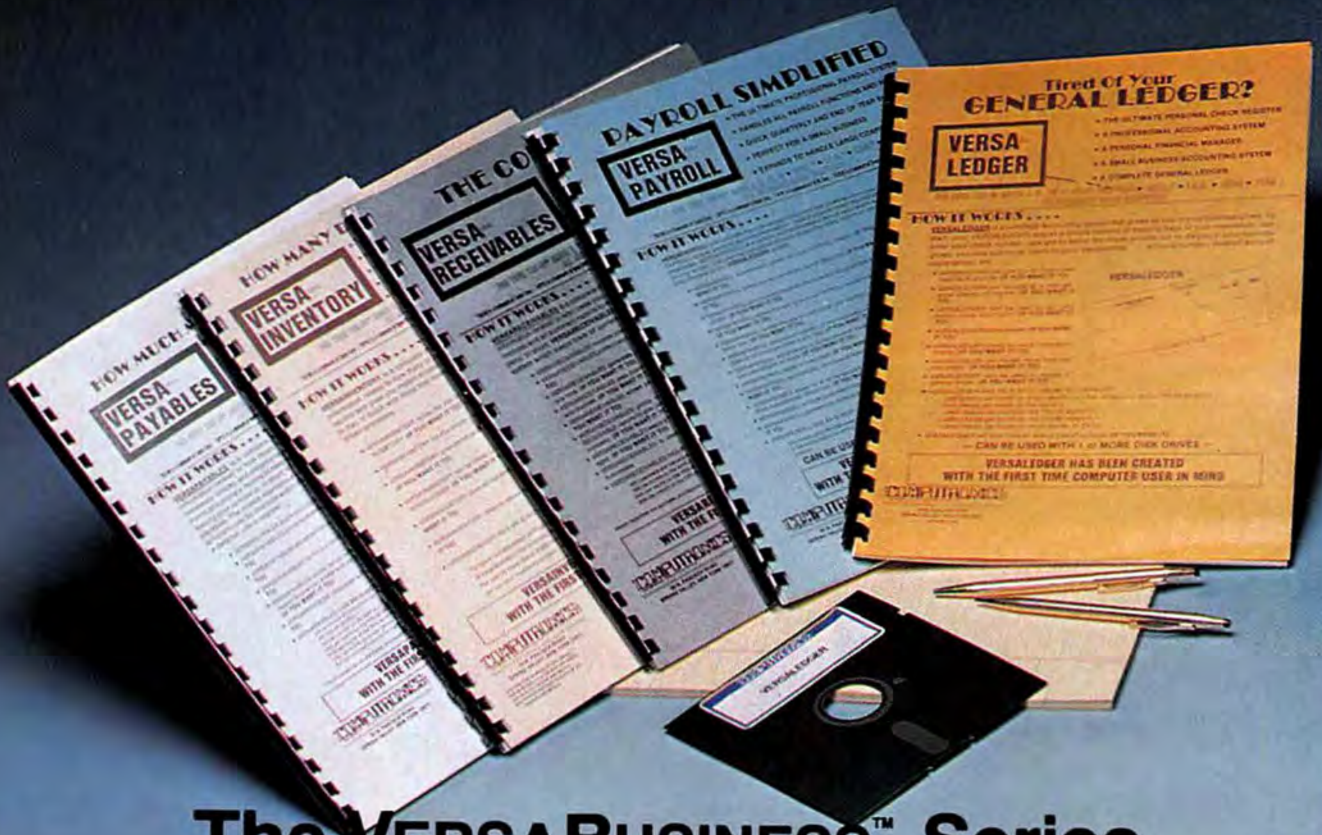

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Harry Miller

A New Look at Accessibility

The changes in this issue of PC World are designed to bring you easier access to the information of greatest interest and to relieve your information burden.

Information overload: at one time or another it affects everyone. We're routinely flooded with information that we really want and need, but the volume of data simply overwhelms us. I can certainly attest that I've fallen victim to this by-product of the information age.

By your responses and your loyalty, you've told us at *PC World* that we're delivering material that's relevant, helpful, and often absolutely essential. As providers of that important data, we feel a responsibility to make the information as easy to get to as possible. And that is what *PC World*'s new look is all about.

For starters, we've created better tools to direct your attention to the items that we feel are most important. The greater emphasis on sidebars (the "boxes" or self-contained stories within articles), the longer captions for figures, and the more explicit large-type article introductions and highlights convey the core of a story without requiring you to take the time to read every word. And that will help you choose the stories you'll want to devote more attention to.

The New Order

We've rearranged the sections and departments to better reflect the way people are reading the magazine.

As always, the magazine opens with two columns. Each month you can sample the perspective of industry pioneer and *PC World* Publisher David Bunnell, and most months you can also read the provocative opinions of guest columnists in the *REMark*. The *Letters* department then presents a lively forum for our readers' opinions regarding topics and ideas that we've covered in past issues.

The *Letters* department is immediately followed by *PC World View*, which features news and reports on recent trends and events in the personal computing community. Easy to start, read, and finish in one sitting, these pieces join to form the appetizer, allowing you to work up to the entree yet to come.

Next, the "Getting Started" section presents simple explanations and tutorials aimed at making new computer users more comfortable with their systems. *The Help Screen* answers readers' questions on subjects that don't warrant a full article but nevertheless present potential stumbling blocks.

The "Community" section has moved to the front of the magazine, and with its new position comes a new focus on personal computer applications. We'll be highlighting success stories (and tales of woe) that demonstrate how personal computers are being enlisted to solve problems in the workplace. "Community" will also continue to present the profiles of industry personalities and the discussions of topics and trends that have made the section an integral component of the magazine. As part of the "Community" section, the *Compatibles Update* department will continue to track business developments in the world of PC clones.

The "Review" section evaluates new hardware and software products to help you choose the winners and eschew the losers. Just as important, with each review we seek to impart some of our ideas about how products should be designed and how they should perform. In this way we hope to give you a frame of reference from which to make your own evaluations. *From the Software Shelf* presents our editorial staff's impressions of new and promising software products. Space limitations prohibit full-size reviews of even a fraction of the new software packages released each month, but these capsules let us abbreviate the review process in the service of keeping you better informed.

The "PCjr World" section not only describes, evaluates, and explains the use of new products that work with the IBM PCjr, it also covers applications aimed at the home, education, recreation, and personal management. Even if you don't own a PCjr, you will find articles of interest and relevance in this section.

The "State of the Art" section describes technological and product advances that have not yet become part of the general marketplace. Products and techniques found in this section are usually too new, too experimental, or too expensive for the average computer user, but these products are likely to have a significant impact on our working styles in the future.

Articles in the "Hands On" section are typically step-by-step tutorials for performing some software trick or adapting hardware in a new and useful way. Often found in this section are useful BASIC programs, *ProKey* macros, and *1-2-3* templates, along with explanations of the more technically sophisticated aspects of the PC's operation. The department called **.** (*Star-Dot-Star*) is a collection of useful tricks and tips that our readers have discovered.

The *Just Announced* department describes new products and provides access information that you can use to further investigate the products.

You probably see the trend by now: the content becomes more technically sophisticated as you move through the magazine. At the same time, as you go further toward the back, the degree of interaction with the magazine increases. It's important to understand, however, that there's likely to be something for everyone in every section. Advanced users may find a unique explanation in the "Getting Started" section that will come in handy when helping a novice get up to speed. Likewise, inexperienced users may find a "Hands On" tutorial that goes a bit further than the manuals, even to the point at which things fall into place for the first time.

Same Old Commitment to Quality

This redesigning and rearranging won't change the overall content, clarity, integrity, or accuracy that we're so proud of. We'll certainly still be taking that extra step to help you get a little more from your computer. And we'll be as exhaustive as ever in our product evaluations.

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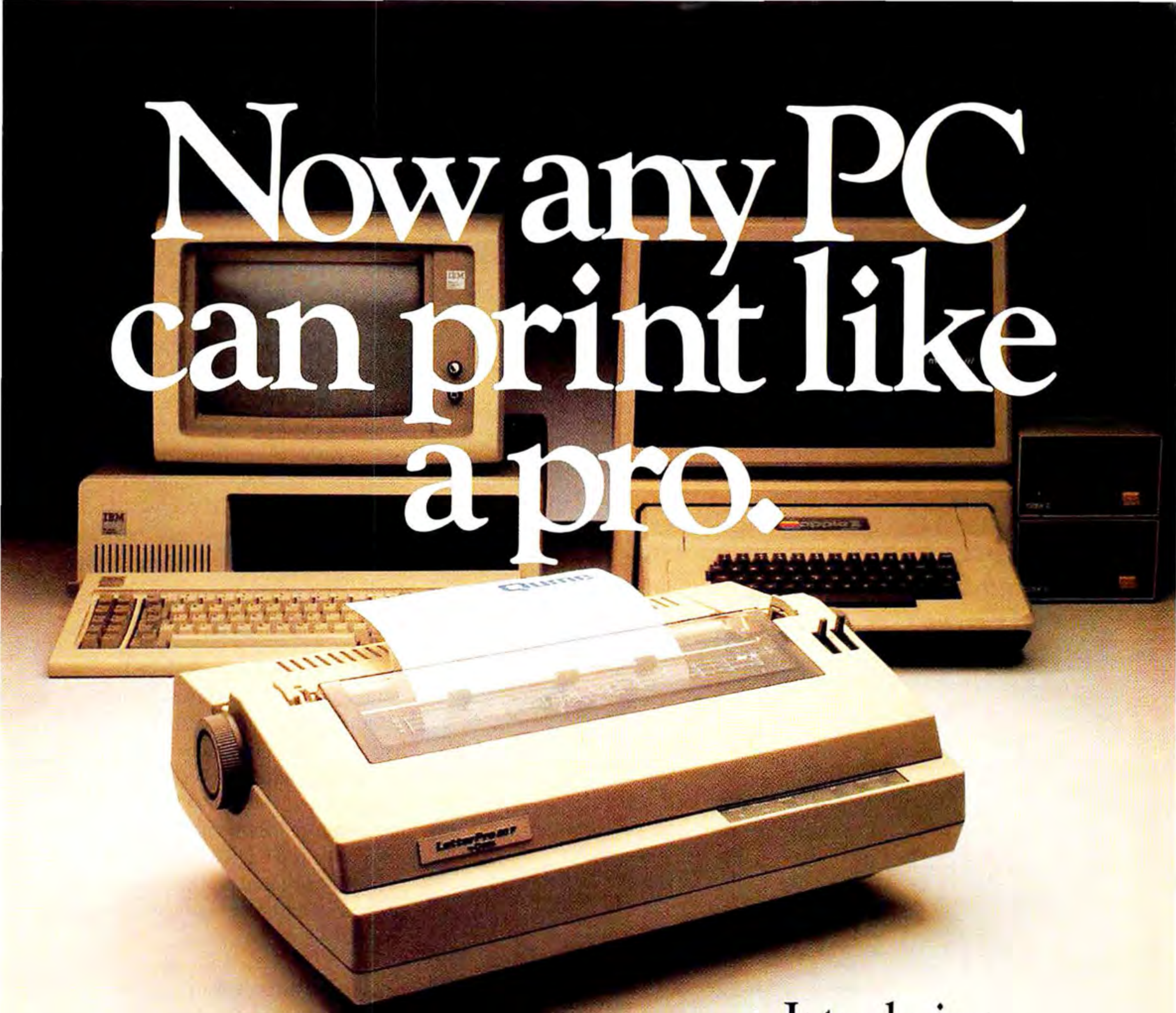

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We've noticed that many of the other computer magazines have been publishing "reviews" of products based on canned demonstrations provided by company representatives. You won't find such reviews in these pages. The "State of the Art" section encompasses early descriptions of products that represent a technological or marketing advance, but we won't review a product until we have something in our possession—that is, until we've had a chance to put the product through its paces and try to make it fail. We've seen too many products, touted as great breakthroughs in manufacturers' demos, turn out to have some fatal but hidden flaws. So even though it may cost us a few "scoops," we don't think it's fair to our readers to do it any other way. It'd be like asking you to buy a car based on the salesperson's description of how it handles and rides.

Eradicate Obfuscation!

The changes I've described here reflect the changing needs of our readership and illustrate our constant efforts to find better ways to serve you. We're acutely aware of those needs because we're trying to do the same thing you are: coax a little more usefulness, a little more productivity, and a little more performance from our personal computers. We welcome your companionship and your collaboration as the magazine, its audience, and the personal computer industry grow and change together.

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KAYPRO	●	●												●	●		●	▲				
APPLE II+	●	○					●					○						▲	●			
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Letters

Reactions and responses from the PC World community

Words on Warranties

Thank you for the generally excellent article on software warranties by Phillip Gordon ["Totally Unwarranted," *PCW*, Vol. 2, No. 9]. However, it contained an error that may cause some problems for your readers trying to do their own legal research. The Uniform Commercial Code (UCC) is not a federal law but rather a uniform state law in effect in all 50 states. Even though it is called "uniform," this law does vary significantly from state to state, especially in the areas of warranties and disclaimers.

If a particular piece of software is treated as coming under the Magnuson-Moss Consumer Warranty Act, a consumer injured by breach of warranty will be able to recover attorney's fees as well as actual expenses if the consumer prevails in court. This provision of the act is especially important in cases in which the damages may be less than the potential attorney's fees.

Charles Kyle Kenyon, Jr.,
Attorney
Tomah, Wisconsin

The Right Copyright

In "Special Symbols in Word Processing" [*The Help Screen*, *PCW*, Vol. 2, No. 7], the reader inquired how he might produce trademark, copyright, and registered trademark symbols using *WordStar* and an Epson MX-80 printer with Graphtrax. In his answer, Mr. Koessel stated that printing *TM*, *(C)*, and *(R)* in condensed superscript mode may be an acceptable alternative.

As an attorney specializing in the computer field and therefore dealing with copyright matters on a regular basis, I am not aware of any provision in the federal copyright statutes or any reported court decision permitting the letter C enclosed in parentheses to serve as a valid notice of copyright. The copyright laws specifically require either the familiar symbol © (enclosed by a circle, not parentheses), the abbreviation *Copr.*, or the word *Copyright*. Until this requirement is modified by Congress or by interpretation of the courts, the convenience of using *(C)* could prove very costly.

Robert B. Clifton, Jr., Attorney
Atlanta, Georgia

Rate of Exchange

The letter from Lawrence D. Baca in the March issue [*PCW*, Vol. 2, No. 3] attracted my attention because I had a similar experience with my PC. Due to a short in the keyboard cable, my PC broke down some time ago. I shipped it to IBM France, and a week or two later they told me that they had had to exchange the motherboard at a cost of $900. In addition, I have to use the old keyboard cable, which I repaired myself, since IBM France didn't have one!

Frankly, I can't believe that a malfunctioning keyboard cable could damage more than one or two chips. (It is incredible that a malfunctioning peripheral device could damage anything at all; it shouldn't be too difficult to protect electronic circuits against this sort of problem.) IBM's policy of exchanging the whole motherboard when one or two chips are damaged should be of interest to prospective owners of an IBM PC and could influence their decision to buy one.

Alex H. Blin
Grenoble, France

Standard Trap

I'd like to comment on the letters by J. Johnson and B. S. Hall in the July issue about the pitfalls of buying compatibles [*PCW,* Vol. 2, No. 7]. Like many "compatibles" customers, they have fallen into a standard trap.

Bundled software is a bonus, an inducement to buy a particular machine. Buyers who let this sway their judgment of the merits of any machine are being unrealistic. Something that seems too good to be true probably is, and a $1200 package of software with a $2200 computer falls into that class.

Support for bundled software is necessarily curtailed. It is terribly expensive to create and support software–the Lotus *1-2-3* program required a seven-figure budget to bring it to the marketplace. Have you noticed that many bundled programs were due to be relegated to second-line software status? If you think about it, why would a company allow "free" distribution of any software that has not been fully amortized?

Pieter Behr
Willingboro, New Jersey

Applause for Symphony

This letter is in response to Mr. Fluegelman's recent review of *Symphony* ["Five Complex Pieces," *PCW,* Vol. 2, No. 7]. I have had a beta copy of *Symphony* for about a month, and my impressions of the product are diametrically opposed to those of Mr. Fluegelman.

When I first read of Mr. Fluegelman's disappointment with *Symphony* I was astonished, but I assumed that I had overlooked some glaring flaws in the product. I anxiously read through the article, looking for the bombshells. There were none!

The article's most serious criticism of *Symphony* seems to be that it is too complex. In my opinion, complexity is a relative term. After spending about an hour with *Symphony,* I felt overwhelmed. When I settled down and started to look at the manual and the screen methodically, I began to understand that the product would be far easier to learn that I could ever have imagined. I was an early convert to *1-2-3* and have been using it for a year and a half. *Symphony* speaks the same language.

If a person were presented with *1-2-3, Volkswriter, PC-Talk III,* a data base manager, and a graphics package, would that combination be more complex than *Symphony?* The answer is obvious.

As to Mr. Fluegelman's criticism of the degree of integration, I am dumbfounded. To have formulas embedded in the midst of text seems like a godsend. No need for tricky ways of putting them in. Just two buttons, enter the formulas as if you were in *1-2-3,* and two more buttons get you back to the letter. Brilliant! The windowing function allows you to know what's going on in a different environment easily without having to leave what you are doing.

I rate *Symphony* a 10 +. I believe that Mr. Fluegelman's evaluation of *Symphony* is way off base.

Eric Haskell
Lawrenceville, New Jersey

Slipped Our Memory

I fail to fully understand the next to the last paragraph of Danny Goodman's article, in which he addresses the ability to piggyback additional memory on component memory expansion boards ["How Much Memory Is Enough?" *PCW,* Vol. 2, No. 6].

I have made extensive use of RAM disks and spoolers and often encounter an out-of-memory condition.

The article contains what appears to be a dichotomy in terms, but hopefully is a lack of information on the part of the reader. By piggybacking the additional memory components, can MS-DOS 2.00 or above address in excess of 640K RAM? If MS-DOS can support the higher level memory by the piggybacking technique, it would aid this operator immensely in some of my current operations.

John R. Jones, Jr.
Arlington, Virginia

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Using a memory technique called bank switching, the PC can exceed 640K of RAM. Tall Tree Systems, for example, offers hardware and software that places RAM disk and print spooling functions in up to 2MB of bank-switched memory. This leaves practically all of your primary 640K available for data.–Danny Goodman

Better Bar Charts

Burton Alperson's article in the August issue ["Beyond Bar Charts," *PCW*, Vol. 2, No. 9] was useful for its information on two fairly expensive programs.

However, Dr. Alperson states that floating labels are not available using *1-2-3*. Floating labels can be created in *1-2-3* by using the data-labels option. The labels can be placed next to plotted data points or can be positioned anywhere on the graph by defining a data range to be plotted and turning off both the line and symbols for the range. While it's not an ideal way to implement floating labels, this method does improve on *1-2-3*'s default of placing symbols on lines and providing a legend across the bottom of the chart.

Table 2 in the same article indicates that *1-2-3* cannot drive Epson FX printers or the HP 7475 plotter, as they are not named in the list of *1-2-3*'s drivers. The MX driver works fine for the FX printers, and the 7470 driver works for the 7475.

Kent Murray
Washington, D.C.

The thought of using data labels for floating legends never occurred to me. The technique works well, and it is at least as easy to implement as floating legends in either of the other programs. I'm grateful to Mr. Murray for the suggestion.

Since the article went to press, I have learned that Lotus has upgraded its printer and plotter support. 1-2-3 *will now support a greater number of devices than I indicated. The necessary file (LOTUS.DLB) is available to registered owners at no charge from their dealers. (The file is designed for version 1A of the program.)–Burton L. Alperson*

CorrectStar Tip

While the review of MicroPro's *CorrectStar* in the August issue [*From the Software Shelf, PCW*, Vol. 2, No. 9] described the spelling correction features of the program, it failed to point out one feature that improves the overall performance of *WordStar*. This feature is *CorrectStar*'s ability to perform multiple global replacements and at the same time automatically reform paragraphs that have been altered by the correction process.

Robert Krumm
Walnut Creek, California

More CorrectStar

There is an inaccuracy in your August review of *CorrectStar* [*From the Software Shelf, PCW*, Vol. 2, No. 9].

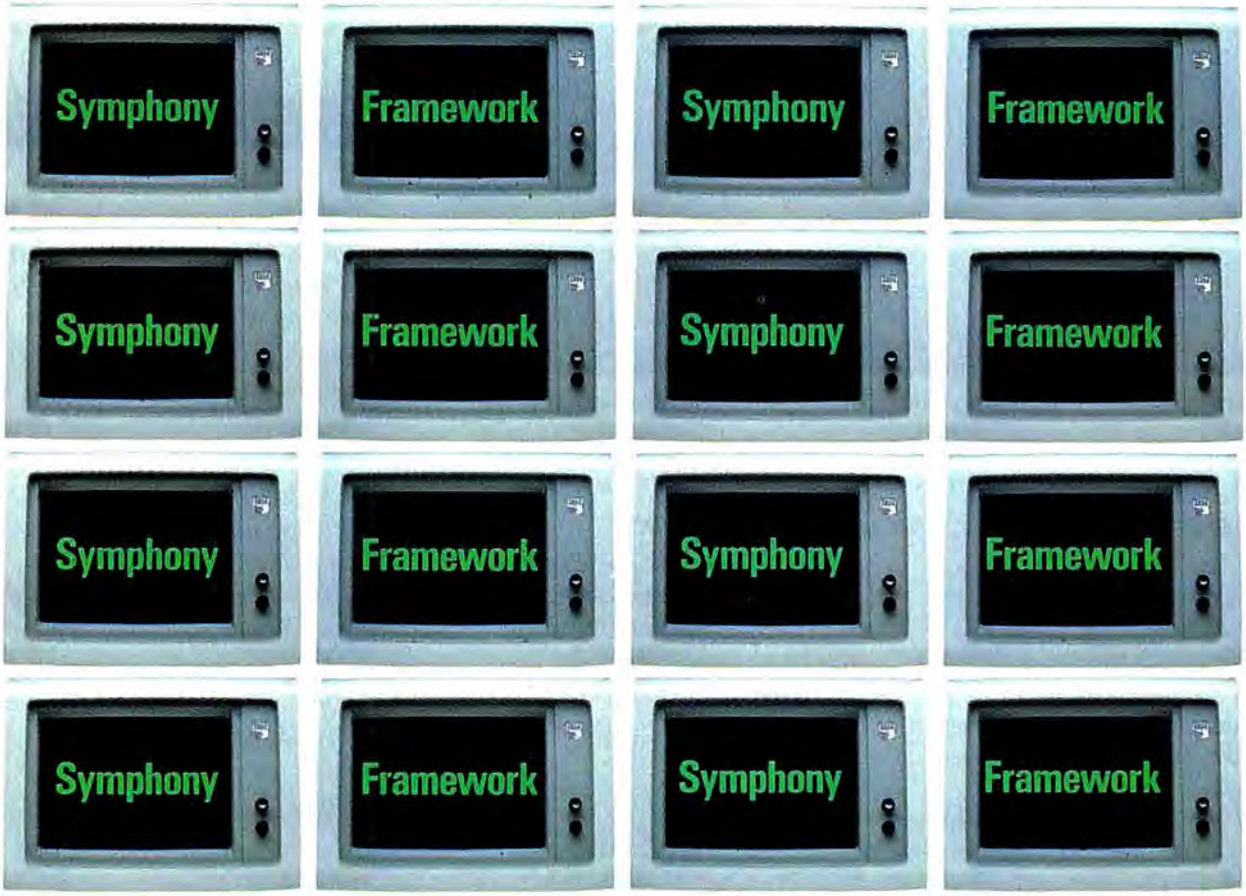
The author states that "you cannot jump forward or backward in the text but must proceed from the beginning to the end of the document. If you exit to *WordStar*, pressing <Ctrl>-L will return you to *CorrectStar* and relocate the cursor at its last position."

Actually, after you start a spelling check and interrupt it, pressing <Ctrl>-L will restart the check from the current cursor position. This means that you can make changes to a document after interrupting a spelling check, move the cursor to the beginning of the changed portion, and restart the spelling check. Or you can interrupt a spelling check, move the cursor down the document, and start the check at another point.

Incidentally, I operate a bulletin board from my home in Forest Knolls, California, and I'm happy to answer product questions. The number is 415/488-9145; the settings are 300/1200 bps, 8 bits, no parity, 1 stop bit.

Morris "MoJo" Jones,
CorrectStar Programmer
MicroPro International
San Rafael, California

To restate my point, I found it annoying that I could not go backwards or forwards in the text while I was in the CorrectStar



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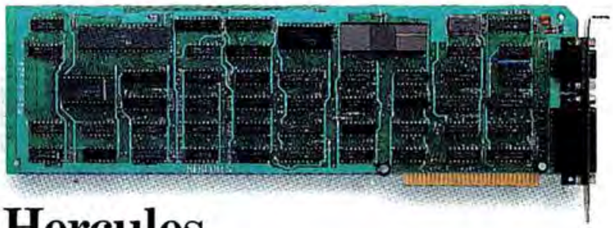

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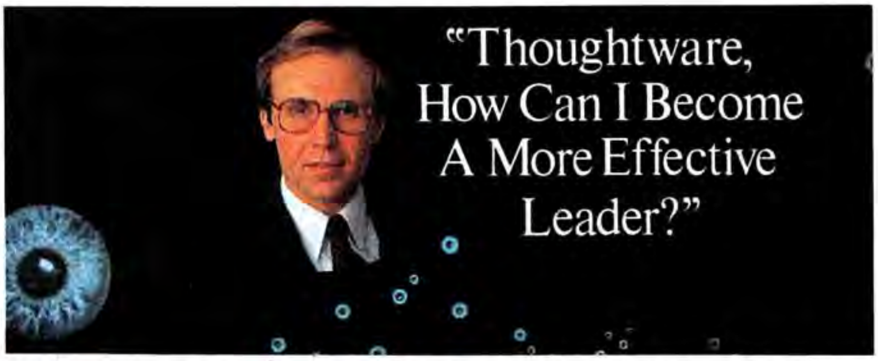

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program but could only proceed to the next misspelled word. In order to relocate the cursor elsewhere in the text, you can follow Mr. Jones's instructions. Bear in mind, however, that this takes time, since you must exit CorrectStar *and return to* WordStar.

Also, you can't return to a previously corrected word in order to recheck the list of alternative words CorrectStar *had offered as possible replacements. The only way to do that is to misspell the word again and restart the spelling check from that point. This strikes me as impractical.—Christine Whyte*

Compaq Correction

*In my article "Compaq Settles Down and Powers Up" (*PCW, *Vol. 2, No. 9), Key Tronic is incorrectly identified as the manufacturer of the keyboard for Compaq's line of Deskpro desktop computers. The Deskpro keyboard, which features snappy action and LED lights on the <CapsLock> and <NumLock> keys, is in fact produced by Advanced Input Devices.—Ken Greenberg*

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YOU WILL MAKE ABOUT YOUR IBM® PC
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QUADRAM

QUADBOARD BRINGS OUT THE BEST.

EXPANDABLE TO
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Quadboard doesn't waste space. It combines 10 of the most needed PC functions onto one board to leave lots of room for expansion. You get all this:

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3. **A serial port** (RS-232C adapter) for plotters, modems, letter quality printers and other serial devices.
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7. **QuadRAM Drive*** to set up multiple RAM drives in memory.
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Quadboard is the number one option board for the IBM PC. First in performance, dependability and reliability. It all adds up to Quality, from Quadram. A company you can count on today. And tomorrow.

QUADRAM QUALITY™

Before you fill another slot, consider Quadboard by Quadram. It's the best board for the job.

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Circle 149 on reader service card

Thinking of buying a modem? You owe it

Inside Outside

to yourself to check out the Qubie' 212A modems.

Just a few years ago, computers needed big air-conditioned rooms to operate in, balefuls of money to buy, and a team of wizards to keep them running. The constant march of technological progress has given more and more powerful machines which cost less and less. Desktop computers more powerful than the early mainframe computers are the result of the evolution. The Qubie' modems represent the latest extension of this progress. Because up until now, a 212A compatible modem cost at least $500. Through the use of four low-cost, state of the art microprocessors, we can now offer two versions of our full featured 212A modem at prices the competition sells 300 baud modems for.

In The Beginning

In September of 1983 we introduced the first 212A modem card for the IBM PC available for under $300. The PC212A/1200 is a complete communications package including PC-TALK III software, modular phone cable, card edge guide, and instruction manual. The modem is an auto-dial, auto-answer type, which uses all the Hayes software commands so it can be used with any of the popular software packages including Crosstalk,™ and Smartcom.™ We picked the best software package we could find based on it's ease of use and features, PC-TALK III. Our modem includes features the old industry standard missed out on. Like being able to fit in one slot in a Portable PC or PC/XT. Or an optional connector to use the modem's serial port when not using the modem. Of course the topper is the $299 price, hundreds less than the competition.

Now Available Outside

Our standalone modem, the 212E/1200 can be used with any computer or terminal with a RS-232C serial port. You can use any Hayes compatible communications software on anything from an Apple to a Zenith. Many owners of IBM PC's are using it because they lack available expansion slots, or have more than one computer they want to use their modem with.

It's attractive gold anodized case houses seven status lights (who says low prices means a shortage of features). It fits comfortably under a standard telephone. It is also a 212A compatible auto-dial, auto-answer modem which supports all Hayes software commands. Even the switch settings are the same, so any software giving recommended switch settings for a Hayes modem can be used, without knowing what the switches do. There is a volume control knob for easy adjustment of the speaker's output. Included in the package is modular phone cable, a cable to hook it to your computer or terminal, and instruction manual. Choose the communications package right for your needs, and you're ready to go!

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The heart of the Qubie' modems are four digital signal microprocessors. Two handle sending, and two do the receiving. Rather than attempt to filter all but the relevant tones used for modem communications, the microprocessors measure the tones digitally. This allows them to overcome line noise and static better than analog filter based modems

PC212A/1200 Includes: Modem Card, PC-TALK III software, card edge guide, modular phone cable, quick reference card, and instruction manual. **$299**
Optional external serial port connector **$20.**

212E/1200 Includes: Standalone modem with cable (specify male or female), modular phone cable, and instruction manual. **$329.**

Circle 605 on reader service card

Why Buy From Qubie'

Because you will get a product as good or better than any available, pay less for it, and get factory direct help if you need it. If at any time during the one year warranty period your modem should require service, we will fix it or replace it within 48 hours. Notice also there are no hidden charges in our prices. No extra for freight, insurance, credit cards, or COD fees. In a hurry? UPS 2nd day air service is just $5 extra. If you are like many who say, "Nah, it's too good to be true," just apply the acid test and find out. Then you will be asking yourself, "Why should I pay what these modems used to cost?"

The Acid Test

Qubie' gives you a 30 day satisfaction guarantee on your modem. If you are not completely satisfied we will refund the entire amount of your purchase including the postage to return it. If you can, get anyone selling another modem to give you the same guarantee. Buy both, and return the one you don't like. We know which one you will keep.

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The Ven-Tel Half Card.™ The only 1200 baud modem for your IBM XT or IBM Portable PC.

The Ven-Tel Half Card™ is the only internal 1200/300 baud modem that fits in the small expansion slots of the IBM-XT and the IBM Portable.

Free Expansion Slot. If you own an IBM PC-XT, look inside the chassis sometime. You'll see a number of standard sized expansion slots and one unused half-sized slot. That's where the Half Card™ fits—in a spot that would otherwise be wasted. So why take up one (or sometimes two) valuable full-size slots for your modem? With the Half Card,™ it's like getting an extra expansion slot for free.

True Portability. IBM Portable PC owners will appreciate the true portability offered by the Half Card,™ the only modem that fits in the half-sized slots of the Portable. When you're on the road, you won't need to pack along a bulky external modem, cable and power supply. Your modem will already be inside your computer, ready to go!

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 using the industry standard "AT" command set, automatic answer on any ring, and full compatibility with virtually all software.

The 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 Portable or XT to the world.

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From Ven-Tel Inc.

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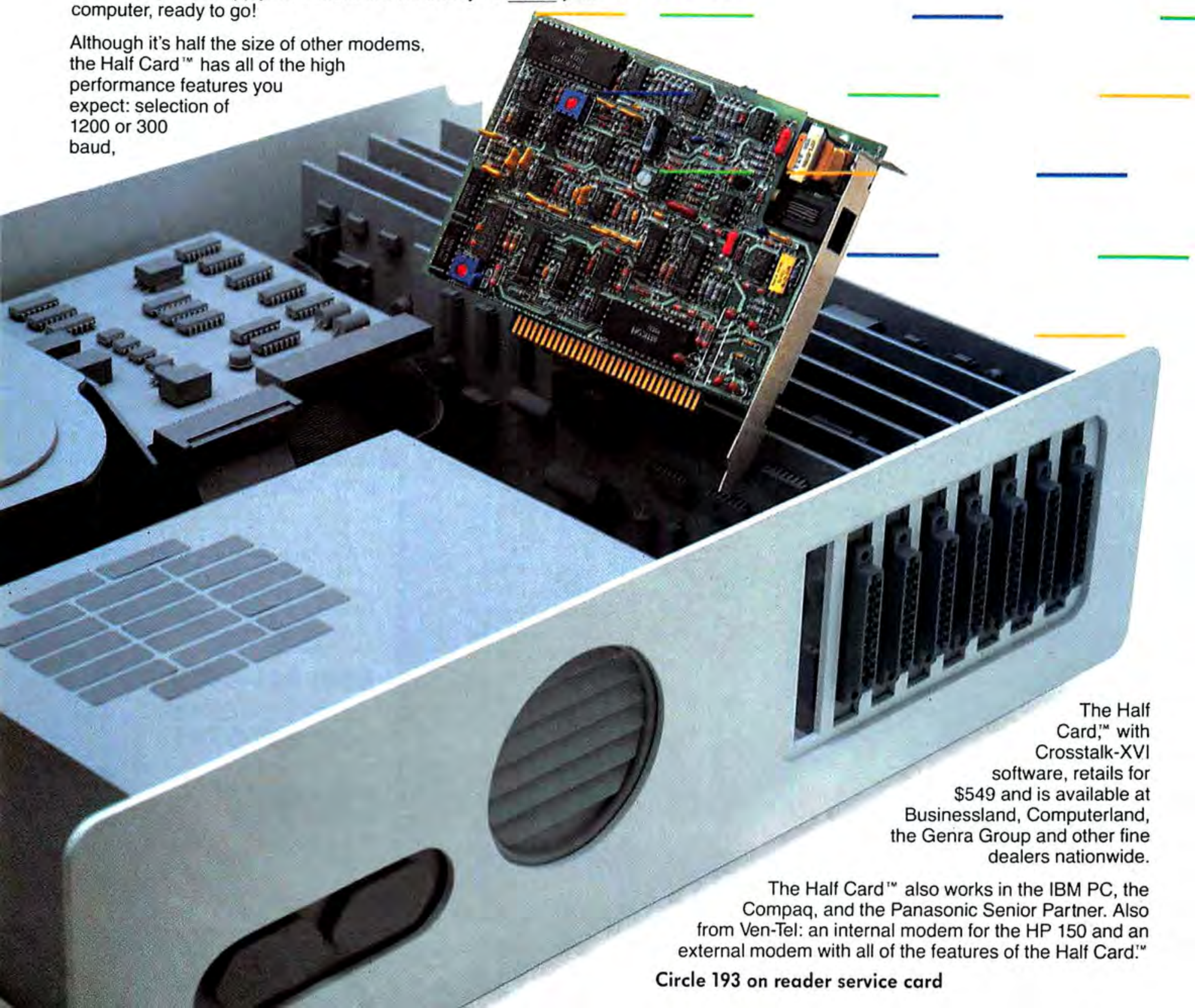

The Half Card,™ with Crosstalk-XVI software, retails for $549 and is available at Businessland, Computerland, the Genra Group and other fine dealers nationwide.

The Half Card™ also works in the IBM PC, the Compaq, and the Panasonic Senior Partner. Also from Ven-Tel: an internal modem for the HP 150 and an external modem with all of the features of the Half Card.™

Circle 193 on reader service card

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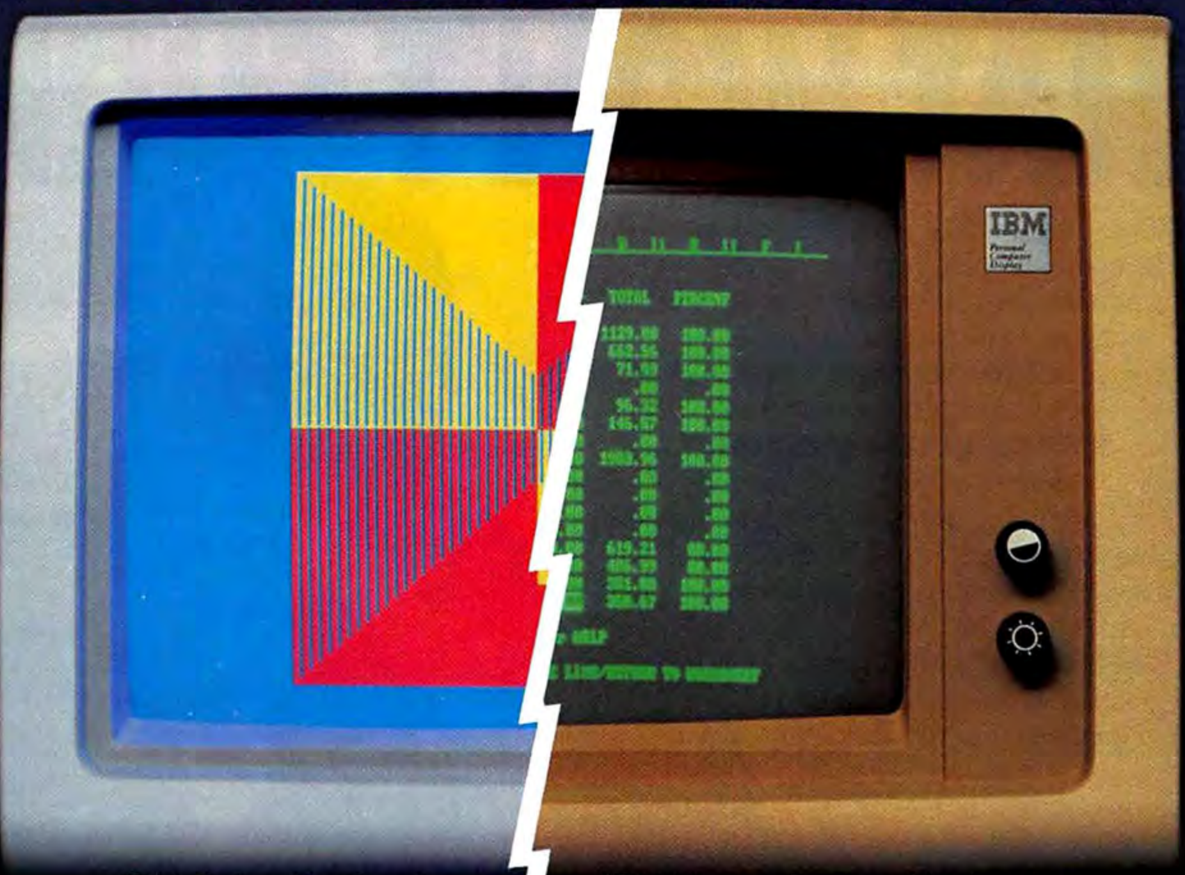

IBM Color Mode plus
640h × 200v - 16 colors
640h × 400v - 16 colors
Parallel Port
Soft Scroll

IBM Monochrome Mode plus
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132 Columns Display
Parallel Port
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All This and More on One Expandable Card

Multigraph gives you the greatest value among all graphics adapter boards! Only Multigraph offers you a choice between using your monochrome or color monitor with all these options. Only Multigraph offers you an inexpensive 132-column-width option in monochrome. Only Multigraph offers you optional smooth scrolling! Only Multigraph offers you increased operating speed made possible by a 32 bit internal architecture...like a mainframe!

Begin With The Base Configuration Compatible with IBM PC and XT, Multigraph has several important standard features. In monochrome, it offers graphics with a high resolution of 720h × 350v (Lotus 1-2-3 compatible). In color and monochrome, it offers full 32K on board memory, flicker-free scrolling, and 32 bit internal architecture.

Expand With A Wide Variety Of Options The many Multigraph options will upgrade your system as your needs change. Available is printer interface for any parallel port printer and "soft scroll" smooth scrolling.

In color you may up grade to 640h × 200v or 640h × 400v resolution in 16 colors. In monochrome you may upgrade with graphics of high 720h × 700v resolution and 132 column convenience. Available in both monochrome and color is a full 128K on-board display buffer memory.

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Circle 468 on reader service card

SURPRISE! A PER
THAT WON'T SURPR

The NCR PC 4 is everything you'd expect from one of the largest computer companies in the world.

It's a personal computer that's easy to use, reliable, versatile and elegantly designed.

So you get all the advantages a personal computer should have. And no unpleasant surprises.

SOFTWARE, SOFTWARE, EVERYWHERE.

The NCR PC 4 is compatible with thousands of programs available at computer stores everywhere. From the best-selling Lotus 1-2-3™ to all sorts of other business programs, educational programs, or just plain fun programs.

IT'S COMPATIBLE WITH PEOPLE, TOO.

You'll get along with this computer the moment you take it out of the box. There are no complicated wires or clumsy boxes to set up. All you

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have to do is plug it in and you're ready to go.

The keyboard is designed to help you work faster and with fewer strokes.

To make things easier still, we include two special self-teaching programs.

One is called NCR PAL. It shows you, step by step, how to use the computer itself.

NCR TUTOR introduces you to the operating system as well as to word processing, spreadsheets and other popular business applications.

YOU WON'T OUTGROW THIS ONE.

The NCR PC 4 can grow as your needs grow. Our basic model, for instance, starts you out with enough memory to run most popular programs. Then you can easily add more. Up to 640K.

You can also add printers, a modem for telephone communications, a mouse, and many other industry standard accessories.

For larger businesses, the NCR PC 4 networks with other computers, including mainframes.

WE'LL BE THERE WHEN YOU NEED US.

While the NCR PC is exceptionally reliable, it's nice to know that if it ever needs service you've got a big company like NCR behind it.

Our dealers have the backing of our extensive service organization, one of the largest and most experienced in the world.

The NCR Personal Computer looks better the closer you look into it.

So look into it closer at your nearest Authorized NCR Personal Computer Dealer.

We think you'll be pleasantly unsurprised.

For the name of your nearest dealer, call toll-free: 1-800-544-3333.*

NCR

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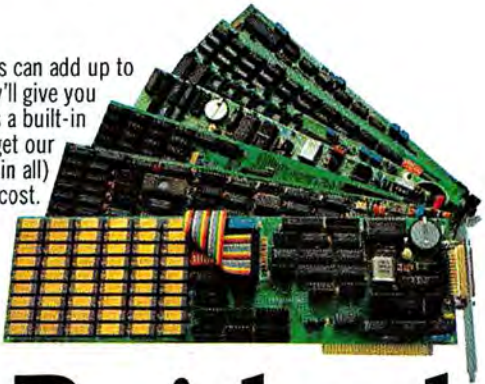
Circle 834 on reader service card

Our Captain™ or other multifunction boards can add up to 384K bytes of memory to your IBM PC. They'll give you additional serial and parallel ports as well as a built-in clock/calendar. With each board, you'll get our Treasure Chest™ of Software (24 programs in all) at no extra cost.



Tecmar's Lab Master™ is ideal for process control and the tracking of laboratory experiments in industrial and scientific applications. It converts analog data to digital data, and back again. Sophisticated timing is accomplished throughout this process by Lab Master's timer/counter circuitry (AMD 9513). The Lab Master has 24 digital I/O lines. 12-bit resolution is standard while 14- or 16-bit resolution is optional. Additional A/D and D/A channels are also available.

For your graphics needs, Tecmar offers the Graphics Master.™ With it, your PC gets graphics support for most popular software packages like Lotus 1-2-3,™ Open Access,™ Auto CAD,™ and all IBM color software. Graphics Master works in high resolution color (640 x 400) or Monochrome (720 x 700).

Peripheral Vision

When your computer needs peripherals, it pays to go with the company that has the peripherals and the vision. Tecmar.

In all, Tecmar has more than 150 peripherals and add-ons for your computer. So, when you're ready to expand, ask for Tecmar. Or write for our brochure.

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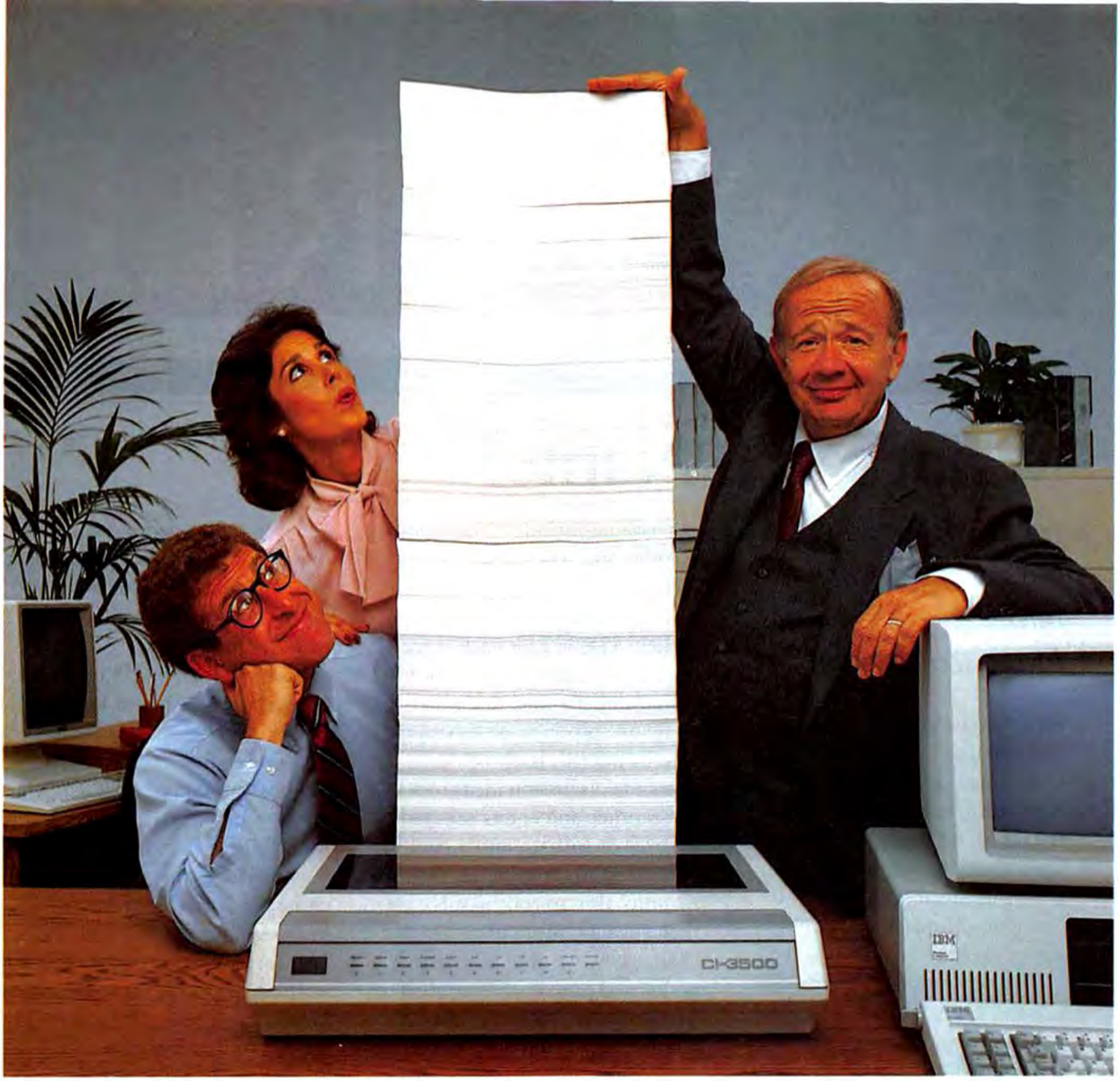
For large memory storage, Tecmar offers your PC a variety of Hard Disk Drives with capacities up to 74 megabytes. These include Removable Disk Drives for unlimited hard disk storage.

And Tecmar also makes the MacDrive,™ Removable or Fixed Hard Disk Drive for the Macintosh.

Circle 190 on reader service card



Never has an IBM®-compatible printer worked so fast for so few dollars.

With data processing printing at 350 CPS and a price tag of under $2,000, the CI-3500, Model 20 is the fastest IBM PC-compatible printer for the price.

Besides speed, the CI-3500, Model 20 delivers letter quality printing at a swift 87 CPS—more than twice the speed of most daisy wheel printers. And you also get the capability for high resolution graphics, up to 240 X 144 DPI.

The quiet, office friendly CI-3500, Model 20 is as flexible as it is fast and affordable. For instance, a convenient interface cartridge allows you to change your printer's personality simply by changing cartridges.

An operator changeable cartridge compatible with the IBM PC graphics printer is standard. Alternate cartridges compatible with other printers, such as DEC-LA100,® are also available.

A similar font cartridge accommodates multiple font and character sets, so you can avoid costly PROM installations.

The CI-3500, Model 20 Serial Printer from CIE Terminals. Never has an IBM-compatible printer worked this fast for so little. To find out more, just write or call CIE Terminals, 2505 McCabe Way, Irvine, Ca. 92714-6297. (714) 660-1421. Or call toll-free 1-800-854-5959. In California, call 1-800-432-3687.

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Circle 773 on reader service card

PC WORLD

What's in a Name?

Ira Bachrach took a hobby and turned it into a successful San Francisco company.

Have you ever heard of Gateway Technology? How about RHB Computers or Digital Transactions? Don't think you're behind the times; on their way to national fame these three computer companies changed their names—to Compaq, Mindset, and Ambi, respectively.

The new monikers were creations of Namelab, a four-year-old San Francisco company that was started by Ira Bachrach as a hobby. The hobby now has a client list that includes Proctor & Gamble and ABC Motion Pictures.

The company charges approximately $35,000 for each three-week job. Clients meet with Namelab personnel to discuss the company, product, or service that is to be named. Bachrach then takes the discussion ideas to a PC in his office and enters selected prefixes or suffixes into a data base of 6200 morphemes (linguistic units akin to root words). He then runs a custom program that creates new words, "which are nouns and phonetically probable." The program would not, for example, put a *c* and a *g* together because those consonants are not normally combined in English words, Bachrach explained.

The best names, of course, must convey the ideas behind the products and the companies they represent. In the case of Compaq, the *com* makes people think of computers and the *paq* indicates a portable, compact unit, according to Bachrach. Ambi brings to mind the word *ambidextrous*, a welcome connotation for a company that produces AmbiSet, a product that combines a personal computer and a telephone, he explained.

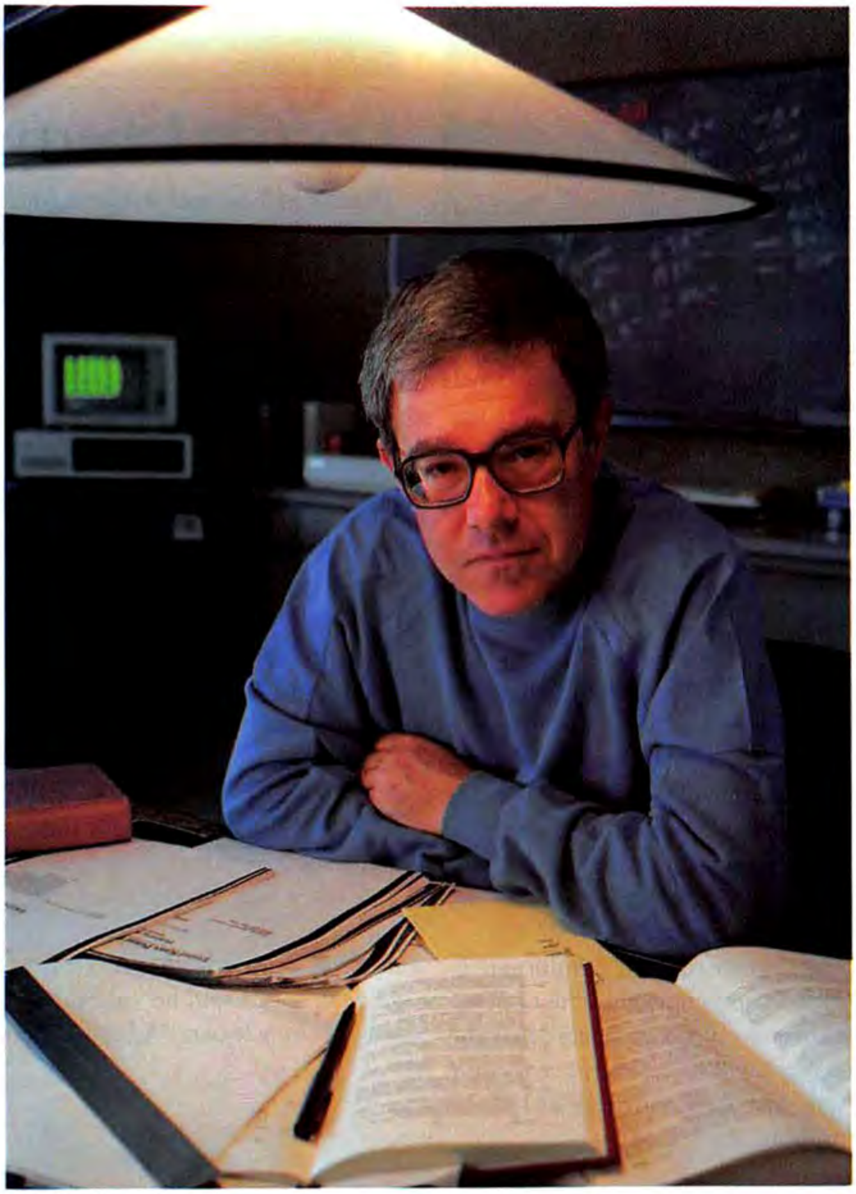
Bachrach, 45, had been an electrical engineer early in his career. His knowledge of California's electronics industry helped him establish his company, Bachrach Advertising, as a major ad agency for Silicon Valley companies. Bachrach sold the advertising company to Ketchum Advertising in 1976 but remained with the firm for three more years, until his retirement in 1979. His retirement lasted only a year. "My wife told me to stop hanging around the house," Bachrach joked.

Bachrach had been a linguistics doctoral student for one year before Uncle Sam drafted him for military service. After his wife's ultimatum, Bachrach dug up the notes for his never-completed doctoral thesis and Namelab was born.

PC World View *reports new developments in computer technology, items of interest to 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.*
—Katie Seger

View

News and notes for the computing community



Ira Bachrach

Annual Reports

Intelligent Systems Corporation of Norcross, Georgia, the parent company of Princeton Graphic Systems, Quadram Corporation, Intecolor Corporation, and Datavue, had a record year last year. Intelligent Systems' revenue for fiscal year 1984 was $90.1 million, a 160 percent increase over its 1983 revenue. Such information is usually splashed across the pages of a company's annual report to give shareholders a chance to plan where they will spend their dividend checks. Intelligent Systems did, of course, print an annual report, but it supplemented the report with a disk that presents financial data in spreadsheet and graphics formats.

"To our knowledge we are the first company to put a report on disk," said Bonnie Herron, director of planning for Intelligent Systems. Herron credits the disk idea to J. Leland Strange, president and chief operating officer of Intelligent Systems and cofounder of Quadram. Both IBM and Apple versions of the report disk were available. The IBM version of the report program required 256K, a graphics board, and a composite or RGB monitor.

Big Blue's News

* * * * * * * * * * * * * * * * * *

European Update

The IBM PC is the best-selling business microcomputer in Europe, according to a recent study by Intelligent Electronics Europe, a Paris-based market research firm. The report said that 60,000 PCs were sold in Europe in 1983. Although PC sales have grown at different rates in various European countries, the study projects that this year's sales figures will be more than triple the 1983 figures. By the end of 1984, 200,000 PCs will be installed throughout Europe, according to the study. Most of the PCs destined for Europe are made at the IBM plant in Greenock, Scotland. Other Scottish firms are also involved in manufacturing the product. According to industry sources, Exacta Circuits and Prestwick Circuits are making the printed circuit boards for the PC, and the Glasgow presses of William Collins and Son are busy running off copies of IBM PC manuals. William Collins and Son once had the exclusive license to print King James Bibles. It looks like the printing company has another best-seller on its hands.

* * * * * * * * * * * * * * * * * *

The King's English

IBM's United Kingdom division is assisting in the preparation of a new edition of the *Oxford English Dictionary.* IBM will supply computers and programming support–a donation valued at $1.4 million–for the project, which involves creating a data base of 500,000 words and 2 million definitions and citations. The Oxford University Press estimates that the project will take several years and will cost approximately $10 million.

Grapevine

IBM may be planning to produce one of its computers in conjunction with a South Korean company, Hyundai. According to an industry source, IBM is negotiating with Hyundai about building IBM's 5550 computer, a personal computer manufactured in Japan

Lexicon Liberty

Thanks to National Public Radio (NPR), the perforated, tractor-feed strips on the sides of computer paper now have a name. Noah Adams and Susan Stamberg, cohosts of NPR's news magazine "All Things Considered," wondered aloud what the throwaway strips were called. Their suggestion was "snaf," and they challenged their listeners to find a better name.

Entries, at least half of which were on computer printer paper, came from all across the country. The winners were Philip Kramer of Muncie, Indiana, with the entry *perfery* and Betsy and Ron Wolfe of Venice, California, with the suggestion *perfory.*

Adams, who judged the entries and chose the winners, pronounces both winning entries the same way but said he "likes the way *perfory* looks." Adams called and marketed only in Asia. IBM has developed software for the 5550 in Korean, Japanese, and Chinese. An IBM spokesperson acknowledged that IBM is talking with Hyundai, but gave no details.

in Eugene Ehrlich, chief editor of the *Oxford American Dictionary*, to examine the winning entries. Ehrlich thinks that the new word has a chance in the world of etymology. However, a word has to be in common usage for several years before it is included in the dictionary, Ehrlich said.

Because It's There

A Columbia VP computer and an Okidata Microline 92 printer were among the 7 tons of equipment hauled up the northeast ridge of Mount Everest by the Ultima Thule expedition. "The computer equipment was used primarily with a custom-designed program for the trip logistics," climb leader Robert Berg said. For example, when three climbers became ill, the program helped recalculate supply needs and carrying weights for the remaining nine mountaineers. "The program helped us replan the expedition in minutes rather than hours," Berg said.

Climbers also used the computer equipment for word processing and occasional games of *Space Invaders*. The printer and computer were housed in a portable research tent and were powered by gasoline generators at the expedition's base camp.

The climb began February 28 and the expedition made its summit attempt on May 20. Heavy snow and dwindling supplies forced the climbers to stop at 28,200 feet–828 feet short of their goal. The exhibition attempted to retrace the 1924 "classic route" of British climbers George Mallory and Andrew Irvine, who disappeared on Everest 60 years ago. Only one expedition has successfully reached the summit by this route.

Political Connections

Whatever the outcome of November's general election, computers were responsible for Walter Mondale's and, to a lesser extent, Ronald Reagan's nominations as their parties' presidential candidates. The 1984 Democratic and Republican summer conclaves will be remembered as the first computerized conventions.

The Democratic convention, held in San Francisco's Moscone Center, had 500 work stations. "We have seven networks," said Tim Sammons, director of Sammons and Associates, a Berkeley, California, computer consulting firm, and computer coordinator and consultant to the Democratic National Convention Committee (DNCC). "We have four long-line networks and three local area networks." The credential and security data bases formed two stand-alone networks. To prevent "*War Games*-like" tampering, the hardware and software for both networks were encrypted. The largest network linked computers in 52 sites, including the Moscone Center, the DNCC headquarters, state caucus offices in 37 hotels, and the mayor's office. American Network Services and Sytek supplied the hardware and the software for the different networks.

Tim Sammons fields reporters' questions before the Democratic convention.

Seven minicomputers, supplying over a gigabyte of data storage, were also used before and during the convention. Hardware and software costs came to approximately $1 million to $1.25 mil-

A Datapoint terminal awaits delegates at San Francisco's Moscone Center.

lion, Sammons said. "Some equipment was donated, some was rented; it was a very complex financial structure," he added.

The first electronic voting system at a national political convention replaced verbal voting during delegate challenges and platform changes. All votes other than the traditional oral roll call for the nomination of president and vice president were recorded on Datapoint terminals by the chairperson of each delegation. Delegates reported that the computerized system was convenient and easy to use. Convention officials said that voting time was substantially reduced.

An electronic message system assembled by Pacific Bell, Chronicle Videotex, and Lanier provided messages and information to the delegates, convention officials, and press representatives throughout the four-day event. The Chronicle Videotex terminals also supplied visitor information, convention and community events calendars, and health and emergency information. Sammons coordinated a premier electronic convention that showcased state-of-the-art hardware and software from nearby Silicon Valley, but he stressed, "We didn't use technology for technology's sake. The main thrust was to get the job done effectively, efficiently, and on time."

The Republicans also used computers at their convention in Dallas, but GOP officials pro-

(continues on page 56)

Fast Boat to China

Companies from 12 countries will be represented at China Comm 84, a telecommunications, computers, and electronics exhibition scheduled for the Beijing Exhibition Center November 5-13. The United States, Canada, France, Italy, Japan, and the United Kingdom will mount national pavilions; individual companies from Australia, Belgium, Finland, West Germany, Sweden, and Switzerland will also participate. IBM, NEC, Burroughs, RCA, Olivetti, Siemens, AT&T International, Oki Electric, and Toshiba are among the companies that have rented display space.

A spokesperson for the Cahners Exposition Group Company, which is staging the event, said that China Comm 84 will have 150 to 200 exhibitors and will be more than three times the size of its predecessor, China Comm 82. The spokesperson said that government officials, scientists, and researchers are the primary attendees of these shows. Unlike American and European exhibition attendees, "the Chinese come prepared to sign contracts, not just look," the spokesperson said, noting that China's Ministry of Posts and Telecommunications and Ministry of Electronics Industry have designated the show as a major procurement event.

(continued from page 55)

ceeded more cautiously than their Democratic counterparts. According to James L. Blythe, information systems consultant for the convention, plans called for 75 terminals to be part of an electronic message network within the Dallas Convention Center. Blythe said that terminals in two hotels may also be part of the network, but at *PC World*'s press time, Blythe could not confirm the hotel setup. Compucorp, AT&T Communications, and AT&T Information Systems contributed hardware and software for the network system. Approximately $1.2 million in systems and services was donated from all vendors.

No electronic voting took place in Dallas. Blythe encouraged GOP convention planners to limit computerization to the electronic mail system. "We encourage our clients to find a practical application for computers." He does foresee electronic voting at the 1988 convention.

Two IBM PCs and one PC XT were among the computers used during convention planning, Blythe said. Budgeting and accounting were done on the two PC's, while the XT and *dBASE II* handled the delegates' housing and accommodations data base.

Electronic Distribution

A number of companies, such as Romox and Cumma Technology Corporation, are downloading software via telephone lines to various retail stores. A new company, Softra, of San Diego, California, has joined the electronic distribution ranks. But unlike the other firms, which offer game software, Softra distributes only business and personal productivity software and does not rely on telephone lines for the actual program distribution. All software is produced in the retail stores with the Softra Software Transaction System.

Softra has created a point-of-sale terminal (see Figure 1) with which retailers create copies of the business software from master disks. The master disks are readable only on the Softra machine, a company representative said. The Softra terminals are connected by nondedicated telephone lines to a host computer at Softra's headquarters that gathers sales and customer information during nonbusiness hours.

"It's really a postage meter for software," Softra chairman John Downing said. Softra rents its terminal for $100 a month and charges retailers 20 percent of wholesale cost to stock program documentation and master disks. Retailers pay Softra the remainder of the wholesale cost after a sale.

Softra has distribution agreements with software manufacturers such as Chang Laboratories, Context Management Systems, Peachtree Software, VisiCorp, and Sorcim Corporation. "We've targeted 30 software manufacturers whose products we want to distribute," Downing said. "We signed with half of them in our first six months of operation."

Softra has tested the distribution system in computer stores in the San Diego area. By the end of autumn, the company plans to have its equipment installed in 80 stores throughout California and Texas. Softra's national marketing campaign will begin in early 1985, Downing said.

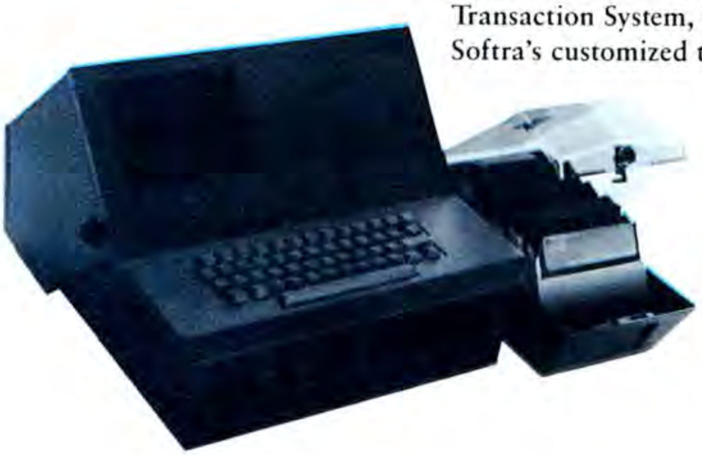


Figure 1: Softra's Software Transaction System, including Softra's customized terminal

PC in Paradise

Some folks don't know when to quit. Consider Ken Greenberg, newlywed and an Assistant Editor at *PC World*. Greenberg, 31, had been thoroughly absorbed by his recent Hawaiian honeymoon until he spied a PC XT humming away in the office of the Koa Lagoon, the condominium complex on Maui's western shore at which he and his wife, Sara, were guests.

The XT in question was the first on the island and belongs to Natalie and Dean Harper, who manage the 42-unit condominium complex, Greenberg learned. The Harpers rely on *Front Desk*, a program written by two Maui residents, CPA Paul Hansen and programmer Joe Heath. *Front Desk* monitors reservations, keeps tabs on arrivals and departures, dispatches reports to owners, updates maintenance schedules, and generates a running list of commissions, deductions, and expenses. (The program also turns out snappy personalized confirmations to honeymooners.) The *Front Desk* package comes with Ashton-Tate's *RunTime* and works with *dBASE II* and *WordStar*.

Greenberg sandwiched interviews of the Harpers between rounds of piña coladas and compulsory trips to every beach within 10 miles of the condo. Said a befuddled Greenberg, "I'm still trying to figure out how any sane human being can write source code on Maui."

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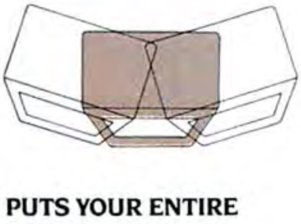

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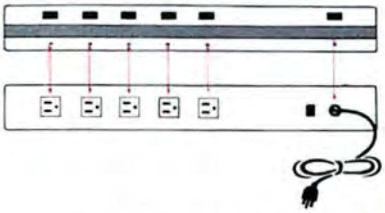

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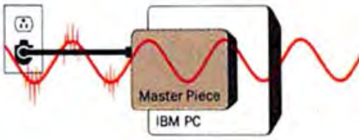

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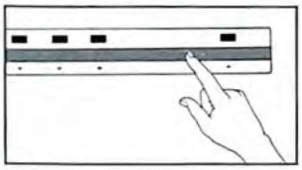

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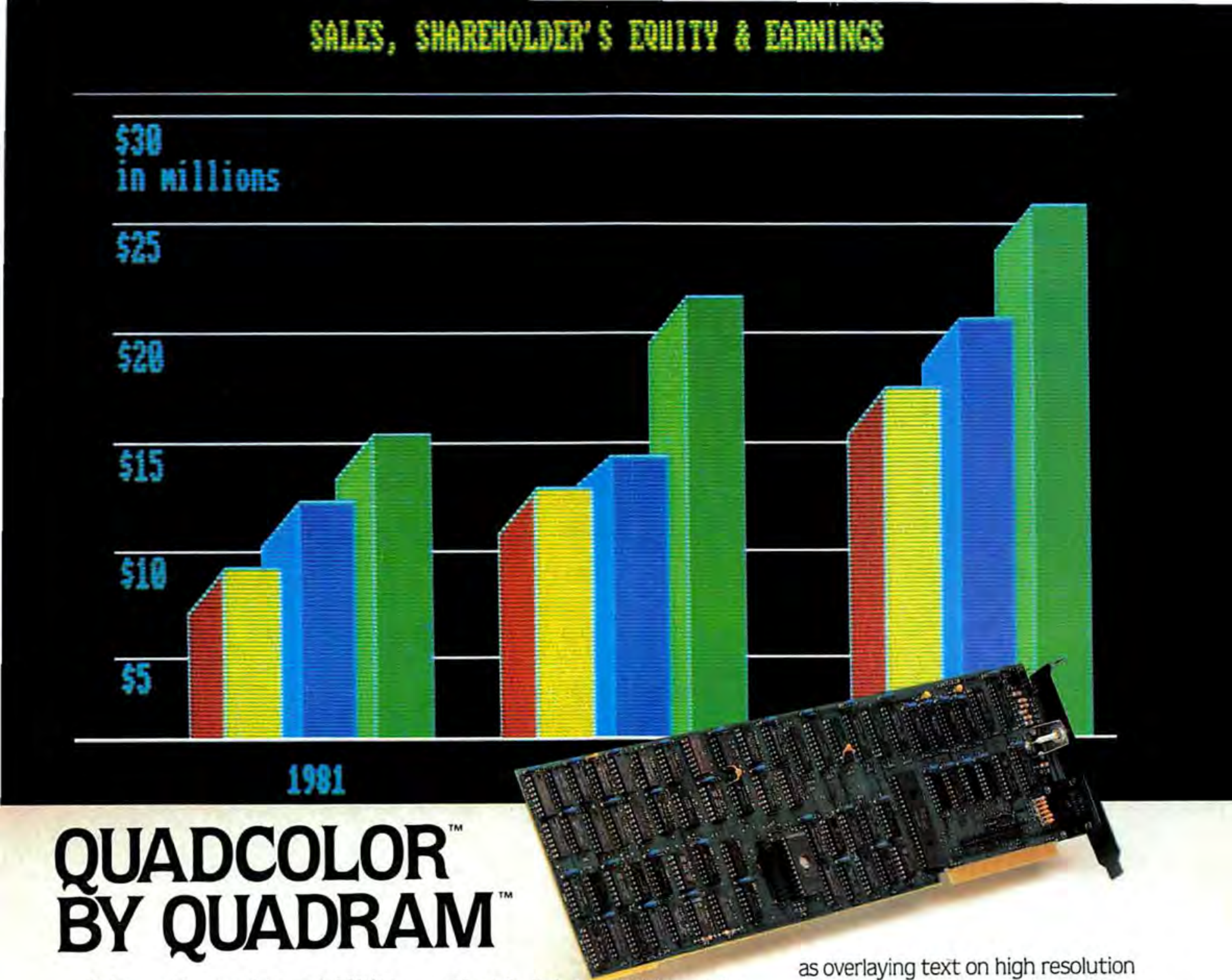

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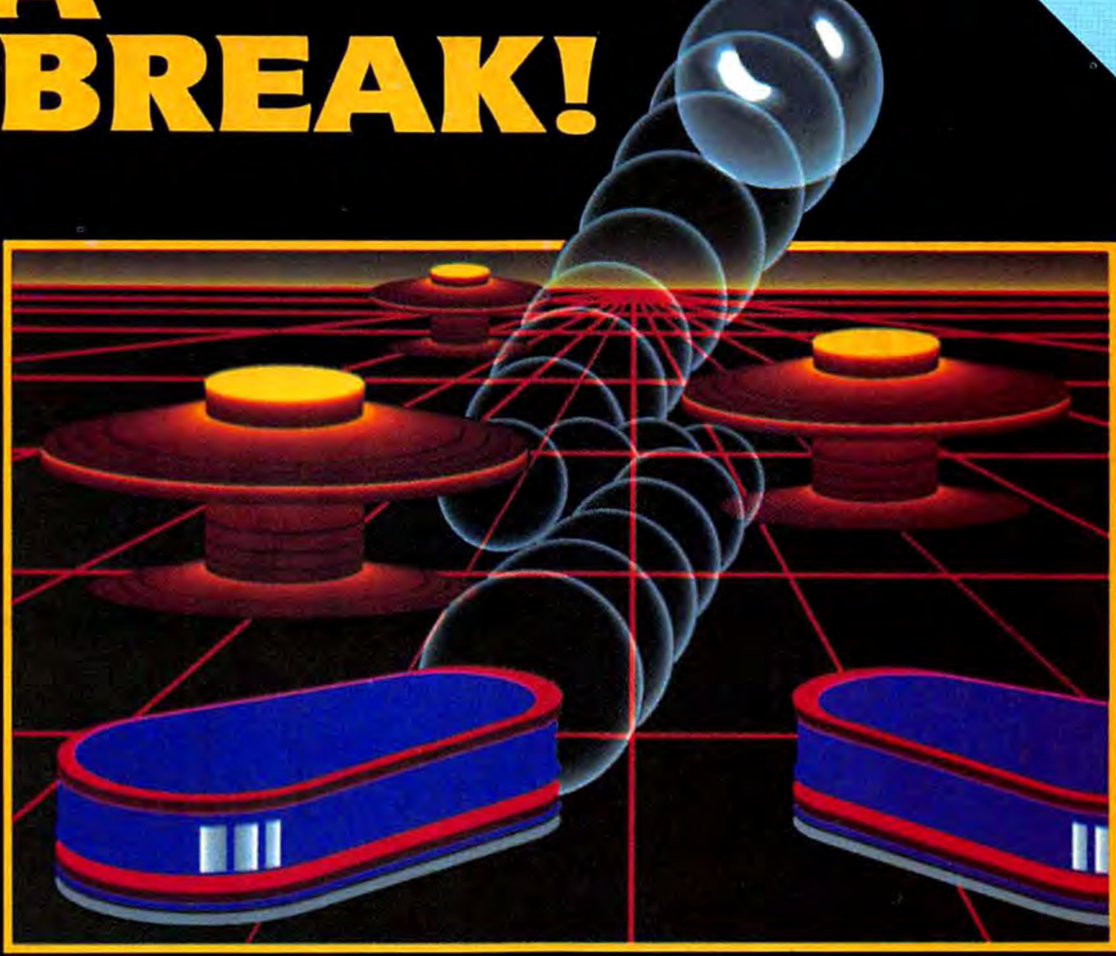

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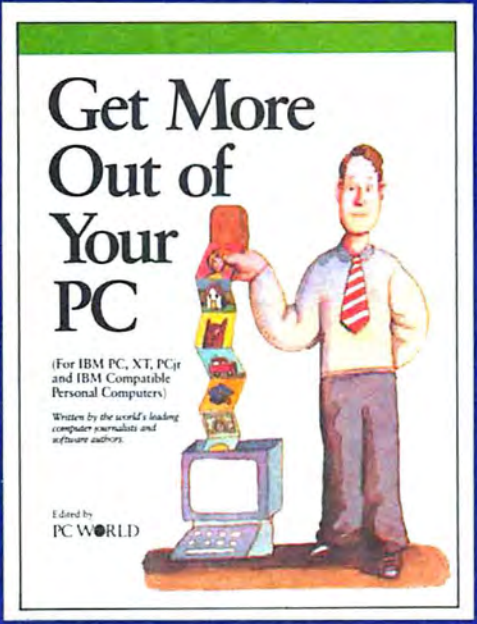
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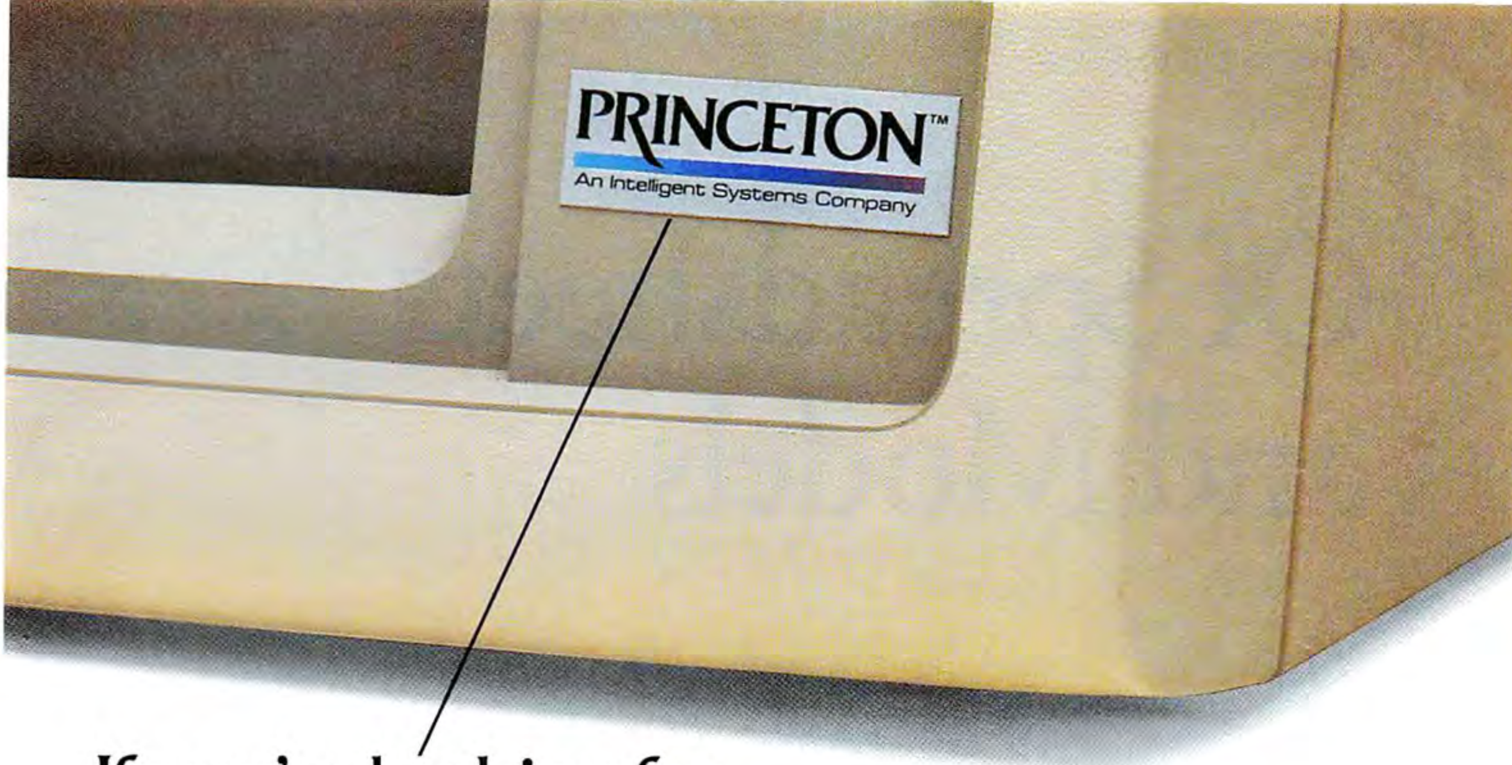

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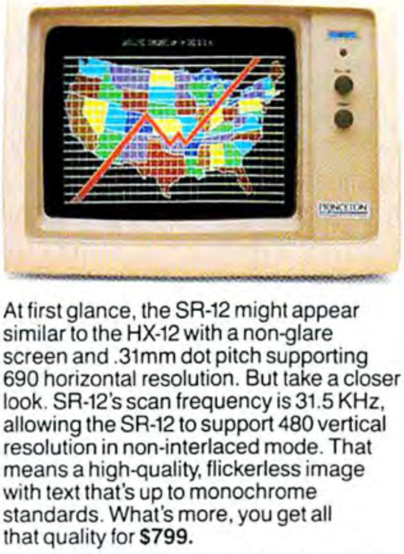

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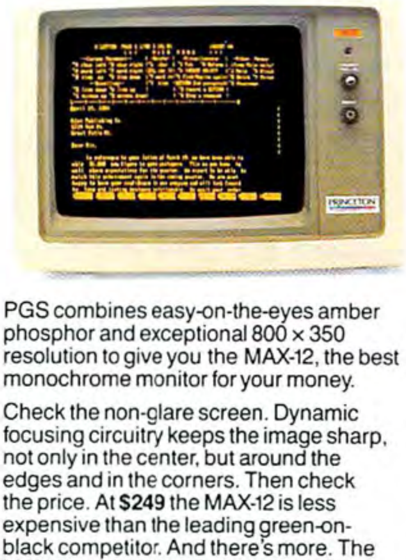

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Of Spreadsheets and Models

The latest microcomputer financial modeling programs have their roots in mainframes. They pack more power than spreadsheet programs but are not as easy to use.

