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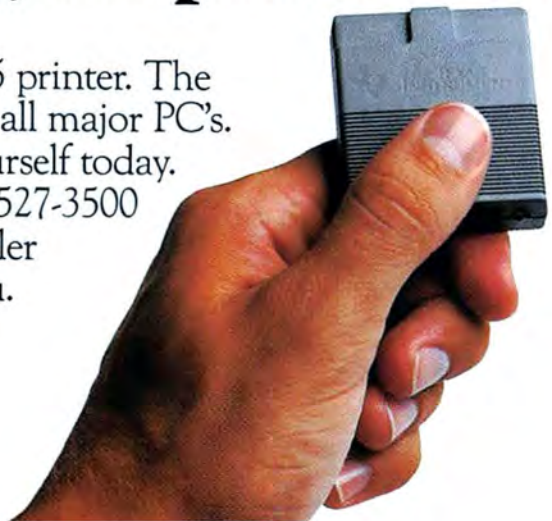

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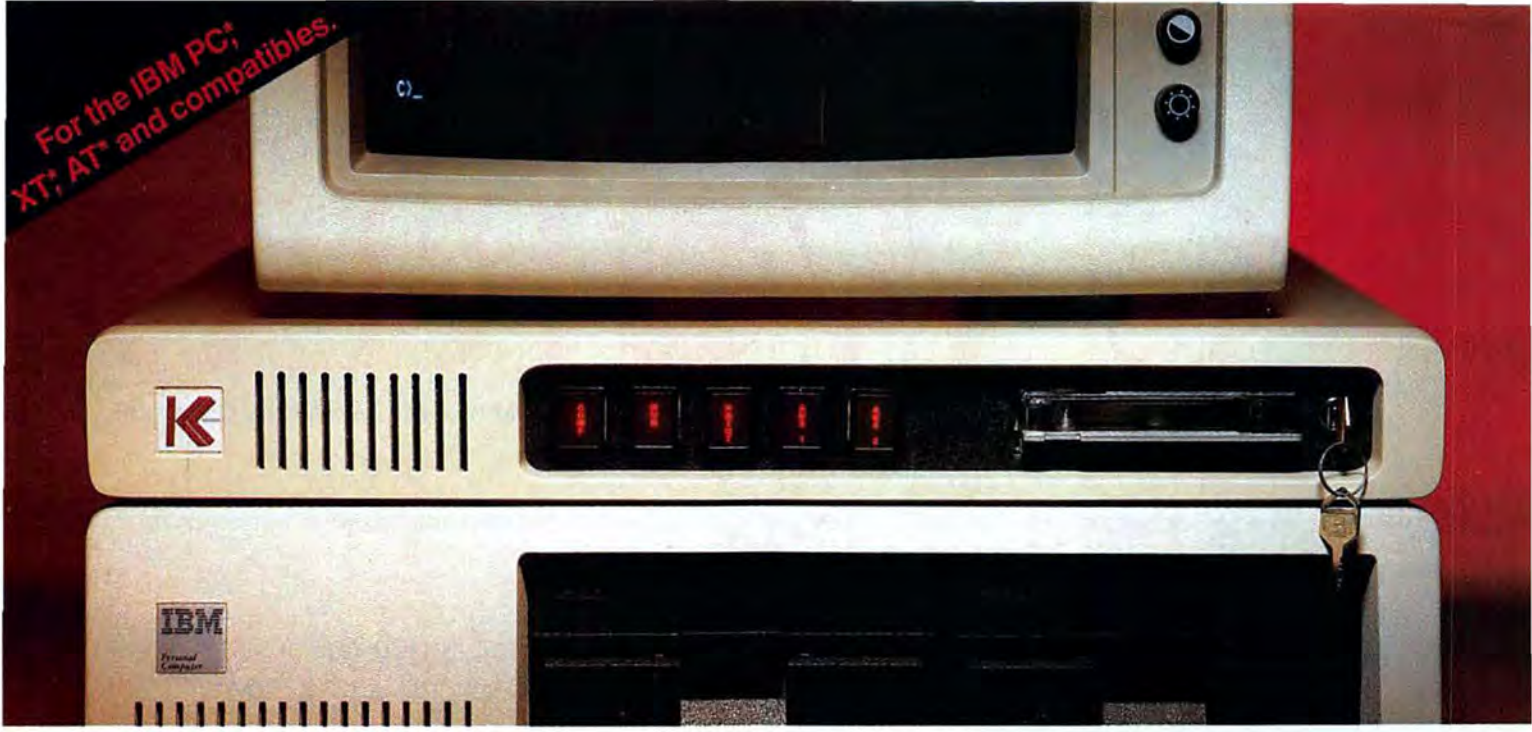

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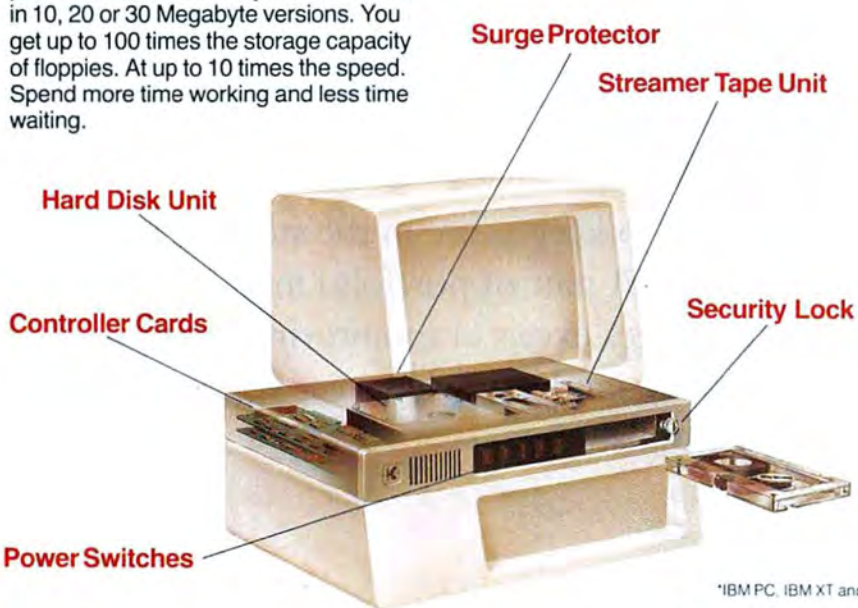

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PC WORLD

The Comprehensive Guide to IBM Personal Computers and Compatibles
March 1985

78 **From Altair to AT**

Ten years have passed since the introduction of the MITS Altair. *PC World* takes a retrospective look at the first decade of personal computing.

122 **Non-Taxing Software**

Got the 1040 blues? Take command of your tax-time morass with a personal tax preparation program. With *PC/TaxCut* and *Tax Preparer* you can trim your week-long ordeal into a 2-hour spin at the keyboard.

132 **The Portfolio Masters**

Need to keep score in the stock market game? A pair of portfolio management packages excels at monitoring your money—and may help steer you toward the bulls.

Getting Started

52 **Word Processing: The Deciding Factors,** ***Merrily Shinyeda***
More than 200 word processing packages currently flood the market. These guidelines help you decide between the swimmers and the sinkers.

Community

78 **From Altair to AT,** ***Wayne Parker***

Review

122 **Non-Taxing Software,** ***Charles Humble***

132 **The Portfolio Masters,** ***Stephen A. Blumenthal***

150 **The Many Faces of Aura,** ***Bill Crider***
Aura's integrated applications imitate stand-alone programs, but their menus and commands can be sculpted to suit the user.

PCjr World

184 **Junior Meets Jr,** ***Linda Williams***
What software should preschoolers use? A review of some popular early-education software separates the good from the bad.

State of the Art

198 **Bar Code Bonanza,** ***Aubrey Pilgrim***
The bar code reader is becoming an essential input device for PCs used in all businesses that need to keep track of inventory.

Hands On

212 **1-2-3 Plays the Options Market,** ***Stephen A. Blumenthal***
This *1-2-3* template helps you manage a conservative options strategy.

226 **Caveats for Custom Software,** ***Jordan J. Breslow***
A carefully designed contract can keep you out of court—and cut your taxes.

Departments

11 **David Bunnell**

19 **Harry Miller**

29 **Letters**

42 **PC World View,** ***Katie Seger***

65 **The Help Screen,** ***Karl Koessel***

103 **Compatibles Update,** ***Ken Greenberg***

165 **From the Software Shelf,** ***Edited by Robert Luhn***

239 ***.*,** ***Edited by Steven Cook***

249 **Just Announced,** ***Seth Novogrodsky***

277 **Listings**

PC World Directory

261 A classified guide to products and services

Indexes

283 **Products**

285 **Advertisers**

Photo/illustration credits: Carlos Aguirre, 226; Aurora Systems (computer imaging), 82-3; David Bishop, cover, 52; Jim Ludtke, 78; Steve Lyons, 105; Jeffery Newbury, 94; Marc Rosenthal, 151; Marcia Steiger, 133; George Steinmetz, 19; Fred Stimson, 41, 82-3, 183-4, 213; Jamie Tanaka, 44; Laslo Vespremi, 199.

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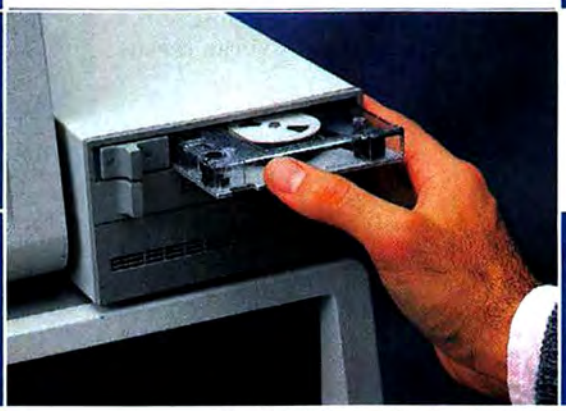

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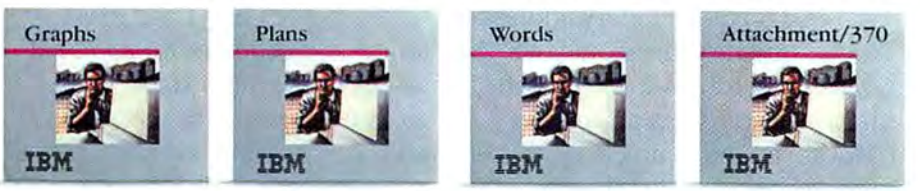

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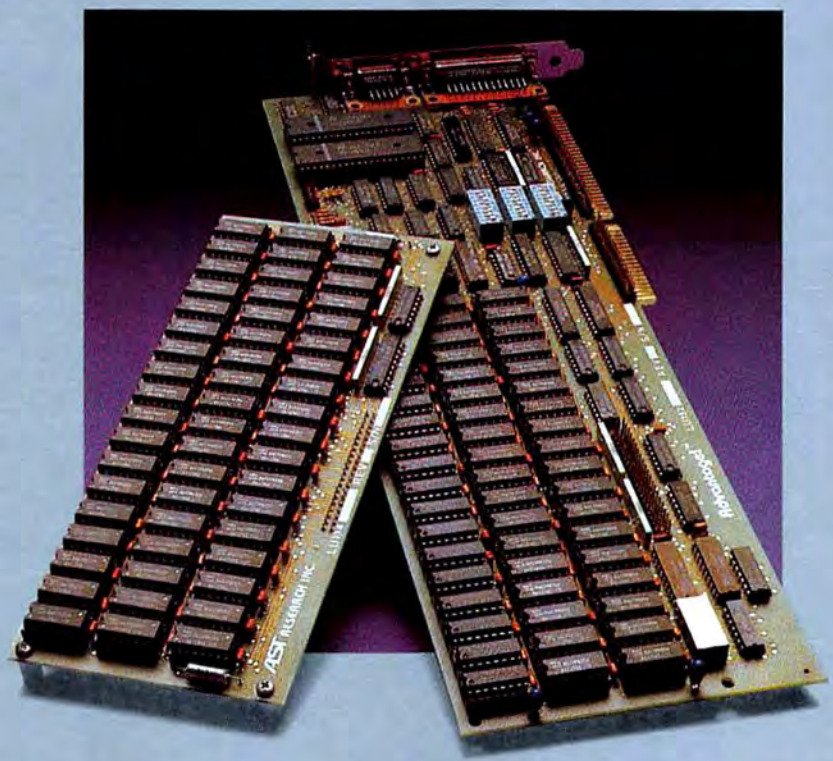

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David Bunnell

Special Treats for Our Readers

PC World's four special editions in 1985 will introduce quality and analysis into the information fray.

One of the universal problems of magazine publishing is something called lead time. This is the time it takes an article that is turned in to the editorial department to make it into print and be delivered to the readers.

Lead time drives writers and editors crazy. For example, this column for the March 1985 issue of *PC World* was written the week before Christmas–and was late!

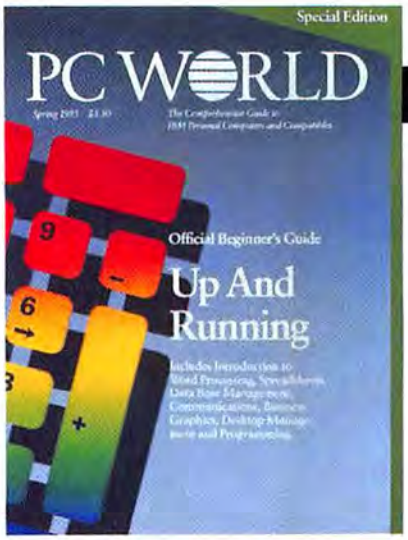
In discussing this problem in editorial and production meetings, we zeroed in on part of our journalistic philosophy: that depth, quality, usefulness, accuracy, and care are more important than immediacy of reporting.

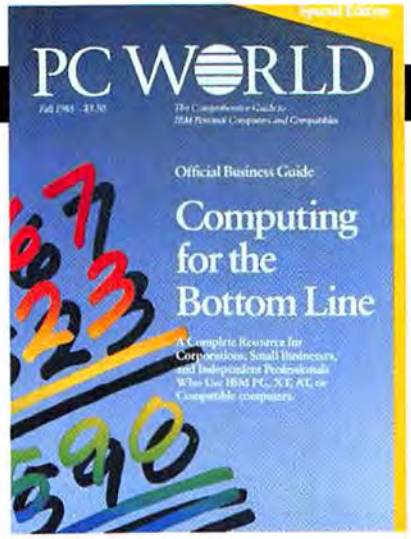
I think the rush to get information out first is more crucial in the minds of editors and advertisers than in those of our readers. If you look under the *PC World* title on the cover of this issue you'll see that we bill ourselves as "The Comprehensive Guide to IBM Personal Computers and Compatibles." Keeping this in mind, we want *PC World* to provide you with the best–rather than the first–information available.

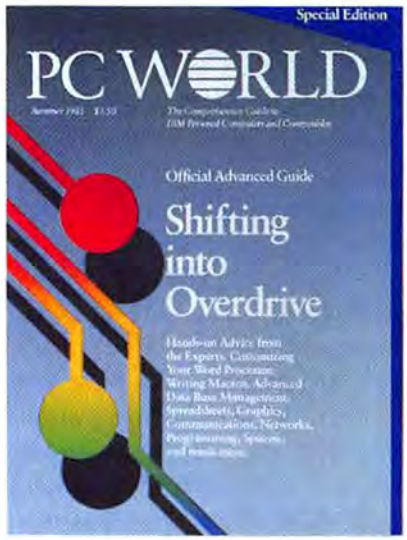
To help us understand who our readers are, we hired a highly regarded research firm, L & J, to conduct an independent study of IBM PC owners and find out what they're reading. The results were astonishing. More IBM PC owners surveyed read *PC World* regularly (68.2 percent) than any other publication. *PC World* is also considered the "most informative" publication that IBM PC owners read.

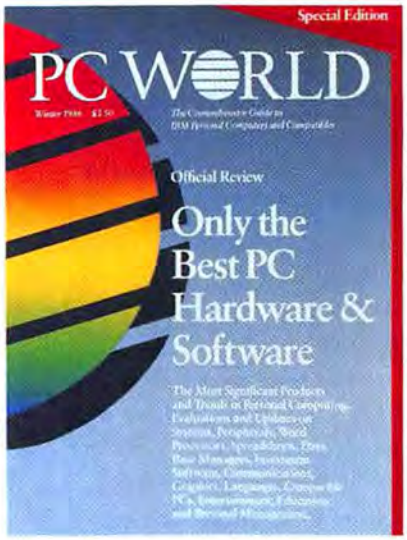
We think that our emphasis on quality and usefulness is the main reason for these results. When a major announcement breaks, such as the release of the AT, we try to get our analysis to you as soon as possible. However, our approach is geared toward careful, in-depth reviews and hands-on tutorials, and we won't sacrifice our attention to detail in favor of speed.

Some of our rivals, such as *PC Week*, try to keep their readers informed with up-to-the-minute reports and analysis of all the latest PC doodads plus behind-the-scenes speculation. Do serious PC users really want that? Somehow it seems silly to report on personal









computers in the same style as the Associated Press reports on international relations.

In keeping with this journalistic philosophy, we have decided to make four of the regular 1985 issues of *PC World* "special issues" emphasizing topics that aren't at all "news" oriented.

The May issue of *PC World* will include a special section, our official beginner's guide, called *Up and Running*. Because many of our readers are beginners, we have created this section to help them get started in several areas of computing. Even if you are an expert at using spreadsheets, you may not have conquered data base management programs or business graphics. In any case, if you are one of our typical readers, you have friends or associates who are just warming up to their personal computers and are constantly asking for advice. This issue will be one that you can pass on to them.

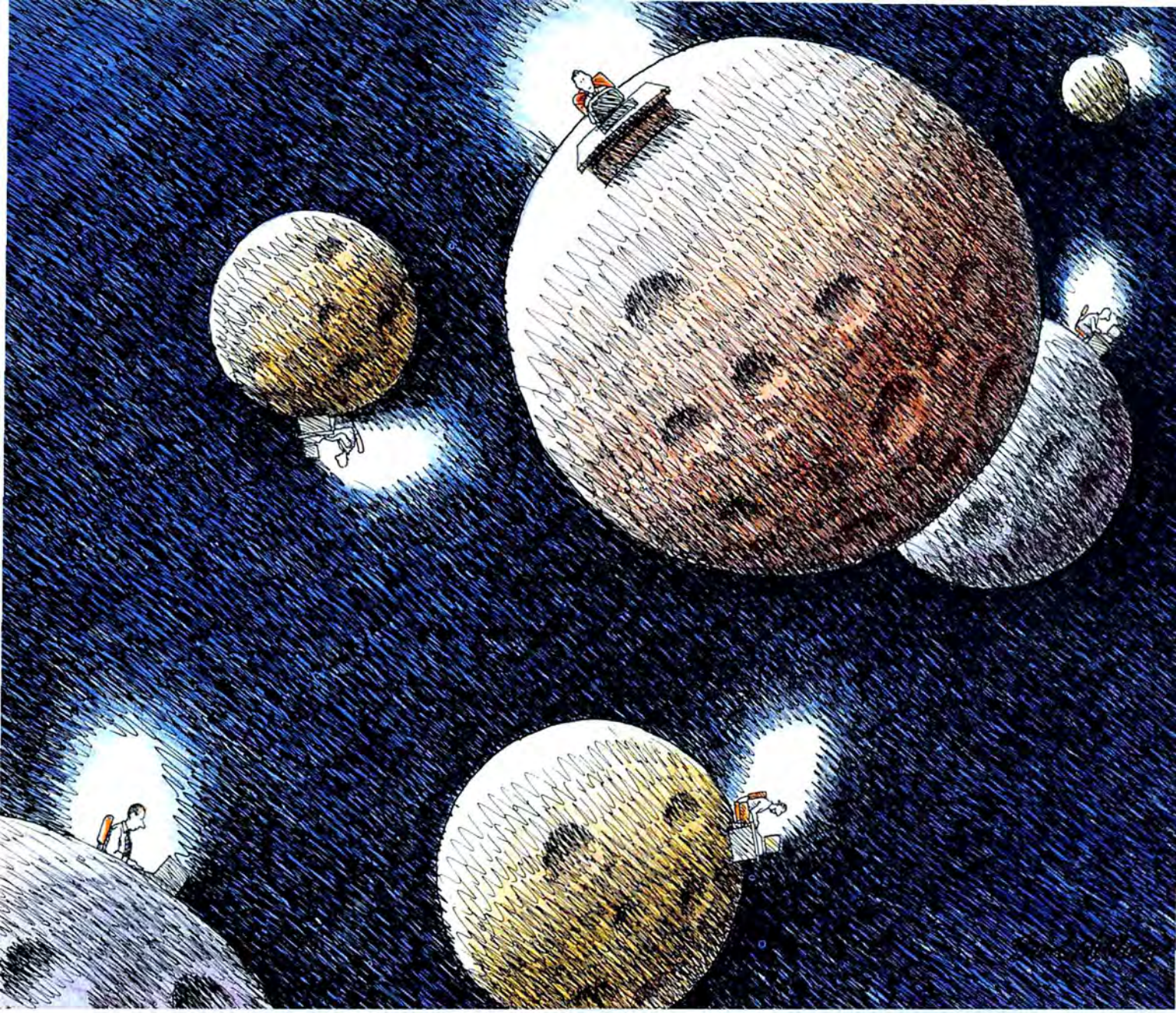
As a logical sequel to *Up and Running*, the July issue will be *Shifting Into Overdrive*, our guide to advanced computing. Aimed at the more experienced user, *Shifting Into Overdrive* looks at products and techniques that result in better performance or a higher degree of automation. Just to keep you on your toes, it will include the *PC World* Test for Advanced Computing. Pass this test and we will certify you as an advanced PC user.

As September's special, we will publish the first *PC World* business guide. This type of special represents an industry first–a publication concentrating solely on the business user–and we will probably have to print an extra 100,000 copies to satisfy the demand at the newsstands. Titled *Computing for the Bottom Line*, this issue will cover communications, business graphics, project management, and financial and accounting applications.

Finally, in December we will print a year-end roundup: *PC World's Annual Review*. Inspired by the style of the *Whole Earth Software Catalog*, we will include only the best PC hardware and software. Instead of listing everything on the market, as we did in past hardware and software reviews, we will help you narrow the choices down to the products rated four stars by our editors and readers.

In addition to the study by L & J, we also conducted an Erdos and Morgan survey that showed that our readers hold on to their issues of *PC World* for an average of 12 months. We hope that these 1985 specials will be around even longer.

By the way, if you have any suggestions for future special issues you'd like to see, please send me a note at 555 De Haro St., San Francisco, CA 94107.



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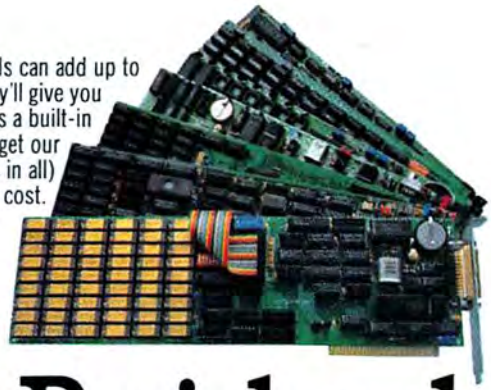

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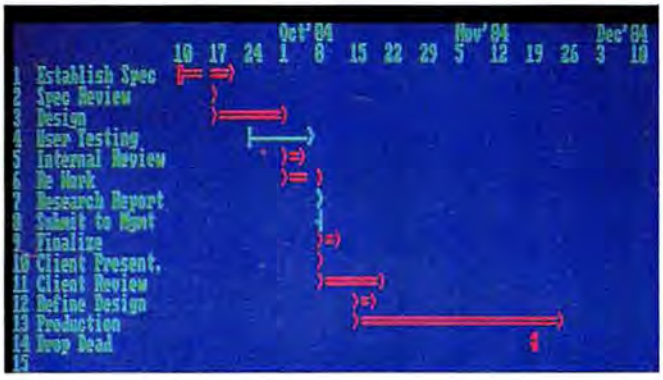

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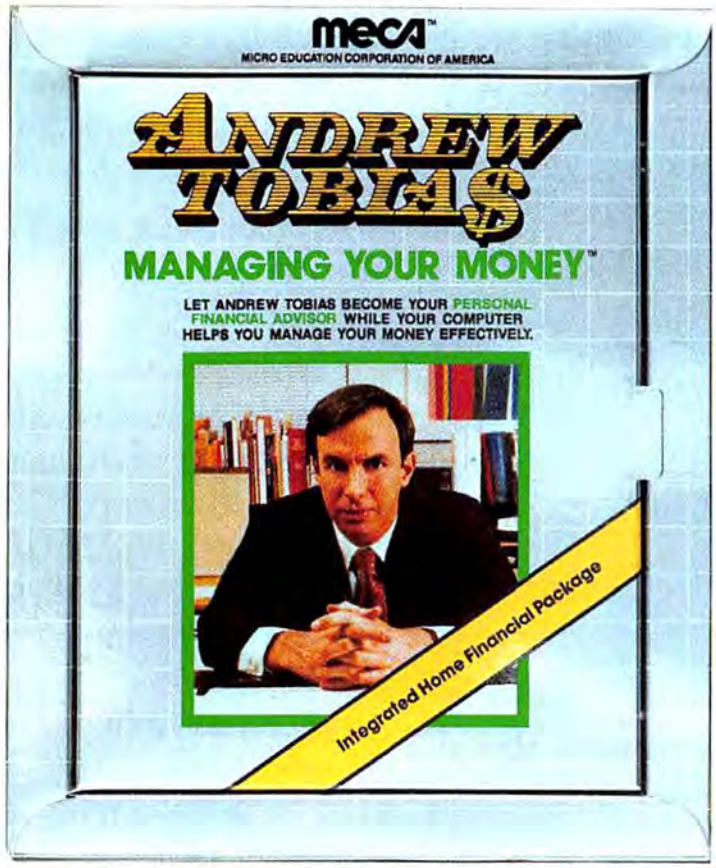

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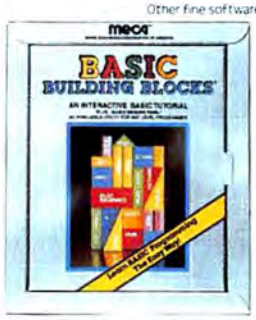

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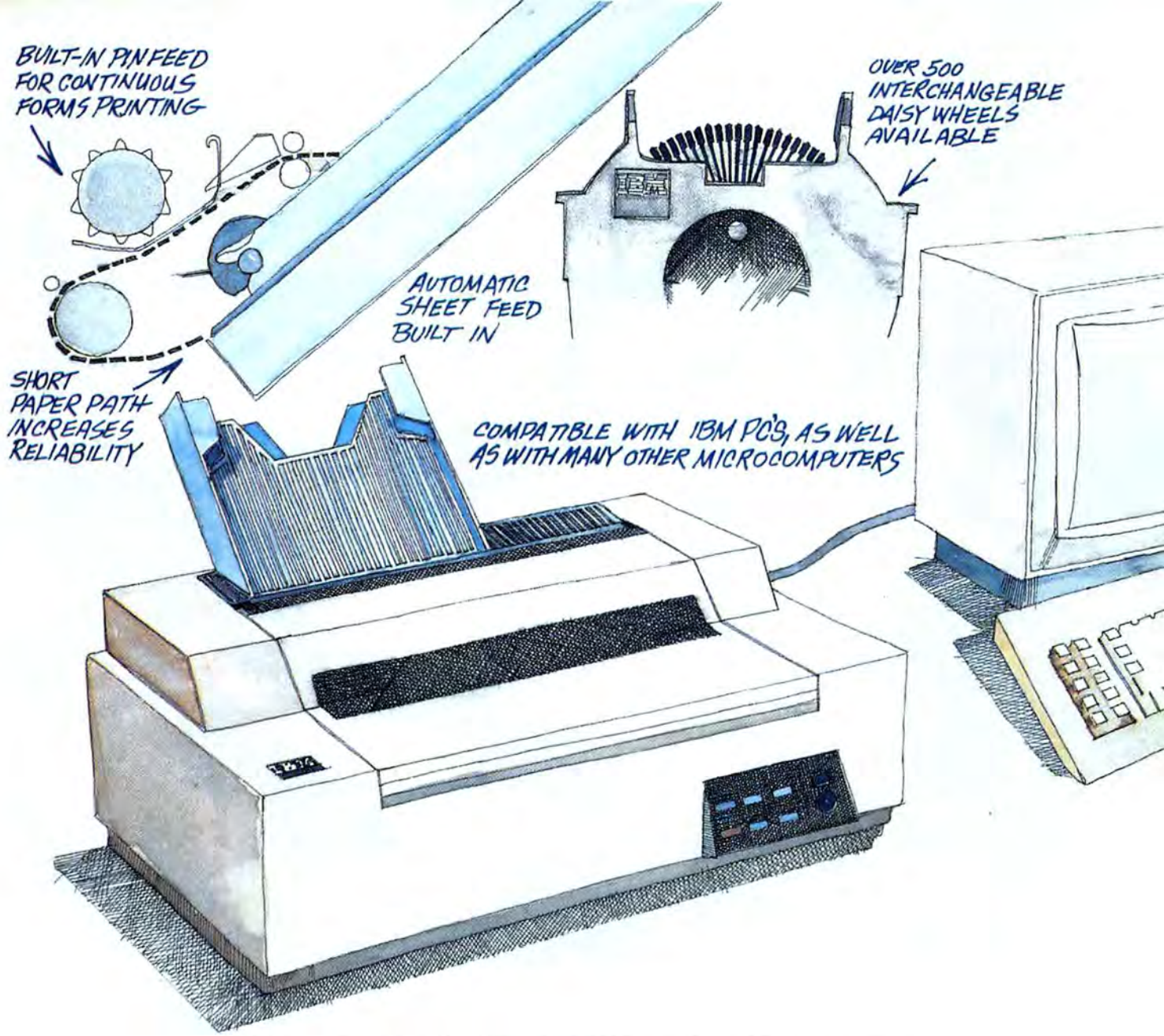

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Harry Miller

The Matrix Menace

Spreadsheets can pave the way to success, but they can just as easily lead you down the road to ruin. The deciding factor can be something as trivial as an omitted character or an improperly referenced formula.

Don't get me wrong, I'm a red-blooded, all-American boy: I like Mom and apple pie, I watch football on Sundays, and I couldn't do my job as well without spreadsheets. But spreadsheets are just tools, and like any other tools they can be dangerous if used without the proper caution and respect. A bulldozer is a useful tool, but think of how dangerous it could be in my hands—or in yours.

It's a little scary to consider how much depends on spreadsheets these days. Personal and corporate fortunes often hang in the balance. The scary part is how little auditing or examination is applied to the underlying model. Most people just look at the bottom line and try to make some sense of the results.

Yet it's not difficult to make a little mistake that can have a big impact. No matter how proficient you are with the software, your models are still vulnerable. If you're a spreadsheet novice, you are susceptible to errors of ignorance; as a sophisticated spreadsheet modeler, you're open to the more insidious errors of arrogance.

Although big mistakes are bad, smaller mistakes can be much worse. Most spreadsheet users have some expectations about the results of their analysis, or at least some reasonable feel for how the numbers should work. If the results are off by an order of magnitude, somebody is likely to question them strongly. But small errors can easily escape such common-sense scrutiny and live on to corrupt several generations of spreadsheets, as the output of one model is often used as input data for another.

Simple errors that live on the surface of spreadsheets are hard enough to detect, but more sophisticated models give errors the kind of safe hideout that Mad Dog Roy Earle would have given up Ida Lupino for. Keyboard macros, data tables ("what if" matrices), and graphics can automate

a model so that you can conveniently evaluate multiple alternatives. Indeed, that ability is one of the greatest benefits of management by spreadsheet. But those same features make errors in logic or underlying algorithms harder to detect.

All right, enough complaining. Spreadsheets are too powerful not to use. There are a few common pitfalls to avoid and some simple precautions that can keep the matrix mistake monster at bay.

It's easy and often tempting to copy a formula that shouldn't be replicated in full. For example, it's common practice to create a formula to sum the first column and then copy that formula across a row so that every column is totaled. If some of those columns have been designed to hold multiplier factors, the sum of those multipliers will be a meaningless number. The problem will be worse if the formula at the other end of the row sums all the column totals to arrive at a grand total. Since that grand total will include the meaningless sum of the multipliers, it will itself be meaningless. The beat goes on.

Or, when copying a formula, you might forget to make a cell reference absolute or you might make the wrong part of the reference absolute. (An absolute cell address is one that won't be adjusted for the new location to which it's copied. That is, the address is exactly the same in the copied formula as in the original formula.) If you make such a mistake, the formula adjustments will get you. If you're lucky, some cell reference will be adjusted to an empty cell, and you'll get an ERR label somewhere. But there's no guarantee of that.

Rounding errors commonly turn into Excedrin headache number 39. If, for example, you have a column of formulas that calculate portions of a whole amount and are expressed as percents, and if the range is formatted not to display any decimal places, you might have trouble getting the column to add up to 100 percent. The percent formula will create decimal (less than 1) values, and the rounding-off feature of the integer-only format will hide the effect of those values.

On the positive side, developing a few good habits can minimize the chances of catastrophe. Use a separate and clearly labeled area for data input and assumptions. That makes it easier to tell what the results are based on.

Date and number successive versions of the model so that you'll know you are incorporating the latest set of assumptions and data. You might also label the spreadsheet with the author's name and the file name under which the model is saved.

Print out all of the formulas. A printed version enables anyone to audit the methodology as well as the mechanics of the model.

Incorporate cross-checks wherever possible. If there are several ways available to calculate an answer, use more than one and compare (or have the model compare) the results. Then you can track down the source of any discrepancies.

Test spreadsheet models using simple-to-follow and predictable data. If a model works correctly with simple data, it's more likely to give good results when it counts.

Name ranges or single cells as much as possible, and use those range names in formulas. You're much less likely to make an error in Total Sales – Total Expenses than in A20 – A40.

Once you've checked the accuracy and appropriateness of a formula, use the range- or cell-protection feature to avoid accidentally corrupting the validity you worked so hard to establish.

The power of the spreadsheet is at the same time its invitation to danger. We've heard of only a few cases in which spreadsheets have been at the root of real catastrophes. All it takes to avoid being such a statistic is to err on the side of caution.

So be careful, good luck, and a hearty "/QY" to one and... Oh no, I can't believe it–I forgot to save the final version.

Harry Miller is the Editor of PC World.

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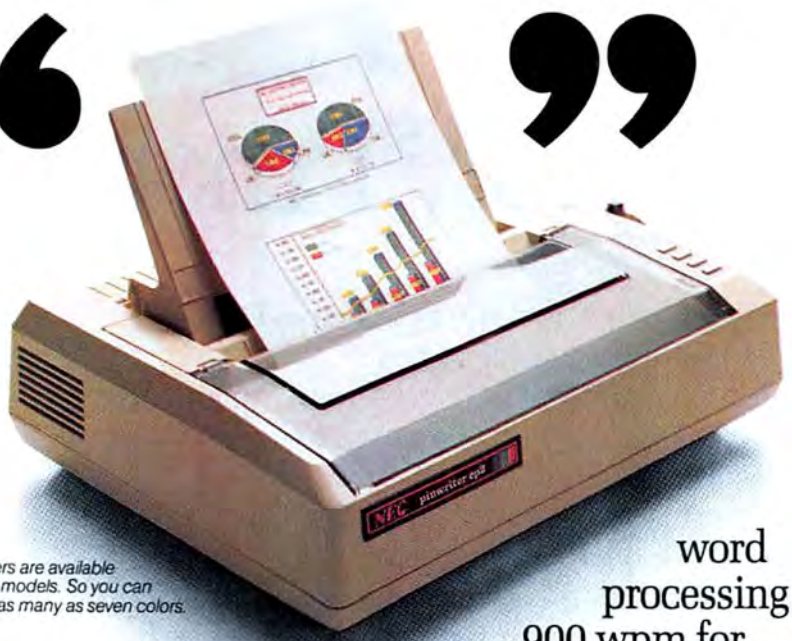

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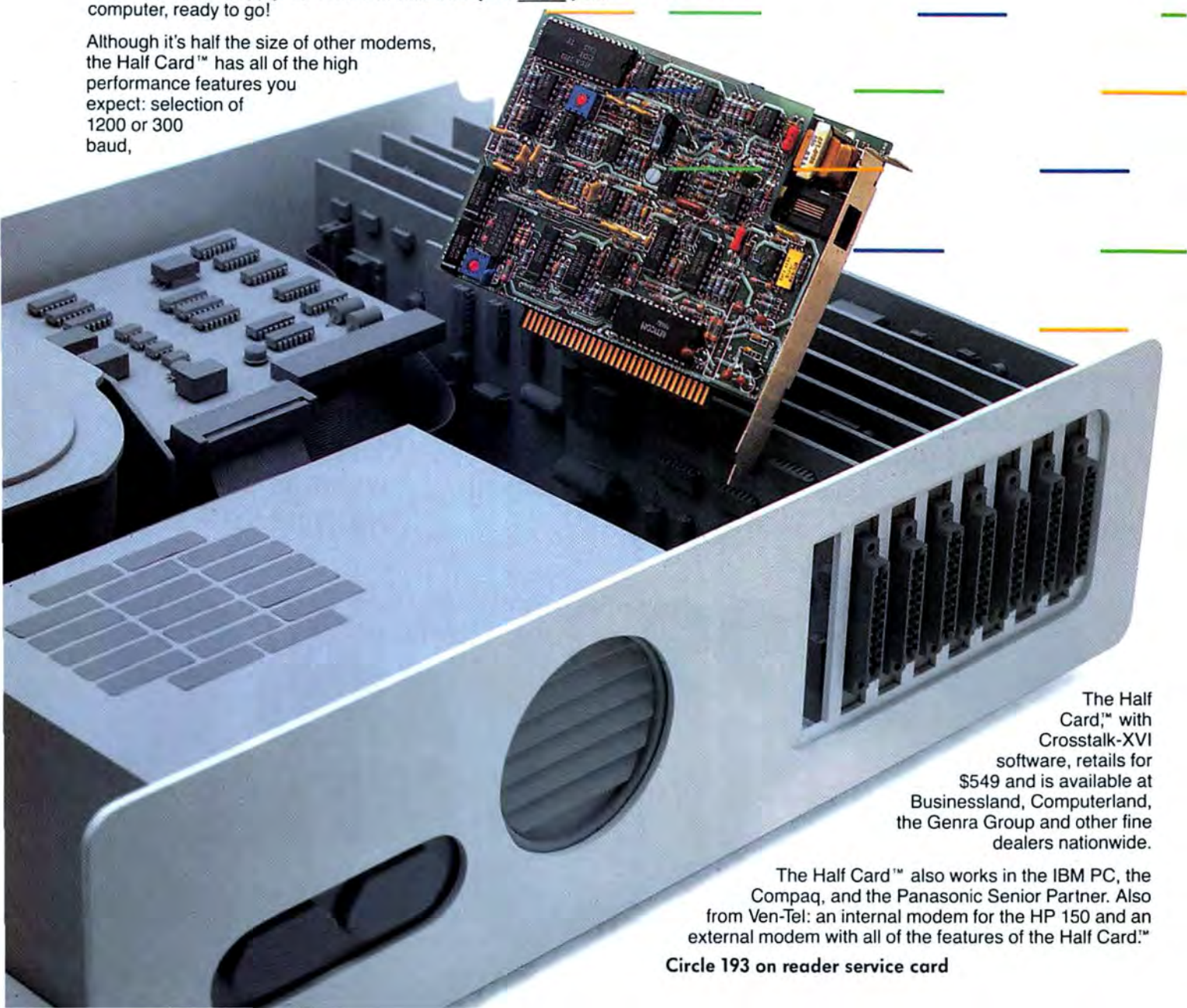

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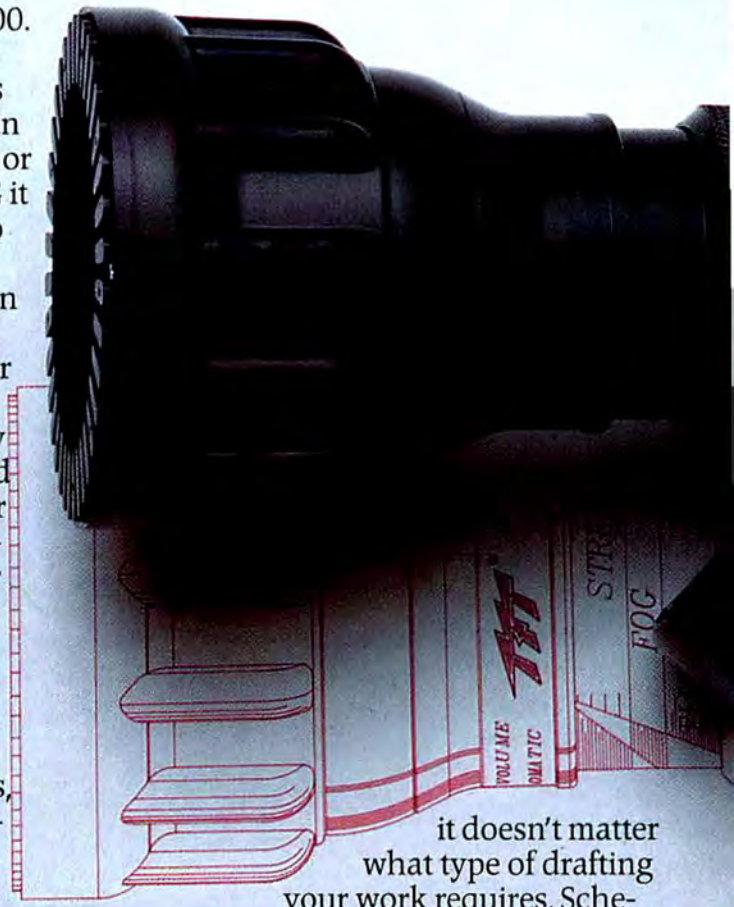

Zoom in on a part to focus on the details

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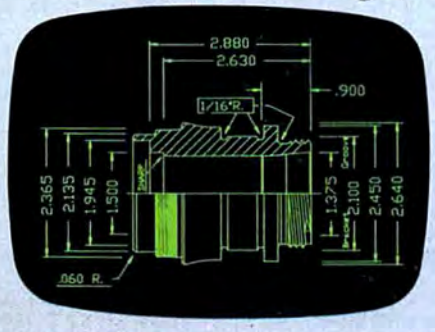

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Architectural layout courtesy of Lansing Pugh, Architect Solar Panel Assembly plot courtesy of Future Technology, Inc.

re ends budget burnout.

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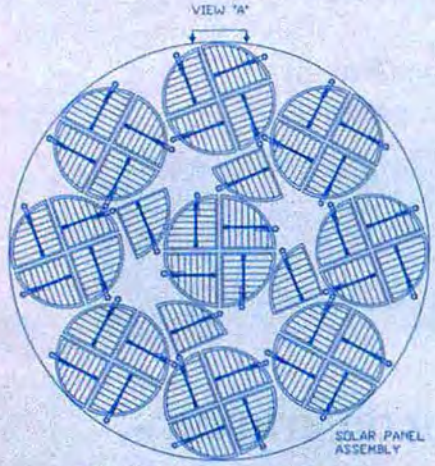

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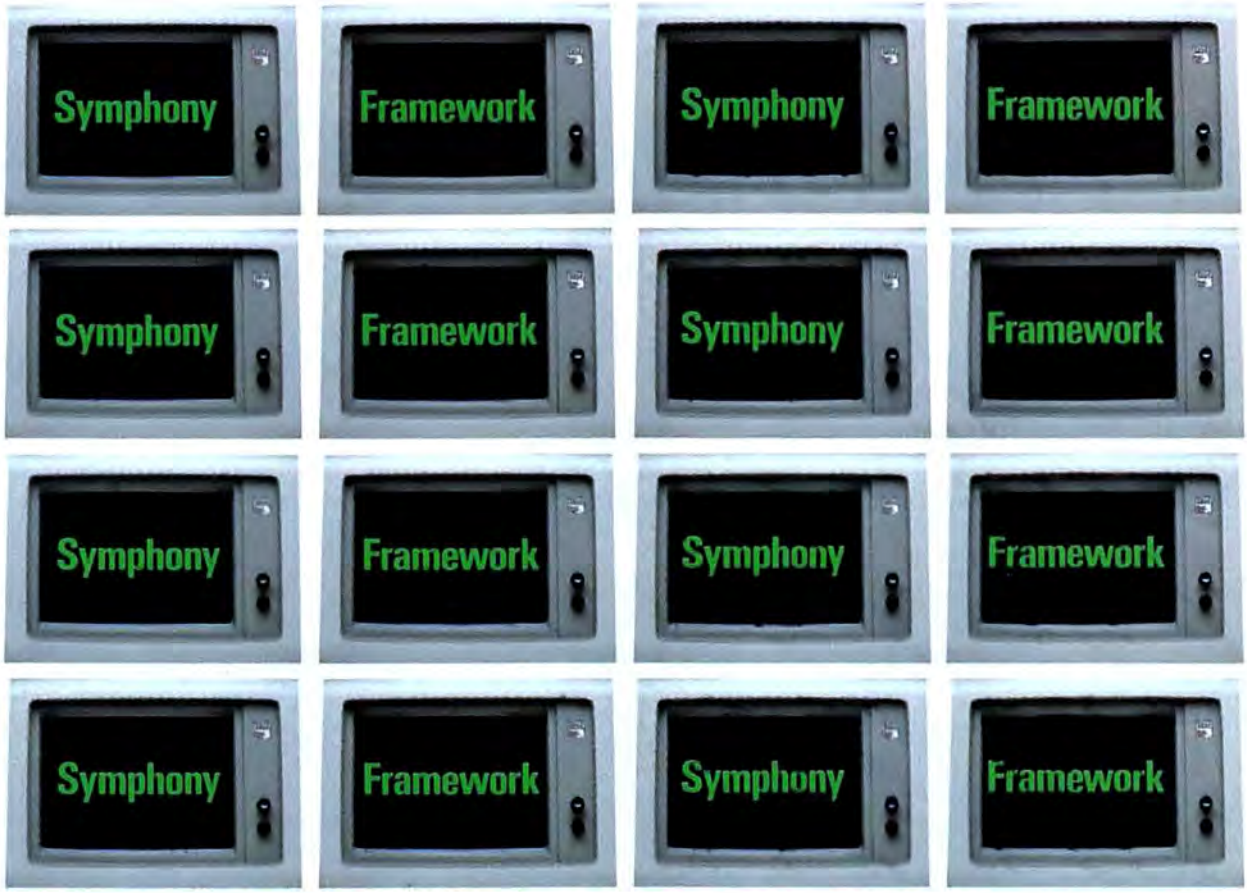
Circle 596 on reader service card



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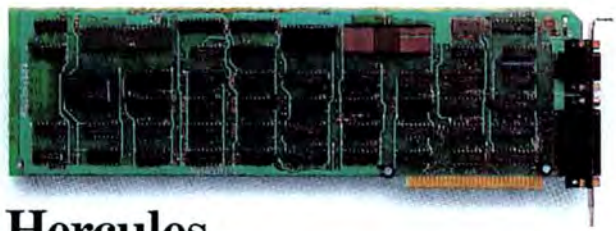

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Address: Hercules, 2550 Ninth St, Berkeley, CA 94170 Phone: 415 540-6000 Telex: 754063. **Trademarks/Owners:** Hercules/Hercules Computer Technology; Lotus, 1-2-3, Symphony/Lotus Development; Framework, Ashton-Tate/Ashton-Tate; IBM, AT/IBM; Microsoft/Microsoft. *The IBM Color/Graphics Monitor Adapter.

Circle 77 on reader service card

Letters

Reactions and responses from the PC World community

No-Class PC?
In the voting for your World Class PC contest you have been led astray by your readers. We voted for what we own, not for what we want.

Therefore, your "World Class PC" (*PCW*, Vol. 2, No. 12) is the mediocre party line as supported by IBM and sold by noncommittal dealers. To be sure, there are some winners in the lineup, such as the AST board, *1-2-3*, and the Hayes Smartmodem 1200. But *Smartcom II?* Give me a break. *PC Talk* runs circles around it and *Crosstalk* is better still. These people haven't compared; they know only what they own.

William Burtt
Union, New Jersey

Rapping dBASE Commands
In the article "Take Command of dBASE II" [*PCW*, Vol. 2, No. 11], David Jenkins states: "Keep in mind that each command must be configured to a single line; you cannot wrap a command around to the next line in a command file." You can, and the previous quote demonstrates that Mr. Jenkins has the secret–the semicolon. I use the ; to break (and wrap) command lines. Furthermore, the limit of characters for a single line is 254, not 78. I have several extensive command files running daily that incorporate wrapped lines; all of them are written with the Modify command.