Andrew T. Williams

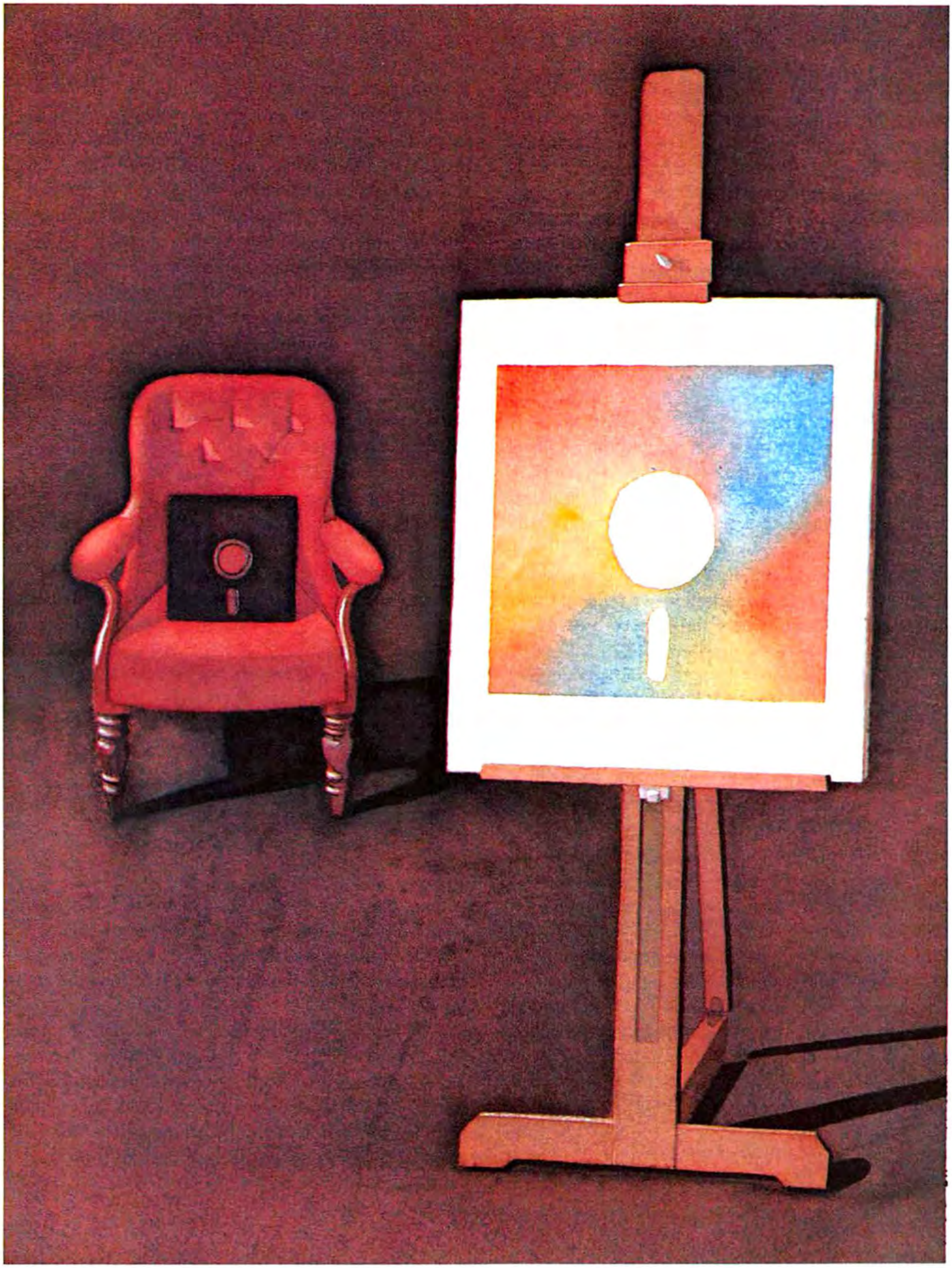
One of the hot new products in the microcomputer software business, the financial modeling package, is actually a familiar standby from the world of time-sharing mainframes. Programs such as Ferox Microsystems' *Encore!* and Via Computer's *Micro/Prophit* are currently being billed as "super" spreadsheets. A common element in press kits is a table comparing a financial modeling package's features to *1-2-3*'s features. Not surprisingly, *1-2-3* comes off holding the short end of the stick.

A look at the annals of computing history puts financial modeling programs in proper perspective and separates them from the many spreadsheet products on the market today. A major event in that history was the creation of the electronic spreadsheet—the software that almost single-handedly took the microcomputer out of the hobbyist's garage and placed it squarely at the center of the executive's desk.

Once Upon a Time . . .

Electronic spreadsheets are the descendants of manual spreadsheets. These manual worksheets are at least as old as double-entry bookkeeping. Manual spreadsheets are useful because they can be adapted to a variety of tasks. By labeling the rows and the columns to specify different elements, you can use a spreadsheet to balance a checkbook, do a budget, or prepare a financial plan for a Fortune 500 company. Manual spreadsheets, like their electronic counterparts, are not dedicated to any one use. Rather, they are like blank blackboards or white sheets of paper upon which many kinds of problems can be written, organized, and solved.

But blackboards and paper have their drawbacks. If you make a mistake, you must carefully erase the error. If other values in the spreadsheet depend on the erroneous value, you must correct those values as well. If the error is in the middle of the spreadsheet—perhaps you forgot to leave a line for payroll taxes in a personnel budget—you may have to throw away all your work and begin again. The same time-consuming labor is required if you receive new information or if you make a slightly different assumption about a variable such as sales totals or rate of inflation. You must recalculate every relationship that depends on the number or numbers you've decided to change and revise the entire spreadsheet.



Eureka!

Daniel Bricklin must have been thinking about the tedious nature of manual spreadsheets back in 1978 when he sat in a classroom at the Harvard Business School watching his professor write out a spreadsheet on the blackboard. This was a familiar sight, for it is a common practice in business schools to subject students to numerous "what if" exercises. A professor creates a hypothetical company or uses figures from a real one and asks what will happen if the company sells this division, markets that product, experiences this recession, or makes that labor settlement.

Students like Bricklin used to take these "what if" assignments home, pull out a ledger pad and an electronic calculator, and stay up most of the night trying to figure out the answers to the professor's questions. A night's work often involved hundreds of interrelated calculations based on numerous alternative assumptions. During the next class, one student's version of the answer was put up on the blackboard and discussed or, more likely, torn to shreds.

No one knows for sure, but it makes a good story to say that Daniel Bricklin viewed one of these blackboards full of numbers and shouted or whispered or maybe just thought, Eureka! Why not put the spreadsheet in one of those new microcomputers (the first Apples and TRS-80s had just come on the market) and get rid of all those nightlong computation sessions?

There were, of course, several steps between Bricklin's good idea and *VisiCalc* as we know it today. First, Bricklin took his electronic spreadsheet idea to Bob Frankston, who was a childhood friend and a former undergraduate classmate at MIT. In October 1978, the two men coded the first version of what was to become *VisiCalc* (for *visible calculator*). With a crude test version of the program running on Frankston's Apple computer, their next step was to seek the advice of one of Bricklin's Harvard Business School professors. The professor responded quickly, "Drop it. It will never get off the ground."

Bricklin was insistent; he believed in his idea. The professor suggested that Bricklin talk to a fellow Harvard MBA student, Daniel Fylstra. Fylstra, against the advice of the same professor, was selling a computer chess game out of his apartment. The professor was certain that Fylstra would also tell Bricklin that his electronic spreadsheet idea wouldn't sell. Instead, Fylstra, who at the age of 12 had learned to program an IBM 360 as part of his Boy Scout duties, was impressed with Bricklin's visible calculator.

The following month at Joyce Chen's Restaurant in Cambridge, Massachusetts, somewhere between the wonton soup and the fortune cookies, a deal was struck between Software Arts (the company Bricklin and Frankston had formed) and Personal Software (the company—later to become VisiCorp—that Fylstra was using to market his chess game). The outcome of that Chinese dinner was what *Forbes* magazine called "the personal computer software industry's first gorilla hit."

Time passes, and even the goodwill induced by an excellent kung pao beef has been known to wear off. Recently, like acrimonious partners in a Hollywood divorce, Software Arts and VisiCorp have been locked in a lawsuit, this one over the advanced version of *VisiCalc*. And in the marketplace, *VisiCalc* is playing the aging movie grande dame to *1-2-3*'s rising starlet. But the fundamental achievement remains. The electronic spreadsheet invented by Bricklin and Frankston changed the way business is done throughout the world.

> *The electronic spreadsheet invented by Bricklin and Frankston changed the way business is done throughout the world.*

The phenomenal success of *VisiCalc* and all the VisiClones (including *1-2-3*) comes from the fact that an electronic spreadsheet is a general problem-solving tool. It has the familiar, widely used row and column format and provides a number of important electronic tools for constructing, saving, and printing information.

The one thing an electronic spreadsheet doesn't provide is built-in procedures for solving problems. Spreadsheets are not dedicated programs. Rather, they are programs in which the user defines a problem or problems and prepares the solution based on his or her knowledge and creative problem-solving skills.

Program Trade-Offs

The appeal of Bricklin and Frankston's visible calculator was immediately apparent to thousands of managers, executives, investors, and ordinary men and women trying to keep their lifestyles in line with their checkbooks. Why, then, did this fail to appeal to a professor at the Harvard Business School?

At least part of the answer has to do with the fact that *VisiCalc* wasn't the first electronic spreadsheet program. In fact, by 1978 "electronic spreadsheets" in the form of financial modeling packages were widely available on time-sharing computer systems. These programs provided reports in spreadsheet format (rows and columns), but instructions to the computer were given in traditional programming language.

The structure or logic of a model was defined by a series of programming lines. The data for the model was usually entered in a separate data file. To get a report the user ran the model, and only then were the results displayed. As with any program, errors in the logic of a model were discovered only after the model was constructed and run.

Thus, the process of constructing a time-sharing financial model was fundamentally an abstract one. The actions—lines of program code—were created hours and sometimes days before the actual report was produced. This type of system required a programmer to have a mental picture of the relationship between the instructions entered into the program and the results those instructions produced.

Despite their drawbacks, these models were much more powerful than *VisiCalc*. These financial modeling packages could work with larger amounts of data than Bricklin's program, and they included a plethora of built-in statistical and financial functions. That is probably why the Harvard professor failed to appreciate the true appeal of the visible calculator. *VisiCalc* gave up power in exchange for ease of use.

But at the same time, *VisiCalc* put the entire analytical process back in the hands of the decision maker. He or she could now control the model and perform all the analyses without having to rely on an intermediary from the data processing division to create the model and run the time-sharing job.

From Mainframes to Micros

Now, five years later, the direct descendants of the financial modeling packages previously available only on time-sharing systems are making their appearance on microcomputers. These packages sell for $600 to $700, a price range that is competitive with prices for programs like *Symphony* and *Framework*.

Two financial modeling programs now available for the PC are *Micro/Prophit* and *Encore! Micro/Prophit* is the microcomputer version of *Prophit II*, which its manufacturer claims is "historically and currently the most widely used modeling system in the world on a time-sharing basis." *Encore!* is descended from *Micro-DSS/Finance*, an early and expensive micro- and mini-based decision support system (DSS). Its maker claims that for power and capabilities its features rival $100,000 mainframe financial modeling and DSS packages.

On a feature-by-feature basis, a program like *Encore!* runs circles around *1-2-3*. Among other things, *Encore!* contains the United States corporate and personal tax tables and many depreciation schedules, including built-in ACRS (accelerated cost recovery system) tables. The program also has goal-seeking functions and does regression analysis. In addition, *Encore!* has a sophisticated programming language for customizing applications and another language for preparing customized printed reports.

The trade-off for all this power is programs that, at least for relatively unsophisticated users, are as friendly as a mugger in a dark alley. Tapping the full power of these programs requires a considerable commitment of time and energy. The results, however, are certainly impressive.

Recognizing the complexity of *Micro/Prophit,* Via Computer offers a $150-a-day training service, a $600-a-day consulting service, and a series of application models for various institutions such as banks and life and health insurance companies. These models must be purchased in addition to the *Micro/Prophit* program at prices that are typically several hundred dollars more than the cost of the program itself.

The Bottom Line

Which is the winner in the financial modeling/spreadsheet derby? The bottom line, as they like to say in business, is, What do you really need? You can certainly perform any task you might do with *1-2-3* or *Symphony* with *Encore!* or *Micro/Prophit,* but you can also do many more tasks with these financial modeling programs. However, you will have to sacrifice ease of use.

If you do detailed financial planning for a large business, the financial modeling packages, with their power, flexibility, and detail, may well return more than enough value to justify the time and money it takes to master them. If your tasks are more modest, a spreadsheet program—even a relatively unsophisticated one like *SuperCalc* or *VisiCalc*—gives you a useful tool for faster and easier decision making. As always, the hard part is defining your needs and then weighing your options.

Andrew T. Williams is a Contributing Editor for PC World. *His latest books are* What If . . . A User's Guide to Spreadsheets on the IBM PC *and* 1-2-3 From A to Z.

Encore!
Ferox Microsystems Inc.
1701 N. Fort Myer Dr., Box A
Arlington, VA 22209
703/841-0800
List price: $695
Requirements: 256K, two double-sided disk drives (hard disk recommended)

Micro/Prophit
Via Computer, Inc.
7177 Construction Ct.
San Diego, CA 92121
619/578-5356
List price: $695
Requirements: 256K, two double-sided disk drives (hard disk recommended), DOS 2.00 or 2.10

VisiCalc
VisiCorp
2895 Zanker Rd.
San Jose, CA 95134
408/946-9000
List price: $99
Requirements: 64K, one disk drive

1-2-3
Lotus Development Corp.
161 First St.
Cambridge, MA 02142
617/492-7171
List price: $495
Requirements: 192K, two double-sided disk drives, graphics board and monitor required for graphics

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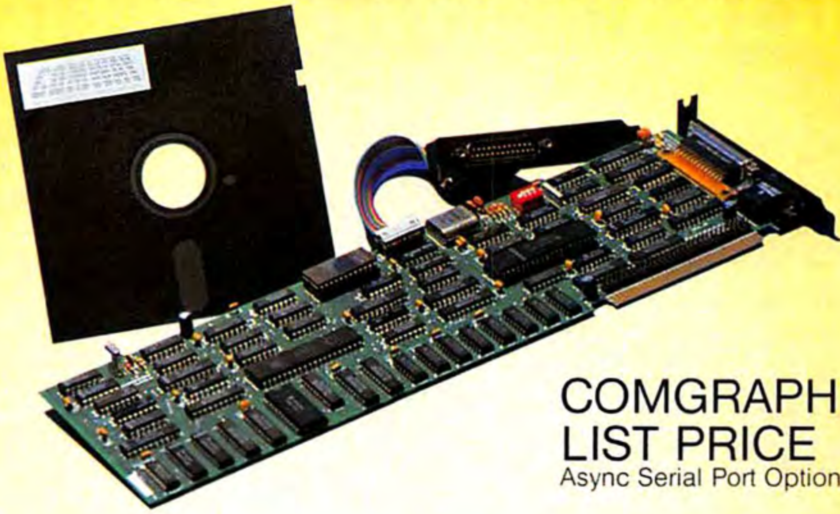

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PIGGY-BACK EXPANSION	◉			
PARALLEL PORT	●	●	●	●
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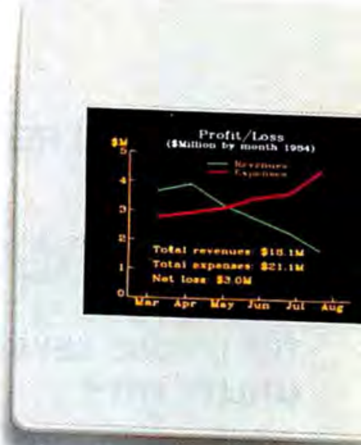

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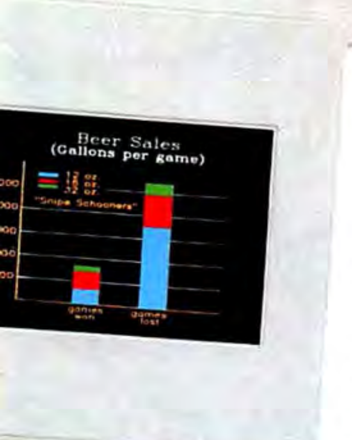

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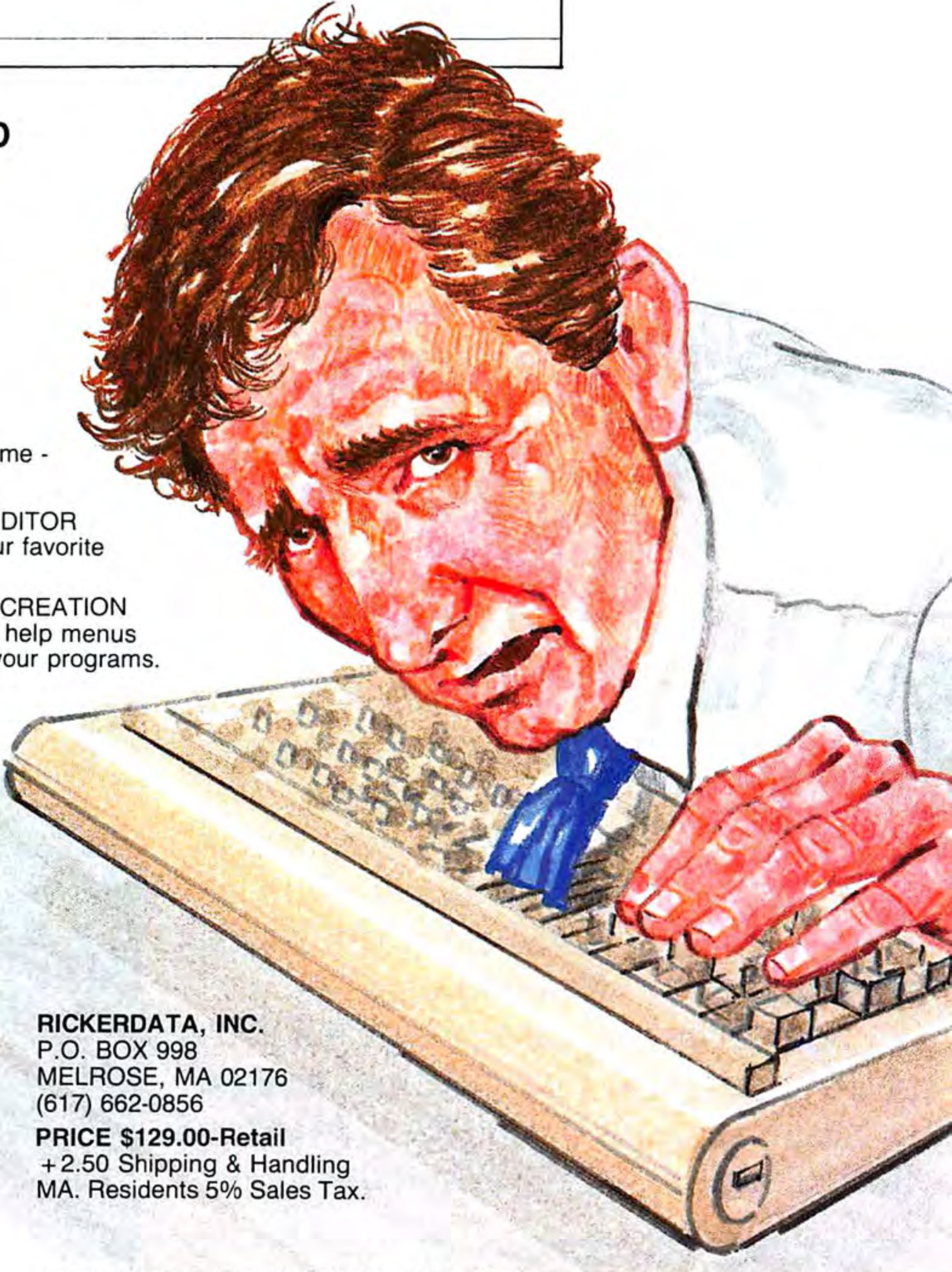

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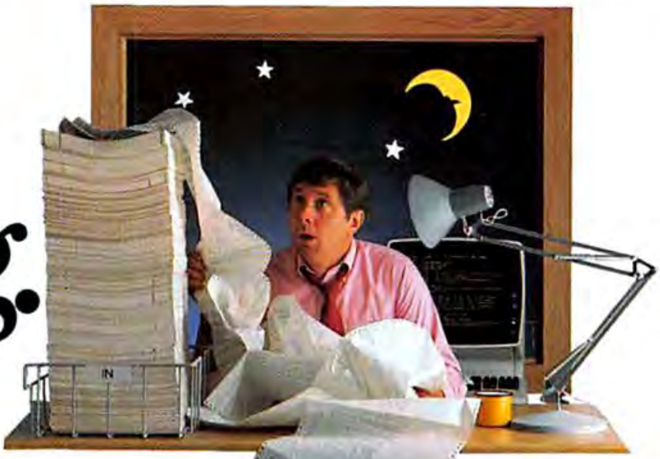
See Backlog.



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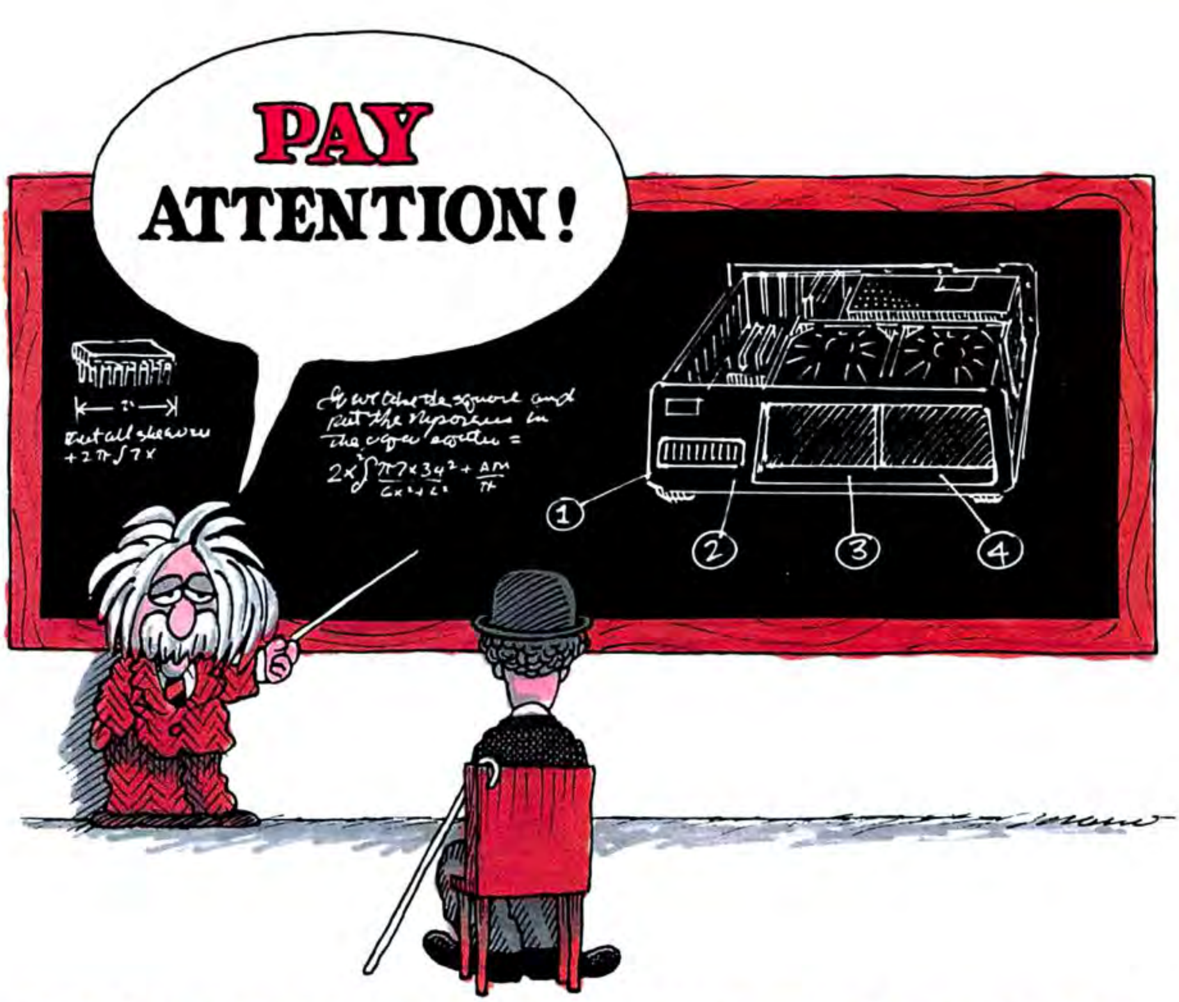

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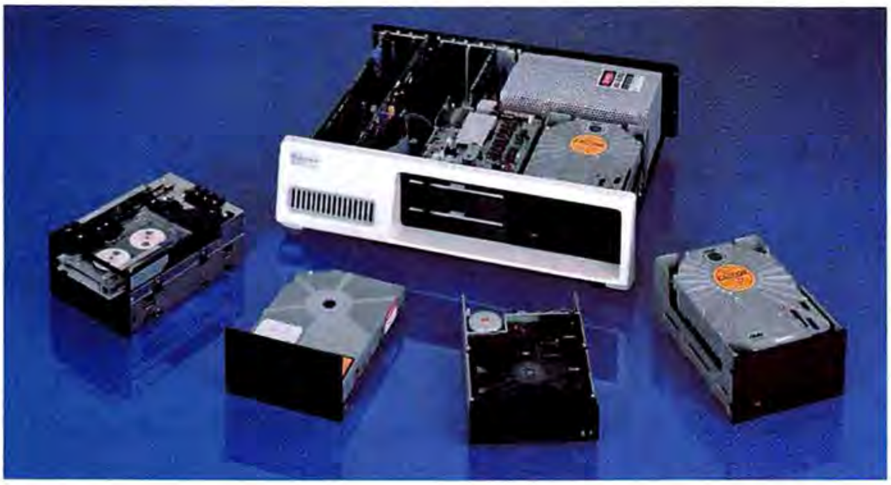

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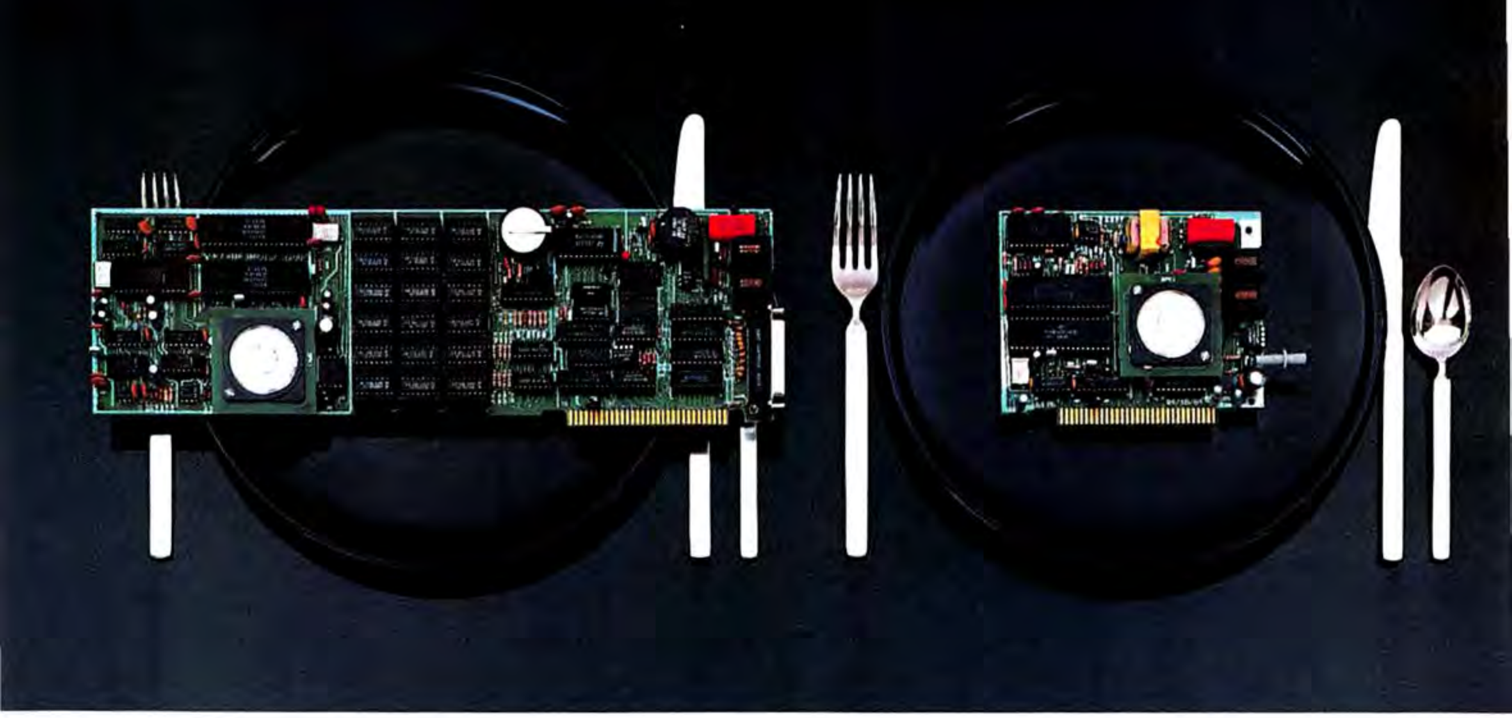

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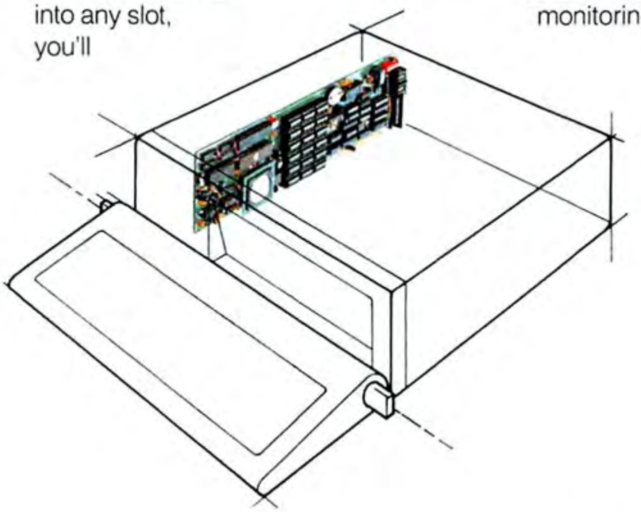

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The Help Screen

PC World offers answers and advice at every level

This month: printer switching, software for apartment management, Compaq versus <PrtSc>, and changing the shape of the cursor

Karl Koessel

The first item this month compares the advantages and disadvantages of a mechanical switch and software to select between printers when a PC is equipped with two. Next, a reader looking for apartment management software is reminded that spreadsheet programs are often capable of performing the tasks done by job-specific applications. The third item includes directions for using any version of DEBUG to "hand-assemble" a command file that changes the cursor's shape to a character-size rectangle. Also included, for readers with graphics-equipped compatibles running MS-DOS 1.25, are command files that change the screen's width to 40 or 80 columns. The last item shows how to "hand-assemble" PRTSCOFF.COM, which prevents older-model Compaqs from forever trying to print to a nonexistent printer when the <Shift>-<PrtSc> key combination is struck.

Hardware Switch or Software Selection?

Q. *As a result of your excellent article on letter quality printers ["Good Impressions,"* PCW, *Vol. 2, No. 3], I purchased a CR-II ComRiter printer (parallel interface) to supplement my Epson MX-80 dot matrix printer. Now that I have it, I have some questions about connecting it to my computer. The salesman from whom I bought the printer pointed out that I can use the present cable for my Epson printer for both printers, but although this works, it is only a stopgap solution.*

I have a PC with a printer port on an IBM Monochrome Display Adapter. I also have an AST MegaPlus II board, but I haven't purchased the parallel printer port option for it.

Is it preferable to buy a rotary switch and cable the two printers through the switch or to buy the optional parallel port, cable the new printer to it, and do the switching through the software? Or is there a better alternative that I haven't considered? The rotary switch is the simplest solution, but I am not sure that I trust mechanical devices for handling electronic signals.

I like the idea of selecting the printer by means of the software, but I don't know whether the four programs that we are using can be modified to do that.

Bruce M. Shields
Pittsburgh, Pennsylvania

A. Either software or hardware can be used to choose the active printer; there is no better third alternative. An understanding of what's involved in implementing these methods should help you decide which is preferable for you.

The software solution is certainly less expensive. The parallel port option for the MegaPlus II costs only $35 to $50 (depending on the distributor), and you already own BASIC, which you can use to create a BASIC program or a DOS command (.COM) file that switches the parallel port assignments for LPT1: and LPT2:. Such a BASIC program is included in the back of the MegaPlus II manual. (Additional programs can be found in "Swapping Parallel Ports 1 and 2" [*The Help Screen, PCW,* Vol. 1, No. 8] and "Swapping Ports With Assembly Language"

[*The Help Screen*, *PCW*, Vol. 2, No. 11].) Using any of these simple programs to swap port assignments, you can select either printer even if an application program always sends printer output to LPT1:. Unfortunately, if the wrong printer has been selected, you usually have to exit the application, swap the port assignments, and then reenter the application to use the other printer.

Once it is installed, using a rotary switch to select the active printer is much easier than using software. If the wrong printer has been selected, you simply stop printing, turn the switch, and start printing again. You needn't distrust mechanical switches; they're easily a hundred times more reliable than mechanical mass storage devices such as disk drives.

The only drawback of the rotary switch method is price–the switch costs about $150, and you also need a third cable to connect the rotary switch to the parallel port (each of the two printer cables connects its printer to the rotary switch). The rotary switch you purchase should have three female, 25-pin D connectors. Be careful: some rotary switches have other kinds of connectors. Many computer supply companies call the type of switch you need an RS-232C, or serial, device switch because of the connectors used; the name doesn't matter, but the connectors do. The third cable, a male-to-male, 25-pin D connector, costs between $30 and $50.

Apartment Management, With Reservations

Q. *I am looking for a software system that can help me manage a small (about 80-unit) apartment hotel business. I need a program that will keep track of reservations, which extend into 1985 and change frequently. Besides short-term guests, I have permanent tenants in the building. I'd also like the system to be able to keep track of deposits held for both the permanent tenants and the daily, weekly, and monthly visitors. If it exists, a system that keeps track of the apartment tenants' rental payment records would be nice. I have an IBM PC with 256K and two disk drives, and I have an Epson MX-100 printer.*

To date, the only systems I have found are not cost-effective for this small business. I priced one system at $4000, which is too expensive, and have contacted other companies that at first say they can help me, but in the end, can't. Can you recommend a system that would meet my needs?

Michele Nourafchan
Los Angeles, California

A. Since I have never managed an apartment building nor used apartment management software, I cannot recommend a specific package. But I can suggest a few packages that you can check up on. Manufacturers of such programs often list the features they offer in descriptive brochures, which they will be happy to provide if you write to them. You should also visit distributors and see the programs in action before you decide which, if any, to purchase.

Although one of these programs will probably have all the features you need, you may be able to duplicate those functions using a spreadsheet program. If you are willing to spend the time needed to create your own management system, a spreadsheet program is often a more practical software investment than a job-specific program. I urge you to read "Introduction to Spreadsheets" (*PCW*, Vol. 2, No. 9) and visit your local computer or software store to see a demonstration of spreadsheet programs. Keep this reservation in mind when you interview your PC's next software "tenant."

Apartment House Manager
User-Friendly Software, Inc.
P.O. Box 1192
Melville, NY 11747
516/643-6618
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Requirements: 64K, one disk drive

PMS
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La Habra, CA 90631
213/947-2762
List price: $795
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Property Management
Continental Software
11223 S. Hindry Ave.
Los Angeles, CA 90045
213/417-8031
List price: $495
Requirements: 128K, two disk drives, DOS or CP/M-86

Property Management
Realty Software Company
1926 S. Pacific Coast Hwy. #229
Redondo Beach, CA 90266
213/372-9419
List price: $450
Requirements: 64K, one disk drive, DOS or CP/M-86

Property Manager
Miracle Computing
313 Clayton Ct.
Lawrence, KS 66044
913/843-5863
List price: $100
Requirements: 128K, two disk drives

The Landlord
Systems Plus, Inc.
1120 San Antonio Rd.
Palo Alto, CA 94303
415/969-7047
List price: $595
Requirements: 128K, two disk drives

Display Control for MS-DOS 1.25

Q. I am a new owner of a Columbia 1600-VP. I was told that there is a way to switch the background and letter colors of the green monitor so that the lettering would be black and the screen background green. I believe a change of visual pace would be very welcome for all computer users who sit in front of their screens for long periods of time.

Also, is there a way to change the cursor shape from a blinking line to a blinking or shaded character-size rectangle? And finally, is there a way to change the screen size from 80 columns to 40 columns with a larger character size? I have seen these features show up on various tutorials and diagnostic functions, so it seems that they are possible.

Robert D. Ascione
New York, New York

A. The features you desire are very easy to implement on your Columbia 1600-VP portable while using BASICA (hereafter referred to as BASIC, but not to be confused with BASIC-86, which is also included on Columbia's MS-DOS disk). BASIC has two screen modes in which you may choose the color of the characters and the background color: text mode and medium-resolution graphics mode. In medium-resolution graphics mode, only "white" and "yellow" characters (which your portable's monitor shows as patterns, or shades, of green) are available. But in text mode, BASIC can produce black characters on a green background (called inverse, or reverse, video) in either the 40- or 80-column display mode.

Text mode is set by the statement **SCREEN 0,1,0,0.** Once you are in text mode, the screen width may be set with the statement **WIDTH 40** or **WIDTH 80.** To switch to inverse video, enter the statement **COLOR 0,7.** Return to normal characters with **COLOR 7,0.**

The BASIC statement used to create a rectangular cursor is **LOCATE ,,1,0,6.** Unfortunately, this

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statement is not correctly implemented for Columbia's BASICA, version 1.6. If this is the only version of BASICA you have, you can still see what it should look like by running the following BASIC program. (Press <Esc> to stop the program.)

```
1    SCREEN 0,1,0,0 : CLS
2    LOCATE ,,1,0,6
3    A$ = INPUT$(1)
4    IF A$ = CHR$(27) THEN END
5    PRINT A$;
6    GOTO 3
```

Implementing these features for DOS is a bit more difficult. In DOS, the rectangular cursor is obtained by creating and executing a command (.COM) file. With a copy of MS-DOS 1.25 (or the comparable PC-DOS 1.10) in drive A:, carefully type the following sequence.

```
A: <Enter>
DEBUG <Enter>
F 100 LA B4 01 B5 02 B1 0A CD 10 CD 20
   <Enter>
R CX <Enter>
A <Enter>
N CURSOR.COM <Enter>
W <Enter>
Q <Enter>
```

Now simply type **CURSOR <Enter>**. This file should work for all MS-DOS-compatible machines, including the IBM PC, yielding a rectangular cursor for DOS and for application programs such as *WordStar.*

Switching the display between 80- and 40-column modes can also be accomplished with command files. Type the sequence below to create the files WIDTH-40.COM and WIDTH-80.COM.

```
A: <Enter>
DEBUG <Enter>
F 100 L8 B4 00 B0 00 CD 10 CD 20
   <Enter>
R CX <Enter>
8 <Enter>
N WIDTH-40.COM <Enter>
W <Enter>
E 103 <Enter>
2 <Enter>
N WIDTH-80.COM <Enter>
W <Enter>
Q <Enter>
```

With those files in the default drive, type **WIDTH-40 <Enter>** for a 40-column screen and **WIDTH-80 <Enter>** for an 80-column screen. These files also work for any MS-DOS-compatible machine. (The IBM PC's DOS comes with a utility called MODE.COM, missing from MS-DOS 1.25, that can be used to switch the display's size. See "Active Display," *The Help Screen, PCW,* Vol. 2, No. 10.)

Implementing inverse video for DOS can be accomplished using the ANSI.SYS device driver and the DOS command PROMPT, both of which are features of PC-DOS 2.00. If you have this version of DOS, directions can be found in "DOS 2.00 COLOR" (*.*, *PCW,* Vol. 2, No. 4).

Creating PRTSCOFF.COM With DOS 1.10

Q. This is in regard to your answer in July's Help Screen *about Compaqs that keep trying to print to nonexistent printers when <Shift>-<PrtSc> is pressed ["Compaq and <Shift>-<PrtSc>,"* PCW, *Vol. 2, No. 7]. I have been fortunate so far in not encountering the problem, but because I frequently use my Compaq sans printer while traveling, it surely is only a matter of time before I hit the fatal key combination. I have been unable, however, to implement your suggested solution using DEBUG. I receive an error response on entering* **A 100 <Enter>**. *I suspect the problem is that I am using DOS 1.10 instead of DOS 2.00 as instructed.*

Thanks to the forewarning, I will be especially careful operating without a printer until you can help me.

Bob Hash
Prescott, Arizona

A. Looking back at the July issue, I notice that I didn't say that the <Shift>-<PrtSc> problem exists only with older-model Compaqs. Compaq is a very attentive and fast-acting company, and they corrected this problem long ago. To create PRTSCOFF.COM using DOS 1.10 (or any other version of PC-DOS or MS-DOS), type the sequence below.

```
A: <Enter>
DEBUG <Enter>
F 100 LB 31 C0 8E D8 B0 53 A2 14 00 CD 20
  <Enter>
R CX <Enter>
B <Enter>
N PRTSCOFF.COM <Enter>
U 100 LB <Enter>
W <Enter>
Q <Enter>
```

The U (unassemble) command should display the assembly language mnemonics shown in Figure 1 of July's *Help Screen.*

> *Do you have any questions concerning the IBM PC or compatibles? Send them to* The Help Screen, PC World, *555 De Haro St., San Francisco, CA 94107, or electronically to CompuServe 74055,415 or The Source STE908.* ◆

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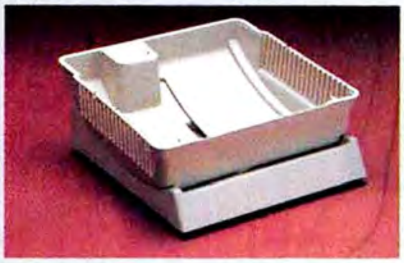

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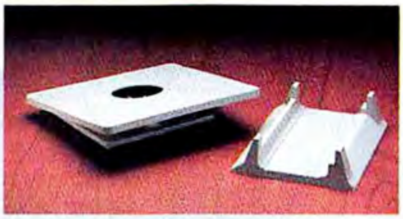

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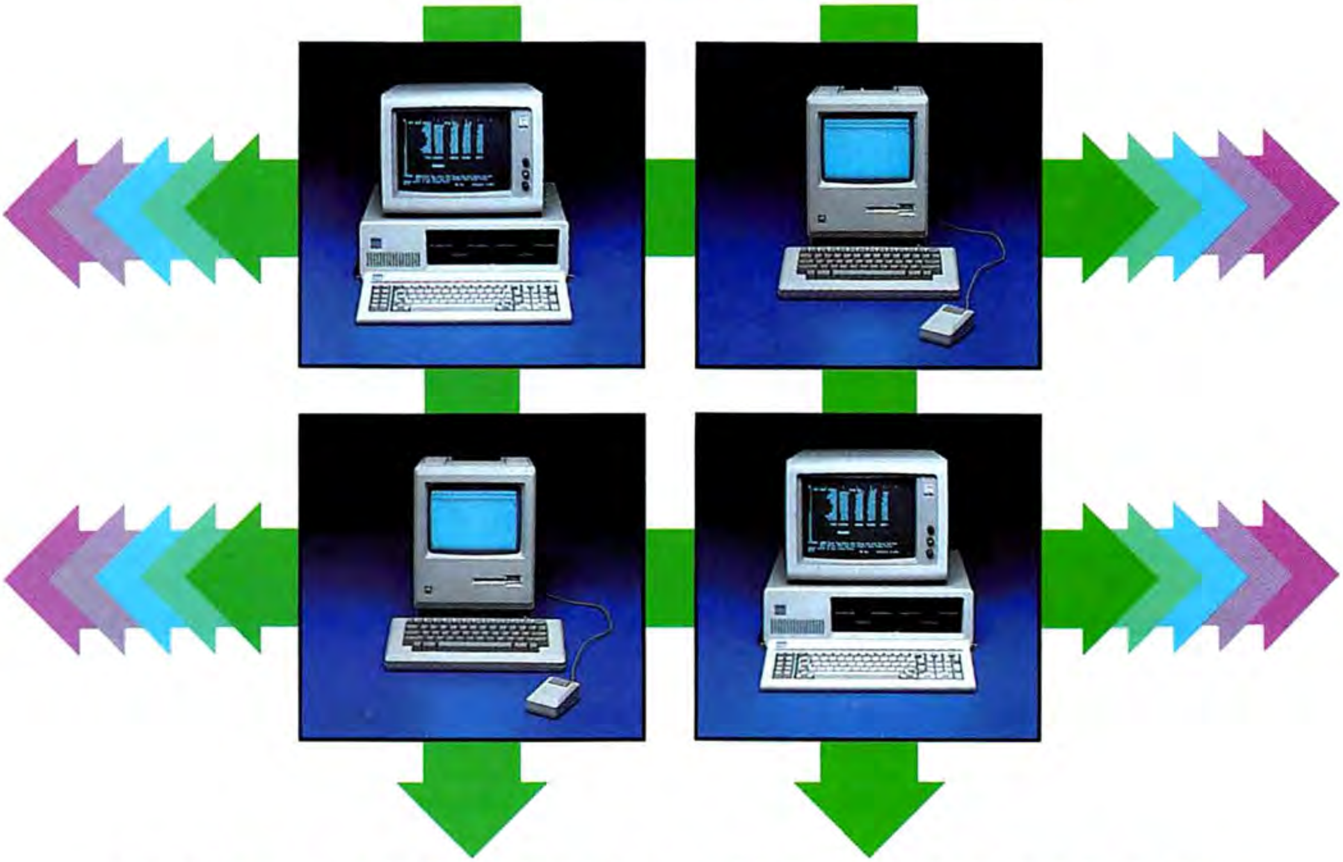

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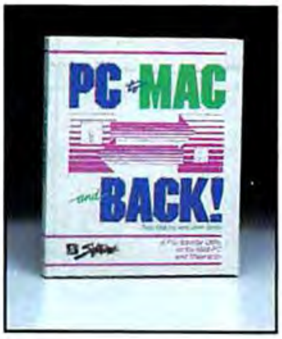

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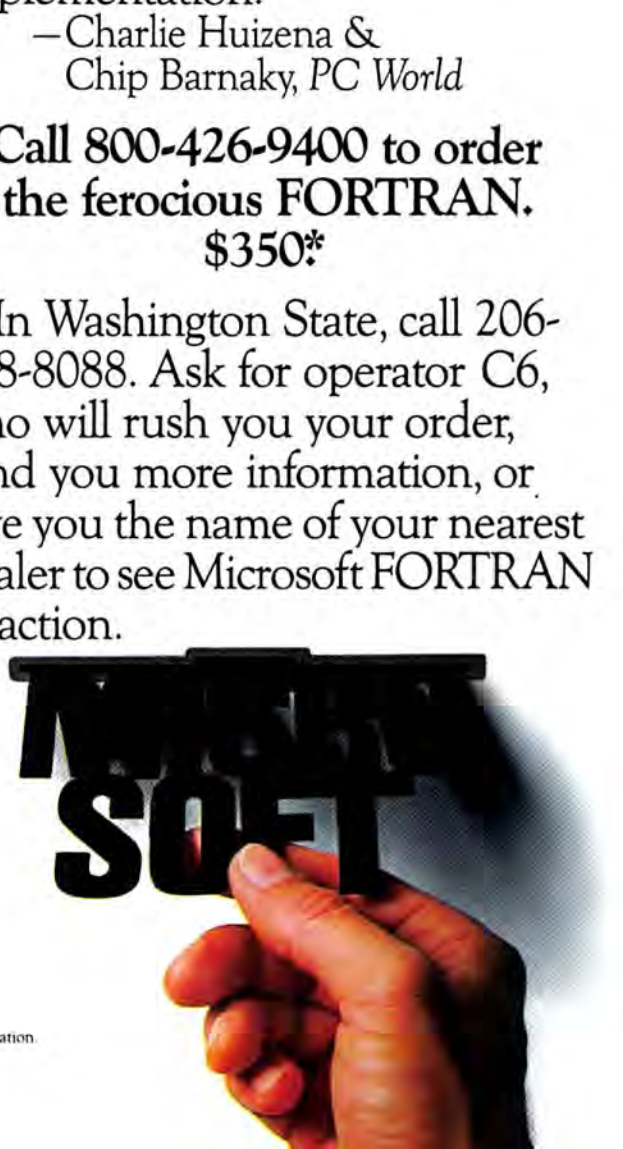

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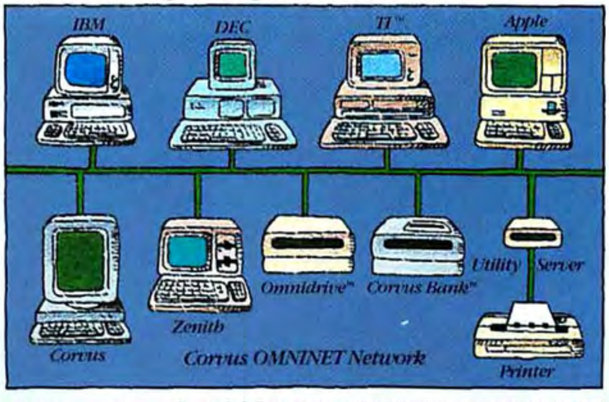

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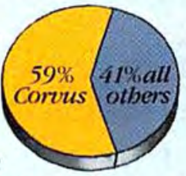

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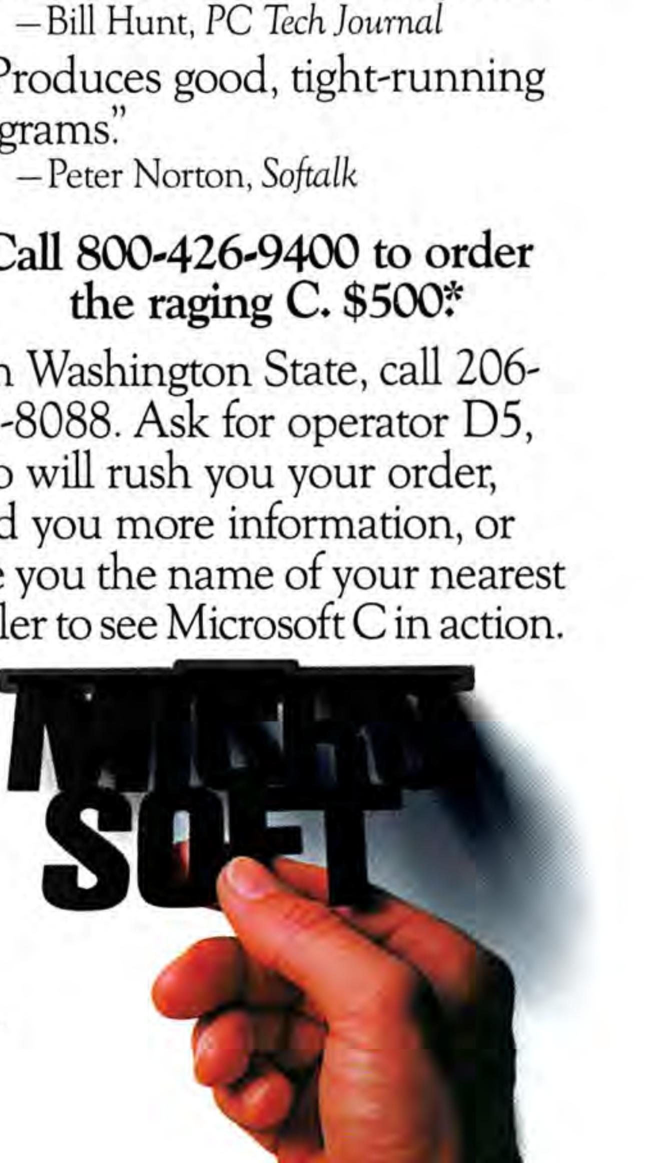

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World Class PC

Christine Whyte

Picking the most popular software and hardware for the IBM PC is no simple task, but in our second annual World Class PC contest, the readers of PC World have once again named their favorites. PC World asked readers to select PC software and hardware that they would recommend to a friend, based on outstanding performance and value. This year's contest boasts 15 new hardware and software categories, and accordingly, the World Class PC prizes have nearly doubled in value.

The product receiving the most votes in each category, plus an IBM

PC, constitutes the 1984 World Class PC system. The system is valued at $23,176 and was awarded as first prize to one lucky person selected in a random drawing by PC World Publisher David Bunnell. The World Class PC contest will also award this year's most popular PC-compatible computer, the $4995 Compaq-Plus, to the second-place winner.

PC World is happy to congratulate the other winners of the contest–the many hardware and software manufacturers whose products have gained the confidence of our readers.

Now the drum roll, please. The winning products and the runners-up are listed in the charts accompanying this article. However, the most vital question begs to be answered first: who won the World Class PC?

PC World congratulates Philip J. Probst, our first-prize winner. Mr. Probst is a production scheduler for a major flour manufacturer in Buffalo, New York. Although he uses an IBM PC XT and Lotus Development Corporation's *1-2-3* at work in preparing cost-control-analysis reports, he has never owned a computer. He plans to use his windfall to delve into the mysteries of managing his personal finances. Phyllis Probst, a volunteer board member of several charitable organizations, will enlist the PC's word processing abilities in her work. The Probst's three sons will use the family's World Class PC system to keep tabs on schoolwork and play games. Maybe they'll even become computerphiles.

Kirk A. Gutmann of Cleveland, Ohio, our second-prize winner of a Compaq-Plus portable computer, is an associate with Booz-Allen & Hamilton. A consultant in the field of manufacturing technology, Mr. Gutmann has used an IBM PC at work for financial analysis as well as word processing. Mr. Gutmann thinks his new Compaq-Plus will be useful for managing his personal finances and stock investments.

A Look at the Results

PC World thought that in addition to the winning products, readers might be interested in knowing which products received a significant number of votes. Everyone has a favorite software package or peripheral. Hence our breakdown of voting results. The tallies reflect the percentage each product received of the total votes in its category.

The "Others" entry in a category notes the combined percentage for all products that failed to receive a significant number of votes. A large percentage in the Others row indicates that a number of products in that category are popular. Not surprisingly, the Others numbers are higher in software than in hardware categories; hardware production and start-up costs are higher and profit margins lower, hence fewer products are created and marketed. Also, developers are more willing to invest in software products because less capital is at risk and the great demand for software enables more products to survive in the marketplace.

The figure for the percentage of total respondents who voted in each category can be equated to reader experience in that area. For example, everyone voted on the Word Processing and Spreadsheet categories, and a majority voted on major data bases and modems, while, predictably, a smaller number of readers expressed their preferences for protocol converters.

Spotting Trends

The clearest overall trend indicated by the voting is that *PC World* readers are less interested in technical sophistication and features than in a product's ability to get the job done. The charts in this article tell the story–there are familiar faces in both old and new places. Programs such as *1-2-3*, *WordStar*, and *dBASE II* are still widely used. Thus it's not surprising to find that *1-2-3* not only tops the spreadsheet and graphics lists but makes a respectable showing in the Data Base–Index File category.

This down-to-earth, application-oriented approach by software customers did not go unnoticed by developers in 1984. The appearance of integrated software packages (surely the biggest industry trend this year) is evidence that the call for ease of use and data sharing–in short, utility–is being heeded.

Only a few of the new integrated programs were on the market in time to receive votes. When the contest categories were defined in the early part of 1984, most of the new crop were nothing but flashy demos and marketer's promises. The spreadsheet category was broadened to include these programs. Next year they will undoubtedly rate their own category.

Peachtree's Business Accounting Software is by far the most popular accounting program, according to the voters. The remaining votes are evenly distributed over a large number of programs, with a gradual decline in popularity after the top five products. An interesting fact for both editors and manufacturers to consider is that just 27 percent of all contest voters expressed an opinion in this category.

WORDSTAR
LOTUS
1-2-3
1-2-3 Spreadsheet Graphics Information Management Plus
Accounts Payable Business Accounting System
Peachtree
IRMA
IBM

The aphorism that number two always tries harder seems to have paid off for *Smartcom II*, which edged out Microstuf's *Crosstalk XVI* for first-place honors in the Communications Software category. As in 1983, these two products, along with *PC-Talk III*, continue to corner the growing communications market.

VisiFile slipped from last year's first-place showing to a distant fifth in this year's Data Base–Index File category; *pfs:file* from Software Publishing Corporation took the honors. Note the appearance of the ubiquitous *1-2-3* in this category—a large number of people consider this application a valid use of the program. In the Data Base–Major category, Ashton-Tate's *dBASE II* easily held first place for the second year in a row, though last year's big lead has been nibbled at by *R:Base 4000* and *Knowledge Man*, two products released in 1984.

The top three disk emulator programs from last year—*QuadRAM Drive*, *JFormat*, and *SuperDrive*—are once more at the top, though their positions have switched around some. As in last year's contest, their popularity is closely tied to the multifunction boards with which they are bundled.

In the new Education category, applications software tutorials from ATI took first place. This isn't surprising given the PC's success in the business world and its only modest acceptance by schools and home users. Nonetheless, Spinnaker's early elementary educational games made a strong showing.

One game that seems to appeal to almost everyone is *Flight Simulator*, which won in the game category this year with an even greater majority than it had in 1983. The *Zork* games and *PC Arcade* also remained in the top six, while *Decathlon* vaulted from 23rd to 4th place.

Although *1-2-3* won in the Graphics category, its dominance is being challenged by such dedicated graphics programs as *Fast Graphs* and *Energraphics*. In the Language category, several subtle product differences should be pointed out. IBM/Microsoft BASIC and Microsoft's BASIC Compiler are, respectively, the interpreted and compiled versions of BASIC. Microsoft Pascal 3.13 is the same as IBM's Pascal Compiler 2.00, although at press time Microsoft had upgraded its package with release 3.2. The Lattice C Compiler and the Microsoft C Compiler are likewise the same product marketed under different labels. The winner in the Operating System category was predictable—PC-DOS.

In the spreadsheet world, *1-2-3* still rules, upping last year's share of votes by 26 percent. The only new product in the category that received a significant number of votes is *Open Access*. *IRMA* won in both the Terminal Emulator and Protocol Converter categories, valid results since the product includes terminal emulation software and a protocol converter board. In the Utilities category, *Norton Utilities* and *ProKey* lead the pack. Comparing products in this category is on the order of comparing apples and oranges, for they all do different things. However, it is significant that our readers find these two products to be the most useful.

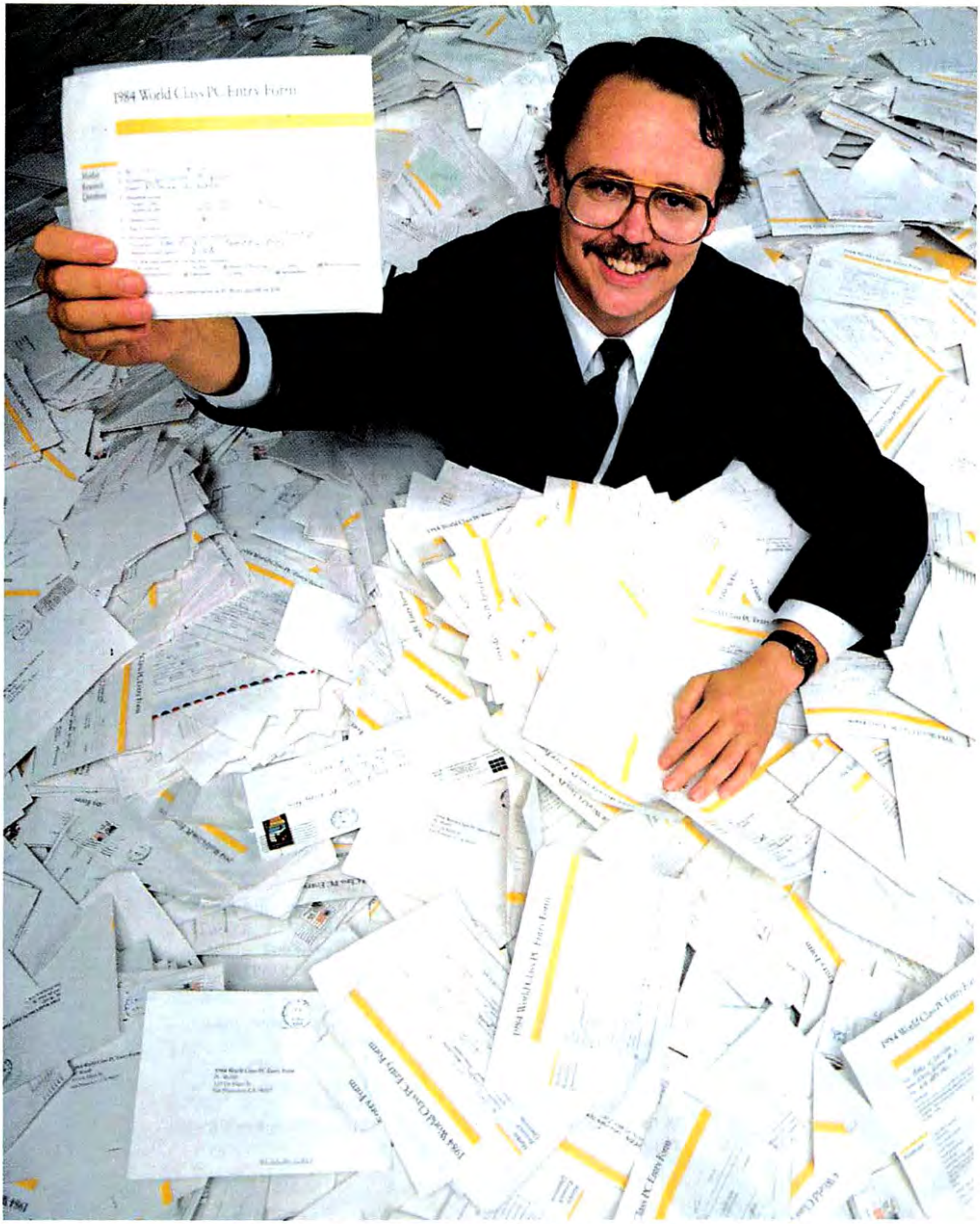
Several new word processing programs have appeared on the market since the 1983 contest, most notably *Microsoft Word*. *WordStar* is still holding on to first place, but it may be a different story next year if *Microsoft Word* continues to grow in popularity.

Of the six hardware categories in the 1983 contest, five that are repeated this year have the same winning products: the Tallgrass 12MB hard disk drive (although this year it has a 20MB instead of a 12MB tape backup), the Hayes Smartmodem 1200, the Epson FX Series dot matrix printers, the NEC 3550 Spinwriter letter quality printer, and the AST SixPakPlus combination board, which duplicates the features of last year's winning ComboPlus but adds more memory and a game port. The closest race for first place in the entire contest was run in this last category—the Quadboard II from Quadram Corporation was a single percentage point back. In the realm of color monitors, the IBM Color Display passed its crown to Princeton's HX-12. In the new Compatible Computer category, the Compaq-Plus easily trounced its competition.

The World Class PC contest has proven so popular that *PC World* will continue to make it an annual event. An important reason for holding the contest is to solicit the valuable opinions of *PC World* readers. Although reader votes should in no way be construed as an endorsement of the winning products by *PC World*, they do indicate which products the *PC World* readers like best.

Don't miss your chance to enter the 1985 World Class PC contest and win the ultimate in PC computing. Look for the contest announcement and entry form in a future issue of *PC World*.

Christine Whyte is the Product Review Editor for PC World.



David Bunnell, Publisher of PC World, randomly selected a first-prize winner of the World Class PC system and a second-prize winner of the Compaq-Plus Portable Computer from thousands of entrants in the 1984 World Class PC contest.

Hardware *Winning Products for the World Class PC Contest*

Compatible Computer

94% of voters voted in this category

Product	Manufacturer	% Votes Received
Compaq-Plus Portable Computer	**Compaq Computer Corp.** **20333 FM 149** **Houston, TX 77070** **713/370-7040** **List price: $4995**	53
Columbia MPC	Columbia Data Products	9
Tava PC	Tava Corp.	6
Sperry PC	Sperry Corp.	4
Columbia VP	Columbia Data Products	3
Chameleon	Seequa Computer Corp.	2
Corona PC	Corona Data Systems	2
Zenith PC	Zenith Data Systems	2
Eagle PC Plus	Eagle Computer, Inc.	2
Radio Shack TRS-80 2000	Tandy Corp./Radio Shack	2
Eagle PC Spirit	Eagle Computer, Inc.	2
TeleVideo TPC-II	TeleVideo Systems, Inc.	2
Others		11
		Total 100

Color Monitor

67% of voters voted in this category

Product	Manufacturer	% Votes Received
HX-12	**Princeton Graphic Systems** **170 Wall St.** **Princeton, NJ 08540** **800/221-1490** **List price: $695**	39
IBM Color Display	IBM	16
Color II Plus	Amdek Corp.	12
Quadchrome	Quadram Corp.	10
Color IV	Amdek Corp.	7
Taxan 400 Series	Taxan Corp.	4
JC 1203	NEC Information Systems, Inc.	3
ZVM 136	Zenith Data Systems	3
Others		6
		Total 100

Hard Disk Storage, 10MB-12MB

41% of voters voted in this category

Product	Manufacturer	% Votes Received
Tallgrass TG-3012 **(12MB hard disk drive with 20MB tape backup)**	**Tallgrass Technologies Corp.** **11100 W. 82nd St.** **Overland Park, KS 66214** **913/492-6002** **List price: $3495**	34
Davong Hard Disk Systems	Davong Systems, Inc.	9
Iomega Bernoulli Box	Iomega Corp.	6
Megaflight 100	Kamerman Labs	5
10M	Corvus Systems, Inc.	5
Pegasus 10 (Shugart 10MB)	Pegasus	5
WS-1, WS-2, and WS-3	Maynard Electronics	4
Others		32

Printer–Letter Quality

59% of voters voted in this category

Product	Manufacturer	% Votes Received
NEC 3550 Spinwriter	**NEC Information Systems, Inc.** **1414 Massachusetts Ave.** **Boxborough, MA 01719** **617/264-8000** **List price: $2290**	**31**
Model 630 ECS	Diablo Systems, Inc.	15
NEC 7700 Series	NEC Information Systems, Inc.	10
Printmaster F-10	C. Itoh Electronics, Inc.	7
Brother HR-25 Daisy Wheel Printer	Dynax, Inc.	7
Sprint 11/40-130 Plus	Qume Corp.	6
Juki 6100	Juki Industries of America, Inc.	6
855	Texas Instruments, Inc.	2
Daisywriter 2000 Printer	Computers International, Inc.	2
NEC 2050	NEC Information Systems, Inc.	2
Others		12
		Total 100

Printer–Dot Matrix

100% of voters voted in this category

FX Series	**Epson America, Inc.** **2780 Lomita Blvd.** **Torrance, CA 90505** **213/539-9140** **List price: $895**	**32**
MX Series	Epson America, Inc.	21
Microline 92	Okidata	11
Microline 93	Okidata	8
800 Series	Texas Instruments, Inc.	4
Prowriter 8510A	C. Itoh Electronics, Inc.	4
Microline 82A	Okidata	4
MT Series	Mannesmann Tally	4
Toshiba P1350	Toshiba America, Inc.	3
Gemini Series	Star Micronics, Inc.	2
P-Series	Data Products	2
RX-80 Series	Epson America, Inc.	1
DS180 Matrix Printer	Datasouth Computer Corp.	1
Others		3
		Total 100

Plotter

32% of voters voted in this category

HP 7475A Plotter	**Hewlett-Packard** **16399 W. Bernardo Dr.** **San Diego, CA 92127** **619/487-4100** **List price: $1895**	**54**
HP 7470A Plotter	Hewlett-Packard	21
Amplot II Plotter	Amdek Corp.	10
HIPLOT DMP-40 Plotter	Houston Instrument	7
Others		8
		Total 100

Hardware *Winning Products for the World Class PC Contest*

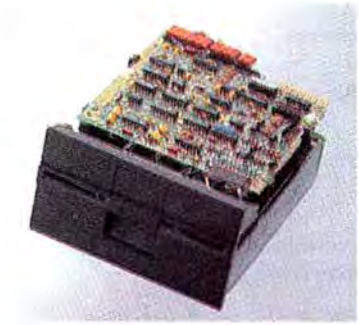
Modem

84% of voters voted in this category

Product	Manufacturer	% Votes Received
Smartmodem 1200	**Hayes Microcomputer Products, Inc. 5923 Peachtree Industrial Blvd. Norcross, GA 30092 404/449-8791 List price: $699**	**47**
Smartmodem 1200B	Hayes Microcomputer Products, Inc.	34
PC-212A/1200 Modem Card	Qubie' Distributing	4
Smartmodem 300	Hayes Microcomputer Products, Inc.	3
PC212A	Rixon Inc.	2
Password with Telpac	U.S. Robotics, Inc.	2
VA 3450	Racal-Vadic	2
Others		6
		Total 100

Disk Drives

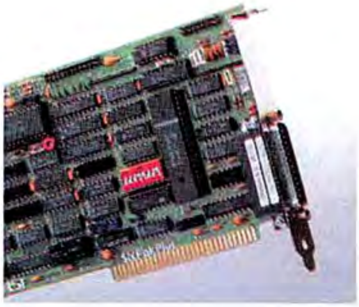
45% of voters voted in this category



Product	Manufacturer	% Votes Received
TM 100-2	**Tandon Corp. 20320 Prairie St. Chadsworth, CA 91311 818/993-6644 List price: $290**	**46**
9400 Series	Control Data Corp.	30
SA Series	Shugart Corp.	10
FD Series	TEAC Corp. of America (TCA)	7
Amdisk V	Amdek Corp.	3
Others		4
		Total 100

Combination Board

73% of voters voted in this category



Product	Manufacturer	% Votes Received
SixPakPlus	**AST Research, Inc. 2121 Alton Ave. Irvine, CA 92714 714/863-1333 List price: $945**	**29**
Quadboard II	Quadram Corp.	28
MegaPlus II Multifunction RAM Board	AST Research, Inc.	27
Captain	Tecmar	3
Six Function Board	Prelude Computer Corp.	2
Super Rio	STB Systems, Inc.	2
Others		9
		Total 100

Protocol Converter

6% of voters voted in this category

Product	Manufacturer	% Votes Received
IRMA	**Digital Communications Associates, Inc.** **303 Technology Park** **Norcross, GA 30092** **404/448-1400** **List price: $1195**	**32**
Blue Lynx Series	Techland Systems, Inc.	11
PA-1000 Protocol Converter	Avatar Technologies Inc.	7
Others		50
	Total	100

Color Graphics Board

49% of voters voted in this category

Color/Graphics Adapter	**IBM** **Entry Systems Division** **P.O. Box 1328** **Boca Raton, FL 33432** **800/447-4700** **List price: $244**	**22**
Graphics Master	Tecmar	14
PC +	Plantronics Enhanced Graphics Products	13
Graphics Card	Hercules Computer Technology	13
Quadcolor I	Quadram Corp.	9
Graphics Edge	Everex Systems, Inc.	6
MultiDisplay Card	Paradise Systems, Inc.	5
MAI Multiple Interface Board	Amdek Corp.	4
Graphix Plus	STB Systems, Inc.	4
Color Display Adapter	Persyst, Inc.	3
Others		7
	Total	100

Input Device

30% of voters voted in this category

Microsoft Mouse	**Microsoft Corp.** **10700 Northup Way** **Bellevue, WA 98004** **206/828-8080** **List price: $195**	**48**
PC Mouse	Mouse Systems Corp.	18
KoalaPad Touch Tablet	Koala Technologies Corp.	13
Power Pad	Chalk Board, Inc.	6
Others		15
	Total	100

Software *Winning Products for the World Class PC Contest*

Accounting

27% of voters voted in this category

Product	Manufacturer	% Votes Received
Peachtree's Business Accounting Software	**MSA, Inc.** **3445 Peachtree Rd. NE** **Atlanta, GA 30326** **404/239-3000** **List price: each module $595, 8 modules $4760**	**30**
BPI Systems Business Accounting Software	BPI Systems	8
Easy Business Accounting Series	Sorcim Corp.-I.U.S.	8
Desktop Accountant	Rocky Mountain Software Systems	6
Hardisk Accounting Series	Great Plains Software	5
Open Systems Accounting Software	Open Systems	5
Others		38
		Total 100

Business Management

7% of voters voted in this category

Product	Manufacturer	% Votes Received
Harvard Project Manager	**Harvard Software, Inc.** **521 Great Rd.** **Littleton, MA 01460** **617/486-8431** **List price: $395**	**23**
Time Accountant	Time Accountant	10
Project Scheduler	SCITOR Corp.	6
Decision-Analyst	Executive Software, Inc.	6
Statpac	Walonick Associates	6
Prospecting	Key Systems, Inc.	6
Others		43
		Total 100

Financial Applications

12% of voters voted in this category

Product	Manufacturer	% Votes Received
Dow Jones Investment Evaluator	**Dow Jones & Co.** **P.O. Box 300** **Princeton, NJ 08540** **800/257-5114** **List price: $149**	**24**
Micro/Prophit	Via Computer, Inc.	20
Tax Preparer	Howard Software Services	10
Others		46
		Total 100

Personal Management

20% of voters voted in this category

Product	Manufacturer	% Votes Received
The Home Accountant Plus	**Arrays, Inc./Continental Software** **11223 S. Hindry Ave.** **Los Angeles, CA 90045** **213/410-3977** **List price: $150**	**36**
Personal Computer/Personal Finance Program	Best Programs, Inc.	19
Dollars and $ense	Monogram	10
Financier II	Financier, Inc.	8
Others		27
	Total	100

Education

16% of voters voted in this category

ATI's Training Power Series: How to Use Your IBM PC, Training Power for PC-DOS, Lotus 1-2-3, dBASE II, WordStar, Multiplan	**American Training International** **12638 Beatrice St.** **Los Angeles, CA 90066** **213/823-1129** **List price: $379.90 for six ($39.95 for first two on list; $75 each for last four)**	**19**
Spinnaker Educational Games	Spinnaker Software Corp.	16
Instructor	Individual Software, Inc.	12
PLATO Microlink	Control Data Publishing	12
MasterType	Scarborough Systems	7
Others		35
	Total	100

Disk Emulator

26% of voters voted in this category

SuperDrive	**AST Research, Inc.** **2121 Alton Ave.** **Irvine, CA 92714** **714/863-1333** **List price: $45 for SuperPak (SuperDrive and SuperSpool)**	**37**
QuadRAM Drive	Quadram Corp.	22
JFormat	Tall Tree Systems	15
SpeedDisk	Tecmar, Inc.	4
Others		22
	Total	100

Software *Winning Products for the World Class PC Contest*

Spreadsheet

100% of voters voted in this category

Product	Manufacturer	% Votes Received
1-2-3	**Lotus Development Corp.** **161 First St.** **Cambridge, MA 02142** **617/492-7171** **List Price: $495**	**70**
Multiplan	Microsoft	11
SuperCalc 1, 2, and 3	Sorcim Corp.	6
VisiCalc	VisiCorp	4
Open Access	Software Products International (SPI)	3
Perfect Calc	Perfect Software	2
MBA	Context Management Systems	1
Others		3
		Total 100

Data Base–Major

78% of voters voted in this category

Product	Manufacturer	% Votes Received
dBASE II	**Ashton-Tate** **10150 W. Jefferson Blvd.** **Culver City, CA 90230** **213/204-5570** **List price: $495**	**57**
R:base 4000	MicroRim, Inc.	13
Knowledge Man	Micro Data Base Systems, Inc.	9
Data Base Manager II	Alpha Software Corp.	3
Revelation	Cosmos, Inc.	3
Power-base	GMS Systems, Inc.	2
InfoStar	MicroPro International Corp.	2
Others		11
		Total 100

Word Processing

100% of voters voted in this category

Product	Manufacturer	% Votes Received
WordStar	**MicroPro International Corp.** **33 San Pablo Ave.** **San Rafael, CA 94903** **415/499-1200** **List price: $495**	**34**
Microsoft Word	Microsoft Corp.	21
MultiMate	Softword Systems, Inc.	13
Volkswriter Deluxe	Lifetree Software, Inc.	8
WordPerfect	Satellite Software International	6
EasyWriter II	Sorcim Corp./I.U.S.	3
Perfect Writer	Perfect Software	3
Others		12
		Total 100

Communications

53% of voters voted in this category

Product	Manufacturer	% Votes Received
Smartcom II	**Hayes Microcomputer Products, Inc.** **5923 Peachtree Industrial Blvd.** **Norcross, GA 30092** **404/449-8791** **List price: $149**	31
Crosstalk XVI	Microstuf, Inc.	29
PC-Talk III	The Headlands Press, Inc.	21
Perfect Link	Perfect Software	2
Others		17
		Total 100

Graphics

29% of voters voted in this category

Product	Manufacturer	% Votes Received
pfs:file	**Software Publishing Corp.** **1901 Landings Dr.** **Mountain View, CA 94043** **415/962-8910** **List price: $140**	29
PC-File	Jim Button	19
1-2-3	Lotus Development Corp.	14
Friday	Ashton-Tate	12
VisiFile	VisiCorp	8
Perfect Filer	Perfect Software	5
Others		13
		Total 100

Data Base–Index File

31% of voters voted in this category

Product	Manufacturer	% Votes Received
1-2-3	**Lotus Development Corp.** **161 First St.** **Cambridge, MA 02142** **617/492-7171** **List price: $495**	15
Fast Graphs	Innovative Software, Inc.	11
Energraphics	Enertronics Research, Inc.	11
AutoCAD	Autodesk, Inc.	8
Chart-Master	Decision Resources	7
Chartman	Graphic Software, Inc.	6
PC-Draw	Micrografx	5
Others		37
		Total 100

Software *Winning Products for the World Class PC Contest*

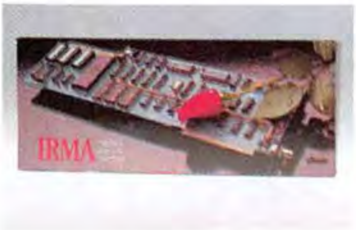
Games

38% of voters voted in this category

Product	Manufacturer	% Votes Received
Microsoft Flight Simulator	**Microsoft Corp.** **10700 Northup Way** **Bellevue, WA 98004** **206/828-8080** **List price: $49.95**	43
Zork I, II, and III	Infocom, Inc.	15
PC Arcade	FriendlySoft, Inc.	5
Decathlon	Microsoft Corp.	4
Millionaire	Blue Chip Software	3
Nightmission Pinball	Sublogic Communications Corp.	3
Cosmic Crusader	Funtastic, Inc.	3
Starcross	Infocom, Inc.	2
Frogger	Sierra On-Line, Inc.	2
Ultima II	Sierra On-Line, Inc.	2
Deadline	Infocom, Inc.	2
Others		16
	Total	100

Terminal Emulator

12% of voters voted in this category



Product	Manufacturer	% Votes Received
IRMA	**Digital Communications Associates, Inc.** **303 Technology Park** **Norcross, GA 30092** **404/448-1400** **List price: $1195**	23
SmarTerm/PC	Persoft, Inc.	15
IBM 3101 Emulation	IBM	8
VTERM	Coefficient Systems Corp.	8
Others		46
	Total	100

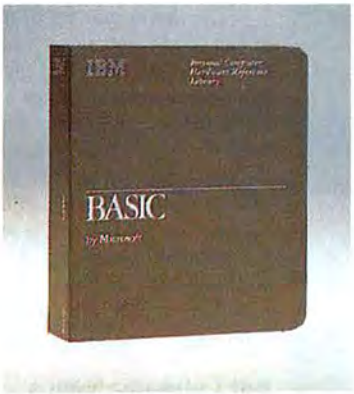
Utilities

37% of voters voted in this category

Product	Manufacturer	% Votes Received
Norton Utilities	**Peter Norton** **2210 Wilshire Blvd.** **Santa Monica, CA 90403** **213/399-3948** **List price: $80**	60
ProKey	RoseSoft, Inc.	10
Copy II PC	Central Point Software, Inc.	4
Sideways	Funk Software	3
Pascal Tools	Blaise Computing, Inc.	3
Disk Mechanic	MLI Microsystems	3
Others		17
	Total	100

Language

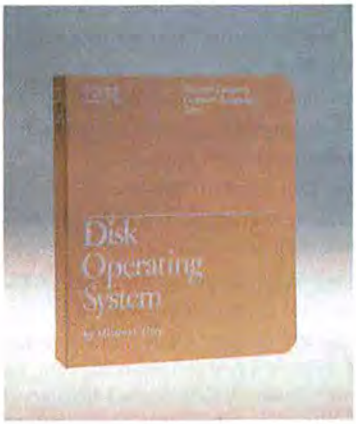
46% of voters voted in this category



Product	Manufacturer	% Votes Received
IBM BASIC	**IBM Entry Systems Division** **P.O. Box 1328** **Boca Raton, FL 33432** **800/447-4700** **List price: included in purchase price of IBM PC**	**15**
Dr. Logo	Digital Research	9
Microsoft Pascal	Microsoft Corp.	7
BASIC Compiler	Microsoft Corp.	7
Lattice C Compiler	Lifeboat Associates	7
Turbo Pascal	Borland International	6
FORTRAN Compiler	Microsoft Corp.	5
Microsoft C Compiler	Microsoft Corp.	4
Pascal Compiler	IBM	4
Pascal/MT + 86	Digital Research	3
Others		33
		Total 100

Operating System

66% of voters voted in this category



Product	Manufacturer	% Votes Received
PC-DOS 2.10	**IBM** **Entry Systems Division** **P.O. Box 1328** **Boca Raton, FL 33432** **800/447-4700** **List price: $65**	**73**
MS-DOS 1.25	Microsoft Corp.	12
CP/M-86	Digital Research	10
UCSD p-System	IBM	2
Coherent	Mark Williams Co.	1
Others		2
		Total 100

"I'll show you how to make disk drives, your IBM,

Fear of frying.

It's a known fact. You can save over $200 buying disk drives from us and installing them yourself. All you need is a screwdriver, and we give you one when you buy the drive from us.

But many people find themselves gripped by a strange terror at the thought of opening up their IBM-PC. Listen, I felt the same way until I separated the truths from the misconceptions.

Misconceptions

1. You'll get confused and panic.
2. Your computer will blow up.
3. You'll blow up.
4. You're better off with an IBM warranty.
5. Drives without an IBM sticker don't work.

Truths

1. It's easy. (If you do panic just call our special PC Connection Tech Support Team.)
2. Your computer will neither blow up nor suffer permanent brain damage.
3. *You* won't blow up (unless you install your drives in the bathtub with the water and power on.)
4. Our warranty is better than IBM's. IBM gives you 90 days. We give you up to a year. (See price section.)
5. We sell the same drives as IBM sells.

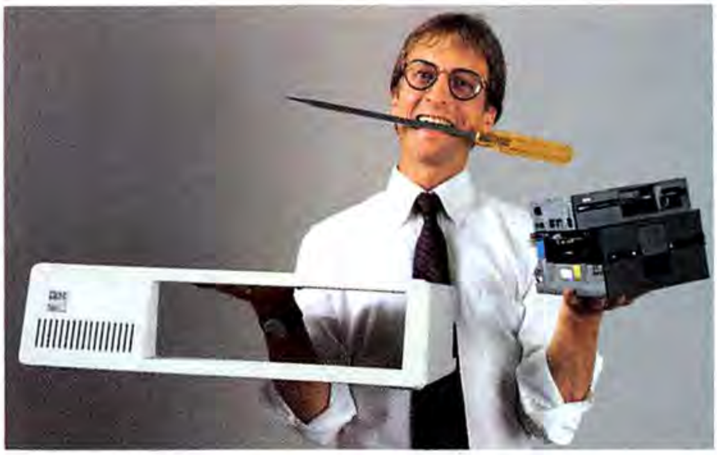
What do you call a PC with no drive?

You call it a deal. Because we can sell you drives *and* drive controllers for far less than you can get them from IBM. We're not talking cheap imitations. *We're talking about the same drives.*

IBM buys their drives from Tandon and CDC (Control Data Corporation). We buy the same drives in a full-height version from Tandon, and even better drives in a half-height version from TEAC. McGill University, bastion of Canadian excellence in both engineering and hockey, has examined many of the drives on the market and buys TEAC drives from us.

IBM buys these drives as raw drives, configures them for the PC, sets them as either Drive A or B and tests them. We follow exactly the same procedure with our raw drives.

IBM or the IBM dealer installs the drives—if you buy drives from them. You install the drives if you buy them from us. It will take you 15 to 30 minutes. *You'll save nearly $200 per drive.*



Glossary

The following is a guide to disk drive terminology for people annoyed by jargon.

Hard disk drive. a.k.a. rigid disk, hard drive, mass storage device. The hard drives we sell can hold from 10 megabytes to 30 megabytes of information. That's 30 to 90 times more than a floppy. And a computer can read from, and write to, a hard disk much faster.

Half-height. Just what it says. A skinny disk drive that works just as well as a regular one. You can put two of them into one drive slot in the PC.

Double-sided (DS). A double-sided disk drive can read data from, and write data to, both sides of the disk.

Double-density (DD). The tracks on double-density disks are twice as close together as the original microcomputer floppies. (Someday they could be 20 times closer together and we'll have double-deco density disks. And then, of course, there are art deco disks—the square disks in the round jackets. . .) The important thing is that all IBM floppy drives, and all our drives, run double-sided double-density disks now.

Drive controller. a.k.a. drive adapter, IBM diskette adapter. You have to buy a special circuit board to boss that drive around on the PC. We sell floppy drive controllers. IBM sells them. Ours are less expensive and your computer will never know the difference.

Raw drive. A drive that doesn't know what it's doing, or where it belongs, or how to talk to disks or computers, or anything a self-respecting drive should know.

Configure. To set up a raw drive so it knows what kind of computer it's inside of, and which drive it is (A drive, B drive etc.). We do it for you.

Pluggable terminator module. A small chip-type gadget on every drive. Take it off and the drive is a B drive. Leave it on and it's an A drive.

Jumpers. There are jumpers on every drive. They're like fuse wires. By either breaking or removing the right ones, we configure the drive for IBM.

DIP switches. a.k.a. dual in-line package switches. When you set these switches on the motherboard correctly it understands what's hooked up to it. All you need is a ball point pen and the illustrations we send with your drive.

DOS. a.k.a. disk operating system. Rhymes with "sauce". Blank disks are not very smart. They don't know how to be disks, or how to act around different computers. They worship this one disk called DOS. A DOS disk knows just about everything there is to know about being a disk and will gladly share that wisdom with any blank disk.

Format. You format a blank disk by putting your DOS disk in one drive and a blank disk in the other.

Spindle speed test. We test the spindle speed of all drives and get a readout within ±0.1 RPM.

Random sector read test. Then we write data to certain locations and send the read head out after it. Your basic search and locate mission test.

Centering test. Floppies can flop but not wobble. This test makes sure your disk gets centered when you load it.

Radial test. A double-sided drive has two heads. This test checks their alignment.

The drives you get from us are as good in every way as the drives you get from IBM. Some companies sell raw drives—as is, unconfigured, untested. Raw drives are a raw deal. You can spend days just trying to get the information you need to install and configure these drives. So when you compare prices, make sure you only look at drives ready to install in an IBM. Like drives from us.

But I already have a disk drive!

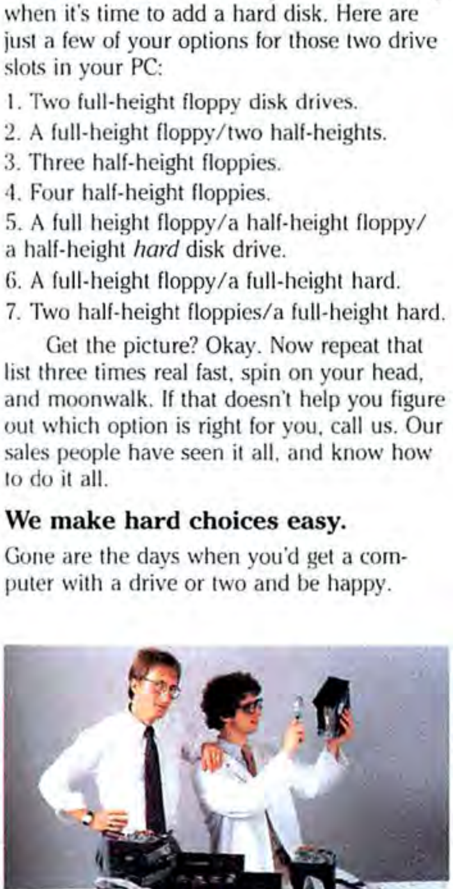
Most IBM dealers insist you get at least one floppy drive when you get your PC. But we can still save you a lot of money when it's time to fill that second drive slot. And we can really save you money when it's time to add a hard disk. Here are just a few of your options for those two drive slots in your PC:

1. Two full-height floppy disk drives.
2. A full-height floppy/two half-heights.
3. Three half-height floppies.
4. Four half-height floppies.
5. A full height floppy/a half-height floppy/ a half-height *hard* disk drive.
6. A full-height floppy/a full-height hard.
7. Two half-height floppies/a full-height hard.

Get the picture? Okay. Now repeat that list three times real fast, spin on your head, and moonwalk. If that doesn't help you figure out which option is right for you, call us. Our sales people have seen it all, and know how to do it all.

We make hard choices easy.

Gone are the days when you'd get a computer with a drive or two and be happy.



We test every floppy drive.

© Copyright Micro Connection, Inc. 1984. Prices and specifications are subject to change without notice. All items subject to availability. 120 day guarantee on Tandon full-height drives. One year guarantee on all TEAC half-height drives and Maynard hard drive systems. Micro Connection is a trademark of Micro Connection, Inc. PC Connection is a division of Micro Connection Inc. PC Connection is a registered trademark. IBM is a registered trademark of IBM Corporation. IBM suggested retail prices effective June, 1984.

$200 in ten minutes with our and a screwdriver.”

—DAVID HALL, C.E.O.
PC CONNECTION

When you buy drives from IBM you pay more for their name than you do for their drives.

Many serious users eventually find they need a hard drive. And the availability of half-height floppy and hard drives lets you upgrade to a hard disk system, *internally*.

Half heights are, by the way, just what they sound like. You put two of them into one drive slot, and get twice the action. We supply all of the cables and mounting brackets you need for free.

Our hard drive systems come from Maynard Electronics. You see a lot of companies selling hard drive systems now. Maynard has been around for a long time and we've found them to be superior in terms of product reliability, value, and customer support.

Maynard hard drive systems are available in both 10Mb and 30Mb versions. (The PC-XT has a 10Mb drive). *However*, the 30Mb versions only come in a full-height model. Every Maynard hard drive package comes complete with internal hard drive, and drive controller board. On WS-1 packages, the controller board handles just the hard drive. On WS-2 packages, the controller board handles the hard drive plus floppy drives. WS-2 packages are more expensive, but *they let you run all of your drives out of just one expansion slot on your PC.* (You can always sell your old floppy controller card to your kids.)

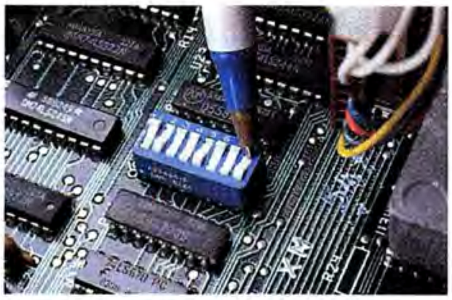
Every Maynard package also comes with a ROM chip which plugs directly into an empty socket on the 256K motherboard. *This allows your PC to behave just like an XT, when running DOS based programs.* PC's with a 256K motherboard can boot off the hard drive. PC's with 64K must boot off a floppy first.

Moving parts.

You have them. We have them. Disk drives have them. Moving parts—a bunch of them. And they do tend to get a little funky as they get older. Now we can't offer you a one-year warranty on *your* moving parts. But we can offer you a one year warranty on all of our half height and hard disk drives.

Because while IBM gives you a 90 day warranty on their drives, all of our TEAC half-heights, and Maynard hard drives *are covered for a full year.* And we even extend the typical 90 day coverage of Tandon full-heights to 120 days.

Remember, all of the floppy drives we sell are standard, 5¼", double-density, double-sided drives, and fully IBM compatible. When formatting disks with DOS 1.1 you'll have 320K per disk, and when formatting with DOS 2.0 or 2.1 you'll have 360K.



A flick of the DIP switches and your motherboard knows how many drives there are.

We test them with a state-of-the-universe tester, performing a spindle speed test, a random sector test, a centering test, and a radial test. If the drive passes, we box it up with the test results and ship it to you. Just take the cover off your PC. Install the drive. Plug it in. Connect it to the drive controller. Set the DIP switches. It's easier than you think. And we include a set of very thoughtful, step-by-step instructions.

We're happy. You're happy. Your computer's happy. You saved money. We made money. It's the American Dream.

1-800/243-8088

For the IBM-PC exclusively. 296M

Leader of the pack.

PC Connection was selling disk drives when a lot of other computer companies were still selling calculators. When you buy from us, you get all the cost benefits of direct sales, along with some very intelligent PC experts who can discuss your storage requirements.

If you've never ordered from us before, drives are a good place to begin. Because storage is one of the most crucial and expensive aspects of your system. And the price and one year warranty breakthroughs from TEAC and Maynard make this a great time to add drives to your system. Give us a call.

Products and Prices

All disk drive shipments include a free super-deluxe plain old PC Connection screwdriver for use in installing drives.

TEAC FD-55B (5¼") *half-height* drive (DS, DD) . . . . ea.	$165
("y" cable & bracket free with each pair)	
Tandon TM100-2 (5¼") *full-height* drive (DS, DD) . . . . ea.	199
Maynard	
Floppy drive controller	135
Maynard 10Mb Internal Drives	
WS-1 pkg. *full height*	879
WS-1G pkg. *half height*	879
WS-2 pkg.* *full height*	1079
WS-2G pkg.* *half height*	1079
Maynard 30Mb Internal Drives	
WS-1A pkg. *full height*	1999
WS-2A* pkg. *full height*	2199

**WS-2 packages include a floppy drive controller on the same board with the hard drive controller.*

PC CONNECTION®

PC Connection, 6 Mill Street, Marlow, NH 03456, 800/243-8088 or 603/446-3383.

You Spend A Lot Of Time Looking For Breaks For Your Tax Clients. Now Look At One For You.

CPAids has the professional tax programs you need to cut through your workload in record time.

Our Master Tax, Standard Tax, Corporate 1120 and Tax Planner give you all the tools necessary for fast, efficient tax return processing and tax planning.

Our new Client Write-Up software includes a flexible report generator and is completely interactive with our Master Tax Program and Corporate 1120 to generate Schedule C.

All CPAids software is operational with IBM* and IBM compatibles using PC-DOS* or MS-DOS*. Also compatible with DEC Rainbow* and many other CP/M* operating systems.

CPAids software has been developed under the supervision of Andy Rosenberg, CPA and noted tax authority. It is this professional daily involvement with tax accounting that separates CPAids software packages from the rest.

FORMS	STANDARD TAX PROGRAM $995.	MASTER TAX PROGRAM $1,795.
1040 Pgs. 1&2	X	X
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2106, 2119, 2210	X	X
2441	X	X
2555, 3903F		X
3468	X	X
3903	X	X
4137		X
4136	X	X
4255	X	X
4562	X	X
4684	X	X
4797	X	X
4835		X
4952		X
4972, 5884	X	X
5695	X	X
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OVERFLOW SCHEDULING		X
INTERFACE WITH TAX PLANNER	X	X
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PROFORMA	X	X
ON LINE HELP		X
MODEM SUPPORT	OPTIONAL	X
Annual updates at 1/3 of current price		

Want to learn more? CPAids makes that easy, too. Demo disks are available at only $55 each. And, demo disk charges will be applied against programs purchased.

Call or write for more information and the name of the dealer nearest you.

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SOLOMON III

It's easy to recognize SOLOMON III as the choice accounting software for the IBM PC/AT . . .

. . . *but upon a closer look, you'll also discover a powerful management information system.* The CEO, controller, marketing director, purchasing director and payroll manager will think SOLOMON III was designed specifically for them (even if they all happen to be the same person).

The truth is SOLOMON III is a series of eleven accounting modules built around a true central data base. Wise business decisions are the natural by-product of accurate and up-to-date information. SOLOMON III includes over 120 standard reports plus the ability to create an unlimited number of user-defined financial reports. In addition SOLOMON III's Database Reporter allows you to generate Ad Hoc reports which can link directly to your spread sheet and word processing programs. Powerful reporting in tandem with over 800 pages of on line help-text make SOLOMON III the easiest software *to use.*

That's why it's quickly becoming the software that business counts on. Small businesses, Fortune 500 companies, Federal agencies, contractors, wholesalers, and banks across the country, are installing and raving about SOLOMON III. Almost every major accounting firm is placing it on their suggested or recommended list.

The 16 and 32 bit microcomputers of today are naturals for accounting programs . . . but not so when they run programs for older generations of computers . . . not so until TLB invested over $2.5 million and 35 man-years to develop the first truly mature and professional accounting software package for microcomputers. SOLOMON III has the accounting features found on large machines coupled with the ease of installation and use you've come to expect from microcomputer software.

The good executive is a skeptic. And computer software claims often promise you the world. However, SOLOMON III is for real. We could list all of the many features of SOLOMON III. But by the time you'd finish reading them, you could have visited an authorized SOLOMON dealer and received an actual demo. So use the electronic coupon and find out who are your closest authorized SOLOMON dealers. We've put in 35 man-years. Why don't you invest a few seconds right now?

Solomon III Specifications

- Runs on IBM PC, IBM XT, IBM AT, DEC Rainbow, Texas Instruments PC, COMPAQ+, and AT&T 6300.
- Requires 256K RAM, 132 Column Printer, 1-320K floppy with hard disk.
- Built around MDBSIII database management system
- Solomon III modules available:
  - General Ledger
  - Accounts Payable
  - Accounts Receivable
  - Payroll
  - Purchasing
  - Inventory
  - Order Entry/Invoicing
  - Fixed Assets
  - Sales Analysis
  - Job Costing
  - Address & Mail List
  - Solomon Database Reporter
  - Tutorial & Support Plan

ELECTRONIC COUPON

Contact your authorized PC dealer or call us today toll-free to locate your nearest authorized SOLOMON dealer to arrange for a demonstration

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TLB, Inc. P.O. Box 271, Main Line Industrial Park, Frazer, PA 19355

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Solomon Series® Software
For Wise Business Decisions™

Quickly becoming the software that business counts on.

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HOW TO RULE

ADMIT IT. You've always wanted control. It was there in your daydreams as you drove to work. The ones in which

there's a subtle change in your boss's tone of voice. Your office begins a steady march toward the corner. And suddenly, you're C.E.O. with six phones and the world at your feet.

What was it that kept getting between you and that goal?

We suggest you were disorganized. No more than most, to be sure. But then, things did sometimes get lost, confused, forgotten.

You can't rule the world *that* way.

A TINY AD FOR PEOPLE WHO LIKE FACTS AND FIGURES.

Machine requirements:

IBM-PC, XT, COMPAQ, or other 100% IBM compatible personal computers with 256K min. RAM and 1 double-sided disk drive. Color or monochrome display.

Performance data

2 keystroke mail merge. 1 keystroke express between all applications. Cut & paste between all applications. Word processor features include bold face, underline, headers & footers, print preview, quick-set margins, full justification, visible page breaks, templates and much more. Less than ½ sec. to perform all word processor editing functions. Accepts ASCII files from other popular software. Window locations, sizes and colors customizable by user. One key auto phone dialing.

WE CAN FIX THIS.

We have a personal computer program called *Get Organized!* It will organize your life. Quickly and painlessly.

To be exact, *Get Organized!* is 7 different business programs integrated on one floppy disk. It puts everything most managers keep on their desks into your computer. And it does this in such an organized, instinctively easy-to-use way that you'll be using it and benefiting from its power and precision as little as ½ hour after paying for it.

Sound interesting?

A COMPETITIVE ANALYSIS.

Compared with *Symphony* and *Framework*, the price of *Get Organized!* is dramatically low—almost $500 lower on a straight list-price to list-price comparison. And *Get Organized!* will run on far less expensive machine configurations. In fact, what you'll save on disk drives and memory alone could pay for a decent printer.

Perhaps the best way to summarize the significance and value of *Get Organized!* is by telling you the following story:

When we exposed IBM-PC owners to *Get Organized!* in secret marketing tests this summer, a good number of them offered to pay us 5 times the list-price for an advance copy.

What do you think *they* had in mind?

THE $4.99 TRIAL OFFER.

If some of you feel that the claims we've made for *Get Organized!* sound too good to be true, we have a cure.

Call us. Our number is (800) 227-6703. (In California call (800) 632-7979.) Give us your VISA or MasterCard number. For a $4.99 handling fee, refundable upon purchase of *Get Organized!*, we'll speed a demonstration copy your way (on Verbatim disks, no less). At which point your skepticism will go the way of the morning dew.

Now then. Armed with your own copy of this remarkable value in business software, go forth, think straight, and you will surely rule whatever it is you wish to rule.

If not, you have hereby lost one of your best excuses.

GET ORGANIZED!™

The personal work manager from ELECTRONIC ARTS™

1 A Full-Featured Word Processor.

You're Julius Caesar. You'd like to rule the world, but first you have to write a book about how all of Gaul is divided into three parts and so forth. You do not have Get Organized! Your writing becomes slow, mistake-ridden and arduous. The Senate becomes impatient. You know the rest.

2 The Address & Telephone File.

If you were Adlai Stevenson and you had Get Organized! you'd have compiled a mailing list of wealthy and influential supporters. Merging this with the Word Processor would have given you a hard-hitting, personalized direct mail campaign. Your budget would have ambushed Ike. And, with the Russians oblivious of the ambitions lurking beneath your liberal exterior, you could have plucked the world like a ripe plum.

3 The Handy Notepad.

You're Napoleon. You're in the study when your wife Josephine comes in and tells you, "Ze pipes are broken and zere is water in ze loo." "Ah weel feex that thing," you tell her, but since you don't have Get Organized!, you scribble down a note to yourself on the nearest paper which, unfortunately, turns out to be the Order of the Day. Nine hours later your army is clobbered in a Belgian village you never heard of.

Get Organized! is a trademark of Electronic Arts, Inc. IBM is a trademark of International Business Machines, Inc. Compaq is a trademark of Compaq Computer Corp. CompuServe is a trademark of CompuServe, Inc. Dow Jones is a trademark of the Dow Jones Compa
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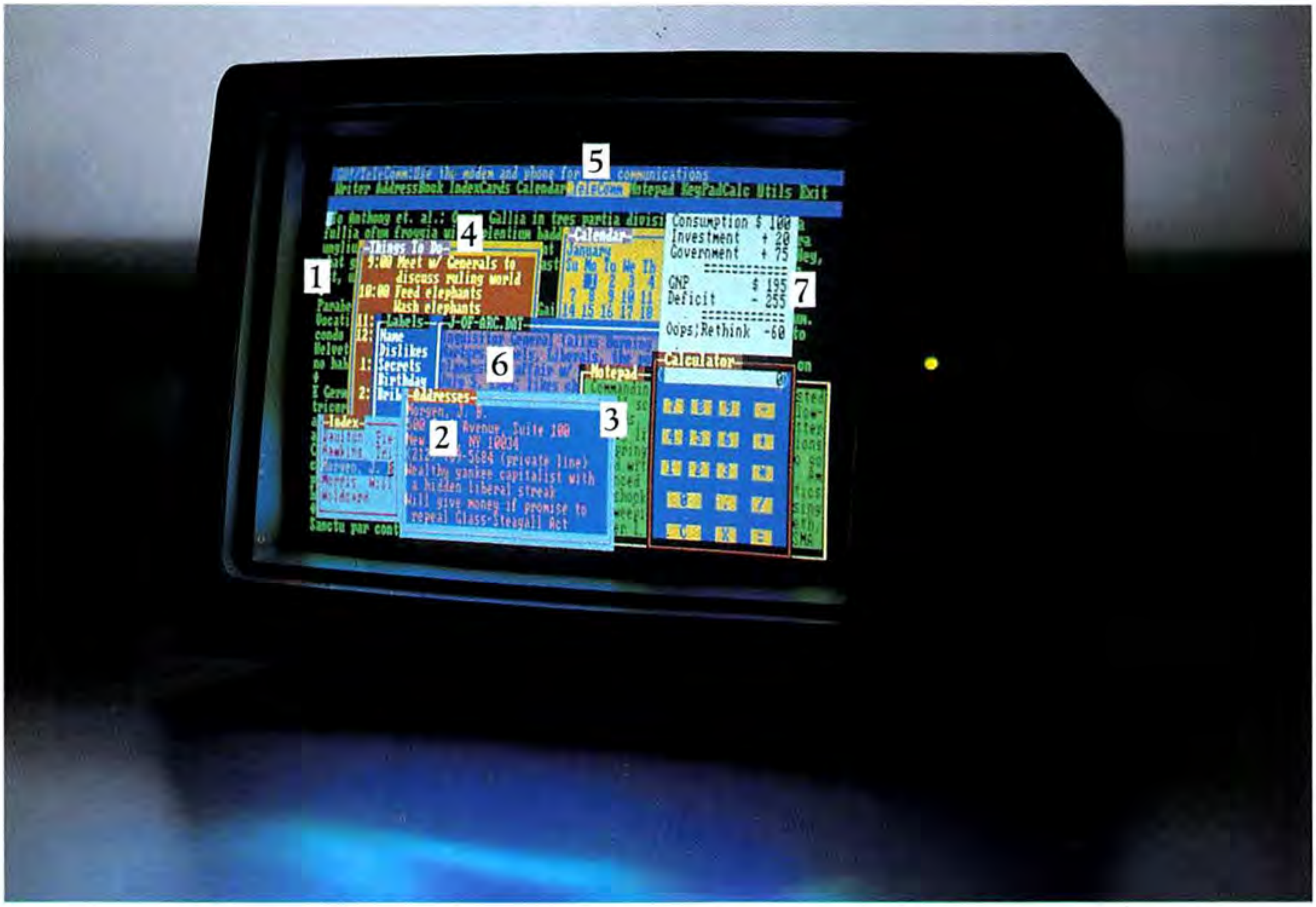
THE WORLD for $199.



4 The Calendar And Appointments Book.

You're Hannibal. You have this idea of taking elephants over the Alps to conquer Rome, but being from Carthage, you're a little fuzzy on dates and seasons in Europe. If you had Get Organized! you'd have known better, been able to plan for recurring events (like winter) and won the day. It would have been right there on the screen: "January 1 . . . Invade Rome, Rule World."

5 The TeleComm Package.

You're Queen Victoria. An excited young man arrives with Get Organized! and a curious metal box. He claims they will instantly connect you with the Empire by means of something called "electronic mail" and "a terminal emulator." He promises wealth and knowledge through "The Source," "Dow Jones," "CompuServe," "MCI," and "MCI Mail." His name is H.G. Wells. You decide he is quite mad and dismiss him. A century later, you're lucky to still have the Falkland Islands.

6 The Index Card File.

You're Joan of Arc. You're on a roll, but certain people are threatening to make things too hot for you. Get Organized! would've let you keep up-to-date info on your friends and foes. Like resumes, statistics, or even birthdays. Who knows? The right birthday card to the right Inquisitor at the right time could have made all the difference.

7 The Calculator.

Imagine how useful this would have been if you were John Maynard Keynes. Simple arithmetic would have revealed the terrible flaw in your economic theory. Governments the world over would not be printing worthless money to cover their debts. And this program would be a lot cheaper.

Source is a trademark of Source Telecomputing, Inc. Symphony is a trademark of Lotus Development Corp. Framework is a trademark of Aston-Tate, Inc. $199 is the suggested retail price for Get Organized! Prices may vary.

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Little Wonder

All you need for less. Finally there's an affordable program flexible enough to be applied precisely to your specific situation. Our six years of software consulting experience plus Hubbard's 25 years in manufacturing management let us know what you do need — and what you don't.

Business transactions require more than a spread-sheet. The TRACKER II System with multiple file updating provides much greater potential for you than limited, single file programs like pfs® file, yet without the expensive complexity of dBase II.™ Instead, our system has 95% of the work already done. It adapts easily to the exact way your business is run and its records kept.

Messrs. Little introduce the answer to the high cost of customized programming: the new TRACKER II™ System for IBM® PCs and compatibles.

Set up and run in less than a day with no prior training. All you need to know is what you want to do. With our simple on-screen instructions and matching-image TRACKPAC booklets, it's as if we were right there in consultation with you.

Take general Time Accounting for example. You adjust and install the file layout for customers, projects, employees, etc. Then you organize time and expense inputs. Individual reports can be added later. In addition, printing output such as invoices can be fit to your format of forms and reports.

Once that's done, all your operator does is answer simple questions. If one can read, one can handle it.

Each single input updates all affected files. Day-to-day data need only be typed in once. Each input goes everywhere it should automatically, ending errors from repetition.

The input also gets processed differently depending on your pre-selected "if...then" alternatives. For instance, one worker's hours may be billed at separate rates for separate tasks with no need for the operator to know all the details. Cumulative calculations are automatic. This is computing power unheard of at this price.

Try it risk-free for 30 days. Pick up the phone and get on track today. With our moneyback guarantee, there's no way you can lose.

The TRACKER II System with general Time Accounting included. **$250***

To order, call toll-free 1-800-336-2966. In Ohio call (216) 464-5013. Use your VISA or MasterCard.

Hubbard Little, Vice President
Mark Little, President

TRACKPAC Application kits let you keep track of even more.

You can use the TRACKER II System with the general Time Accounting TRACKPAC kit provided, or purchase one of those listed for $65* or set up your own application.

- Job Costing/Scheduling
- Cost Estimating
- Order Entry/Billing
- Inventory w/sales & purchasing
- More to come

*(Plus $3 shipping and handling. Ohio residents add sales tax.)

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Earn Royalties

Submit a running application of your own design, and if we decide to market it, royalty arrangements will be made. A submissions kit is included with the TRACKER II System or can be purchased separately for $5.

analex

The fast track to success.

Analex Computing, Inc.
5222 Richmond Road,
Cleveland, Ohio 44146

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THE HARDEST WORKING TOOLS ARE OFTEN THE EASIEST TO WORK.

For years, people have used ledgers and calculators to help plan and analyze their businesses.

These are hardworking tools yet they're quite easy to work.

Now there's a way to make doing your business planning and financial analysis even easier. And a lot faster.

It's called PFS® PLAN. It's an extremely hardworking spreadsheet software program that's surprisingly easy to work.

PLAN was designed for people without computer experience. So all instructions are easy to understand and you can be productive quickly.

PLAN gives you everything you'll need to analyze your financial records in record time. Like simple words to replace complicated mathematical formulas, automatically adjusted column widths and a quick entry key for headings.

Since PLAN is fully integrated with the PFS Family of Software, you can do the whole job from start to finish without complications. You can create worksheets with information stored with PFS:FILE, graphically illustrate this information in line, bar and pie charts with PFS:GRAPH, then put it all in printed documents with PFS:WRITE.

PFS — it's the powerful software that's simple to learn. It's the power of simplicity.

See your computer dealer for more details.

PFS SOFTWARE
The Power of Simplicity

PFS:PLAN currently works on IBM® and selected MS-DOS computers. © Software Publishing Corporation.

In Quest of True BASIC

Dr. John Kemeny and Dr. Thomas Kurtz discuss the origins of BASIC, their views on what has happened to the language they invented, and their plans for keeping BASIC alive as the lingua franca of the computing world.

Edited by Andrew Fluegelman

Dartmouth College's colonial brick buildings rest secluded among wooded New Hampshire hills as the northernmost outpost of the Ivy League. There, in 1964, two professors in the mathematics department, John Kemeny and Thomas Kurtz, invented a computer language for their students. They called it the Beginners' All-purpose Symbolic Instruction Code.

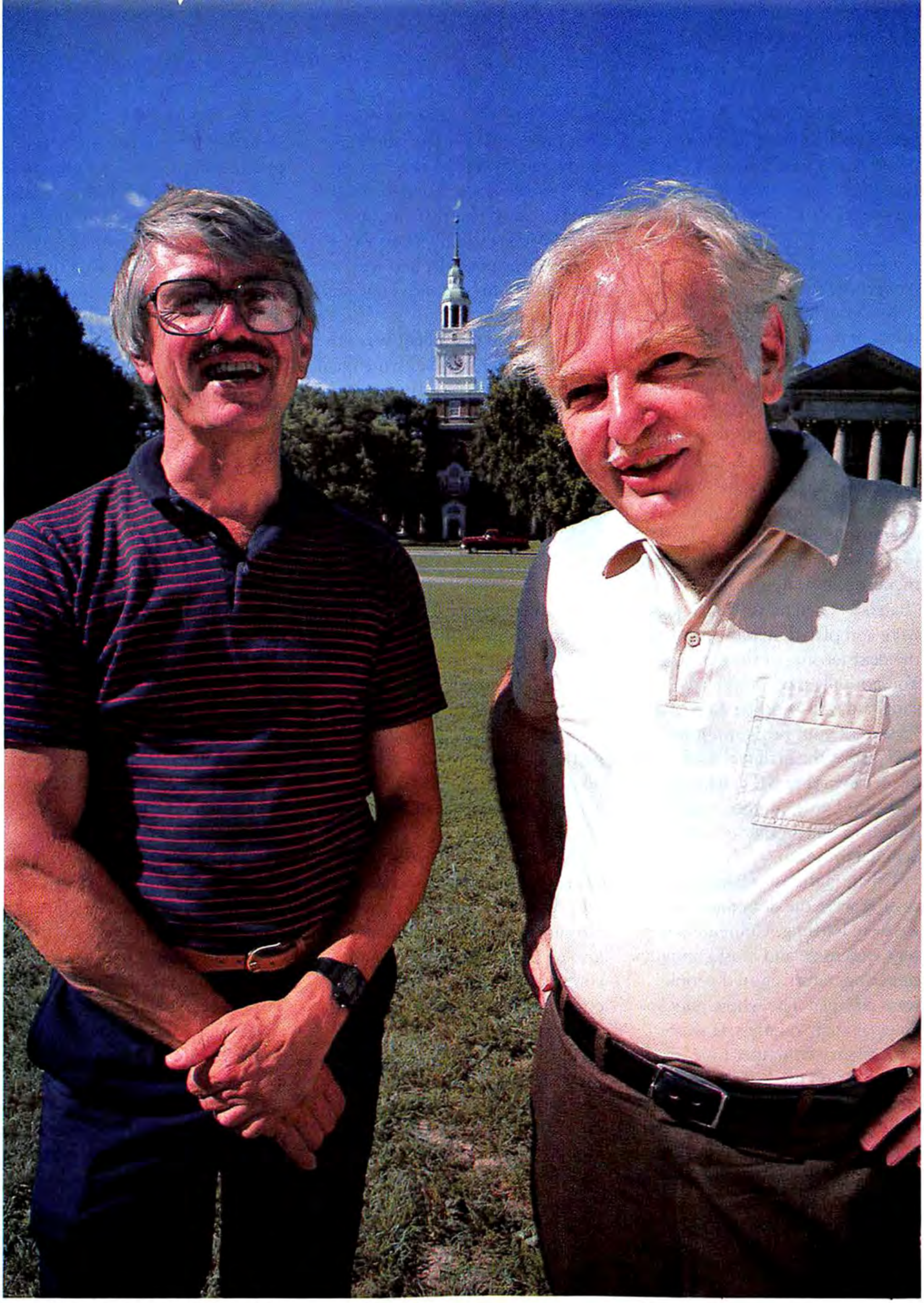
Today, BASIC is not only the most widely used computer language, it has become one of the major world languages. More people are conversant with BASIC than speak Norwegian, Swedish, and Danish combined.

The spread of BASIC was due in large part to the personal computer explosion. In 1975, two young Harvard students named Bill Gates and Paul Allen developed a version of BASIC that ran on the Mits Altair–generally regarded as the first personal computer. From that beginning, BASIC spread through the microcomputing world to Commodores, Apples, TRS-80s, and IBM PCs. In the meantime, Gates and Allen started a company called Microsoft.

One would be tempted to say that the rest is history, but there is more to the story. While personal computer BASIC was making converts among the general public, BASIC continued to evolve at Dartmouth in its original timesharing, mainframe-based environment. This "Dartmouth BASIC" developed most of the features of a modern, structured programming language. Many of the features of Dartmouth BASIC found their way into a set of standards for the BASIC language that is currently being proposed by a committee of the American National Standards Institute (ANSI). This proposed ANS BASIC is quite different from the Microsoft-produced BASIC and BASICA that IBM distributes for the PC.

Kemeny and Kurtz, who are still on the Dartmouth faculty, have supervised the development of an ANS BASIC for the PC, which they are calling True BASIC. The product will be marketed by the publishing company Addison-Wesley this fall, along with a book, *Back to BASIC*, describing the history and development of the language.

PC World Editor-in-Chief Andrew Fluegelman traveled to Hanover, New Hampshire, to



Dr. Thomas Kurtz and Dr. John Kemeny on the Dartmouth campus speak with Kemeny and Kurtz about their contributions to computing. The following is an edited version of that conversation.

PCW: What was the state of computing back in 1964?

Kemeny: Everything was done in batch processing. There are now some systems that have what is called "batch processing," but they are nothing like what computers were like back then.

People would punch their programs on IBM cards and submit them to a computer operator. The operator would collect the cards for hundreds of programs and feed them to the computer in a "batch." When all the batch jobs were completed, it was time for the next feeding of the computer. You got only one, maybe two, shots a day at running a revised version of your program. John McCarthy, the artificial intelligence expert at MIT, who was a very good programmer, said that it used to take him two weeks to debug a program.

The limitations of batch processing were the dominant factors we were battling. Computers were very expensive and most computer center operators figured people were cheaper. The whole philosophy was that you mustn't waste unnecessary computer time. And that situation made the computing environment impossible as a teaching or research environment.

PCW: So what was your response to that situation?

Kurtz: I had reached the conclusion that it was possible to design a computing environment that would be palatable for students so that they could get their answers fairly quickly. In the time period 1959 to 1964, we designed a user-interactive system that ran on Royal McBee's LGP-30, so we knew it was possible, and we knew it had to be done. That was one ingredient.

The second ingredient was this notion of time-sharing, which had been invented at MIT in 1959 in a research environment. In fact, it was John McCarthy who said to us, "You guys ought to do time-sharing." I remember his exact words. And I came back and told John [Kemeny] what McCarthy had said, and John said, "Yes, let's do it." It was that simple. There was no cost/benefit analysis. We just decided to do it.

Kemeny: It was perfectly obvious to both of us that time-sharing would be a vastly superior environment for teaching. We could give each student the ability to communicate directly with the computer—with the illusion that it was just sitting there waiting to serve.

Perhaps equally fortunately, we had no idea what we were getting into. While MIT had played around with time-sharing and Bell Labs had done some before we got started, their systems would not be completed until after ours.

Kurtz: There was one other important component—the open access principle, which was that students and faculty members shouldn't have to pay for or get permission to use computing time.

Kemeny: It was a rather radical decision at the time. The analogy that Tom came up with was the college library, and I used that analogy in presenting the notion of free computer time to the college trustees at a time when all educational institutions were under tremendous financial pressures.

> *'We wanted to get rid of the elements of a computer language that would not be obvious to students.'*

We proposed that computer time should be a central collegewide facility, much like the library, to be used for everything from course work to research to recreation—as a library is. Once I had convinced them of the reasonableness of the analogy, I asked them, "Would you charge a student to take a book out of the library?" (I usually couldn't resist adding that, upon occasion, I would *pay* a student to take a book out of the library, but to charge them for it had never occurred to me.) That analogy worked every single time, and it's a perfectly good analogy. Even now, computer center costs run about the same as library costs.

PCW: How did BASIC fit in?

Kurtz: We decided to develop BASIC because we needed an easy language that students could learn quickly and that was appropriate to the system we were creating.

Kemeny: At that time, there was only FORTRAN. ALGOL was somebody's dream, and John McCarthy was starting to play around with LISP, but the other languages weren't easy, general-purpose languages.

I just knew that we could do much better than FORTRAN, and in a way, the fact that BASIC was not the first general-purpose language gave us an advantage. Also, as a logician, I figured I could contribute to language design.

The only question Tom had was whether the language would ever get used outside of Dartmouth, because IBM so completely dominated the field and FORTRAN was IBM's language. We were afraid that our students would learn a language that they could use nowhere outside of Dartmouth.

PCW: Time-sharing and open access and BASIC were obviously key elements in the democratization of computing. What were the innovations of BASIC that made computing more accessible?

Kurtz: We wanted to get rid of the elements of a computer language that would not be obvious to students. For example, the difference between integers and floating point numbers was built into FORTRAN. But to the ordinary person, a number is a number. So we made the decision to have a single number type.

Kemeny: Take the following example: A student will understand that 2 is an integer and that 3 is an integer, but a student who is nervous and who is writing his or her first program may not remember that when you divide 2 by 3 you're going to get a different kind of number. That sort of thing is a tremendous psychological barrier to programming.

Kurtz: BASIC's input and output were new. Almost anything you typed for a number was legal, and you didn't have to worry about format on output.

Kemeny: Just having an INPUT statement was an innovation. BASIC was the first language that was designed for interactive rather than batch processing. Several features of the language were developed because we knew that students would be sitting at a terminal rather than handing a computer center operator a batch of cards.

PCW: What about line numbers?

Kemeny: They were a major innovation at the time too, although of course they have been much criticized. There were no such things as full-screen editors then; statements had to be edited line by line. We put the line numbers in for reference, to make modifying a program much easier. We also put them in so that we could pinpoint error messages.

And we made a mistake. We decided that while we were at it we would also use line numbers as addresses for GOTO, IF . . . THEN, and GOSUB statements. That was not one of our brighter ideas.

PCW: When did the original version of BASIC appear?

Kemeny: It was at 4 a.m. on May 1, 1964. A number of us were sitting at Model 33 Teletype terminals typing in BASIC programs. We had done that many times before, but that was the first time they worked. That was the simultaneous birth of BASIC and time-sharing.

PCW: Did BASIC continue to evolve at Dartmouth?

Kurtz: That's an important point. The language continued to grow to reflect things that people were developing, such as interactive graphics and structured programming.

PCW: Many people criticize BASIC for its lack of structure. When and how were structured program features added?

Kurtz: The structured programming boom came around the middle seventies. Some work had been done earlier than that, but it hit this campus around 1974-1975. We began experimenting with a version of BASIC called SBASIC, for Structured BASIC. The person mainly responsible for that was Professor Stephen Garland.

PCW: What were the new features?

Kemeny: The most notable advance was having separately defined subroutines that you can call by name and that have independent variables and to which you can pass parameters. No one would argue for GOSUB 800 over CALL GETFILE.

PCW: Were those features generally implemented?

Kurtz: As soon as we had a chance to experiment with structured programming, we changed to it instantaneously. We used SBASIC with great success in our teaching, and the acceptance by our students was immediate. I discovered that with a given amount of time, effort, and knowledge, a student could write a program that was twice as big and twice as complex as with the original BASIC.

PCW: At what point did you change your thinking about line numbers and GOTOs?

Kurtz: Personally, I have not used a GOTO since 1975.

Kemeny: I was slower to give in on one point. I was an immediate fan of SBASIC, but it took me quite a while to be persuaded that the GOTOs had to go. At that time, there were clear-cut cases in which avoiding GOTOs led to unnatural programs. The prime examples were when you wanted to make a middle exit from a loop or an error-condition exit from a subroutine. Eventually, we were able to add enough structures for handling those special situations so that now I don't use GOTOs anymore, and I simply don't let my students use any instruction that has a line number in it.

PCW: You also added a CASE test?

Kemeny: There's an interesting anecdote in connection with that. Professor Garland wrote the manual for SBASIC. He wanted to demonstrate the advantages of Structured BASIC, and the program he used to illustrate how *not* to program using the old, unstructured BASIC was a craps game straight out of a book Tom and I had written. Really, it was designed to show how rotten programs looked before the CASE structure was available [see Figure 1].

PCW: That was in 1975—the year that Bill Gates and Paul Allen wrote a version of BASIC for the Altair. What was your reaction to that?

Kurtz: To be honest, I didn't have any reaction in 1975. I didn't look at BASIC on any personal computer until about three years ago when I had occasion to use an Apple. The reason for that is that we've always had such a friendly and convenient time-sharing system here at Dartmouth that there was never any cause to go outside. That wasn't true at other big universities where they had big research machines but nothing for students. So we came to the personal computer revolution here at Dartmouth later than they did at many other schools.

PCW: And what was your reaction when you saw BASIC on the Apple?

Kurtz: Well, of course, I was appalled at what I saw.

PCW: What was appalling?

Kurtz: The most obvious deficiency was the lack of structured features and the reliance on line numbers. There were also some grave problems in the way lines were scanned for key words. Many of the problems have been corrected in subsequent implementations on the PC, but the lack of structured programming still remains.

Kemeny: I was horrified by the fact that microcomputer BASICs insisted on changing your entire program to capital letters. It's a silly thing and a stupid thing. I didn't really realize how bad it was until about a year ago when I started playing around with Microsoft BASIC. There are some incredibly ugly constructs in it.

PCW: It's ironic that all of your improvements to the language were being put into place just about the time BASIC was making its first appearance on a microcomputer, but its implementation on microcomputers did not reflect any of those new developments.

Kurtz: Absolutely correct. The first microcomputer version of BASIC was an imitation of an imitation of an imitation of the first Dartmouth BASIC of about ten years earlier.

PCW: What was the reason for that?

Kurtz: When people wanted to do a version of BASIC, they never came back to us—except in the very early days—to figure out what the "official" word was. Each BASIC was patterned after somebody else's BASIC. It's sort of like when a bunch of people sit in a ring and each whispers something to his or her neighbor. After a time, what was originally said is lost. Much of what was important in the original design of BASIC got completely garbled.

Kemeny: Also, in the very early days microcomputer BASIC was implemented on minute machines. It really was an incredible techni-

> *'The first microcomputer version of BASIC was an imitation of an imitation of an imitation of the first Dartmouth BASIC of about ten years earlier.'*

```
100 'PC BASIC Craps Game Simulation - 10 Plays
110 '
200 FOR GAME = 1 TO 10
210 GOSUB 800
300 ON DICE-1 GOTO 400,400,600,600,600,500,600,600,600,500,400
400 PRINT "You lose"
410 GOTO 700
500 PRINT "You win"
510 GOTO 700
600 MAKEPOINT = DICE
610 GOSUB 800
650 IF DICE <> 7 AND DICE <> MAKEPOINT THEN 610
660 IF DICE = MAKEPOINT THEN PRINT "You win" ELSE PRINT "You lose"
700 NEXT GAME
710 END
720 '
800 'Roll Dice
810 DIE1 = INT(6*RND + 1)
820 DIE2 = INT(6*RND + 1)
830 DICE = DIE1 + DIE2
840 PRINT DICE
850 RETURN
```

```
!True BASIC Craps Game Simulation - 10 Plays

FOR game = 1 TO 10
    CALL roll
    SELECT CASE dice
    CASE 2,3,12
         PRINT "You lose"
    CASE 7,11
         PRINT "You win"
    CASE ELSE
         LET makepoint = dice
         DO
             CALL roll
         LOOP UNTIL dice = 7 OR dice = makepoint
         IF dice = makepoint THEN PRINT "You win" ELSE PRINT "You lose"
    END SELECT
NEXT GAME

SUB roll
    LET die1 = INT(6*RND + 1)
    LET die2 = INT(6*RND + 1)
    LET dice = die1 + die2
    PRINT dice
END SUB

END
```

Figure 1: These two craps-game programs illustrate IBM PC BASIC vs. True BASIC. In the True BASIC version, notice the absence of line numbers, the ROLL subroutine to roll the dice, the SELECT CASE structure to test dice outcomes, and the DO . . . LOOP structure to test for a 7 or a making point.

cal achievement, but as a result of that, horrible compromises had to be made just to squeeze the language in. Unfortunately, some of those compromises became features of the language.

Certainly, there were decent, very small BASICs on 8K machines, but the compromises that had to be made in those BASICs are still there today in 128K and 256K machines. That's just crazy.

PCW: Do you regret that BASIC was allowed to slip out into the world in imperfect or corrupted form?

Kurtz: I don't personally, because I don't know that I could have done anything to improve the situation. The popularization of BASIC happened because of the completely laissez-faire situation. I wish that we had gotten started in standardization or that John and I could have started our own project sooner, but I don't see that I could have done any better following a different course at the time. If we had tried to control the language through trademark or whatever, it would not have expanded the way it has.

Right now, the real question is whether we, together with the ANSI standard, can bring the language back. That's why we call our book *Back to BASIC.*

Kemeny: I really did not become aware of the problem until after my term as president of Dartmouth, which was from the beginning of 1970 to mid-1981. And then I took a year off, so I did not get back into circulation until mid-1982.

The first time I really became aware of the problem was when the College Board made its decision that the language it would use on the advanced college placement exam in computing would be Pascal. The irony is that the chairman of the College Board committee was the same Professor Garland who had been responsible for getting all of us on campus to program in Structured BASIC.

Almost all of the high-school teachers pushed for BASIC, because that was the language that they all knew. Steve Garland himself pushed for BASIC. But then the committee asked the question, "Which version of BASIC should we choose?" They surveyed all the available versions of BASIC and ended up not choosing any of them, and that's how they finally chose Pascal. But the board did say that if and when acceptable structured versions of BASIC become available for personal computers, they would consider BASIC.

I was furious when I heard that decision, and that motivated me to become interested in getting somebody to write a really good version of BASIC for microcomputers. It took us a year or so to decide that we ought to be part of that "somebody." The deciding factor was when three superb programmers—Chip Elliott, Dave Pearson, and Chris Walker, who were all Dartmouth graduates—asked us to participate in writing a BASIC for microcomputers.

PCW: What is your connection with the project?

Kemeny: I am chairman and Tom is vice-chairman of True BASIC, Inc., which is the devel-

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oper of the language. We agreed to be in on the design of the language and to supervise its development. The big joke is that our agreement with the corporation says that we will put in one day a week during the development. Recently, we've been putting in five-and-a-half-day weeks and very late nights. Of course we have loved being involved in the project.

PCW: Do you think there can be such a thing as a "true" BASIC?

Kemeny: We would have been reluctant to use that name if there were not a proposed ANSI standard. For all practical purposes, the standard exists. It should be in the second public comment period this fall, and usually there are not major changes after that.

It's not that we have designed this language. We have figured out how to implement it on personal computers, and we have added some extensions of the language simply to take full advantage of certain features of personal computers; but True BASIC is essentially ANS BASIC. It's also not surprising that True BASIC bears a strong resemblance to Structured BASIC at Dartmouth. There were some major cases where the ANSI committee improved the language, and so Dartmouth changed its BASIC to follow the ANSI standard. Therefore, it's certainly not Dartmouth BASIC, and it's not John Kemeny's and Thomas Kurtz's BASIC. Except for certain additional features, it's ANS BASIC.

PCW: When you compare ANS BASIC to other modern computer languages, you start to see that, with some minor exceptions, it's not that different from Pascal, and Pascal is not that different from C. Do you think that we're moving toward a universal computer language?

Kemeny: When you say that it's not that different from Pascal, I know exactly what you mean, and I agree with you–up to a point. There are of course some very substantial differences. Pascal has the possibility of declaring all kinds of structures, which BASIC doesn't. On the other hand, BASIC is a much bigger language and in many ways a much more powerful language than Pascal, which in its standard form does not have strings. Pascal doesn't have graphics. So there are some major differences.

But what you might call the central cores of both languages are very similar, and I would be absolutely delighted if, for example, the control structures were standardized.

Kurtz: One of the problems with Pascal is that the control structures were not well thought out in terms of the key words. Incidentally, the BASIC control structures bear a striking resemblance to Ada.

Kemeny: I really feel, for the first time, that the control structures are absolutely right in this version of BASIC. The syntax was changed fairly dramatically by the ANSI committee. It's a highly improved version of Professor Garland's original structures. Every-

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one will quibble over small points, but the control structures are absolutely beautifully done.

PCW: Back in 1964, did you envision that BASIC would still be in use today or that it would be so popular?

Kurtz: We could barely look a year ahead. We just hoped that it would work at all—that students would learn something about computing.

Kemeny: The furthest I could look ahead was to hope that some other educational institution would find BASIC a good way of introducing students to programming. We didn't start to get optimistic until General Electric adopted BASIC for use on its time-sharing system and the language started to get popular. By 1970, we thought that the language would go very far, but of course none of us anticipated the microcomputer revolution.

PCW: What's been your reaction to that revolution?

Kemeny: I have two reactions. First, it's great, and it makes many of my old dreams come true. I do worry about one thing: They've got to get much better at tying personal computers into networks and large computers. A time-sharing system is a tremendous device for sharing information and sharing knowledge. I don't want people to end up in a solipsistic universe, in which you talk to your computer and don't share information with anyone else.

PCW: Do you think that True BASIC will be able to set a new standard?

Kurtz: This may be looking at the world through rose-colored glasses, but from the initial reception that we're getting, I feel confident that this is going to turn things around.

Kemeny: I feel really good about the ANSI standard. Having experienced what happened to the original BASIC on microcomputers, I have this nightmare that someone will write a truly bastardized version of ANS BASIC and that *it* will become the standard. In a way, I see True BASIC as a preemptive strike to try to maintain the integrity of the ANSI standard.

Kurtz: Once our product appears, I hope that it will be very hard for people to come out with shoddy versions of BASIC. One of our altruistic goals is to improve the quality of computing that is available for education at all levels.

Kemeny: Of course, we'd love to make some money also—we've put a heck of a lot of work into it. I do hope to make very sure that no one's going to beat us with a bad implementation. But if it should turn out that someone comes out with a better ANS standard version, I think we still will have made a major contribution to education. ◆

Andrew Fluegelman is the Editor-in-Chief of PC World *and* Macworld.

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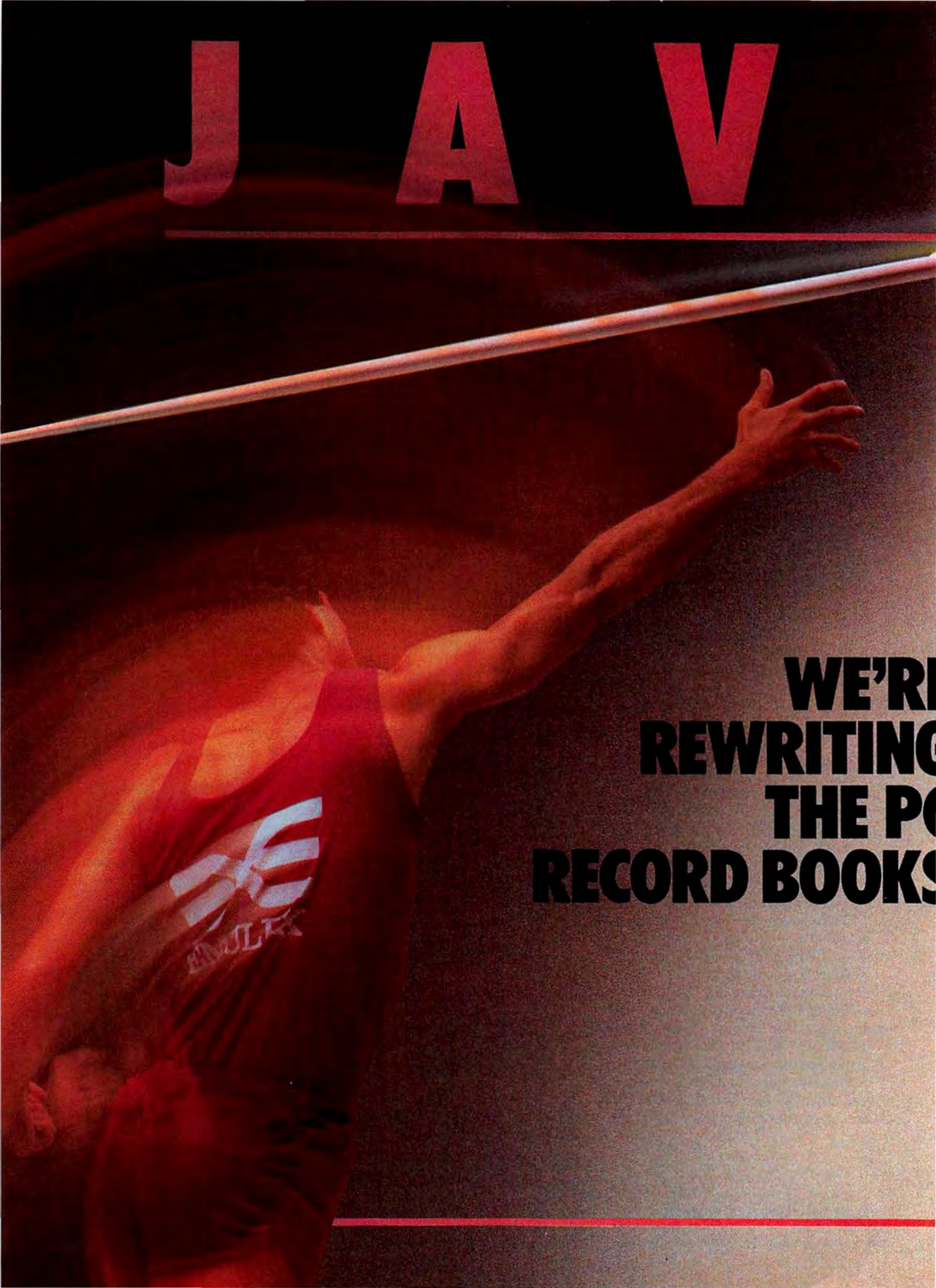
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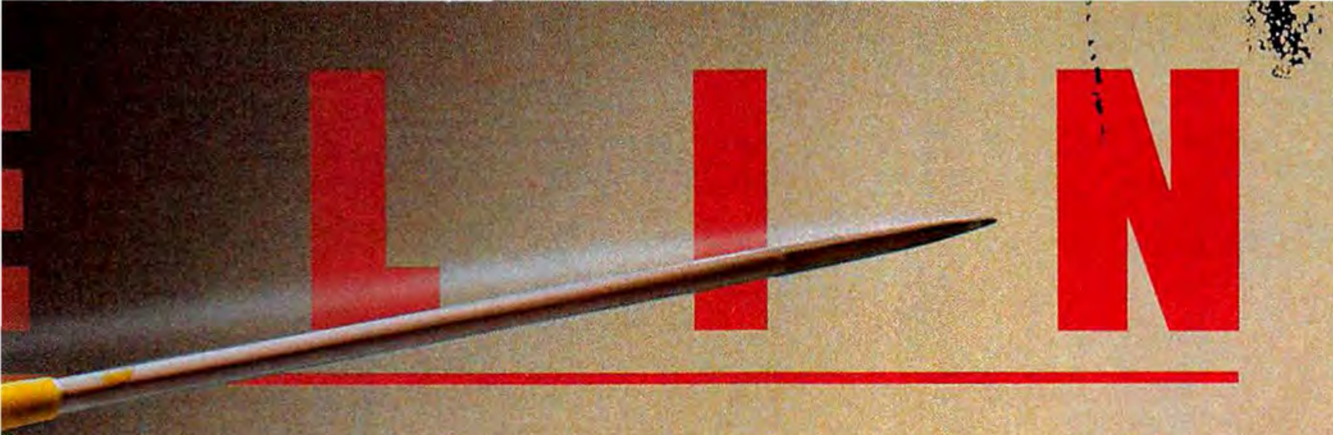

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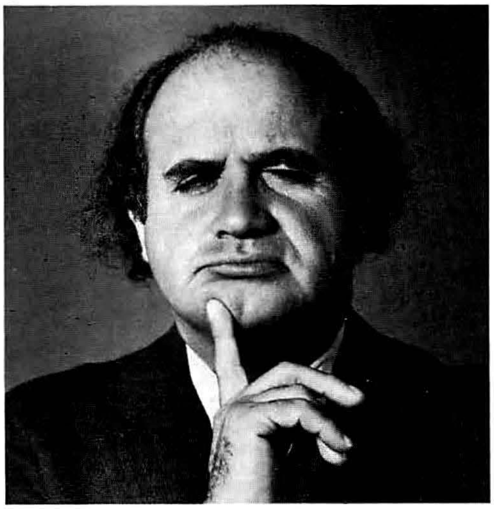

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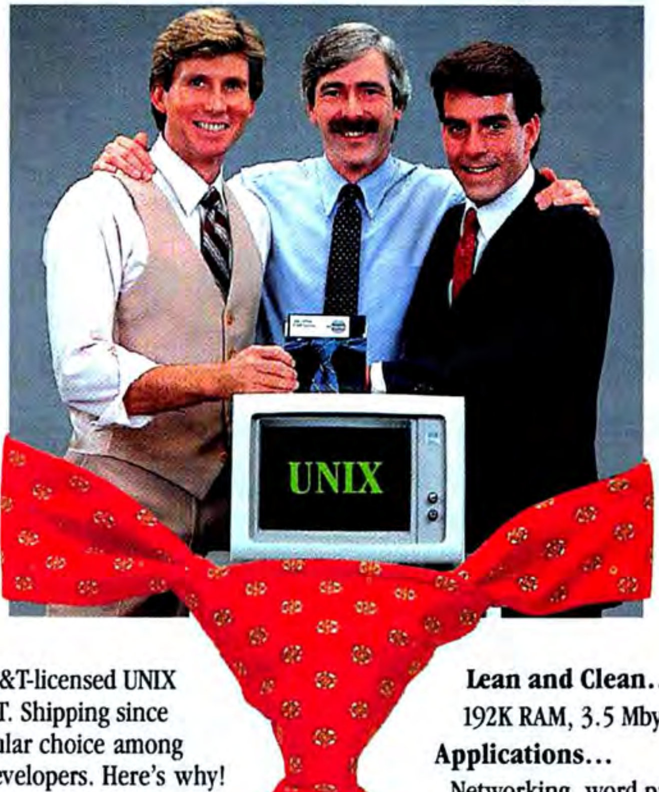

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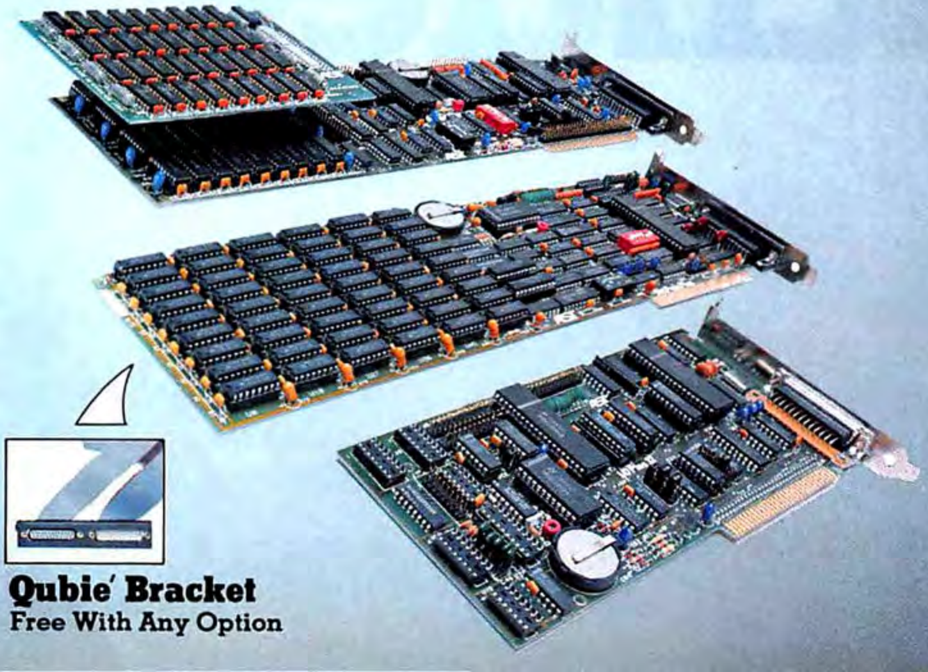

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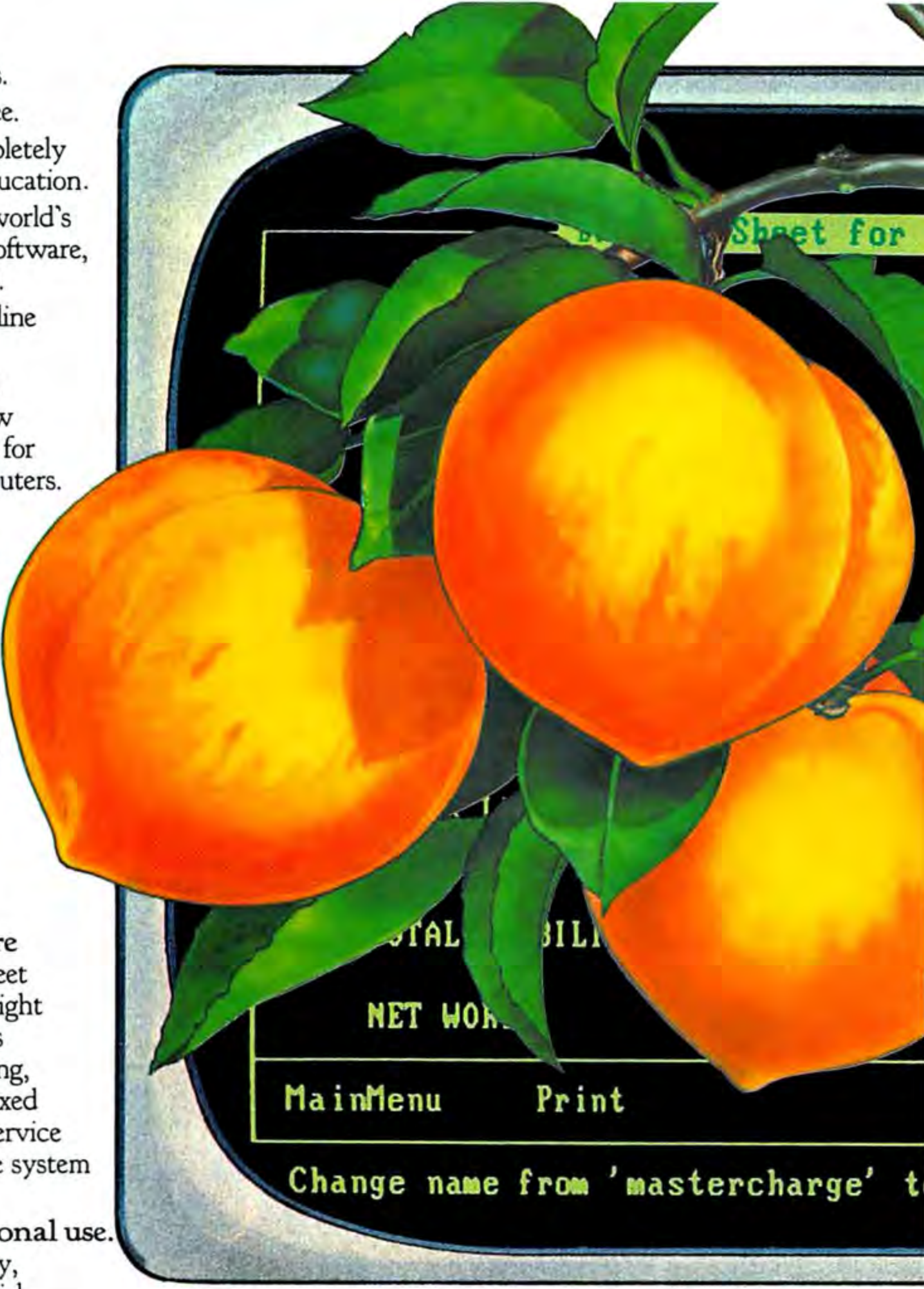

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Compatibles Update

The latest developments in the PC-compatible marketplace

The PC clone as work station? This month's column highlights that strategy as a pair of office automation giants plunge fully into PC compatibility. The same approach is evident in the profiles of two PC-compatible multiuser systems.

Ken Greenberg

Compatibles Update keeps tabs on the growing market of personal computers that emulate the IBM standard. The column features news on hardware and software as well as insights into the legal and marketing issues that affect compatibility.

Trends

PCs? Terminals? Work Stations?

Spring COMDEX was a bit thin on industry trends, but the show offered evidence that PC-compatible multiuser systems have finally come of age. The timing is right; a recent survey by Strategic, a San Jose, California, market research firm, revealed that 80 percent of large corporate users would like their PCs to be more communicative.

New and significant entrants in the PC-compatible multiuser field include North Star's Dimension and TeleVideo's Personal Mini, both of which are 80186-based and loom as alternatives to traditional local area networks (LANs). Common selling points include reduced outlays for fully configured systems and the ability to run off-the-shelf PC software. These systems tilt more toward distributed processing than true networking, although they offer hardware- and data-sharing features similar to those found in LANs.

Televideo's Personal Mini consists of a dual-processor desktop machine called the PM/16, the company's proprietary InfoShare operating system, and up to 16 work stations. The PM/16 accepts PCs, PC clones, or TeleVideo's new diskless TS-1600 work station. TeleVideo claims that its InfoShare operating system fully supports PC-DOS 1.10, 2.00, and 2.10. The list price for the Personal Mini is $8995.

The TS-1600 work station includes an 8088 microprocessor, 128K expandable to 256K, a 14-inch monochrome monitor, parallel and serial ports, and one expansion slot. It lists for $1995.

North Star's Dimension centers around an 80186-based server capable of supporting up to a dozen work stations, each running a different application. North Star bills its proprietary operating system as completely compatible with DOS 2.00. An updated version of the North Star operating system, released in August, also takes advantage of multiuser applications written for 3Com's Ethernet local area network.

The Dimension's list price of $7000 buys a server and two work stations. Additional work stations list for $1500 each.

Wang Bolsters PC Compatibility

The Wang Professional Computer, an 8086-based machine, came into the world with nearly everything going for it: speed, ergonomics, and a company with a solid reputation for quality. It had everything but an ability to closely emulate the IBM PC.

The Televideo PM Workstation, a PC-compatible diskless computer designed for TeleVideo's Personal Mini multiuser system

Wang has changed that with the introduction of several product enhancements designed to satisfy large corporate accounts and give the company a higher profile in the PC marketplace. A new monochrome monitor controller board enables the Wang Professional Computer to run most PC-DOS software. Wang also unveiled a telecommunications board and software for the PC and XT that allow those IBM machines to access Wang VS minicomputers.

In addition to the controller and telecommunications boards, Wang released other additions to its Professional Computer line, including a 5¼-inch, 30MB hard disk drive, a color monitor, a 160-characters-per-second dot matrix printer, and a host of software utilities.

For more information contact Wang Laboratories, One Industrial Ave., Lowell, MA 01851, 617/459-5000.

Dedicated to Personal Computing

NBI, like Wang an office automation giant, has chosen to break into the PC-compatibles market with little fanfare.

NBI's OASys 4100 series computers are several steps removed from dedicated word processors. The 8088-based machines can serve as stand-alone PCs or can be linked with NBI's line of office work stations. Plugging a 4100 series computer into an NBI OASys 64 cluster controller enables the computer to share data and peripherals with the other stations on an NBI network.

PC compatibility appears to be high. NBI claims that the 4100S runs *Flight Simulator, 1-2-3,* and an array of other off-the-shelf software for the PC. But mimicking IBM may not be the primary selling point for the machine. NBI is touting the computer's ergonomics and ability to fit in with the rest of the company's hardware lineup. Spokesperson Jerry Ruhl confirmed that NBI figures the OASys 4100 series will help sell the rest of NBI's "total office automation systems" offerings.

For additional details contact NBI, P.O. Box 9001, Boulder, CO 80301, 303/938-2795.

Dare to Bow Out?

You know the PC-compatibles business isn't as robust as it once was when so-called "major players" begin to downplay their entries in the MS-DOS derby.

The tip sheets, in this case, are company annual reports. These usually glowing epistles from corporate America have yielded a smattering of less-than-rosy tidings lately. Consider Texas Instruments' 1984 report to stockholders: "The TI Professional Computer is important to us, but we are keeping it in perspective. It is only one of many data systems products. Our objective is to secure TI's place in the upper performance end of the microcomputer market by stressing superior user benefits, excellent service, and long-term dealer engagements."

Viewed against sales for the TI Pro (12 percent of the broadly defined "compatibles market," according to Future Computing), the statement suggests that even a formidable corporation with a quality product can't buck too many trends. Might the TI Professional, which is only somewhat PC compatible, experience the same fate as TI's home computer? TI has sufficient confidence in its product to buy lavish "Dare to Compare" ads pitting the TI Pro against the PC, but the company may not be potent enough to dislodge business users from their PCs and more-compatible PC work-alikes.

All DECed Out and No Place to Go

Speaking of large high-technology companies, Digital Equipment Corporation (DEC) continues to suffer the slings and arrows of personal computer marketing.

ComputerLand, the nation's largest computer specialty retailer, has canceled a central purchasing agreement with DEC. That move is expected to pare DEC's 355 ComputerLand retailers by one-half. ComputerLand attributed the cancellation to sluggish sales of the DEC Rainbow. DEC's relationships with dealers have been cool since the giant firm's decision to compete with major chains on small orders. In an attempt to soften the impact of ComputerLand's decision, DEC recently signed a central buying agreement with MicroAge computer stores.

This latest round of trouble for DEC caps a year's worth of difficulty that commenced with the unveiling of a slick, high-powered, but thus far unsuccessful marketing effort designed for the Rainbow. The company is attempting to turn the current situation around by merging several personal-computer-based divisions into a single unit—and by relying largely on the minicomputer resellers it knows best.

OSM Revisited

The latest version of the OSM-PC checks out as "system compatible," *PC World*'s highest level of PC compatibility. A preproduction version of the OSM-PC was classified as 66 percent PC compatible in "The Compatibles Line Up" (*PCW,* Vol. 2, No. 4). At the request of OSM marketing vice president Gary Baughn, *PC World* applied similar benchmarks of PC compatibility to OSM's new machine. After models with nonproduction ROMs had difficulty starting several programs, a production unit had no trouble booting up and running PC versions of *1-2-3, Flight Simulator,* PC-DOS 2.00, GW BASIC, *WordStar* version 3.3, and *Advanced Diagnostics* for the PC.

The OSM personal computer is available in three models: the entry level PC, with two half-height 5¼-inch floppy disk drives, 128K RAM, and parallel and serial ports; the XPC, which substitutes an internal half-height 10MB or 20MB hard disk for one floppy disk drive; and the VIPC, which augments the hard disk with a 20MB tape backup unit. All models include a monochrome monitor and a detachable keyboard.

Logical Seeks Protection

Logical Business Machines, a Sunnyvale, California, maker of PC XT compatibles and LANs, has filed for protection from creditors under Chapter 11 of the federal bankruptcy code.

Logical Business Machines' L-XT, a PC XT work-alike that uses the Logical Natural Language

George Browning, chairman and CEO of the ten-year-old company, attributed the bankruptcy petition to a year-long chain of events that included a thorough reorganization of the company and delays in two rounds of financing. The privately held firm had hoped to raise nearly $3 million in the second round. The cash flow shortage put a crimp in shipments of the PC XT-compatible LX/T and Logical's LAN, the company's two newest products. Logical accompanied the bankruptcy announcement with layoffs of 15 percent of its staff, leaving the firm with 50 employees in the United States and 13 in Europe.

"We stretched vendor relationships as far as we could, but several were not as cooperative as we hoped," Browning said. He estimated that Logical would remain in Chapter 11 for three to six months from the July filing date and reported that the company is scouting around for merger candidates. In addition to its XT compatible and its network products, Logical markets its "natural language," Diplomat. Diplomat is an easily modifiable programming language designed for first-time computer users who need to develop job-specific applications for a language other than English. Because Diplomat is available in virtually all European languages, 80 percent of the company's sales have occurred among small- to medium-size businesses in Europe. With the introduction of Logical's hardware products, however, United States dealer participation has, in Browning's words, "increased substantially."

Software

Rising From the Ashes of Incompatibility

Companies interested in building PC compatibles (and decidedly not interested in feeling the hot breath of IBM's copyright-conscious legal department on their BIOS ROMs) now have somewhere to turn for help.

Phoenix Software Associates caters to companies seeking to be in synch with the PC without unnecessary labor. Phoenix has begun to market PC-compatible BIOS ROM code and various accoutrements and even offers to customize that code for specific machines. Through its insurer, the Hartford Group, Phoenix is indemnifying clients, to the tune of $2 million, against any copyright infringement claims. The market for PC-compatible firmware may be limited, but at $200,000 to $300,000 a pop, that market is also undeniably lucrative for Phoenix.

Phoenix Software is not a new company, just new to the public eye. The firm is cultivating that portion of the OEM (original equipment manufacturer) market in which PC compatibility is vital. While Phoenix marketing vice president Lance Hansche acknowledged that the size of that market is small indeed—about 50 companies in all—the firm's public emergence is clearly a sign of the times. IBM's crackdown on BIOS ROMs from Eagle, Corona, and Handwell has had a chilling effect on new entrants in the compatibles race, so the thinking goes. Phoenix, an established software development firm that wrote ROM routines for the Otrona 8:16 and a variety of other machines, is simply selling PC compatibility without tears.

Hansche said Phoenix has been approached by more than a hundred major corporations—many of them outside the computer industry—interested in building PC-compatible systems. In preparing its latest product, Phoenix developed specs and hired one programmer, deliberately kept in the dark about the PC's BIOS routines, to write the ROM. Eight months later, the company thoroughly tested the finished product and then proffered it to IBM. "They declined to look at it," Hansche said. "They said they weren't in the business of blessing products that don't infringe on their copyright."

Since "going public," Phoenix Software's most prominent client has been AT&T. While AT&T developed the BIOS ROM for its PC 6300, the company purchased versions of MS-DOS, MS-DOS util-

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SEE PAGE 185

ities, and GW BASIC from Phoenix. Wang Laboratories also enlisted Phoenix to write the PC emulation software it recently introduced for the Wang Professional Computer.

For more information contact Phoenix Software Associates, 1420 Providence Hwy. #260, Norwood, MA 02062, 617/769-7020.

Music to DG's Ears

Data General's Desktop Generation personal computer, previously a low-profile product from a major manufacturer, may be gaining in status now that Lotus Development has released a version of its *Symphony* integrated software for the machine.

Symphony is Lotus Development's second product, building on but greatly expanding the features of the company's *1-2-3* (see "Lotus's Symphony: Three User Reports," *PCW,* Vol. 2, No. 7). In addition to spreadsheet, data management, and graphics features, the program includes enhanced word processing and communications functions and a new command language.

The Desktop Generation Model 10 features dual processors running MS-DOS and DG's proprietary operating system under the 8086 and DG's MicroEclipse chips, respectively. Data General recently doubled the multiuser capabilities of the Model 10, enabling it to support eight users. A single-user system lists for $3400.

DG spokesperson Jeff Bartman said DG is marketing the Model 10 to independent business professionals–lawyers, doctors, accountants, and the like. The machine's multiuser attributes place it in a league with Altos, Fortune, and TeleVideo, not IBM and Apple, Bartman added. (The company may be cultivating more traditional retail channels, however; DG recently announced a 10-pound lap computer, complete with a 25-line display and software etched in ROM.)

Just the Link

For Sperry Corporation and Wang Laboratories, two formidable forces in office automation, introducing PC-compatible personal computers was in part a defensive move–a means of protecting existing Sperry mainframes and Wang mini-based networks by enabling their PC clones to act as terminals.

Pathway Design is helping both companies adhere to that strategy . . . more or less. The only catch is that their new terminal emulation packages serve IBM (not Wang or Sperry) hosts. Pathway is providing Sperry with micro-to-mainframe links for the Sperry PC; the firm is also supplying Wang with enhanced file transfer capabilities.

Pathway's package for the Sperry PC includes both software and hardware: *Pathway Design/SNA, Pathway Design/BSC,* and Pathway Design/Communications Adapter and Cable. A fully equipped Sperry PC emulating a 3270 or 3770 work station will be able to converse with a variety of IBM hosts in both SNA/SDLC and BSC networking environments. IBM hosts notwithstanding, Sperry has purchased more than 1000 Pathway products thus far.

Wang users will be able to take advantage of *Pathway Design/3770,* a file-transfer package that operates in both SNA/SDLC and BSC environments. The software permits micros and mainframes to swap data.

For more information contact Pathway Design, 177 Worcester St., Wellesley, MA 02181, 617/237-7722.

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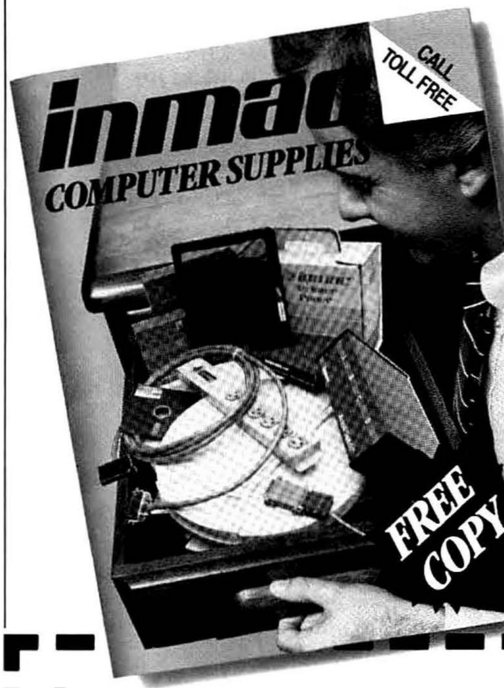

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Framework: Simplicity and Synergy

Ashton-Tate's Framework integrates business applications–word processing, spreadsheet, data management, graphics, communications, and outline processing– and provides a simple way to control them all.

Bill Crider

In my toolbox I have an all-in-one tool that looks like it was created by Pablo Picasso. It has two handles like a pair of pliers, but each handle has a screwdriver on the end–a Phillips on one and a slotted on the other. It has jaws like pliers, but on one outside edge there's a hammer and on the other, a nail puller.

The all-in-one tool is intended to accomplish the most essential tasks with the least number of tools. However, the tools are not always appropriate for the job, and sometimes they get in each other's way. Sure, you can turn a screw, tighten a bolt, or drive a nail, but a regular screwdriver, wrench, or hammer might do the job better.