Joseph M. Crass
Chicago, Illinois

Of course you're right. There are two kinds of lines: lines on the screen, and dBASE *command lines. When you use* dBASE*'s Modify command, a screen line is limited to 78 characters and ends with a carriage return. You can "join" a screen line to the next screen line with a semicolon so that both lines form a single command line. "Wraparound" refers to one screen line continuing on the next line without an intervening carriage return.* dBASE II*'s Modify command does not permit wraparound (although* dBASE III*'s does).–David Jenkins*

Graphics Blues
After what I had thought was a reasonably thorough investigation of IBM video boards, I purchased an STB Graphix Plus II. I use my IBM PC primarily for word processing and spreadsheets and therefore have an IBM monochrome monitor in order to benefit from the high-resolution text characters. However, because I have two small children at home, I also wanted to be able to run educational programs and games that require an IBM Color/Graphics Adapter.

The review "More Color Than Big Blue" [*PCW*, Vol. 2, No. 9] conveyed the unmistakable impression that the Graphix Plus II would run programs such as *Flight Simulator* on the IBM monochrome monitor without modification or special drivers. I was surprised and disappointed to find that this is not the case, with the exception of *1-2-3*, for which special drivers were supplied.

At first I thought that there was something wrong with my board; there wasn't. Since then, I have

found that what the Graphix Plus II does, it does well. But it does not do what I bought it for, and therefore it does not do much for me.

Oscar Fricke
Costa Mesa, California

As noted in my review, the prerelease version of the STB Graphix Plus II board that I tested ran various graphics packages on an IBM PC with an IBM monochrome monitor. The only exception I noted was 1-2-3, *which would not run on a monochrome monitor.*

The review also pointed out that the monochrome graphics appeared "squashed," because the display's vertical-to-horizontal ratio was reduced. Also, the Graphix Plus II does not translate colors into different shades of green on the monochrome monitor. Only two colors–green and black–are available in monochrome graphics mode.

Since my review, STB has discovered that the board does not work in monochrome graphics mode with all IBM monochrome monitors. Most of these problems can be fixed by adjusting the vertical sync on the monitor. You need to open the monitor to do this, however, thus voiding the warranty.

Further, STB has since found that the monochrome graphics mode does not work with the Amdek 310A and Princeton Graphics MAX-12 monitors.

To solve these problems, STB now provides special software drivers for three programs: 1-2-3, Symphony, *and* Framework. *With the special drivers, these programs display graphics correctly in monochrome mode. STB will not guarantee that any other graphics programs will work on the Graphix Plus II in monochrome graphics mode. STB also says the board will not work properly with the Eagle and Leading Edge computers.*

Given the quirkiness of the production version of the Graphix Plus II, I no longer recommend it to users who want to display graphics on a monochrome monitor. It may work with your particular monitor (as it did with mine), but you would be taking a risk in buying this product.–David McCune

Re: Write

The *Software Shelf* item on *PC Write* [*PCW*, Vol. 2, No. 12] was a good review of the product as a word processor, but it failed to note the program's other equally important use as a full-screen program and file editor. *PC Write* leaves files in readable ASCII form without embedded control characters, unlike most word processors. All the usual program edit features are present, including block operations, search and replace, insertion of other files, and storing sections of code as new files.

I use the IBM CMS Xedit editor on a mainframe, but I have come to prefer *PC Write* for its superior use of the keyboard and instant response. Bob Wallace, its author, suggests registering your copy for $75, for which you get hot-line service and source code. I don't need those, but I intend to send him something; he deserves it.

Richard A. Russell
Burlington, Massachusetts

The Biggest PC

I enjoyed David Bunnell's well-written column, "My Travels in the PC Time Machine," on the short history of personal computing [*PCW*, Vol. 2, No. 12]. I was going to rate it an "A" until the opening sentence in the next to last paragraph: "Since the computer has the ability to remember an infinite amount of data.... "

Really now, large amounts. But always finite.

Maurice D. Lind
Birmingham, Alabama

... Would Smell as Sweet

Rick Altman's November article "Two Word Processors in Search of a Home" [*PCW*, Vol. 2, No. 12] was technically correct about the features of *Bank Street Writer.* However, he didn't do his homework as far as whom the program was written for. It was developed by New York's Bank Street College of Education for young children. It was never intended for

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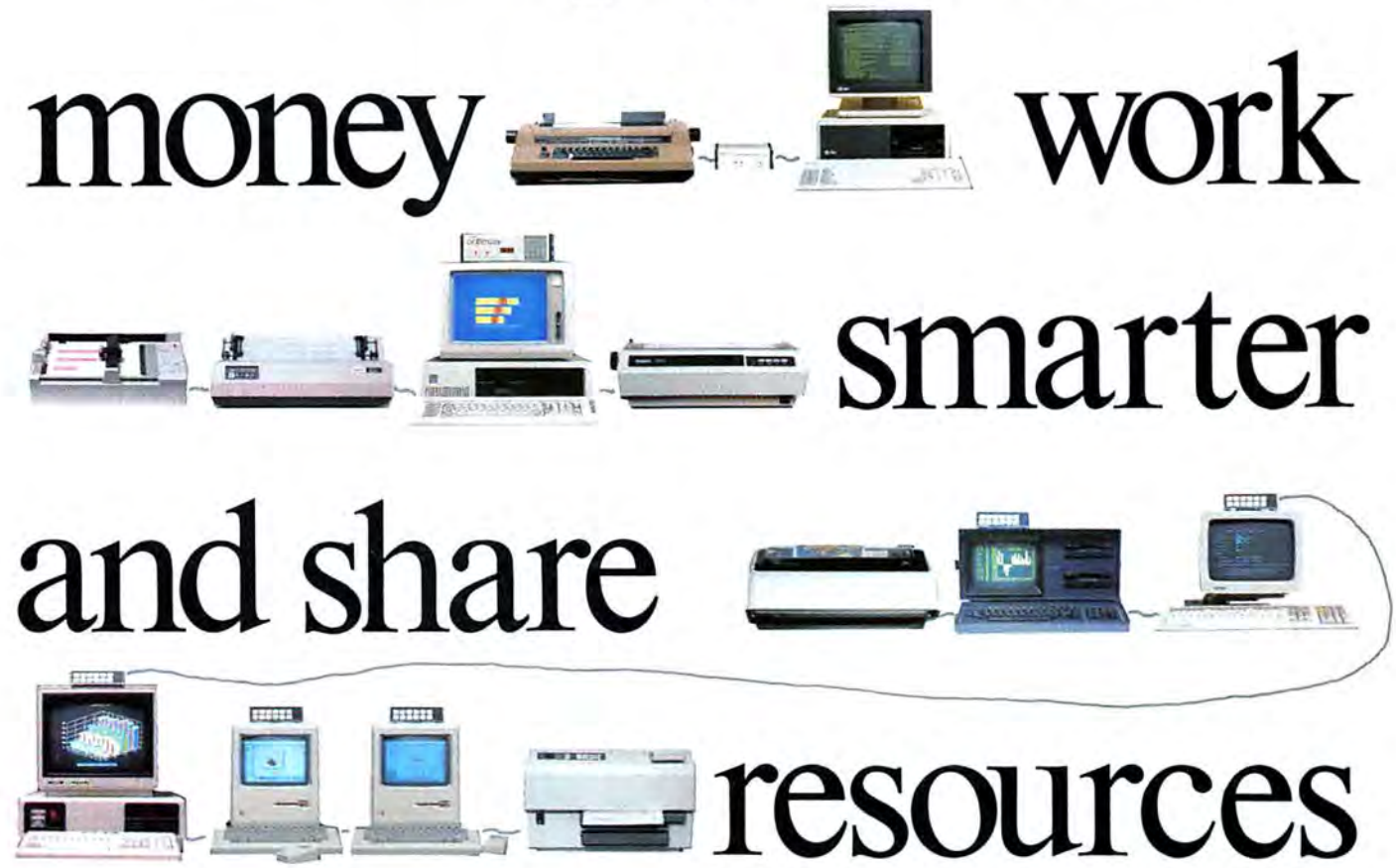

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Circle 966 on reader service card.

businesses or bankers. I am sorry the name bothers him so much. It's a great little word processor for the 7- to 12-year-old set of computer beginners.

Betty J. Roy
Poughkeepsie, New York

I approached Broderbund Software about changing the name for its word processor but was met with stony silence. Not one to give up easily, I am now talking to Bank Street College about changing their name.–Rick Altman

A Bundling Defense

I've been annoyed by the recent letters criticizing the software bundle provided with Columbia computers. Bundled software is not necessarily second rate. Anyone who does research will find that the two most widely bundled word processing programs, *Perfect Writer* and *WordStar*, are among the most powerful word processors on the market. If anything, they're too powerful for the novice users who typically acquire software in bundles.

As a former user of an expensive minicomputer-based word processing system, I'm convinced that no package on the market exceeds *Perfect Writer*'s ability to compete with the features of that professional system. *Perfect Writer* keeps my outline, the book chapter I'm currently writing, my notes, and the chapter I've just completed all in memory at once, switching among them nearly instantaneously with only a few keystrokes. When I write market studies for consulting clients, the software generates chapter and section numbers, a table of contents, and an index–all updated to reflect changes I've recently made in the manuscript.

Anyone who buys a computer product without first researching how it works is likely to face some disappointments. Bundled software disappoints a good many users because it's sold to inexperienced bargain hunters who don't know the right questions to ask. But bundled software can be a very good deal for people who buy carefully. I couldn't have acquired the computer power I need without it.

Robert Chapman Wood
Scituate, Massachusetts

The Highest PC

I read with interest the November *PC World View* item about the Ultima Thule expedition and their Columbia VP [*PCW*, Vol. 2, No. 12]. Sorry, but Mt. Everest has been climbed three or four times via the "classical route" of Mallory and Irvine, not just once. The Chinese followed the route in 1960 and again in 1975, and the Japanese made the climb in 1980. The Great Mystery of 20th Century Exploration is whether or not Mallory and Irvine themselves reached the summit before failing to return in 1924. It is a mystery the Ultima Thule expedition (and many others) attempted to solve by recovering the camera of Irvine, whose body has been spotted high on the mountain's North Face.

Tom Holzel, President
Atlantic Alpine Club
Concord, Massachusetts

Where to Find a Jewel

Jewel Advanced Business Software, referenced in the October article "How to Choose an Accounting Package" [*PCW*, Vol. 2, No. 11], is no longer marketed by Heritage Holdings. Now the accounting software is available from the authors at Advanced Business Microsystems (ABM), 19712 MacArthur Blvd. #210, Irvine, CA 92715, 714/851-8722. Readers can contact ABM for the nearest franchise location that offers sales and product support.

Douglas K. Brown
Advanced Business Microsystems

Letters should be mailed to Letters, PC World, *555 De Haro St., San Francisco, CA 94107, or sent electronically to MCI Mail PC-WORLD, CompuServe 74055,412, or The Source STE908. We reserve the right to edit letters. Letters should not exceed 300 words.*

READ ONLY

A review of the IBM Personal Computer Family. Vol. 2, No. 1

GRAPHICALLY SPEAKING

E Pluribus Unum. IBM Personal Computer graphics hardware covers a lot of territory, from graphics cards and monitors to printers and plotters. Color monitors alone are available in four models that can satisfy varying levels of color graphics requirements, from home or office to the laboratory.

Two of the most recent, for example—the IBM PC Enhanced Color Display and the IBM PC Professional Graphics Display—offer advanced business and technical graphics capabilities. The IBM PC Enhanced Graphics Adapter can also be used to extend some of those capabilities to the IBM PC Monochrome Display and the IBM PC Color Display.

This growing array of hardware products is unified by a strong IBM Personal Computer graphics software development strategy, one that can dramatically improve your programming efficiency and broaden the application potential of your graphics programs.

Independence. Graphics software has traditionally been written for a specific graphics device and couldn't be run on a second device without complex and time-consuming reprogramming. By using the IBM Personal Computer Graphics Development Toolkit, however, you can now develop software that is compatible with all existing IBM PC graphics hardware products.

This is possible because the Toolkit contains a constant interface—the Virtual Device Interface—to which all applications can be written. The result is device-independent software.

The Graphics Development Toolkit allows you to program bit-map graphics to a 32K x 32K addressable point window and to combine graphics and text capability on a variety of graphics devices. The device drivers necessary for information exchange with existing IBM PC graphics devices are included in the Toolkit, as are a driver for the IBM PC*jr* Video Subsystem and language interfaces for the IBM BASIC, FORTRAN, C, and Pascal compilers and for the IBM Macro Assembler.

The right tools. Several products from the IBM PC Engineering/Scientific Series also play an important part in the IBM PC graphics programming strategy. All of them incorporate the Virtual Device Interface discussed above.

The IBM Personal Computer Graphical Kernel System—which is consistent with Draft ISO and ANSI GKS Standards—gives you a common high-level graphics language that can help further simplify your programming tasks. It also helps increase the portability of applications between computer systems.

In addition, the IBM Personal Computer Plotting System provides a

IBM Personal Computer Enhanced Color Display

IBM Personal Computer Graphics Development Toolkit

IBM Personal Computer Professional Graphics Display

subroutine library of functions that help make it easy to produce a wide variety of charts and graphs. There's also a Metafile Interpreter available to facilitate retrieving and manipulating graphics images.

This range of IBM graphics programming tools is designed to help speed and simplify nearly every aspect of your graphics programming work. They can substantially reduce the time and tedium involved in program development, and the device independence they provide can help increase the flexibility of your finished programs. Device independence also helps extend the life—and marketability—of your programs, because applications developed with the Virtual Device Interface can interface with future generations of graphics devices.

HARDWARE NEWS

Lock and key. Troubled by people who try to peer without permission at sensitive business or personal data stored in your IBM Personal Computer? You can go a long way toward locking it up with the IBM Personal Computer Keylock Option.

Fifteen minutes and a screwdriver are all you need to install the Keylock Option on your IBM Personal Computer, IBM Personal Computer Expansion Unit, IBM Personal Computer XT, IBM Personal Computer XT/370, or IBM 3270 Personal Computer.

Once your system unit is outfitted with the Keylock Option and locked, it will be difficult for someone without the proper key to access the hardfile and all the valuable software it contains. Also, other users in a network won't easily be able to access or tamper with data stored on your system. In fact, when the Keylock Option is installed, the system unit can be powered up only with the key and can't be powered up through the CRT plug port.

And with the Keylock Option locked in place, the system unit cover can't be removed—short of forcible entry—by just anyone who might want to browse around inside your IBM PC during off hours.

Small packages. If you need more memory but don't have a full-size slot available in your system unit, the IBM Personal Computer 256KB Memory Expansion Option may be the answer. It offers 256KB of additional memory on a short card (5 inches rather than 11 inches) with a comparably diminutive price.

That makes it ideal for adding memory to the IBM *Portable* PC. This Memory Expansion Option is also a compact way to beef up your IBM Personal Computer or IBM Personal Computer XT (which has two slots for short cards).

Talkies. The combination of film and sound revolutionized the movies. Speech capability may soon spell an equally big change for computers. The IBM PC*jr* Speech Attachment is a step in that direction.

It's a side-attached option for the PC*jr* that permits speech and sound under control of software such as IBM Writing to Read.* The Speech Attachment contains 196 words and sounds in its ROM. Cartridges manufactured with prerecorded speech can be used under program control. And with the purchase of a microphone and the proper software, you can even record your own speech data on an IBM PC*jr* diskette.

So far, at least, the last word is ours.

*Developed by Dr. John Henry Martin.

WHAT'S THE PROGRAM?

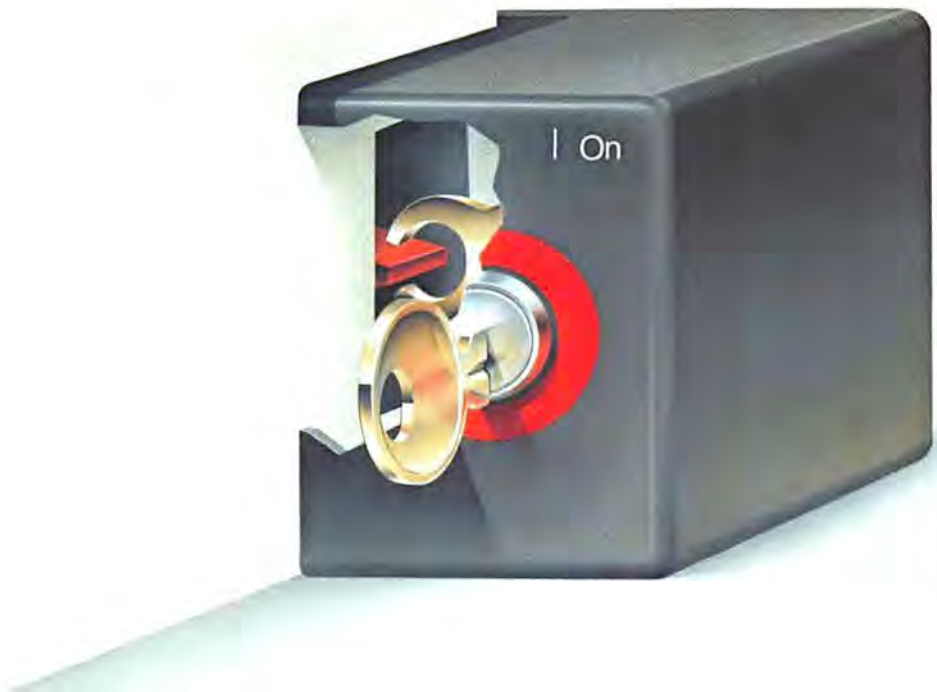
Retrieval. Whether you work with pen and paper or the latest word processing software, writing documents is only half the battle. Try finding them again a month later.

We don't claim to have discovered a better system for paper filing. But a new software package from IBM—Office Correspondence Retrieval System (OCRS)—does promise to make life a lot easier for those who store written work on a fixed disk or who have a library of documents stored on diskettes.

OCRS can help in two ways. First, it makes document abstracts and stores them in a summary file for future reference. OCRS automatically searches out keyword information such as date, subject, sender, or any other significant word. You can also add keywords other than those actually contained in the document.

Second, and most important, simple English language queries will prompt OCRS to locate the original document. A document search request can be entered as individual words or complete sentences. You don't need to learn a special query language.

OCRS can abstract and retrieve any type of file containing ASCII text such as letters, charts, and computer programs. It can also directly abstract documents written with IBM



Help protect your software and hardware with the IBM Personal Computer Keylock Option

IBM PCjr Speech Attachment

Writing Assistant, IBM PCWriter, and WordStar® and documents using the IBM Revisable Form Text Document Content Architecture (RFTDCA). Documents can be converted to RFTDCA data format by IBM DisplayWrite 1 and 2 and PCWriter.

With OCRS, missing reports may be a thing of the past.

Evolution. Like their human language counterparts, computer languages and operating systems change and evolve. Occasionally, an entirely new dialect crops up, such as the IBM Personal Computer XENIX® Operating System.

IBM Personal Computer XENIX is derived from the UNIX® Time Sharing System. Several enhancements designed specifically for the IBM Personal Computer AT allow you to take full advantage of its power. IBM Personal Computer XENIX supports both single-user and multi-user configurations. It also enables you to run several programs at the same time—you can, for example, compile a program in the background while you edit one in the foreground.

There are two additional packages available to be used with the IBM Personal Computer XENIX operating system that deserve special mention. First, the IBM Personal Computer XENIX Software Development System gives you tools to generate code suitable for either XENIX or IBM Disk Operating System (DOS) operating environments. Second, there's an IBM Personal Computer XENIX Text Formatting System that can help simplify the production of technical reports, memoranda, formal papers, and documentation—it's especially useful for publications that require technical or scientific formats.

IBM DOS has been updated twice recently. DOS 3.0 provides all the functions contained in DOS 2.1 plus enhancements to support the IBM Personal Computer AT. DOS 3.1 incorporates further enhancements that support the IBM Personal Computer Network.

There are also new versions of the IBM BASIC Interpreter and of the IBM Macro Assembler. BASIC 3.0 contains several noteworthy new functions that provide access to user-installed device drivers. They are: SHELL, IOCTL and IOCTL$, ERDEV and ERDEV$, and ENVIRON and ENVIRON$.

The recent 2.0 version of the IBM Macro Assembler supports both the 8088 and 80286 processors and the 8087 and 80287 Math Co-processors. Other additions include a new more powerful Linker, a Library Manager, and a Structured Assembler Language Preprocessor. And you can use the IBM Professional Debug Facility to put the finishing touches on your assembler language programs.

Office Correspondence Retrieval System Software from IBM

See your authorized IBM Personal Computer dealer or IBM Product Center about an economical trade-up from your 3.0 version of IBM DOS to version 3.1 or from Macro Assembler version 1.0 to 2.0.

WordStar is a registered trademark of MicroPro. XENIX is a registered trademark of Microsoft Corporation. UNIX is a registered trademark of AT&T's Bell Laboratories.

BUDDING USER GROUPS

Getting started. Ever considered forming a group to exchange ideas about using your IBM Personal Computer, but never got around to sorting out all the start-up details? Or, once past that first stage, does your group find it difficult to come up with new information, presentation materials, and connections with other groups?

Help is at hand.

Because of the growing interest in PC user groups all across the country, IBM has expanded its efforts to encourage new groups and to support existing ones. There's no charge for this assistance, and all groups—whether they have 10 or 1,000 members—are eligible for the same basic level of support.

For starters, the IBM User Group Support department will provide a package that introduces you to some of the basics of organizing a club. It includes a sample constitution and bylaws, suggestions for officers' titles and duties, and a list of other groups already in the program.

Staying started. Once the initial burst of enthusiasm is past, a PC user group needs more than a common interest to maintain its membership—it needs some focus for that interest. IBM can provide information and materials to help keep your group going.

Perhaps the most impressive

form of support is a monthly newsletter on diskette, complete with color and sound. It includes reviews of new products, editorial commentary, and technical tips. The newsletter also carries reprints of the best articles from participating group newsletters, so you can follow the activities of other user groups around the country.

Other sources of useful information are the PC User Group Phone Line and PC User Group Bulletin Board System. You can use the phone line to get answers to questions about the organization and functions of a user group and to find out about other groups in your area.

The bulletin board, which can be accessed through your IBM Personal Computer, carries new production information from the day of announcement. It also provides a means of communicating with other PC clubs.

Finally, to provide topics of interest for your regularly scheduled meetings, IBM will send timely presentation and demonstration materials. Better still, group officers can use the phone line to request guest speakers from IBM for special meetings.*

For more information about participating in the IBM User Group Support program, please write to: IBM User Group Support, IBM Corporation 2900, P.O. Box 3022, Boca Raton, FL 33432.

*The availability and frequency of guest speakers depend on the size of the group, its location, and meeting night.

HARDCOPY

Hidden talent. Think of the many entertaining and useful programming ideas that must exist out there but never find their way to market.

The IBM *Directory* of Personally Developed Software gives you direct access to some of that hidden talent. It's a catalog of new programs developed by individuals for the IBM Personal Computer Family.

The best news is the prices. Programs listed in the *Directory* sell for as little as $14.95. They cover a wide range of interests, from entertainment and education to personal productivity and business applications.

The Directory of Personally Developed Software from IBM

Each program in the *Directory* has a full description that includes system requirements and illustrations or color photos of representative screens. Programs may be ordered by mail or through an 800 telephone number.

To subscribe to the *Directory* call 800-IBM-PCSW.

TIPS AND TECHNIQUES

Added color. Bored with the black screen that appears on your IBM PC Color Display when you boot up your system? There are lots of other color possibilities, and the brief program below shows you how to set them from DOS.

It will give you a display with a black border around a rectangle 80 columns wide and 25 lines high. The program can be used in an AUTOEXEC.BAT file to produce a starting color, and DEBUG will maintain the color you set.

All you have to do is substitute number or letter values for the colors you want where the ?? appear in the following program. For the first ?, substitute one digit (0-7) for the background color. For the second ?, substitute either a digit or a letter for the foreground color (1-7 for regular colors, 9-F for intensified colors). For example, 28 will give you grey text on a green background. For a complete listing of the color codes, see the Color Statement section of your IBM BASIC manual.

To set your screen colors, do the following from the DOS prompt:

```
A>debug color.com
File not found (ignore this message)
-rcx
:20
-e 100 2b c0 1e 50 b8 03 00 cd 10 b8
00 06 b9 00 00 ba
-e 110 50 20 b7 ?? cd 10 b4 02 ba 00
00 b7 00 cd 10 cb
-w
writing 20 bytes
-q
```

Thereafter, you need only type "color" at the initial DOS prompt after booting your system to change the display from black and white to your preset colors.