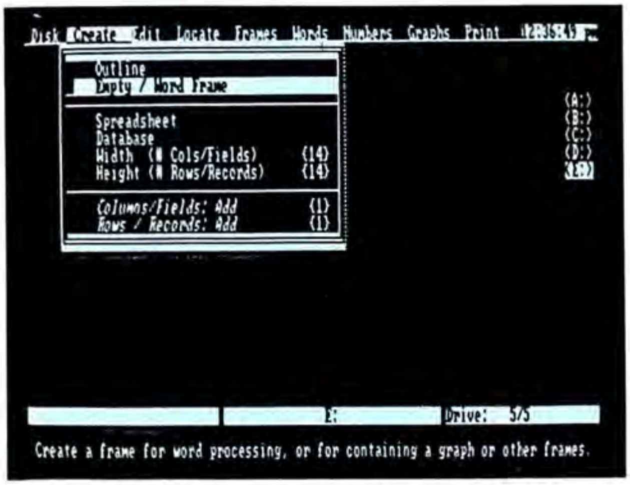
Integrated software tends to be a lot like an all-in-one tool: the parts don't always work together, and often they can't stand alone. In an attempt to closely integrate applications, the different modules get in each other's way.

Ask the Right Questions

It seems fair to ask two questions when you look at integrated software: How well do the parts stand alone, and how well do the parts hang together? A third question should also be asked: Does it provide tools appropriate to the job? If the software has more commands and procedures than you need to get the job done, why not use something simpler? For example, few people need a spreadsheet with more than a few hundred cells. Instead of using a huge spreadsheet that requires mountains of memory, why not just tie several smaller ones together? That would allow you to have only the parts of the spreadsheet you need in memory at any given moment, leaving memory free for other tasks.

In *Framework*, Ashton-Tate has applied appropriate solutions instead of complex ones. Each of the functions provides the tools to get the job done without making the program too complex to learn or too large to load.

Another question to ask about an integrated package is whether the parts are integrated more completely than just having the ability to share data. Do all the applications share the same commands, keystroke sequences, and, most important, concepts? For example, if the <Tab> key moves the cursor to the next field in the spreadsheet, it should do the same in the data base management system (DBMS).



```
Create a frame for word processing, or for containing a graph or other frames.
```

Figure 1: The Create menu in Framework. There are nine pull-down menus that are consistent throughout the program.

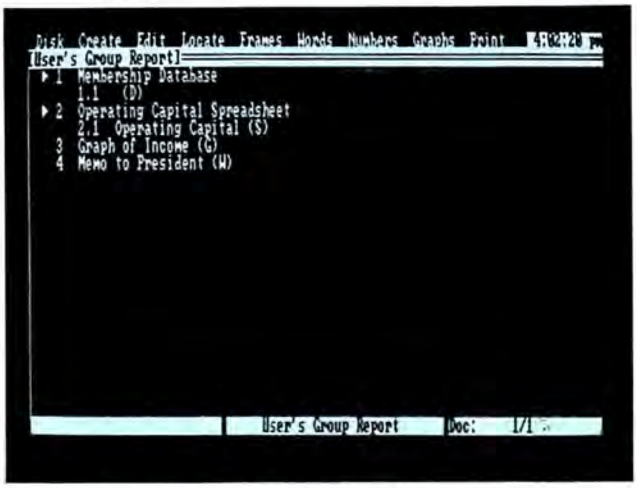
Menus in each part of the program should be similar, if not identical. You should not have to think about which mode you are using in order to decide which command you need.

Framework is integrated, not modal. The nine pull-down menus are identical. If a menu choice is not appropriate to the frame you are using, it is italicized or in dim type (see Figure 1). The commands are almost all the same, no matter where you are in *Framework*. Even the function keys almost always do the same things.

Framework illustrates the principle of synergy–the whole is greater than the sum of its parts. For example, the word processor is not as powerful as *Microsoft Word*, and the DBMS is not as powerful as *dBASE II*. But used together, the word processor and the DBMS are more powerful and versatile than *Microsoft Word* and *dBASE II* combined.

The first integrated software packages were essentially spreadsheets with limited graphics capabilities; DBMS features were added later. Now, many integrated packages blend in word processing and macro capabilities. *Framework* has all these features, plus telecommunications, an outline processor, and a programming language.

With all these features, you might surmise that *Framework*, like almost every other integrated package, needs megabytes of memory and a hard disk. Not so. It runs on 256K RAM (384K using telecommunications) and two double-sided floppies. If you want, you can improve its performance with a hard disk, more memory, a mouse, and an 8087 chip, but these enhancements are not necessary to get your money's worth out of the program. *Framework* runs efficiently and quickly on a standard system.


Disk Create Edit Locate Frames Words Numbers Graphs Print 4:02:20
User's Group Report
Doc: 1/1

```
[User's Group Report]
 ▸ 1  Membership Database
      1.1   (D)
 ▸ 2  Operating Capital Spreadsheet
      2.1  Operating Capital (S)
   3  Graph of Income (G)
   4  Memo to President (W)
```

Figure 2: Framework's Outline View, where frames are organized and rearranged. The letters in parentheses represent the type of frame (e.g., (s) is spreadsheet, (w) is word processing, and (g) is graphics).

Frames and Outlines

The basic unit in *Framework* is called a frame. Frames are similar to windows, but there are important distinctions. Like windows, frames provide a way of looking at several files on the screen at one time. Also like windows, frames can overlap and can be changed to any size or rectangular shape. Unlike windows, frames can be saved as files or parts of files. Frames are organizational building blocks that can be interconnected in a variety of ways. You can have frames holding spreadsheet, data base, graphics, outline, and word processing data all within the same file (see Figure 2).

Subframes can be nested within other subframes, and you can save any level of the nesting as a separate file. You can "compact" a document so that you see just the subframe labels or "expand" it to see the contents of one or more subframes. You can write macros and programs that affect the whole file or just specific subframes in it and make the contents of one frame dependent on the contents of another or on a calculation performed on another. The size of a frame is limited only by the computer's memory.

What can you do with information? You can discuss it (word processing), do calculations on it (spreadsheet), store and retrieve it (DBMS), illustrate it (graphics), and communicate it (telecommunications). But all of these capabilities are useless unless you can organize it (outlining). The key to the organization of *Framework* is the Outline View, which is similar to Living Videotext's outline processor, *ThinkTank* (see "ThinkTank," *PCW,* Vol. 2, No. 2).

When you create an outline frame, it has three empty subframes, each with three subframes under it (see Figure 3). You can nest subframes as deep as your PC's memory permits. I nested an outline 16 levels deep, for a total of 144 subframes, before I used up all the memory on a 320K PC.

Subframes under an outline can be of any type–another outline, word processing, DOS access, spreadsheet, DBMS, communications, or graphics. The subframes can be logically tied together or not related at all. You can add new subframes at any time and move them anywhere you want in the outline–*Framework* automatically renumbers the outline for you.

The Outline View is especially helpful in generating a table of contents. *Framework* calculates the page breaks in a document and puts the page numbers in the table of contents. Although changes in a document are not automatically recalculated on the table of contents, a simple command can change the table of contents to reflect new page numbers (see "Frame by Frame" in this issue for some hands-on applications using *Framework.*)

FRED Programming Language

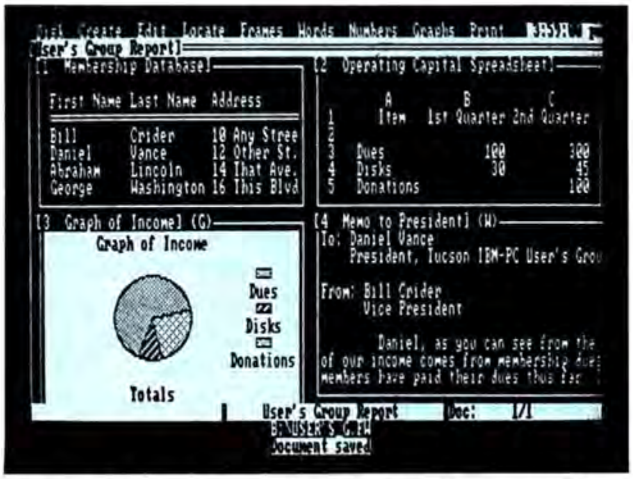
Framework has a built-in programming language called FRED (FRame EDitor) that can be used in any frame of *Framework*. FRED provides over 140 commands and functions and enables you to create your own. With FRED you can create user menus and special programs. One of the sample FRED programs included with *Framework* is a music editor that plays the "Star-Spangled Banner" and enables you to create and edit songs. Another sample provides a mail merge application that works with the word processor.

With FRED you can write your own enhancements to make each application as powerful as you wish. You need never learn a single FRED command to use *Framework* effectively, but for advanced users the programming language makes *Framework* a dynamo.

Macros and DOS Access

In addition to writing programs, you can create macros in *Framework*. A macro is a series of keystrokes compressed into one or two. Pressing <Alt> and typing the key assigned to the macro executes the stored command sequences just as if they had been typed at the keyboard. Macros can also be nested and can call other macros. Macros are useful for frequently used boilerplate text and for issuing complex sequences of commands. A macro library can contain only 46 macros, but you can create as many libraries as you want. A sample library of useful macros comes with *Framework*.

Another useful feature is the ability to open a frame that contains DOS. You can enter the frame and perform DOS functions (such as formatting



```
[User's Group Report]
[1  Membership Database]            [2  Operating Capital Spreadsheet]

 First Name Last Name  Address              A         B           C
                                     1     Item   1st Quarter 2nd Quarter
 Bill       Crider     10 Any Stree  2
 Daniel     Vance      12 Other St.  3   Dues            100         300
 Abraham    Lincoln    14 That Ave.  4   Disks            30          45
 George     Washington 16 This Blvd  5   Donations                   100

[3  Graph of Income] (G)            [4  Memo to President] (W)
                                    To: Daniel Vance
                                         President, Tucson IBM-PC User's Grou

                                    From: Bill Crider
                                          Vice President

                                              Daniel, as you can see from the
                                    of our income comes from membership due:
                                    members have paid their dues thus far

                         User's Group Report       Doc:    1/1
                         [illegible]
                         Document saved
```

Figure 3: Four frames displayed on Framework's desktop that correspond to the outline in Figure 2. Like windows, many frames can be displayed simultaneously and overlapped.

disks) without exiting *Framework.* When you return to *Framework,* a complete record of your DOS transactions will be kept in the frame. You can even run other programs from DOS and bring the generated data into a frame. Thus you can integrate *Framework* with other programs the way you can in windowing environments such as *DesQ* (see "A DesQ With Nine Views," *PCW,* Vol. 2, No. 11).

Word Processing

The word processor is simple yet appropriate. It contains all the features you would expect from a stand-alone word processing program, including search and replace, text formatting (right justified, left justified, and centered), font formatting (underline, bold, and italic), and block moves. For the most part, editing commands are obvious and conventional. Two advanced features *Framework* does not support are multiple fonts and proportional spacing.

The word processor (along with the rest of *Framework*) supports a wide variety of printers and plotters. You can set it up to support two printers and a plotter, and you can even send print jobs to all three at the same time. The ability to print high-resolution graphics in the middle of a page of text is a synergistic coup that elevates the word processor far above the limits of its features.

Spreadsheet

Advanced *1-2-3* users may find *Framework*'s spreadsheet less powerful than they would like. For many users, however, it will be more than adequate. It has standard features like variable-width cells, aligned or centered titles, column and row recalculation, automatic or manual recalculation, protected cells, ascending and descending sorts, cursor pointing to define ranges, and locking titles. The *Framework* spreadsheet also sports the unique ability to italicize, boldface, or underline titles. It has a plethora of functions, including numeric, string, logical, international currency, and statistical calculations. If these aren't enough, you can write your own functions in FRED. The Undo key, which is available throughout *Framework,* can even undo a sort.

The spreadsheet lacks the ability to split screens and name ranges. *Framework* almost makes up for the lack of split screens by encouraging the use of smaller, linked spreadsheets. It is easy to set up multiple linked spreadsheets, and you can use cells in other spreadsheets as though they were named ranges.

You can link as many spreadsheets as you want, as long as they fit in the available memory. If they don't all fit, you can store some to disk and call them up only when you need to recalculate the one you are using. If they are all within the same outline, they can be printed out continuously, as though they were one spreadsheet.

Named ranges are replaced with "English language references." Instead of referring to a cell by its column letter and row number, you may choose to use its column and row titles. Users may prefer the convenience of named ranges over the English language references, since named ranges are easier to remember.

For some reason you cannot point to a range by moving backward; you have to start at the top or left of a range and move downward. The ability to print a range is also omitted; the print function will only print the whole spreadsheet. To print a partial spreadsheet, you must save it (without closing it), then delete the portions you don't want to print. You then have to recall the saved version from disk if you want to use it further.

The spreadsheet is not a speed demon like Lotus Development's *1-2-3,* but it's faster than many spreadsheets. If you have an 8087 math coprocessor chip, you can speed up calculations considerably.

Ashton-Tate knows its competition. In a special supplement to the documentation, entitled *Quick Guide to Framework for Advanced Users of Spreadsheets,* the only other spreadsheet discussed is *1-2-3.* The supplement includes a comparison of the function key layouts of the two programs and a *1-2-3-*to-*Framework* command translation table.

The biggest hurdle potential converts will face is *Framework*'s lack of emphasis on huge spreadsheets. *Framework* can handle large spreadsheets, but the documentation discourages it. On a 640K IBM PC I set up a 64- by 64-cell spreadsheet (over 4000 cells) and still had 148K available. On a 320K machine a 45- by 40-cell spreadsheet left room for only a few formulas–30 by 30 cells was the largest size I found practical. Theoretically, *Framework* can use a 32,000- by 32,000-cell spreadsheet, but I wouldn't want to try that on anything less than a Cray I supercomputer.

Business Graphics

Framework enables you to chart almost any data from a spreadsheet or data base and to place the chart within any frame. Five kinds of graphs are available: bar, pie, line, marked points, and X-Y. To build a graph, you simply specify a range of cells or fields by pointing with the cursor, call down the graphs menu, choose the type of graph you want (or accept the default type, which is that of the last graph drawn), and press <Enter>. You can change the size and location of the graph by pressing a function key and then moving the graph with the cursor keys. Unless you choose otherwise, the graph is automatically scaled to match the size and shape of its frame. You can also overlay several graphs from several data ranges.

Graphs can even be displayed on a monochrome monitor. Although character graphics appear on the screen, the printout will be high resolution. On a graphics monitor the graphs appear in high resolution.

Data Base Management

Framework's DBMS capability is not meant to replace Ashton-Tate's *dBASE II*. For that purpose the company is simultaneously introducing *dBASE III*. The *Framework* data manager is intended for quick analysis of smaller data bases.

The DBMS includes calculated fields, does single-key sorts, searches for specific records, searches for and replaces specific information, and checks the validity and format of input data. You can view or manipulate data in either a Table View, which puts records in rows and fields in columns like a spreadsheet, or a Forms View, which shows only one record at a time but locates the fields in any order you want. The Table View is handy for looking at a data base and altering it. The Forms View is intended for entering new data.

Two unique features of *Framework*'s DBMS are hidden fields and hidden records. A hidden field has its column width set to zero and can be used to hide confidential data or just to make more room on the screen. The information can still be accessed.

Records can be hidden by using a FRED formula called a "filter." The hidden records still exist but cannot be accessed by any commands. To sort, search, or view them, you have to delete the filter with the edit formula key, <F2>.

Changing the structure of a data base is remarkably easy: you just open it in Table View and add new columns or delete old ones. You can even lengthen a field without going through a complex procedure, and you can easily change the structure of a form. To create a new form you just move the various fields around on the screen with the cursor keys. When you print a data base from either the Forms View or the Table View, all the word processing format functions, such as italic or underline, are available.

The most critical function missing from the DBMS is multiple-key sorts. Only one field can be sorted at a time. To imitate a multiple-key sort, you sort first by the least important field, then by the next important, and finally by the most important. The effect is the same as a multiple-key sort, but the process takes longer.

A spreadsheet and a data base can be linked almost as easily as two spreadsheets. However, only a one-way flow is possible–information from the data base can go into the spreadsheet, but not vice versa. To move data to a data base from a spreadsheet, you must either use the Move command to move it manually or write a FRED program. You can also generate a DOS file with appropriate delimiters from either a spreadsheet or a data base. Thus *Framework* data can be sent to other programs.

Generating reports is not as simple with *Framework* as it should be. To organize and print any report other than the whole data base, you will have to write a short FRED program. Ashton-Tate plans on releasing a *Framework* report generator in the near future.

Framework is fully compatible with other Ashton-Tate programs such as *Friday, dBASE II,* and the new *dBASE III*. *Framework* can manipulate data more effectively than *dBASE* but is limited by RAM. *dBASE* can't manipulate data as well but is limited only by disk space. It is easy to move information between *dBASE* and *Framework*. To load a *dBASE* file into *Framework*, you just open the file. *Framework* automatically generates an appropriate structure for the data base file. To move a *Framework* file into *dBASE*, you must write it out as a DOS file and then use the Append Delimited command to send it to *dBASE*. (If there is no *dBASE* file with the right structure, you will have to define it.)

Telecommunications

The telecommunications portion of *Framework*, called MITE, was obviously tacked on at the last minute. This is the weak link in the *Framework* chain. MITE is a stand-alone program; it can operate outside of *Framework* on a 256K PC. If you use it as an integrated part of *Framework*, you must have 384K of RAM. MITE does not use pull-down menus, and it uses the function keys in a different way than the rest of *Framework* does. To use MITE inside *Framework*, you must install it with the telecommunications option. Then MITE stays resident until you delete it.

MITE's most advanced feature is its ability to both send and receive files while unattended. The program supports 300- or 1200-bits-per-second transfer in binary or ASCII format, and it uses the Xmodem error-checking protocol. MITE can be integrated into FRED programs to capture remote data directly into word processing, spreadsheet, or data base frames. In this respect it is more powerful than most telecommunications programs. But it wouldn't be my first choice as a stand-alone program. MITE's menus are not very helpful, and it requires a separate data file for the numbers and parameters of each remote system you call.

Documentation

Framework's documentation is a definite step up for Ashton-Tate. It consists of two IBM-size binders; one a tutorial, the other a reference. Unlike the *dBASE II* documentation, the manuals are typeset, logically arranged, and full of examples and illustrations. However, they do not go into as much detail on FRED as I would like; instead, they refer to the *Programmer's Reference Manual*, which is sold separately. The documentation is adequate for most applications, but I wish they had included a programmer's reference.

In addition to the printed documentation, there are numerous context-sensitive help screens throughout the program, and an on-line tutorial is packaged with *Framework*. The tutorial is only marginally interactive and is almost an insult to the user's intelligence. However, considering *Framework*'s complexity, the program is remarkably easy to learn even without the tutorial.

Flies in the Ointment

Framework has some annoying habits. The distribution disk is Pro-Loked. You can make all the copies you want, but they will not run. If you try to boot the program without the distribution disk in drive A:, the computer says 'Unauthorized Duplicate' and kicks you back to DOS. Since I almost always boot from a hard disk, I often forget to put the distribution disk back into drive A:, or I leave the drive door open. Every time I read that message, I feel like I have been slapped in the face. Why not say 'Please place the distribution disk in Drive A:'?

My commercial-release version of *Framework* has one serious bug. It does not always save files on my PC. It works perfectly on my wife's Portable PC, but only about 60 percent of the time on my PC. The other 40 percent of the time, the program hangs without saving all my precious work, and I have to reboot to restart the program. Since I have a "pure" IBM PC except for an AST Sixpak board, this is a nasty bug indeed. Ashton-Tate told me they had similar problems with certain ROM releases on the PC in an earlier beta-test version, but those problems were fixed. If this problem persists, I predict a rocky road ahead for the program.

For the most part, *Framework* commands are obvious and logical. But there are exceptions. For example, I expect the <Ins> key to toggle between the insert and overtype modes, but in *Framework* the <Ins> key calls the last pull-down menu you used. The toggle between the insert and overtype modes is on the Edit Menu.

Another unusual approach is the method of moving blocks of text or data. You can only move a block to the position after the cursor. Standard practice is to insert before the cursor. Because *Framework* inserts blocks after the cursor, you can never move a block to the first position in a frame. You have to move it to the second position, then move whatever is ahead of it to the position behind it. This is a roundabout and awkward method.

> *The telecommunications portion of* Framework, *called MITE, was obviously tacked on at the last minute. This is the weak link in the* Framework *chain.*

One other weakness is the method of print queueing. *Framework* writes a print file to disk before printing it; then it spools from the disk file and eventually erases the file. If there is not enough space on the disk, *Framework* will print from memory. In that case there is no spooling, and you must wait for the file to print before you continue to work. A better approach would be to let you specify another drive if the default is full or, if you have plenty of memory, allow you to queue in memory. This is one of the weakest print spoolers I have seen on a PC; it's only marginally better than no spooler at all.

For the most part, *Framework*'s screen layout is clear and aesthetically pleasing. However, the clock in the upper right corner of the screen can be annoying. It ticks whether you want it to or not. Seeing that motion from the corner of my eye distracts me, but I can find no way to turn it off. I would also like to be able to turn off the twitching status line on the bottom of the screen.

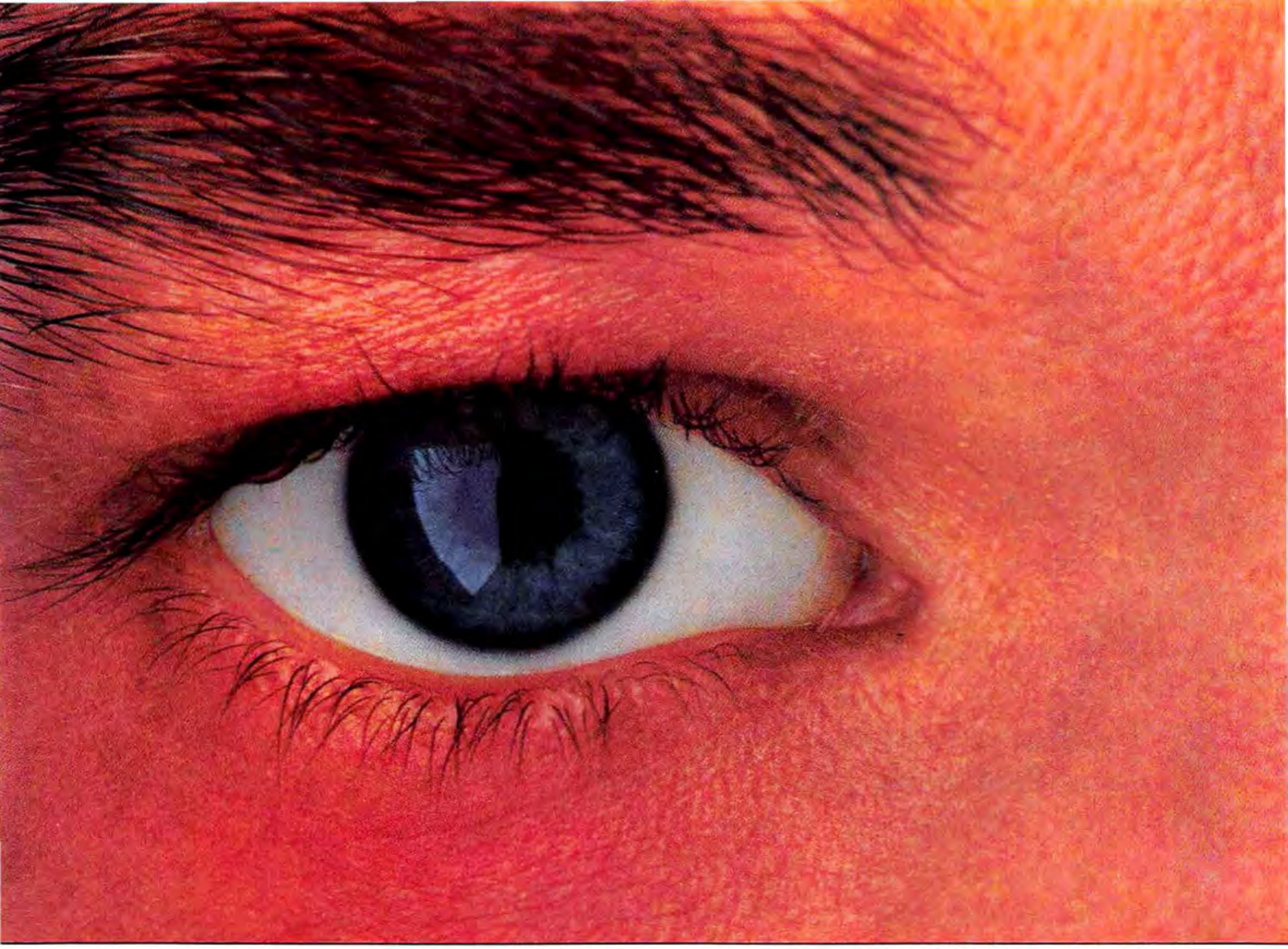
The Quality All-in-one Tool

I don't use my all-in-one pliers/hammer/screwdriver much. That concept needs to be refined. On the other hand, I think I will be using *Framework* often because, overall, it is a quality all-in-one tool.

The concept of an outline processor as the main link between all the features is excellent, and it is one of the main ways *Framework* differs from other integrated programs. *Framework* is not perfect, but so far it seems to be the best of its kind. If you can only afford one piece of software, this is the one to buy. ●

Bill Crider is a microcomputer training consultant and freelance writer. He lives in Tucson, Arizona.

Framework
Ashton-Tate
10150 W. Jefferson Blvd.
Culver City, CA 90230
213/204-5570
List price: $695
Requirements: 256K (384K for telecommunications), two disk drives



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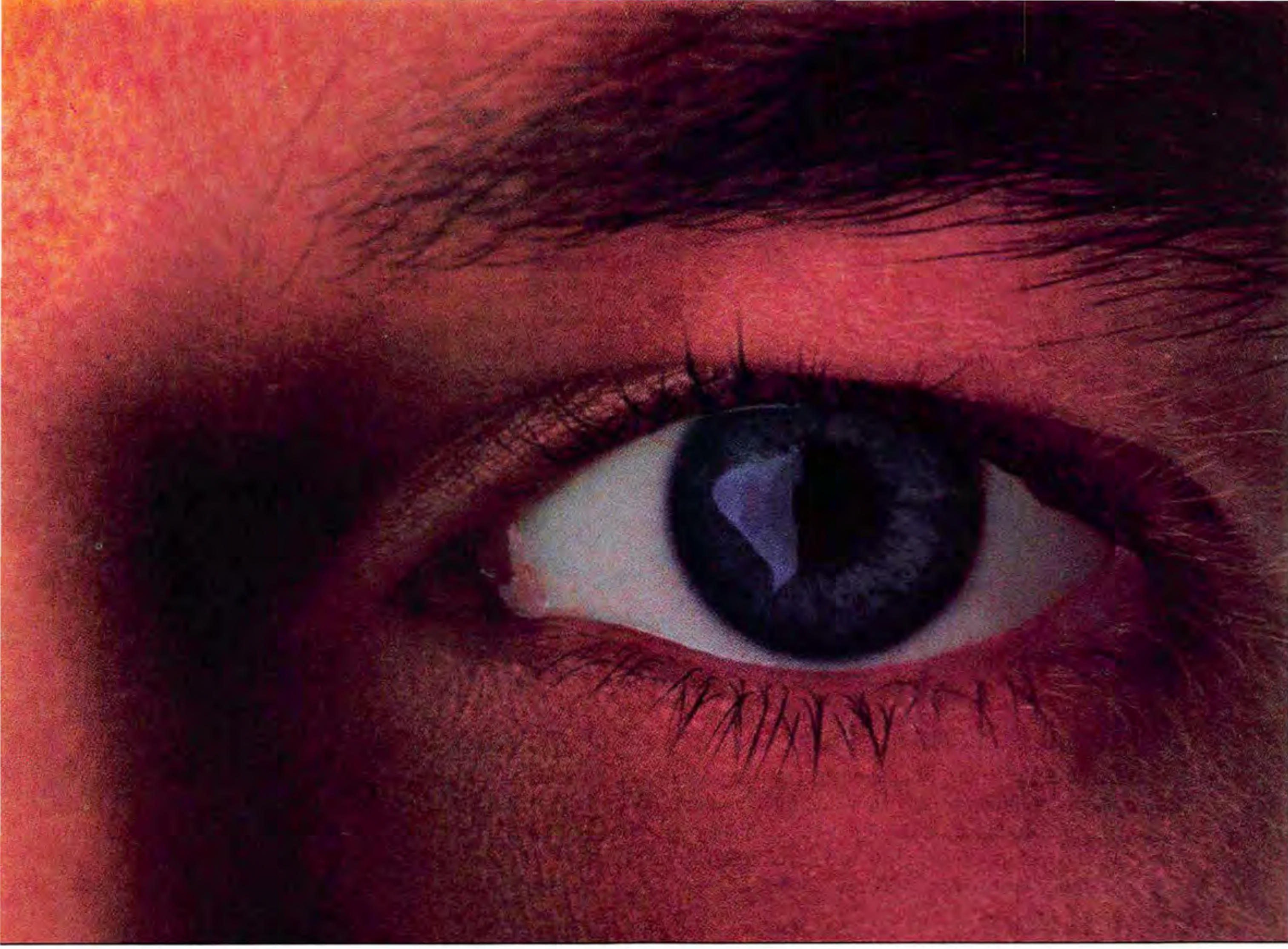

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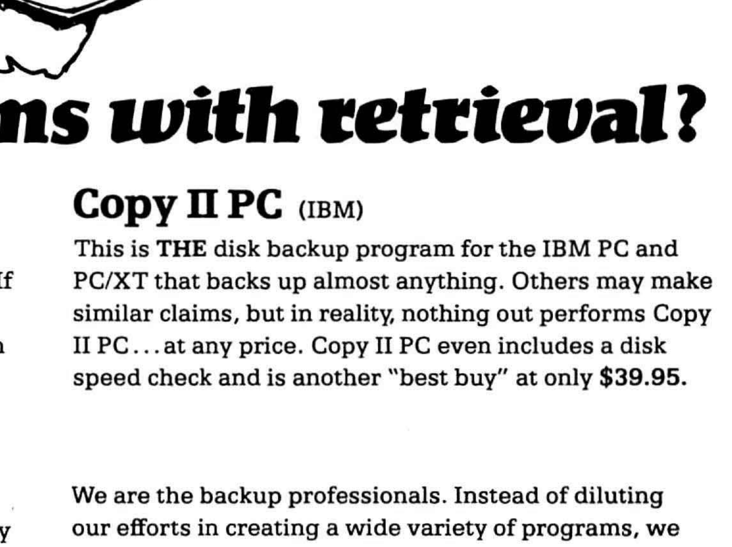

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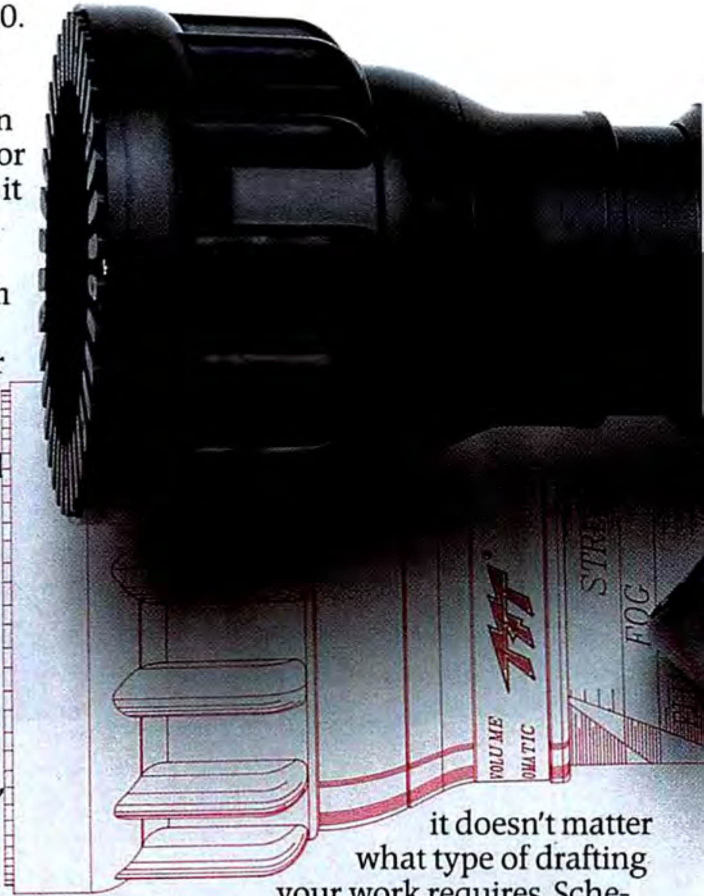

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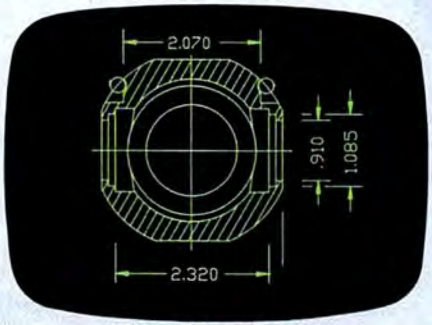

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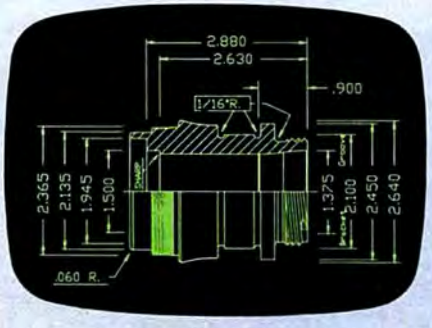
AutoCAD automatically dimensions distances and angles



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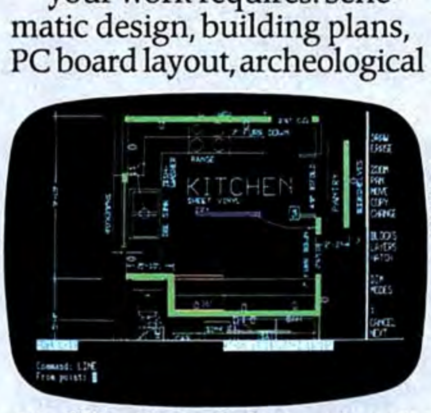

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Command: LINE
From point:
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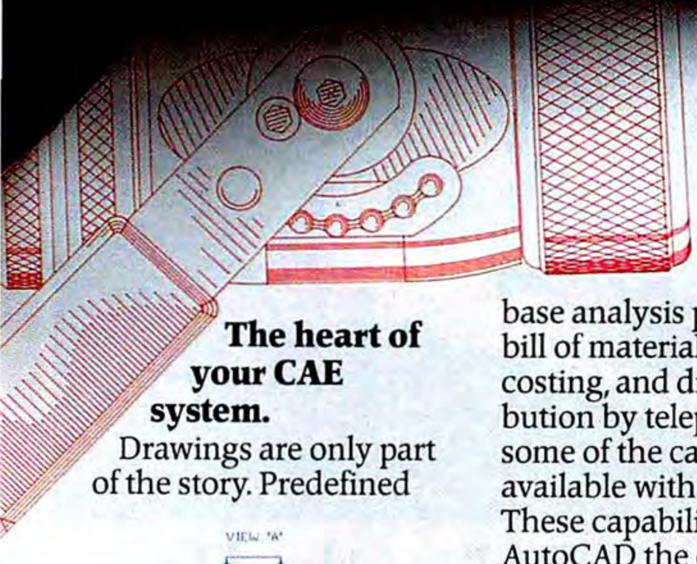

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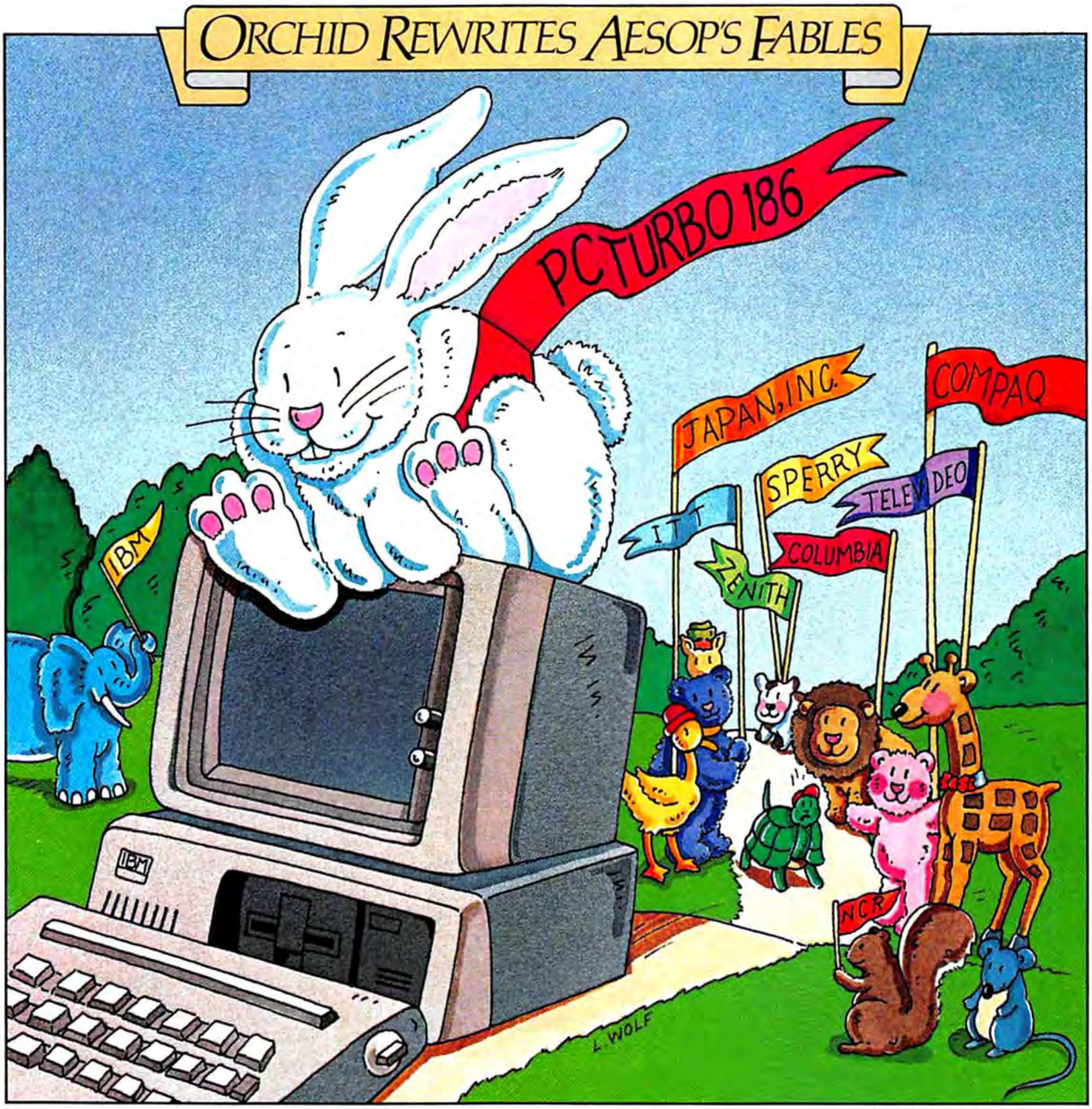

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Planning for Profit

Micro/Prophit is a financial modeling and analysis program that can make forecasts almost as easy as 1-2-3 for the experienced planner.

Bill Dauphinais

The term "financial modeling" is apt to conjure up the vision of a cigar-chomping executive making momentous decisions about a Fortune 500 corporation. This captain of industry naturally uses mammoth mainframe computers to distill reams of financial data about divisions, subsidiaries, and the like into a model of how the entire corporation runs. With this model, the executive can ponder and perhaps answer such vital questions as, What can I do to increase our rate of return? What division might have to be closed down? What company should the corporation acquire next?

While this image of the lone corporate desperado at the helm of a great company may be a bit fanciful, the use of financial modeling in charting the course for a big corporation is not. Until recently, only those few professionals with access to powerful mainframe computers and similarly powerful modeling software have been able to develop complex financial models. Even today, running a large financial model a single time on a commercial time-sharing system can cost as much as $400. But financial managers are discovering the ease of use and the availability of the PC, so it's not surprising that, like mainframe and minicomputer project management and accounting packages before them, large systems financial modeling software is finally migrating to the PC.

Of course, financial modeling is no stranger to the PC user (see "Of Spreadsheets and Models" in this issue). Spreadsheet packages such as *VisiCalc* and *1-2-3* are frequently used to create financial models. While there's no question about their flexibility, spreadsheet programs can't match the analytical power of a dedicated financial modeling program or impose the structure that's necessary to cope with a monstrous modeling problem; they are essentially general-purpose tools. When a corporation has multiple divisions with their own profit centers, has 100 retail outlets, or is involved in an intricate large-scale merger, attempting to project the future course of the entire enterprise with a spreadsheet is like steering an ocean liner with a paddle. A sophisticated system that accommodates large, complex models and offers many ways of analyzing them is needed.

Micro/Prophit

One such system is *Micro/Prophit,* a descendant of the popular *Prophit II* financial modeling system developed by Via Computer and marketed by Control Data Corporation for its Call/370 time-sharing service. *Prophit II*

and *Micro/Prophit* are very much alike in their organization and internal workings, although the latter is much easier to use. *Micro/Prophit* is designed for the PC, the Compaq, the Columbia, the Passport, and the Hyperion. The program is menu- and prompt-driven, and Via Computer has paid a great deal of attention to making data entry as simple as possible. However, the program is best used by those with experience in financial planning.

Micro/Prophit's forte is creating complex financial models that can be used by corporate planners, analysts, and managers in making business decisions. The program handles profit and loss forecasting, real estate and land development analysis, cash flow management, capital investment, acquisition and merger analysis, product line planning, and more. Like most financial modeling packages, *Micro/Prophit* assumes that each line (row) of a report represents the same element of data (such as sales) for each time period (column). Spreadsheet programs can get around this kind of restriction with their cell-by-cell approach, but you pay a price when data is analyzed or updated in a large model and each cell must be individually changed.

> *Attempting to project the future course of a very large company with a spreadsheet is like steering an ocean liner with a paddle.*

Creating a Model

You don't have to be a programmer to create a *Micro/Prophit* model; if you've written spreadsheet formulas or *1-2-3* macros, you'll find the program's syntax easy to master. The program extracts data from the user with its formatted, on-screen forms and helpful prompts. To simplify the process, *Micro/Prophit* keeps a model, its numbers, and the resulting report in separate files (see Figure 1). Thus one model can be used with any set of numbers. With a model in place, you enter the data to produce a projection and then run the model.

A model is built line by line, each line describing the logic and calculations necessary to create a forecast. You must first lay out what you want a report to show (the headings and line items like accounts payable, payroll, common stock, and so on) and then enter the proper codes and information for each row—recognizing that some lines (such as intermediate calculations) are created but not printed on the report. Figure 2 illustrates how a line is written. *Micro/Prophit* displays a neatly formatted input screen to capture the information. A full-screen editor is available for any necessary corrections.

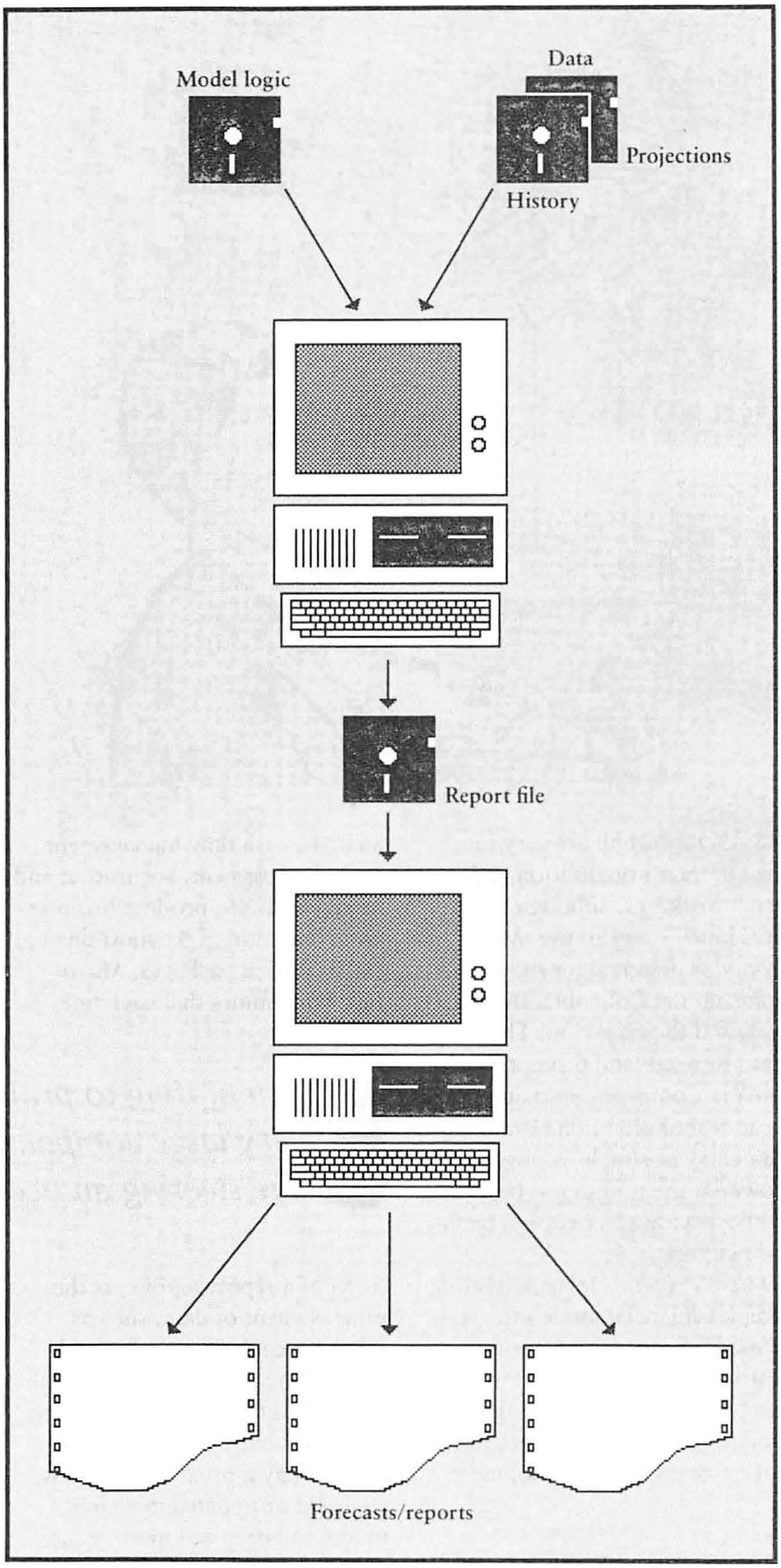
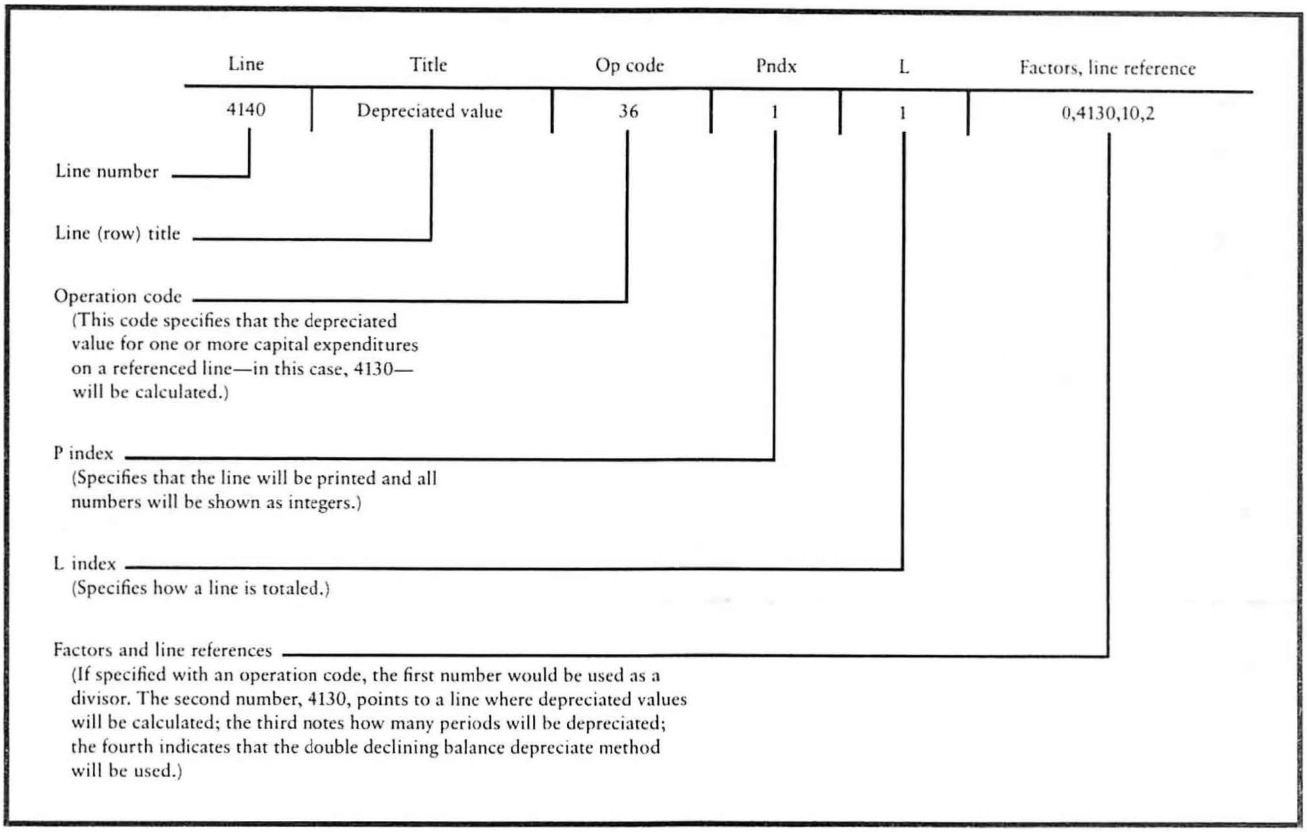


Figure 1: A Micro/Prophit report is generated by merging two separate files, the first holding the logic or structure of the model, the second, the actual data the model uses. Once a report file is generated, the program can go back and analyze the report many ways.



Operation code
(This code specifies that the depreciated value for one or more capital expenditures on a referenced line—in this case, 4130—will be calculated.)

P index
(Specifies that the line will be printed and all numbers will be shown as integers.)

L index
(Specifies how a line is totaled.)

Factors and line references
(If specified with an operation code, the first number would be used as a divisor. The second number, 4130, points to a line where depreciated values will be calculated; the third notes how many periods will be depreciated; the fourth indicates that the double declining balance depreciate method will be used.)

Figure 2: Micro/Prophit command parameters. Each line of a model is defined with these six elements.

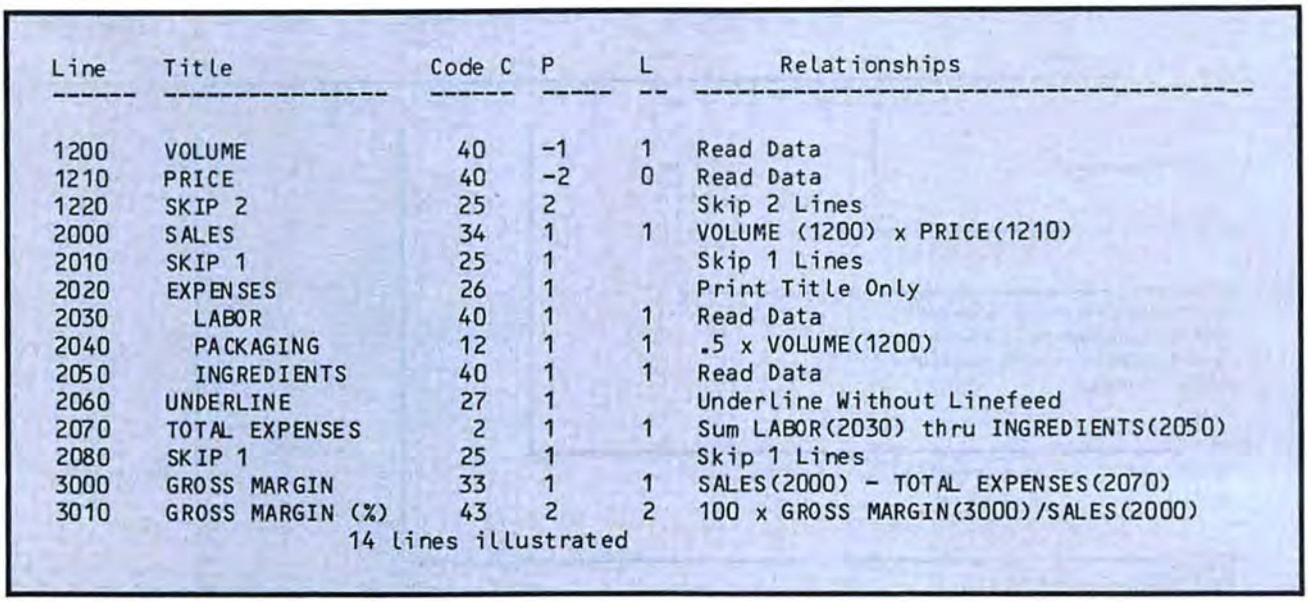
Once a model is defined you can establish both historical and projection files. A historical file could hold data on a company's past financial performance, for example. The file could be used as the basis for a forecast or for a report that portrayed both estimated and actual company performance over a period of time. Projection files, on the other hand, might reflect the expected effects of a merger, an impending shortage of vital manufacturing supplies, or the layoff of 200 employees.

The logic in a model file dictates which lines require which data, so the process of entering financial data is a matter of answering a series of prompts issued by the program. Entering historical data simply amounts to typing in known data, period by period, as you would in a spreadsheet. What sets *Micro/Prophit* apart from spreadsheet modeling is the way it assembles a forecast. Over 40 options for entering and creating projection data are available. Data can be stepped (numbers changed by a certain factor over time); based on a prior period, plus or minus an amount or a percentage; extrapolated in a straight line from historical data; and extrapolated from historical data based on a parabolic or quadratic formula. All this can be done automatically once initial values and relationships have been specified.

Reports

A report is a natural extension of a model's logic. Once a *Micro/Prophit* model is created, any number of historical or projection data files can be merged with it to create a report file. An existing report file can then be combined with other data files holding new information. Thus, you could create a report file with three months of historical data, later adding nine months of projection data to produce a report with a quarter's worth of actual data followed by a forecast for the remainder of the year.

Selecting 'Display' from the *Micro/Prophit* menu calls up a report on a monitor or sends it to a printer. Once a report file has been selected for printing, you can specify which lines, ranges, or columns are to appear in the report. Print format options include col-



```
Line    Title              Code C  P      L         Relationships
------  ----------------   ------  -----  --  ----------------------------------------

1200    VOLUME               40    -1     1   Read Data
1210    PRICE                40    -2     0   Read Data
1220    SKIP 2               25     2         Skip 2 Lines
2000    SALES                34     1     1   VOLUME (1200) x PRICE(1210)
2010    SKIP 1               25     1         Skip 1 Lines
2020    EXPENSES             26     1         Print Title Only
2030      LABOR              40     1     1   Read Data
2040      PACKAGING          12     1     1   .5 x VOLUME(1200)
2050      INGREDIENTS        40     1     1   Read Data
2060    UNDERLINE            27     1         Underline Without Linefeed
2070    TOTAL EXPENSES        2     1     1   Sum LABOR(2030) thru INGREDIENTS(2050)
2080    SKIP 1               25     1         Skip 1 Lines
3000    GROSS MARGIN         33     1     1   SALES(2000) - TOTAL EXPENSES(2070)
3010    GROSS MARGIN (%)     43     2     2   100 x GROSS MARGIN(3000)/SALES(2000)
                   14 lines illustrated
```

Figure 3: The structure of a model elicited by the Display Illustrate Command

umn width, the combination of commas with numbers, the use of parentheses or minus signs to indicate negative numbers, and suppression of zeros. A print compression feature for dot matrix printers is also included.

Micro/Prophit's graphics function is rather limited, since all charts are essentially confined to the screen. The program produces standard and stacked bar charts, simple pie charts, and line plots based on up to four lines from a report. Graphics can be printed only on an IBM graphics printer; to print an image you must load GRAPHICS.COM, then *Micro/Prophit,* find the proper image, and press the <Shift>-<PrtSc> keys.

dBASE II users will find *Micro/Prophit*'s Display command not unlike *dBASE II*'s List, since it can be used to print out the contents of a data file or the structure of a model. *Micro/Prophit* does take the liberty of translating model logic into something resembling English (see Figure 3).

Operation Codes

The value of any forecasting program like *Micro/Prophit* depends on the accuracy of the models it creates. Such accuracy is largely a matter of how well the program specifies the myriad interrelationships among the data that make up a model. *Micro/Prophit* excels in this area, providing over 50 operation codes for creating these relationships (see Figure 4). The operation codes are like typical spreadsheet functions, though they are far more powerful. Further, while spreadsheet functions specify how a given cell is calculated, *Micro/Prophit* operation codes generally work on an entire row.

Not surprisingly, *Micro/Prophit*'s operation codes focus on the functions most needed by financial planners. The functions range from the very simple (add a range of lines) to the not-so-simple (raise a line to a given power) to the very complex (negative carryback). One powerful operation code lets you forecast amounts computed for any of six depreciation methods. The forecasting needs of most managers should be met by the program's collection of operation codes, which also includes functions for net present value, internal rate of return, discounting, and loan amortization.

Though most relationships created with the operation codes involve line-by-line computations, *Micro/Prophit* can perform complex period-by-period calculations as well. The program uses what it calls "loops," in which the results of one calculation are used elsewhere in a model or models (see Figure 5). You can even nest loops within other loops or have them perform a function down a column or throughout a model. These iterative loops are particularly useful if the model has to converge at a given number—say the model has to balance (like a fi-

(1) Multiple logic operations. Allows four possible comparisons—less than, equal, greater than, not equal—between two lines or a line and a constant number.

(2) Summing a range of lines. Will add a range of lines and put the result in the current line.

(4) Cumulating data. Takes a line of numbers, sums them, and puts the result in the current line.

(8) Factoring and adding lines. This code factors the values in two specified lines, adds the products, and places the result in a current line.

(9) Moving average. Calculates a moving average on the numbers in a referenced line and puts them in the current line.

(13) Full line as a ration or product of a single column value. Takes the percentage of the numbers on one line and divides or multiplies the result by the value in a specified column.

(20) Copying a line. A simple but vital function: copying the values from one line to another. Micro/Prophit has a number of other copy functions.

(23) Initiating a transfer loop. This code copies values from a line to another column. Thus, the result of a calculation can be used elsewhere in a forecast.

(24) Iterative looping. Allows a forecast to converge on a given number, such as a budget amount that must be met.

(32) Negative carry forward. This adds the value in one line to that in another. If the result is negative, the loss is carried forward to the next column of the current line; if positive, the next column is set to zero.

(34) Multiplying multiple lines. This code will multiply values in up to 15 lines. Micro/Prophit has several other functions for multiplying and dividing lines.

(36) Depreciated value. Calculates for a specified number of periods the depreciated value for one or more capital expenditures. The program assumes that capital expenditures are made at the start of the period. Six depreciation methods are available.

(40) Input data. This code reads a corresponding line in a projection or history data file and inserts it into the current line.

(290) Rate of return. This code calculates and prints an internal rate of return for cash flow figures contained in a line or many lines. Cash flow may be discounted, positive and negative balances changed, and other actions occur automatically.

(450) Loan amortization. Amortizes a loan value in a line over a specified number of periods, using the interest rate referenced in another line. An annual interest rate is assumed.

Figure 4: Some of the operation codes used by Micro/Prophit. Some simply perform an arithmetic operation; others provide an automatic analysis of financial data that is useful for a financial planner. Many line items in a projected financial report are extrapolated or interpolated from row or column totals within that report or from historical data.

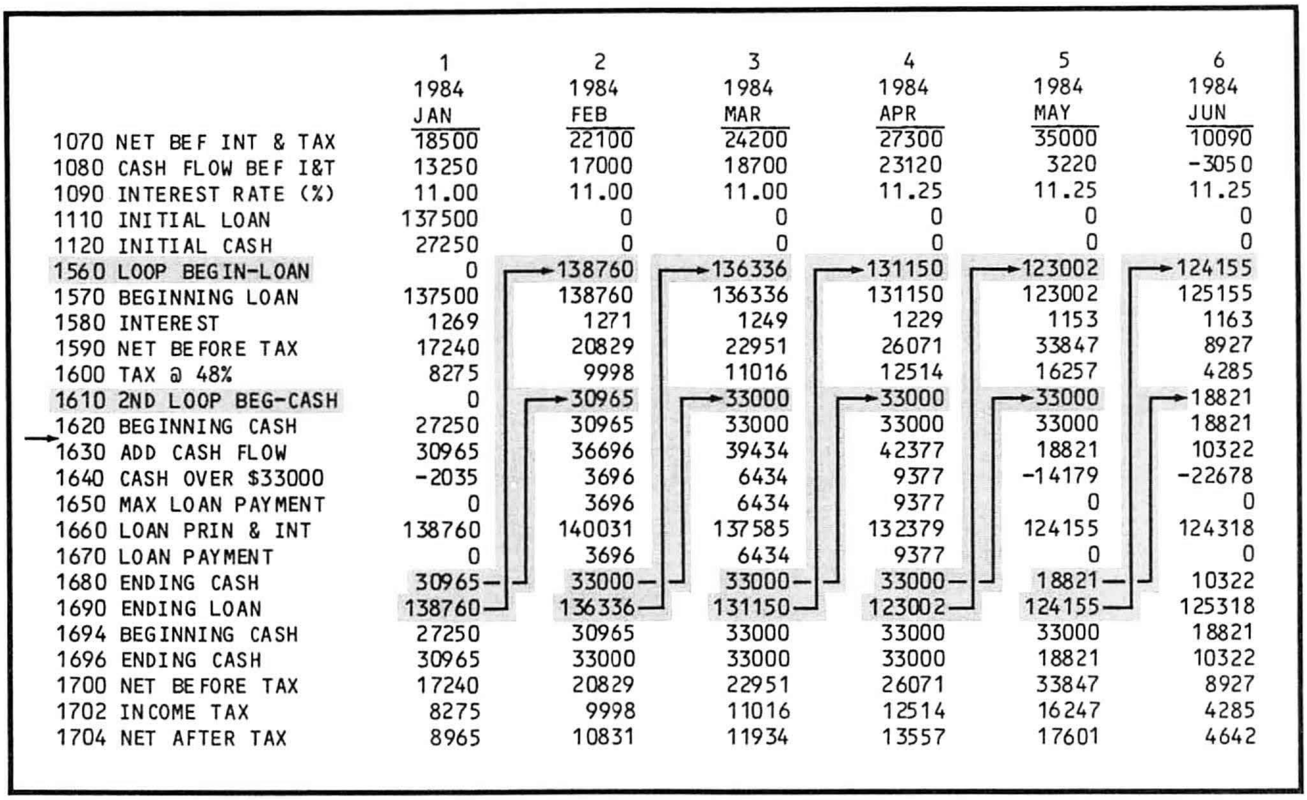
nancial statement) or its "bottom line" must hit $3 million, plus or minus a few farthings. With a spreadsheet, you might spend hours changing numbers before finding that bottom line. With *Micro/Prophit,* an iterative loop can perform the job in minutes.

Advanced Features

A financial model can force you to examine and understand what financial levers drive your business. *Micro/Prophit* compounds this benefit by providing an impressive array of functions for analyzing a model once it has been created. Two of the most useful of these functions are sensitivity analysis and model consolidation.

The objective of sensitivity analysis (known to *1-2-3* fans as "what if" analysis) is to explore various alternatives and examine their financial impact. These alternatives may range from adding new employees to opening another store to reorganizing corporate headquarters. With a series of screen prompts, the program determines which parameters in a model are changed and how they are changed. Forecast data can be replaced or increased or decreased by an amount or a percentage. These changes are stored in a new report file and do not affect the original data or report files. As a result, original data is not lost and "what if" reports can be generated. I found the whole process a little too structured and less effective than a spreadsheet's change-a-value-and-recompute approach to sensitivity analysis.

Related to the sensitivity analysis function is *Micro/Prophit*'s goal-seeking ability. For example, if a financial planner knows that a company's projected budget cannot exceed $7,250,000, *Micro/Prophit* can calculate a model from the bottom up. In this case,



```
                                   1        2        3        4        5        6
                                1984     1984     1984     1984     1984     1984
                                 JAN      FEB      MAR      APR      MAY      JUN
1070 NET BEF INT & TAX         18500    22100    24200    27300    35000    10090
1080 CASH FLOW BEF I&T         13250    17000    18700    23120     3220    -3050
1090 INTEREST RATE (%)         11.00    11.00    11.00    11.25    11.25    11.25
1110 INITIAL LOAN             137500        0        0        0        0        0
1120 INITIAL CASH              27250        0        0        0        0        0
1560 LOOP BEGIN-LOAN               0   138760   136336   131150   123002   124155
1570 BEGINNING LOAN           137500   138760   136336   131150   123002   125155
1580 INTEREST                   1269     1271     1249     1229     1153     1163
1590 NET BEFORE TAX            17240    20829    22951    26071    33847     8927
1600 TAX @ 48%                  8275     9998    11016    12514    16257     4285
1610 2ND LOOP BEG-CASH             0    30965    33000    33000    33000    18821
1620 BEGINNING CASH            27250    30965    33000    33000    33000    18821
1630 ADD CASH FLOW             30965    36696    39434    42377    18821    10322
1640 CASH OVER $33000          -2035     3696     6434     9377   -14179   -22678
1650 MAX LOAN PAYMENT              0     3696     6434     9377        0        0
1660 LOAN PRIN & INT          138760   140031   137585   132379   124155   124318
1670 LOAN PAYMENT                  0     3696     6434     9377        0        0
1680 ENDING CASH               30965    33000    33000    33000    18821    10322
1690 ENDING LOAN              138760   136336   131150   123002   124155   125318
1694 BEGINNING CASH            27250    30965    33000    33000    33000    18821
1696 ENDING CASH               30965    33000    33000    33000    18821    10322
1700 NET BEFORE TAX            17240    20829    22951    26071    33847     8927
1702 INCOME TAX                 8275     9998    11016    12514    16247     4285
1704 NET AFTER TAX              8965    10831    11934    13557    17601     4642
```

Figure 5: When loops are established, the results of a calculation can be used elsewhere in the model.

Micro/Prophit would automatically adjust up to 25 specified lines in a model until it reached the budget's limit. The goal can be a specific total or the sum of a row for all financial periods in the model.

This goal-seeking capability far outstrips a spreadsheet's "what if" approach, which can at best work with a few variables. *Micro/Prophit* lets you manipulate as many as 25 lines at once. If a model involves a company with numerous divisions or multiple sources of income, you can painlessly examine all the possible answers to questions like, what would it take to get a 20 percent return on an investment instead of 15 percent or how much in sales must we generate to make a $200,000 profit? However, goal seeking with *Micro/Prophit* does have its limits. For example, adjusted lines must be the result of calculations and cannot be part of a loop.

The other important post-model function is consolidation, a feature that allows the combination of two or more forecasts. The benefits of this function are numerous. For example, if a company has 15 divisions (each with its own report file), consolidating them provides an overall view. If a merger is in the works, you can determine if it's best to acquire assets or stock by consolidating each respective forecast with a projected company model. Consolidation with *Micro/Prophit* takes three forms: additive, advanced, or columnar. An additive consolidation essentially sums forecasts with similar structures along the same lines—rates of return, column totals, and so on.

Advanced consolidation is much more flexible, since different factors can be applied to a forecast to scale its impact upon the consolidated forecast. For example, a planner might have three forecasts to combine; two are considered conservative, the third a bit speculative but with relevant data. The planner could specify that the third forecast's data be taken at only 85 percent of its value. Advanced consolidation can also be used for summary reports, since specified lines (such as totals) in different models can be extracted and merged into one forecast.

As its name implies, the columnar consolidation function extracts and operates on columns rather than lines. Columns from various forecasts can be placed side by side, compared, or summed. This function is useful if you need to focus on a particular aspect of your business, such as first-quarter profits from a number of subsidiaries.

Micro/Prophit's consolidation abilities are indeed comprehensive, but this level of sophistication brings with it a corresponding level of complexity. It takes some time to learn how to employ operation codes to combine lines and files. Some situations needing advanced consolidation functions also require the use of a separate consolidation file, which contains the instructions capable of directing a model in the intricate process of combining forecasts from essentially dissimilar businesses. Anyone needing a clear and accurate financial overview of a corporation that has manufacturing, marketing, and distribution divisions will appreciate this *Micro/Prophit* feature.

Ready-to-Use Models

To make *Micro/Prophit* even more attractive to financial planners, Via Computer markets 15 ready-to-use models, each addressing a specific area of analysis. The models will perform analyses such as bank planning, savings and loan planning, lease versus buy analysis, capital investment analysis, and insurance company planning. The models are like the templates used with spreadsheet programs. Once a model is installed, generating reports is merely a matter of entering data.

The models range from $195 to $895. These prices may seem a little steep, but if a model meets your requirements it's worth the expense, since it relieves you of the task of designing your own model and specifying report formats. All models can be modified to more closely match a particular forecasting application. Each model comes on a single disk and includes documentation in a three-ring binder.

> *Anyone needing a clear and accurate financial overview of a corporation that has manufacturing, marketing, and distribution divisions will appreciate* Micro/Prophit.

Missing Links

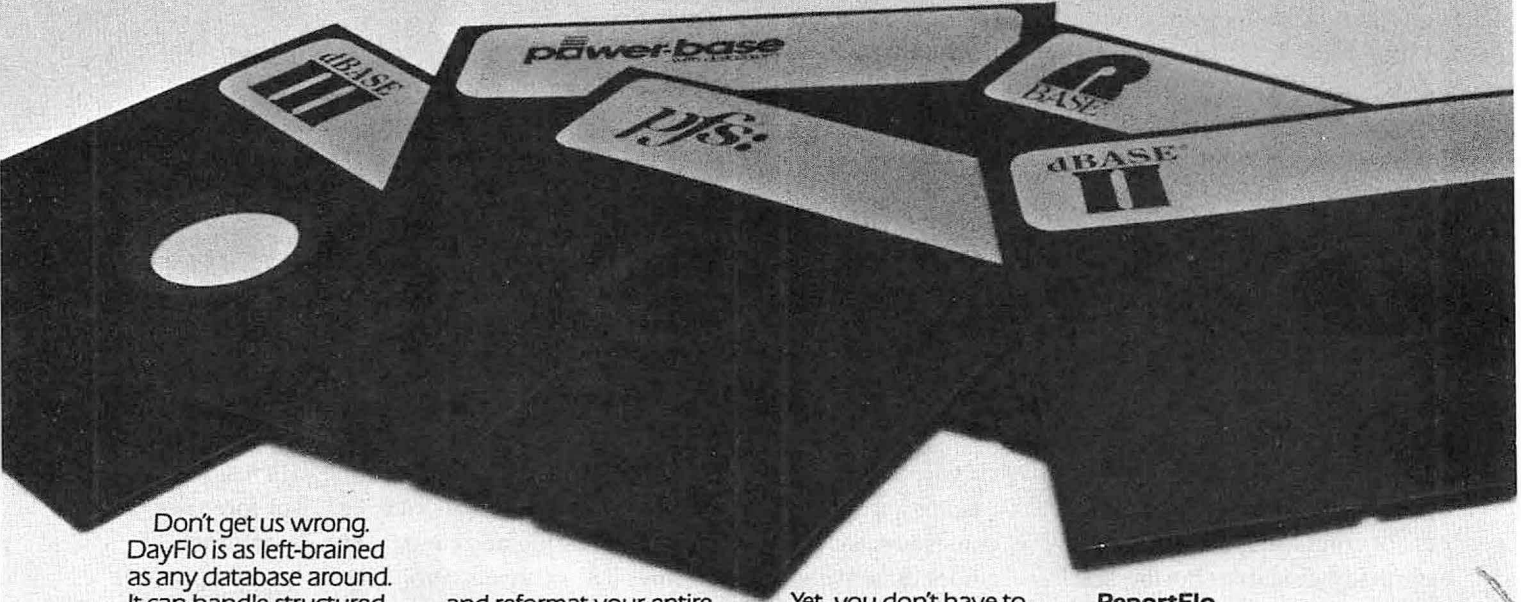
It would be comforting if *Micro/Prophit* could anticipate any forecasting relationship, no matter how unique. *Micro/Prophit*'s collection of operation codes is admittedly far-reaching, but it is by no means complete, and the program's major drawback is its inability to create custom codes. Another limitation is its graphics, which are mostly confined to the screen. The ability to output forecast data to a graphics plotter would be a measurable improvement. This limitation is made worse by the fact that you cannot transfer data from *Micro/Prophit* to a .DIF or standard ASCII file—which would make it accessible to a graphics program.

Nonetheless, in the world of classy financial modeling packages for the PC, *Micro/Prophit* deserves high marks. The program doesn't gobble memory, and thankfully, it comes with a complete, well-indexed, and clearly written user manual. If you're a casual financial planner, you probably should stick to your spreadsheet. But if you need the power and the structure a comprehensive financial modeling system can offer, *Micro/Prophit,* with its rich legacy of forecasting and model analysis options, consolidation features, and reporting flexibility, is a good choice.

Bill Dauphinais is a CPA and partner in charge of the management consulting services staff for the Sacramento, California, office of Price Waterhouse.

Micro/Prophit
Via Computer, Inc.
7177 Construction Ct.
San Diego, CA 92121
619/578-5356
List price: $695
Requirements: 192K, two disk drives (hard disk recommended)

Traditionally, databases have been left-brained.



Don't get us wrong. DayFlo is as left-brained as any database around. It can handle structured information such as customer lists and personnel records. Keywords and field names are used to gain access to records.

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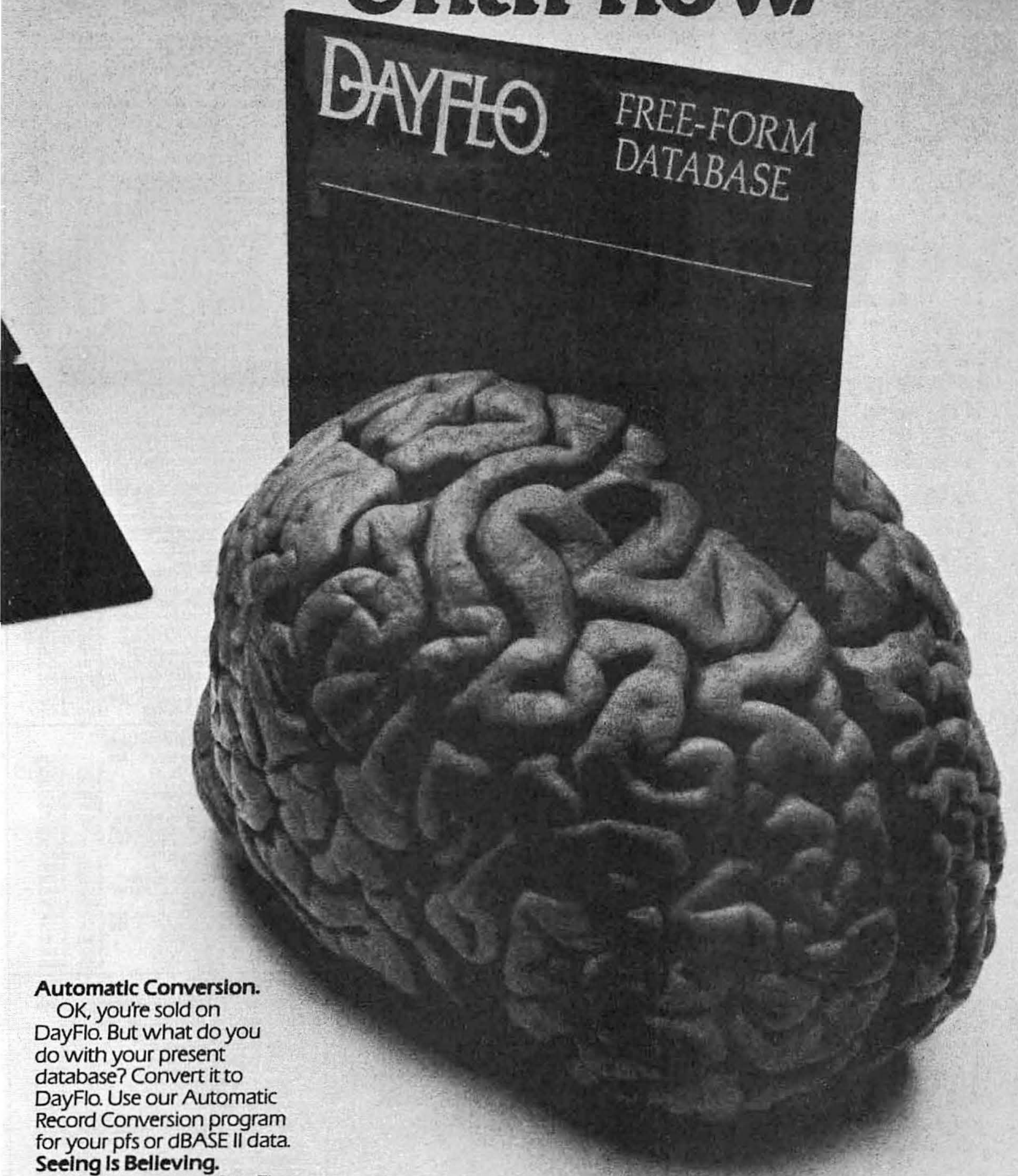

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Parallel Interface for LQ1500 NEW	$ 100	Call
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RX80, F/T	$ 499	Call
FX80, 160 cps	$ 699	Call
FX100, 160 cps	$ 895	Call
MX100F/T, 80cps, w/Graftrax+	$ 995	Call
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★ **MANNESMANN** Sprit, 80 col 80cps	$ 399	$ 299
TALLY, 160L, 80 col. 160cps	$ 798	$ 568
180L, 132col. 160cps	$ 1098	$ 778
OKIDATA, 82A, 80 col., 120 cps, para.	$ 349	$ 319
83A, 132 col., 120 cps, para.	$ 749	$ 599
84, 136 col., 200 cps, para.	$ 1395	$1095
92, 80 col., 160 cps, para.	$ 599	$ 469
93, 136 col., 160 cps, para.	$ 999	$ 695
2350P, Pacemark, 350cps, para	$ 2695	$2095
2410P, Pacemark, 350cps, para.	$ 2995	$2395
Accessories, Plug 'N Play, Tractors, Okigraph		Call
ORANGE MICRO, Grappler+, for Apple	$ 165	$ 119
PRACTICAL, Microbuff In-Line 64K, Para.	$ 349	$ 259
Microbuff In-Line 64K, Ser.	$ 349	$ 259
QUADRAM, Quadjet, Jet Color Printer	$ 895	$ 795
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Gemini 15"X, 120cps	$ 549	$ 439

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1114, same as 1014 with T/F, 2 col.&Prop.	$ 599	$ 439
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★ **JUKI,** 6100, 18cps, Para, 3 pitch	$ 599	$ 459

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IBM-PC Smartcom II Software	$ 149	$ 109
Micromodem IIe w/Smartcom	$ 329	$ 239
Micromodem 100 (S-100 bus)	$ 399	$ 275
Stack Chronograph (RS-232)	$ 249	$ 189
Stack Smartmodem 300(RS-232)	$ 289	$ 225
Smartmodem 1200 (RS-232)	$ 699	$ 535
IBM-PC to Modem Cable	$ 39	$ 29
KENSINGTON, Modem 1200 NEW	$ 595	$ 385
NOVATION, 103/212 Smart Cat	$ 595	$ 415

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★ 12" Amber, #310A for IBM-PC	$ 230	$ 159
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★ 13" Color II, RGB, Hi Res, (IBM/Apple)	$ 559	$ 439
★ 13", Color IV, RGB, 720Hx400V, (IBM)	$ 795	$ 685
★ DVM III, Color II or III to Apple II I/F	$ 179	$ 129
★ **PRINCETON,** RGB Hi Res, HX-12	$ 795	$ 499
★ RGB Hi Res, SR-12	$ 799	$ 599
★ Amber, MAX-12 (for Mono Board)	$ 249	$ 199
★ **QUADRAM,** Quadchrome 12" RGBColor	$ 695	$ 495
★ Quadscreen 17" 968x512	$1995	$1595
★ Quadchrome II, 14" RGB Color NEW	$ 650	$ 450
★ Amberchrome, 12" Amber NEW	$ 250	$ 165
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12" Amber, ZVM124	$ 200	$ 149
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100 ea, DS/DD, 40 Track (IBM, H/P)	$ 239
1000 ea, DS/DD, 40 Track (IBM, H/P)	$1995
10 ea, DS/DD, 40 Track (IBM-PC Pre-formatted) NEW	$ 34
100 ea, DS/DD, 40 Track (IBM-PC Pre-formatted) NEW	$ 289
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CDC, 100 ea SS/DD, 40T (Apple, IBM)	$ 550	$ 195
10 ea SS/DD, 40T (Apple, IBM)	$ 55	$ 21
100 ea DS/DD, 40T (IBM, H/P)	$ 750	$ 295
10 ea DS/DD, 40T (IBM, H/P)	$ 75	$ 32
DYSAN, 10 ea SS/DD (Apple, etc.)	$ 40	$ 27
10 ea DS/DD 48T (IBM, H/P, etc.)	$ 69	$ 35
MAXELL, 10 each, MD1, SS/DD	$ 55	$ 24
10 each, MD2, DS/DD	$ 75	$ 37

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100 ea., SS/SD, 35 Track (Apple, Atari)	$ 415	$ 130
1000 ea., SS/SD, 35 Track (Apple, Atari)	$4150	$ 995
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1000 ea., DS/DD, 48TPI (IBM, H/P)	$6260	$1400

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	MegaPlus Products			Call
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	SixPakPlus, 256K, S/P/CC+S/W		$ 695	$ 495
	SixPakPlus, 384K, S/P/CC+S/W		$ 895	$ 595
	Game Port for SixPak		$ 50	$ 39
	I/O Plus II, S/P/CC		$ 215	$ 150
	I/O Plus II, S/P/CC/G		$ 265	$ 185
	I/O Plus II, 2S/P/CC/G		$ 315	$ 215
	MonoGraphPlus™ P/CC (for Lotus)		$ 495	$ 375
	PCNet, Starter Kit, PC002			$1095
	PCNet, Circuit Board, PC001			$495
★**CCS**	SuperVision, 132 col., mono. board		$ 799	$ 399
	Graphics Adapter for Supervision		$ 250	$ 99
Chalkboard,	Power Pad (Requires Kit)		$ 100	$ 73
	Chalkboard Starter Kit		$ 50	$ 34
★**ComX**	EconoRAM™ 256K RAM Card w/Fastrak™ RAM disk emulator and spooler software.		$ 495	$ 325
CURTIS	UNI-I, Monitor tilt & swivel base		$ 50	$ 39
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	8087 Math Pak	NEW	$ 295	$ 245
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Key Tronic,	KB5150, Std. keyboard		$ 209	$ 159
	KB5151, Std. keyboard	NEW	$ 255	$ 199
	KB5151 jr, keyboard	NEW	$ 255	$ 199
Koala	Koala Pad™ w/PC Design		$ 150	$ 89
	Programmer's Guide		$ 15	$ 14
MAYNARD SANDSTAR SERIES	Multifunction (6) Card, MFC		$ 89	$ 79
	Memory Card no RAM		$ 199	$ 169
	Memory Card 256K		$ 495	$ 395
	HardDisk I/F Module (HDM)		$ 499	$ 399
	HardDisk Cable		$ 30	$ 27
	Para Port Module (PPM)		$ 59	$ 49
	Serial Port Module (SPM)		$ 95	$ 79
	Clock Cal. Module (CCM)		$ 55	$ 48
	Game Adapter Module (GPM)		$ 49	$ 43
	Memory Module "0"K (MMO)		$ 122	$ 99
	Memory Module 256K (MM256)		$ 422	$ 357

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MICROSOFT	SystemCard 256K		$ 625	$ 450
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MAGNUM	PC MasterCard™, 1,536K, Multifunction S/P/G/CC with SofRAM™ software which provides printer spooler, RAM disk & many other functions		$4995	$3950
PLANTRONICS	Color Board & Colormagic, 16 color, w/Para		$ 559	$ 395
	Color Board & Draftsman, 16 color, w/Para		$ 559	$ 395
PARADISE,	MultiDisplay Card	NEW	$ 595	$ 435
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	Quadboard, no RAM, expand to 384K		$ 295	$ 215
	Quadboard 64K, expand to 384K, S/P/CC		$ 395	$ 265
	Quadboard 256K, expand to 384K, S/P/CC		$ 675	$ 525
	★ Quadboard, 384K, S/P/CC		$ 795	$ 625
	Quadboard II, no RAM, expand to 256K		$ 295	$ 215
	Quadboard II, 64K expand to 256K, 2S/CC		$ 395	$ 265
	Quadboard II, 256K, 2S/CC		$ 595	$ 395
	Quad 512 + 64K plus serial port		$ 325	$ 265
	Quad 512 + 256K plus serial port		$ 550	$ 420
	Quad 512 + 512K plus serial port		$ 895	$ 625
	Quadcolor I, board, 16 colors		$ 295	$ 215
	★ Upgrade Quadcolor I to II kit		$ 275	$ 199
	Quadvue, board, Mono/S/P/CC			Call
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	Quadchrome II, 14" RGB Color	NEW	$ 650	$ 450
	Amberchrome, 12" Amber	NEW	$ 250	$ 165
	Quad 3278	NEW	$1195	Call
	Quadnet VI	NEW		Call
	Quadnet IX	NEW		Call
Tecmar	Graphics Master		$ 695	$ 545
	1st MATE, 64K, S/P/CC		$ 389	$ 275
	1st MATE, 256K, S/P/CC		$ 589	$ 399
	Captain, 64K, S/P/CC		$ 424	$ 324
	Captain, 384K, S/P/CC		$ 795	$ 595
	Wave, 256K (short board)		$ 499	$ 369
	Bosun, S/P/CC (short brd.)		$ 195	$ 145
Titan	Accelerator PC (8086 + 128K)		$ 995	$ 750
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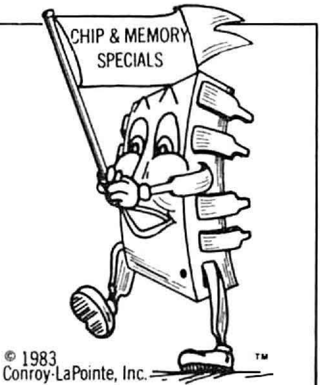

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6MB Fixed	NEW	$1995	$1495
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ATI, Training Programs—Wide line in stock		$ 75	$ 50
★ **BRODERBUND,** Bank Street Writer		$ 80	$ 56
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CHANG LABS, Micro Plan		$ 495	$ 335
★ **CONTINENTAL,** Tax Advantage		$ 70	$ 45
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FCM (Filing, Cataloging, Mailing)		$ 125	$ 79
Property Management		$ 495	$ 329
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Market Manager		$ 300	$ 195
Market Microscope		$ 349	$ 289
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NW ANALYTICAL, Statpak	NEW	$ 495	$ 345
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PFS:Report		$ 125	$ 79
PFS:Write		$ 140	$ 89
PFS:Graph		$ 140	$ 89
SORCIM, SuperCalc 2		$ 295	$ 195
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Pascal/MT+ (PCDOS)		$ 600	$ 399
PL/1 (PCDOS or CP/M-86, each)		$ 750	$ 499
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DR LOGO-86 (CP/M86)		$ 100	$ 69
FUNK SOFTWARE, Sideways	NEW	$ 60	$ 40
HAYES, Smartcom II (Data Com.)		$ 149	$ 109
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MICROSOFT, muMath/muSimp		$ 300	$ 199
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Pascal Compiler		$ 300	$ 199
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COBOL Compiler		$ 700	$ 469
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MICROSOFT, Flight Simulator II		$ 50	$ 33
MONOGRAM, Dollars & Sense		$ 165	$ 110
ORIGIN, Ultima III		$ 60	$ 40
PBL CORP., Personal Investor		$ 145	$ 99
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SPINNAKER, Snooper Troops (1 or 2)		$ 45	$ 35
Story Machine or Face Maker		$ 35	$ 24
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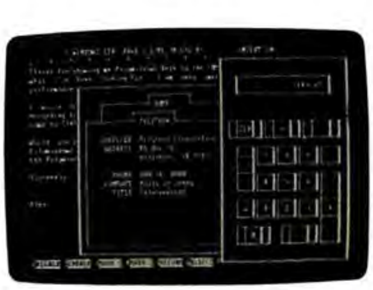

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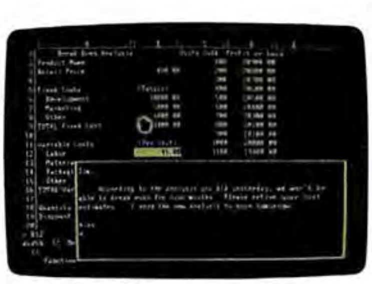

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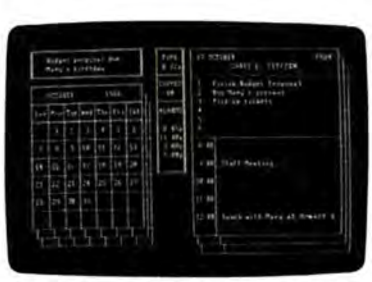

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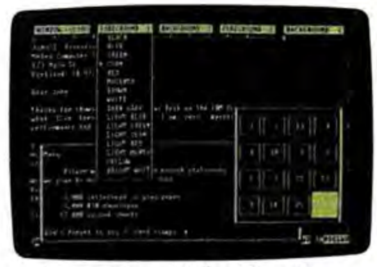

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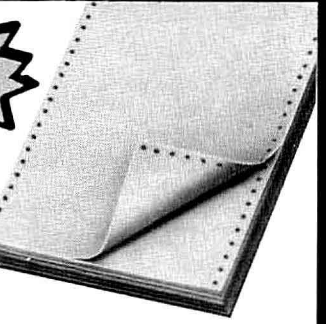

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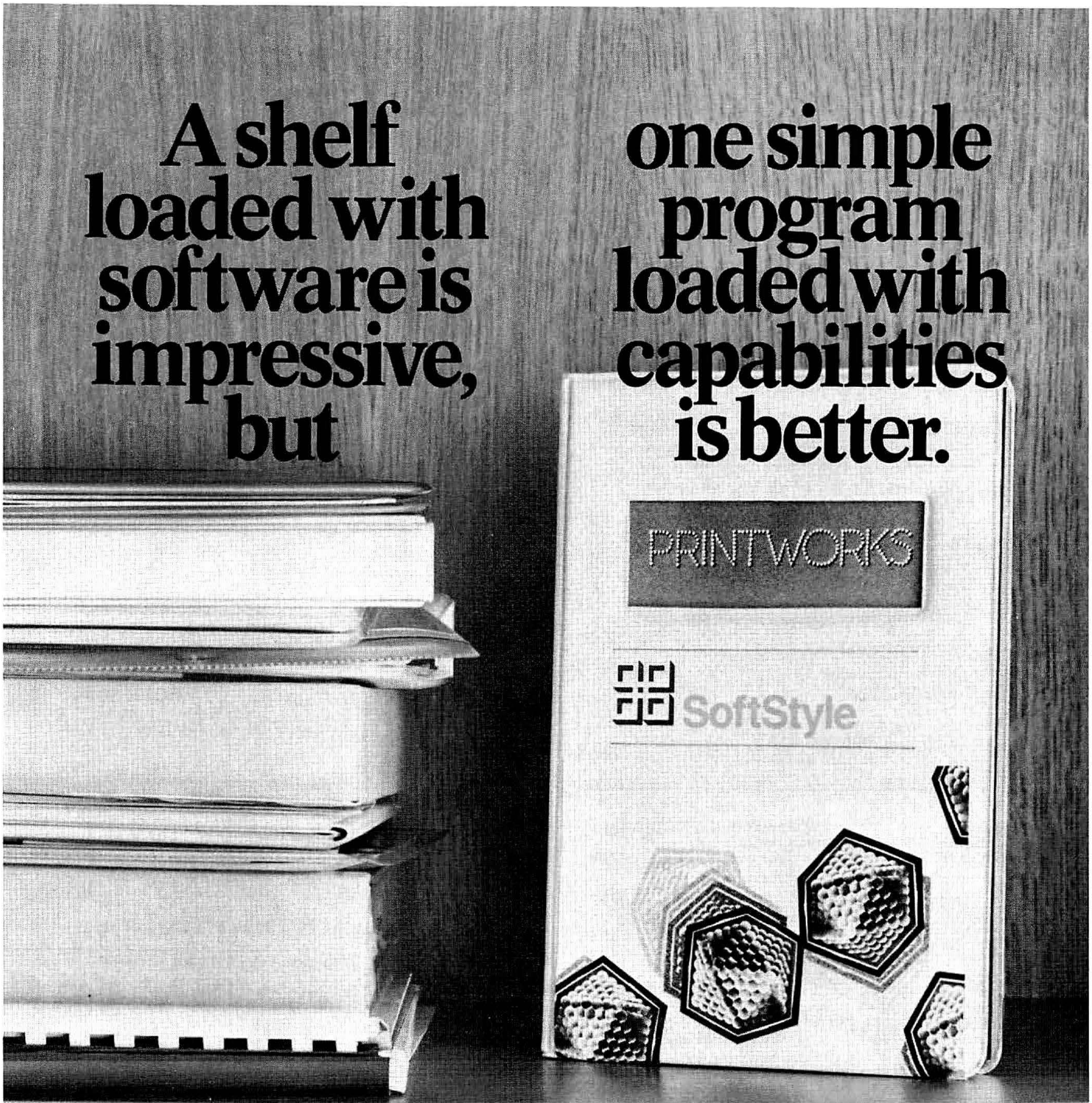
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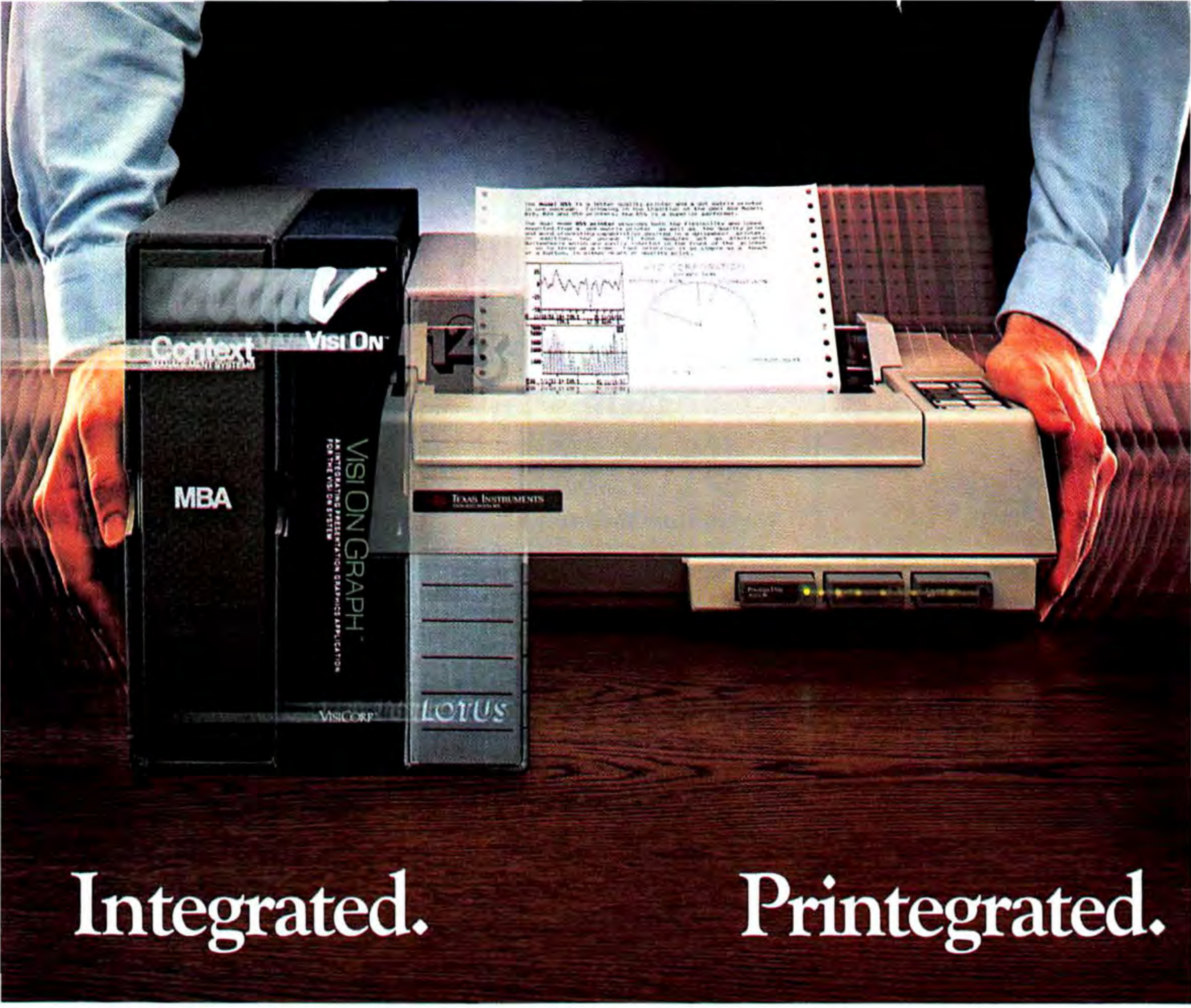

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Follow the Yellow Brick Road

Oz is a wizard of a financial modeling package that helps you analyze budgets, create organization charts, and keep track of where your business is going.

Andrew T. Williams

One of the most difficult problems facing businesses is knowing exactly what is going on soon enough to correct mistakes and capitalize on opportunities. Adam Osborne's computer company, for example, thought it was swimming in profits when, in fact, it was drowning in red ink. Mistakes of this magnitude occur because the timely monitoring of the financial health of even a relatively small business—let alone a multimillion-dollar company—is a time-consuming and difficult task.

Until recently the only computer software capable of gauging the financial performance of all but the simplest organizations were decision support systems running on mainframe computers. Now a management control system called *Oz* places sophisticated financial planning techniques within the reach of owners, executives, and managers of organizations of all sizes. *Oz* provides management control by recording information about a company's past performance, current budgets, and most recent forecast and then analyzing this information in a variety of ways to determine exactly how the business is doing.

Off to See the Wizard

Oz is constructed around two familiar concepts: the line item budget and the organization chart. Line items define the categories by which an organization measures its performance: for instance, total payroll or net income. An organization chart pinpoints responsibilities by defining the relationships between organizational units.

Oz is a menu-driven program. The left side of the main menu lists various actions (see Figure 1). The Modify action allows you to supply data. The Update action creates permanent data files and frees disk space by clearing current journal entries. The Consolidate action calculates line items for divisions higher in the organization chart.

You can analyze your organization with the Analyze, Graph, and Report actions. The Analyze action lets you view any combination of data sets and calculate the variance between any two of them. The Graph and Report actions are libraries of previously specified graphs and reports ready to be viewed or printed. Specifying line items and constructing an organization chart are accomplished using the Housekeeping action.

The right side of the main menu lists the five data types that can be supplied for each line item. Actuals contain current year-to-date figures. Budget and Forecast contain the budget for the current year and the latest forecast from the current month to the end of the current year. The two remaining data categories, Next Year and Last Year, contain historical data and projections for the future.

The first task in implementing an *Oz* system is to specify line items. Figure 2 shows the Lines Files screen for the sample company, SOFTCO. Typical line items are number of employees, salaries, rent, supplies, revenues, and net income. Some line items, such as number of employees, contain data, while others, such as net income, are computed by formulas you specify (for example, REV − EXP, or revenue minus expenses). *Oz* allows up to 149 line items for each organization.

One of *Oz*'s strengths is that it allows you to construct the lines files to parallel the line items already in use in your accounting system. If you use existing data from another program, chances are that *Oz*'s excellent translation facility can import the line items for you. The program can translate *VisiCalc*, *1-2-3*, *Symphony*, *dBASE II*, and other popular file formats into *Oz* data files.

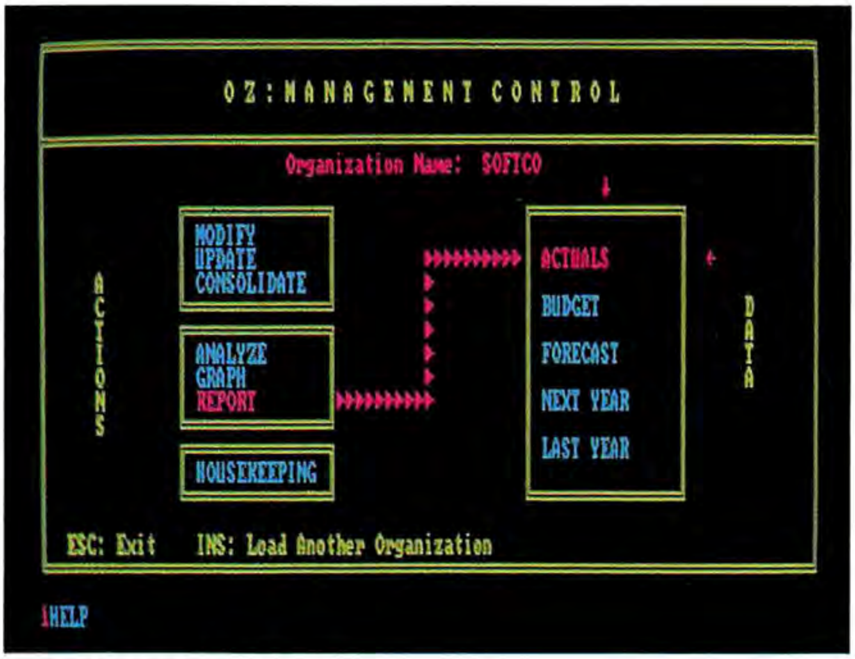
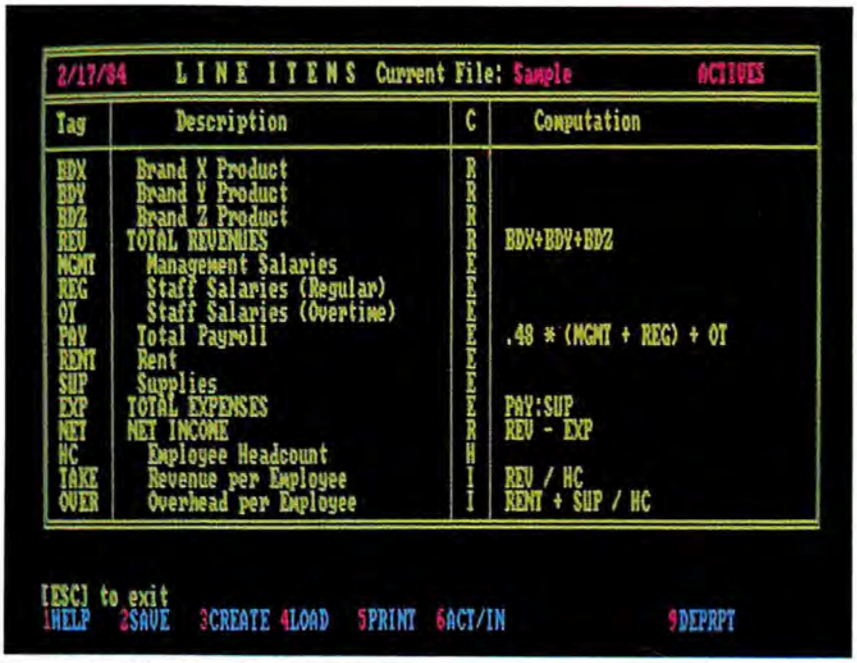


Figure 1: The Oz main menu. On the left are the actions you can perform with Oz. The box on the right lists the data sets you can work with.



```
2/17/84    LINE ITEMS  Current File: Sample              ACTIVES
Tag    Description                      C    Computation
BDX      Brand X Product                R
BDY      Brand Y Product                R
BDZ      Brand Z Product                R
REV     TOTAL REVENUES                  R    BDX+BDY+BDZ
MGMT      Management Salaries           E
REG       Staff Salaries (Regular)      E
OT        Staff Salaries (Overtime)     E
PAY      Total Payroll                  E    .48 * (MGMT + REG) + OT
RENT     Rent                           E
SUP      Supplies                       E
EXP     TOTAL EXPENSES                  E    PAY:SUP
NET     NET INCOME                      R    REV - EXP
HC        Employee Headcount            H
TAKE      Revenue per Employee          I    REV / HC
OVER      Overhead per Employee         I    RENT + SUP / HC

[ESC] to exit
1HELP  2SAVE  3CREATE 4LOAD  5PRINT  6ACT/IN                  9DEPRPT
```

Figure 2: The Lines Files screen for SOFTCO. The screen lists the values and computations that measure the company's financial performance.

Once the line items have been specified, the next task is to define the organization chart (see Figure 3). You can place up to 50 boxes and eight levels on an organization chart–room enough to describe even a large multinational corporation.

The Emerald City

The heart of *Oz* is the Analyze action, which enables you to compare data sets side by side (Budget and Actual, for example), analyze the differences between two data sets to expose variances, and focus on key months, divisions, or line items. You can use a single key to explode a line item to show the detail behind the item. For example, you could explode Revenue to show the revenue from different product lines.

Oz presents information "three-dimensionally" so you can "turn" an analysis screen to view the data from different perspectives. For example, Figure 4 shows budgeted revenue and expenses for SOFTCO. By pressing the <F2> key you can turn to a more detailed view broken down into divisions. By pressing Q you can also have the information displayed in a quarterly rather than monthly breakdown (see Figure 5).

To view a graph, select the rows and columns to include from the Analysis screen and press <F9>. A graph attributes box appears. After making the format choices, press <Enter> to display the graph (see Figure 6).

Oz can display and save eight different graph types, including pie, bar, percentage bar, horizontal bar, and line graphs. The graphs can be printed directly

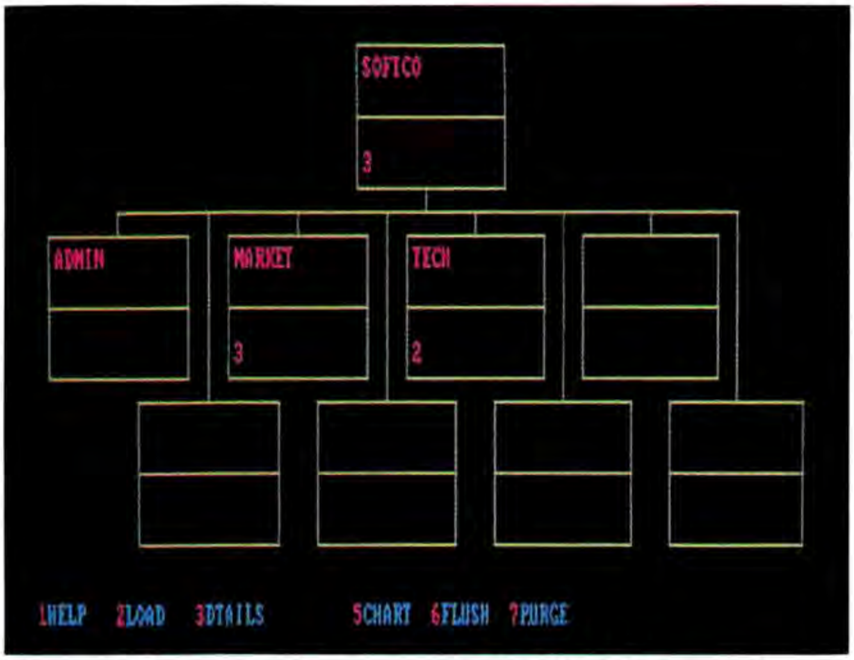
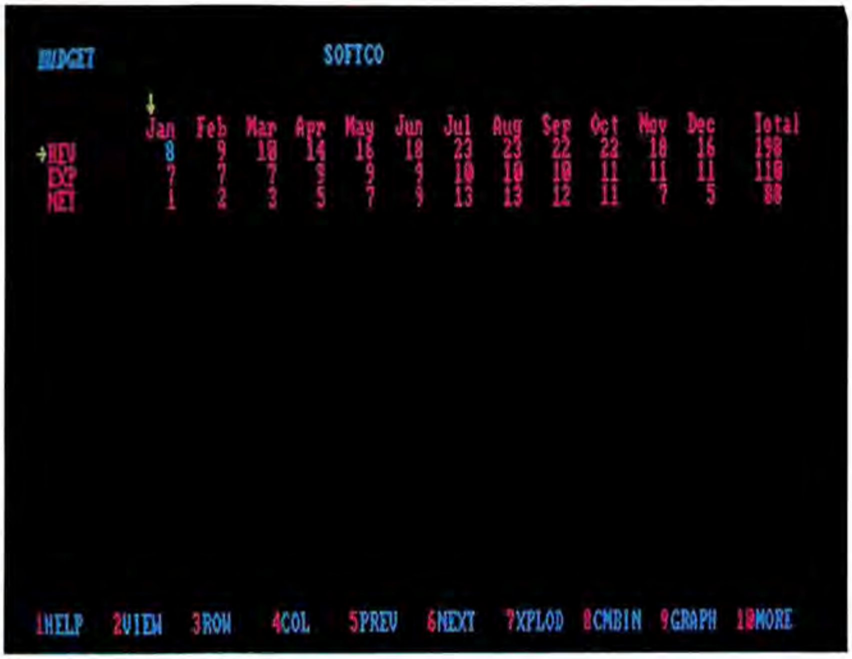


Figure 3: The organization chart for SOFTCO. The chart shows the interrelationships between a company's departments. To see the departments underneath 'MARKET', move the cursor to that box and press the <CursorDown> key.



```
BUDGET                         SOFTCO

               Jan  Feb  Mar  Apr  May  Jun  Jul  Aug  Sep  Oct  Nov  Dec   Total
→REV             8    9   10   14   16   18   23   23   22   22   18   16    198
 EXP             7    7    7    9    9    9   10   10   10   11   11   11    110
 NET             1    2    3    5    7    9   13   13   12   11    7    5     88

1HELP  2VIEW  3ROW  4COL  5PREV  6NEXT  7XPLOD  8CMBIN  9GRAPH  10MORE
```

Figure 4: An Analysis screen showing budgeted revenues and expenses for SOFTCO. The Analysis action allows you to look at data from different perspectives.

from the screen by pressing <PrtSc> or, if you have a plotter, plotted with the P key.

Ask the Wizard

To use a management control system properly, you must continually update the actual and forecast data sets. Actual performance is measured each month, and the forecast for the remainder of the budget period is modified each month. These updates typically result in variances from the initial budget.

Understanding these variances is the key to management control–the reason for a variance often suggests the appropriate response to it. An opportunity to obtain raw materials at a favorable price, for example, can mean a large expenditure that reduces the current month's net income but results in larger profits in the future. That's a good reason for a variance. On the other hand, an unexpected price increase that results in a variance of the same size is cause for concern and would require a completely different response.

To discover the reason behind any number of variances, you simply use the Explain function. The Explain function doesn't involve analysis; it displays the reasons you entered when making a change. Despite its simplicity, the Explain function is one of *Oz*'s most important features. Without the reminder provided by Explain, it is easy to lose track of the specific reasons for adjusting a budget item. It is particularly difficult to see how a change works its way through the interrelationships among line items. The Explain feature automatically keeps track of the reasons and the interrelationships and displays them when you ask.

Once you have set up *Oz* to monitor your business, you enter each month's actual figures and, if necessary, revise the forecast until the end of the year. You then use the Graph and Report actions to view the library of graphs and reports you had previously defined. You can print any reports or graphs you require for memos, meetings, or distribution to other organization members. If you need additional information, you can use the Analyze action to seek the answers to your questions.

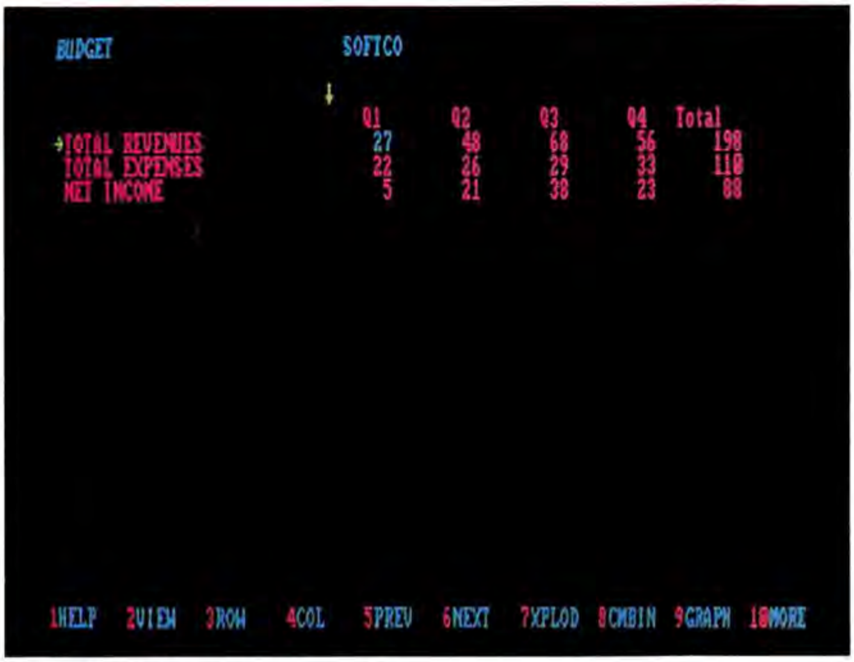
> *One function allows you to translate amounts between different currencies automatically. Another feature controls user access to different levels of the system through user-selected passwords.*

Glenda the Good

Oz is a powerful tool for monitoring the financial performance of organizations. The menus are clear and easy to use, and help is always attainable by pressing the <F1> key. Depending upon the topic you are asking about, you can get up to five screens of help. Help screens often appear in the same format as the screen to which they apply, so the information they present is easier to understand.

Oz makes extensive use of the function keys, but except for Help, which is always <F1>, the assignments change from screen to screen. The current function key assignments are displayed across the bottom of the screen (see the bottom of Figures 2 and 3), and the help key is available for a detailed explanation of the screen.

Oz has a number of features to simplify the management control of large business enterprises. One function allows you to translate amounts between different currencies automatically. Another feature controls user access to different levels of the system. This is accomplished through user-selected passwords that provide up to six levels of security. Thus, an entire organization can be monitored in a single *Oz* system, but an individual's access can be limited to those levels of the organization for which he or she is responsible.



```
BUDGET                    SOFTCO
                         ↓
                            Q1     Q2     Q3     Q4  Total
→TOTAL REVENUES             27     48     68     56    198
 TOTAL EXPENSES             22     26     29     33    110
 NET INCOME                  5     21     38     23     88






1HELP 2VIEW 3ROW 4COL 5PREV 6NEXT 7XPLOD 8CMBIN 9GRAPH 10MORE
```

Figure 5: Budgeted revenues and expenses for SOFTCO, broken down into quarters. Pressing <F2> "turns" the data to display another view. Pressing Q translates the data into quarters.

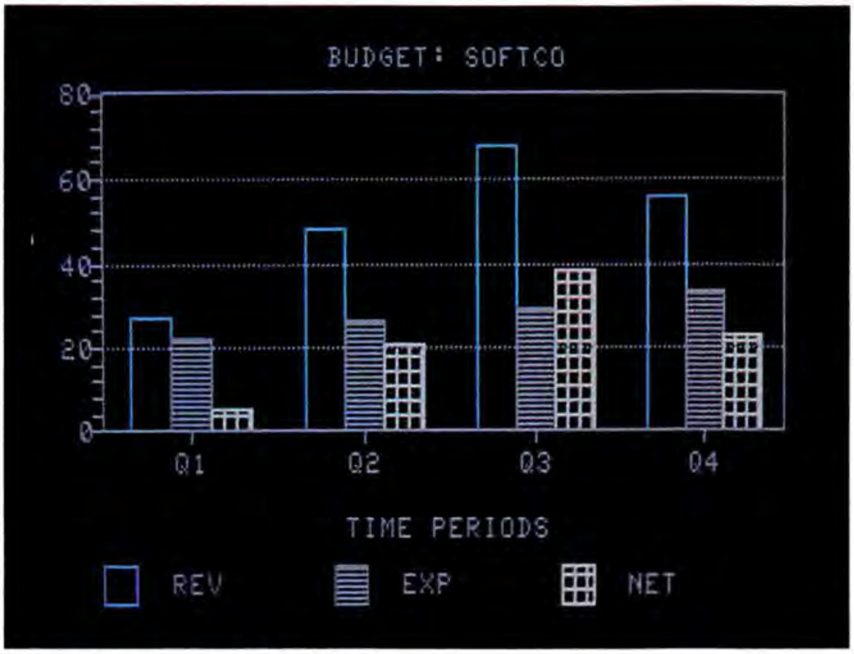


Figure 6: A graph of SOFTCO's budgeted revenue and expenses by quarter. Oz provides a variety of graph types.

The Wicked Witch of the West

Oz wouldn't be Oz without a nasty lady on a broomstick to make it tough on the kid from Kansas. The most serious trap for the unsuspecting consumer is the publisher's failure to include a tutorial with the program. An excellent sample program shows off the package's features, and the *Read Me First* pamphlet takes you through the example, but after this introduction you may still not be prepared to adapt *Oz* to your own business. Except for a brief, oversimplified statement on the last page of the *Read Me First* book, nowhere in the 292-page manual or supporting documents can you find a description of the steps involved in setting up your own management control system.

Oz also has a Wicked Witch who occasionally drops a house on you. If you try to graph data without specifying the row and the column containing the data, *Oz* displays the message 'NO DATA VALUE EXISTS' and crashes. Sometimes you get a 'STACK OVERFLOW' message and the DOS prompt. At other times the system freezes for no apparent reason, and you have to turn off the computer and restart the program.

When you look in the manual for the explanation of an error, you can't find it because neither the table of contents nor the index lists *error messages* as an entry. A system error shouldn't occur under normal circumstances, but there should be a section in the manual that explains any error messages you might receive if one does.

Oz requires a hard disk to operate optimally. Potential buyers of the program should be aware of this additional expense. The program can be run on a floppy disk system (two double-sided drives), but this requires a fair amount of disk switching, and almost every action results in delays while *Oz* reads some additional program code. Storing the program and the data files on a hard disk reduces the need to switch disks and allows *Oz* to run significantly faster.

Oz is potentially a useful management tool. At the very least, it forces you to take a systematic approach to monitoring your organization's performance. If you have the persistence to figure out how to use the program despite the lack of a tutorial, you will have at your command a wealth of features for making management control a reality.

Andrew T. Williams is a Contributing Editor for PC World. *His latest books are* What If . . . A User's Guide to Spreadsheets on the IBM PC *and* 1-2-3 From A to Z.

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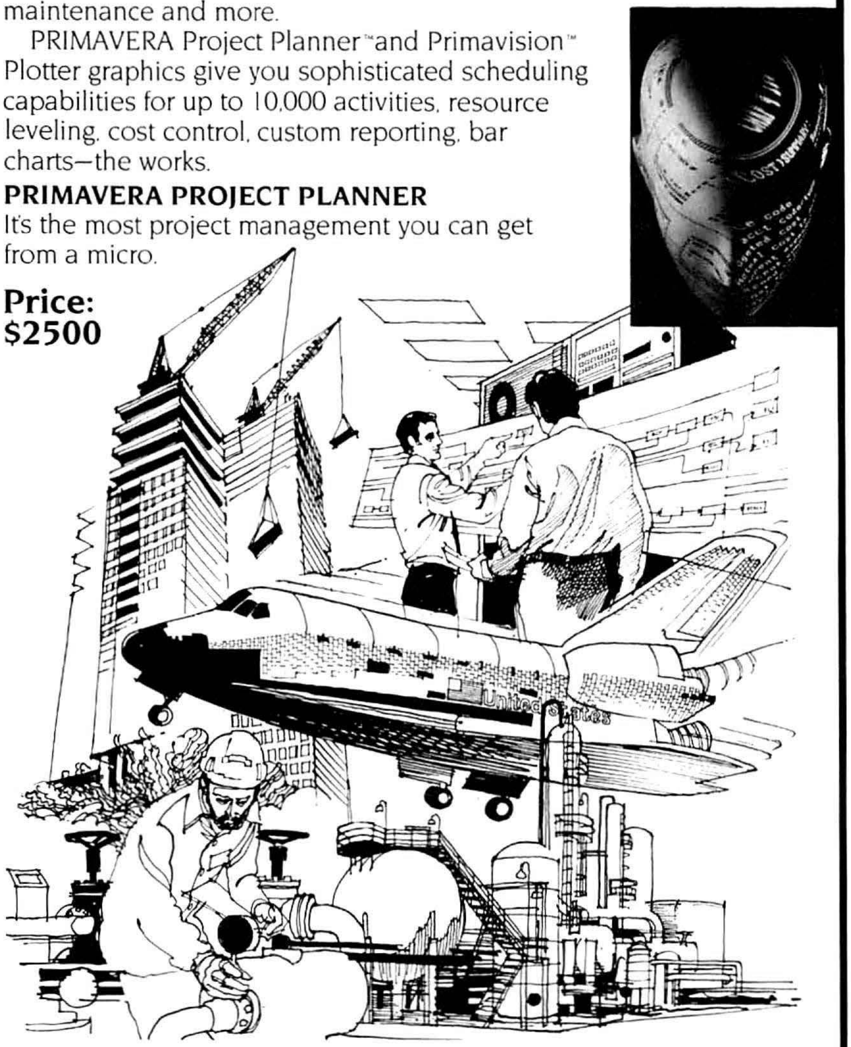

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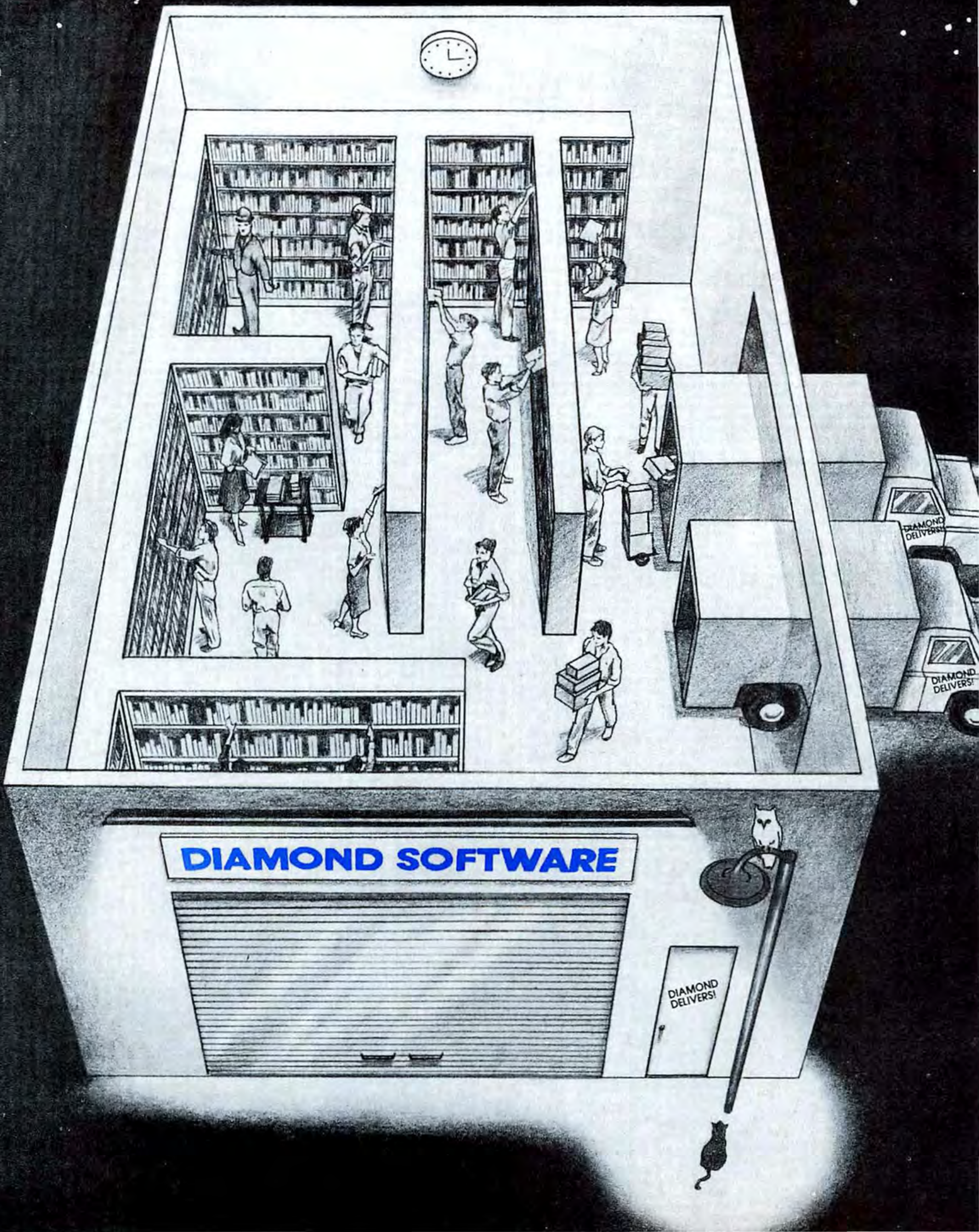

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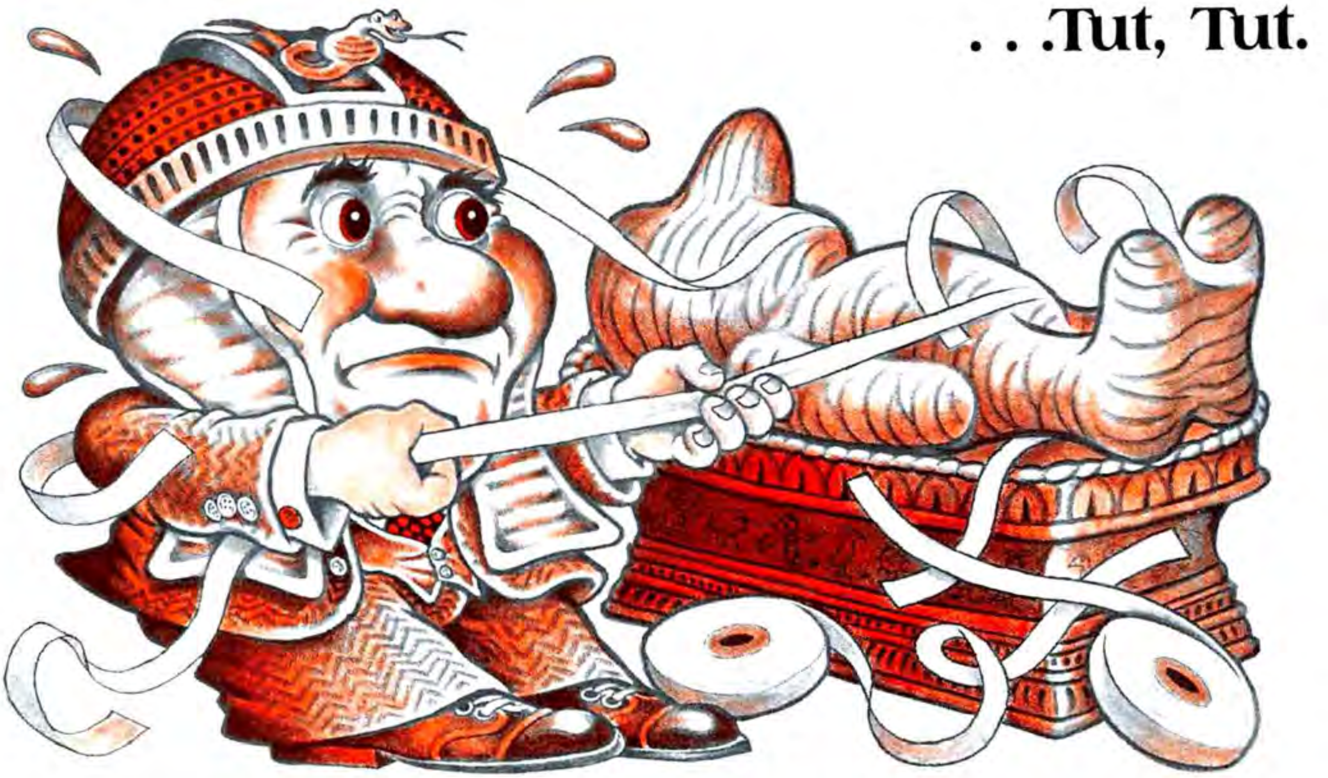

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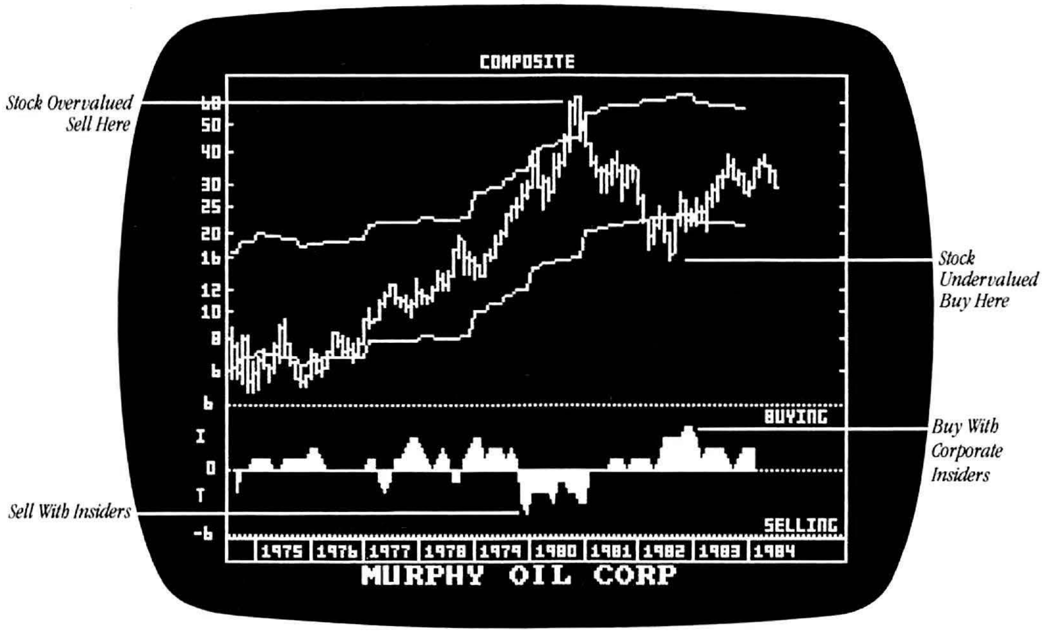

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Break
9
PgUp
6
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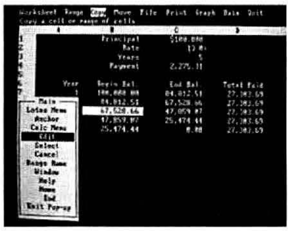

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Circle 122 on reader service card

The PC's Space Program

Need more disk space? A utility program called Spacemaker takes the "air" out of program files unobtrusively and efficiently.

Gene Plantz

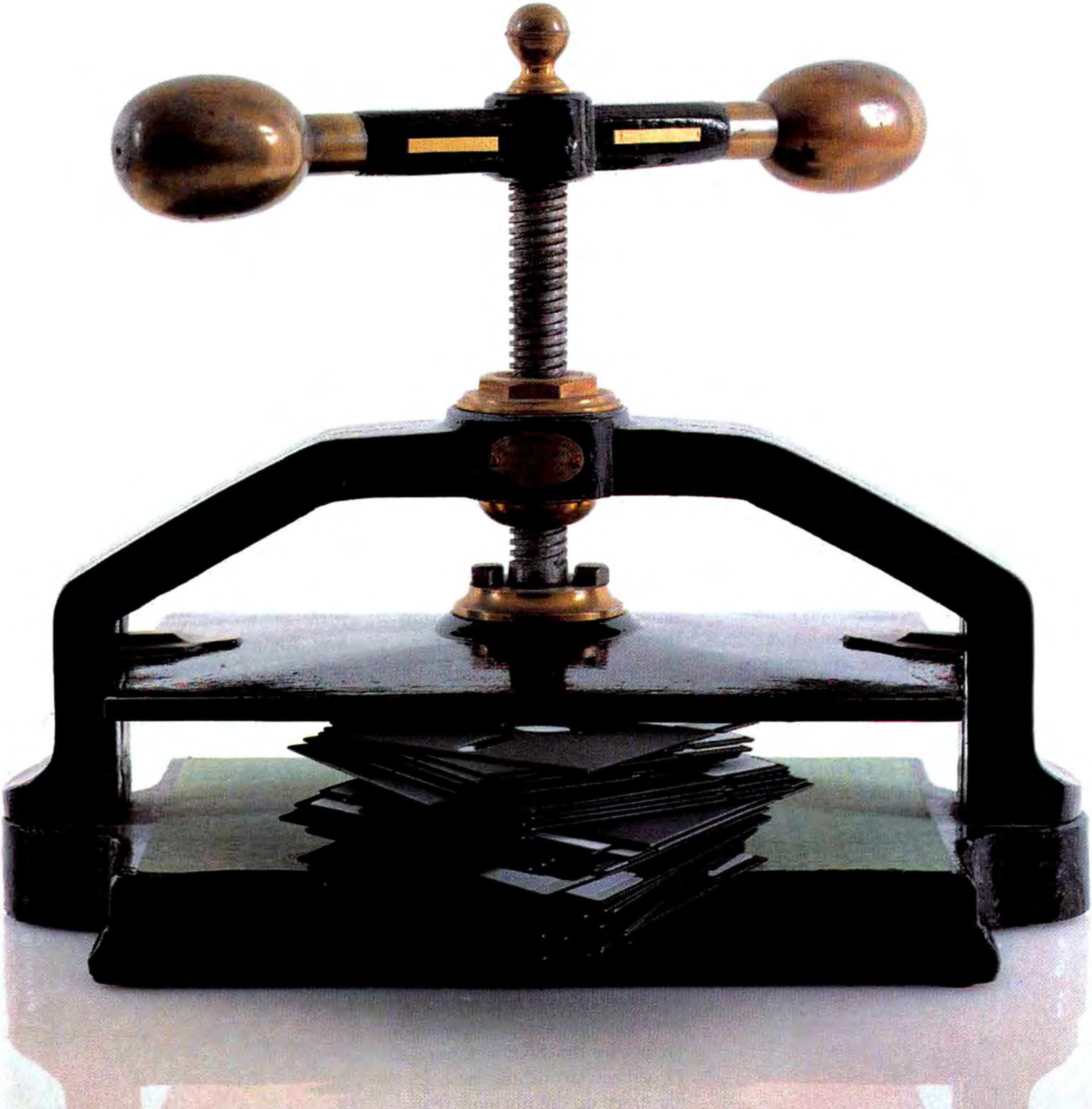
I've often wanted just a bit more room on a start-up floppy disk to store more of my favorite programs. Before I installed my hard disk, I attempted to transfer the utilities that I used most frequently to my start-up disk. Invariably I'd need a tad more room. By not placing the desired utilities on that basic disk, I wasted time swapping disks when I needed a stray utility program.

This cumbersome process is no longer necessary. *Spacemaker,* from Realia, lets you compress the .COM and .EXE files of your favorite programs to conserve space on the disk. After the files are compressed, you can run the programs as you normally would.

Spacemaker is designed not for novices but for active PC users who have more floppies–and less free space–than they'd like. Programming expertise can help you make the most of the utility, but it is not essential. The program works on just about any .COM or .EXE file that can be executed from the DOS prompt. Application programs, of course, require at least one of the two files to function.

> Spacemaker *is designed for active PC users who have more floppies–and less free space–than they'd like.*

Spacemaker can also convert .EXE files to .COM files if the compressed version takes up less than 64K. The advantage of doing so is that loading and directory searches are generally faster for .COM files than for .EXE files. To make the conversion from .EXE to .COM files, you use *Spacemaker* as you would the DOS utility EXE2BIN (which performs a function similar to *Spacemaker*'s but, unlike *Spacemaker,* alters the file's logical format. (.COM files are understood by the computer at its most basic level and thus differ from files written in source code, which is far more accessible. The computer always loads .COM files into a specific location in memory. .EXE files, which can be loaded anywhere in RAM depending on how memory is used, are capable of supporting bigger programs. Functionally the two are the same; the difference is in how DOS handles them.)



Other file compression programs are on the market, but none allows you to leave the program compressed and still use it; most file compression programs require that you reconstitute the program before running it.

How the Program Works

Spacemaker reads your .COM and .EXE files, then produces fresh .COM or .EXE files that retain the original files' information. The program compresses binary zeros as it reformats the file. The result is a smaller file that is equivalent in every way to the original program file except that superfluous disk space has been eliminated.

The *Spacemaker* process actually adds code to the beginning of a program file. This code is called the "loader." It reconstructs the program file in memory to its precompression form. This loader routine uses little space and is hardly noticeable when the program is running. The routine is designed to work when the program is loaded under DOS (via COMMAND.COM). This means that virtually any program you initiate from the DOS command prompt is a candidate for compression.

You start *Spacemaker* by providing the program with file specifications, such as the names of the input and output files. If anything is missing the program will ask you for the necessary information. To compress a program, you simply give the command **SM** *infile outfile*, with *infile* representing the name of the input file and *outfile* representing the name of the output file.

You must use a different name for the output file than you've used for the input file. *Spacemaker* does not alter the input file in any way. Under the program's default settings, .EXE files are input and .COM files are output.

Space to Spare

The program's results are noteworthy. When I ran *Spacemaker* with the PC-DOS LINK program, I recorded a 22 percent saving in disk space–about 10K–upon completion of compression. The program file now requires less disk space than it formerly did, and being smaller, it also loads faster than before compression. I've used the compressed LINK program for four months without a hitch.

Although *Spacemaker* is best suited to help you get the most from floppies, it also enables hard disk users to store more files and reduce program load time. My hard disk, for instance, contains roughly 700 files. Using *Spacemaker*, I compressed 17 .COM files and 25 .EXE files. The .COM files used an average of 8 percent less space following compression; savings for the .EXE files averaged 15 percent. Crunching these 42 files freed up slightly more than 500K.

Ironically, some files grew slightly after compression. My bulletin board programs, written in Compiled BASIC, were larger following compression. If the program code doesn't contain many groups of binary zeros, there won't be much to compress. Unfortunately, there is no way to tell in advance whether a file will benefit from the compression process. Other Compiled BASIC programs have realized significant space savings from *Spacemaker*'s efforts.

To Compress or Not to Compress

As these examples suggest, *Spacemaker* is easy to use and the results can be impressive. The only difficulty is in determining what you can and cannot compress.

A few programs that start from the DOS prompt–including the word processing program *Multimate*–did not run after compression. And compression will prevent some .COM files from running, including *1-2-3* utilities like FILEMGR.COM. But of the hundreds of programs that I compressed, only ten or so failed to run properly after compression by *Spacemaker.*

Discussions with the utility's author revealed that a problem could occur if a program's developers use a linker program other than the standard DOS LINK. The rule is, if a .COM or .EXE file is loaded by a program other than DOS, you should not attempt to compress it. If you do, you'll lock up your system, lose any new data, and need to reboot.

The documentation for *Spacemaker* includes sufficiently detailed explanations of what the program does and how it works. The manual is concise and particularly insightful for the technically inclined.

I found it interesting that the files that *Spacemaker* compresses are hard to debug. Conceivably, software developers could use the program as a copy-protection technique that avoids unconventional disk formats yet "hides" code from those who know how to use DOS's DEBUG feature to disassemble programs.

Overall, I found *Spacemaker* to be an effective means of getting more from less. Active PC users can, with minimal effort, save both space and time. ●

Gene Plantz is a Contributing Editor for PC World.

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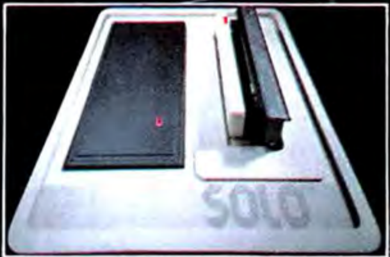

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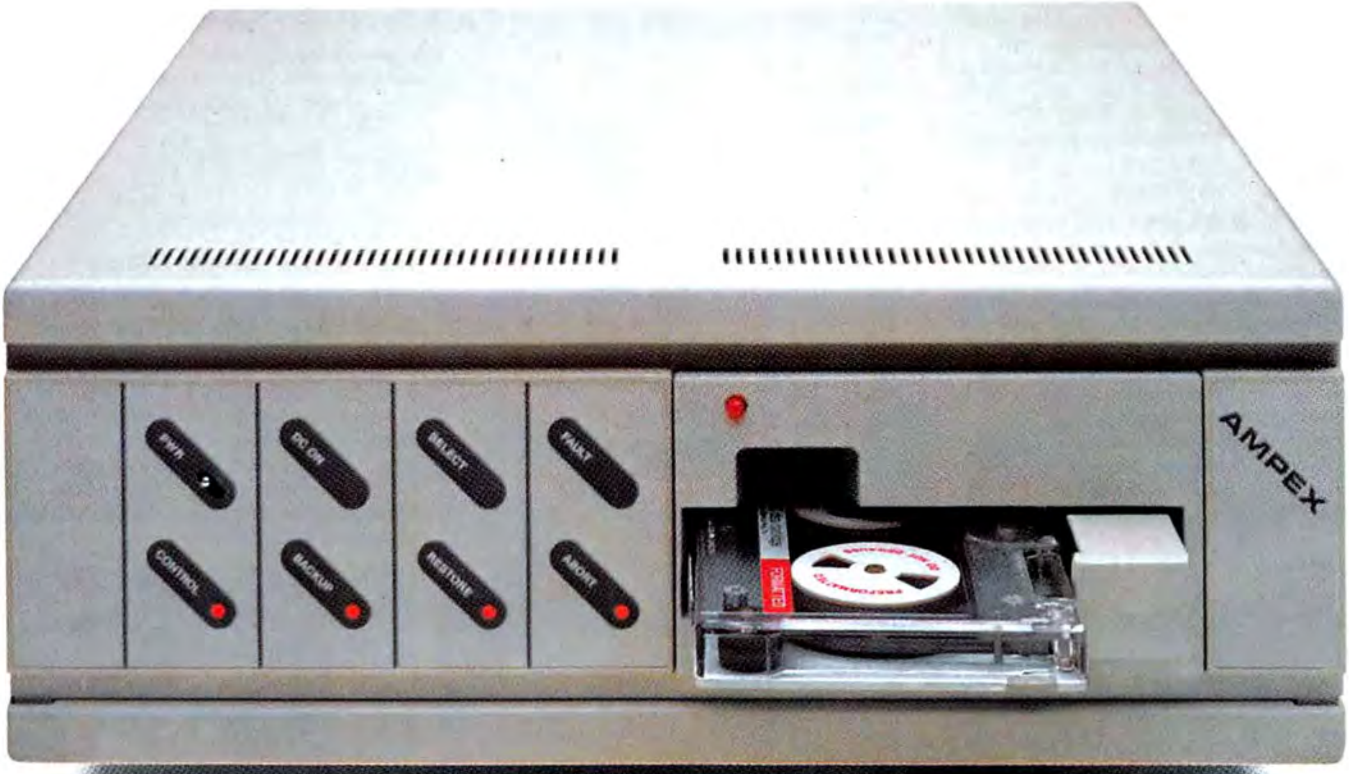

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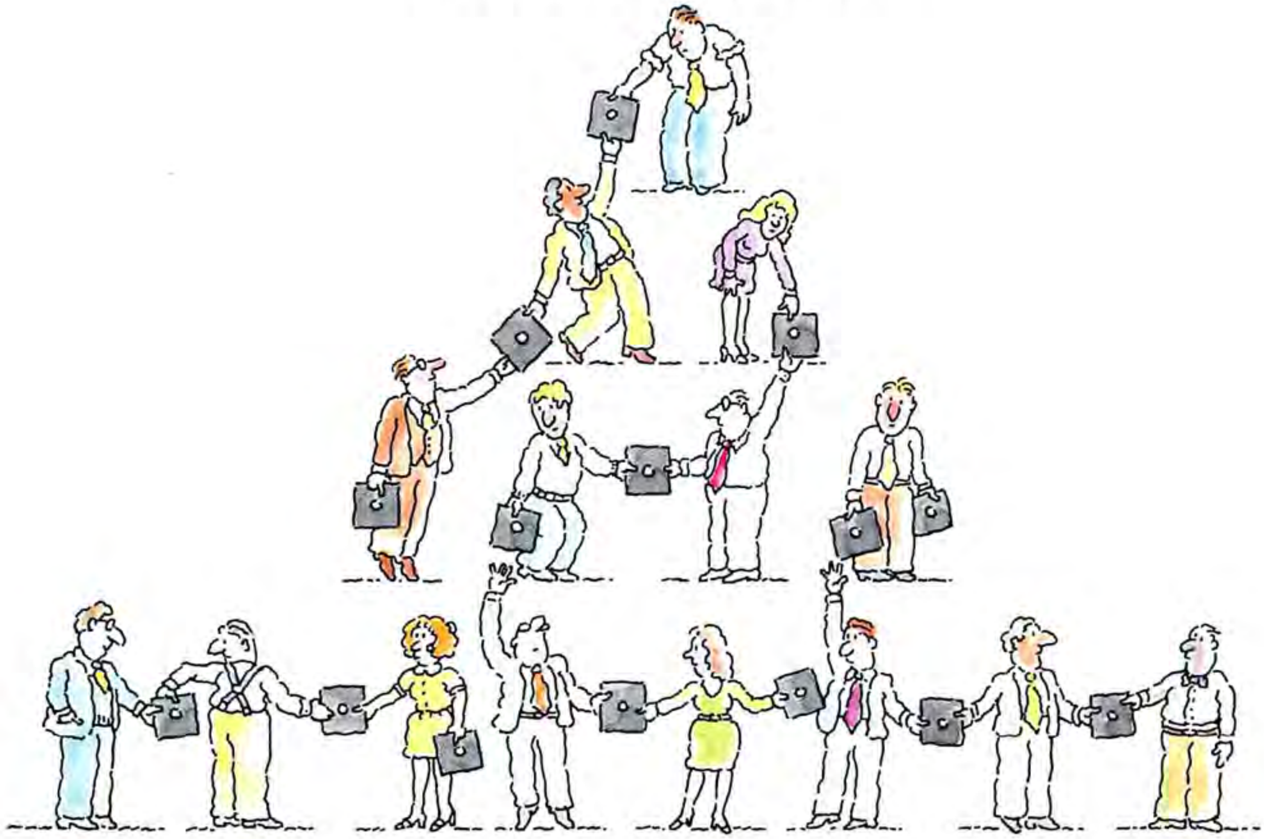

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Circle 278 on reader service card

From the Software Shelf

PC World editors offer first impressions of recent software releases

This month's software gems include new life for old versions of *WordStar,* the "bashing" of an Epson printer, a money-saving alternative to *WordStar,* and a program that transforms the PC into an intelligent, if ungainly, clock.

Edited by Robert Luhn

From the Software Shelf samples a small portion of the software flooding the PC market. These reviews, written by the staff of *PC World,* provide a brief glimpse of new word processors, spreadsheets, data base management programs, utilities, tutorials, and other products—including new additions to established software families—that might otherwise be overlooked. These impressions are not intended to take the place of full-length reviews of the products but rather to keep you informed of new products that we think will be of interest. *From the Software Shelf* examines programs for ease of use and installation as well as for the strong features or significant weaknesses of these contenders for software fame.

Printer Basher

When it comes to printing derring-do, I don't. I've tried to hide this sordid fact, but the truth is that I'm a timid printer user. I've never learned how to use any of the special control codes that change my humble Epson RX-80 into the dot matrix peer of Gutenberg's press.

Before you chide me for my timidity, consider my socioeconomic background. There certainly weren't any dox matrix printers around when I grew up. I wrote my school papers and, later, my first stories on an old Underwood typewriter the size of a 1949 Packard. It had, to say the least, a severely limited character set, and the letters were all the same size.

Now I am a devoted computer user. I write everything longer than two lines on my Compaq. But the resulting text is always printed out in regular pica characters, even though my Epson can print several character styles—elite, pica elite, italic—in several modes—compressed, condensed, or enlarged. The RX-80 can also print superscripts and subscripts and can nearly simulate letter quality printing with its double-strike feature. But using these options has always meant looking up and memorizing the appropriate control codes.

Luckily, *Printer Basher* from Connecticut Software came to my rescue. *Printer Basher* lets me take advantage of my printer's built-in features by just making a menu selection. Designed to work with the Epson MX-80, MX-100, FX-80, FX-100, RX-80, and RX-100 printers, *Printer Basher* lets me choose, set, and store on disk up to ten printer settings. Load *Printer Basher,* select one of the printer setting files, load a program such as *WordStar,* and issue a print command. *Printer Basher* does the rest.

The best way to learn about *Printer Basher*'s options is to print out BASHDEMO.EXE, which contains four pages of available print styles and special characters. Oddly, the manual doesn't discuss the special characters; it also lacks instructions for running *Printer Basher* with application programs. I hope Connecticut Software rewrites this user manual, because *Printer Basher* deserves better documentation.—*KS*

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WordStar Customizer

One reason for *WordStar*'s continued popularity is that it offers enough features to satisfy almost anyone's word processing needs. But many users complain that *WordStar* is inflexible when it comes time to change the program's default settings on everything from function keys to the help level. Of course, you can modify, or "patch," *WordStar* using dot commands and DEBUG or, if you have version 3.3, using *WordStar*'s less-than-simple Install program. But determining what to do and how to do it is a time-consuming process–unless you have *Customizer for WordStar.*

Customizer for WordStar, from Computer Hand Holding, quickly and easily transforms *WordStar* (versions 3.2 and 3.3) into a well-tailored program perfectly suited to your needs. With a menu selection you can patch over 40 *WordStar* defaults, including line spacing, justification, margins, tabs, default drive, word wrap, hyphen help, and many others. You can also use *Customizer for WordStar* to assign functions to the PC's function and numeric keys quickly.

This menu-driven program is so self-explanatory that its manual is almost unnecessary. The main menu lists the various *WordStar* patches. Choosing a menu selection displays a description of the patch and the number of the page in the *WordStar* manual where that particular feature and its default setting are explained. The program lets you choose one color for *WordStar*'s menu from the 16 color bars at the top of the screen and another color for text. My selection of green for the menu and amber for the text was so visually soothing that I've since abandoned my IBM monochrome display and now always use a color monitor for word processing.

Customizer for WordStar is especially valuable if you use *WordStar* for different applications. For example, if you write financial reports and business letters, each format requires different settings for margins, page lengths, line spacing, and so on. With *Customizer for WordStar,* it's a simple matter to set up a special copy of *WordStar* for each application.

The program's one fault is that it doesn't display the current patches you've made, but only *WordStar*'s standard defaults. Thus, if you decide to change a certain feature's default and realize that you've already patched it, hitting <Enter> to return to the main menu will erase the patch and replace it with the standard *WordStar* default. The only recourse is to exit the program, restart, guess what the patch was, and type it in. Though this scenario may occur infrequently, it's probably a good idea to record current patches in a file on the *WordStar* system disk.

In spite of this drawback, *Customizer for WordStar* is a useful utility program. If you have version 3.3 of *WordStar*, it's a convenience; if you have an older version, it's a necessity.–*KRC*

Customizer for WordStar
Computer Hand Holding
1800 Market St. #91
San Francisco, CA 94102
415/561-9189
List price: $49.95
Requirements: 96K, one disk drive

PC Write

There's a notion tucked away in our consumerist ids that associates money with superior quality. Conversely, we tend to assume that bargains really aren't worth very much.

Then along comes *PC Write* from Quicksoft, a "shareware" word processing program that stands these notions on their heads. A *PC Write* disk will set you back $10; a bound manual, $25. Or you can copy a *PC Write* disk (complete with a 75K documentation file) from someone for free. Legally.

Bob Wallace, developer of *PC Write* and a Microsoft alumnus, isn't merely trusting our better instincts; he's exhibiting confidence in the quality of his program. To quote his homespun user manual, "Shareware is like public television: free distribution of programming supported by people who find it valuable." For $10, you can hardly go wrong with *PC Write*, but don't be put off by its modest price tag: this is a serious, ambitious product.

PC Write is packed with intelligent, useful features, including some that mimic those found on dedicated word processing systems and on most of the popular word processors around. For text processing alone, *PC Write* may well be more versatile than *WordStar*–it's certainly more straightforward. Indeed, at first glance it seems as if Wallace sat around one afternoon reciting *WordStar*'s failings–particularly its use of cryptic control codes–and then set out to design a product that avoided them all. Even those *WordStar* attributes that Wallace retained have been improved; <Ctrl>-B, for example, not only reformats a block of text, it moves the cursor to the beginning of the next paragraph.

Invoking commands in *PC Write* doesn't require fingers nimble enough to play Rachmaninoff. The ten function keys are the real workhorses in this program; each key can perform a number of functions. For example, <F1> will exit a program, save files, rename files, or display a series of nine help screens, depending on where you are in the program. All function keys may be prefaced with <Ctrl>, <Alt>, or <Shift> to change what they do; function keys also work in conjunction with one another. However, if you've souped up your function keys with programs like *SmartKey* or *ProKey*, *PC Write* won't perform as Wallace intended.

Like most word processors, *PC Write* divides word processing into editing and printing. The editing component includes the usual retinue of functions: word wrap, search and replace, justification, block moves, block copying, and deleting. The program also features inverse video, use of color, windows, a repeat option for search and replace, and a variety of character fonts. *PC Write* is a what-you-see-is-what-you-get program, so the screen isn't littered with control characters. *PC Write* also permits multiple-line headers and footers and contains the necessary character codes for foreign language characters and other custom printing features.

PC Write is quite competent when it comes to manipulating text. Deleting, copying, or moving any amount of text is a matter of marking it and "painting" the text in inverse video with the cursor keys. Since *PC Write*'s replace and delete keys hold marked text in a buffer, you can undo the last action with the touch of a key. Text is also easily moved from an open file to any other existing file. Need to edit two files on the same screen? *PC Write*'s window feature splits the work space horizontally and permits scrolling and editing in both partitions.

PC Write contains a few other bells and whistles worth mentioning, including a feature that actually rings a bell when the cursor approaches the right margin—admittedly something of a frippery with word wrap. The program's status line includes two helpful counters that note remaining memory and where the cursor is, in terms of percent, in a document. *PC Write* even has a "go to page" feature, and <Alt>-9 will place the cursor on any specified line number.

PC Write executes commands very quickly, and file size appears to be no obstacle. For example, moving from the top to the bottom of an 18K file is instantaneous. On the down side, *PC Write* lacks utilities for copying a file, renaming a file, and so on. It's to Wallace's credit that even this key omission is compensated for, since you can exit a *PC Write* document, use the appropriate DOS utility, and then resume your word processing session where you left off. Note too that *PC Write* cannot read *WordStar* files, although *WordStar* accepts *PC Write* documents without modification.

For the word processing veteran, *PC Write* is a snap to learn. The manual is informal but clear and the help screens ample, so novices should also have little trouble getting the hang of the program. With *PC Write,* logic and simplicity prevail—to say nothing of economy.—*KG*

PC Write
Quicksoft
219 First N #224
Seattle, WA 98109
206/282-0452
List price: $10
Requirements: 128K, one disk drive

Timepiece, Version 3.1

The passage of time is relentless. If you are either fascinated or frustrated by this fact, you may be inclined to use *Timepiece.* This mostly fun and occasionally useful program not only turns a PC into a clock that ticks off the hours, minutes, and seconds but will, among other things, tell you the local time in Japan, sound an alarm when it's time for you to attend a meeting, or determine what day your birthday falls on in 2001.

Timepiece is, to my knowledge, unique among utility programs. The on-screen clock takes the form of a large digital watch or an analog clock with a face and hands (displaying the latter re-

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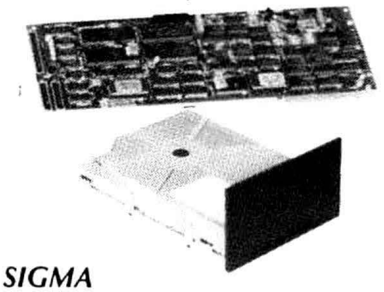

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quires a color graphics board). Appearing on the same screen as the clock are the date, the day of the week, and output from some of the program's more unusual functions. Among these are a Set Alarm function that allows you to set up to six consecutive alarms, an Alternate Time function that tells you the time in any part of the world, an Elapsed Time function that measures the time elapsed since any starting time that you choose, and a Set Countdown function that informs you when the time is up for any duration up to 100 hours. On a separate screen, the Set Calendar function displays a calendar for any month from 1760 AD through 2099 AD.

Timepiece is published by Software Publishing Corporation, the manufacturer of the *pfs:* family (including *pfs:write, pfs:file, pfs:report,* and others), a product line whose popularity is based on its "easy-to-use" reputation. It's no surprise then that *Timepiece* is simple to operate. On the other hand, *Timepiece* has a practical drawback: you can't copy it onto another program disk, so it cannot function in the background while you do something else on the PC. The manufacturer states that *Timepiece* will not work with a software integration program such as *DesQ,* although some of the *Timepiece* functions worked when tested with *WindowMaster,* a similar software integrator put out by Structured Systems Group.

Thus, if you work on your PC continually, you would be better off with an alarm wristwatch and a calendar. But if you have a real need for the combination of time and calendar functions that *Timepiece* offers, and you use your PC infrequently or, better yet, have an XT, you may enjoy this program and find it useful. Likely users might be companies that work with national and international clients or professionals, such as lawyers or consultants, who must keep track of services provided over the phone.

I had fun with *Timepiece* for the same reason I read maps or study a globe–I like to fantasize

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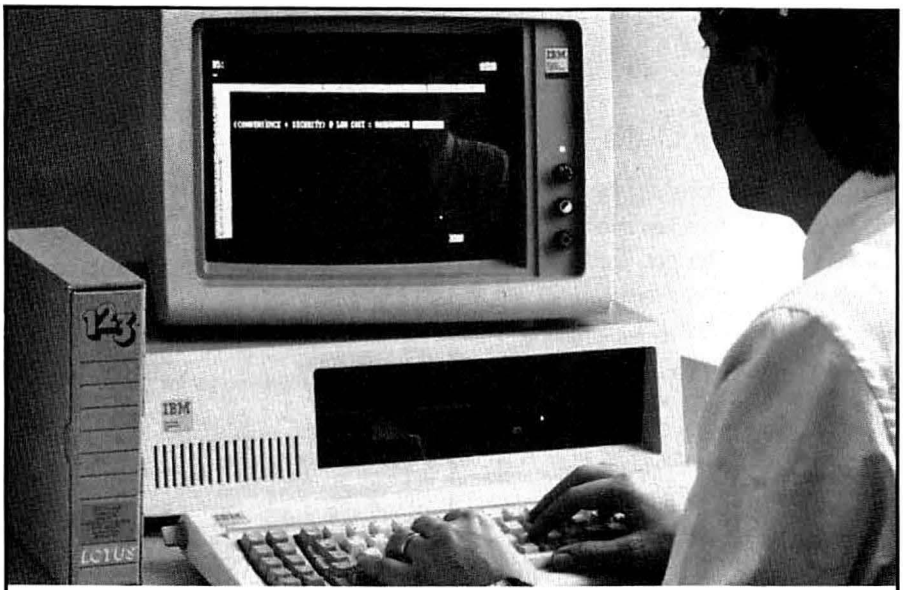

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about faraway places. I want to know how far I am from Tahiti or that it's dinnertime in Paris while I'm eating leftovers for lunch.

The *Timepiece* user manual contains a table that lists an abbreviation, or code name, for every state in the United States, every Canadian province or territory, and most foreign countries. You can add, modify, or delete entries in this table. When you enter a code name on the appropriate screen, *Timepiece* displays the local time in the state or country's capital city (or in both capitals if a country has two) and any brief notes (up to 60 characters) you have included about that area. If you receive a phone message and don't know the caller's location, you can find out by entering the telephone area code. *Timepiece* displays the state or country name, plus the area code's current time and whether that state or country has multiple area codes.

Timepiece runs on the IBM PC, the PC XT, the PCjr, and the Compaq and other PC-compatible machines. If you want a serious business tool to help in your daily routine, keep looking. But if you can accept inconvenience in exchange for some interesting data and mild entertainment, *Timepiece* may be worth the price.—CW

Timepiece
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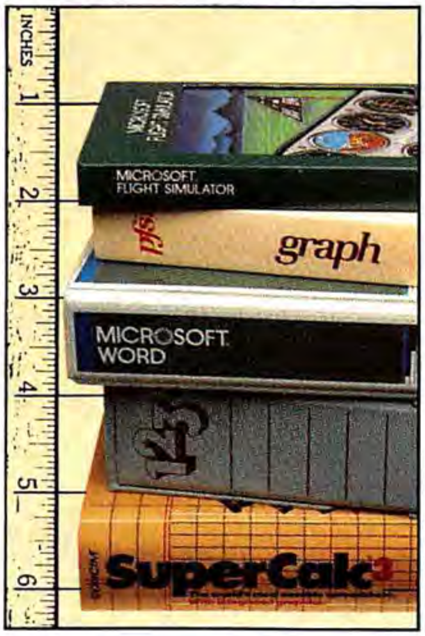

Many video cards only work with specially modified software. The Paradise Modular Graphics Card runs popular off-the-shelf color/graphics software on your choice of monitors. *Unmodified.*

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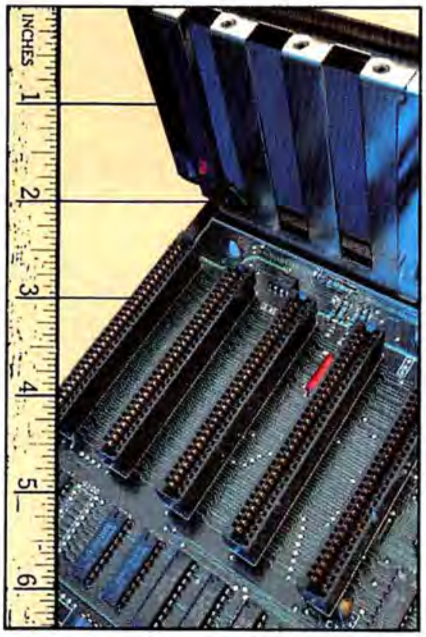

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ut choosing a video card.