For more information about IBM Personal Computer products discussed in this issue of *Read Only*, see your authorized IBM Personal Computer dealer or IBM Product Center. To learn where, call 800-447-4700. In Alaska and Hawaii, 800-447-0890.

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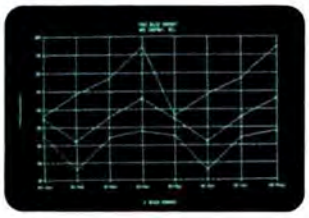

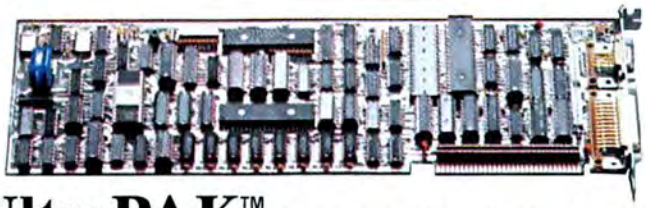

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Systems Supported: IBM PC, IBM PC/XT, IBM PC/AT, ITT XTRA™, Sperry™, Eagle PC™, TAVA™, Leading Edge™.

With Amdek 310A Monitor: Corona™, AT&T™, Compaq Portable™, Eagle PC Spirit Portable™, IBM PC Portable.

*Multiplan™, Word Star™, Word Perfect™, with FREE - Lotus 1-2-3 driver for 132 column. **IBM PC Compatible. ***UltraPAK-S, serial port and battery backed clock not available.

Lotus, 1-2-3 and Symphony are TM of Lotus Development. PC is a registered TM of IBM. Framework is a TM of Ashton-Tate. Multiplan is a TM of MICROSOFT. Wordstar is a TM of MICROPRO Intl. Wordperfect is a TM of Satellite Software Int.

SINGLE BOARD COMPARISON		
Integrated Applications	**UltraPAK Integrated Board**	**IBM Monochrome Board**
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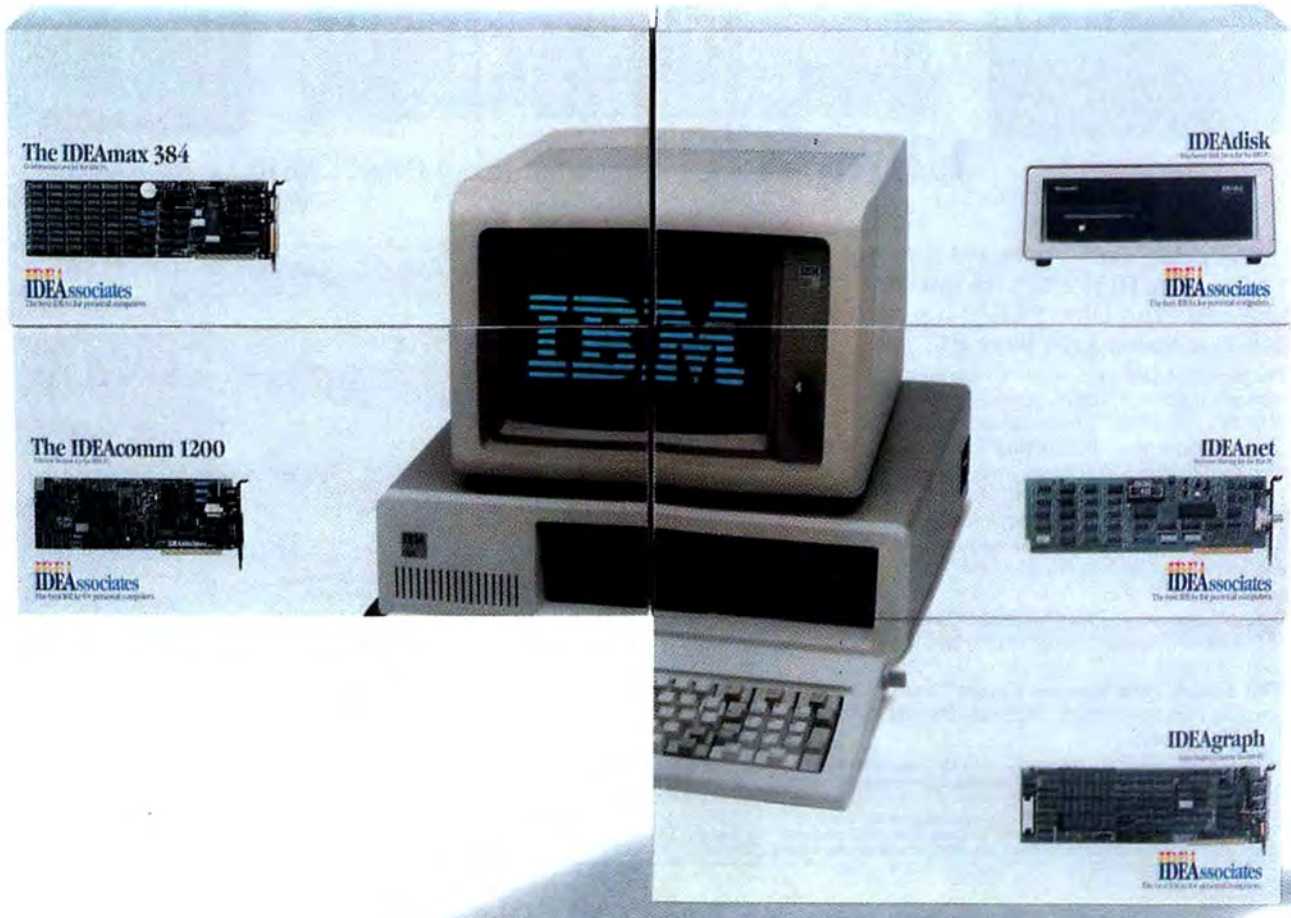

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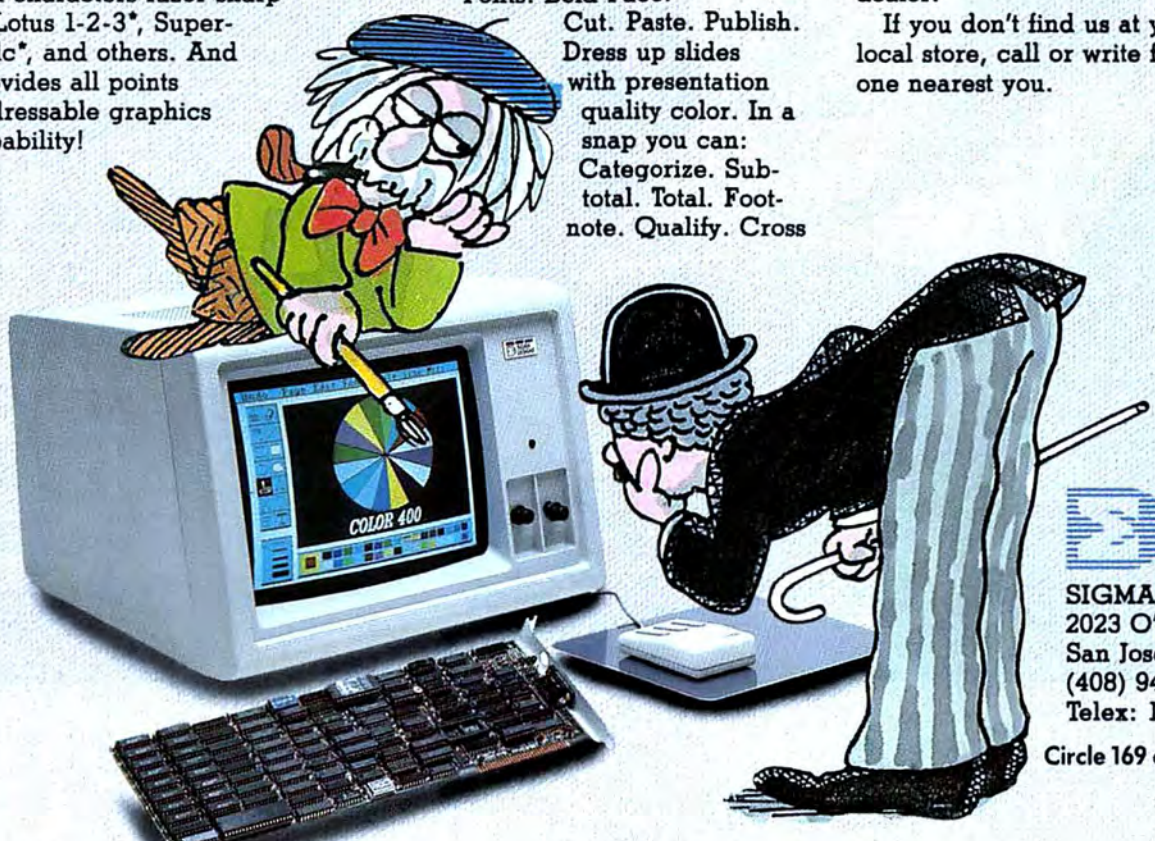

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Monitor performance can be measured. That's something you should know about.

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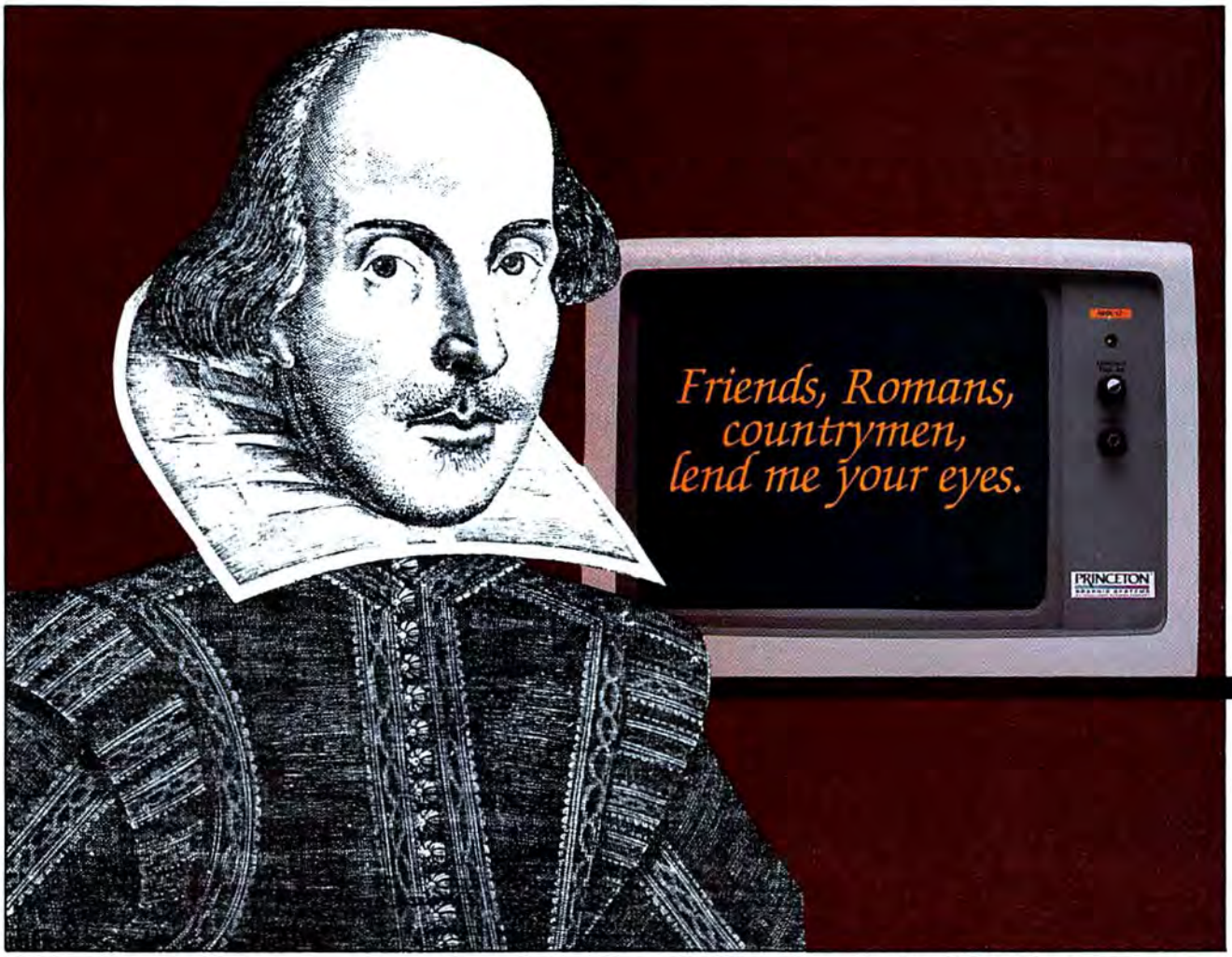

W. Shakespeare composing Great Ideas on a Princeton Monitor

Things you should know about monitors

Resolution The quality of a color monitor's image is directly related to its resolution. The greater the number of dots available within a given area for displaying an image the greater the resolution.

The PRINCETON SR-12 monitor features an extraordinary 640x480 (non-interlaced) resolution. The result is an extremely high quality, flickerless image with text that approaches monochrome quality. When used in conjunction with the PRINCETON Scan-Doubler card, the SR-12 runs from a standard IBM or equivalent color card, maintaining complete compatibility with all IBM software.

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Price All Princeton monitors set the price/performance standard in their class. The SR-12 at $799 compares favorably with monitors costing hundreds more. The HX-12 is in a class by itself at $695.

The PRINCETON MAX-12, with easy-on-the-eyes amber phosphor, sets the standard for monochrome monitors at $249. The MAX-12's dynamic focusing circuitry ensures sharpness not only in the center but also in the edges and corners. And it runs off the IBM PC mono-card—no special card is required.

All three monitors feature a non-glare screen and an IBM compatible cable. A PCjr adapter cable is also available for the HX-12. And to see your Great Ideas from the best possible angle, you can put your Princeton monitor on the Princeton Undergraduate Tilt and Swivel Base for only $39.95. **Or, while supplies last, get the Undergraduate FREE with the purchase of a MAX-12 monitor.**

Image The ultimate test of any monitor is how the image looks to your own eyes. Compare the Princeton monitors side-by-side with the competition at Computerland, Entre or your local independent dealer.

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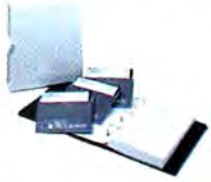

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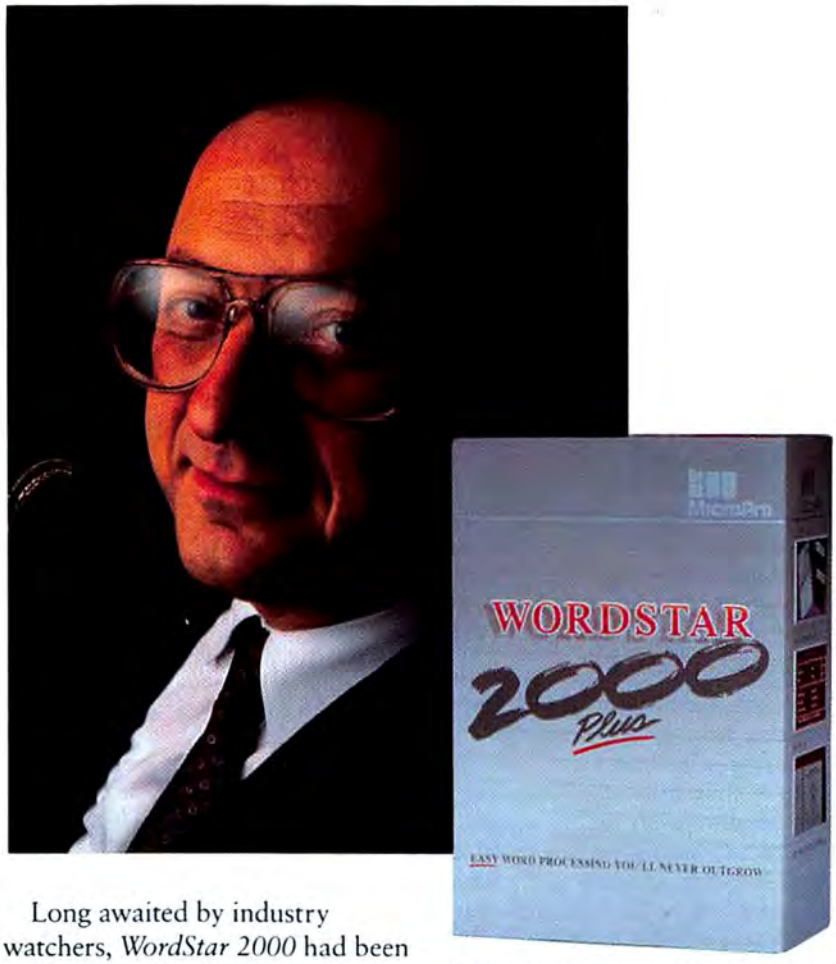
PC WORLD

WordStar in a Pin-Striped Suit

MicroPro still believes in stand-alone programs. The software firm announced its new version of WordStar with a well-balanced mixture of decorum and fanfare.

Reminiscing about his salad days, Seymour Rubinstein said that when he introduced his first version of *WordStar* at the West Coast Computer Faire in 1979, he could barely afford the cost of a booth. But MicroPro's founder made up for the lean times by treating nearly 100 press representatives to lunch when he announced *WordStar 2000* and *WordStar 2000 Plus* at San Francisco's posh St. Francis Hotel.



Seymour Rubinstein and his new product

Long awaited by industry watchers, *WordStar 2000* had been dubbed Ivan by the trade press. MicroPro personnel acknowledged the prerelease gossip by wearing pins proclaiming "The Rumor Is True." (The pin's declaration prompted one of our editors to ask, "So MicroPro's really pregnant?") MicroPro says it will continue to produce and support the original *WordStar* along with the company's new products. *WordStar 2000*, which is not compatible with previous versions of *WordStar*, is an enhanced inte-

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

grated word processing program that features mail merge and spelling correction; *WordStar 2000 Plus* has identical features plus a mailing list data base and communications capabilities.

MicroPro resorted to a few theatrical tricks to engage its jaded audience during the announcement. As the press corps sat in the darkened hall, a spotlight hit a large curtain-draped box. Vangelis-like music played as dry-ice vapors began to encircle the hidden object. The music swelled, and the curtain dropped on cue to reveal an enlarged *WordStar 2000* package.

Calling *WordStar 2000* an integrated word processing program, H. Glen Haney, MicroPro's president and chief executive officer, took a few potshots at integrated products on the market. Without naming *Symphony* or *Framework*, Haney said that integrated products will be "difficult to sell as long as they're difficult to use." He thinks that MicroPro's new product "relegitimizes free-standing word processing, data base, and spreadsheet programs." But Haney must like something about Lotus, since the *WordStar 2000* box jacket features pinstripes à la *1-2-3*.

Sure an' Begorra

Lotus is exchanging its Brahmin accent for an Irish brogue. The software firm isn't abandoning its Cambridge, Massachusetts, headquarters, but it is building a $2 million manufacturing plant in Dublin.

According to a company spokesperson, the plant will provide 50 jobs and should be operational by the second quarter of 1985. The plant will support all of Lotus's "European needs" by June of this year. Immediate plans call for versions of *1-2-3* and *Symphony* to be produced at the plant. *Jazz*, an integrated product for the Macintosh, will also be manufactured there, but the spokesperson could not comment on when the new program would go into production.

Lotus was spurred on in large part by a grant it received from the Industrial Development Authority of Ireland (IDA). Although David O'Sullivan, IDA's director of public relations, is reticent about the details, he says that IDA grants typically cover one-third of building costs. O'Sullivan also says that IDA training grants commonly pay 100 percent of workers' salaries while they learn their jobs.

O'Sullivan adds that Ireland offers many financial incentives to foreign firms. The maximum corporation tax is 10 percent, and write-offs are "the most generous in Europe." Foreign manufacturers can also save on export charges; products manufactured in Ireland, a European Economic Community member, are free from European tariffs.

User-Chosen Awards

Something was added to the second annual World Class PC contest–an awards dinner. More than 80 people representing 20 companies attended the 1984 black-tie banquet at the Carnelian Room in San Francisco. *PC World* plans to make the awards dinner an annual event.

The World Class PC contest asks *PC World* readers to choose their favorite hardware and software products. Top vote-getters in 12 hardware and 17 software categories received awards in last year's contest.

Bill Murto (right), Compaq vice president of marketing, talks with CW Communications Chairman Patrick J. McGovern (center) and PC World Publisher David Bunnell. The Compaq-Plus Portable Computer was voted the best compatible computer in the World Class PC contest.

Microsoft's Stuck Windows

Microsoft Windows has hit another production snag. The windowing environment was originally slated to make its debut in April 1984. Microsoft then promised the product for November. Last October the company announced that it would not ship the product until June 1985. Apparently Microsoft is having problems meeting its ambitious goals of keeping the package device-independent and small enough to run in only 256K.

Scott McGregor, the product manager of *Microsoft Windows*, denied that the delay was in response to IBM's *TopView*. "It is important that *Microsoft Windows* be very small and very fast," says McGregor. Microsoft wants to "synchronize" with independent software vendors and "regroup" before going to market with the product.

Microsoft may be a bit disappointed with the response from those software vendors. Some are purposely choosing not to support either *Microsoft Windows* or *TopView* until the marketplace determines which operating environment becomes the industry standard.

Although existing application programs may not take full advantage of an environment's features–such as icons or data exchange between windows–many programs can coexist with either environment. Instead of being in a window, the application merely takes over the entire screen. Some successful software vendors, secure in the knowledge that their present programs don't preclude IBM's or Microsoft's environment, feel they have more to gain by sitting on the fence. Far better to wait and see than risk offending either Microsoft or Big Blue.

Wells Fargo Delivers ... Software

Although decision makers at Wells Fargo Bank knew that some customers were using computers, they didn't think that enough clients owned modems to make home banking viable or profitable. Instead the bank decided to offer customers a $99 checkbook program, *Quicken*. As part of its promotion, Wells Fargo is also offering $6 sample *Quicken* disks.

Quicken requires 192K and one disk drive and runs on the entire IBM PC line. The program can handle 2000 transactions, according to Scott Cook, president of Intuit, the software firm that designed *Quicken*. Cook says that his firm has agreements to market the program through banks in other states, but he is mum on the details.

Wells Fargo is pleased so far with the product's initial acceptance. More than 200 orders for *Quicken* were taken in the first week of the offer.

Grapevine

News keeps surfacing about IBM's large component purchases. One industry source says that IBM has ordered almost 2 million 3½-inch floppy disk drives from Japanese manufacturers Toshiba and Alps. The disk drives will apparently be used in IBM's long-awaited lap-size computer. Another source has whispered to us that IBM paid very low prices for more than 1 million 5¼-inch optical disks. Hard disk manufacturers take note.

Big Blue's News

IBM tried out a new advertising plan for the PCjr that included a successful ingredient common to many consumer ad campaigns—coupons. IBM's partner in the campaign was consumer product giant Procter & Gamble (P&G).

The campaign, called Computerrific, ran through January 31 and was set to give away 750 PCjrs and 250 PCs. The contest also offered a coupon worth $100 toward the purchase of an IBM PCjr to people who mailed in 25 proofs-of-purchase from such P&G products as Prell, Crest, and Tide. The coupons were distributed by direct mail and as newspaper inserts.

A P&G spokesperson says his company believed there was enough interest in computers to make this kind of promotion viable. "We felt that the personal computer was coming of age," he says. P&G suggested the campaign to IBM because "the IBM name made for a stronger promotion."

Computerrific may turn out well for both companies, but only time will tell whether the campaign boosts or hinders PCjr sales to business. Some analysts think that if the contest establishes the PCjr as a home computer, IBM may drop advertisements and promotions pushing the PCjr as a business machine.

Figure 1: The Computerrific promotion combined the marketing acumen of IBM and Procter & Gamble

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PCW 3

Know Thy Computer

Correspondent Jo Frohbieter-Mueller writes that her husband, Wayne, spends many hours in front of his home computer. This is not an uncommon occurrence across the land. And like many of us, he frequently finds that modern technology is not all that it's cracked up to be.

After an especially belabored session with the computer, Wayne retreated to his workbench. An hour later he emerged carrying a wooden box with a glass door; he carefully hung the box above the computer. The box contains a slide rule and an abacus; a painted sign on the box reads, "In Case of Emergency Break Glass." With this backup in place, Wayne no longer finds the computer intimidating.