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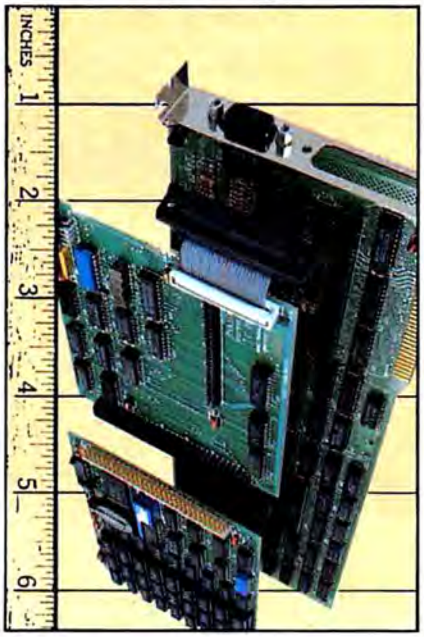

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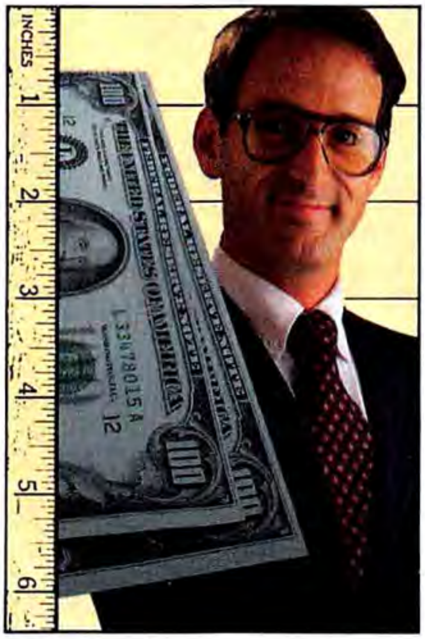

Value: the ratio of performance to price. No matter how you configure the Paradise Modular Graphics Card, you get more performance for your money, and more performance for your slot.

You'd have to combine several other cards to even approach the Paradise Modular Graphics Card's functionality.

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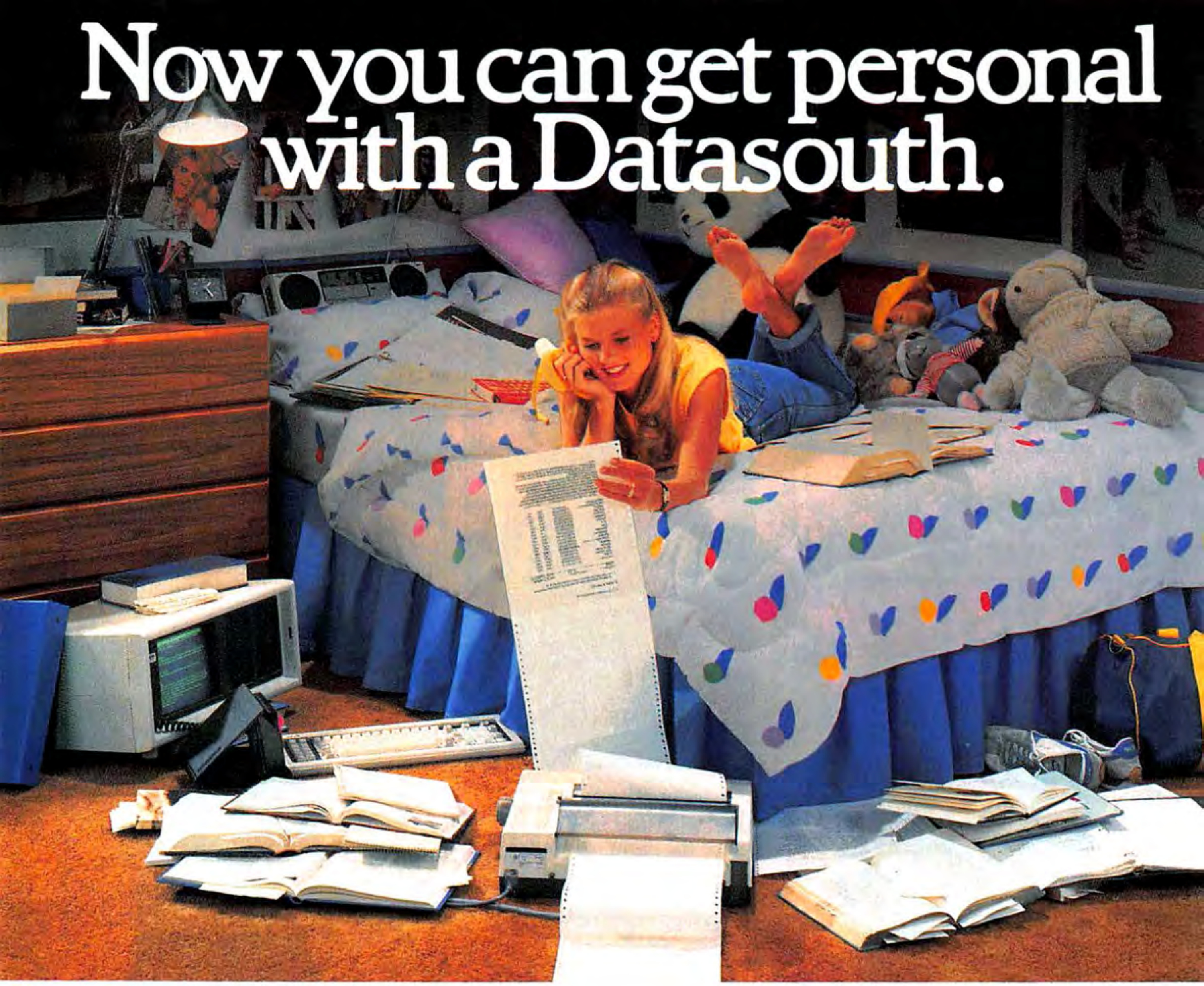

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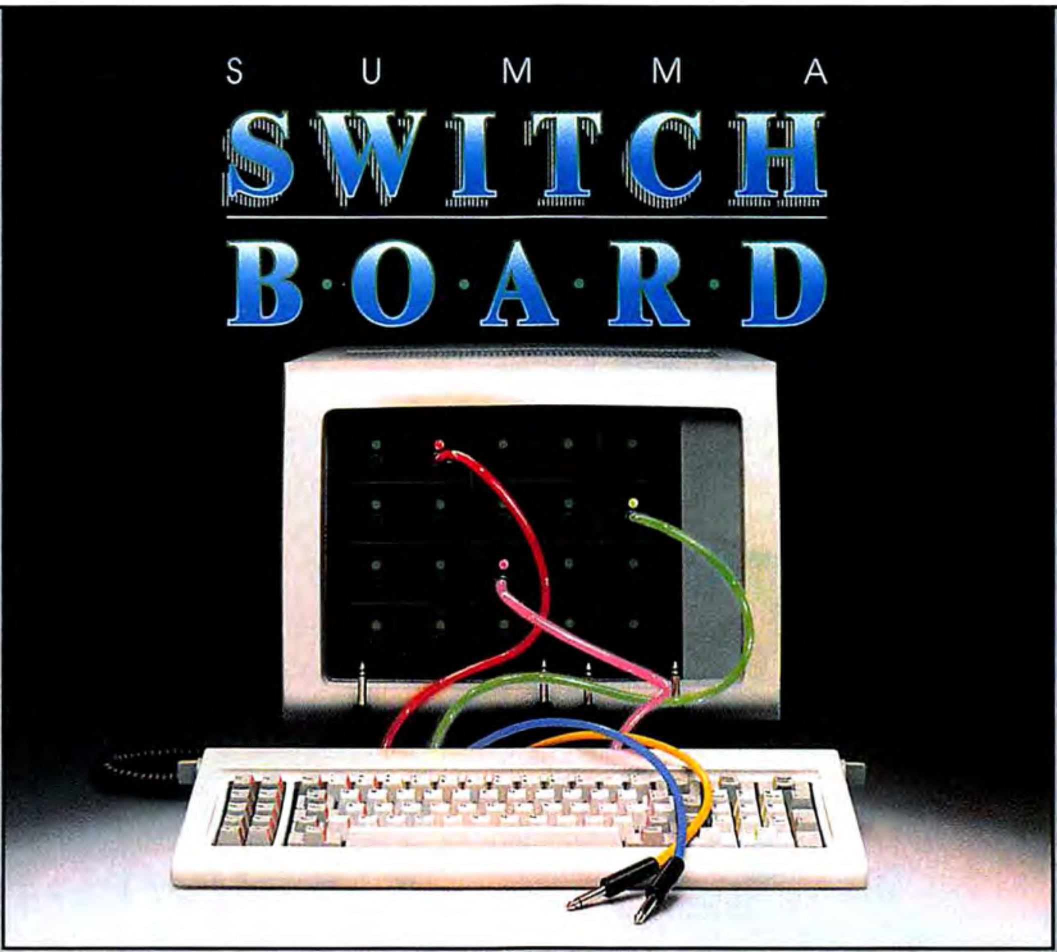

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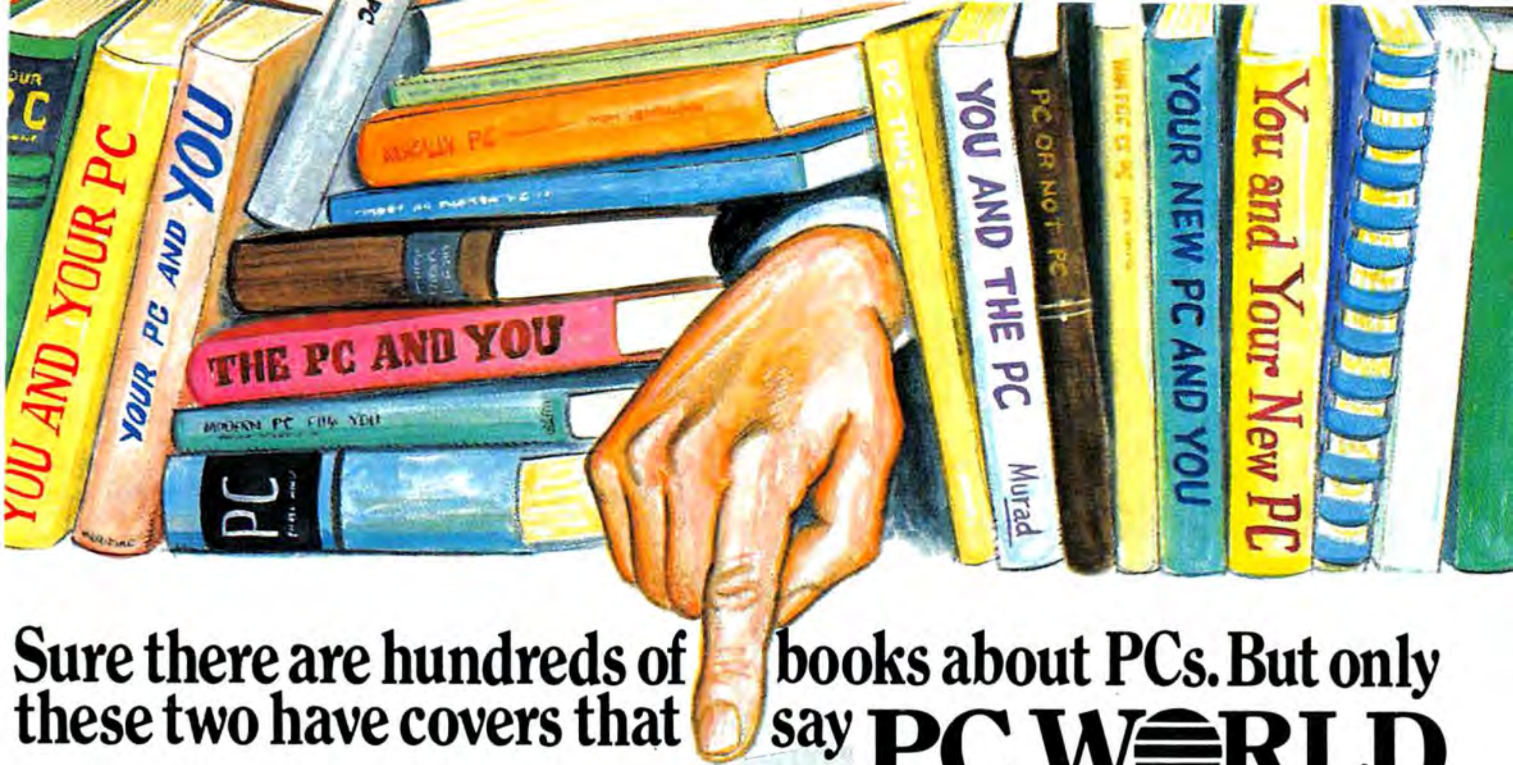

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PCjr WORLD

November 1984

The Home Computer Magazine
for People with PCjrs and Compatibles

Special Report:

PCjr Grows Up

Back from the drawing board, IBM presents a revamped PCjr.

PCjr Gets Bigger and Better

Reed McManus

In a second-round attempt to establish itself firmly in the home and educational computer market, IBM has announced major changes and additions to its much-criticized PCjr. The new hardware includes a redesigned keyboard and a 128K memory expansion unit. As a result of these changes, the PCjr may become attractive to the low end of the business market as well. The PCjr system unit prices remain unchanged at $599 for the 64K entry model and $999 for the 128K enhanced model. A PCjr with one disk drive and 256K of memory costs $1324; a comparably equipped PC costs $1995.

The Keyboard Grows Up

The original PCjr keyboard received much criticism. The Chiclets keyboard, with characters written above rather than on the keys, seemed to be designed for young children. The keyboard did not have the look or the feel that people have come to expect from IBM office products. Fast typists complained that the wide spacing between keys slowed them down, and many people said that the keyboard made the machine look more like a toy than a serious computer.

The new keyboard retains the infrared eye and the compact size of its predecessor but replaces the Chiclets with PC-like keys. The new keyboard's 62

keys are full-size and closely spaced and have character symbols imprinted directly on them. As on the PC keyboard, letter, number, and symbol keys are white, and operation keys are gray. The keyboard also includes some nice extra touches, such as small ridges marking the J and F home position keys so they can be found by touch.

Like the original PCjr keyboard, the new board lacks a separate numeric keypad and separate function keys. The top row of keys acts as both number and function keys; you still activate functions by pressing the <Fn> key and the desired number key. The new keyboard retains the original keyboard's blue, green, and red color coding.

The new PCjr keyboard is available at no charge to current PCjr owners if they purchased their machines from an authorized IBM dealer. They can claim the new keyboards from the stores where they originally purchased their computers. PCjr owners can receive a new keyboard without returning the old keyboard and without disrupting the 12-month warranty that covers their system.

Expansion Modules

IBM announced three expansion modules that connect to the computer's I/O expansion bus: the $150 PCjr Power Expansion Attachment, which adds 20 watts of additional power to the computer; the $325 PCjr 128KB Memory Expansion Attachment; and the $300 PCjr Speech Attachment.

A single module can be added directly to the PCjr system unit. If more than one module is added, the Power Expansion Attachment must be plugged into the system. With the power attachment in place, three modules can be piggy-backed onto the PCjr. Three Memory Expansion Attachment modules bring an enhanced PCjr's usable memory up to 512K.

Included with each Memory Expansion Attachment is the PCjr Memory Options Installation disk, which enables any amount of memory, in 1K increments, to be used as a RAM disk. The Memory Options Installation disk includes RAMDISK.COM, a file that lets you treat a section of the machine's memory as if it were a floppy disk. Since a RAM disk is electronic rather than electromechanical, information can be accessed faster than from a floppy disk. In effect the program creates a second drive, allowing you to run programs that require two disk drives and to take better advantage of programs, such as *WordStar* and *1-2-3*, that require only one drive but are more conveniently run from two drives.

The new keyboard retains the infrared eye and the compact size of its predecessor but replaces the Chiclets with PC-like keys.

IBM's new PCjr keyboard

RAM disks are fast but volatile. If power is disrupted, everything stored in memory–including everything in the RAM disk–is lost. Whenever possible, application program files should be copied onto the RAM disk so that data can be stored on a floppy disk. If power is cut off, you will lose only the copy of the application program, not your data.

Unfortunately, it is not always possible to store copy-protected application programs in RAM disks. In such cases, you must save the data in the RAM disk and, when you're done, copy the RAM disk data onto a floppy disk for permanent storage.

The PCjr Speech Attachment is a speech synthesizer that contains 196 words in ROM. The synthesizer can record words or sounds on disk through a user-supplied microphone.

Software for Schools

In a bid for a larger share of the educational market currently dominated by Commodore and Apple Computer, IBM announced several new educational programs, as well as discounts for schools purchasing PCjr systems.

IBM's new educational offerings are spearheaded by *Writing to Read*, a system for teaching children to read and write. The system includes software, audio cassettes, student workbooks, and teacher manuals. A speech synthesizer enables the computer to pronounce 30 words while corresponding pictures and letters appear on the computer display. Students use workbooks to practice writing the sounds they have learned, then use a typewriter to compose words, sentences, and stories. Through repeated writing practice, children first learn to write words and sentences phonetically and then make the transition to conventional spelling. According to a two-year study by the Educational Testing Service, students in a *Writing to Read* pilot program progressed faster than the national norm on standardized reading tests and performed as well on spelling tests as other students.

IBM is selling the *Writing to Read* system with PCjrs and separately. Additional hardware, such as typewriters and cassette players, must be purchased separately.

IBM announced other educational software that runs on the PC and the XT as well as the PCjr: four $49 earth science programs, a $49.95 logic skills game, a $60 interactive introduction to BASIC, a $70 teacher's quiz designer, and a $50 package for designing self-paced study programs.

As many as three Memory Expansion Attachment modules can be added, bringing an enhanced PCjr's usable memory up to 512K.

The PCjr will now be offered at a discount to schools, teachers, and full-time faculty members. Enhanced PCjrs with a TV connector and keyboard cord, DOS 2.10, and Cartridge BASIC will cost $700 each for quantities of 1 to 14 and $675 each for quantities of 15 or more. Computer systems with the PCjr Color Display cost $950 each for quantities of 1 to 14 and $900 each for quantities of 15 or more.

More Software

IBM also announced two personal software packages. These programs run only on the PCjr. The first, *PCjr ColorPaint*, is a $99 cartridge-based graphics-design program similar to Apple Computer's *MacPaint*. The program runs with a user-supplied mouse and features pull-down menus and a 16-color palette. Objects and pictures can be drawn in a variety of brush styles and patterns, and drawings and parts of drawings can be copied or moved across the screen with the mouse.

The second program is *Andrew Tobias Managing Your Money with the IBM PCjr*, a $199 integrated personal financial planning and accounting package. *Managing Your Money*, which comes on a ROM cartridge and two disks, is designed to help people track personal income, expenses, and investments and plan for long-term financial goals.

This Time With Feeling

IBM took quite a few lumps with the original PCjr. Sales were far below the 500,000 units some analysts initially projected for 1984. The company originally came out with a relatively expensive machine that it hoped would embrace a wide range of nonbusiness uses, such as education, entertainment, and personal management. IBM also hoped that the PCjr's PC compatibility would appeal to people who use a PC or an XT at the office and want to bring their work home. The original PCjr did not fit this bill.

IBM evidently realized that it had to go back to the drawing board and provide the PCjr with more of the PC's versatility and expandability. The new PCjr is a great improvement over its last incarnation; it now offers the power necessary for a solid business machine and is a strong home and education computer. Whether PCjr can overcome its poor image is something only time will tell.

Reed McManus is Editorial Manager of PC World Special Editions.

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Systems Products Division
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Hardware

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"Volkswriter Deluxe ... a simple way to word processing power ... for writers who like to think."

Washington DC Capital PC User's Group Vol. 3, #4

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John Lombardi, Reviewer, InfoWorld, April 16, 1984

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Software

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Teacher's Quiz Designer
List price: $70
Requirements: 128K, one disk drive

BASIC Primer 2.0
List price: $60
Requirements: 128K, one disk drive

Private Tutor 2.0
List price: $50
Requirements: 128K, one disk drive

Rocky's Boots
List price: $49.95
Requirements: 128K, one disk drive

PCjr ColorPaint
List price: $99
Requirements: 128K, one disk drive

Andrew Tobias Managing Your Money With the IBM PCjr
List price: $199
Requirements: 128K, one disk drive

Writing to Read
List price: $1108
PCjr requirements: 128K, one disk drive, speech synthesizer
PC requirements: 128K, one disk drive, speech synthesizer, graphics board

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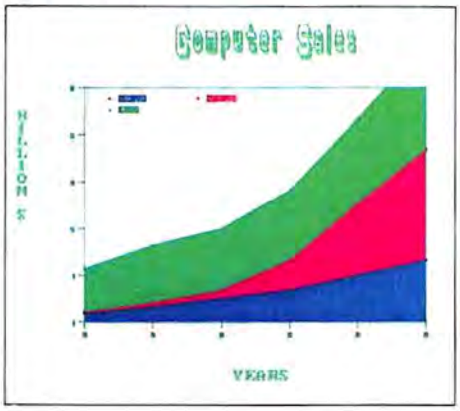

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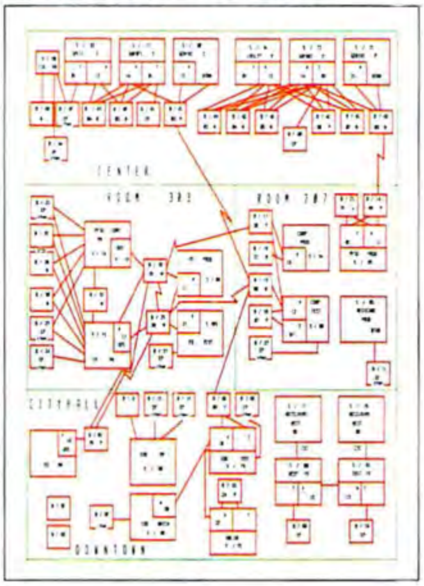

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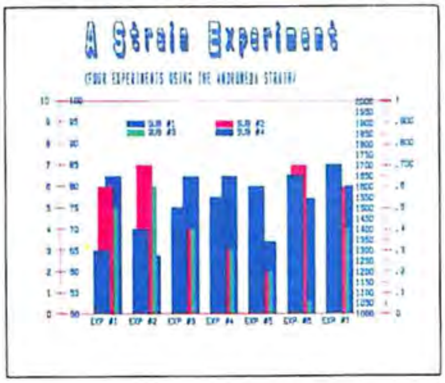

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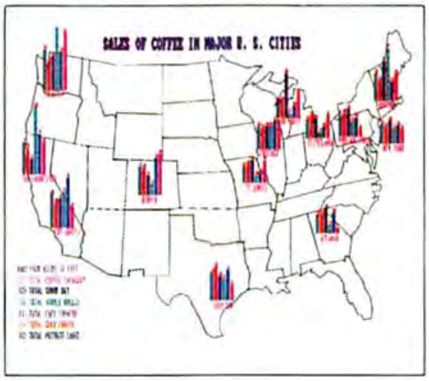
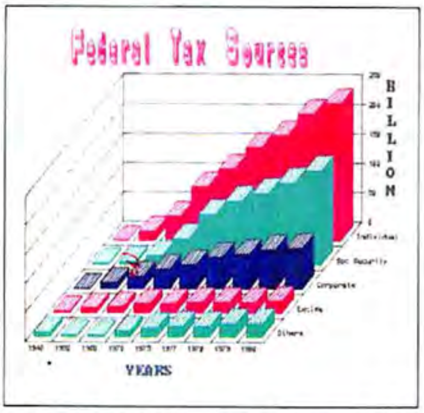


3-DIMENSIONAL
BAR CHARTS



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Two word processing programs for the PCjr fulfill the needs of home users.

Two Word Processors in Search of a Home

Rick Altman

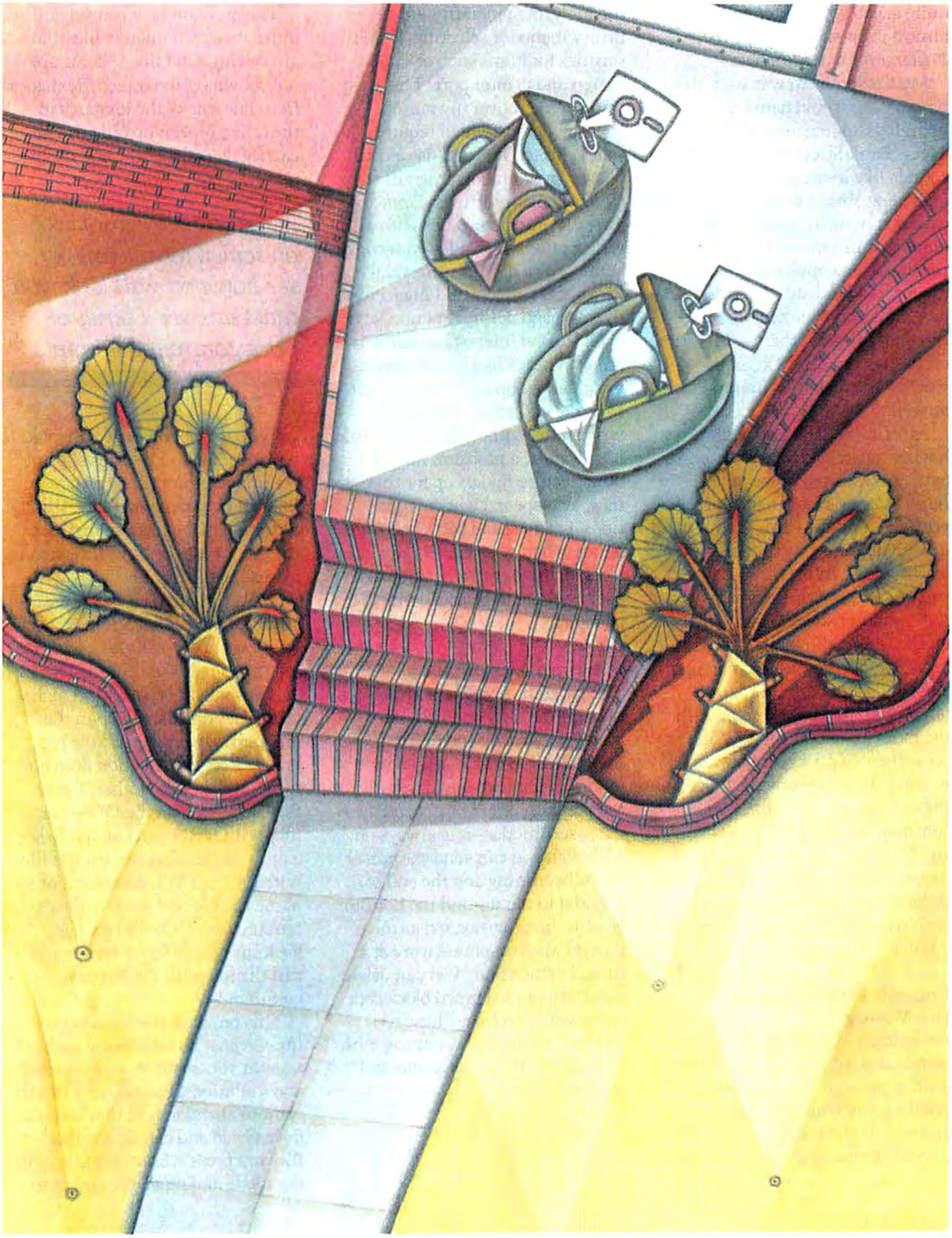
Is it my imagination, or is there a conspiracy afoot to give the IBM PCjr and all of its users an identity crisis? Software manufacturers are apparently divided on how to market their PCjr products; either they aim them toward home users and stress the software's ease of use, or they address the professional user and tout the programs' features and business capabilities. The programs themselves often appear to walk on both sides of the home/business dividing line, with varying degrees of success.

I have just tried two PCjr word processing programs, *Bank Street Writer* and *WordPlus-Jr.* The $79.95 *Bank Street Writer* from Broderbund Software works on both the PC and the PCjr; Professional Software's *WordPlus-Jr,* which costs $149.95, runs only on the PCjr and was adapted from the company's PC word processing program.

Both programs seem to suffer from the PCjr "which market am I?" schizophrenia. The only real hint we get about the programs' target audience is from their price tags and from *Bank Street Writer's* documentation, which features a charming family-around-the-computer scene on its cover. At these prices, both programs may wind up in a lot of homes playing key roles in sixth-grade term papers. However, certain features of both programs make me wonder whether the manufacturers had the business market in the backs of their minds.

Bank Street Writer

Bank Street Writer seems geared to students and home users, and after a few hours of working with it I was convinced that the program



quite capably fills their needs. Yet I almost deep-sixed *Bank Street Writer* after five minutes.

My first problem was with the name. Who would name a program for children and occasional users "Bank Street Writer"? It sounds like a spreadsheet program for a New York investment firm. I gave up trying to figure out the name just in time to discover that the duplicate copy I had carefully made wouldn't load. Yes, this $80 program is copy-protected. Fine, I thought, I'll show them—I'll write on the system disk. Oh, no I won't—the disk is write-protected as well.

After a few choice words and having mustered some reluctant patience, I started to write with *Bank Street Writer.* I had to agree with the manual—this menu-driven program is very easy to learn. *Bank Street Writer* draws a square marking the text area on the computer screen. Text remains on the screen through all but the most complicated format changes. Above the square, the program tells you to move the cursor with the four cursor control keys and to press the <Esc> key if you want to enter the editing mode. Once in the editing mode, 12 different command choices, such as Save and Copy, are displayed. You choose commands by moving the cursor to the appropriate word with the <Tab> key and pressing <Enter>.

Enough Functions for the Money

Bank Street Writer includes most standard word processing features. Special print commands, such as Boldface and Underline, are grouped in one menu, which is retrieved by pressing <Alt>-K. Surprisingly, the program includes a utility menu for selecting default settings for items such as cursor design and printer port. This is an improvement over my present word processor, which requires that I exit to DOS and use a complicated installation program to change default settings. *Bank Street Writer* also comes with a utility program that lets you copy a file, copy a disk, print several files consecutively, add linefeeds to the text, and define function keys.

Of special interest are *Bank Street Writer*'s block commands, which allow up to 15 lines of text to be deleted, moved, copied, or written to another file. The 15-line limit can be a problem, but another feature makes up for this flaw. Two special editing functions, Unerase and Moveback, are handy when you accidentally block-erase text or when you can't decide where to place a defined paragraph.

Program Limitations

The program reveals its limitations in the nuts-and-bolts demands of writing and editing. *Bank Street Writer* has no option for justifying text, and curiously, the program offers no control over the insert mode—it is always on. Although you can send the cursor to the beginning and the end of a line and to the top and the bottom of a file, no provision exists for moving the cursor one word at a time. Furthermore, you can delete a character or a defined block, but not a word or a line. These restraints make serious editing with *Bank Street Writer* a tedious and frustrating task.

The program lacks on-screen formatting; parameters like margin settings and line spacing are not shown on the screen. Text goes from one side of the text area to the other, broken up only by hard carriage returns at the end of paragraphs. To see how text will look, you must answer a series of print command prompts (even though they all have default answers) and, with the final question, instruct the program to print to the screen instead of the printer.

> Bank Street Writer *lacks on-screen formatting; to see how text will look, you must answer a series of print command prompts.*

The alternative is even more cumbersome: *Bank Street Writer* lets you make "print files," formatted versions of the documents stored on disk. Strangely, though, these files don't show up in the program's directory, and the program's Retrieve function does not recognize the files either. These files do appear on the DOS directory with .PRN extensions. To see a print file you have to list the file with DOS's TYPE command or rename the file and remove the extention with DOS and then go back into *Bank Street Writer* and call the file with the Retrieve command.

This program is excessively polite—repeatedly throwing questions at you about your preferences and intentions. For example, if you want to abandon text that you have typed and call up another file, you press <Esc> to enter editing mode and move the cursor to

'Retrieve.' The program then asks: 'DO YOU WANT TO CLEAR CURRENT TEXT BEFORE RETRIEVING FILE (Y/N)?' You type Y. The program responds with: 'YOU HAVE NOT SAVED THIS TEXT. ARE YOU SURE YOU WANT TO ERASE IT (Y/N)?' Again you type Y, and *Bank Street Writer* asks: 'DO YOU WANT TO LOOK AT A CATALOG OF FILES ON THE DISK (Y/N)?' For expediency's sake, you answer N. Finally, the program prompts: 'TYPE THE NAME OF THE FILE TO RETRIEVE:'. After typing the file name, you think you're home free, but the program comes back with 'TYPE THE PASSWORD (RET IF NONE):'. This $80 copy-protected, write-protected program has a provision for entering secret passwords into your directory.

Overall, *Bank Street Writer* has a lot in its favor. The clear, onscreen menus make *Bank Street Writer* easy to learn and use. The program comes with good documentation, which you may not even need since *Bank Street Writer* operates so logically. Its ease of operation is an impressive feather in its authors' caps.

I found the kindergarten-level prompts a little insulting, but at the program's low price, I can forgive the programmers for that. If you are a novice computer user, *Bank Street Writer* is an excellent program to get you started with word processing, but expect to outgrow it. Be prepared for the day when you can't tolerate being asked to enter a secret password for your letter home to Mom.

WordPlus-Jr

My first inclination was to declare that *WordPlus-Jr* is a more sophisticated program than *Bank Street Writer. WordPlus-Jr* is conscientious about those little things that prove crucial to detailed editing and writing. It offers a toggling insert mode, an option for justified text, and word-by-word cursor movement. Indeed, *WordPlus-Jr* offers a full array of word processing features—that is, if you don't get lost in what the literature calls "easy-to-use color-coded keys." The manual comes with four little colored dots called keycap labels to stick on the control keys and a color-coded template designed for the original PCjr keyboard for the number keys. Never before has "just follow the colors" been such a tall order.

Complicated Commands

WordPlus-Jr was designed so that about 90 percent of its capabilities are programmed into the function keys. Each function key has three or four commands built into it; the commands are usually given by typing <Ctrl>, <Shift>, or <Alt> while pressing <Fn> and a number key.

If you want to use the Search and Replace command, for example, you must hold down <Shift> while you type <Fn> and 5. In case you haven't noticed, the <Shift> and the <Fn> keys are situated on diagonally opposite corners of the keyboard. One of the world's longest hand spans—over 12 inches—belongs to Julius Erving. He could type <Shift> and <Fn> with one hand. He is also 6 feet, 7 inches tall and palms basketballs for a living. Unless you're Dr. J, all of the writing and editing commands will require a dexterous performance by both hands.

According to the manual, the color-coded template and the keycap labels are so easy to locate that "you won't have to memorize which keys perform which functions." In other words, *WordPlus-Jr* is designed so that every time you want to give a command, you must hunt for the function listed on the template and then type the specified keys. Pardon my skepticism, but I believe that the trick to efficient word processing is the very memorization that *WordPlus-Jr* is trying to abolish. A keyboard template is fine when you're learning, but special key combinations should become second nature. The idea is to have a design whereby you can't help but commit functions to memory.

Well, my philosophy of word processing aside, the *WordPlus-Jr* authors were successful: you couldn't memorize their barrage of functions if you spent a week trying—I spent two weeks. A much greater blunder is that the manual does not refer to the the special functions by their key combinations. So if you lose that 75-cent template, this $150 program is useless.

All of the writing and editing commands will require a dexterous performance by both hands.

This template fiasco is the biggest problem with *WordPlus-Jr*, but not the only one. Another is a strange quirk in the program's wraparound feature. If you are editing the middle of a paragraph and the insert function is off, the line automatically wraps around when you reach the edge of the screen, but the program does not automatically insert a line. So when the cursor reaches the next line, you find yourself typing over existing text.

Another problem is that *WordPlus-Jr* doesn't warn you if you haven't saved a file you are about to exit. If you want to leave one file and enter a second, all you have to do is retrieve the second file. The first file is gone—no questions asked. (I suppose I'll never be satisfied on this count: *Bank Street Writer* prompted me too much on file retrievals and *WordPlus-Jr* not enough.)

The *WordPlus-Jr* authors have mastered the art of unwieldiness. The program design seems to have come down to a question of form versus content, and content prevailed. It's a shame that more thought wasn't given to the total package, because the program has tremendous capabilities. *WordPlus-Jr* offers uncommon features such as incremental margins, which allow you to set margins as percentages of original margins—you change margins with commands such as Right Margin +3 or Left Margin -6. Another nice feature is the program's Cut and Paste command, which allows column manipulations entirely separate from the conventional block maneuvers.

Which to Choose

If you are just starting out in the computer world, *WordPlus-Jr* might overwhelm you. If you have a bit of computer experience already, *Bank Street Writer* might underwhelm you. Although it is not priced for the heavy-duty user, *WordPlus-Jr* will answer almost every word processing need you have. If you prepare complicated documents and you're on a budget, you might be able to overlook *WordPlus-Jr*'s clumsiness for the sake of its powerful capabilities. For writing high-school essays or writing home for beer money, go with *Bank Street Writer.* Ultimately, both programs will show their weaknesses as they try to straddle both sides of the home/business line.

Rick Altman is the managing editor of a San Francisco Bay Area sports magazine. His articles have appeared in many general-interest magazines.

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San Rafael, CA 94903
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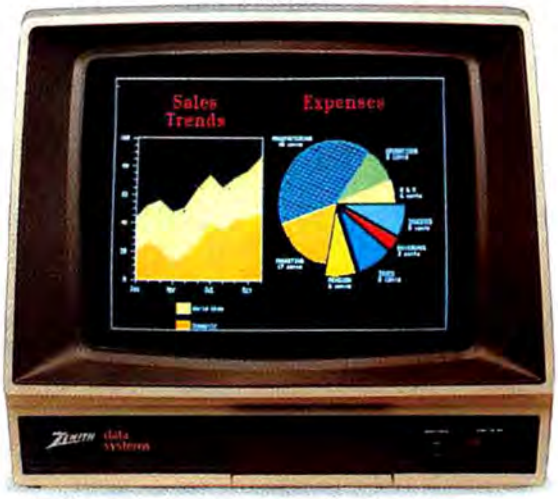

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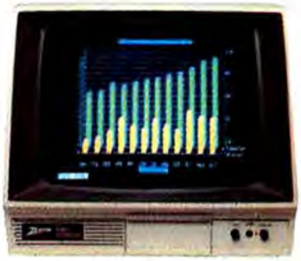

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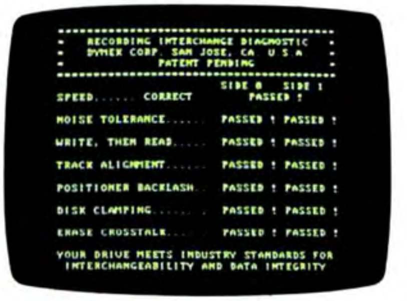

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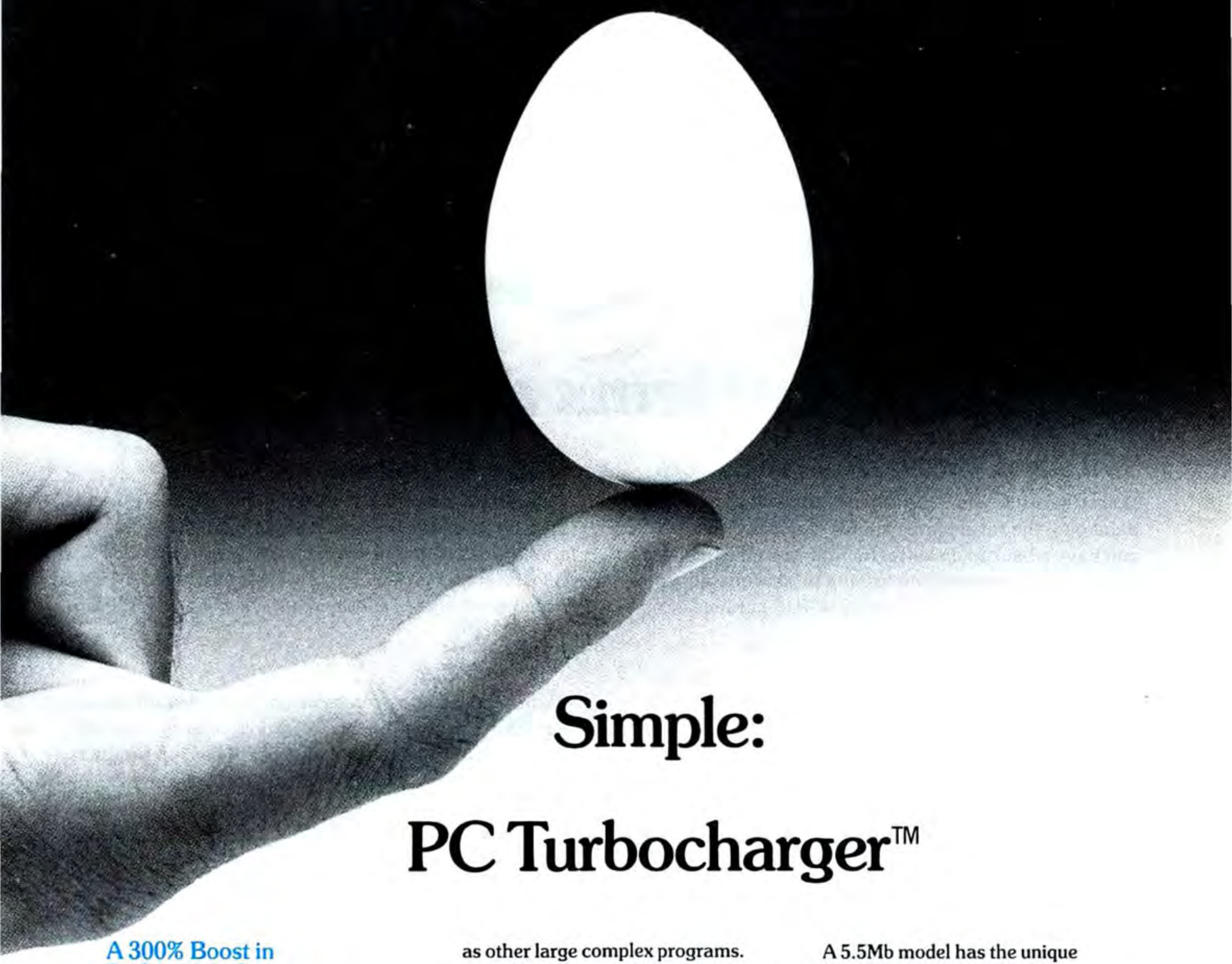

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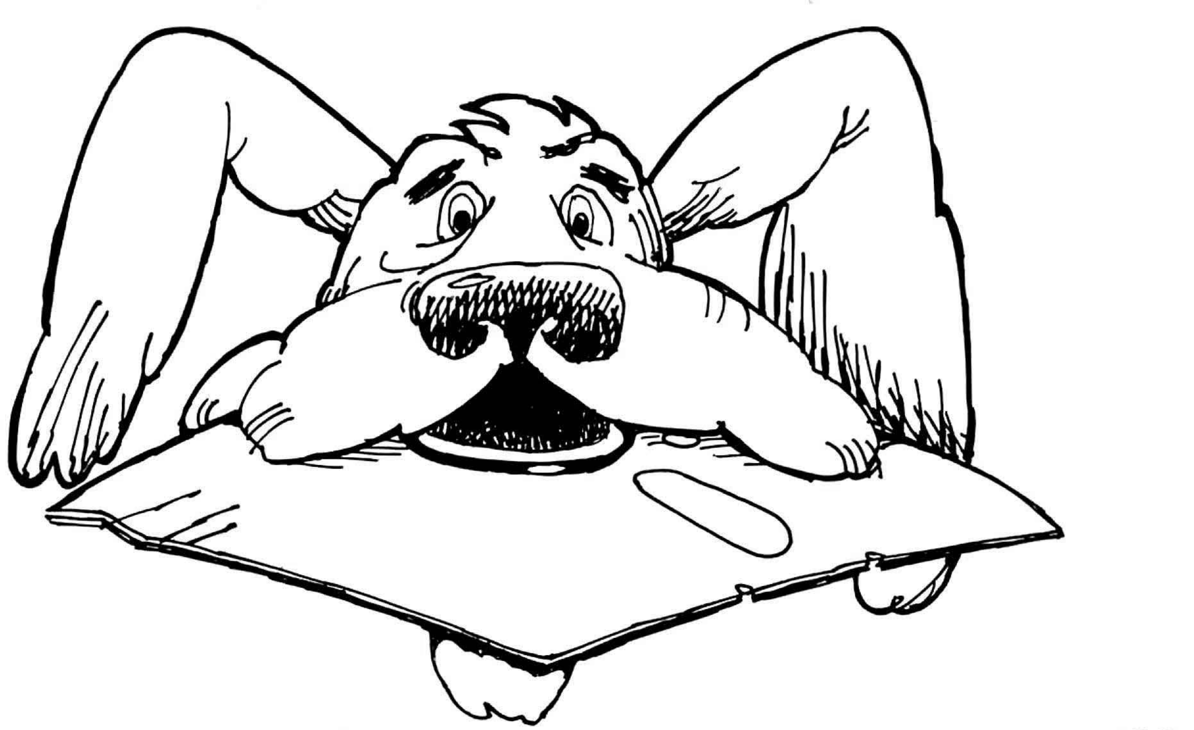

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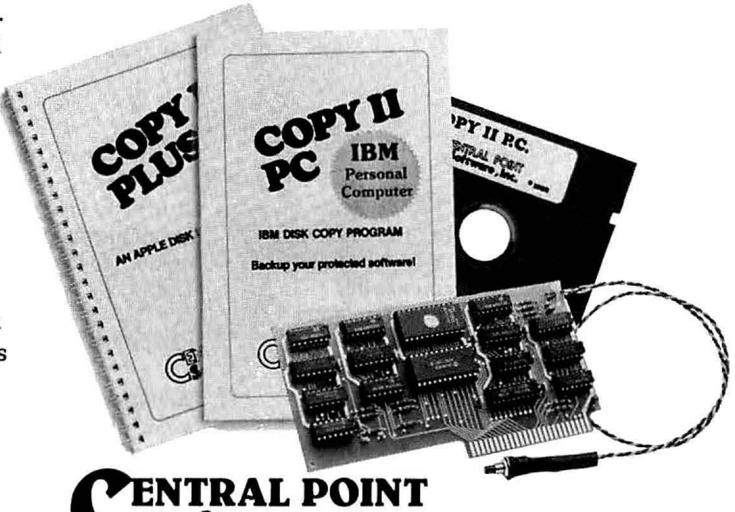

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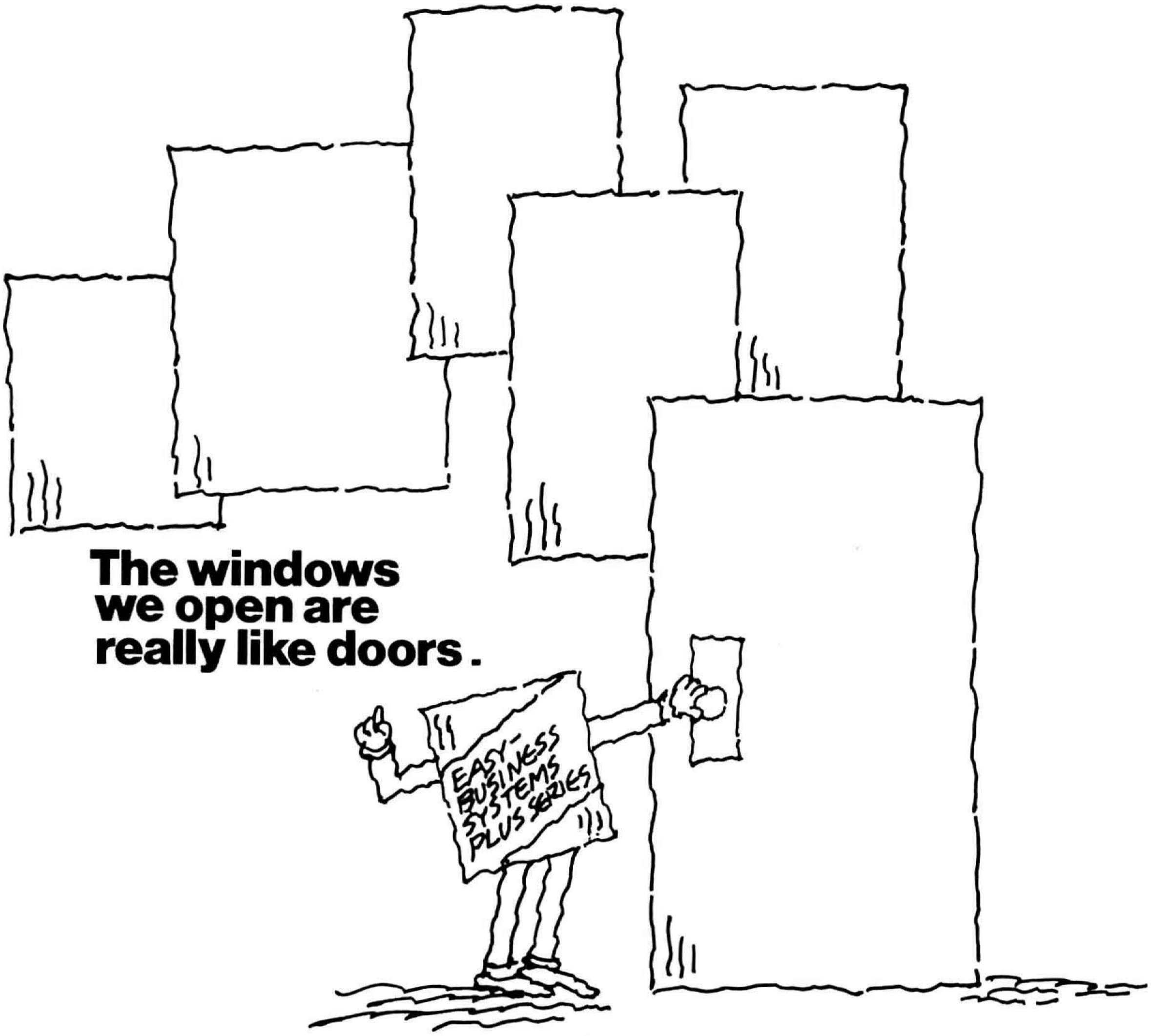

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“If one more person asks memory boards,

Multifunction or mass confusion?

We always tell people that the very first enhancement they should buy for their IBM-PC is a multifunction board.

But the tough question is, which one??? Especially now that just about anyone who ever wrapped a wire is coming out with a multifunction board for the PC.

That's why I'm writing this ad. Together we'll cut through the jungles of jargon and topple the towers of tech talk surrounding multifunction boards. And we'll even tell you which one is our personal favorite.

A face only a motherboard could love.

To electronic engineers they may be beautiful. But to most of us, circuit boards (a.k.a. circuit cards, enhancement modules, upgrades, etc.) are strange looking at best and intimidating at worst.

IBM, in its infinite wisdom, gave us *just five slots* to put additional circuit boards into the PC. But the PC can be enhanced in a lot more than five ways. So smart money buys a multifunction board and gets a whole lot of action out of only *one* of those five slots.

A single multifunction board can:
1. increase your computer's memory; 2. set you up to add a printer, mouse, modem, and/or other device; 3. tell your computer the date and the time; and now even, 4. prepare you for networking with other IBM-PC's.

Most multifunction boards come with their own software that puts it on the same wavelength as your motherboard. You'll be able to do things like: 1. input new data while the printer is outputting hard copy; 2. pretend you have additional disk drives; 3. have faster access to frequently used programs or files; and, 4. automatically back-up your data to a hard disk every few seconds.

Up close, multifunction boards look no more complicated than a map of San Francisco.

Glossary

A guide to multifunction board terminology for English-speaking people.

Please excuse the small type. But it was the only way we could squeeze all of these multifunction board basics on two pages. Besides, small type excites some people. So let's get down to business.

Multifunction board. A circuit board that fits into one I/O (input/output) slot and does more than one thing. This ad is about multifunction memory boards—extra RAM, some I/O ports, and other features. There are also multifunction graphics boards. We'll have to save them for another ad.

Memory. The new PC's and the XT have room on the motherboard for 256K. But they can address (a.k.a. find, locate, call up, cope with) 640K. The best multifunction boards have room for an additional 384K. 384K + 256K = 640K. You can add the memory in 64K blocks as needed.

Serial port. a.k.a. "async" or "asynchronous communications port," or "asynchronous adapter." You can hook a mouse, a plotter, a serial printer or any other serial device to this port. A serial device is a gadget that communicates with the computer one bit at a time. Just follow the instructions and the electrons will take care of the rest.

Parallel port. Most printers used with IBM personal computers connect via a parallel port.
Parallel devices are gadgets that communicate with the computer eight bits at a time.

Clock calendar. Turn your computer on and it knows what day and time it is. Which is more than you can say for a lot of us when we wake up in the morning.

Game port. Where you plug in your joystick.

Local Area Network (LAN). All of the circuit boards, cables, connectors, and software you need to tie a few IBM's together in one office.

Networking interface. The Orchid BLOSSOM comes with a networking interface. That means that when you slap a PCnet daughterboard on top of it, it knows what hit it and what to do about it.

User-transparent. PCnet is user-transparent. Each user treats the network as if it were his/her own huge computer with a whole lot of disk drives and memory. There are no complex formulas for going from using only your own computer to using the network.

File allocation table locking. Since DOS is single-user, networks need to protect against cross-locking files on public volumes. PCnet does this by insuring that each disk write request sees a fresh copy of the File Allocation Table. This enables two or more users to write at the same time, and eliminates the need to pre-allocate database files.

PCnet TALK. Communicate easily with your fellow networkers. Your message on one half the screen. Their message on the other half.

Disk partitioning. On both BLOSSOM and PCnet software. This program allows you to partition any hard disk into multiple volumes, which you treat like extra disk drives (maximum 16 per PC). In addition you can designate any of these volumes as public or private. Keep your public files public and your private files private.

RAM disk. On BLOSSOM, Quadboard, SixPakPlus, and PCnet software. RAM disk lets you designate part of the available memory as additional disk drives. But these "drives" are electronic. In other words, they're fast.

Disk cache. On BLOSSOM, Quadboard, and PCnet software. Disk caching stores frequently used data in RAM. It is an intelligent RAM disk. When your program looks for a data file it first looks at the cache. If the data isn't there it gets it from the drive, and pulls it through the cache, leaving a duplicate there for future quick access. When you save data, a copy is automatically written to the cache at the server PC which flushes the changes back to the disk every 1 to 60 seconds (you choose). You don't have to wait while your data is being written to the disk. The server PC takes care of it.

Print spooler. On BLOSSOM, Quadboard, SixPakPlus, and PCnet software. A print spooler (a.k.a. printer buffer) lets you dump output to the printer as a background process. First the PC dumps the output to the spooler's RAM buffer at high speed. Then the spooler delivers the output to the printer as fast as the printer can take it. You're already back to work at some new project while the printer's still chugging along.

Those are some of the reasons why multifunction boards are the hottest thing since the push-button phone. But if you want to be able to go to parties and talk about your new "multifunctionboardwith 384KofRAM,parallelport,serialport,clock-calendar,RAMdisk,diskcaching,printspooler, andnetworkinginterface" and actually understand what you're saying, you may have to refer to the very fine print in the glossary. So, whenever you see a term you don't understand, try the glossary.

Which ones work?

PC Connection has sold thousands of multifunction boards. Our two most popular ones have been AST's SixPakPlus™ and the expanded Quadboard™ from Quadram. They both offer a very attractive combination of ingredients: up to 384K of additional RAM, serial port, parallel port, clock calendar, RAM disk, and print spooler. The Quadboard also has a game port, disk caching software, and a "connectall" bracket for arranging your cables neatly. AST offers a game port as an option. We sell both boards for the same price. And our customers have been very pleased with their performance.

The multifunction board breakthrough of the year.

My real inspiration for writing an ad is the new board that just came out from Orchid Technology.

It's called the BLOSSOM,™ and it has all the standard features mentioned above, like up to 384K of RAM, serial port, parallel port, clock calendar, RAM disk, print spooler, and disk caching.

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me about multifunction I'll write an ad."

——DAVID HALL, C.E.O.
PC CONNECTION

Networking lets your PC's share data, peripherals, and their deepest, darkest secrets.

But, unlike *any* other multifunction board, BLOSSOM is designed so that *you can piggy-back a networking board on top of it. Without using an additional expansion slot in the PC.* (In the picture, that's the BLOSSOM Board on the left and Orchid's PCnet™ piggy-back board on the right.)

At last we have one multifunction board that answers all the needs of your typical basic business PC *in just one expansion slot.* And it's actually less expensive than SixPakPlus or the Quadboard. To me that's very impressive.

Networking simplified.

If they gave awards for the computer word-of-the-year, "networking" would be a strong candidate in 1984. It seems that suddenly everyone who owns one PC wants to own two or three or more. And they want those PC's to cooperate—sharing data, printers, disk drives, and even in-house software. Networking saves time. And it saves money.

Orchid Technology has been one of the leaders in networking ever since they developed the very effective, low cost Local Area Network (LAN) called PCnet.

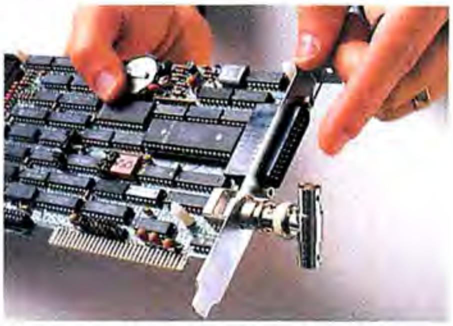
You see other manufacturers selling PCnet as their own product because Orchid licensed it to them. But now you can get Orchid's version along with their most up-to-date version of PCnet software, directly from us. Either alone or, better yet, sitting on top of the Orchid BLOSSOM multifunction board. The picture at the upper right shows how Orchid's new compact PCnet "daughterboard" slips right on top of a set of gold-plated pins on the BLOSSOM board. The coaxial connector for networking is there on the BLOSSOM board, at the right.

Networking complicated.

If you've done some research into networking you know that each system has its own complexities. Orchid's PCnet has a strong reputation for its simplicity and low-cost. PCnet 2.4, the new PCnet software *available only on the Orchid versions,* puts PCnet right up there as far as speed goes.

The key is intelligent use of PCnet 2.4 software—RAM disk, disk caching, partitioning, print spooling, and multi-sector I/O, all of which can work together to keep your data and programs where you want them, for faster access when you want them.

On closer analysis, PCnet turns out to be a very powerful LAN at a very low price. Other features include: PCnet TALK, and true public file sharing via an automatic File Allocation Table (F.A.T.). Best of all, PCnet is so user transparent, and Orchid's new manual is so straightforward, that it can cure your most computer-timid employee of networkphobia. I promise!

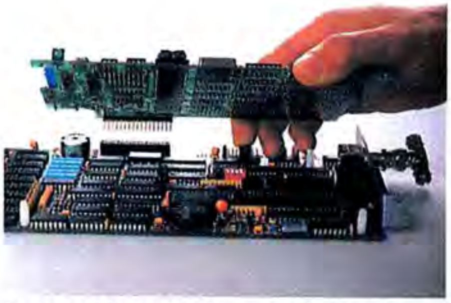


There's your coaxial connector for networking, right on the BLOSSOM board.

(Networkphobia is not in the glossary—but most of those other fancy words are.)

E Pluribus Unum.

Of the many multifunction boards on the market, I'd definitely choose the BLOSSOM. Because, as far as I'm concerned, if there's one thing in the future of most PC's, it's networking.



Orchid's PCnet "daughter board" slips right on top of BLOSSOM.

If networking doesn't interest you, the Orchid BLOSSOM is still a powerful multifunction board. And it looks like there are some other impressive "daughterboards" coming down the Orchid R&D pipeline that you could add on later.

And now that I've written this ad, I'm ready to answer some more questions. About the BLOSSOM, SixPakPlus, Quadboard, other multifunction boards, and/or the other hundreds of hardware and software products PC Connection has for your IBM-PC. Just call.

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Circle 837 on reader service card

80286: Intel's Multitask Master

Wouldn't you like your PC to have the power to run four programs simultaneously and act as a server for 16 PCs in a network? Intel's 80286 microprocessor may bring such power to the PC.

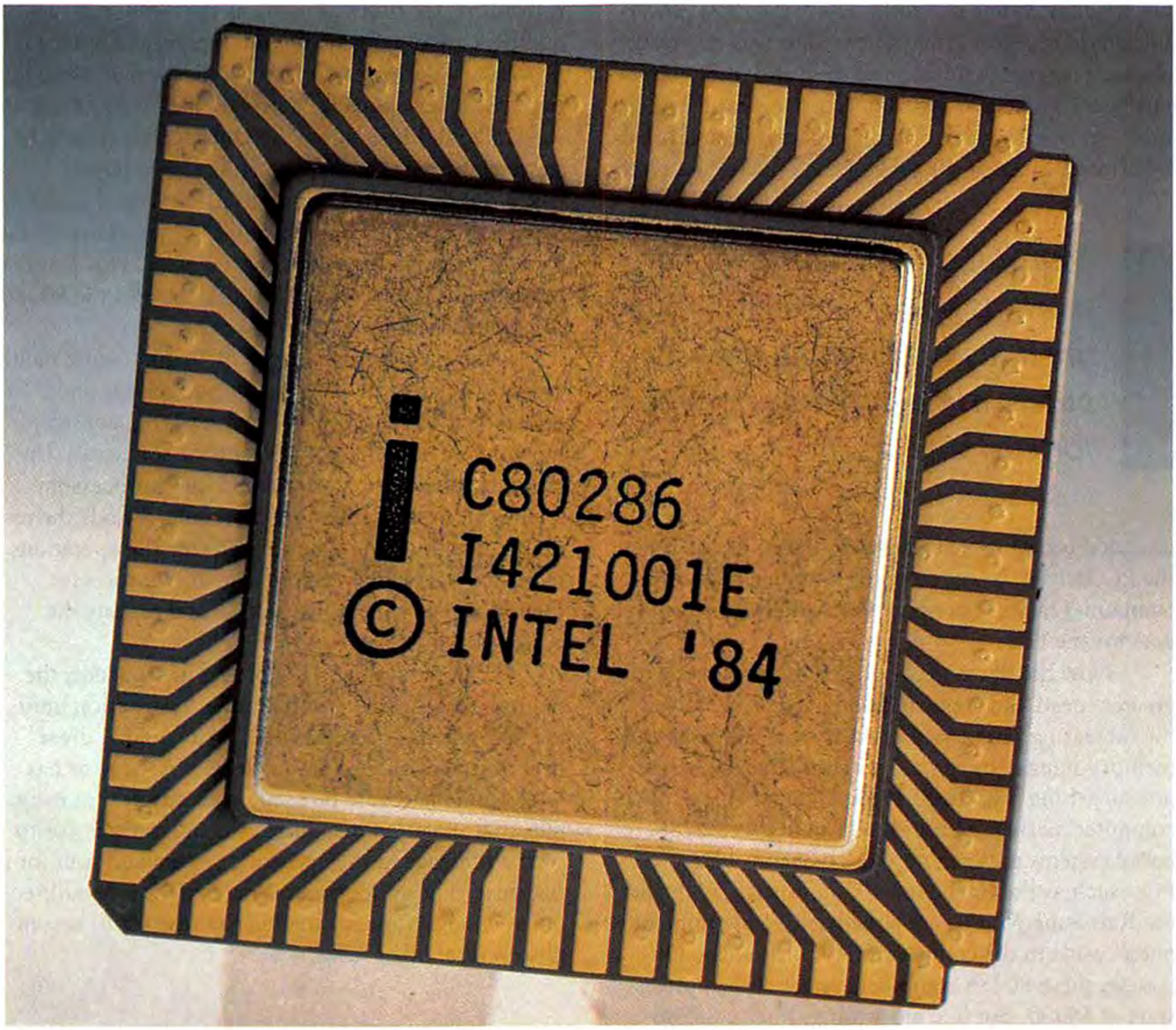
Robert Luhn and Rick Cook

Like most personal computers, the PC is essentially a one-person, one-program machine. In a local area network the PC is a little chummier, sharing data and, on occasion, processing with the other computers. But it remains a single-user device, its grasp and limitations defined by an Intel 8088 microprocessor. In short, the PC can go only as far as its microprocessor will carry it—a distance that will radically change when Intel's new 80286 microprocessor charges the personal computing market and at last opens the door to cheap multitasking systems.

Over 20 companies, from office automation giant Datapoint to semiconductor manufacturer Intel, have already released or will soon release machines using the 80286. As this issue goes to press, the exact form an 80286-based IBM personal computer will take is still a matter for conjecture. It may be a super single-user computer that juggles four programs simultaneously at five times the PC's speed or a minicomputer-like machine with 16MB of RAM that serves a panoply of PCs in a network. Reliable sources indicate that IBM will release an 80286-based personal computer that can be upgraded into a multiuser machine serving 12 PCs. The computer—code-named "Popcorn"—will reportedly include a 20MB hard disk drive and run MS-DOS 3.00, a new multitasking operating system. Whatever its form, it will be a faster, more versatile, and, at last, multitasking PC.

In the Chips

Microprocessors got their start in 1969 when Ted Hoff, an engineer at Intel, was given the job of designing the components for a desktop calculator. Hoff got the notion of placing the calculator's arithmetic and logic circuits on the same slice of silicon—and the microprocessor was born. It was the start of big things for Intel and small things in the world of computing. On its rise, Intel spawned a number of microprocessors, the most prominent being those in the burgeoning 8086 family. This clan of 16-bit microprocessors boasts the popular 8088; the faster 8086; the 80186 and 80188, which pack the processing power of the 8086 plus the support circuitry of 15 other chips; and now the 80286, a chip that essentially combines two 8086s with the special features necessary for multitasking and multiuser systems.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All these microprocessors process data in 16-bit gulps; most also receive and send data to the outside world in 16-bit dollops. The exceptions are the 8088 and the 80188, which combine 16-bit internal processing with 8-bit input and output. For example, an 8088 receives data from a disk drive 8 bits at a time, processes it internally in 16-bit registers, then sends the results back out in 8-bit form. This 8-bit format is imposed by the 8088's "bus," the eight miniature wires that connect the microprocessor to the rest of the computer and, hence, the outside world. Each line is dedicated to 1 bit. A machine using an 8086, with its 16-bit processing and 16-bit bus, usually works faster than a PC.

IBM's choice of the 8088 was dictated by market wisdom. While the 8088 wasn't the most powerful microprocessor around in 1981, it was relatively cheap, available in large quantities, and, more importantly, a reliable and tested microprocessor. Furthermore, most expansion boards, disk drives, and parallel printers made at the time of the PC's release were designed for 8-bit computers like the Apple II. When the PC arrived, it was a relatively simple matter for companies making peripherals to adapt their products for the PC.

> *Multitasking systems can network as many as 16 PCs–and are already elbowing minicomputers aside in the competition for customers.*

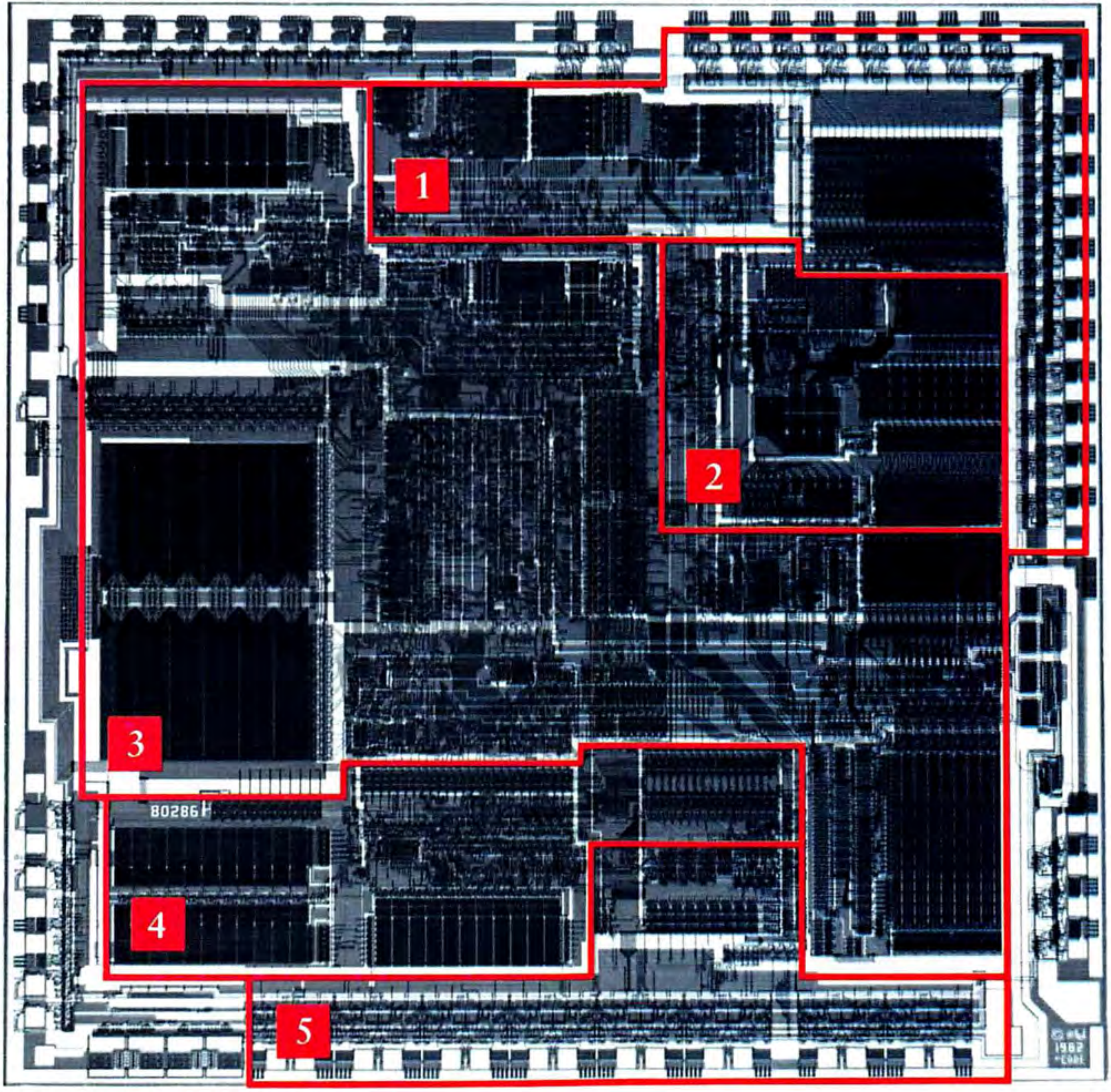
Now the demand for personal computers with greater speed and sophistication is growing. Given the increasing popularity of local area networks and memory-hungry integrated software packages, it's not surprising that the 80286 is showing up in the computer market. Multitasking, multiuser 80286-based systems that can network as many as 16 PCs–such as the Intel 286/310, the Visual 2000, and the Rair SuperMicro–are already elbowing minicomputers aside in the competition for customers. Of course, these 80286 computers aren't cheap–prices start at $8000. But like most things micro, 80286 machines will get cheaper as production of the 80286 grows and software that takes advantage of the chip's power makes such machines truly useful. A host of add-on products for the PC incorporating the 80286 are also on their way: everything from expansion boards that triple the PC's processing and input/output speeds to those, like the PC Xtender, that turn a PC XT into a high-speed, multiple-terminal-network server. Sources at Intel estimate that over 200 80286-based products for the PC and other computers will be available by early 1985.

Inside the 80286

The 80286 runs at 8 MHz, over one and a half times the rate of the PC's 8088, and holds 120,000 transistors, six times as many as the 8088. But raw numbers are not always a good measure of a microprocessor's performance or an indication of its abilities. The 80286 runs PC software five times as fast as the 8088, and Intel engineers consider the chip to be six to eight times more powerful. This is largely based on the 80286's ability to use 16MB of memory (versus the 1MB addressing ability of its relatives) and to manage that memory in special ways. This memory-handling ability is the key that enables the 80286 to unlock the door to multitasking.

Multitasking is achieved by manipulating multiple sets of data and program instructions at once. To understand the essentials of multitasking, consider how a typical sequential microprocessor works. Under the direction of a program, a microprocessor fetches an instruction stored in memory, finds the required data in memory, and performs the operations indicated by the instruction. The microprocessor then receives the next instruction and repeats the cycle.

Each operation is performed in sequence; the microprocessor can't fetch another instruction until the first one has been executed. If it could, a great deal of time would be saved. A microprocessor has slack time that could be used productively. For example, an instruction may direct the microprocessor to send a message to the operating system and wait for a response. The entire process may take a few milliseconds–enough time for the microprocessor to accomplish several other tasks.



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Anatomy of Intel's 80286 (1) bus unit (addresses), (2) address unit, (3) execution unit, (4) instruction unit, and (5) bus unit (data).

The 8088 takes advantage of these inactive moments with its bus instruction unit (BIU), a small, independent section of the microprocessor that includes an instruction queue. When the traffic clears on the bus, the BIU finds the first two bytes of the next instruction and stores them in the queue. As soon as the microprocessor finishes the last instruction, it goes to the queue for the next one. This approach to managing data not only speeds up the 8088's operation–since the microprocessor doesn't have to search memory for its next instruction–but in effect lets it do two things at once.

The 80286 carries this process several steps further. It not only uses a BIU but has an instruction queue that holds three ready-to-execute instructions. When the microprocessor is close to completing one instruction, it signals the BIU to take the next instruction out of the instruction queue. At the same time, another section of the chip called the "address unit" handles several complex housekeeping tasks required by the 80286's memory management scheme. In short, the 80286 does four things at once and enormously speeds up processing by eliminating much of the lag time common in most microprocessors.

Managing and Protecting Memory

What truly distinguishes the 80286 is its memory management unit (MMU), a discrete section of the chip that handles the actual addressing of memory much in the manner of a mini or mainframe computer. Most personal computers store data and program instructions at specific, or "real," locations in memory. A programmer can even include references to specific memory locations–called addresses–in a program.

Large computers, on the other hand, use a scheme known as "virtual" addressing, in which data and instructions are stored relative to a reference point, which may change from program to program or from user to user. The difference between real and virtual addressing is the difference between specifying the third card from the top of a deck of cards and specifying the third card after the first ace. In either case, the designated card can be found, but in the second, the physical location of the card changes every time the deck is shuffled. The 80286's MMU converts the virtual addresses into real addresses. The user and the software never know what the real addresses are and don't need to.

But how are programs on a multitasking 80286 or users in a local area network that is served by an 80286-based machine prevented from writing over each other's files? The 80286 avoids this potentially disastrous problem by allowing an operating system or other software to cordon off sections of memory into segments as large as 64K. Passage from one segment to another is tightly controlled by assigning each segment one of four security levels. If a program requesting access to a segment doesn't have the proper security clearance (which is determined by the MMU), access is denied. Since segment boundaries also serve as reference points for virtual addressing, programs and data do not accidentally write over existing material in memory.

Memory can be even more strictly protected: in addition to a security level, a segment can be assigned to a particular task. A task could be a user on a network or one of several programs run by the same user. This approach prevents programs or users with the same security level from entering a segment unless permission is explicitly given. Security is further assured because the registers that convert virtual addresses to real ones are inaccessible to the inspired programmer and the insidious hacker.

This combination of segmentation, virtual addressing, and security is at the heart of the 80286's ability to protect memory. While protection is a complicated process, it not only makes the user's life easier but also makes multitasking and multiuser computers possible.

Virtual Memory

The 80286 is dexterous enough to support over 1000MB of "virtual memory." Virtual memory, like memory protection, is a software function. It lets a computer fake more memory than it has by permitting programs to ignore the distinctions between RAM and disk storage. All available memory and disk storage can be written to and read from at will. This electronic sleight-of-hand is made possible by the MMU working in conjunction with an accommodating operating system.

Virtual memory is a scheme by which programs and data are divided into "frames" that are swapped in and out of memory as needed. In the case of the 80286, a frame is almost always the same size as a segment. The MMU keeps track of what frames are currently in RAM and where frames are on the disk. Since memory is limited in any system, some frames must return to disk when space is needed for new frames. The ideal method would determine the least-needed frames and send them back to disk–a decision that is made by the operating system based on any number of criteria. One common method, the "clock algorithm," sends frames back to disk if they haven't been accessed within a certain time.

Although the process of moving data and instructions in and out of memory is automatic, disk access takes time–a reason why virtual memory is most commonly used on hard disk systems. Even on a hard disk a program can drag if it makes continual disk reads. Because a frame on the 80286 can hold up to 64K of data and instructions, the 80286 keeps disk access to a minimum. By matching frame and segment sizes, the 80286 also avoids some time-consuming and hair-raising logistical problems.

The Single-User 80286

It's been noted several times that the 80286 supports multitasking. The term, one that's often dropped by computerists in casual conversation, strictly means that a computer has several programs in memory at once and two or more of them are running simultaneously.

Actually, almost no computer can run two programs at precisely the same time. But by putting several programs in memory and quickly switching between them, multitasking is neatly simulated. Obviously, multitasking is at the heart of any 80286-based multiuser computer. But multitasking is also quite useful on a single-user system, since it allows quick access to numerous applications–spreadsheet, word processor, data base management, and others–and allows the powers of each to be greatly expanded.

The 80286's memory management also opens a single-user computer to powerful mini and mainframe operating systems like UNIX. More than one industry analyst has rightly noted the 8088's limitations in using UNIX and similar operating systems. But an 80286-based PC, with its raw processing power, memory protection, and abundant memory, would easily handle UNIX.

Both Digital Research and Microsoft are so confident in the chip's acceptance that they are working on versions of UNIX for the 80286. Digital Research, with the aid of Unisoft Systems, is developing a version for Intel based on Bell Labs' UNIX System V. Once completed, it will be delivered to AT&T and licensed for use on the company's 80286 machines. Meanwhile, Microsoft is reportedly converting Xenix, its popular PC version of UNIX, for the 80286.

> *Virtual memory, like memory protection, is a software function. It lets a computer fake more memory than it has.*

Not surprisingly, Intel is several steps ahead of other hardware companies in getting software up and running on its own 80286 machine. Microsoft has already produced a version of MS-DOS (called 310 MS-DOS 1.0) that permits the Intel 286/310 computer to use such off-the-shelf PC software as *WordStar* and *Multiplan*. A number of other popular programs have been specially sculpted for the 286/310 system, among them UCCEL Corporation's *Software Fitness* integrated accounting package; Quadratron's word processing and productivity software; Ryan-McFarland's COBOL compiler; three data base development and management programs–*C-ISAM*, *File-It!* and *Informix*–from Relational Database Systems; plus 286/310 versions of software from MCBA, Software Express, and Access Technology.

A single-user PC built around the 80286 could also simultaneously run application software under different operating systems. With the proper master operating system—one that coordinates other operating systems or emulates them—an 80286 PC could be a nearly universal computer. Programs would run as tasks under the appropriate operating system, which in turn would be a task under the master operating system.

Digital Research's Concurrent DOS 3.1 approaches this kind of integration via software; the Micro Craft Dimension personal computer does it by incorporating the necessary microprocessors on expansion boards. Both approaches are a bit expensive and unwieldy and, on an 8088-based machine, rather slow. The 80286 can easily support this kind of all-in-one integration, since it offers the necessary RAM, processing speed, and memory protection.

An 80286 in Your Future?

No one really knows if the 80286 will form the basis of the next generation of personal computers, since the chip is designed primarily for multiuser systems. Building a general-purpose personal computer around the 80286 might seem like overkill. But once the cost of the 80286 drops, a personal computer with virtual memory and efficient multitasking might be very attractive indeed. Apparently the notion is attractive to IBM, assuming rumors about its upgradable 80286 "Popcorn" prove true.

A large part of the 80286's success hinges on IBM and, by logical extension, the availability of software. This isn't a profound insight, but it's a proven one. The other major consideration, of course, is price. An 80286 machine with a 20MB hard disk and 4MB of RAM—the minimum configuration for a full-fledged multiuser system—would have to cost close to $5000 to catch on. Two years ago, such a system at that price would have been a pipe dream. Today, that dream is almost within grasp.