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

Softcon Celebrity

Gerry Milden, president of Northeast Expositions, decided to get a hard-hitting moderator for his keynote panel discussion at Softcon '85. His moderator will be ABC's Ted Koppel, anchor of the late-night news show "Nightline." Milden thinks he couldn't have made a better choice. "He [Koppel] has the ability to get right to the heart of the subject matter," Milden says.

The panel will tackle the oft-sacked subject of "The Future of Software." At present, Lotus Development Corporation's Mitch Kapor and Apple's John Sculley are among the industry leaders who have agreed to be panelists at the March 31 session. Milden says that Northeast Expositions will give Koppel an "extensive briefing" before the panel discussion. Koppel will probably need it–a source at "Nightline" says Koppel still uses a typewriter at work.

Ted Koppel

Veterans Go On Line

Where do you get information about refinancing a Veterans Administration (VA) home loan or news on the latest rulings and legal actions in Agent Orange and atomic veterans court cases?

If you're a CompuServe subscriber, you dial up the service's Military Veterans Forum.

The Forum has been on line for a little less than a year and has already attracted more than 650 members. According to CompuServe product manager Dan Meeks, members range in age from 17 to 70, but the majority of them are men who served in Vietnam. News and information are updated daily by David Aldstadt, the Forum SYSOP (system operator). Aldstadt is executive director of the Vietnam Veterans Leadership Program, Ohio.

In addition to news and information, the Forum offers a locator service that includes an electronic bulletin board to help reunite service buddies. The Forum also stages on-line conferences. Meeks, who served 13 months in Vietnam as an Air Force flight engineer, thinks that the conferences are probably the most valuable service of the Forum. "Some of the guys haven't talked about their experiences in nearly 15 years," says Meeks. The Forum conferences, which permit participants to remain anonymous, let veterans talk about their memories, experiences, and feelings without fear of incrimination or criticism. As Meeks puts it, "Most vets understand other vets."

Legal Maneuvers

IBM signed an agreement with the Illinois Institute of Technology's Chicago-Kent College of Law that may give Big Blue a head start in the lucrative legal field. The agreement calls for the college to develop computer-aided legal instruction and client interview programs, among others, that can be used by law students.

Law professor Ronald Staudt says that IBM is providing 30 PCs and XTs as well as $100,000 in cash to fund the work. The agreement gives IBM the right to market any software developed by the school.

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"The HELP facility is a gem."
Peter A. Cattaneo, President
Applied Reasoning Corporation

"Nothing matches Cornerstone's ease of use. Our sales support system was built quickly and easily."
Paul Shearer, V.P.—Operations Systems
Massachusetts Financial Services

"Best documentation I've ever seen! The explanations and examples are crystal clear and easy to understand."
Greg Christian, Maintenance Supervisor
VanLeer Chocolate Company

"My boss wanted a system that could do everything but call our clients. I still can't believe I did it myself."
Kathy Mack, Project Coordinator
Stage One Marketing Research

Look for Cornerstone where you buy software.
Cornerstone has a suggested retail price of $495.

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Infocom, Inc., 55 Wheeler Street, Cambridge, MA 02138

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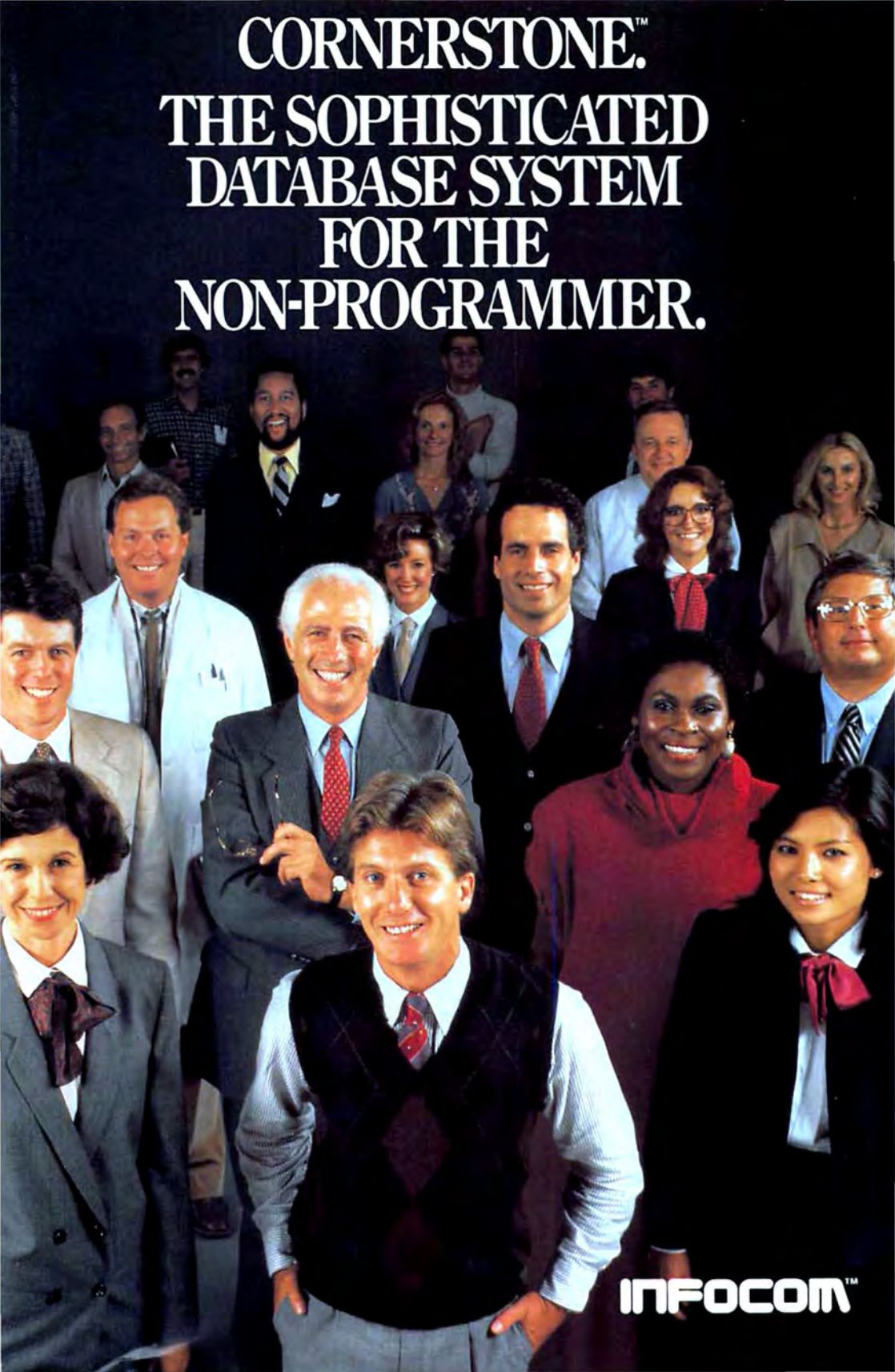
CORNERSTONE.™

THE SOPHISTICATED DATABASE SYSTEM FOR THE NON-PROGRAMMER.



INFOCOM™

YOU'LL THINK IT WAS

DESIGNED JUST FOR YOU.

Until now, unless you were trained in computer programming, you've been unable to realize the full potential of your personal computer.

That's why we created Cornerstone, the first sophisticated database system designed specifically for the non-programmer.

Cornerstone is for sales managers who don't want to spend nights organizing for the next day's calls.

It's for personnel directors who never know what kind of report they'll be asked for next.

It's for professionals who use Lotus™ 1-2-3™ for budget forecasting, but need help managing all kinds of information.

It's for entrepreneurs with their own growing businesses.

It's for research scientists and accountants, plant managers and engineers.

(It's even for programmers who are too busy to spend needless time programming.)

It's for everyone who wants to get more from a personal computer.

YOU CAN WORK ON YOUR OWN.

From the start, we envisioned Cornerstone as a powerful tool to help non-programmers manage information. We carefully designed it so that you can get the results you need without any help from a programmer.

First of all, Cornerstone has everything you need to start using it productively the very first day. A *Beginner's Guide* and *On-Screen Tutorial* (written in plain English and using familiar concepts) teach you the basics of building and using a database. A customized keyboard template clearly labels what each function key does. And unique Help and Options keys provide immediate assistance whenever you're not sure what you can do next.

What's more, Cornerstone makes building a database easier than ever before. Menus, prompts and questions guide you through the entire operation. And Cornerstone won't let you make a mistake. It tells you what's happening and, more important, what to do about it.

YOU HAVE ALL THE POWER YOU NEED.

The beauty of Cornerstone is that although it was designed for non-programmers, we've made no sacrifices. Cornerstone is not one of those lightweight systems that can handle only a few easy jobs. On the contrary, Cornerstone is a full-featured relational database system.

You can put it to work solving an entire range of information management problems you face every working day, from mailing lists and sales tracking to personnel management and resource planning. And Cornerstone is remarkably flexible. You can search for information according to any criteria you think of, look at reports in any format you want, and make changes and corrections in seconds.

AND IT'S FROM INFOCOM.

We're the people who created a whole new category of entertainment software, Interactive Fiction. Along the way, our software products have won numerous awards for quality and sophistication, and have become a dominant force on the software best-seller lists.

Now, we're applying our unique expertise to a new line of business software, of which Cornerstone is the first. Behind our success lies our ability to create software that eliminates the barriers between computers and people. You'll find that's what makes Cornerstone special, too.

"With Cornerstone keeping track of my customers, now I can spend my time doing what I do best... selling."

T. M., Sales Manager

"I used to waste hours every night organizing my calls for the next day. First, I had to figure out which of my hundreds of customers and leads to call. Then I had to find my notes from previous contacts to make sure I didn't wind up saying the wrong thing to the wrong person.

"Cornerstone solved my problem. It let me build my own customer tracking system. The system keeps track of all the companies I sell to and keeps me up-to-date on key contact people and account status. I can also add notes to my files whenever I need to. And they can be as short as two words or as long as three pages. Cornerstone is the only database system that lets me do that.

"So now I have the entire history of my sales contacts with every customer at my fingertips. And I never forget a sales call. Two months ago, for example, Ed Black told me he couldn't place an order till May 1. Today's the day, and Cornerstone reminded me to call Ed and showed me a summary of what we had spoken of before. Not only did I call Ed right on time, but I made him feel like he was my only customer."

"The VP wanted a report in 30 minutes on training costs for every employee who makes over $30,000, drives to work and lives in Philadelphia. Cornerstone did it in 3."

B. E., Personnel Director

"It was getting so that responding to requests like this was taking up half my day. We were using a computer, but every time we thought we had all our reports accounted for, somebody would come up with something new they needed yesterday. It finally dawned on us that we had to have a system that could change as fast as we needed to change.

"With Cornerstone, I was able to build a database that does exactly that. (And I built it myself.) So I can give people the information they need in whatever form they need it. Faster than they ever thought it was possible.

"I can create a new report in seconds. Even when it requires information from different files. I can also organize the information the way I want it, make calculations and add notes. And once I make a new report format, I can save it and use it over and over.

"Now I prepare new reports as fast as they dream them up. Maybe even faster."

"Nothing beats 1-2-3® for budget forecasts, but for managing all kinds of information I depend on Cornerstone."

S. R., Financial Consultant

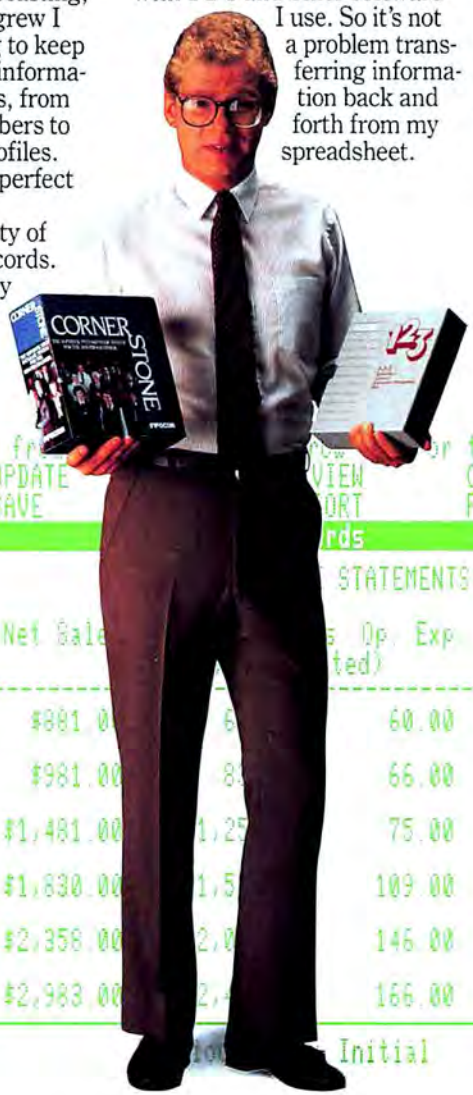
"My job is helping people manage money, and most of my clients are small businesses. I'd been using 1-2-3 for budget analysis and forecasting, but as my business grew I found myself having to keep track of all kinds of information about my clients, from multiple phone numbers to detailed portfolio profiles. And Cornerstone is perfect for that.

"It gives me plenty of room to store my records. And I can look at any specific information I need in seconds.

I can also create reports in hundreds of different formats. In addition, Cornerstone is designed to work in harmony with 1-2-3 and other software I use. So it's not a problem transferring information back and forth from my spreadsheet.

"Since I was already familiar with 1-2-3, it was easy to begin using Cornerstone. Simple menus list what I can do at the top of the screen. And if I get lost, the Help Key tells me what to do next.

"Cornerstone makes my life a little easier and is helping me make my clients a little richer, too."



Select a command fr… …r type the command.
UPDATE … VIEW COLUMN DETAILED
USE SAVE … ORT PRINT ALL-DONE
VIEW Finance … rds SORTED
… STATEMENTS

Quarter	Net Sale…	…s Op. Exp.	Tax Exp.	Net Income
		…ted)		
1983 - 3Q	$881.0…	60.00	38.00	56.00
1983 - 4Q	$981.00	66.00	23.00	36.00
1984 - 1Q	$1,481.00	75.00	56.00	76.00
1984 - 2Q	$1,830.00	109.00	48.00	66.00
1984 - 3Q	$2,358.00	146.00	43.00	62.00
1984 - 4Q	$2,983.00	166.00	62.00	135.00

File: Finance … Initial … Files viewed: 1

"When a small business grows as fast as mine, you need a database system that can really keep up. I've got Cornerstone."

L. L., Wine Merchant

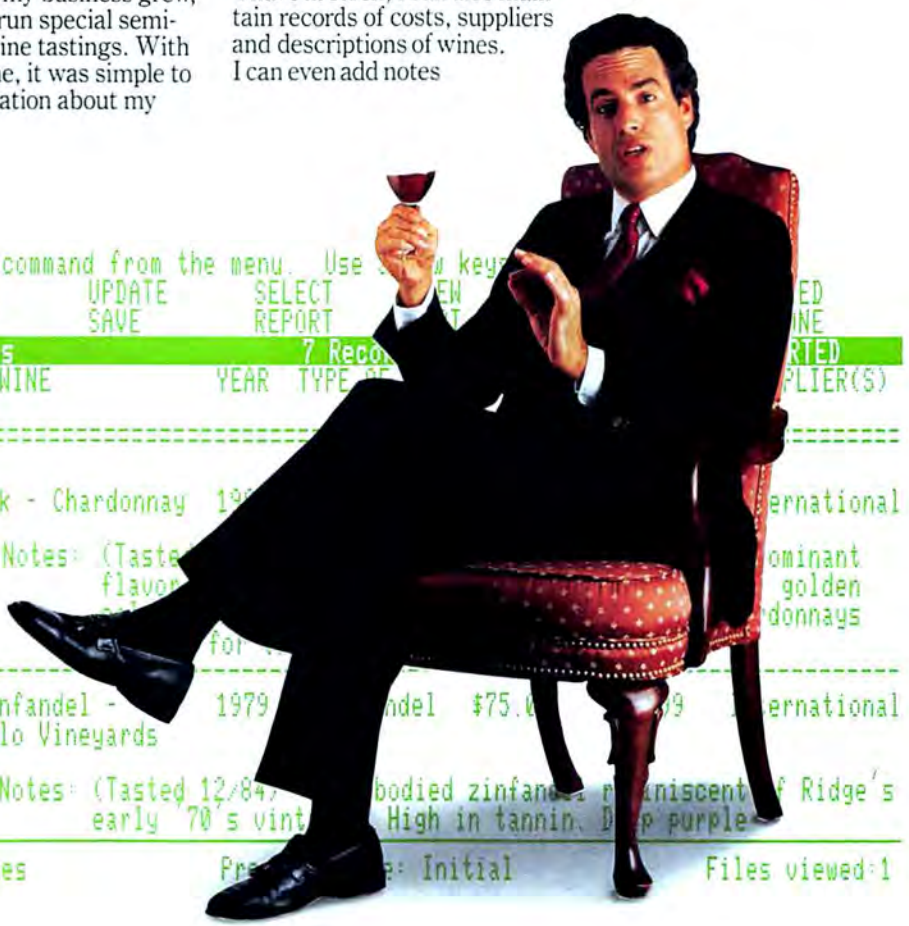
"When I started my business, I realized that customer mailings were an excellent way to keep in touch with my clientele. I could inform them about new arrivals and different things I had planned. But that meant I needed a quick and easy way to print mailing labels. That was my first job for Cornerstone.

"But as my business grew, I began to run special seminars and wine tastings. With Cornerstone, it was simple to add information about my customers and their wine preferences to my files. So I could target my mailings to inform special customers about events I thought would interest them.

"And after a while I decided to use Cornerstone to keep track of my inventory. Now, not only am I able to stay up-to-the-minute on what I have in stock, I can also maintain records of costs, suppliers and descriptions of wines. I can even add notes on tasting results anywhere I want thanks to Cornerstone's flexible text handling.

"Now if a customer walks into my store and asks for a mature red Bordeau for under $10, I can quickly point out the available choices.

"There's no telling what I'll be doing next with Cornerstone."



12 FEATURES NON-PROGRAMM

1 HELP KEY. Cornerstone is always there to support you. Just press the Help Key anytime, and it will tell you—in English—where you are, what you can do and where you can go from there. It's like always having the *Owner's Handbook* open to the right page.

2 OPTIONS KEY. If there's any doubt about what to type next, you simply press Cornerstone's unique Options Key. It shows you all your possible choices. For example, if you're entering the category for a new wine in your inventory, it lists all categories previously entered in the system. (And Cornerstone can make sure the one you're entering is spelled correctly.)

3 INTERACTIVE REPORT WRITER. There's no limit to the different ways you can look at information. You can search out specific data according to any criteria you can think of. Create new report formats in seconds. And easily arrange information on the screen until you have it the way you want it.

And when you decide to print a report, you get exactly what you see on the screen.

4 FLEXIBLE DATABASE DESIGN. Planning your database is easy. Cornerstone handles all kinds of information. And, unlike other systems, you don't have to decide in advance how much space you'll need. You can type in notes, a second phone number or even an additional line for an address. Cornerstone automatically makes room.

5 FEWER KEYSTROKES. Cornerstone is smart. Type in enough letters for it to understand what you want, and Cornerstone automatically completes the rest.

6 COMBINE NOTES AND DATA. You can easily add notes, memos and comments to your files whenever you want to. And the additions can be as short as two words or as long as three pages, without wasting space.

```
Enter values for the record.

EDIT   Category                                    ENUMERATED   OVS *
You are entering an ENUMERATED value.  Given what you've typed so far (before
the current cursor position), the following values are allowed.  (To see all
the possible values, move the cursor before any text and press OPTIONS again.)
    Bordeaux              Burgundy              Cabernet
    Pinot Noir            Reisling              Graves
    Chardonnay            Moselle               Sauterne
    Port                  Sherry                Zinfandel

Category:
Brief Description:
Tasting Notes:
Wholesale Cost:
Retail Price:
Supplier:

File: Wines                Previous mode: Update              Files viewed: 1
```

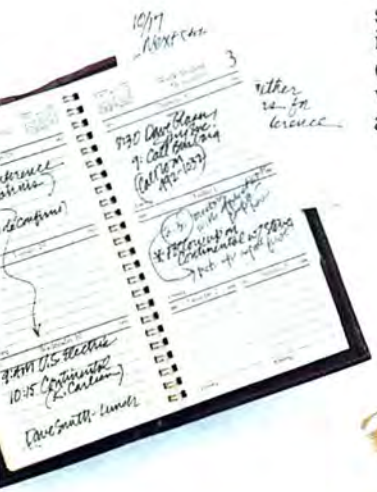
ERS CAN REALLY RELATE TO.

7 EASY-TO-BUILD DATABASES. To create a new file, you just fill out a form on the screen by answering a series of simple questions. Of course, as you become more experienced, more advanced features are available.

8 QUICK STARTS. To get started using Cornerstone, you only have to learn the basics. Our *Beginner's Guide* and *On-Screen Tutorial* teach you everything you need to know in ten easy lessons.

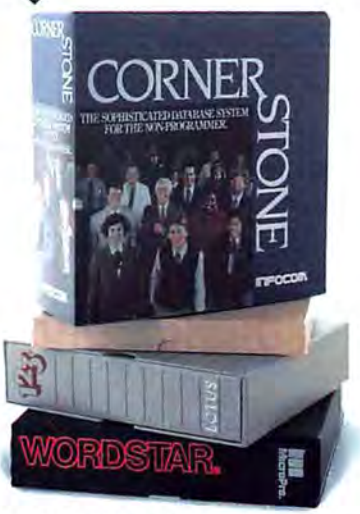
In addition, our friendly, easy-to-use *Owner's Handbook* shows you how to build powerful, sophisticated applications.

9 BUILT-IN CALENDAR. Tell Cornerstone there's a sales meeting *next Friday* and it automatically fills in the date. It also understands words like *noon*, *tomorrow* and *last month*.



10 EASY-TO-MODIFY DATABASES. Cornerstone makes it simple to change the structure of your database as your needs change. Adding a new field, for example, is easy even with data already in your database.

11 SOFTWARE COMPATIBILITY. You can easily convert existing PFS*: FILE and dBase II* files to Cornerstone. Plus our software is designed to exchange information with many other popular programs, including 1-2-3, WordStar,™ Mailmerge™ and other widely used word processors and spreadsheets.



12 HOT LINE. You can learn to use Cornerstone all by yourself. But if you have any questions, you can call us directly for assistance.

START HERE.

Cornerstone is the start of a more productive relationship with your personal computer. At first, you may only use it for everyday applications like mailing lists and Rolodex.™ But as you discover how powerful Cornerstone really is, you'll use it to solve problems you never thought you'd be solving on your own.

And no matter what you decide to use it for, you can be sure Cornerstone won't hold you back. Because it's designed to keep up with you as you apply it to bigger and more complex jobs.

WE'LL HELP YOU GET STARTED.

Start being more productive from day one with the ready-to-use Client Tracking System we've included with Cornerstone.

You can put the system to work immediately keeping track of clients, patients, customers, sales prospects or whomever you do business with. Among the many things this application can do for you is file notes on all client contacts, remind you whom to call and when, and print mailing labels. Of course, as with everything you do with Cornerstone, you can easily tailor the Client Tracking System to fit your specific business needs.

START TODAY.

Cornerstone is a completely different kind of software product. Created by a company committed to eliminating the barriers between computers and people. But to fully appreciate how different Cornerstone really is from other database systems, you have to try it for yourself. So ask for a demonstration of Cornerstone wherever you buy business software.

Cornerstone. The sophisticated database system for the non-programmer.

CORNERSTONE™ TECHNICAL INFORMATION

SPECIFICATIONS

- ☐ 8,000,000 characters per file.
- ☐ 120 files per database.
- ☐ 255 saved formats per file.
- ☐ 160 fields per record.
- ☐ Any and all fields can be indexed.
- ☐ Each field may have multiple values (up to 255).
- ☐ Up to 4,000 characters per record, expandable by subrecords (all records are variable length).
- ☐ Unique subrecord feature allows information to be organized in a natural way.
- ☐ Each record can contain hundreds of subrecords. Each subrecord may contain up to 4000 characters.

DATA TYPES

- ☐ Strings: up to 255 characters per value, (expandable using multiple values).
- ☐ Numbers: 15 decimal digits of precision per field. Flexible display styles include dollar signs and commas.
- ☐ Dates: over 100 different display formats supported. Date arithmetic.
- ☐ Time: over 10 different display formats supported. Time arithmetic.
- ☐ Boolean: expressed as True/False; T/F; Yes/No; or Y/N.
- ☐ Enumerated: user-specified set of choices, such as [Red, White, Blue], or [Cash, C.O.D., Net 30, Net 60].
- ☐ Derived: calculated from other fields in the same or related files.
- ☐ Subrecords: sets of fields grouped as a unit within a file. In effect, a file within a file.

FEATURES

- ☐ Powerful context-specific help. Explains available commands, most recent error messages, and even allowable data values.
- ☐ Menu-driven command structure. Commands entered by typing or choosing from the menu. Menus can be hidden for sophisticated users.
- ☐ Interactive report writer. Allows different formats to be used for entering, viewing and selecting records.
- ☐ Any field can be indexed at any time (indexing enhances the speed of sorting and selecting operations).
- ☐ Thorough data checking. Includes minimum and maximum values, unique values, mandatory fields and automatic filling in of fields.
- ☐ On-Disk Tutorial, Beginner's Guide, and Owner's Handbook.
- ☐ Advanced database structures including multi-valued fields, enumerated data type and subrecords.
- ☐ Complex selection (search) criteria are storeable for repeated use.

SYSTEM REQUIREMENTS

- ☐ IBM PC, PC XT, AT or 100% compatible computer.
- ☐ Minimum 256K memory (512K recommended).
- ☐ 2 floppy disk drives or 1 floppy and hard disk.
- ☐ Monochrome or color.
- ☐ IBM PC-DOS 2.0, 2.1, 3.0 or compatible operating system.

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If one of your fast-handed colleagues has beaten you to our 12-page Cornerstone introductory booklet, call us at 617-576-3190 to receive your own copy. You can also call us if you have further questions about Cornerstone.

Cornerstone. The sophisticated database system for the non-programmer.

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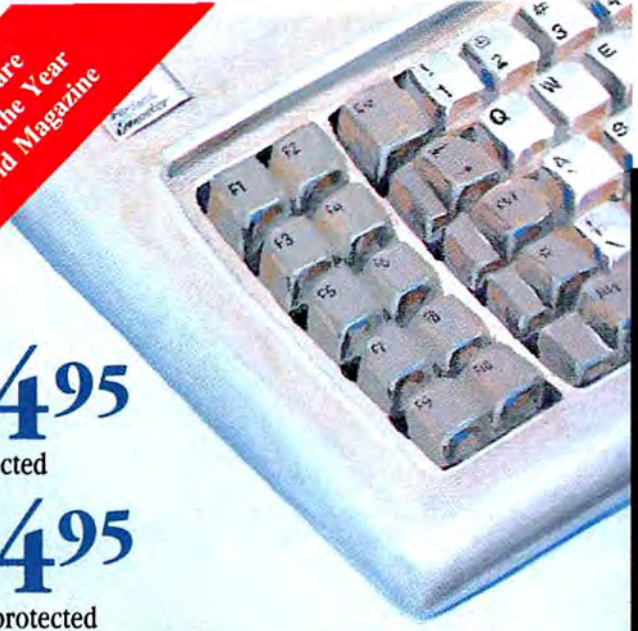
1984 Software Product of the Year - Infoworld Magazine



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30 DAY MONEY-BACK GUARANTEE

Here's Sidekick in action. That's Lotus 1-2-3 running underneath. In the Sidekick Notepad you can see data that's been imported from the Lotus screen. On the upper right, that's the Sidekick Calculator.

NOW . . . Whether you're working in dBase, Lotus, Wordstar or whatever . . . you can unleash the full power of your computer . . . and make a lot of extra space on your desk at the same time.

Whenever you're using your computer . . . from start to finish of your session . . . Sidekick™ will be there . . . ready to serve. And it's as lightning-fast and compact as only Borland knows how to make it.

There's a notepad that has a full-screen editor that can time and date stamp your notes, and then save them to disk. You can even pull information into the notepad directly from the screen of your "underlying" software.

Suppose you're working in Lotus and the phone suddenly rings. Give your Sidekick a call and it pops right up over Lotus with the notepad you need. Or an appointment calendar . . . one you can never misplace.

What if you need to do a quick calculation? A keystroke instantly brings up the calculator. And the results of your calculations can even be transferred to your "underlying" software.

Need to make a phone call? Up pops your personal phone directory. Type in the name you want . . . and Sidekick jumps right to the phone number. Another keystroke, and the phone is automatically dialed for you.†

There's lots more, too. You can move the Sidekick windows anywhere on the screen you like. And you can have as many on screen at a time as you need. There's even an on-line help window for each of Sidekick's features.

We designed it because we needed it. If you've ever been writing a report and needed to do a quick calculation, or jot down a note, then you need Sidekick, too.

†*Only with Hayes Smartmodem and compatibles.*

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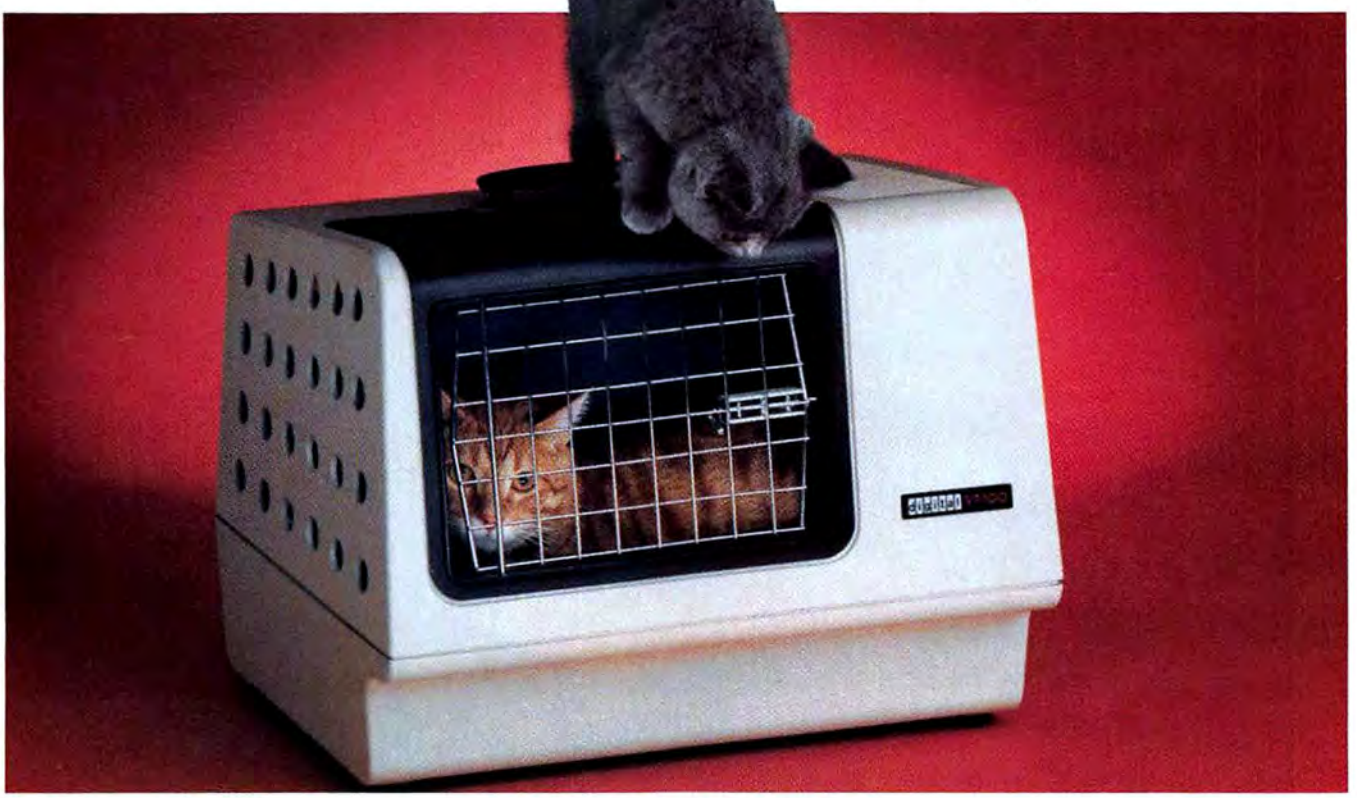

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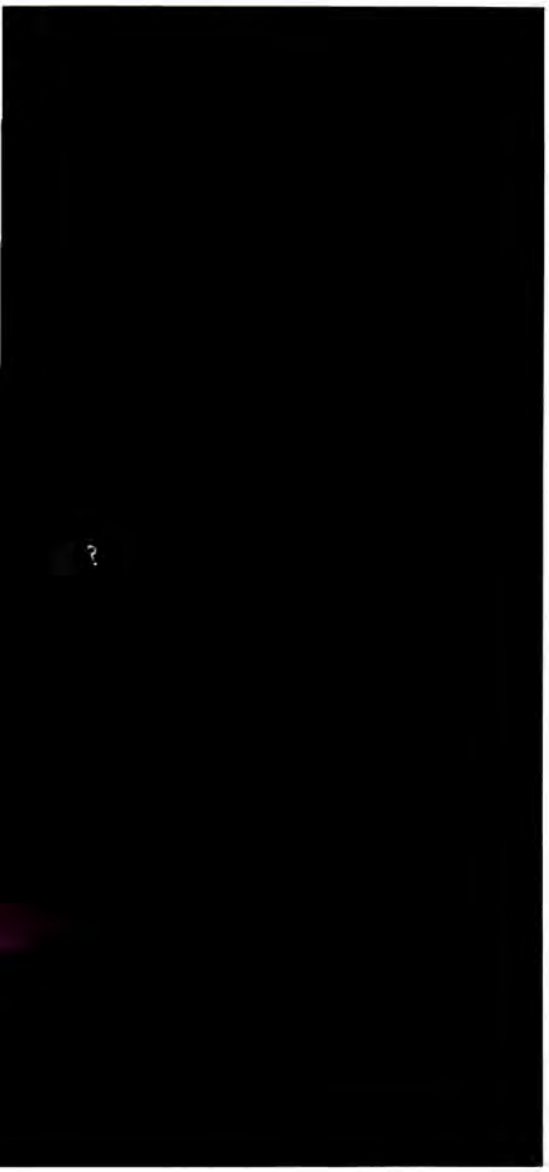
Word Processing: The Deciding Factors



More than 200 word processing programs crowd the market. Some are easy to use but limited in functions; others can do almost anything but take weeks to master. Here are some tricks for narrowing the field and ensuring that you get the information you need at the demonstration.

Merrily Shinyeda

The question "What is the best word processing program for the IBM PC?" has no answer. There are a number of excellent programs available. New software is constantly being introduced, and enhancements and updates to existing word processing packages are regularly announced.

Your choice of a word processing package should depend on what kind of documents you produce, how much work you have, and who will use the program. If you produce only simple, short documents, your word processing needs are different from those of someone who frequently produces long statistical reports. Similarly, a system that will be used frequently may require features, like print spooling, that aren't needed for an infrequently used system. Frequency of use determines how much complexity you can put up with to obtain extra features.

Categorizing Your Needs

Word processing software can be loosely categorized into basic, intermediate, and advanced packages. Determining which category satisfies your word processing needs will allow you to focus your attention on a select few programs rather than the full bewildering collection. (See Table 1 for a guide to the features that define the three categories. See "New Dimensions in Word Processing," *PCW*, January 1985, for descriptions of the features listed in Table 1.)

Basic word processing packages are ideal for managers and others who use word processing infrequently and do not have the time or the need to master more complex programs.

Basic word processing packages are intended for the person who occasionally writes a memo or drafts a short letter. These word processing packages are simple to operate and incorporate only basic text-editing functions. Basic word processing packages are ideal for managers and others who use word processing infrequently and do not have the time or the need to master more complex programs. Good basic word processing programs are available for under $200.

Intermediate word processing programs incorporate all the functions necessary to produce the variety of routine business documents found in most offices, including daily correspondence, lengthy reports, and statistical tables. They generally range in price from $200 to $400. In addition to performing the same functions as the simplest word processing programs, these packages can handle such challenges as multiple format changes within a document and justified right margins. Intermediate programs often include a "mail merge" feature, which enables you to merge mailing lists with a form letter.

The most powerful word processing programs rival dedicated word processing systems with their lists of features. These programs often include spelling checkers and automatic footnoting and indexing capabilities. More rarefied features like grammar checkers and thesauruses are also available. The most advanced packages can handle high-volume production and a limitless range of document types. You should expect to pay more than $400 for such multi-featured programs. No single package contains all the advanced features listed in Table 1, but you should be able to find a program with an array of features that cover your needs.

If you routinely send out personalized letters to your customers announcing such things as new inventory items or special offers, the word processing package you select should have a mail merge feature. You might also want a records-processing feature, which enables you to sort your list for special mailings. If you prepare lengthy reports or dissertations, seek out packages that provide automatic footnoting, indexing, and table of contents generation.

If you do creative or complex writing, you might look for compositional help features such as built-in outlining capabilities, spelling and grammar checkers, and thesauruses. A new writing aid called a text data management system makes it possible to organize text segments as you would a data base.

The categories of basic, intermediate, and advanced are a helpful starting point, but some programs don't fit neatly into one slot. For example, some packages contain the most advanced compositional aids, but don't provide basic business features such as decimal tabs. Other programs are loaded with advanced formatting features but are weak in meeting the most basic file-handling needs.

Getting Personal

While many word processing programs offer similar lists of features, no two packages are identical. The commands or key sequences used to perform a given operation and the speed with which the function is executed may vary greatly among programs. But features and efficiency are not the only factors that make one package superior to another. To know whether a software package is right for you, you should see it perform under the circumstances in which it will be used. You will then be able to differentiate a useful feature from a flashy but superfluous added attraction.

Table 1: Categories of word processing software features

	Basic	Intermediate	Advanced
File Organization	Renames file Deletes file	Writes block to new file Reads file into document File size limited only by memory Mail merge Makes/reads ASCII files	Automatic index/table of contents Virtual memory Continually saves to disk Splits screen Moves blocks between files Text data management system Outline generator Boilerplate glossaries
Input and Editing	Insert and replace Block copy and move Search and replace Page, row, and column display Tab ruler display Cursor movement by character, line, and screen Deletes by character, line, and block	Deletes by word and sentence Deletes to end of line Deletes word to left Undo delete Decimal tabs Search and replace/ignores case Search and replace/backward Horizontal scrolling Cursor movement by page, sentence, paragraph; to beginning and end of line or document; to specified line or specified page	Spelling checker Math functions Mouse support Wild-card search and replace Transposes characters Thesaurus Changes case Column move Grammar checker
Formatting	Adjusts margins Adjusts line spacing Centers text	Superscript and subscript Justified margins Underline Boldface Headers and footers Block indentation Automatic reformatting Automatic page numbering	Automatic footnoting Automatic hyphenation Format glossaries Widow and orphan control Proportional spacing
Printing	Automatic pagination	Prints multiple copies Prints selected pages Extended character set	Print queuing Print spooling Printer pause for text entry

Before you call a software salesperson or rush off to the nearest dealer for a demonstration, assemble samples of the documents you produce. Note the kinds of editing required by each and gather up any odd-sized paper or letterhead that uses a special format. Using your own documents as benchmarks ensures that all the software you examine will be evaluated according to the same criteria and based on your own specific needs.

Class Structure

If the demonstration will take place in your office, odds are that you are considered a "major account" with the potential to order several copies of the software. You will have no trouble getting the salesperson to demonstrate your specific applications on the software in question, take you to lunch, or do handstands on your desk. However, if you have to visit a software store to see a demonstration and do not represent big business, be prepared to be disappointed.

Most software manufacturers provide their sales representatives with a prerecorded, or "canned," presentation disk that is designed to show off the features and capabilities of their product. In most cases, the demo disk is accompanied by a rigid sales script. Although this may be an effective way for the salesperson to provide a comprehensive overview of a product, it should not be the primary basis upon which to make a buying decision. Remember, the objective of a software demonstration is no different from any other product demonstration–it is designed to emphasize strengths, minimize weaknesses, and sell the product. Even the most savvy software critic can be fooled by a professionally designed demonstration.

Most retail salespeople are trained only to run the demo disk and recite the sales script–few have the ability to create or edit complex documents. Therefore, it is in your best interest to call the dealer ahead of time and arrange an appointment with a trainer or salesperson experienced with the product you want to see. Arrange for at least an hour of hands-on time.

As a prospective buyer, your purpose in seeing a demonstration is not to be entertained, but to judge how effectively the program can handle the types of work you do. The only way to avoid the razzle-dazzle of a canned software demonstration is to identify and understand your requirements, take the time to prepare an evaluation package, and when you visit the dealer, maintain control of the demonstration.

At the Demonstration

When you arrive for the demonstration, the software may already be loaded into the system. If it is, ask the salesperson to load it again while you watch. Some packages have only one disk to load, while others may make you wade through several disks and menus before you can type a single character. If the software is not demonstrated on your own equipment, find out how much memory the demonstration system has and how much memory the software requires. The need to buy additional RAM to accommodate a memory-hungry program is a factor to consider in your purchase decision.

Next, check to see if the demo system is configured with a hard disk. If you have no hard disk on your system, request that the demo be performed using only floppies. Word processing programs are quite long, and often the code for only the most frequently used functions is loaded into memory. In that case, when you use a function not in memory, the code must be read from disk before the function can be executed, a process that takes much longer on a floppy disk system. Depending on how the program is organized, this can happen infrequently or be a repeated nuisance that results in agonizing delays during editing.

A software demonstration is designed to emphasize strengths, minimize weaknesses, and sell the product. Even the most savvy software critic can be fooled by a professionally designed demonstration.

Try typing a page of text. The keystrokes required to correct typographical errors and minor mistakes during input should be logical, easy to remember, and simple. There should be no noticeable delays in the screen's response to commands. Observe prompts on the screen. Do they guide you through editing operations? Move or copy a block of text to the beginning of a multipage document and see how this affects the following text. Professionally prepared demonstrations usually move text to the end of the document so that no reformatting or repagination is necessary.

Is text automatically stored to disk, or are there lengthy procedures to save what you have typed? After you save your document to disk, check the document directory. Does the directory indicate the length of the document and when it was created or last edited? Are you required to return to the main

menu to retrieve documents, or does the system allow you to load documents from the directory? Flexible file-handling features will save you frustrating extra steps.

Check to see if documents can be printed directly from the main menu or the directory. Note what procedures are necessary to begin printing and whether it is possible to work on a document while another document is being printed ("print spooling"). Many programs permit you to print several documents in sequence without interruption ("print queuing"). The abilities to print in the background and queue documents to the printer are important features for high-volume operation.

Visible Means of Support

Once you understand the basics, attempt one of the more difficult functions like mail merge or glossaries. If the program includes on-line help, test its effectiveness by trying to complete the function using only this aid. If the help screens are not sufficient, refer to the documentation. If even the manual can't help you through the exercise, the package is not the right one for you.

A software package's documentation is as important as the features it offers. Information should be easy to locate and easy to understand. An index is a must, and keyboard templates and quick reference guides are useful for first-time users.

You may want to avoid software that comes with a typewritten manual. When a manual is not typeset, it can mean two things: either the software is not in its final form, and future modifications will make it necessary to rewrite the manual; or the company does not have the funds to produce professional, quality documentation. New companies continue to enter the software arena with innovative products and high hopes. But a number of new entrants will falter and some will fold. If you want to keep your word processing operation current, you will depend on the manufacturer of your program for support and software updates. Choosing software from an established company is especially important if you're buying multiple copies for an office. You can avoid being left holding the bag by selecting a software company with a track record and sound financial backing.

To get an idea of the kind of support you can expect from the manufacturer, find out if the package is the company's first software offering or if there have been previous releases. Knowing how the company has handled updates in the past gives you a good indication of how future updates will be treated. Find out if other businesses like yours in the area are using the software. Check with them to find out whether they are satisfied with the package; ask whether additional training or support was required, and if so, whether they were happy with the vendor's response.

The abilities to print in the background and queue documents to the printer are important features for high-volume operation.

Most software purchases are influenced by advertisements, a review in a trade publication, or the opinion of someone who has used a particular package. While all these are good places to begin, the only sure way of determining that a program is right for you is to work with it. If you make it a point to see your typing applications demonstrated, you should be able to find the best PC word processing package–for you.

Merrily Shinyeda is a Contributing Editor of PC World *and the director of the Sierra Group, an office automation marketing research and consulting company.*

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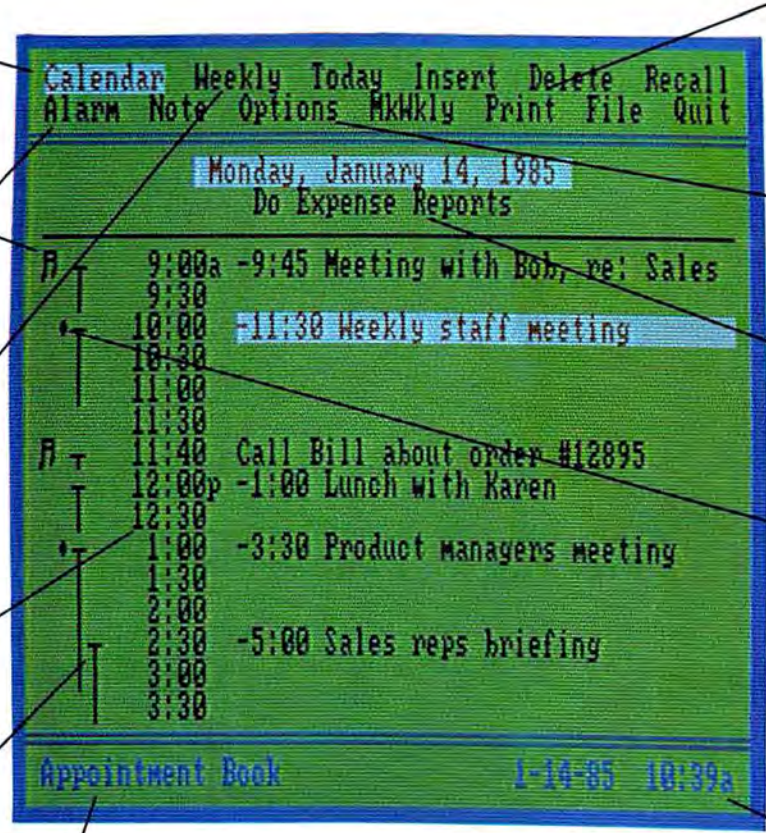

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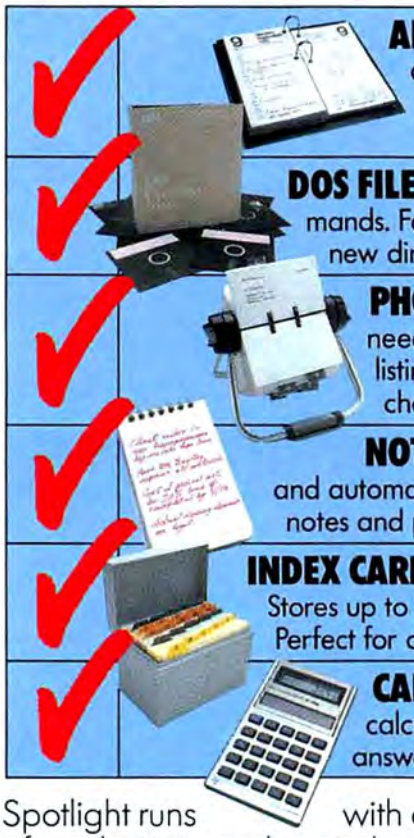