Robert Luhn is the Associate Editor of PC World. *Rick Cook is a freelance writer whose work has appeared in* ComputerWorld, Barrons, *and the* Buyer's Guide to Small Computers. *His latest book,* The Cassette Computer Book, *is being published by Sybex.*

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408/987-8080
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408/988-1790
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310 MS-DOS 1.0
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206/828-8080
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617/851-5000
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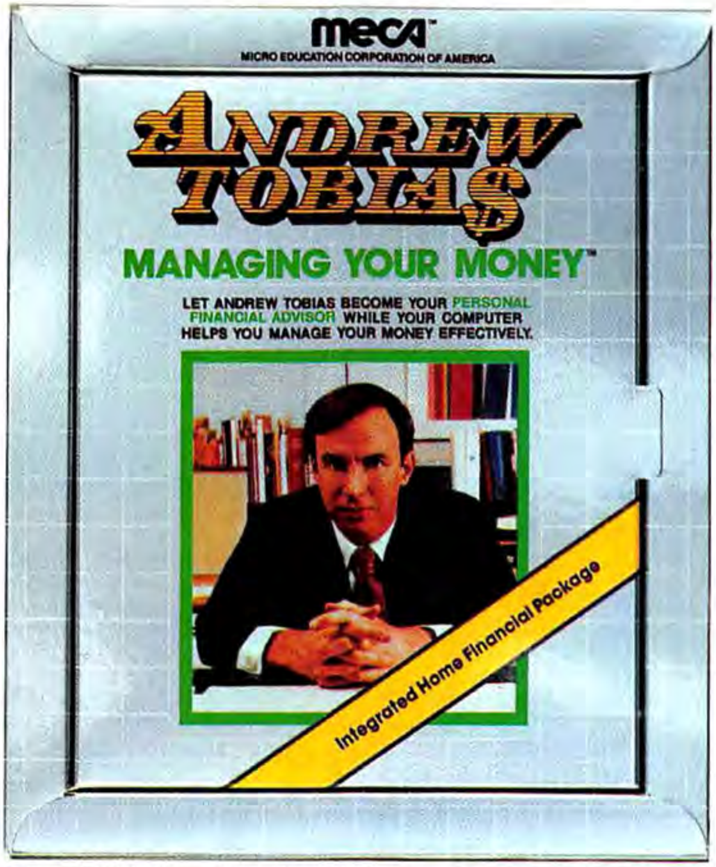
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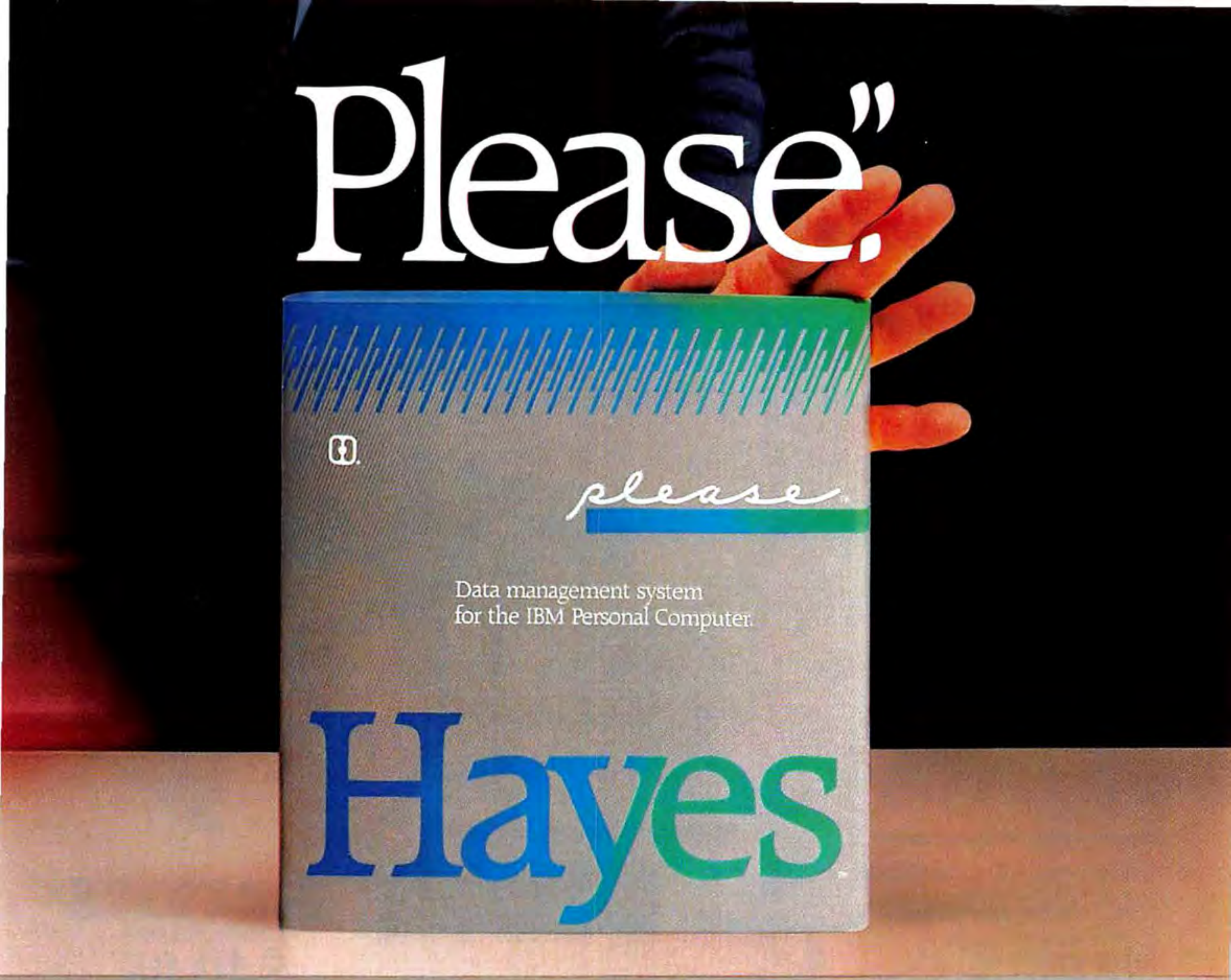

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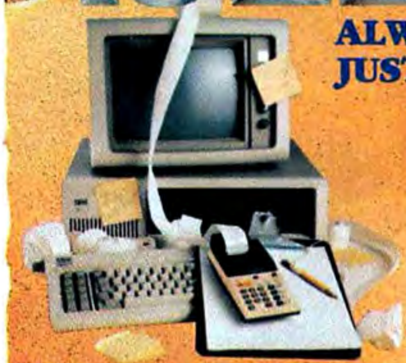

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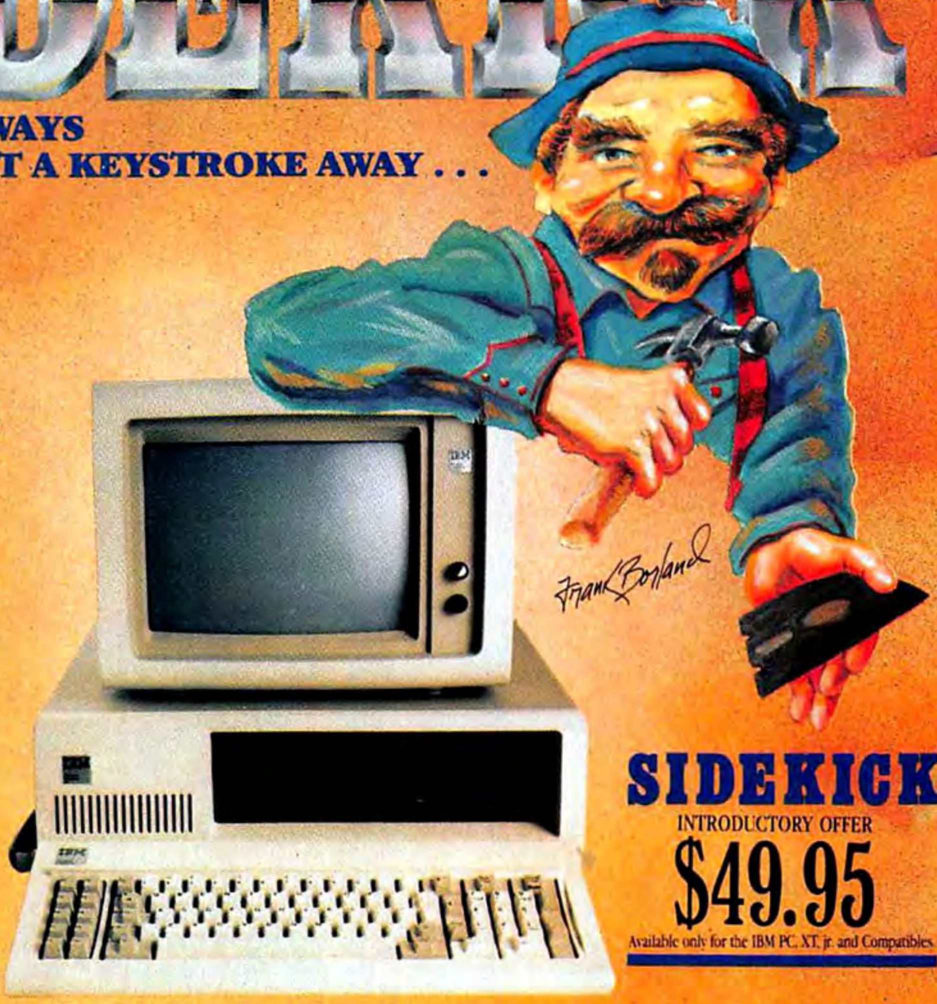

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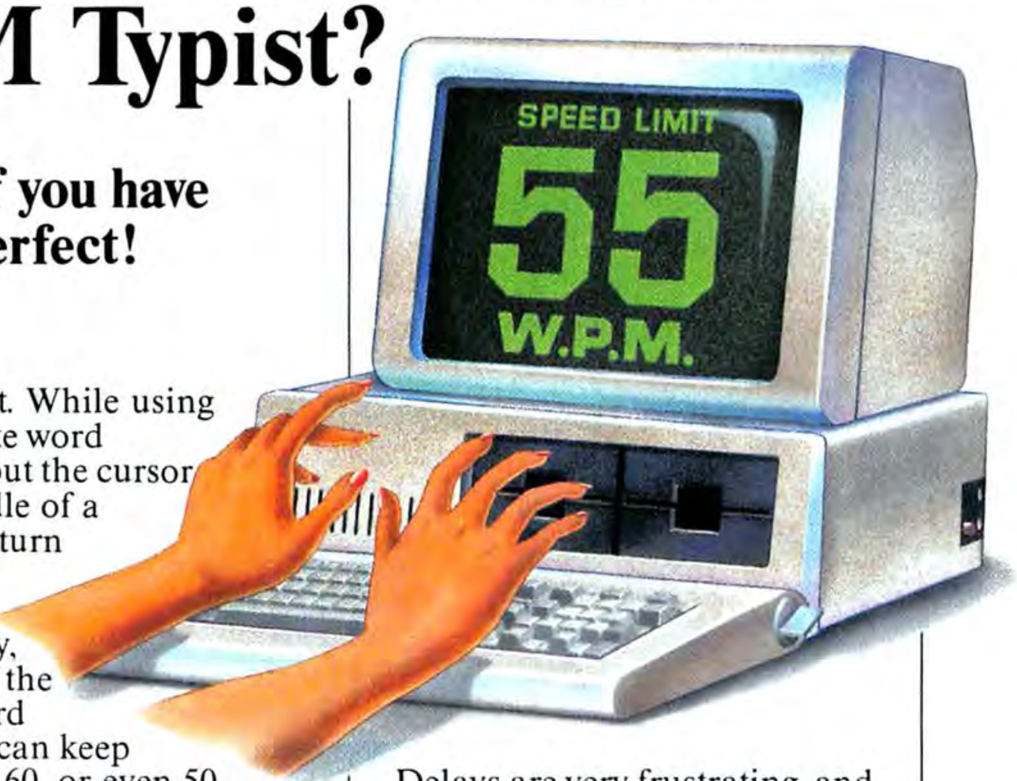

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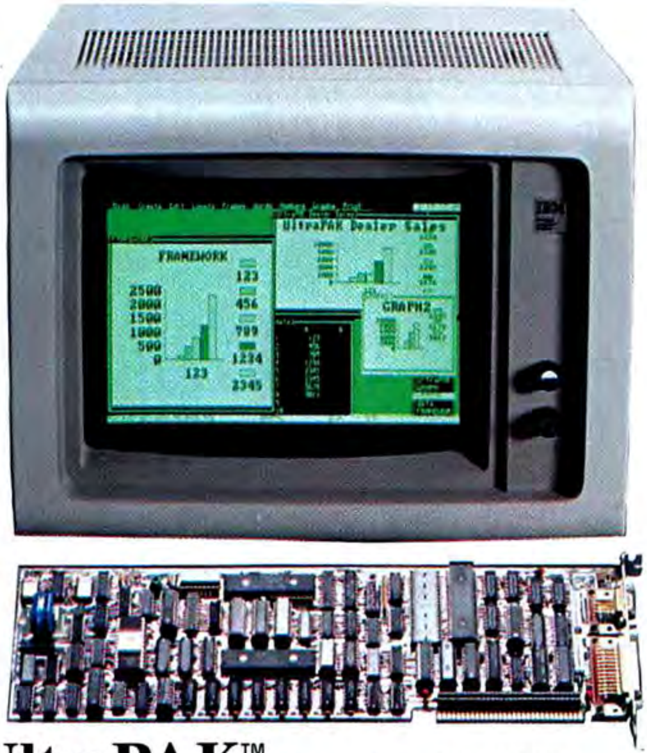

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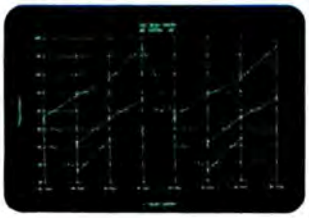
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Toward a Graphics Standard

Ready to receive color graphics information over the phone line? The NAPLPS presentation standard provides the communication and display rules that make it possible.

Mark Dietrich and Jennifer Stothers

Until recently, computer graphics users had to be satisfied with creating and displaying their own designs on their own equipment. If they wanted to exchange designs with friends or colleagues, graphic artists would either have to use the same or similar graphics software or repeat the steps taken to create the original design. The lack of a standard method of communicating graphics information has led to a profusion of graphics packages written for different computers, monitors, and printers.

Luckily, a new graphics standard called the North American Presentation Level Protocol Syntax, or NAPLPS ("nap-lips"), was adopted in January 1984 by the standard-setting organizations in the United States and Canada. This standard was originally developed to unify videotex systems being developed separately by AT&T in the United States and by the Department of Communications in Canada. Videotex is the interactive communication of text and graphics between central data bases and remote terminals (see "The PC News," *PCW,* Vol. 2, No. 4).

The acceptance of NAPLPS opens up the possibility of videotex data bases of images, text, and numeric data that can be accessed by any personal computer equipped with a modem, communications software, a high-resolution color monitor, and a NAPLPS decoder. The decoder, which is usually implemented in software, translates between NAPLPS and ASCII and directs the image display on the personal computer screen.

By increasing the graphics capabilities of users' terminals, NAPLPS can enable on-line services to go beyond scrolling text and expand into new and exciting areas. For example, a NAPLPS-based data base could include weather maps, charts of stock prices, or electronic circuit diagrams. The new standard also paves the way for on-line advertising, which, like it or not, is necessary to get the videotex business

> *NAPLPS is well suited for use in on-line environments because its code is compact and therefore requires little transmission time.*

rolling. NAPLPS is well suited for use in on-line environments because its code is compact and therefore requires little transmission time.

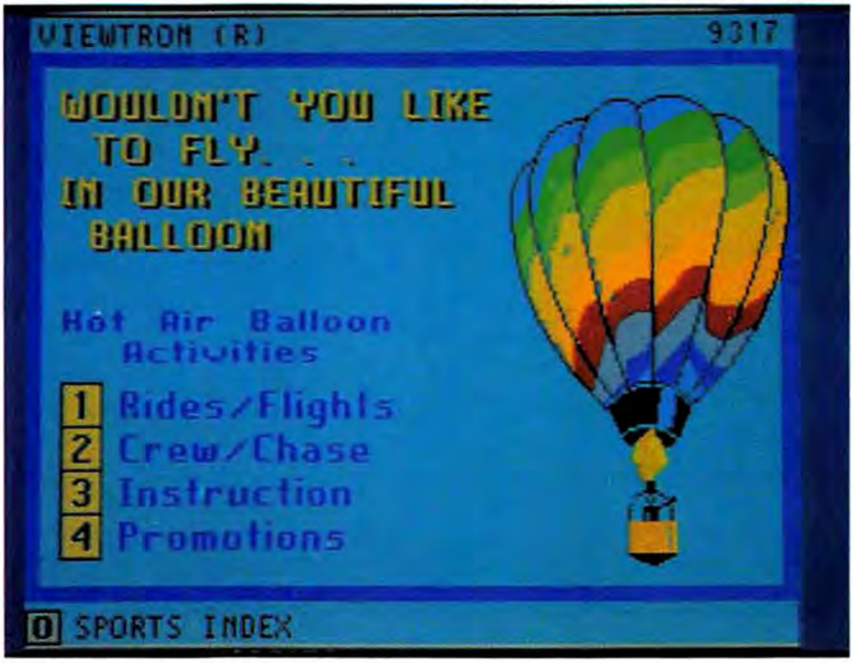
A New Foundation for Videotex

Videotex data bases evolved separately from personal computing. The two activities are, however, becoming highly interdependent—an interaction that enhances the commercial prospects of both. With NAPLPS, a personal computer that is already in place can be used as a videotex terminal, giving videotex access to a broad, ready-made audience. As the personal computer industry emerges from its early stage, when many of its customers were technical experts, new applications must be found that appeal to a broader base. Communications applications like videotex seem the most promising.

Although the videotex industry is in its infancy, a few companies are beginning to provide videotex services for users of personal computers, and many more services are being planned. These include interactive services, available from banks, mail order houses, and cable TV services, and news and information services such as Dow Jones News/Retrieval and Viewtron. So far, most NAPLPS videotex services are located in Canada, and many are aimed at farmers who need up-to-date commodities and weather information.

One indication of the seriousness with which NAPLPS videotex is being considered is IBM's recent announcement that it has em-

Source: Viewdata Corporation of America, Inc.



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0 SPORTS INDEX

The range of colors and shapes possible with NAPLPS makes videotex an attractive alternative for advertisers.

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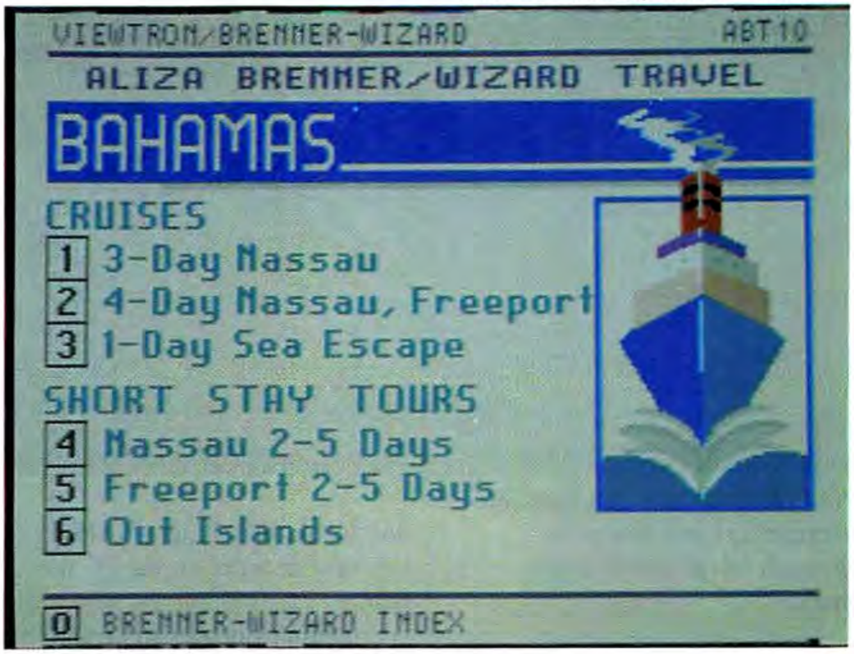

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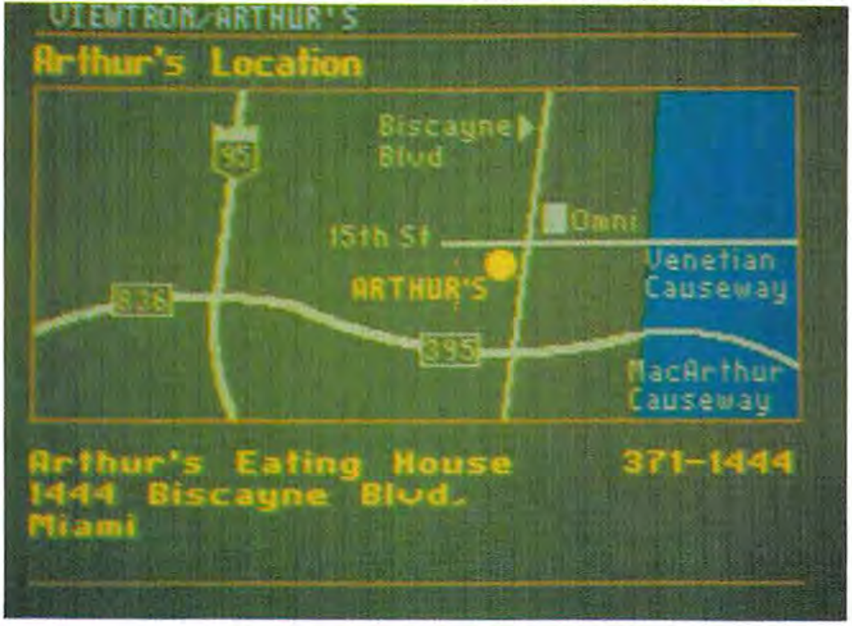
5 Freeport 2-5 Days
6 Out Islands

0 BRENNER-WIZARD INDEX

Like the ASCII videotex available from The Source and CompuServe, NAPLPS videotex is menu-driven. However, NAPLPS images appear frame by frame rather than in a scrolling stream of text.

Source: Viewdata Corporation of America, Inc.

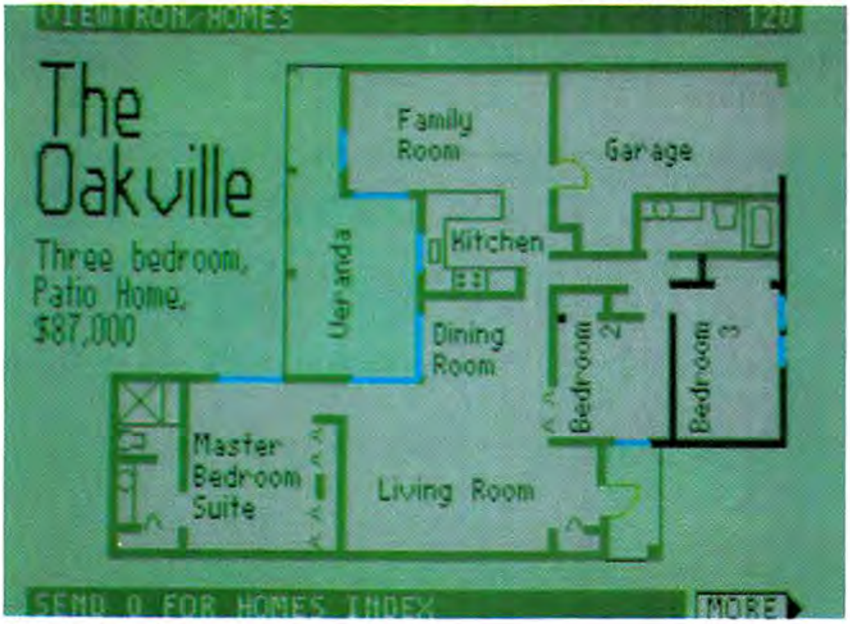


VIEWTRON/ARTHUR'S

Arthur's Location

Arthur's Eating House 371-1444
1444 Biscayne Blvd.
Miami

Source: Viewdata Corporation of America, Inc.



VIEWTRON/HOMES 120

The Oakville

Three bedroom,
Patio Home,
$87,000

SEND 0 FOR HOMES INDEX

MORE

NAPLPS videotex can communicate maps and blueprints through telephone or cable lines.

barked on a joint venture with Sears and CBS to create a NAPLPS-based videotex service called Trintex. Although Trintex will not be ready for several years, IBM announced that the corporation would be selling a NAPLPS software decoder for the PC this year.

Providing videotex information need not be solely the dominion of large corporations. NAPLPS frame-creation software is becoming available for the PC. As frame-creation software prices drop, an increasing number of people will set up NAPLPS bulletin board services, just as thousands have set up ASCII BBSs.

Solving the Communications Problem

Videotex could be the primary application for NAPLPS, but users of computer graphics have also looked to the standard as a way of communicating and transferring graphics between incompatible systems. For example, in Canada a forerunner of NAPLPS called Telidon is used as a standard method of coding computer-generated medical images. Artists at a wallpaper firm are using NAPLPS-based equipment to prepare their designs. Standard coding allows designs to be stored and subsequently retrieved without the danger that changes in hardware or software will make the designs unusable.

NAPLPS is the first formally adopted standard for defining the presentation of text and graphics on any display device. Other graphics coding approaches have either been dependent on the type of display device used or concerned more with describing the objects to be displayed than with describing the display itself. NAPLPS provides a common language that all image-creation systems can speak and that all image-display systems can understand.

To date, a number of approaches to the coding of text and pictorial information have been developed for videotex systems around the world. Prestel (in Britain) and Antiope (in France) were the earliest graphics videotex systems. These systems rely on mosaic coding to depict graphics information. Mosaic coding is based on a fixed set of graphics symbols, similar in principle to those included in the IBM character set. The color of these symbols can be controlled by special device control characters that work much like the format characters in ASCII (such as carriage returns, backspaces, and form feeds).

Telidon took videotex graphics a step further with the use of a sophisticated geometric coding approach. Instead of tying the display to the location of each character (as in mosaic coding), geometric coding draws geometric primitives (such as points, lines, squares, and circles) by specifying the kind of primitive and where on the screen it should appear. Not only does geometric coding provide more flexibility in designing graphics than mosaic coding offers, but it takes up only a fraction of the digital coding space (in bytes) that mosaic coding requires. Thus, graphics represented in geometric coding can be stored or transmitted more efficiently.

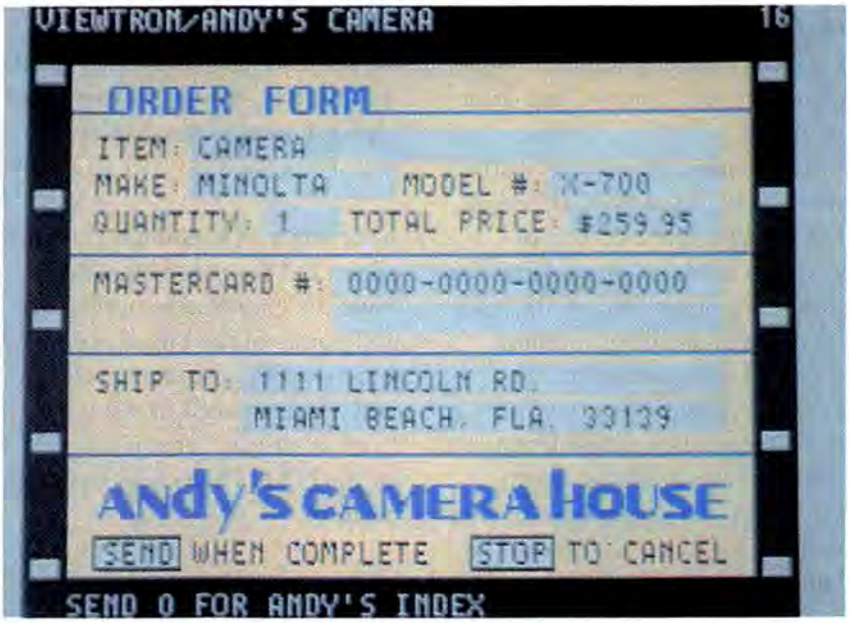
> *NAPLPS is the first formally adopted standard for describing the presentation of text and graphics on any display device.*

Moving Along the Graphics Spectrum

To understand the relationships between the different graphics coding approaches, it is useful to arrange them along a "graphics spectrum" that illustrates the incremental increase in text and graphics display capabilities resulting from the use of each additional coding approach (see Figure 1). CompuServe, The Source, and other information services offer the most primitive form of videotex, in which interactive information is provided in scrolling type and graphics cannot be communicated. The transition from scrolling to the full-frame coding possible with Antiope, Prestel, Telidon, and NAPLPS allows the explicit control of character positions and the display of graphics information using coordinate systems.

Another difference between coding methods is whether they depend on a character-mapped or a bit-mapped display. Character-mapped coding relies on a limited repertoire of text and graphics characters but does not require much memory. Bit-mapped coding allows the display to be controlled at a much finer level of resolution, but it does so at the expense of larger memory requirements. In addition, bit-mapped displays often require a convoluted organization of memory in order to meet the speed requirements of their video display circuits, making display updates complicated and slow.

In addition to the spectrum of text and graphics capabilities, there is also a wide range of color control and dynamic control capabilities among various videotex standards. Standards vary in their ability to differentiate elements of an image by using color, texture (such as solid, dotted, or crosshatched areas), or a combination



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MIAMI BEACH, FLA. 33139

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SEND 0 FOR ANDY'S INDEX

Videotex is a two-way, interactive medium. Most analysts believe home shopping and home banking will be the catalysts that will launch videotex.

of both. Mosaic coding systems limit the user to a choice of one color from a palette of eight, whereas the geometric-coded Telidon provides an unlimited range of colors as well as a varied set of textures for both lines and areas.

So far the only dynamic control provided by NAPLPS is blinking, in which a given image can be made to flash on and off and change color at predetermined intervals. A standard for more sophisticated computer animation effects is still in the future.

The Inner Workings of NAPLPS

Because NAPLPS is an open-ended syntax, making additions and modifications fairly easy, the standard embraces every level of both the graphics and color/texture spectra. In addition to the basic ASCII character set, NAPLPS encompasses picture description instructions, mosaic characters, dynamically redefinable character sets, supplementary character sets, macros, and color mapping.

The picture description instructions (PDIs) used by NAPLPS allow the geometric coding of graphics information in a manner that is not dependent on the resolution of a particular monitor. (PDIs are also integral to the Telidon videotex system.) The goal of accommodating a wide range of display technologies is accomplished by a simple syntax of commands that form the basis of the language (point, line, arc, rectangle, and polygon) followed by parameters. For example, in a line command the parameters determine the coordinates of the two end points of the line. Coordinates can be either absolute or relative and are referenced to a standard "virtual display" that is mapped by the NAPLPS decoder onto the monitor.

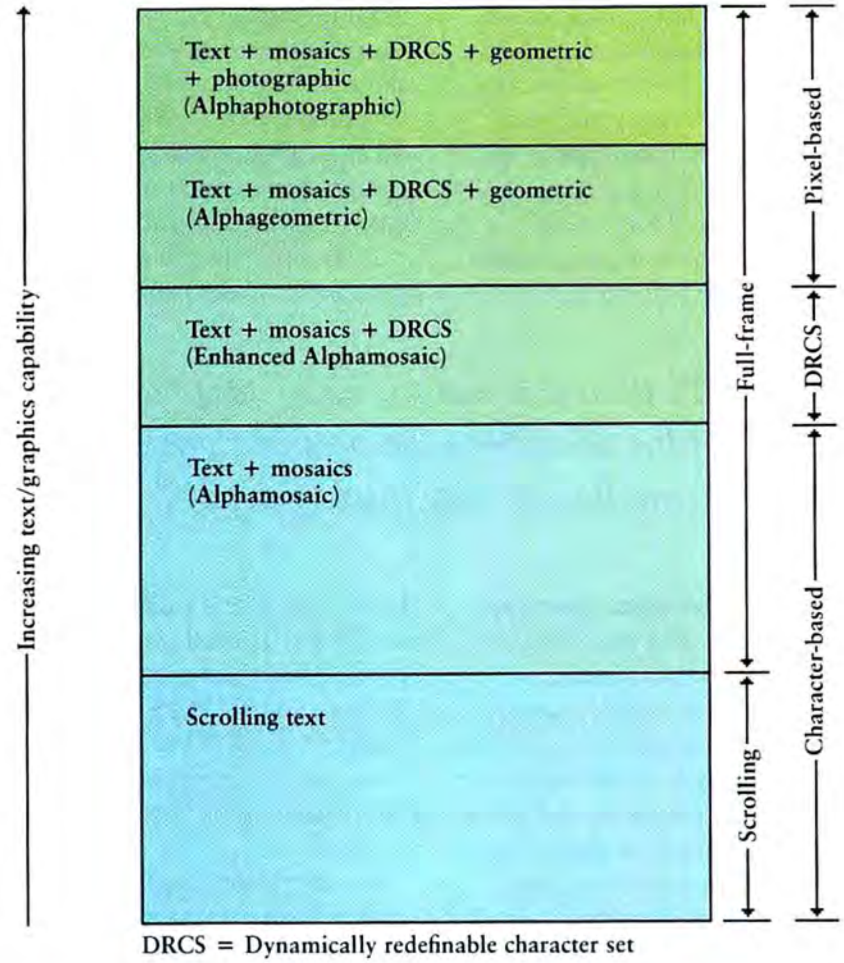
Increasing text/graphics capability
Text + mosaics + DRCS + geometric + photographic (Alphaphotographic)
Text + mosaics + DRCS + geometric (Alphageometric)
Text + mosaics + DRCS (Enhanced Alphamosaic)
Text + mosaics (Alphamosaic)
Scrolling text
Full-frame
Scrolling
Pixel-based
DRCS
Character-based
DRCS = Dynamically redefinable character set

Figure 1: A spectrum of graphics capabilities, from scrolling text to alphaphotographic display

In addition, the PDIs include commands that control display functions such as color and blinking. PDIs also allow the efficient coding of certain frequently used picture elements. A graphics display is generated by a sequence of PDIs, each followed by coordinates or other supplementary information defined in the NAPLPS standard.

Mosaic characters are created by character-based coding to make simple pictures and diagrams. With mosaic coding, the display area is addressed as a fixed matrix of cells, each cell being a matrix of pixels. Cells are divided into six elements (three high by two wide), yielding 64 possible black-and-white designs for each cell.

Dynamically redefinable character sets (DRCSs) significantly enhance the mosaic option. They allow dot patterns of new text or graphics characters to be downloaded from a host computer and permanently stored in the terminal's memory instead of being transmitted every time they are required. DRCSs permit the use of sophisticated symbols and graphics. The flexibility offered by this method makes PDI geometric coding methods almost unnecessary.

Supplementary character sets complement the basic ASCII character set, defining special symbols and diacritical signs such as accents, umlauts, and circumflexes.

Macros allow reduction of the number of bytes that must be transmitted to the terminal in order to create a display. Any sequence of NAPLPS code may be transmitted and stored as a macro. The macro can subsequently be invoked by the host computer by transmitting a short command to the terminal, which then executes the associated sequences of NAPLPS code.

Color mapping allows colors to be defined and used with great precision; an almost limitless variety of colors can be used in a NAPLPS image. Color mapping also gives designers the ability to create animation effects by making images drawn in one color change to another color at predefined intervals.

NAPLPS reconciles different graphics coding approaches by incorporating certain features of each. Because NAPLPS is defined according to a standard coding technique set up by the International Standards Organization (ISO), its range and functions can easily be extended. This technique, called code extension, allows new commands and functions to be defined without making old NAPLPS-based data and software obsolete. Two functions that might be added are sprite programming (simple animation) and font control.

NAPLPS Decoders and the SRM

Although most decoders for the PC are implemented in software, several manufacturers of video display circuits have announced plans to produce products that will support NAPLPS almost directly. This opens up the possibility of NAPLPS support as a standard feature of future monitors for personal computers.

Because NAPLPS creates an image on a virtual display, theoretically it can be implemented on any color display device. This device independence will make the stan-

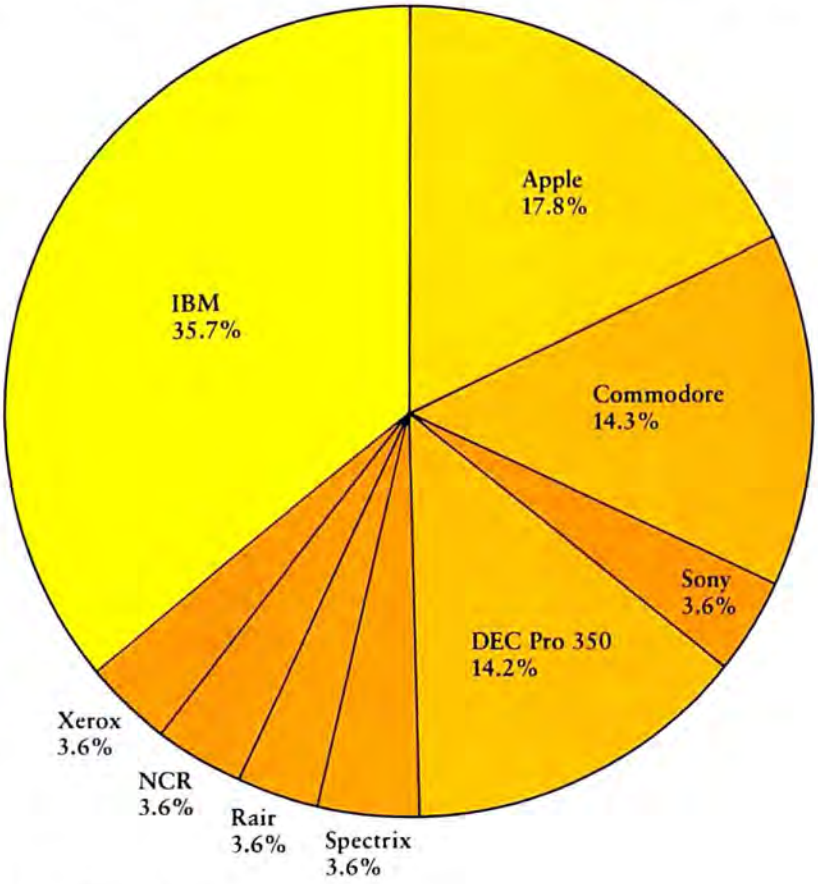

Figure 2: Videotex software availability for personal computers

How a NAPLPS Decoder Works–And How It Doesn't

David McCune

A NAPLPS decoder has three primary functions: it accepts as input the bytes of data that describe an image under the NAPLPS protocol; its interpreter program translates them into the thousands of bits that define the colors of the phosphor dots in a particular personal computer's graphics display; and its video circuitry creates an image.

Given the proper software, some personal computers can qualify as NAPLPS decoders. The IBM PC, though, can be programmed to be a true NAPLPS decoder only with the addition of nonstandard video hardware. Even the minimum NAPLPS hardware requirement (the Service Reference Model, or SRM) far exceeds the standard PC's video capabilities. The SRM requires the display of at least 16 simultaneous colors with 256- by 200-pixel resolution. The PC can only manage four colors. In addition, the display must be color mapped so that colors can be changed instantaneously.

Because of the sophisticated video requirements of NAPLPS, many NAPLPS decoders include the necessary hardware and are sold as stand-alone videotex terminals. These terminals contain an input channel (usually a modem or an RS-232C port), a microprocessor, ROM (for the interpreter program), RAM, video memory, and video circuitry. Some decoders include a built-in color monitor. These stand-alone NAPLPS decoders range in price from $900 (for AT&T's Sceptre) to well over $2000. At these prices it is no surprise that NAPLPS videotex has hardly penetrated the home market.

During the past two years, much of the hardware required for a NAPLPS decoder has turned up inside personal computers. Some of the NAPLPS decoder software for the IBM PC works with a standard IBM Color/Graphics Adapter and an IBM RGB color monitor. However, if you use an enhanced color graphics board, you can display more colors with a finer resolution.

Regardless of the color graphics board used, software decoders generally have no trouble producing the correct NAPLPS shapes. Dots, lines, and rectangles can be drawn in the correct size at the correct locations on the screen even with a simple IBM Color/Graphics Adapter.

Color is harder. It is perfectly reasonable for a NAPLPS artist to create a frame using 16 shades of purple simultaneously. An IBM Color/Graphics Adapter can display four colors simultaneously, only two of which look even remotely like purple. In some cases, this distortion can render a frame useless. A stacked bar chart would be misleading if the segments of each bar (shades of purple) were all translated into the same shade of purple on the PC.

Some NAPLPS decoders for the PC allow the user to take some control over the NAPLPS-to-ASCII translation. The *Microstar Decoder*, for example, lets you pick which IBM color should be displayed for each original NAPLPS color. By changing the color correspondence table, you can improve the legibility and aesthetics of a frame. Some decoders provide an algorithm that ensures that text will never be translated into the same color as the background graphics.

The Quickpel Decoder takes a different approach. Quickpel's NAPLPS interpreter program dwells in ROM chips on a circuit board that fits into a PC expansion slot. The board also includes its own color-mapped video memory and circuitry and an 8088 microprocessor to run the interpreter firmware. The 8088 can also be used as a coprocessor to run programs simultaneously with the PC.

Although most NAPLPS frames will be legible even if you use standard IBM equipment, the addition of one of the enhanced color boards improves the graphics display considerably. Most of the decoders work with the Plantronics Colorplus board, which provides 16 fixed colors simultaneously (actually 8 colors, with a high- and low-intensity version of each); this makes it less likely that the software decoder will translate two different shades into identical colors on the PC.

The Realcolor board by Micro Developed Systems goes one step further, supporting full color mapping. The board can generate 16 simultaneous colors selected from a range of 512. Using the Realcolor board's color-mapping capability, a software decoder can satisfy all of the color requirements of the NAPLPS SRM, including high-speed color changes used for blinking and animation. However, the Realcolor board cannot generate color-mapped video on the standard IBM Color Display. You need a special analog RGB monitor, a composite video color monitor, or a color TV with an added RF modulator.

Two major problems currently limit the compatibility of decoders with NAPLPS data bases. The first problem affects text display. Each NAPLPS text character is contained within an invisible "character cell." NAPLPS carefully defines how the size of the character cell is specified and how the cell should be mapped on the decoder's display. The default cell size, for example, is 1/40 of the display's width. Thus, all NAPLPS decoders

(continues)

must be able to fit exactly 40 standard characters on one line.

Unfortunately, the font used within the character cell is not defined by NAPLPS. For example, some decoders draw a lowercase *l* that has a 1-pixel-wide vertical stem, while others draw fatter vertical strokes. As long as the letter fits within the character cell, both decoders conform to the standard.

NAPLPS also provides proportional spacing. When text is proportionally spaced, different characters take up different widths. NAPLPS leaves the precise algorithm for determining this allocation of space entirely up to the decoder manufacturer. As a result, the same string of NAPLPS text may fit across one line on one decoder's display and require two lines on another decoder. The problem can be serious if the frame combines text with graphics. On some decoders, the text may appear in the wrong place.

There is no easy solution to this problem. Some system operators have simply given up on proportional spacing, thus ensuring that all NAPLPS decoders will display text the same way. The best solution would probably be an amendment to the NAPLPS standard in order to define one or more standard fonts and proportional spacing techniques.

The other serious problem facing decoder manufacturers concerns the so-called "session level interface" to videotex services. The NAPLPS standard is intentionally limited to "presentation-level" issues, which means it only deals with encoding of data that makes up graphic displays. NAPLPS has nothing to say about data communications protocols, for example. Therefore, each videotex service must adopt its own session-level conventions. These consist of strings of bytes that can be used, for example, to define programmable function keys on a local decoder, switch a decoder from 7-bit to 8-bit mode, or cause the local decoder to store incoming data to disk or print a page on a local printer.

None of these session-level tasks has been standardized. The Viewtron videotex service in Miami uses session-level codes entirely different from those used by the Grassroots NAPLPS data base in Winnipeg. Just because a NAPLPS decoder claims "full SRM compatibility" does not mean that it can connect successfully to any videotex service. If you need a decoder to access a specific data base or particular frames, you should test the software on those frames before you buy.

dard compatible with future improvements in display technology.

NAPLPS is also downward compatible, so older monitors can continue to use NAPLPS successfully despite advances in display technology. Downward compatibility is an important feature of any successful standard. Consider, for example, what would have happened if the color TV broadcasting standard had not been downward compatible with black-and-white TV sets.

Because NAPLPS is an open-ended standard and supports a widely varied level of display resolution, industry participants defined a minimum implementation level for NAPLPS-based terminals. This standard, called the Service Reference Model (SRM), sets out the minimum capabilities a monitor must have in order to display an acceptable NAPLPS image. The SRM calls for a minimum terminal resolution of 200 vertical pixels by 256 horizontal pixels and a palette of at least eight colors and eight shades of gray (including white and black). Both of these requirements exceed the capabilities of most color graphics monitors currently in use, including that of the IBM PC (see "How a NAPLPS Decoder Works–And How It Doesn't").

As shown in Figure 2, software products designed for the IBM PC make up the greatest portion (35.7 percent) of all videotex software, perhaps indicating that the primary target market for this product is the business sector. Possible business applications include on-line display of stock prices, employee want ads, up-to-date business news, and training.

Recent trends in the personal computer market show the growing importance of PCs to the videotex industry. There is also a significant trend toward using color graphics monitors for both business and home computers. It is no coincidence that all major personal computer manufacturers, including IBM, Apple, and DEC, have endorsed the NAPLPS videotex standard. This is an unprecedented degree of unanimity in an industry for which proprietary protocols have been the norm. NAPLPS could become the standard display protocol for all personal computers. ●

Mark Dietrich is a telecommunications engineer and a member of CSP International's Business and Technology Studies consulting staff in New York City. Jennifer Stothers is a member of CSP International's Information and Transaction Services consulting staff, which specializes in videotex and videotex-related technologies.

HELIOgraph (software decoder, slide-show generator, frame-creation software)
Microtaure, Inc.
P.O. Box 6039
Station J
Ottawa, Ontario
K2A 1T1 Canada
613/230-5265
List price: $398.95
Requirements: 256K, one disk drive, monochrome and color monitors, Micro Developed Systems Realcolor board

Microstar Videotex Interpreter (software decoder)
Microstar Software, Ltd.
14 Concourse Gate #400
Napean, Ontario
K2E 7S6 Canada
613/727-5696
List price: $240
Requirements: 192K, one disk drive, color monitor, color graphics board

PCS-UVIC (frame-creation software)
ESC Information Services Ltd.
381 Irving Rd.
Victoria, British Columbia
V85 4A3 Canada
604/598-0395
List price: $500 (with UCSD p-System $700)
Requirements: 128K, one disk drive, serial port, color monitor, color graphics board, NAPLPS decoder, UCSD p-System from NCI

(continues on page 274)

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(continued from page 273)

Picture Painter (software decoder and frame-creation software)
Cableshare, Inc.
P.O. Box 5880
20 Enterprise Dr.
London, Ontario
N6A 4L6 Canada
519/686-2900
List price: $3000
Requirements: 128K, one disk drive, color monitor, Plantronics Colorplus board

Quickpel (expansion board decoder)
Micropixel, Inc.
235 Yorkland Blvd. #300
Willowdale, Ontario
M2J 4Y8 Canada
416/492-9803
List price: $625
Requirements: 64K, one disk drive, color monitor

TVX MacroVision (software decoder and frame-creation software)
TVX Corporation
P.O. Box 88364
Atlanta, GA 30356
404/433-4500 (in Canada, Tayson Information Systems 403/230-5998)
List price: $3000
Requirements: 128K, one disk drive, color monitor, color graphics board

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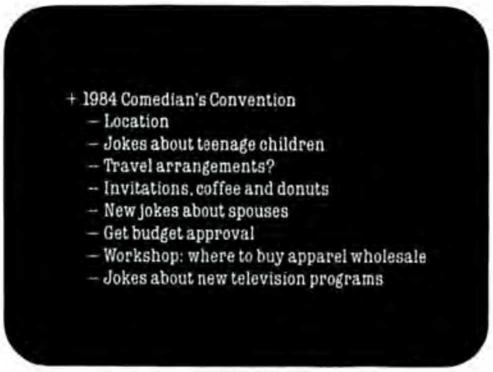

```
+ 1984 Comedian's Convention
  – Location
  – Jokes about teenage children
  – Travel arrangements?
  – Invitations, coffee and donuts
  – New jokes about spouses
  – Get budget approval
  – Workshop: where to buy apparel wholesale
  – Jokes about new television programs
```

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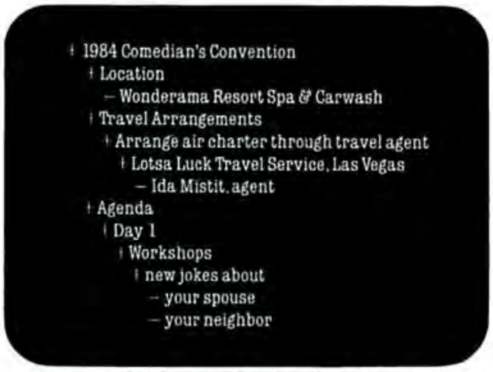

```
+ 1984 Comedian's Convention
  + Location
    – Wonderama Resort Spa & Carwash
  + Travel Arrangements
    + Arrange air charter through travel agent
      + Lotsa Luck Travel Service, Las Vegas
        – Ida Mistit, agent
  + Agenda
    + Day 1
      + Workshops
        + new jokes about
          – your spouse
          – your neighbor
```

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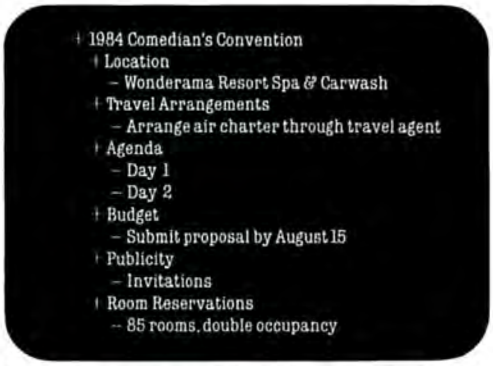

```
+ 1984 Comedian's Convention
  + Location
    – Wonderama Resort Spa & Carwash
  + Travel Arrangements
    – Arrange air charter through travel agent
  + Agenda
    – Day 1
    – Day 2
  + Budget
    – Submit proposal by August 15
  + Publicity
    – Invitations
  + Room Reservations
    – 85 rooms, double occupancy
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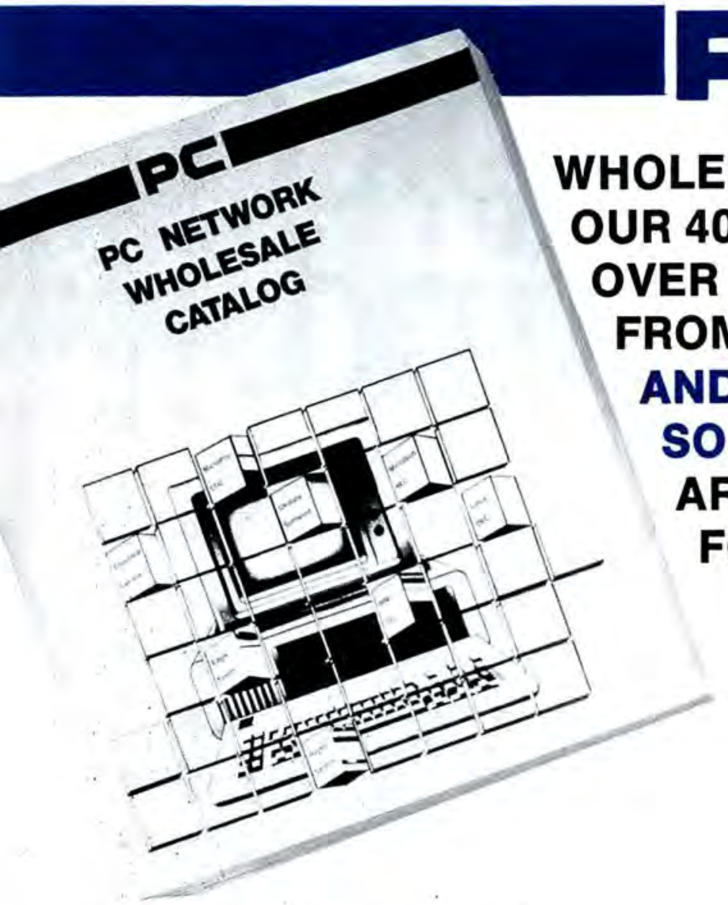

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- 12-21 Day Game Software Rentals (optional)
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	Wholesale
Avant-Garde *Air Traffic Controller*	$16.50*
Bluebush *Chess (Your Toughest Opponent)*	34.00*
Broderbund *Lode Runner*	19.75*
CBS *Goren-Bridge Made Easy*	48.00*
CBS *Mastering the SAT*	81.00*
Epyx *Temple of Apshai*	21.97*
Infocom *Zork I, II, or III*	21.50*
Infocom *Deadline, Witness or Suspended*	27.00*
Microsoft *Flight Simulator*	27.00*
Orion *JBird (QBert Look Alike)*	22.00*
Scarborough *Mastertype*	27.00*
Screenplay *Asylum (works with mono card too)*	15.50*
Sierra On-Line *Frogger*	21.00*
Sierra On-Line *Crossfire*	18.00*
SubLogic *Night Mission Pinball*	24.00*
Spinnaker *Alphabet Zoo*	17.00*
Spinnaker *Delta Drawing*	29.00*
Spinnaker *FaceMaker*	20.00*
Spinnaker *Hey Diddle Diddle*	17.00*
Spinnaker *KinderComp*	17.00*
Spinnaker *Rhymes & Riddles*	17.00*
Spinnaker *Story Machine*	20.00*
Spinnaker *Most Amazing Thing*	23.00*
Virtual Combinatics *Micro Cookbook*	21.00*

BUSINESS SOFTWARE

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ATI *How to use MultiMate*	$42.00*
ATI *How to use Microsoft Word*	42.00*
ATI *How to use Lotus 1-2-3*	42.00*
Ashton-Tate *DBASE III*	CALL
Ashton-Tate *Framework*	CALL
Ashton-Tate *Friday!*	158.00*
Central Point *Copy II PC*	23.00*
Conceptual Instruments *Desk Organizer*	177.00*
Cosmos *Revelation (Requires 8087)*	575.00*
Digital Research *CP/M-86*	33.00*
Digital Research *DR Logo*	57.00*
Digital Research *PL/I Compiler*	399.00*
Digital Research *Concurrent CP/M w/Windows*	90.00*
Funk Software *Sideways*	36.00*
Harvard *Harvard Project Manager*	215.00*
Hayes *Smartcom II*	68.00*
Human Edge *The Management Edge*	145.00*
Human Edge *The Sales Edge*	145.00*
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Lotus Development *Symphony*	CALL
MicroRim *RBase 4000*	230.00*
Microsoft *C Compiler*	275.00*
Microsoft *Word with Mouse—Latest Version*	255.00*
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Monogram *Dollars & Sense*	89.90*
Multimate *Multimate (Latest Version)*	240.00*
Oasis *The Word Plus*	90.00*
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RDS *Informix*	705.00*
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Ryan McFarland *RM COBOL (Development System)*	570.00*
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Satellite Software *WordPerfect*	210.00*
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Apple *Apple //c*	940.00*	*(20.30)*
Apple *Apple //e*	CALL	
Columbia *Desktop & Portable Systems*	CALL	
Compaq *All Models*	CALL	
Eagle *Desktop PC and Spirit Portables*	CALL	
IBM *PC Starter System 1 DSDD/FDC/Color CD/Par Port/Monitor/64K*	1,713.00*	*(37.00)*
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NEC *Notebook New Price!*	420.00*	*(10.00)*
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Tava *PC Complete IBM Compatible (64K/Color or Monn Card/2 drives)*	1,450.00*	*(31.32)*
Texas Instruments *Professional*	CALL	

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► **Maynard** *WS-1 10MB Internal Hard Disk with Sandstar Multi Function Card*	770.00*	*(18.15)*
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► **Tandon** *TM100-2 Full Height DSDD Drive*	158.00*	*(3.16)*
Tallgrass *20MB External Hard Disk with Tape Backup*	2,800.00*	*(46.20)*
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U.S. Robotics *Password (Compact 1200BPS External)*	290.00*	*(6.50)*

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► **Amdek** *Video 300A Composite Amber*	120.00*	*(3.00)*
► **Amdek** *Video 310A IBM Type Amber*	130.00*	*(3.00)*
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Epson *FX-80*	415.00*	*(9.25)*
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ORCHID BLOSSOM/64K installed New Price! Full Six-Pack Features with networking capability!	**205.00***
PANASONIC 1/2 Height Disk Drives with Mounting Kit	**250.00* pr.**
AMDEK MONITORS	
V300G Composite Green	**110.00***
V300A Composite Amber	**120.00***
V310A IBM Amber	**130.00***
HERCULES MONOCHROME CARD	**298.00***
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Almost 50% of The NETWORK's members are corporate buyers and users *(see box at left).* The NETWORK can establish open account status and assign account managers to expedite orders, and coordinate multiple location shipments.

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Complete order form—please print—then fold at arrows, seal with tape or staple and mail today.

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PC

PRICING MADNESS

Once again, as Federal Express picks up our ad at the very last millisecond before this issue's advertising deadline, **here we sit with dozens of price reductions and new product announcements which have arrived too late for us to let you know.**

Why, our ad manager asks, do we always go through a last minute price update frenzy, just seconds before our ad is due at the publisher, when we know that despite our heroic effort, **many of these products will cost even less by the time you read this ad.**

How he asks, can we get a crystal ball to forecast what fantastic promotions and specials our suppliers are going to offer from now to the date this ad gets to the newsstand **over two months from today?**

Well, we decided that he has a good point. While we'll still keep getting our grey hairs and ulcers from last minute revisions, we will start publishing this notice and ask our readers to make a simple check. Look at any four back issues of this magazine (*yes we're in every one)* and track the prices on the most popular products. **You will see that many drop with every issue.** Most of these price changes were instituted well before the issue was printed and **our members always pay the lower price.** This should prove that this notice is much more than hype.

Given the current madness in the PC industry with its spur of the moment pricing and instant product introductions, **you will find it always pays to call for our latest prices.** You will be glad you did.

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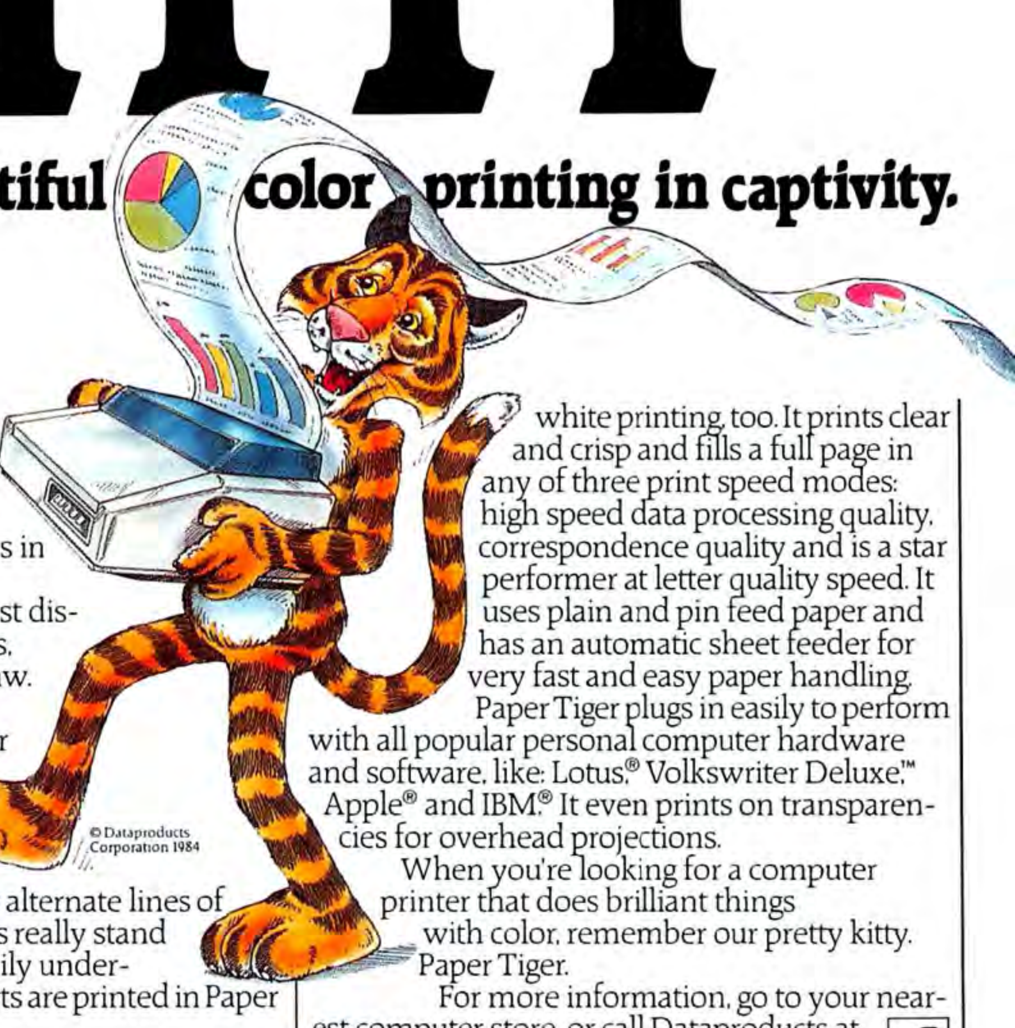

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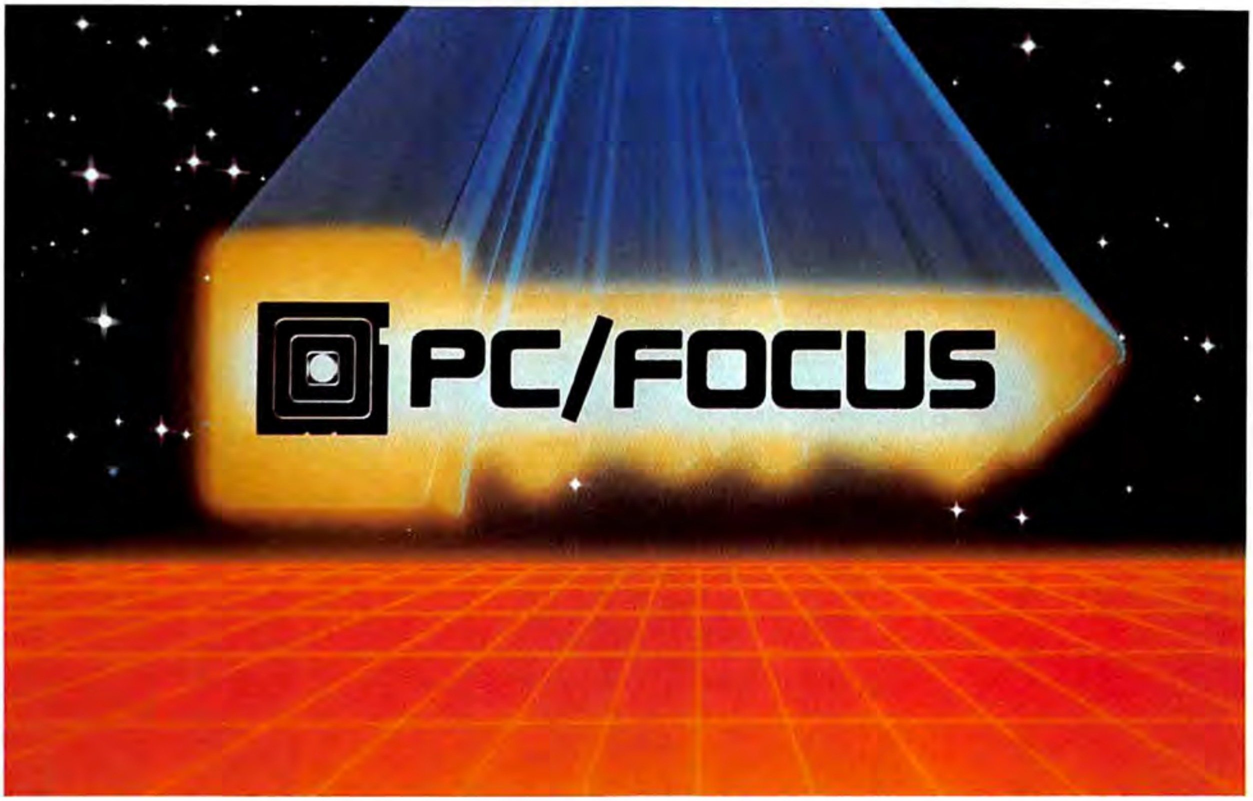

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Frame by Frame

Framework is a straightforward, logical program based on one tried-and-true structure–the outline–and one new one–the frame. This hands-on example shows how the two can work in tandem to create a simple sales report.

Dick Andersen

Putting together a sales report is a common and, in many cases, nettlesome job. The report is typed with a word processor, financial data is collected in a data base and funneled into a spreadsheet for analysis, and various graphs are generated. If you use separate programs, such as *WordStar*, *dBASE II*, and *1-2-3*, for each task, assembling the report takes on the character of a juggling act as you pop program and data disks in and out of disk drives. *Framework*, an integrated software package from Ashton-Tate, not only ends this disk swapping but helps you tackle the thornier issue of how to assemble a sales report or any other project. (For an evaluation of *Framework*'s features, see "Framework: Simplicity and Synergy" in this issue.)

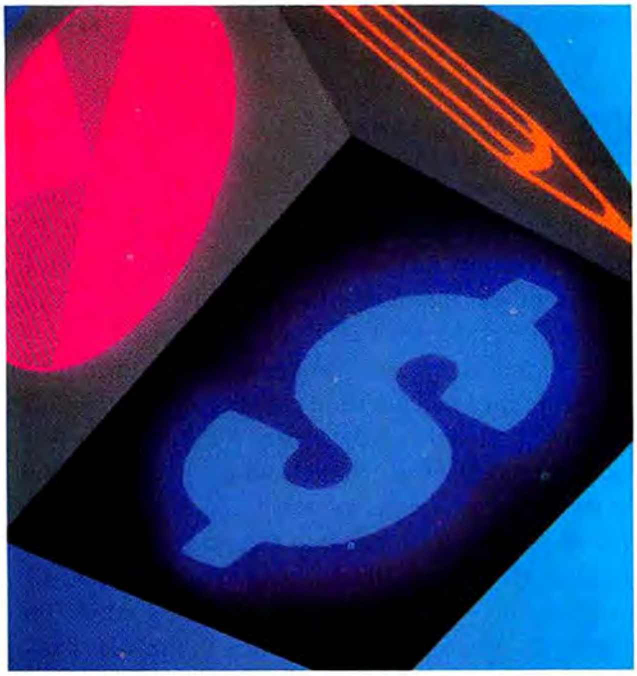
Starting With Framework

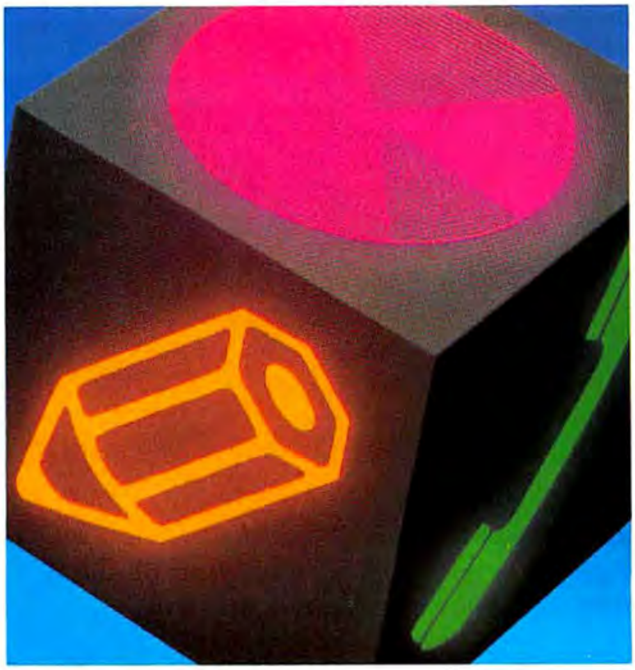
To assemble a sales report, where do I begin? After loading *Framework*, I build an outline by choosing the *Outline* option from the Create menu. An outline is essentially a map of the frames that are created by the program; each line in the outline is tied to a frame. The program first displays a bare-bones outline with several main and subordinate levels. When I add frame descriptions, the outline appears as shown in Figure 1.

A frame is a container for data that allows the program to isolate collections of data from each other. A given frame contains one of several types of data. A containing frame is a master container that holds only other frames, a W (word) frame holds text that is edited with the *Framework* word processor, an S frame contains a spreadsheet, a G frame holds a graph, and a D frame contains a data base. Frame types are specified by the user when he or she makes an outline entry.

Adding a line at an existing level in the outline is a matter of moving the cursor to the last line at that level, displaying the Create menu, and choosing the *Create Empty Word Frame* command. To create a subordinate level, such as 2.1.1 (which would be subordinate to 2.1), I move the cursor to the desired location; <Ctrl>-<GrayPlus> confirms the choice. As the command Create Empty Word Frame suggests, adding a line to an outline also creates a new frame.

To write the sales report, I create a word frame called Final Report as item 3 of the outline. Any time I need to consult the outline, I switch to Outline



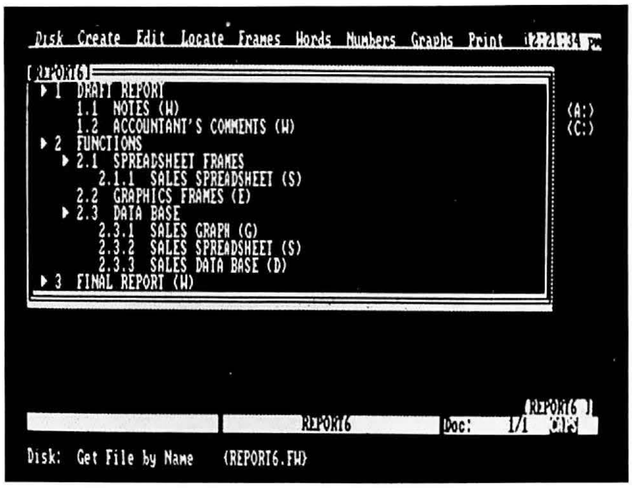


mode by pressing the <F9> key. After I review the outline, I return to my place in the document by placing the cursor at 'Final Report' and pressing <F9> again.

Framework's frame hierarchy compels a user to organize thoughts in a structured way, in the manner of an outline. The outline structure is also helpful when you're navigating through a myriad of frames. Since each frame is listed in the outline, moving from the Final Report frame to the Sales Graph frame is a matter of moving through the outline until you come to the 'Sales Graph' citation.

Using dBASE II Files

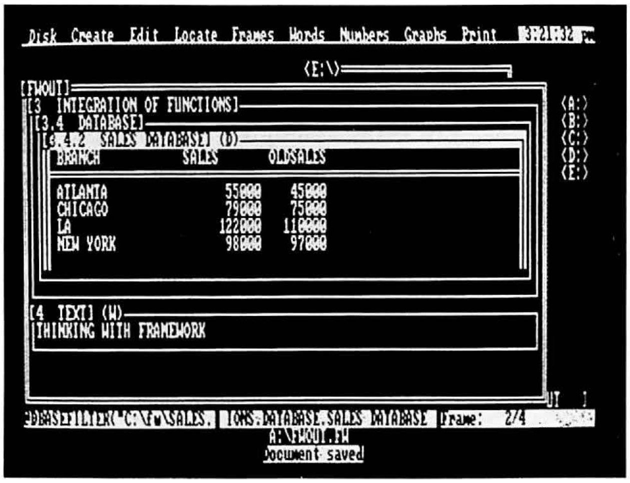
Framework's data management function is RAM based, and all data records must reside in memory when operations are performed on them. Luckily, *Framework* can read selected files and records directly from both *dBASE II* and *dBASE III*, which are disk-based programs. In this example, the sales figures needed for the report are stored in a *dBASE II* file. To copy the file into *Framework*'s data base, I choose the *Get File By Name* option. After I supply the file name, SALES.DBF, *Framework* creates a data base frame and displays the *dBASE* field names.



```
 Disk  Create  Edit  Locate  Frames  Words  Numbers  Graphs  Print   12:21:34
[REPORT6]
 ▶ 1  DRAFT REPORT
      1.1  NOTES (W)                                                  (A:)
      1.2  ACCOUNTANT'S COMMENTS (W)                                  (C:)
 ▶ 2  FUNCTIONS
   ▶ 2.1  SPREADSHEET FRAMES
         2.1.1  SALES SPREADSHEET (S)
      2.2  GRAPHICS FRAMES (E)
   ▶ 2.3  DATA BASE
         2.3.1  SALES GRAPH (G)
         2.3.2  SALES SPREADSHEET (S)
         2.3.3  SALES DATA BASE (D)
 ▶ 3  FINAL REPORT (W)

                                                              [REPORT6 ]
                              REPORT6             Doc:    1/1
Disk:  Get File by Name    (REPORT6.FW)
```

Figure 1: A Framework outline not only lists the containers of data, called frames, that are created in the program, but acts as a reference for the user moving from one frame to another.



```
 Disk  Create  Edit  Locate  Frames  Words  Numbers  Graphs  Print   3:21:32
                                 (E:\)
[FWOUT]
[3  INTEGRATION OF FUNCTIONS]                                         (A:)
 [3.4  DATABASE]                                                      (B:)
  [3.4.2  SALES DATABASE] (D)                                         (C:)
   BRANCH               SALES        OLDSALES                         (D:)
                                                                      (E:)
   ATLANTA              55000        45000
   CHICAGO              79000        75000
   LA                  122000       110000
   NEW YORK             98000        97000

[4  TEXT] (W)
 THINKING WITH FRAMEWORK

                                                                   UT   ]
@DBASEFILTER("C:\fw\SALES.  IONS.DATABASE.SALES DATABASE  Frame:   2/4
                                 A:\FWOUT.FW
                               Document saved
```

Figure 2: A dBASE II file, SALES.DBF, captured in a frame. This data can be referenced later by a Framework spreadsheet or graph.

At this point, I can use the *Edit Fields/Columns* command in the Edit menu to remove fields or change their order. Once that is done, <F5> tells *Framework* to copy the *dBASE* file into the current frame (see Figure 2). Of course, in many cases you might need only certain *dBASE* records. Combing a *dBASE* file for these records is a relatively simple process.

When *Framework* creates a data base corresponding to SALES.DBF, it places a "filter formula" at the bottom border of the frame: @DBASEFILTER(file,logical condition).

The formula operates on the data base, sifting out records that are not requested, according to the given logical condition. *Framework*'s default logical condition is #TRUE, which selects all the records in a file, but it could be changed, for example, to Sales > 10000, in which case only records with sales figures topping $10,000 would be gathered. More sophistiphisticated operations are possible with FRED, the *Framework* equivalent of *dBASE II*'s command language (see "Formulas and FRED").

Setting Up a Graph

Framework can create graphs from data in either a data base or a spreadsheet. In this case, I graph the imported *dBASE* file shown in Figure 2. First, I transfer the file into a frame called Sales Database. I then highlight the range of values to be graphed using <F6> (Extend Select) and the cursor keys.

Graph types are displayed in a pull-down menu. At this point I make several choices, among them the graph type (Line) and the source for the graph's X-axis labels. The labels come from the far left column in the data base frame. I specify *Column Has X-axis Labels* to copy the labels into the graph. The *Draw New Graph* command tells *Framework* to create a graph frame; <F9> displays the resulting graph (see Figure 3). When you change values in the sales data base frame (or in a spreadsheet, for that matter), they are immediately reflected in the graph.

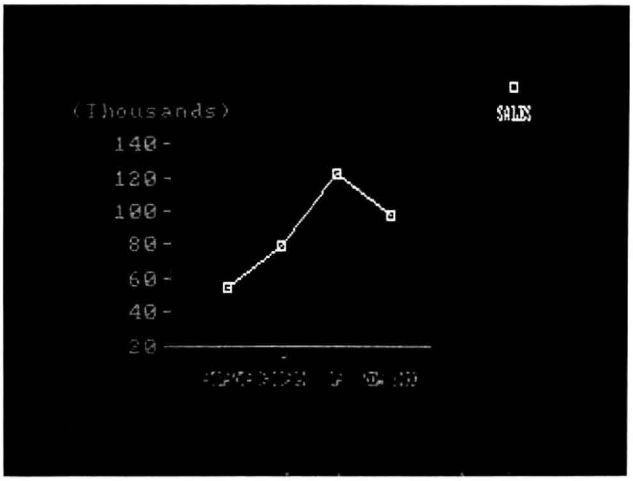


Figure 3: A line graph generated from dBASE II data copied into a Framework data base.

Formulas and FRED

FRED is the *Framework* equivalent of *dBASE II*'s command language. At the simplest level, FRED (for FRamework EDitor) is expressed as cell formulas. A formula can be associated with any frame, much like a formula can be tied to a cell in a spreadsheet. Indeed, a cell in a *Framework* spreadsheet is just a special kind of frame. The concept is perhaps clearer if you consider a frame's contents to be the result of a formula behind the frame.

Formulas and other control statements are really part of FRED. FRED is unique in its ability to operate not just on variables but on frame contents. FRED has standard procedural statements such as @WHILE and @IF, which are similar to *dBASE II*'s DO WHILE and IF statements. But FRED's working statements give the language the power to manipulate entire frames. With FRED, automated applications can be created using any of *Framework*'s functions. For example, a FRED program could automatically load Dow Jones stock quotes from a file into a *Framework* data base and then display a graph. The FRED program would look in part like this:

```
@PUT(djss.A2:djss.A13,@VALUE(
   @MID(data,j+4,3)),
;move to next line
j : = j + 9,
```

The 'djss.A2:djss.A13' statement in the first line refers to the cell range A2 through A13 in the djss frame. The '@PUT' statement places the result of the '@VALUE' function on the same line in this particular cell range. As you can see, FRED can be quite complex. At this level of sophistication, programming experience or familiarity with *dBASE II*'s command language is a decided plus. But once FRED is mastered, it gives you control over data equaled by few programs.

The Framework Spreadbase

Data in a *Framework* data base can also be used by a spreadsheet. The appropriate formula to reference a data base field is placed in a spreadsheet cell. The formula operates on all the values in that field for every record in the data base. For example, the Sales Database file in Figure 2 has a field called SALES. The formula @AVG(SALES DATABASE .SALES) in a *Framework* spreadsheet cell will add all the sales figures in the field and display the average in the cell.

Interestingly enough, spreadsheet-like calculations can be done without leaving the *Framework* data base. Suppose I add a third field to the data base representing the previous period's sales (see Figure 4). The field, called OLDSALES, is created by choosing the *Column/Fields-Add* command from the Create menu. Instead of using a *Framework* spreadsheet to determine the difference between SALES and OLDSALES, you set up a SALESDIFF field. This can be done by typing the formula **SALES – OLDSALES** into the first SALESDIFF field and copying it down the column using the <F8> (Copy) key. The difference between the SALES and OLDSALES numbers is calculated and can be recalculated instantly–the sort of "what if" speculation usually done in a spreadsheet.

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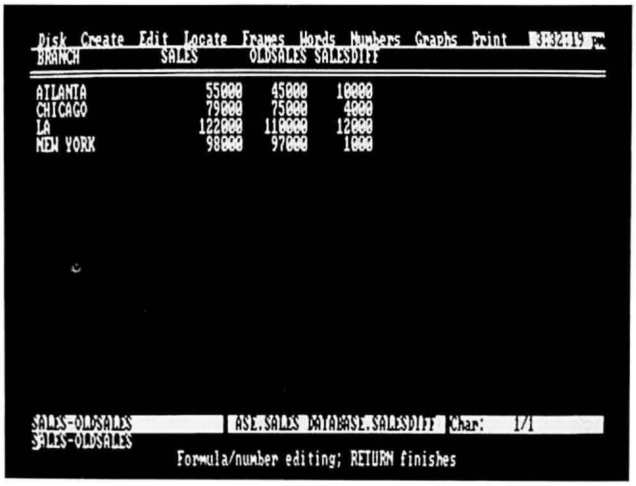

```
 Disk  Create  Edit  Locate  Frames  Words  Numbers  Graphs  Print   3:32:19
BRANCH              SALES       OLDSALES SALESDIFF

ATLANTA                  55000    45000    10000
CHICAGO                  79000    75000     4000
LA                      122000   110000    12000
NEW YORK                 98000    97000     1000




SALES-OLDSALES          ASE.SALES DATABASE.SALESDIFF  Char:     1/1
SALES-OLDSALES
                 Formula/number editing; RETURN finishes
```

Figure 4: A Framework data base can also work like a spreadsheet. SALESDIFF figures are calculated from existing SALES and OLDSALES figures in the frame.

The tasks performed in preparing this sample sales report demonstrate some of *Framework*'s broad capabilities. Even in such a limited example, *Framework*'s powerful assistance in organizing and interrelating data in frames is clear. *Framework* gives me a lot to think about–and a way of putting those thoughts in order and acting on them. ●

Dick Andersen is the director of Advanced Micro/Mainframe Solutions, a consulting firm specializing in the integration of personal computers into small and large businesses. His first book is 1-2-3 Tips, Tricks, and Traps, *published by Que Corporation.*

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Personal Macro Economics

If you usually think of your finances as an unplugged bathtub with the water running, take this CPA's advice about conserving your cash flow with a little help from 1-2-3's macro feature.

Ralph Soucie

Most people have trouble saving money. If you don't save, you feel bad. When you do save, it cuts into your lifestyle, and you feel worse. Although it's important to set personal savings goals, it's equally important to set goals you can live with comfortably. The spreadsheet described in this article, created with Lotus Development Corporation's *1-2-3*, should help illuminate the impact of your savings goals on your standard of living, and vice versa.

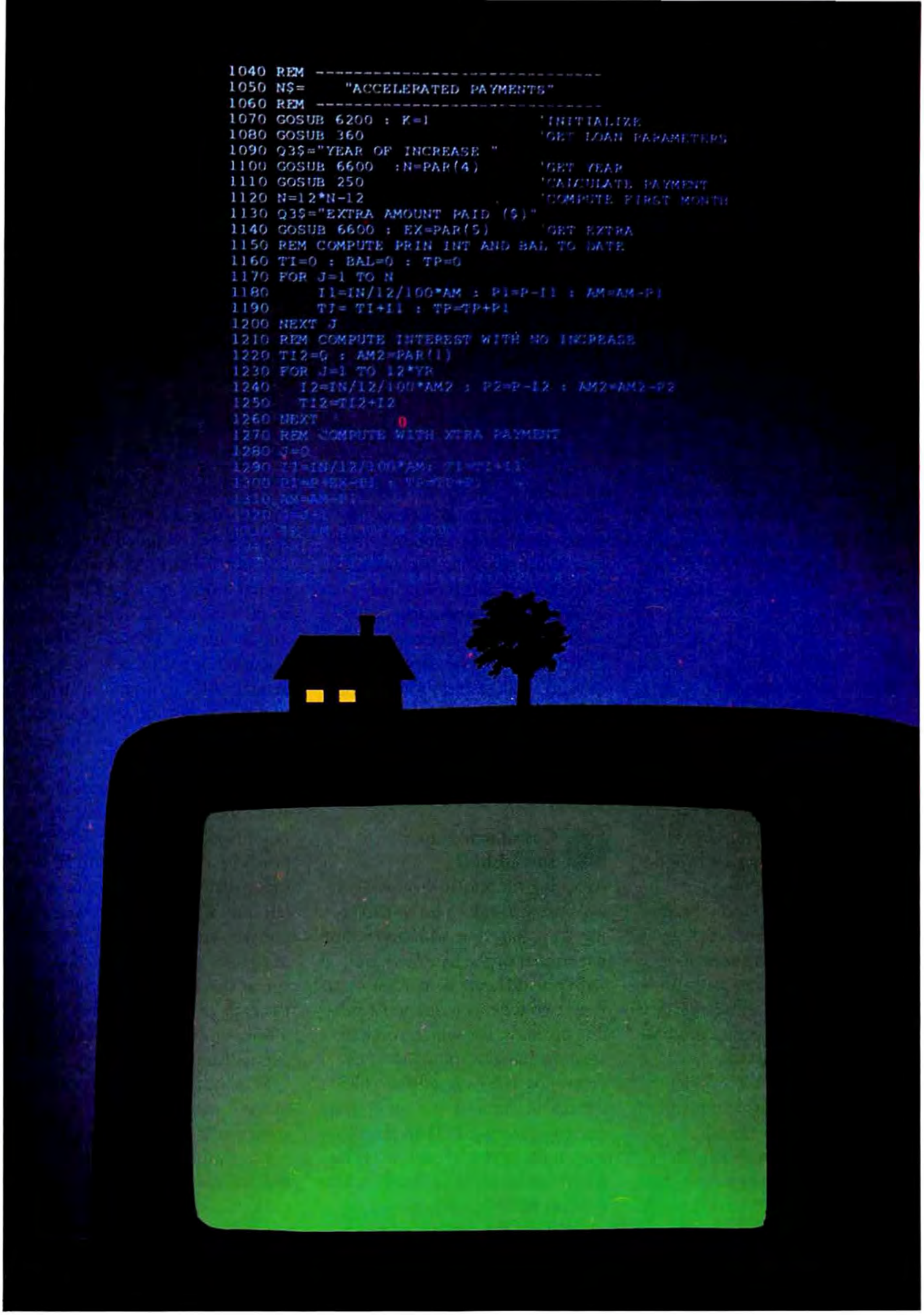
1-2-3's macro feature is the key to creating the sample home budget described in this tutorial. (For a description of the macro feature, see "/X Marks the Macro," *PCW,* Vol. 2, No. 3.) Aside from enabling you to store and retrieve keystroke sequences for labels, formulas, and commands, *1-2-3*'s macros provide a special set of commands called the /X commands, which allow you to string together macros and perform complex tasks. The /X commands can invoke a menu (/XM), branch to (GOTO) a macro cell (/XG), create an "if . . . then" formula (/XI), call a subroutine (/XC), and prompt for a label input (/XL) or a number input (/XN).

1-2-3 macros can often be used instead of templates. Although templates are usually easier to write, they are difficult to modify and take up far more memory space than macros do. Each macro is contained in one cell and is entered as a label. Several sample macros are provided here for reference, but since most readers will need to alter the model to fit their own circumstances, the tutorial does not provide step-by-step instructions for setting up the macros.

The Bathtub Principle

To set your savings goals, you must know how much "discretionary" income you have to work with—how much money is left after all the necessities are paid for. To do this, you must determine your fixed, or "uncontrollable," living expenses. Many people approach this by recording in minute detail their expenditures on any and all items, no matter how small. This usually doesn't work. No matter how hard you try, you end up wondering where the "missing" $10 went.

It's a better idea to attack the problem from the opposite direction: record everything but your everyday living expenses. Think of



```
1040 REM ------------------------------
1050 N$=     "ACCELERATED PAYMENTS"
1060 REM ------------------------------
1070 GOSUB 6200 : K=1              'INITIALIZE
1080 GOSUB 360                     'GET LOAN PARAMETERS
1090 Q3$="YEAR OF INCREASE "
1100 GOSUB 6600  :N=PAR(4)         'GET YEAR
1110 GOSUB 250                     'CALCULATE PAYMENT
1120 N=12*N-12                     'COMPUTE FIRST MONTH
1130 Q3$="EXTRA AMOUNT PAID ($)"
1140 GOSUB 6600 : EX=PAR(5)        'GET EXTRA
1150 REM COMPUTE PRIN INT AND BAL TO DATE
1160 TI=0 : BAL=0 : TP=0
1170 FOR J=1 TO N
1180      I1=IN/12/100*AM : P1=P-I1 : AM=AM-P1
1190      TJ= TI+I1 : TP=TP+P1
1200 NEXT J
1210 REM COMPUTE INTEREST WITH NO INCREASE
1220 TI2=0 : AM2=PAR(1)
1230 FOR J=1 TO 12*YR
1240   I2=IN/12/100*AM2 : P2=P-I2 : AM2=AM2-P2
1250   TI2=TI2+I2
1260 NEXT
1270 REM COMPUTE WITH XTRA PAYMENT
1280 J=0
1290 I1=IN/12/100*AM: TI=TI+I1
1300 P1=P+EX-I1 : TP=TP+P1
1310 AM=AM-P1
1320 J=J+1
1330 [illegible]
```

your wallet as a bathtub and of money as water constantly flowing through it. If you know exactly how much water the tub contained on the first and the last day of the month and how much water was added in between, you can easily figure out how much water drained out that month. So if you have only one bank account, and you know how much cash you deposited during August as well as your balances on August 1 and August 31, you can easily figure your total disbursements from that account during August. Multiple income sources and multiple bank accounts complicate the picture, but the "bathtub" principle still holds water.

Table 1: The Uptown's August balances and earnings

	August 1 Balance	August 31 Balance	August Earnings
Checking	$ 560	$ 636	$ 5
Savings	2028	0	16
Money market fund	9462	8304	79
Stocks and bonds	2160	2160	20
Unpaid credit card charges	650	480	

A Model Couple

Ken and Barbie Uptown are a fictitious married couple, both working, who want to save for the future and also to live some of the good life along the way. During August Ken's net paychecks totaled $1750, Barbie's $1420. The Uptowns had one unusual expenditure during August: the purchase of an IBM PC and related items for a total of $4250. They have several bank and securities accounts. The balances and current earnings for these accounts, along with unpaid credit card balances, are shown in Table 1.

Figure 1 shows the *1-2-3* cell formulas for calculating the Uptowns' cash flow by month. Notice the formulas in cells D18 and D20. The amount in cell D18 ("Personal living expenses") is calculated so that total sources (income–D12) and total applications (expenditures–D20) are equal. This is the bathtub principle at work in a *1-2-3* spreadsheet.

The data entry macro shown in Listing 1 moves the cursor around the spreadsheet and prompts for data input. After the data for August is entered, Ken and Barbie's spreadsheet looks like the one in Figure 2.

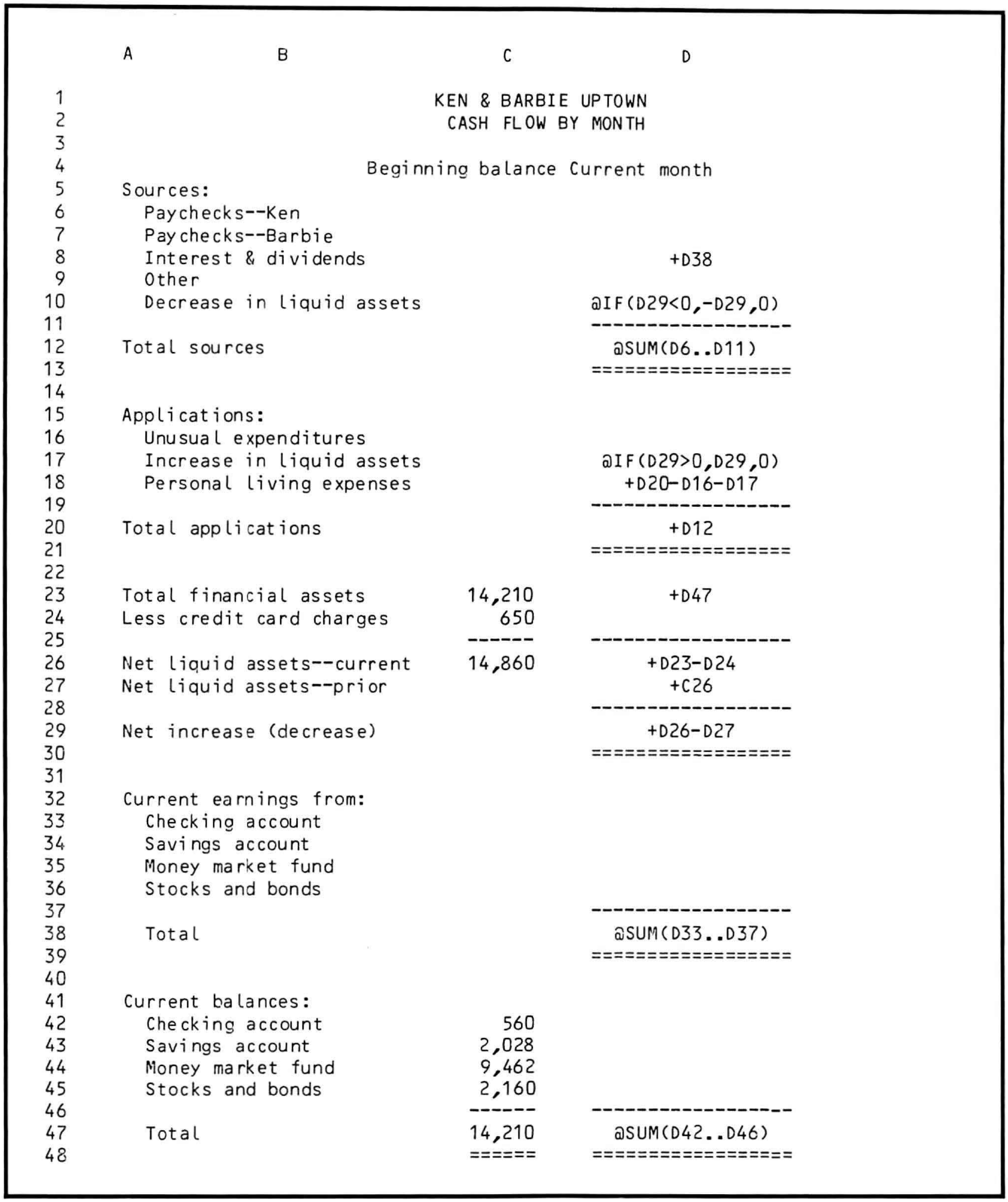
Customizing the Spreadsheet

Adapting the spreadsheet for your own use will take a bit of tinkering. Let's say your situation is similar to that of the Uptowns, but with one difference: in addition to your two jobs, you operate a sideline business, for which you have a separate bank account. Start by creating a *1-2-3* spreadsheet like the one in Figure 1 and set up the macro in Listing 1. Then insert a row in the spreadsheet for "Transfers from business account" in the Sources section, and insert a prompt for the amount of those transfers in the data entry macro. Then adjust the {UP} and {DOWN} commands in the macro to reflect the new row in the spreadsheet.

Note that the business bank account is not included in the list of account balances. If it were, you would have to show total deposits to the business account as a source and business expenses as an application. It's simpler to leave this account off the list and to treat the net cash flow from the business account as if it were another paycheck.

The schedule of "Net liquid assets" is not a true balance sheet. Nonfinancial assets such as your home or automobiles and all debts other than charge card charges are left out. When you purchase securities, keep them on the books at cost for the purposes of this spreadsheet. When you sell, show the gain as "Other" income. If it's a loss, show it under "Unusual expenditures."

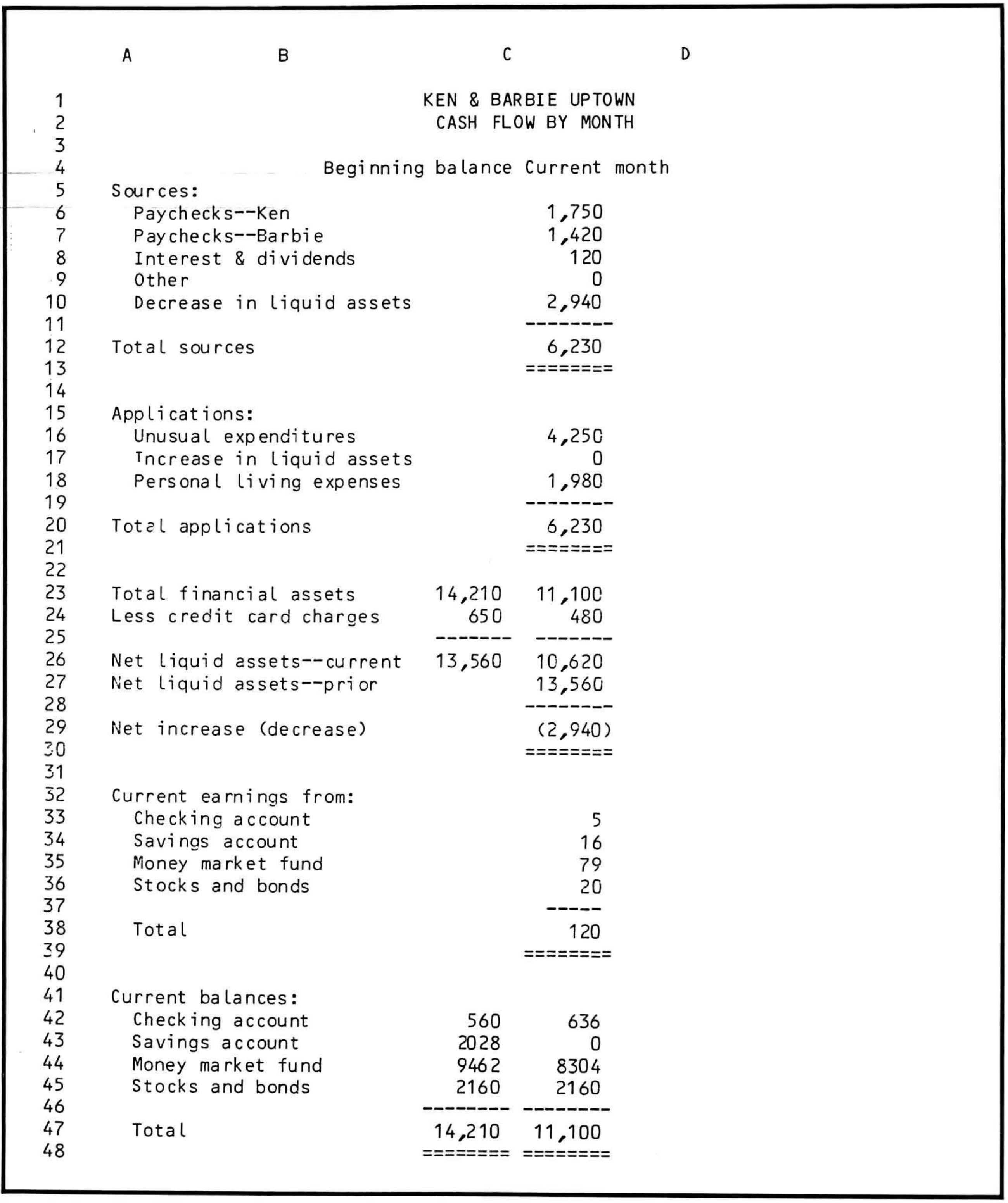
Stocks and bonds are not shown at their market value, if they are shown at all. Generally, it is best not to bother with details like holding gains and losses on securities, since the purpose of the spreadsheet is simply to show



```
       A             B                   C               D

 1                                 KEN & BARBIE UPTOWN
 2                                  CASH FLOW BY MONTH
 3
 4                           Beginning balance Current month
 5     Sources:
 6       Paychecks--Ken
 7       Paychecks--Barbie
 8       Interest & dividends                               +D38
 9       Other
10       Decrease in liquid assets               @IF(D29<0,-D29,0)
11                                               ------------------
12     Total sources                               @SUM(D6..D11)
13                                               ==================
14
15     Applications:
16       Unusual expenditures
17       Increase in liquid assets                @IF(D29>0,D29,0)
18       Personal living expenses                   +D20-D16-D17
19                                               ------------------
20     Total applications                                   +D12
21                                               ==================
22
23     Total financial assets         14,210            +D47
24     Less credit card charges          650
25                                    ------     ------------------
26     Net liquid assets--current     14,860          +D23-D24
27     Net liquid assets--prior                         +C26
28                                               ------------------
29     Net increase (decrease)                        +D26-D27
30                                               ==================
31
32     Current earnings from:
33       Checking account
34       Savings account
35       Money market fund
36       Stocks and bonds
37                                               ------------------
38       Total                                     @SUM(D33..D37)
39                                               ==================
40
41     Current balances:
42       Checking account                560
43       Savings account               2,028
44       Money market fund             9,462
45       Stocks and bonds              2,160
46                                    ------     ------------------
47       Total                        14,210       @SUM(D42..D46)
48                                    ======     ==================
```

Figure 1: The monthly cash flow spreadsheet. The formulas in the "Current month" column automatically calculate totals.



```
        A           B                    C               D

 1                           KEN & BARBIE UPTOWN
 2                            CASH FLOW BY MONTH
 3
 4                      Beginning balance Current month
 5   Sources:
 6     Paychecks--Ken                          1,750
 7     Paychecks--Barbie                       1,420
 8     Interest & dividends                      120
 9     Other                                       0
10     Decrease in liquid assets               2,940
11                                          --------
12   Total sources                             6,230
13                                          ========
14
15   Applications:
16     Unusual expenditures                    4,250
17     Increase in liquid assets                   0
18     Personal living expenses                1,980
19                                          --------
20   Total applications                        6,230
21                                          ========
22
23   Total financial assets         14,210    11,100
24   Less credit card charges          650       480
25                                 -------   -------
26   Net liquid assets--current     13,560    10,620
27   Net liquid assets--prior                 13,560
28                                          --------
29   Net increase (decrease)                 (2,940)
30                                          ========
31
32   Current earnings from:
33     Checking account                            5
34     Savings account                            16
35     Money market fund                          79
36     Stocks and bonds                           20
37                                             -----
38     Total                                     120
39                                          ========
40
41   Current balances:
42     Checking account                560       636
43     Savings account                2028         0
44     Money market fund              9462      8304
45     Stocks and bonds               2160      2160
46                                -------- --------
47     Total                        14,210    11,100
48                                ======== ========
```

Figure 2: The monthly spreadsheet after the Uptowns' August figures have been entered.

```
{HOME}{GOTO}D6~
~/XNNET PAYCHECKS--KEN: ~~
{DOWN}~/XNNET PAYCHECKS--BARBIE: ~~
{DOWN}{DOWN}~/XNOTHER INCOME: ~~
{DOWN}{DOWN}{DOWN}{DOWN}{DOWN}{DOWN}{DOWN}~/XNUNUSUAL EXPENDITURES: ~~
{PGDN}{UP}{UP}{UP}~/XNCHECKING ACCOUNT INTEREST: ~~
{DOWN}~/XNSAVINGS ACCOUNT INTEREST: ~~
{DOWN}~/XNMONEY MARKET FUND EARNINGS: ~~
{DOWN}~/XNEARNINGS FROM STOCKS AND BONDS: ~~
{DOWN}{DOWN}{DOWN}{DOWN}{DOWN}{DOWN}~/XNCURRENT CHECKING ACCOUNT BALANCE
{DOWN}/XNCURRENT SAVINGS ACCOUNT BALANCE: ~~
{DOWN}/XNCURRENT MONEY MARKET FUND BALANCE: ~~
{DOWN}/XNSTOCKS AND BONDS, AT COST: ~~
{PGUP}{UP}/XNTOTAL UNPAID CREDIT CARD CHARGES: ~~
{CALC}
```

Listing 1: The data entry macro. The macro automatically moves the pointer to the places in the worksheet where information is needed, uses the /XN command to prompt the user for the needed information at each place, and then calculates the worksheet.

```
/XNENTER CURRENT MONTH: ~MONTH~
/XIMONTH=1~{GOTO}D5~ JANUARY~/XGE~
/XIMONTH=2~{GOTO}E5~FEBRUARY~/XGE~
/XIMONTH=3~{GOTO}F5~  MARCH~/XGE~
/XIMONTH=4~{GOTO}G5~  APRIL~/XGE~
/XIMONTH=5~{GOTO}H5~   MAY~/XGE~
/XIMONTH=5~{GOTO}H5~   MAY~/XGE~
/XIMONTH=7~{GOTO}J5~   JULY~/XGE~
/XIMONTH=8~{GOTO}K5~  AUGUST~/XGE~
/XIMONTH=9~{GOTO}L5~SEPTEMBER~/XGE~
/XIMONTH=10~{GOTO}M5~ OCTOBER~/XGE~
/XIMONTH=11~{GOTO}N5~ NOVEMBER~/XGE~
/XIMONTH=12~{GOTO}O5~ DECEMBER~/XGE~
```

Listing 2: A macro for monthly data entry. The macro prompts the user for the name of the current month, inserts that name at the top of the worksheet, and then calls the data entry macro (Listing 1) so the new month's data can be entered.

where your money went during a certain span of time. If you participate in an employee stock purchase plan at work, it's generally easier not to account for the stock at all until it is sold. When you sell, show the sale proceeds as "Other" income.

If you buy a new car, new furniture, or another big-ticket item, show it under "Unusual expenditures" for that period. Sure, it's a personal living expense, but the important thing is to separate the controllable from the uncontrollable. It's better to highlight major spending decisions than mundane, day-to-day expenses, and that is what the "Unusual expenditures" category does.

If you own rental property, treat it as you would a sideline business. If your cash flow from the property is negative, then the transfers from your personal account to the rental account will be shown as an application instead of as a source.

An income tax refund is simply additional after-tax income, so treat it as "Other" income. Income taxes paid with your return should be netted against your net paycheck totals.

IRA contributions are savings, so technically you should show your IRA balances in your schedule of liquid assets. However, to reduce clutter on the spreadsheet, you can ignore the IRAs and show the contributions as "Unusual expenditures."

A 12-Month Schedule

You may decide to record your financial data each month. The macro in Listing 2 automatically enters the name of the month at the top of the column and positions the cursor for data entry. You must enter a number in response to the first prompt (for example, 1 for January, 2 for February). The /XG command at the end of each line transfers control to the data entry macro (named "E"). To adjust the data entry macro (Listing 1) for use with the 12-month macro you must delete the first line of the data entry macro, insert **DOWN** at the beginning of the next line (which now is the first), and using the *Range Name Create* command, name the first cell of the macro E.

> *The important thing is to separate the controllable from the uncontrollable. It's better to highlight major spending decisions than mundane, day-to-day expenses.*

Once you have customized the spreadsheet and entered the data, see if the total living expenses look realistic. If not, try to think of anything you might have omitted, either from "Other" income or "Unusual expenditures." You will find that it takes some discipline to consistently record extraordinary items as they occur. But if you keep at it you will probably find that your living expenses are falling within a fairly narrow range.

Once you reach that point, don't worry too much about controlling the number—just accept minor fluctuations as a given. Concentrate instead on your discretionary income—the difference between your after-tax income (D12) and your day-to-day living expenses (D18). The "Unusual expenditures" category may include some necessities—for example, large and unpredictable items like major car repairs. Nevertheless, the financial planning spreadsheet creates a very useful record. With this record, you can document over time how much of your discretionary income you have allocated to savings ("Increase in liquid assets") on the one hand and spending (generally, "Unusual expenditures") on the other. You can then narrow your focus to concentrate on the areas where your decisions really make a difference.

Ralph Soucie, is a CPA with Kenneth M. Mitchell and Company in Oregon City, Oregon.

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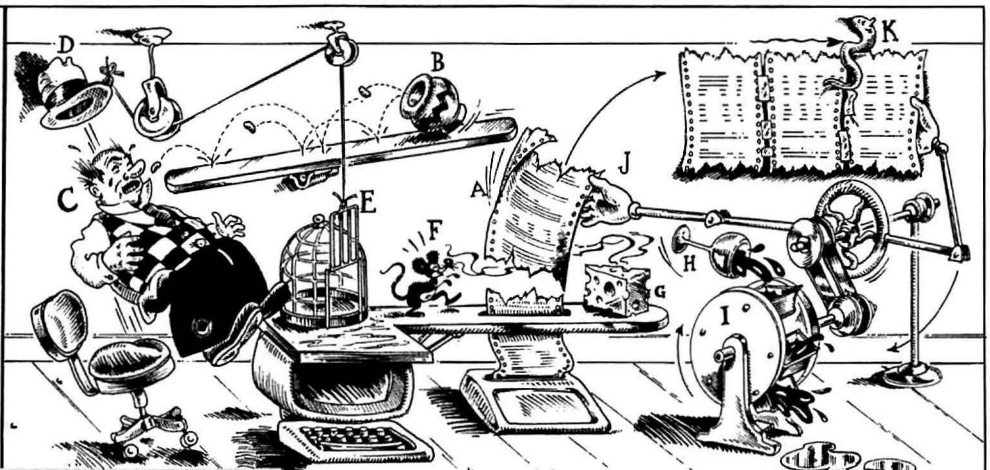

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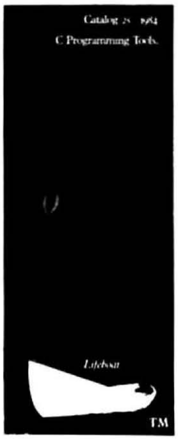

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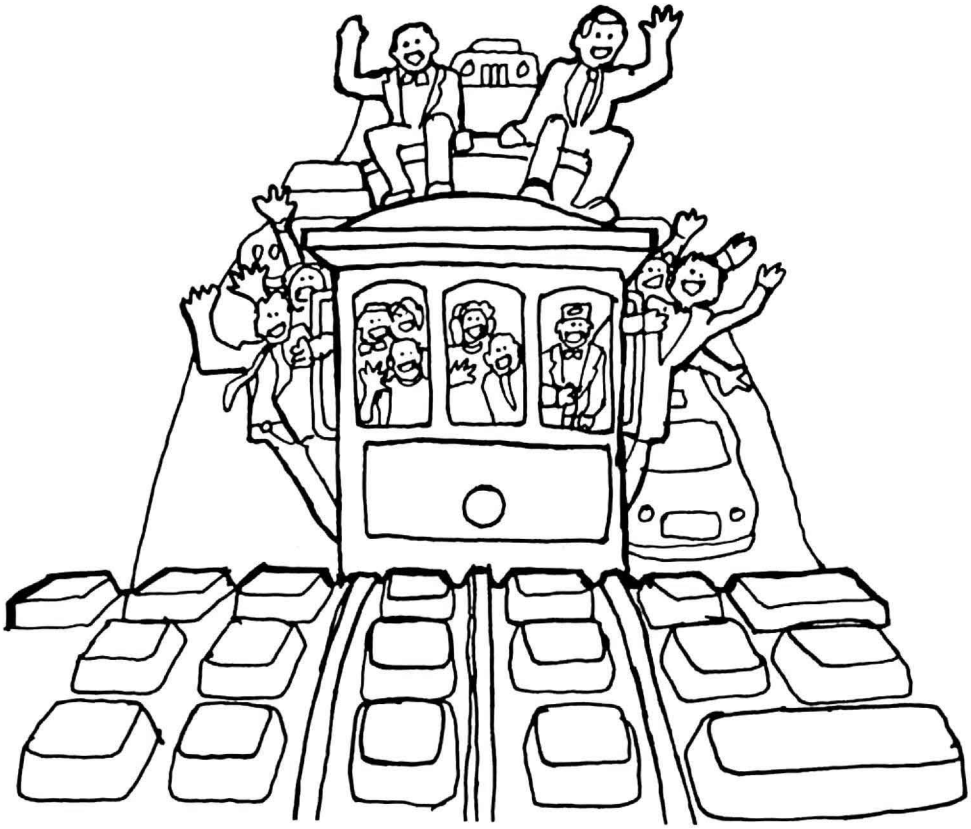

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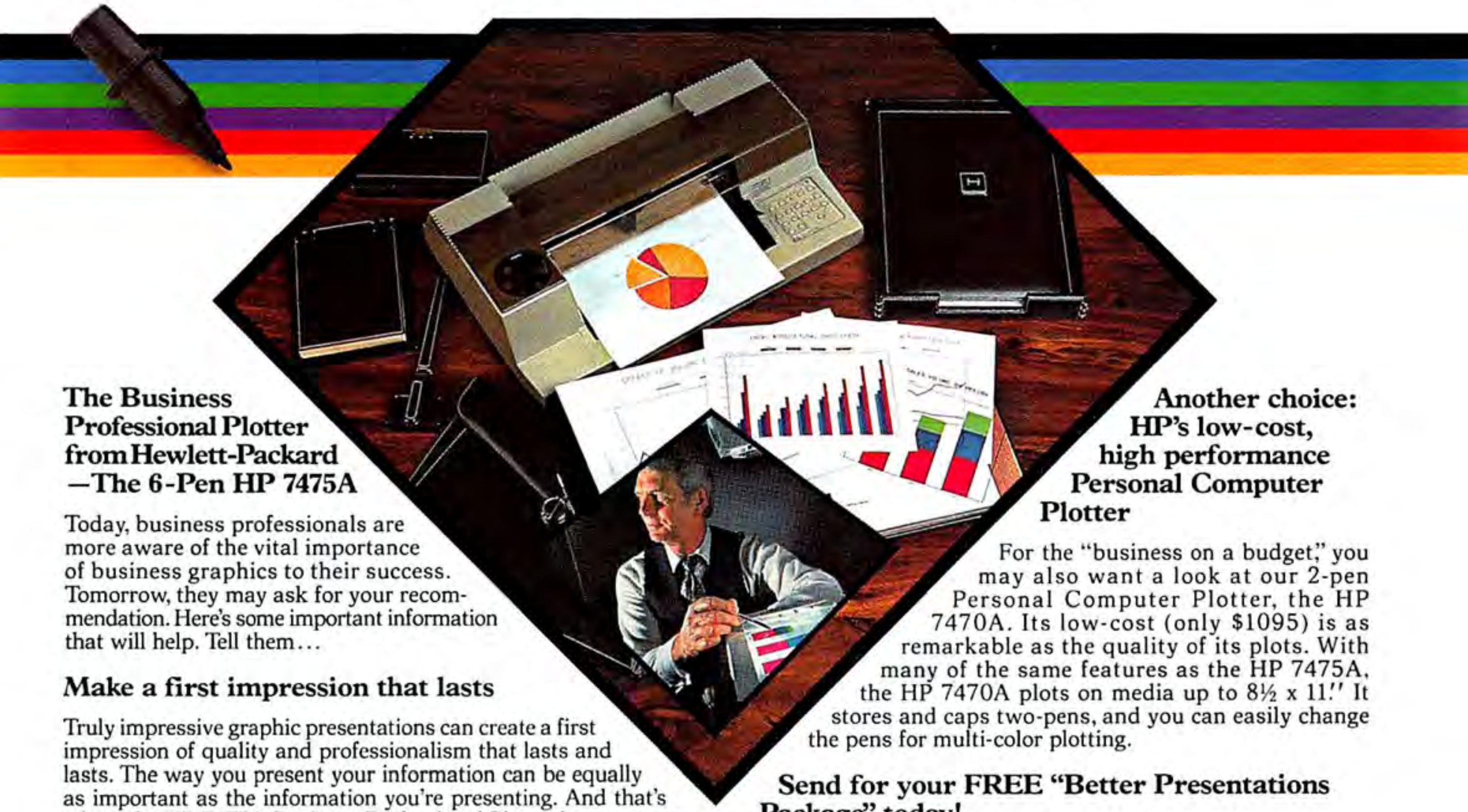

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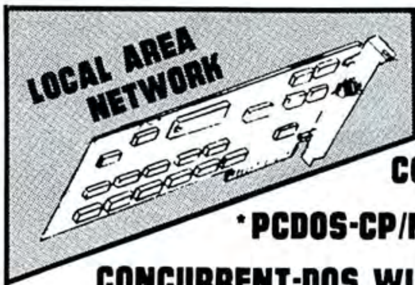

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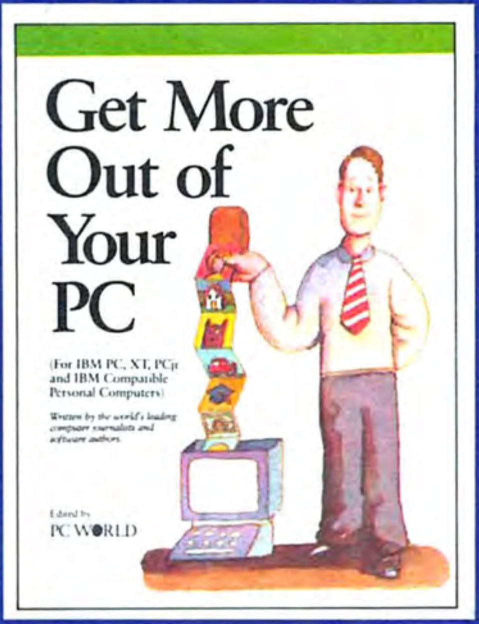
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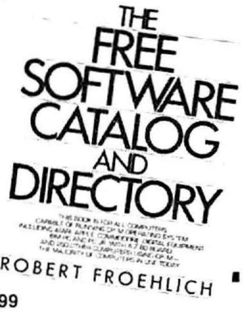

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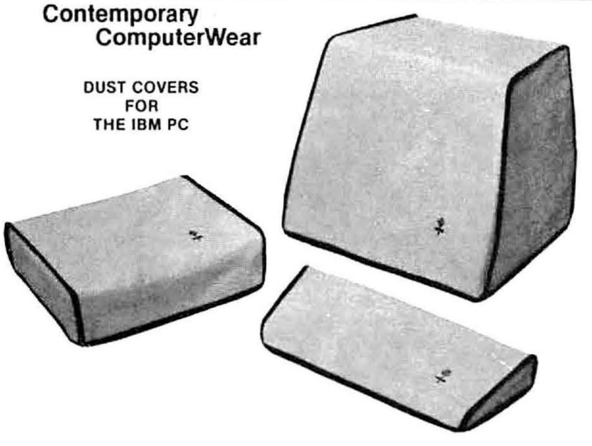

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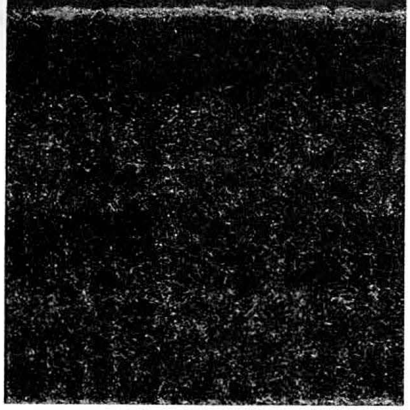

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Star-Dot-Star

A global exchange of computer discoveries

This month: A special graphics display mode in BASIC, how to prevent accidental erasure of a hard disk, batch files that create menus and select help screens, and a program that adds sound to the keyboard

Edited by Steven Cook

Have you ever wondered how items are selected for publication in this column? Obviously, items of interest to the broadest range of readers rate highest, but within that category the items that are brief, clearly written, and complete are usually the ones that end up in print. All submissions should be on paper and accompanied by printouts of listings. Your name, address, and telephone number should be on every item you send. Ideally you should also include a disk containing your letter as well as your program, but you should never send a disk by itself—Murphy's Law guarantees that it will be mangled in transit if you do.

Speaking of Murphy's Law, Michael Covington advises that two typographical errors were introduced into his item "PC-Beep III" (*.*, *PCW,* Vol. 2, No. 7). The three characters '$PL' in line 560 of PCBEEP should be replaced by a single plus sign, and 'SSMACSS' in line 608 should be 'XXMACXX'. Also, thanks to Sanford MacDonald of Marshfield, Wisconsin, for pointing out that the 'OR' in the fourth line of the program NUMOFF.COM (*.*, *PCW,* Vol. 2, No. 9) should be an 'AND'.

User Beware

The item from James Morgan regarding the undocumented SWITCHAR function ("TREE Root Bug," *.*, *PCW,* Vol. 2, No. 7) warrants a few words of warning. The only commands that will work with it are the DOS 2.00 commands written by Microsoft. IBM probably chose not to document SWITCHAR because it added its own commands, such as BACKUP and RESTORE, which do not support the SWITCHAR facility.

The SWITCHAR function does not, as stated, define the directory path separator symbol; it changes the command option delimiter (the default is / in PC-DOS). When SWITCHAR=- is placed in the CONFIG.SYS file, the option delimiter becomes a hyphen, and both / and \ will work as directory path separators.

Unfortunately, a severe problem with the RESTORE command is caused if you use SWITCHAR=-. The BACKUP command creates its files with a header record containing */directory/filespec,* but RESTORE looks only for \ as the separator in those records. Thus, while the BACKUP command works properly, no files can be restored from the backup disks. This could prove to be a disaster, since backup disks are usually needed in an emergency. Also, IBM's Fixed Disk Organizer menu program will function properly only in the root directory.

These problems all point out the risk of using undocumented features. In some instances using undocumented features is justified, but the hidden dangers are often greater than the benefits.

Ronald Parsons
Austin, Texas

Editor's note: Readers are advised to avoid experimenting in any situation where the risk outweighs the potential benefits.

Format Fix

The FORMAT.COM program included on the DOS disk makes it all too easy to format the hard disk inadvertently on an IBM PC XT. The program blandly requests that the user 'Press any key to begin formatting C:' and, without further warning, proceeds to send any and all files on that drive into oblivion. The steps shown in FORMAT0 and FORMAT1 are changes to the FORMAT.COM programs of DOS 2.00 and DOS 2.10, respectively, that will cause a return to the system prompt if any attempt is made to format a disk in a drive other than drive A: or drive B:.

To make the changes, copy FORMAT.COM onto the fixed disk, then place a disk containing DEBUG.COM in drive A: and type in the commands as shown in either FORMAT0 or FORMAT1.

I cannot verify that the FORMAT.COM program will be identical on every DOS 2.00 or DOS 2.10 disk, so you should be careful to ensure that the display on your screen matches the listing shown here except for the 'xxxx', which will be replaced by different numbers, depending on the configuration of the machine.

Wilson Smith
New York, New York

```
C>a:debug format.com <Enter>
-u585 <Enter>
xxxx:0585 BA340C          MOV     DX,0C34
xxxx:0588 803E3D1400      CMP     BYTE PTR [143D],00
xxxx:058D 7403            JZ      0592
xxxx:058F BA740C          MOV     DX,0C74
xxxx:0592 E888FF          CALL    051D
xxxx:0595 E8A0FF          CALL    0538
xxxx:0598 E896FF          CALL    0531
xxxx:059B E893FF          CALL    0531
xxxx:059E C3              RET
xxxx:059F 8A164509        MOV     DL,[0945]
xxxx:05A3 FEC2            INC     DL
-a58f <Enter>
xxxx:058F int 20 <Enter>
xxxx:0591 nop <Enter>
xxxx:0592 <Enter>
-w <Enter>
Writing 1780 bytes
-q <Enter>
C>
```

FORMAT0: Changes to the DOS 2.00 version of FORMAT.COM

```
C>a:debug format.com
-u548 <Enter>
xxxx:0548 BAF60E          MOV     DX,0EF6
xxxx:054B 803EE51700      CMP     BYTE PTR [17E5],00
xxxx:0550 7403            JZ      0555
xxxx:0552 BA360F          MOV     DX,0F36
xxxx:0555 E888FF          CALL    04E0
xxxx:0558 E80700          CALL    0562
xxxx:055B E896FF          CALL    04F4
xxxx:055E E893FF          CALL    04F4
xxxx:0561 C3              RET
xxxx:0562 B8080C          MOV     AX,0C08
xxxx:0565 CD21            INT     21
xxxx:0567 B8000C          MOV     AX,0C00
-a552 <Enter>
xxxx:0552 int 20 <Enter>
xxxx:0554 nop <Enter>
xxxx:0555 <Enter>
-w <Enter>
Writing 1B00 bytes
-q <Enter>
C>
```

FORMAT1: Changes to the DOS 2.10 version of FORMAT.COM

Batch File Brilliance

After learning about batch files in "One From Column A, One From Column B" (*PCW,* Vol. 1, No. 5), I enthusiastically began using them. I displayed text files as menus and wrote batch files from 1.BAT all the way up to 30.BAT. Eventually, the root directory of my IBM PC XT became clogged with all those batch files and menus.

Then one day while I was experimenting with replaceable batch file parameters, an idea hit me. If each program is stored in a subdirectory having the same name as the program, a single batch file such as the one shown in RUN.BAT can be used to initiate any program.

```
echo off
cls
cd \%1
%1 %2 %3 %4 %5 %6 %7 %8 %9
echo Please select a program from the list below.
echo To start a program, type:
echo        RUN name
echo where name is the program you wish to run.
dir *./w
```

RUN.BAT: A program menu batch file

After you have typed and saved RUN.BAT in the root directory, use the DOS command MKDIR to create a subdirectory for each of your programs. (The subdirectory names must not include a period or an extension.) For example, if you have Lotus Development's *1-2-3,* you should create a subdirectory called LOTUS and then copy the Lotus files into it. To execute the Lotus Access System you would type **RUN LOTUS**. That command would pass the word *LOTUS* to the RUN.BAT batch file, which would then clear the screen, change to the LOTUS directory, and execute the Lotus package. When the Lotus system is exited, RUN.BAT will return to the root directory, display instructions, and then list the available commands. To add a new program you need only create its subdirectory and copy the program file(s) into the subdirectory; RUN.BAT will support it automatically.

Tony Timbol
Melbourne, Florida

A Batch of Help

As the number of programs on my hard disk expanded, I quickly found that I could not remember the operating instructions for each of them. I managed for a while by creating small help files containing a screen or so of instructions for each program, but those too became unmanageable, until I wrote the routine shown in HELP.BAT. Typing **HELP** displays a list of the available help files, and typing **HELP** *filename* displays the contents of that help file.

The help files are given the extension .PLH because the extension .HLP is used by other programs. HELP.BAT also displays cross-reference information, which is stored in files with the extension .HTO. I keep the cross-references in separate files because they change whenever I add another program to the disk. Use any text editor, including the DOS program EDLIN, to create as many .PLH and .HTO files as you need.

David Harmacek
Winchester, Mass

```
echo off
if %1x==x goto help
if not exist %1.plh goto none
more < %1.plh
if not exist %1.hto goto out
type %1.hto
goto out
:none
echo Sorry!
echo Help is not available for %1
goto out
:help
echo For assistance with any program type HELP followed by the
echo program's name. Help is available for the following programs:
dir *.plh/w
:out
```

HELP.BAT: A batch file to provide an on-line help facility

Keyboard Clatter

The program shown in KEYCLICK.BAS will create a utility called KEYCLICK.COM that provides audible feedback (a "click" sound) when a key is pressed on the keyboard. It is intended for use primarily on IBM-compatible computers, such as the Corona, Eagle, and Columbia PCs, that have little tactile feedback and no audible feedback. Some touch typists prefer a silent keyboard, but I am not among them.

KEYCLICK.COM is a very small (111 bytes), easily installed utility that should end your frustrations with a quiet and/or "soft" keyboard. Once you type **KEYCLICK** and press <Enter>, KEYCLICK.COM will intercept each interrupt caused by pressing any key on the keyboard and check several conditions to determine if the click sound should be generated. If all the conditions are met, the speaker will emit a short, middle-frequency tone.

One of the interesting features of KEYCLICK is that it is totally transparent to DOS. When KEYCLICK is done processing a keyboard interrupt (and making its click sound), it passes control to the original keyboard interrupt routine. That way, KEYCLICK doesn't assume responsibility for anything except the key clicks. This enables KEYCLICK to run under both DOS 1.*xx* and DOS 2.*xx*, that is, under any version of DOS up to 2.11. In fact, I have run it under Corona's MS-DOS 1.25 as well.

Charles Meyer
Milwaukee, Wisconsin

Editor's note: Compaq users can cause their computers to beep with each keystroke by holding the <Ctrl> and <Alt> keys down while repeatedly pressing the <GrayPlus> key. Each stroke of the <GrayPlus> key increases the beep's volume. To reduce the volume, hold down the <Ctrl> and <Alt> keys while pressing the <GrayMinus> key.

```
10 DEFINT A-Z:CLS:KEY OFF:DEF FNHEX(X$)=VAL("&h"+X$)
20 LOCATE 3,1:PRINT "X-Maker":READ F$
30 LOCATE 5,1,1:PRINT "Now testing for data errors...please wait";
40 SUM=0:READ LN.IF LN<0 THEN 80
50 READ H$:IF VAL(H$)<0 THEN 70
60 SUM=(SUM+FNHEX(H$))*2:SUM=(SUM\256)+(SUM MOD 256):GOTO 50
70 READ CKSUM$:IF SUM=FNHEX(CKSUM$) THEN 40 ELSE GOTO 170
80 RESTORE:CLS:LOCATE 3,1:PRINT "X-Maker":READ F$
90 LOCATE 5,1,1:PRINT "Press any key to create ";F$;": ";
100 A$=INPUT$(1):PRINT:IF A$=CHR$(27) THEN END
110 LOCATE 6,1:PRINT "Working...":
120 OPEN F$ AS #1 LEN=1:FIELD #1,1 AS BYTE$
130 READ LN:IF LN<0 THEN 160
140 READ H$:IF VAL(H$)<0 THEN READ CKSUM$:GOTO 130
150 LSET BYTE$=CHR$(FNHEX(H$)):PUT #1:GOTO 140
160 CLOSE:PRINT:PRINT F$;" has now been created.":END
170 PRINT:PRINT "Error in DATA line";STR$(LN);". ":
180 PRINT "Check your work.":BEEP:END
1000 DATA "keyclick.com"
1010 DATA 1,EB,4B,00,00,00,00,9C,50,53,51,E4,60,A8,80,75,34,-1,B2
1020 DATA 2,24,7F,3C,36,74,2E,3C,2A,74,2A,3C,1D,74,26,3C,38,-1,CD
1030 DATA 3,74,22,E4,61,BB,05,00,FA,24,FC,0C,02,E6,61,B9,2F,-1,69
1040 DATA 4,00,E2,FE,24,FC,E6,61,B9,2F,00,E2,FE,4B,75,E9,24,-1,CD
1050 DATA 5,FC,E6,61,FB,59,5B,58,9D,2E,FF,2E,02,01,06,B4,35,-1,CC
1060 DATA 6,B0,09,CD,21,8D,3E,02,01,89,1D,8C,45,02,07,B4,25,-1,FA
1070 DATA 7,B0,09,8D,16,06,01,CD,21,8D,16,4D,01,42,CD,27,00,-1,78
1080 DATA 8,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,-1,00
1090 DATA -1
```

KEYCLICK.BAS: The program X-MAKER.BAS configured to make KEYCLICK.COM

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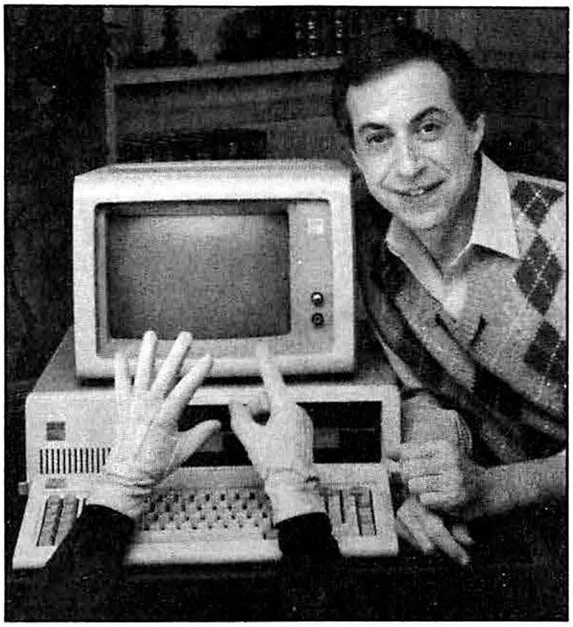

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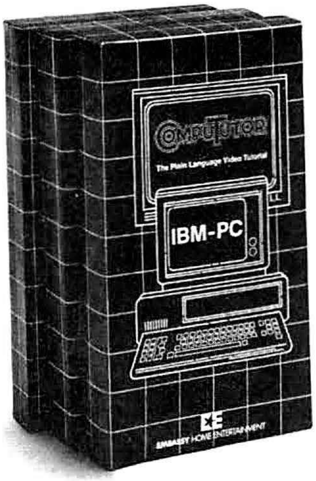

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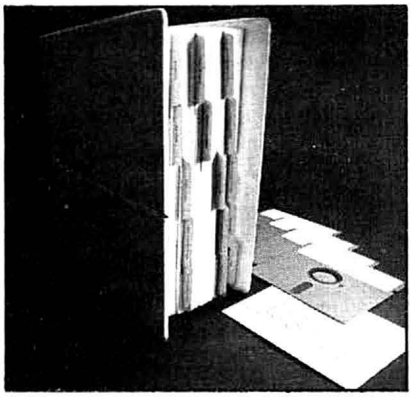

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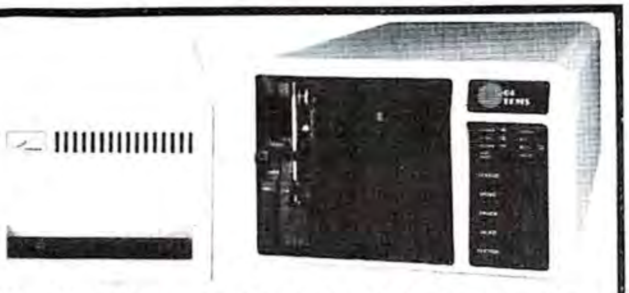

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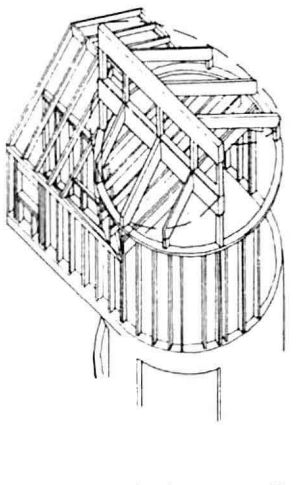

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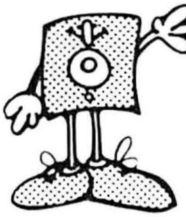

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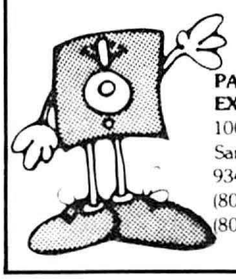

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Games/Educational

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PADLOCK furnishes the user with a method for providing protection against unauthorized duplication from DOS commands. $99. PADLOCK II disks come preformatted with fingerprint & serialization. PADLOCK II disks offer superior protection. Ask about our fast data encryption product. All work w/hard disk, EXE/COM files & all DOS versions. MC/Visa. *Glenco Engineering, 3920 Ridge Ave., Arlington Hts., IL 60004, 312/392-2492*

DOS Data Path Command

Now Lotus *1-2-3*, *dBASE II*, *WordStar*, others can access data files no matter where they are located! Works with hard disks & floppies. A stay-resident function allowing you to organize your disk any way you like. Includes screen-oriented maintenance utility & 60-page man. DOS 2.00+. $25. Qty. discounts. *Personal Business Solutions Inc., P.O. Box 757, Frederick, MD 21701, 301/865-3376*

Cogitate Dump/Restore-XT

Seven programs make hard disk backups quick & easy. COGBKUP supports multiple positive & negative wildcards & runs up to 50% faster. COGTREE gives an interactive graphic or hardcopy display of directory trees. Other programs make this a complete backup system. Only $90. Visa/MC. *Cogitate, Incorporated, 24000 Telegraph Rd., Southfield, MI 48034, 313/352-2345, Telex #386581*

Print Package $39.95

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Digital Concepts, P.O. Box 8345, Pittsburgh, PA 15218, 412/823-8314

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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, underline, boldface, headers/footers, etc. 9 help screens, quick ref card, 100 page manual. Split screen edits two files. Software & manual on disk, $10; registration w/ support, source, commissions $75. Visa/MC. Shareware: copy and share with others. *Quicksoft, 219 First N. #224F, Seattle, WA 98109, 206/282-0452*

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MY WORD!™ Just $25!

Get a WS-like word processor for the IBM PC/XT/jr or compatibles (even Tandy 2000). Sort, mail merge, quick print; use 256 char.! Word wrap, 100+ operations, won't lose text, ASCII files. Manual with index included. Source code: just $25 more! 96K, 1 drive, DOS 1.10-2.10. 30-day money back guarantee. *T.N.T. Software, Inc., 34069 Hainesville Rd., Round Lake, IL 60073, 312/223-0832*

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XEROX NORTHSTAR
TRS80 Many Others
Disk to disk & disk to tape conversion also avail. *Pivar Computing Services, Inc., 47 W. Dundee Rd., Wheeling, IL 60090, 312/459-6010*

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Novice Tutorials

Quick guides for the novice. QUICKDOS–extensive examples of common DOS commands. Clear, easy. Only a few advanced commands. BATCHES. The what, why & how of batch files. Complete examples. VERY BASIC ... a 20 minute tutorial, using only 15 commands, teaches how to write & run a menu-driven program. With listing. $9.95 for all 3 pamphlets. Chk/MO. Dealer discounts. *Glenn Abelson/Sales, P.O. Box 1031, Rockville Ctr., NY 11571, 516/766-7782*

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 company name, address, and telephone number.*

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CORP. HDQTRS: 1860 Hartog Dr.,
San Jose, CA 95131 (408) 287-4640
TELEX 176309 SCS SNJ

CANADIAN DISTR: Compuserve, Toronto (416) 494-1100; Vancouver (604) 733-7783; Montreal (514) 844-9343

AUSTRALIAN DISTR: Telecomputing PCS/83 Mount Street, N. Sydney 2060, Australia

Santa Clara Systems, Inc.

PCterminal is a trademark of Santa Clara Systems, Inc.
IBM-DOS is a registered trademark of IBM Corporation.

Just Announced

An array of new PC products

Featured this month: a speech synthesis board, internal modems, two low-cost printers, two keyboard improvements, project management and data management systems, and a financial planning template

Edited by Seth Novogrodsky

Just Announced keeps you informed of the latest developments in PC technology in the fast-paced personal computer marketplace. Information for this department is provided by manufacturers; these write-ups are not reviews. *Just Announced* does not evaluate products or corroborate manufacturers' claims. Many of these descriptions will be followed up by reviews in future issues.

Hardware

Boards

MPII

A combination memory and clock/calendar board manufactured by AST Research, the MPII features from 64K to 384K of RAM with full parity checking. The clock/calendar features a replaceable battery. The board comes with a program disk called SuperPak, which includes the SuperDrive disk emulator and the SuperSpool print spooling utility. List price: 64K $345, 384K $845, each additional 64K $100.

AST Research Inc.
2121 Alton Ave.
Irvine, CA 92714
714/863-1333

ProTalker

An expansion board that allows the IBM PC to simulate human speech, ProTalker uses a digital recording technique to record almost any kind of sound. ProTalker is designed to be used with a low-impedance microphone and an 8-ohm speaker. Software is included that allows users to create and play back voice message files. At a digitizing rate of 2K per second, approximately 150 seconds of speech can be stored on a disk. With the supplied software, ProTalker can reproduce almost any speaker's voice and intonation. List price: $350. Requirements: 128K, two double-sided disk drives.

Speech Ltd.
3790 El Camino Real #213
Palo Alto, CA 94306
415/941-2490

Modems

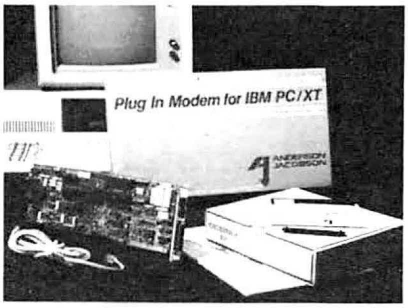
USR Personal Communicator Modems

A line of modem boards for the IBM PC and compatible systems, the Personal Communicator modems feature data transmission rates of both 300 and 1200 bits per second. The basic model is a short board that can fit into any available slot in the PC or XT. All models feature auto-dial/auto-answer, automatic speed detection, audio phone line monitor, volume control, programmable commands, two RJ11C jacks (one for a telephone, the other for the modem), and a telephone cord. The enhanced models feature a clock/calendar with battery backup, a parallel printer port, and from 64K to 256K of RAM. All models are supplied with U.S. Robotics' Telpac communications software. List price: $499, 64K enhanced model $699, 256K enhanced model $999.

U.S. Robotics Inc.
1123 W. Washington Blvd.
Chicago, IL 60607
312/733-0497

PC Connection 1212 System
A data communications hardware and software package, PC Connection 1212 consists of a modem board and the Crosstalk XVI communications software package. The modem features data transmission rates of 300 and 1200 bits per second, auto-dial (either pulse or tone), and two modular phone jacks. An integral speaker provides an audio alert for conditions such as "busy," "wrong number," and so forth. Crosstalk XVI provides simultaneous data capture and printing as well as the ability to emulate popular terminals such as the IBM 3101, the DEC VT-100, the Televideo 920, and the ADDS Viewpoint. List price: $495.

Anderson Jacobson
521 Charcot Ave.
San Jose, CA 95131
408/945-9030

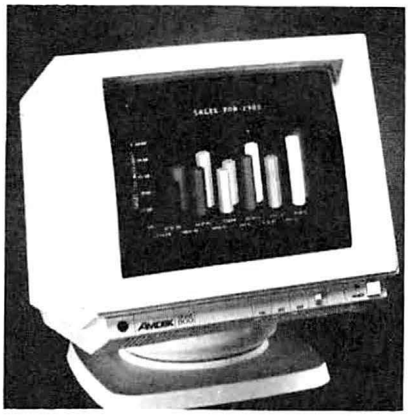


PC Connection, Anderson Jacobson

Monitors

Amdek Color 600
A high-resolution RGB video input color monitor, the Amdek 600 features 640 (horizontal) dots by 240 (vertical) lines and a black matrix cathode-ray tube (CRT). The monitor has a text switch on the front panel that can change the text color from white to green. The Amdek 600 displays up to 25 lines of 80 characters and features a built-in speaker and audio amplifier for computers with audio output. A headphone jack is also provided. The monitor features brightness, contrast, and volume controls. An optional tilt/swivel base is available. List price: $650.

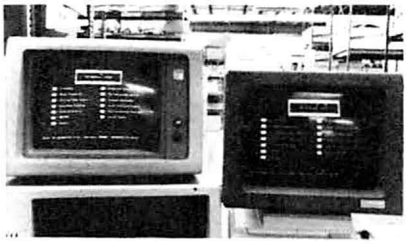
Amdek Corp.
2201 Lively Blvd.
Elk Grove Village, IL 60007
312/595-6890



Color 600, Amdek

Network Devices

PC/7000 Link
Solvation has recently made available a PC link for its 7000 multiuser system called the PC/7000 Link. The Link allows one or more PCs to act as general-purpose work stations for the 7000 system and permits the 7000 to act as a file server and back-end processor for the PCs. The PCs can also function as stand-alone systems. A range of PC-compatible multiuser software is available through the Link. Files can be transferred in both directions between the 7000 and the PCs. Files on the PCs can be backed up on the 7000's integrated tape backup system and can be spooled to the 7000's printer. The Link is attached to each PC through the PC's serial port. List price: PC Link software $295, PC/7000 ca-



PC/7000 Link, Solvation

ble $150. Requirements: 192K, one disk drive, serial port.

Solvation, Inc.
150 Flanders Rd.
Westboro, MA 01581
617/366-6621

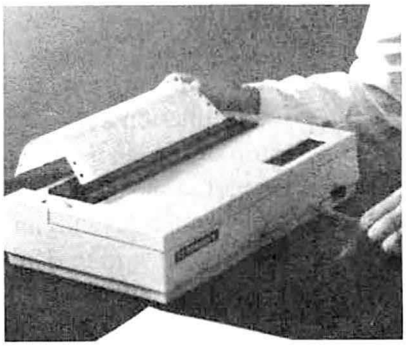
Printers

Electronic Compact NP
A bidirectional dot matrix printer, the Olympia Electronic Compact NP features a nine-wire printhead capable of printing the 96-character ASCII character set and seven international character sets. Other features include a unidirectional bit-image mode for graphics, a 2000-character printer buffer, and a built-in tractor feed. The printer can accommodate continuous form paper up to 10 inches wide. The Electronic Compact NP comes with a Centronics-compatible parallel port; an optional RS-232C serial port is available. List price: $499.

Electronic Compact NP, Olympia USA

Olympia USA Inc.
Box 22
Somerville, NJ 08876-0022
201/722-7000

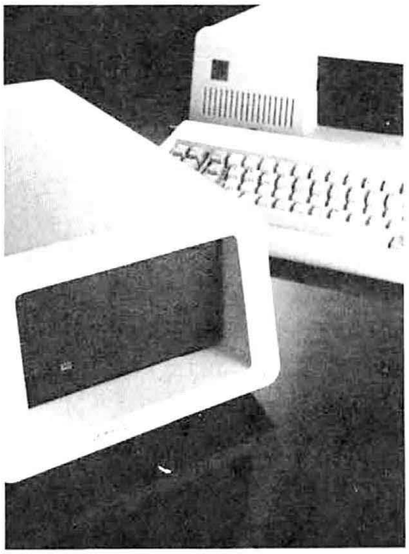
Centronics GLP
GLP (an abbreviation for Great Little Printer) offers PC block graphics characters, correspondence-quality printing, and enlarged, condensed, emphasized, and double-strike print modes. Superscript, subscript, and underlined printing are also available. The printer can accommodate cut sheets, roll paper, and 8-inch fanfold paper when using the operator-installable form-feed tractor option. The GLP prints 50 characters per second in draft printing mode and 12 characters per second in near-letter-quality mode. The printer is equipped with a Centronics parallel printer port and is also available with both a parallel and a serial port. List price: $299.


Centronics GLP, Centronics

Centronics Data Computer Corp.
One Wall St.
Hudson, NH 03051
603/883-0111

Storage Devices

PC eXTender
Falcon Technology has recently announced a 30MB version of its PC eXTender hard disk subsystem. In addition to hard disk controller circuitry, the hard disk controller board features a clock/calendar, a serial port, and sockets for up to 192K of RAM. The drive itself is packaged in a case that resembles the IBM PC. Complete backup utility programs are included in the package. The drive can store the equivalent of 90 floppy disks or 15,000 pages of text. According to the manufacturer, the data


PC eXTender, Falcon Technology

transfer rate is effectively six times faster than that of the hard disk drive in the PC XT. A ROM chip is provided so that DOS can be directly booted from the hard disk. This chip permits the use of all PC-DOS hard disk utilities, including BACKUP, FORMAT, and FDISK. List price: $3995.
Falcon Technology, Inc.
6644 S. 196th St., Ste. T-101
Kent, WA 98032
800/722-2510, 206/251-8282

Miscellaneous

Touchstone 1 Rapid Data Controller
The Touchstone 1 Rapid Data Controller is a 29-key "work pad" featuring a numeric keypad, a separate cursor cluster, and <Space>, <Backspace>, <Home>, and <Enter> keys. Mathematical keys such as plus, minus, and equal signs and parentheses are also included. The Touchstone 1 is designed to be used with spreadsheet, accounting, and other number-intensive applications. A coiled cable with two DIN-type connectors is attached to the work pad. One of the connectors plugs into the keyboard socket on the back of the PC system unit. The other connector attaches to the IBM keyboard cable so that both keyboards can be used at the same time. List price: $169.95.
Touchstone Technology Inc.
955 Buffalo Rd.
P.O. Box 24954
Rochester, NY 14624
800/828-6968, 800/462-4891 New York, 716/235-8358

Touchstone 1, Touchstone Technology

Sure Stroke Keyboard
A plug-compatible replacement keyboard for the IBM PC, Sure Stroke features an oversized <Enter> key, function keys across the top of the keyboard, a numeric keypad, a separate cursor cluster, tactile feedback (with an audible click toggle), and two adjustable positions (5 and 15 degrees). The keyboard has a total of 96 keys in a layout similar to that of an IBM Selectric typewriter. The keyboard comes with a 6-foot coiled cord. List price: $199.95
Titan Data Systems Inc.
P.O. Box 2095
Santa Ana, CA 92707
714/546-6355

Application Software

Accounting and Inventory

General Ledger
General Ledger with Fixed-Asset Management from Eagle Enterprises is designed for owners of small businesses or professional people who don't know much about accounting. The system automatically determines debits and credits for transactions and prevents out-of-balance conditions. The Fixed-Asset Management subsystem is included for calculating equipment depreciation and project depreciation by month. *General Ledger* can also produce a 12-month graphic analysis of income and expense accounts and print loan amortization schedules. List price: $385. Requirements: 128K, two disk drives.
Eagle Enterprises
2375 Bush St.
San Francisco, CA 94115
415/346-1249

Business Management

Task Monitor
A project management program from Monitor Software, *Task Monitor* is designed to help managers with planning and schedul-

ing. The program performs critical-path management and can generate charts similar to a PERT network. The program can keep track of schedules, costs, and resources. *Task Monitor* is menu-driven, takes advantage of the PC's function keys, and includes an integrated help facility. List price: $395. Requirements: 192K, one double-sided disk drive, DOS 2.00.

Monitor Software
960 N. San Antonio Rd. #210
Los Altos, CA 94022
415/949-1688

Baseline

A general purpose information management system, *Baseline* enables users with no programming or data processing expertise to design, operate, and maintain a data base. Key features include a high-speed search capability, a data dictionary facility, a batch processing capability with math functions, an extract and sort facility that allows ascending and descending

Baseline, Computer Network Research

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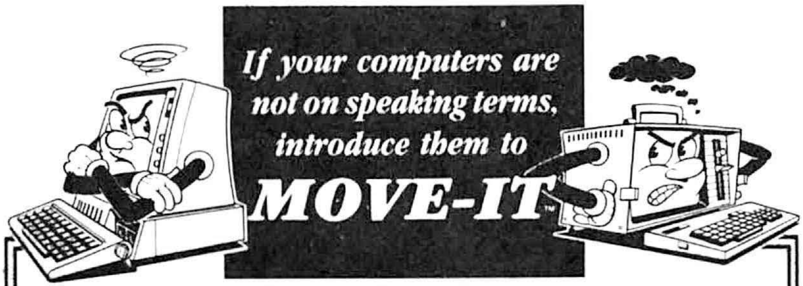

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With MOVE-IT you can communicate with over 120 different makes of computers using PC DOS, CPM/86 and CP/M systems. Retail price is $125 for all CP/M systems and $150 for all CPM/86 and MS-DOS systems including the IBM PC. Available from your local dealer or from:

WOOLF SOFTWARE SYSTEMS, INC.
6754 ETON AVE., CANOGA PARK, CA 91303 • (818) 703-8112
Dealer inquiries invited.

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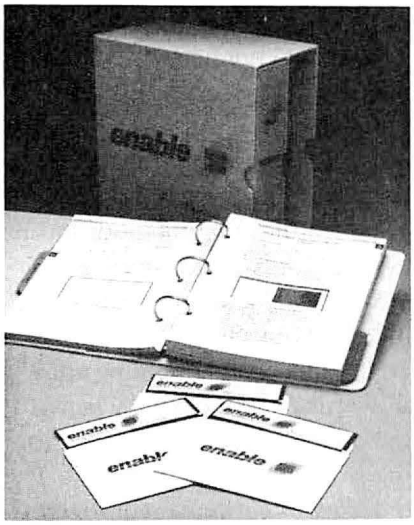
Computer Network Research, Inc.
1835 Savoy Dr. #315
Atlanta, GA 30341
404/451-6100

Integrated Applications

Enable

An integrated software package incorporating word processing, a spreadsheet, graphics, data base management, and telecommunications, *Enable* allows as many as eight windows from different applications or files to be displayed on the screen at one time. Windows can be moved, shaped, overlapped, or enlarged to full-screen size. Data can be transferred between separate applications in different windows with a few keystrokes. The program can make use of files created by other programs such as *1-2-3*, *WordStar*, and *dBASE II*, and it can produce files that are compatible with these programs as well. According to the manufacturer, as many as three applications can be executed simultaneously. That means you could print a spreadsheet while editing a letter and receiving information over the phone line. List price: $695. Requirements: 192K, two double-sided disk drives.



Enable, The Software Group

The Software Group
Northway Ten Executive Park
Ballston Lake, NY 12019
518/877-8600

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Word Plus speller for MicroSoft	$150	**$109**	$ 23
MultiMate	$495	**$269**	$ 74
Volkswriter Deluxe	$285	**$179**	$ 43
* Word Perfect	$495	**$259**	$ 74
WordStar	$495	**$225**	$ 74
* WordStar Propak	$695	**$329**	$104
DATABASE			
Knowledgeman	$500	**$299**	$ 75
Kgraph	$225	**$149**	$ 34
Kpaint	$100	**$ 69**	$ 15
R:BASE 4000	$495	**$279**	$ 74
R:BASE Clout	$195	**$129**	$ 29
R:BASE Extended Report Writer	$150	**$ 99**	$ 23
dBASE II	$495	**$299**	$ 74
* dGRAPH	$295	**$149**	$ 44
* Quickcode	$295	**$149**	$ 44
dBASE III	$700	**$389**	$105
dBASE III Upgrade	$200	**$149**	
Quickcode III	$295	**$159**	$ 44
PROJECT MANAGEMENT			
Harvard Proj. Mgr.	$395	**$229**	$ 59
MicroSoft Project	$250	**$179**	$ 38
UTILITIES			
Crosstalk XVI	$195	**$109**	$ 29
Norton Utilities	$ 80	**$ 49**	$ 12
PROKEY 3.0 (NEW)	$130	**$ 85**	$ 19
Inside IBM-PC (Norton)	$ 80	**$ 65**	$ 12

	LIST	DISCOUNT PRICE	RESTOCK FEE
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FRAMEWORK	$700	**$399**	$105
Lotus 1-2-3	$495	**$309**	$ 74
Open Access	$595	**$299**	$ 89
Symphony	$700	**$469**	$105
* VisiCalc	$ 99	**$ 59**	$ 15
COMPILERS			
BASIC (MicroSoft)	$395	**$259**	$ 59
C Compiler (MicroSoft)	$500	**$319**	$ 75
FORTRAN (MicroSoft)	$350	**$239**	$ 52
* FORTRAN (SuperSoft)	$495	**$199**	$ 74
Macro Assembler	$100	**$ 69**	$ 15
Pascal (MicroSoft)	$350	**$229**	$ 53
BUSINESS ACCOUNTING			
BPI Systems	$595	**$429**	$ 89
IUS Business Accounting	$595	**$395**	$ 89
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USD Inc.
251 Round Lake Rd.
Vermontville, MI 49096
517/726-1155

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Apropos Software, Inc.
64 Hillview Ave.
Los Altos, CA 94022
415/948-7227

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2031 Broadway
Boulder, CO 80302
303/447-9495

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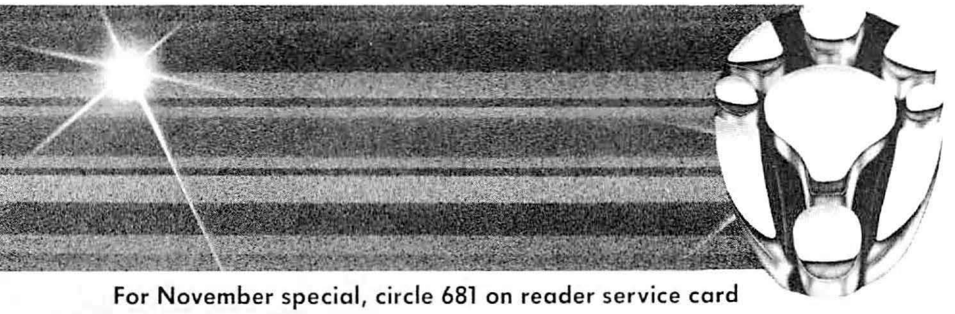

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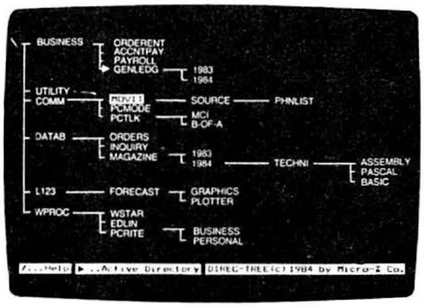

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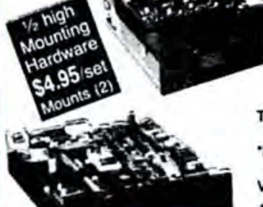

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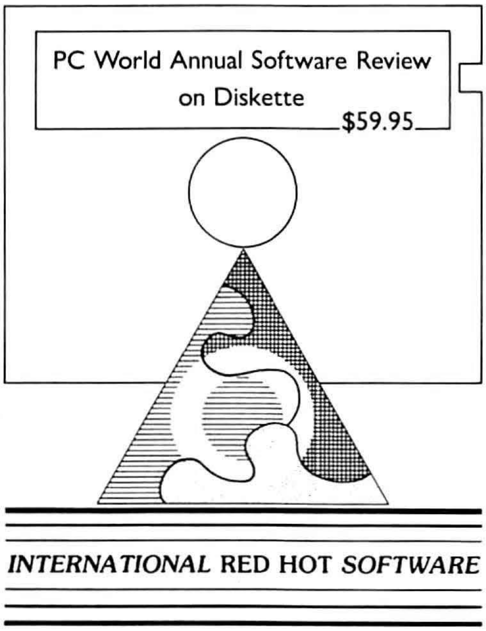
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ORCHID *PC Blossom*, 64-384K multifunction with optional *PCnet* Piggy-Back.

MAYNARD *Sandstar*, mod. Floppy & Hard Disc Controllers.

Graphic Cards

PERSYST *BoB board*, Best of Both, doubles text resolution & color graphics.

STB *Graphics Plus II*, color & mono, w/parallel port & software.

HERCULES Mono & color graphics cards support Lotus on IBM.

PLANTRONICS *ColorPlus +*, HiRes color board, parallel port, with Color Magic or Draftsman.

TECMAR *Graphics Master*, HiRes color & mono supports Lotus.

QUADRAM *QUADCOLOR I & II*, upgradable color cards for IBM.

PROFIT SYSTEMS *Multigraph*, 132 column monochrome 720h x 350v, color graphics 640h x 400v.

PARADISE SYSTEM *Multi-display* or *Modular Graphics Cards*, color & mono, parallel port.

Software

Accounting

IUS A/P, A/R, G/L, inventory, order entry, payroll.

PEACHTREE A/P, A/R, G/L, payroll, job cost, inventory, order entry.

Spreadsheets & Integrated Packages

ASHTON-TATE *Framework*.

LOTUS *Symphony and Lotus:* spreadsheet, word processing & data base.

MICROSOFT *MultiPlan*, comes with choice of templates.

MDBS *Knowledge Man*, spreadsheet, data base & graphics.

PEACHTREE *Decision Manager*, micro to mainframe integrated package.

SORCIM *SuperCalc 3 & 4*, superior graphics to Lotus.

SPI *Open Access:* spreadsheet, 3-D graphics, word processor, time manager & communications in one package.

Enhancements & Utilities

FOX & GELLER Complete line of enhancement products for *dBase II, III & Rbase 4000*.

NORTON Complete line of utility programs for IBM-PC.

ROSESOFT *ProKey 3.0*

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CENTRAL POINT SOFTWARE *Copy II PC.*
ATI *Training*, critic's choice software tutorials.
SOFTSTYLE *Set FX*, Epson font control package.
SIDEWAYS Inverts printout.
BORLAND *Sidekick.*

Compilers & Language Tools

LATTICE *C*-Compilers, most popular 1 Meg RAM on PC.
MICROSOFT Complete line of compilers.
DIGITAL RESEARCH Complete line of compilers.
BORLAND *Turbo Pascal, Turbo Toolbox* and more.

Graphics & CAD

Zsoft *PC Paint Brush*, mouse driven graphics w/screen dump util.
DECISION RESOURCES *Chart-Master/Sign-Master* graphics pkgs. for printers & plotters.
AUTODESK *AutoCAD*, the most popular graphics package in the world.
ENERTRONICS *Energraphics*, low cost graphics & CAD package.
MICROPRO *ChartStar.*

Communications

MICROSTUF *CROSSTALK XVI*, communications.
HAYES *SMARTCOM II*, communications.
VM *Relay*, communications.

Word Processors

MULTIMATE Latest version with spelling checker and tutorial.
SAMNA *III*, New Flagship word processor.
MICROSOFT *Word;* 4th generation word processor, w/or without mouse.
LIFETREE *VOLKSWRITER DELUXE*
MICROPRO *WordStar Professional* series with Tutor, CorrectStar, MailMerge & Star Index.
SSI *WordPerfect;* popular word processor emulates IBM's Displaywriter.
PEACHTREE *PeachText 5000*, Personal Productivity Series.

Office & Project Planning

HARVARD *Harvard Project Manager.*
IUS *Easy SalesPro.*
MICROSOFT *Project.*

Data Base Managers

MICRORIM *4000* or *6000*, Report Writer & Clout options.
GMS SYSTEMS *Power-base*, relational and hierarchical data base.
ASHTON-TATE *dBase II & III.*
MICROSTUF *Infoscope*, critically acclaimed data base.

Modems

HAYES *Smartmodem 300, 1200, & 1200B.*
NOVATION Complete line of internal & external.
RIXON 1200-4800 BAUD synchronous & asynchronous models.
ANCHOR AUTOMATION *Signalman Mark XII*, 300-1200 direct connect.
VEN-TEL The 1200 BAUD & Half Card for the IBM portable & XT.

Miscellaneous Hardware & Accessories

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LQ SHEET FEEDERS Cut sheet feeders for the NEC 3550 & C-ITOH printers.
MOUSE SYSTEMS *PC Mouse*, optical type, 3 button with software.
MICROSOFT *Mouse;* Bus or serial mechanical mouse with mouse menu software.
CURTIS Monitor pedestal, keyboard extension cable, monitor extension cable.
QUADRAM *MICROFAZER*, print buffer: 8-128K.
TRIPPELITE Back up power supply 200-1000 Watts, and *ISOBAR* surge protectors with 4 & 8 plug.

Monitors & CRT's

PGS *MAX 12*, amber, runs off the IBM Mono Card, 720 h x 350v.
PGS *SR-12*, 690h x 480v, HiRes RGB with dual scan card.
PGS *HX-12*, HiRes 690 Dot RGB.
QUADRAM *QUADCHROME*, HiRes 690 Dot RGB.
AMDEK *COLOR I, IIA & IVT*, The industry standard RGB's.
AMDEK *COLOR 300, 500, 600, 700, 710*, new complete line of HiRes RGB's.
AMDEK *300A/300G*, Industry std. composite monitors.
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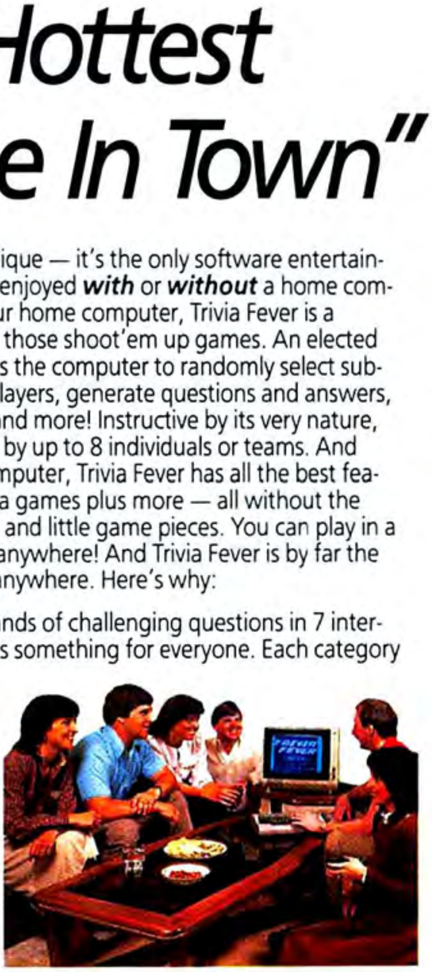

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