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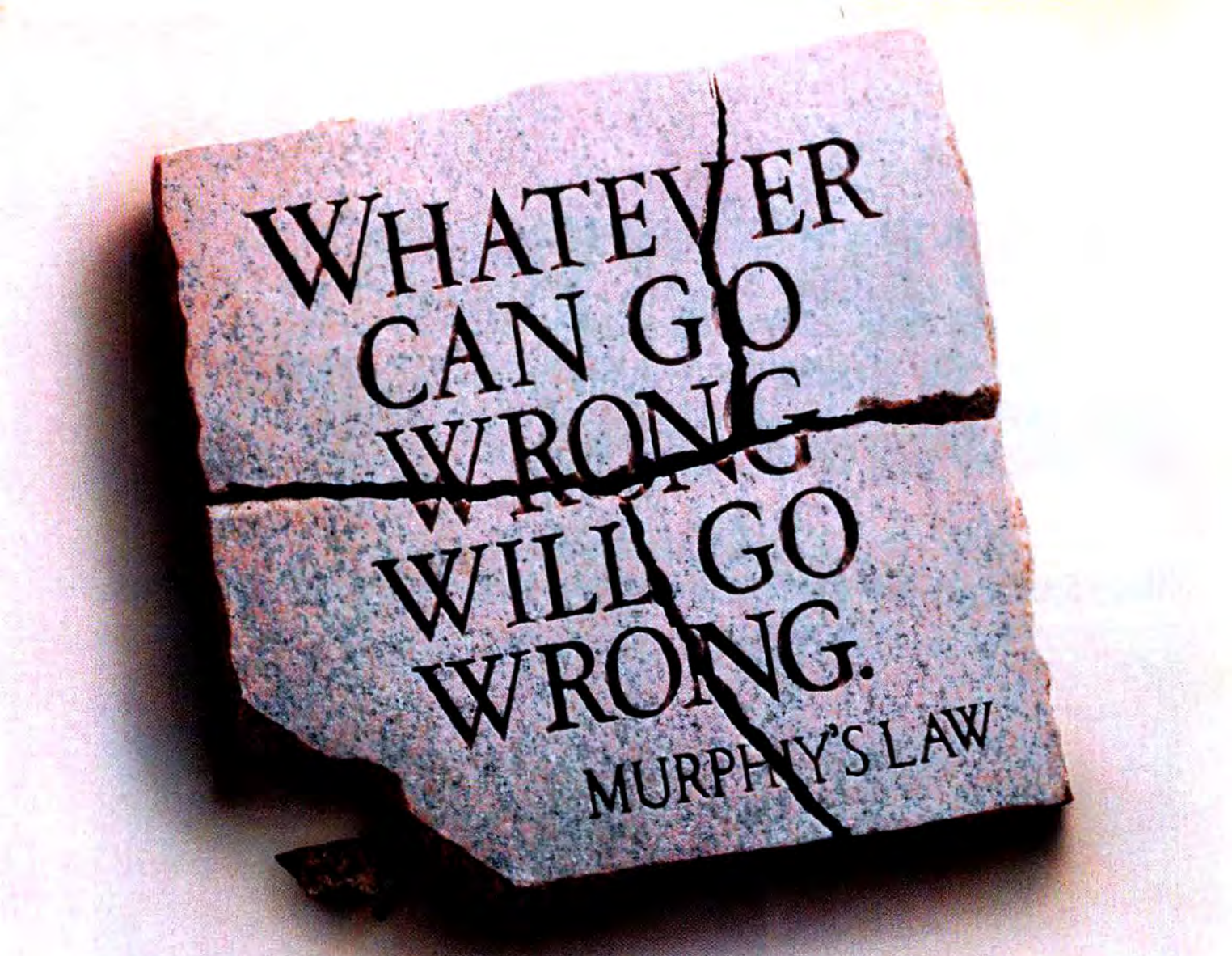

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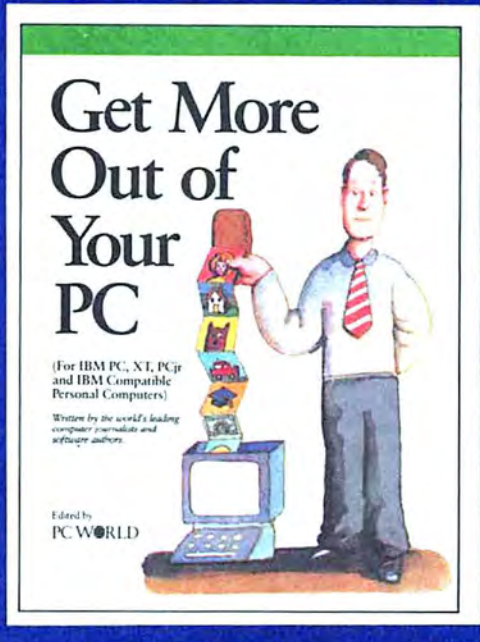

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The Help Screen

PC World offers answers and advice at every level

This month: a potentially troublesome quirk of the PC AT, plus tips on how to make short work of entering long lists into 1-2-3, convert a BASIC string to uppercase, and mix the order of DATA elements

Karl Koessel

Before responding to this month's letters, I want to pass along an advisory on IBM's new PC AT and a tip for those using *WordStar* on the AT. Nancy Canning, telecommunications/hardware administration manager at MicroPro International, reports that one of the company's ATs blew out a hard disk when an employee plugged in the keyboard while the machine was on. It seems that the AT is more sensitive than the PC. The moral is: Be certain to turn off the AT before you connect or disconnect the keyboard or any other peripheral.

Also on the AT front, you might want to note that *WordStar*'s L command, which changes the logged disk drive, does not work on IBM's top-of-the-line PC. To change drives you must exit *WordStar*, change the default drive in DOS, and reenter *WordStar*. This routine is only a slight inconvenience in light of the AT's speed.

1-2-3 and the PC's Number Pad

Q. Thank you for the overview in the August issue ["Introduction to Spreadsheets," PCW, Vol. 2, No. 9]. I concur that electronic spreadsheets can do almost everything as well as a pencil and a calculator, but I am not so sure they're faster.

I have 1-2-3, but entering large amounts of numbers takes a long time. I can't use the number pad to enter numbers and use the cursor keys to change cells without hitting <NumLock> in between. This means that each input requires two extra keystrokes. Is there a way to move down to the next cell so that large amounts of numbers can be entered quickly?

Jim Hawkinson
Columbia, South Carolina

A. Because numeric keys and cursor control keys share the same keypad on the PC's keyboard, the problem you describe afflicts many other programs. Fortunately, *1-2-3*'s keyboard macro feature can remedy your problem. *1-2-3*'s keyboard macros enable you to assign a series of keystrokes and commands to an <Alt>-*character* combination, such as <Alt>-A. When you press <Alt>-A, *1-2-3* executes the assigned keystrokes and macro commands automatically.

You can assign characters, cursor movements, the <Enter> key, and even function keys to a keyboard macro. You can also invoke a command that causes the macro to wait for input from the keyboard before it proceeds with the remainder of the steps; yet another command transfers control to another macro.

Experienced users can create highly complex keyboard macros (see "/X Marks the Macro," *PCW*, Vol. 2, No. 3). But even novices can create a macro to perform the task you describe. The following instructions illustrate how to create the desired macro on a blank worksheet. After you have "walked" through the necessary steps, you can add such a macro to worksheets of your choice.

Load *1-2-3* and move the cursor to cell D1. (In an actual worksheet you'll want to move the cursor to any empty cell that has a few blank cells below it.) Carefully enter the following lines into cells D1 through D3.

```
{?}
{down}
'/xg\a~
```

Now move the cursor back to cell D1. Use the */Range Name Create* command sequence to name the macro **\a** (a macro range must be named with a backslash followed by a single letter). When asked to enter the range to be named, enter the coordinates of the macro's first cell, **D1**. That's all there is to it.

To use the macro, move to the cell in which you'd like your list of entries to begin. Let's start at cell A1 for this example. Press <NumLock>, then <Alt>-A, enter a number on the numeric keypad, and press <Enter>. The number is entered into cell A1, and the cursor moves down to the next cell, awaiting the next number. When you've finished entering your list of numbers, press <NumLock> and then <Ctrl>-<Break> to activate the cursor keys and exit the macro. Any time you want to enter a list of numbers (or labels or formulas), just move to the cell that will contain the first number and press <NumLock>, then <Alt>-A.

It's unfortunate that *1-2-3* does not include a macro key symbol for <NumLock>, <CapsLock>, or <ScrollLock>. Perhaps in a future release?

Converting BASIC Strings to Uppercase

Q. *Both BASIC and* EasyWriter *include a built-in function to ignore case when accepting and saving titles; I can enter the name of a program or document in uppercase, lowercase, or a random mixture of both cases. The name is always stored and returned in uppercase. Is there any easy way to apply this function to entries made in BASIC programs that I write?*

Byron E. Phelps
Hendersonville, North Carolina

A. The subroutine in UPPER.BAS (lines 100 through 160) converts the lowercase letters of X$ into uppercase without changing any other characters or using any string space (see Listing 1). You can incorporate this routine into your BASIC programs, assign the string you want converted to the variable X$, and call the routine with a GOSUB.

The routine uses a FOR . . . NEXT loop to step through each character of X$ one at a time, checking for lowercase characters and converting them to uppercase. Inside the loop the variable ASCIIVALUE is set to the ASCII value of the character currently being checked (line 110). (Lowercase letters have ASCII values from 97 for *a* through 122 for *z*; uppercase letters have ASCII values from 65 for *A* through 90 for *Z*.) Accordingly, if the current character has an ASCII value of less than 97, line 120 causes program execution to skip the remainder of the loop and proceed to check the next character of X$. Line 130 does the same if the ASCII value is greater than 122. If the character's ASCII value is between 97 and 122, the character is lowercase, and line 140 replaces it in X$ with one whose ASCII value is 32 less than the current character (that is, the uppercase equivalent).

This routine works fine for short strings but offers no input control, such as accepting only numbers or only letters. For that kind of control you need an input routine, not just a case-conversion routine. You can find such a routine in "Q-String," **.**, *PCW*, Vol. 1, No. 2.

Random DATA

Q. *I am writing a BASIC program that will require reading DATA statements in random order. Unfortunately, BASIC will permit restoring the DATA pointer to only a specified DATA line number, not a variable value. For example,* **RESTORE X** *(where X has been assigned an integer value) brings the error message 'Undefined Line Number In . . . '.*

I suppose I could open a random file and create records that could be accessed randomly to get the required data, but I'd prefer to keep the program self-contained. Any suggestions?

Raymond J. Hildenbrand
San Antonio, Texas

A. There is no need to READ the data in random order every time you want the data elements mixed. When your program begins, it can READ the data into an array once and then randomly mix the array assignments each time

```
10 CLS           'Clear the screen
20 INPUT "Enter any characters: ",X$
30 GOSUB 100     'Convert X$ to uppercase
40 PRINT X$      'Show the new string
50 END
99 '-----Convert X$ to uppercase--------
100 FOR I=1 TO LEN(X$)
110    ASCIIVALUE=ASC(MID$(X$,I,1))
120    IF ASCIIVALUE<97 THEN 150
130    IF ASCIIVALUE>122 THEN 150
140    MID$(X$,I,1)=CHR$(ASCIIVALUE-32)
150 NEXT
160 RETURN
```

Listing 1: UPPER.BAS demonstrates a subroutine that converts the lowercase letters of the string variable X$ to uppercase.

```
10 CLS           'Clear the screen
20 GOSUB 100     'Set up the data elements
30 GOSUB 200     'Shuffle their order
40 GOSUB 300     'Use the data
50 GOSUB 200     'Shuffle the order again
60 GOSUB 300     'Use the data again
70 END
99 '-----Read the data into an array-----
100 TOTAL=40
110 DIM ELEMENT$(TOTAL)
120 RANDOMIZE VAL(RIGHT$(TIME$,2))
130 FOR I=1 TO TOTAL
140   READ ELEMENT$(I)
150 NEXT
160 RETURN
199 '----Shuffle elements in one pass----
200 FOR I=TOTAL TO 2 STEP-1
210   SWAP ELEMENT$(RND*I+.5),ELEMENT$(I)
220 NEXT
230 RETURN
299 '----Show the shuffled order---------
300 FOR I=1 TO TOTAL
310   PRINT USING "\   \";ELEMENT$(I);
320 NEXT
330 PRINT:PRINT
340 RETURN
999 '----The data elements---------------
1000 DATA a,bb,ccc,dddd,e,f,g,h,i,j,k,l
1010 DATA m,n,o,p,q,r,s,t,u,v,w,x,y,z
1020 DATA 1,2,3,4,5,6,7,8,9,0,!,@,#,$
```

Listing 2: MIXEDATA.BAS demonstrates a technique to mix the order of data elements in a BASIC program.

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you want them in a new order. MIXEDATA.BAS demonstrates the necessary routines (see Listing 2).

As shown in lines 100 through 160, your program must set a variable (TOTAL in this example) to the total number of data elements, DIMension an array (ELEMENT$() in this example) to hold the data elements, seed the random-number generator, and read the data elements into the array. This initialization process is done only once.

Any time you want your program to mix the order of the data elements, have it GOSUB to a subroutine such as the one shown in lines 200 through 230 of MIXEDATA.BAS. The routine uses one FOR . . . NEXT loop to step backward through the array and the SWAP statement to shuffle the order of the array elements in one quick pass.

Software to Reset Memory Switch Values

Q. Some time ago I used a bulletin board service to obtain a memory utility that permits system board memory switches to be reset through software. In the heading of the utility was a copyright notice from Microlife, Inc., and a phone number. My problem is that while the utility works great for DOS 1.00, it does not work under DOS 2.10. Microlife no longer answers that phone number. Do you know if the firm still exists or of any other such utility?

Edward C. DeLand
Los Angeles, California

A. I haven't heard of Microlife, and although the name seems to suggest an abbreviated existence, I hope that wasn't the company's fate.

Jetdrive, a package from Tall Tree Systems that includes an excellent RAM disk program, contains a utility called Jboot that lets you specify the amount of memory that the PC recognizes as installed and available and then reboots (restarts) the PC with only that specified amount of memory. This feature also enables you to restart the PC without losing the contents of *Jetdrive*'s RAM disk program, Jdrive.

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 74055,412 or The Source STE908.*

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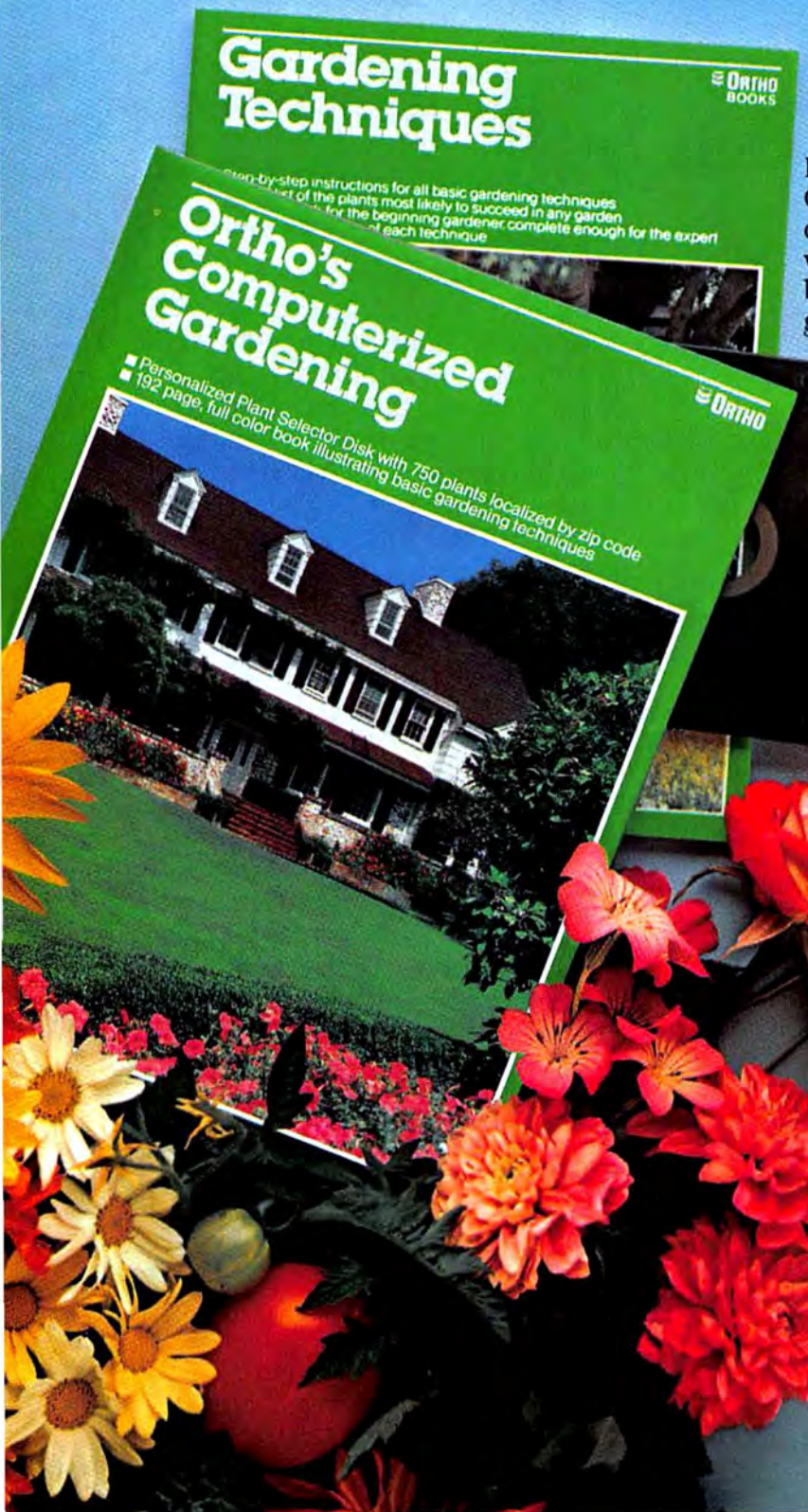

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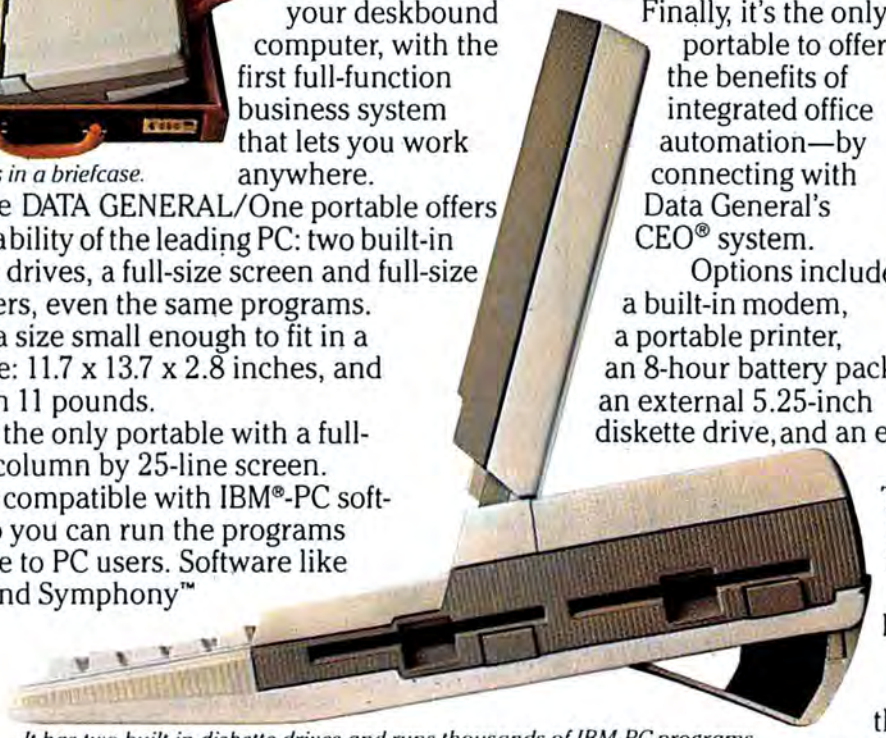

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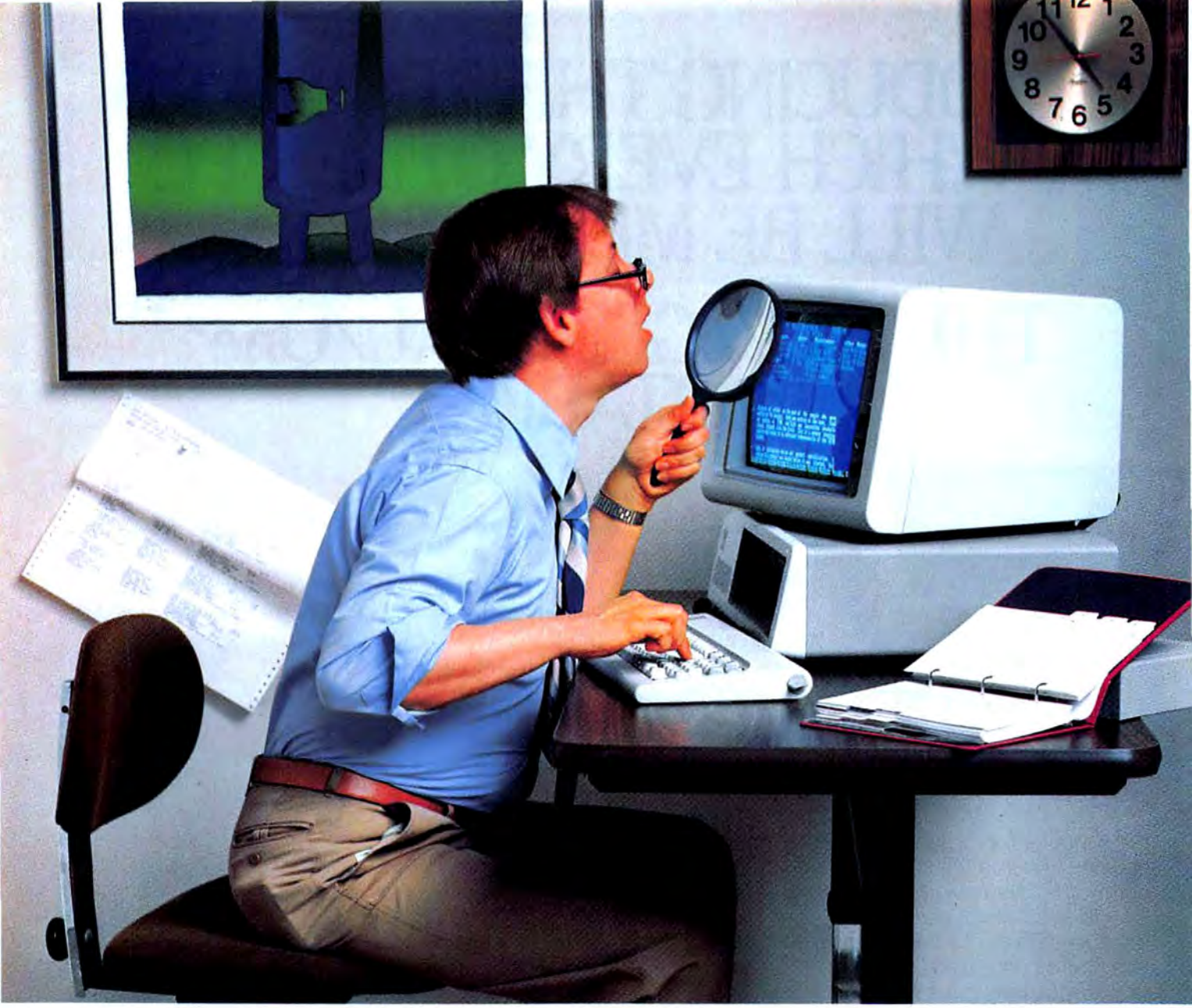

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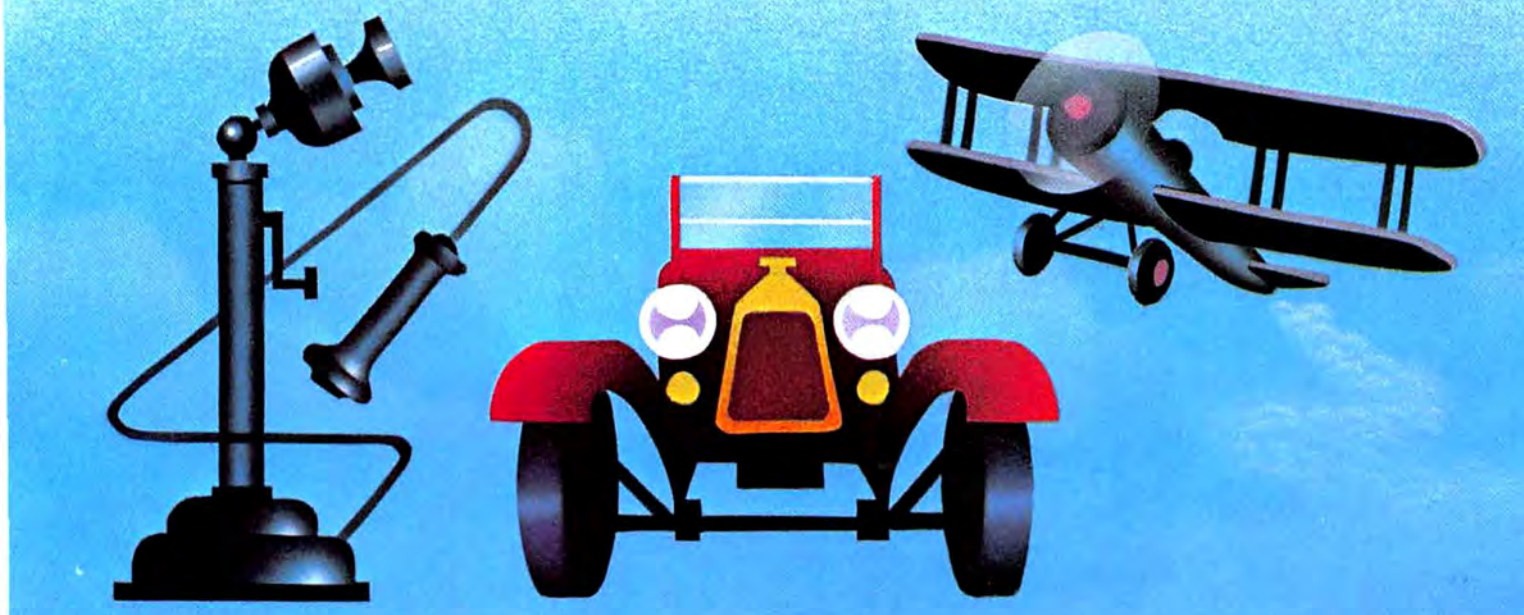
From Altair to AT

Five technological milestones over the past century have forever changed the way we live and work: the invention of the telephone in 1876, the first gas-powered car in 1892, the flight at Kitty Hawk in 1903, the first radio broadcast in 1920, and the first coast-to-coast television broadcast in 1956. A sixth candidate for the list, the personal computer, appeared ten years ago.

Wayne Parker

The date was January 1975, and the cover of *Popular Electronics* featured the Altair 8800, a computer that an electronics hobbyist, soldering iron in hand, could build from a kit. The Altair, which was sold by an obscure Albuquerque company named MITS for $397, bore little resemblance to today's personal computers. It had no keyboard or monitor and no available software. It was programmed by flipping switches on the front panel.

Despite all this, Les Solomon, the editor of *Popular Electronics* and an electronics hobbyist, considered the Altair a major breakthrough and was willing

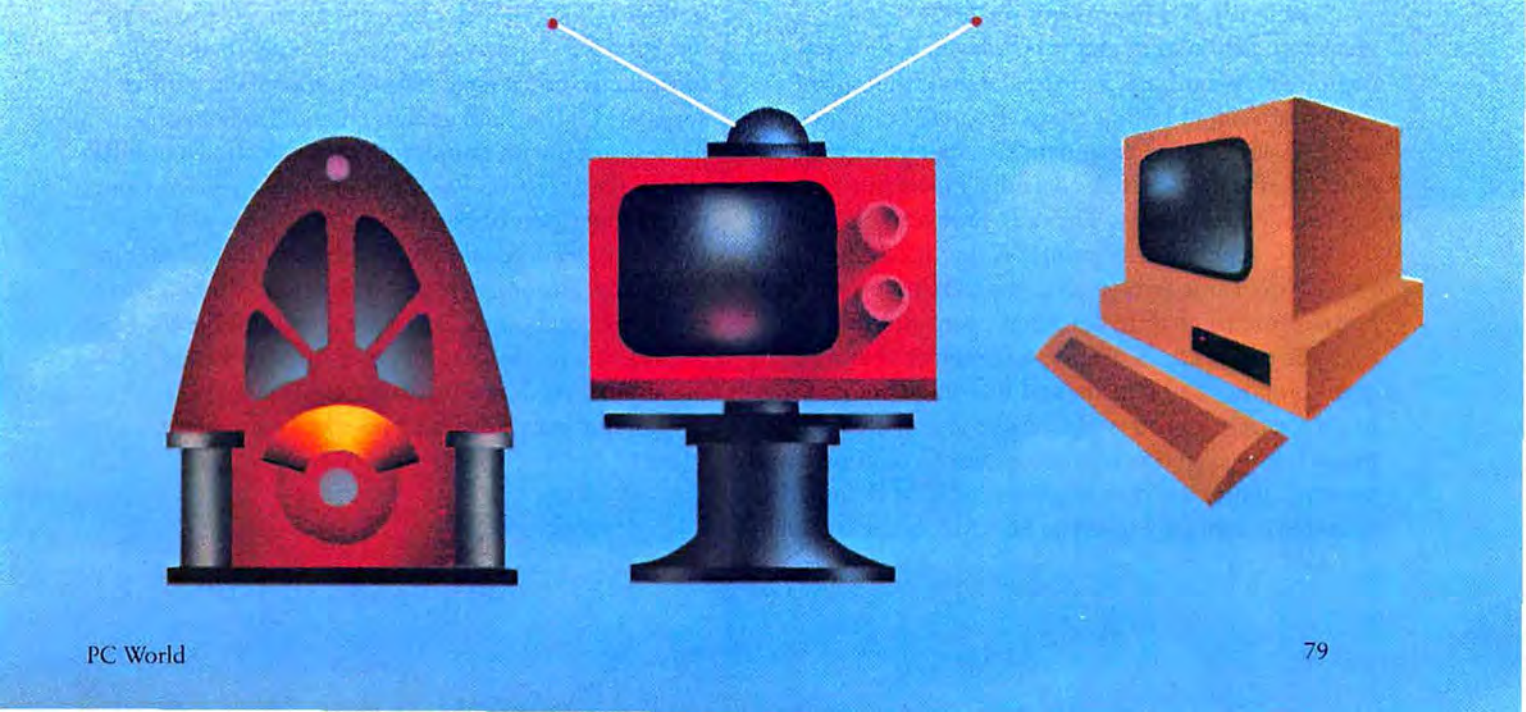


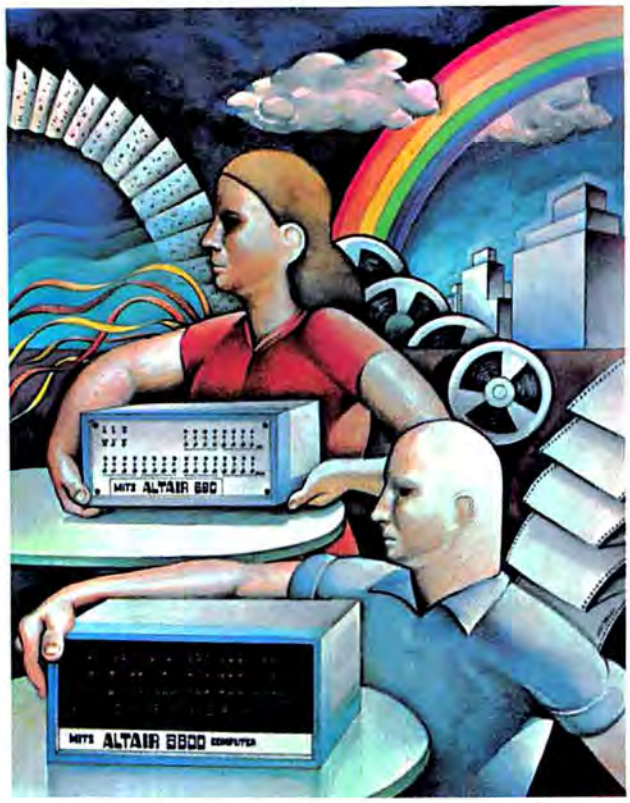
to risk his reputation on it. Solomon sensed that other electronics enthusiasts were eager to get their hands on a real computer. And he knew MITS founder Ed Roberts well enough to trust that Roberts was just as closely attuned to the dreams of the hobbyists. As for MITS's ability to deliver on those dreams in quantity—well, Solomon knew he was taking a risk.

Calculator Wars

Initially a moonlighting enterprise for Roberts during his years as an Air Force officer stationed in Albuquerque, MITS started out with mail-order sales of light flashers used in model rockets. The company's first real success was electronic calculator kits in the early 1970s, but that market quickly turned savage as Roberts found himself up against major companies like Texas Instruments in a brutal price war. By 1974 MITS was deep in debt, the staff was shrinking rapidly, and it seemed only a matter of time before the company would go bankrupt.

But Ed Roberts wanted to make one more attempt to save MITS. Since Intel had begun developing the first microprocessor in 1969, the technology for putting complex circuits onto silicon chips had been steadily improving. In April 1974 Intel released an 8-bit microprocessor chip, the 8080, designed not for use in a computer but for such purposes as traffic-





The early publicity for the MITS Altair, such as this 1975 advertisement, encouraged buyers to take a visionary outlook on the significance of the personal computer.

light control. Roberts was convinced that the 8080 could provide the basis for a computer that an electronics hobbyist could build from a kit. He figured that by selling even a few hundred such kits he could put a dent in his company's debt.

Actually, MITS was not the first company to create a machine that might be labeled a personal computer. As far back as 1962, Digital Equipment Corporation had built a relatively small computer, the LINC (Laboratory Instrument Computer), equipped with a keyboard, a small cartridge tape drive for saving data, and a display. The only problem with calling the LINC a personal computer is that it cost $43,600.

Next came two small computers that were built but never marketed. In 1969 Alan Kay and Ed Cheadle designed the FLEX, a computer that had good graphics capabilities and was small enough to fit on a desk top. Kay and Cheadle abandoned the project, however, due to the computer's costliness and poor reliability. In 1973 engineers at IBM designed a portable computer called the SCAMP, but it lacked sufficient backing within the company to move beyond the prototype stage (see "The First Portable Computer," *PCW*, Vol. 1, No. 7).

Several months prior to the advent of the Altair, *Radio-Electronics* magazine announced a computer kit called the Mark-8, which was based on the 8008, a more primitive Intel chip than the Altair's 8080. The Mark-8 failed to attract much interest. The Altair, however, was an instant success. On the basis of the single article in *Popular Electronics*, thousands of people sent checks to order a kit from MITS. Despite its limitations, the Altair ignited the imagination of hobbyists everywhere. Why?

Marketing Magic

Ed Roberts performed a bit of marketing judo in selling the Altair. The trick was to somehow flip the obvious limitations of the Altair upside down, making them appear to be advantages. Roberts accomplished that feat by including 16 empty slots in his design, making it possible for an owner to enhance the Altair's capabilities with add-on circuit boards. Hobbyists were instantly attracted to the machine not so much because of what it could do (which wasn't much), but for what it might do if properly enhanced. The real beauty of the Altair was its potential.

Putting together an Altair was not a task for the timid. Ed Juge, now with Tandy Corporation, remembers, "The Altair was a great technological breakthrough, but you needed to know something about electronics and keep the soldering iron hot." Driven by necessity and by their shared enthusiasm, hobbyists sought each other out and formed groups like the Homebrew Computer Club in Silicon Valley to trade technical information and lend each other support. Out of such groups emerged small companies, some with names like Intergalactic Digital Research (later Digital Research), Kentucky Fried Computers (later part of North Star), and, in a play on well-known corporate initials, the Itty Bitty Machine Company. Such enterprises were soon selling a variety of add-on boards, software, and peripherals. Entrepreneurs published computer magazines and organized fairs. And hardware competitors began developing more advanced personal computers.

What started as a tiny calculator company trying to work off a $300,000 debt rapidly evolved into a full-blown movement with more facets than anyone could hope to keep track of. The heyday of MITS lasted only two years, but by the end of that brief period an entire industry had come into being around the Altair and competing computers, and that industry had a momentum of its own (see Figure 1).

Early Competitors

One of the earliest and, for a time, most successful competitors was IMSAI, based in San Leandro, California. IMSAI copied the Altair, beefed up the power supply, and found better marketing techniques. Soon, more IMSAI computers were selling than Altairs.

Success, however, eventually overwhelmed both MITS and IMSAI. IMSAI failed to manage its growth and declared bankruptcy in 1978. Ed Roberts sold MITS to Pertec, a manufacturer of disk drives, which discontinued the Altair line as problems mounted. These failures did not deter other companies, however, and 1977 saw the introduction of a new wave of personal computers.

This second generation of personal computers had many of the features that the Altair lacked, such as a keyboard, a monitor, more internal memory, and better data storage. These machines were each designed primarily by one or two individuals, typically young hobbyists drawn to personal computers at the time of the Altair. A number of companies sold computers in the second wave, but good computers and excellent marketing separated the Apple II, the Tandy TRS-80, and the Commodore PET from the crowd.

Radio Shack Meets the Micro

Before 1977 Tandy/Radio Shack was known for its free-battery club, electronic doodads, and build-it-yourself electronics kits of every flavor. Radio Shack producing a computer seemed about as likely as Sears marketing airplanes. But the TRS-80, known by both its admirers and detractors as the Trash 80, brought the company unequivocally into the silicon age. With more retail outlets than McDonald's, Radio Shack instantly became a major force in the market.

Steve Leininger was the engineer behind the TRS-80. John Roach, later to become chairman of Tandy, met Leininger during a visit to the Byte Shop, one of the early stores that specialized in Altairs. "I thought he worked for us," said Roach's tour guide, a National Semiconductor executive, when they encountered Leininger working at the Byte Shop. In fact, Leininger did spend his daytime hours as an engineer at National Semiconductor, but he moonlighted selling microcomputers.

One of Tandy's buyers, Don French, was urging Tandy to market a personal computer and had submitted his own preliminary design, which Leininger was hired to work on. The result of this collaboration, the TRS-80, was based on the 8080's cousin, the Z-80, and came complete with a keyboard and a monitor. The response of Radio Shack's customers was no less than overwhelming: within a month of its introduction in 1977, 10,000 TRS-80s had been sold, three times the number projected for the entire year.

What started as a tiny calculator company trying to work off a $300,000 debt rapidly evolved into a full-blown movement with more facets than anyone could hope to keep track of.

From Garage to Glory

The success of the Apple II computer, also introduced in 1977, was even more remarkable. Tandy was a well-established company with a vast network of dealers when it released the TRS-80. But Apple came out of nowhere, making it from a garage into the Fortune 500 in less than seven years.

Steve Wozniak, a young electronics engineer working at Hewlett-Packard, and Steve Jobs, a neophyte entrepreneur, were both regular members of the Homebrew Computing Club when they saw their first Altair. A true hobbyist, Wozniak had been thinking about building a personal computer but hadn't yet collected enough paychecks at Hewlett-Packard to afford an Intel 8080 microchip. He finally bought a

Table 1: The personal computer, 1975 and 1985 [1]

1975 Altair 8800
Input Data and commands are entered in binary form via 16 toggle switches.
Display Output is displayed in binary form by 36 light-emitting diodes.
Microprocessor 8-bit Intel 8080, operating at a speed of 2000 cycles per second
Memory 256 bytes of RAM (about a paragraph of text)
Disk Storage None
Expandability The Altair's 15 empty slots enabled users to upgrade the computer's memory and capabilities by adding circuit boards.
Software Once a hobbyist had assembled the Altair from a kit, there was nothing that could be done with it other than entering machine language instructions. Useful applications had to await the development of add-on memory boards, boards that provided for adding input devices such as cassette players or paper-tape readers, and output devices. Even then, users had to write their own programs.

[1]The capabilities shown for the Altair are those of the first kits sold and therefore do not include additional enhancements (such as memory boards) and peripherals (such as keyboards) that later became available.

1985
PC AT Model 99

Input
Information is entered from an 84-key typewriter-style keyboard.

Display
Text and graphics are displayed on a monochrome or color monitor.

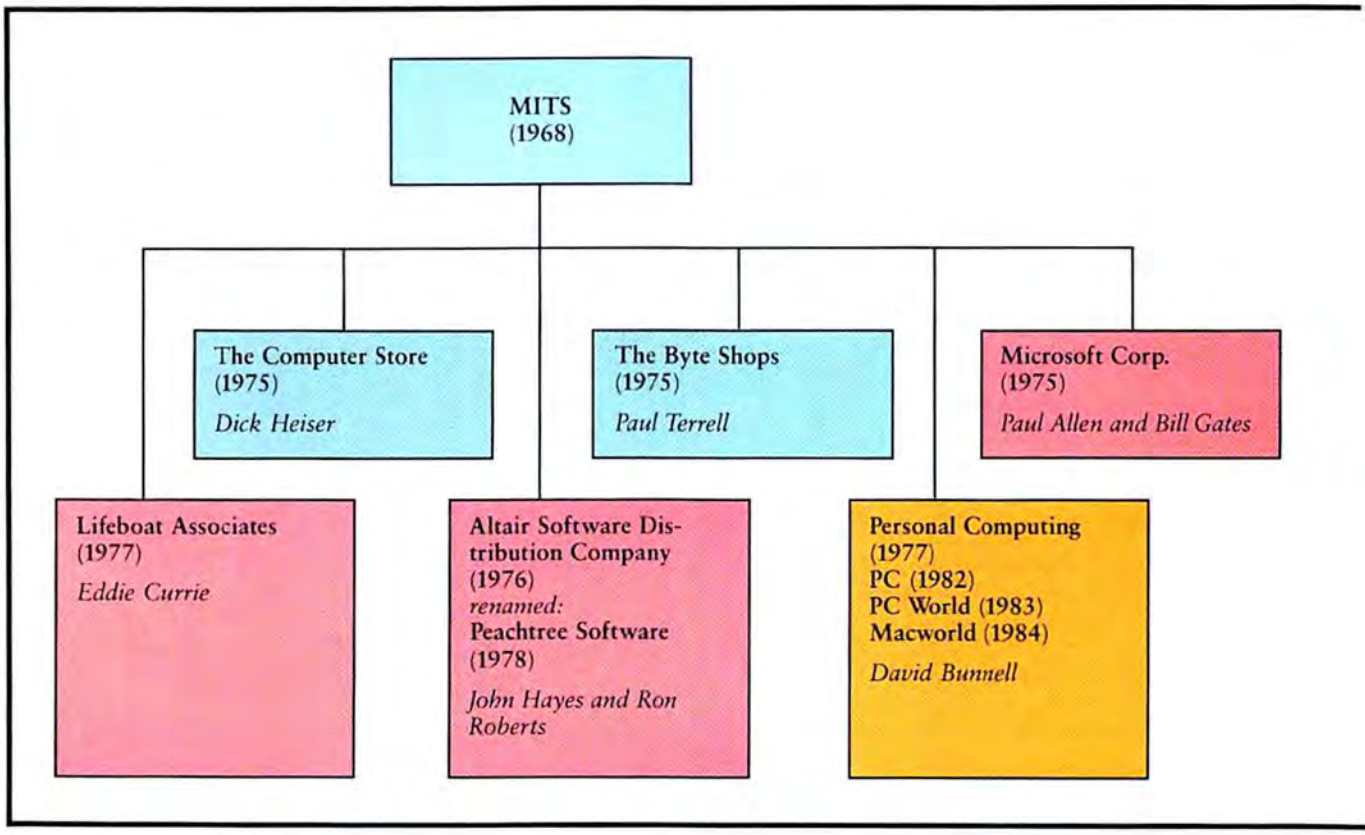
Microprocessor
16-bit Intel 80286, operating at a speed of 6000 cycles per second

Memory
512K of RAM (about 350 double-spaced pages of text)

Disk Storage
1.2MB (about 800 pages of text) on a floppy disk and 20MB (about 13,000 pages of text) on a hard disk

Expandability
The PC AT features 6 empty expansion slots, allowing the computer's memory and other capabilities to be increased by the addition of circuit boards.

Software
From the day of its introduction the AT could run most of the programs written for the IBM PC–thousands of pieces of software.



Motorola 6800 through an employee discount and later picked up a MOS Technology 6502 for only $20 at an electronics trade show.

In addition to the computer that he designed, Wozniak wrote a BASIC interpreter that would work with the 6502, added a keyboard, and included PROMs (programmable read-only memory chips). He added 4K of RAM (random access memory) and worked meticulously to lay out the computer's components on a printed circuit board.

Wozniak did all this in his spare time, reluctant to leave his job at HP, which he thoroughly enjoyed. In fact, he offered his computer design to HP, but in a move it would soon rue, the company turned him down. Finally, Steve Jobs talked his friend into leaving HP and devoting his full efforts to their new enterprise. Jobs sold his VW bus, Wozniak sold his HP calculators, and Apple Computer was born.

The first order—for 50 computers—came from Paul Terrell's Byte Shop in Mountain View, California. This order did for Apple what the *Popular Electronics* article had done for MITS. But Apple somehow managed to skip past the land mines that destroyed so many other start-ups. Jobs and Wozniak had the sense to bring in good business managers and a top-notch advertising agency, and the popularity of Apple II fueled the most phenomenal growth the business world has ever seen.

Peddle's PET

Meanwhile, MOS Technology had been producing chips for the calculator market, and its customers included both MITS and Commodore, a Canadian company. Though much larger than MITS, Commodore was also experiencing difficulties in the calculator market. It purchased MOS Technology and looked for new applications for the microchips.

Jack Tramiel, head of Commodore, asked Chuck Peddle, the engineer who had designed the MOS 6502 microprocessor chosen by Steve Wozniak, to design a computer. Commodore named the computer the PET in homage to the pet rock fad.

The PET came with 16K of memory, a keyboard, a built-in monitor, and BASIC—all for $795. The TRS-80 had similar features. The Apple II was

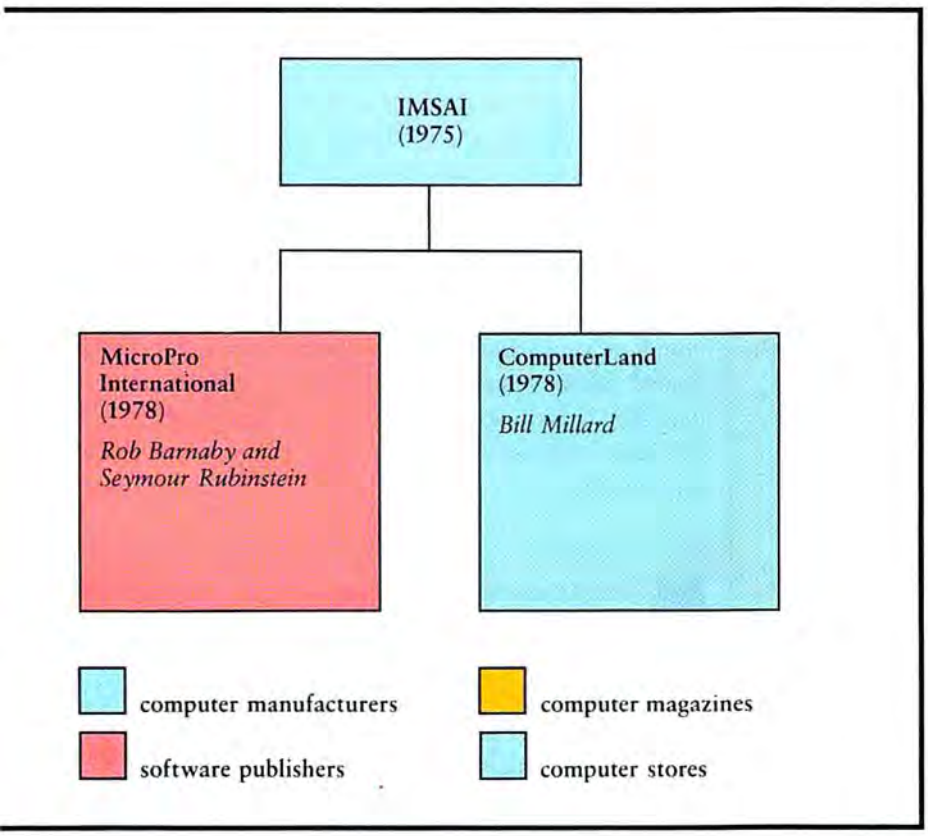


Figure 1: The legacy of MITS and IMSAI. Although the first two personal computer manufacturers, MITS and IMSAI, did not survive into the 1980s, a number of people who were involved with the two companies later played key roles in organizing other enterprises, including software companies, magazines, and computer stores. Businesses such as these became the skeletal structure of the burgeoning personal computer industry.

the only one of the three without a monitor, since Wozniak had designed it to be connected to a color television.

"The competition between Apple, Radio Shack, and Commodore was very, very useful," recalls Peddle. But had things gone somewhat differently, that competition might never have occurred. Early in 1977, reports Peddle, Commodore tried to buy Apple. Rather than developing its own product, Commodore hoped to change the Apple II to meet Radio Shack specifications and market the machines through Radio Shack stores. Says Peddle, "It is better for the consumer that it didn't happen."

Goliath Awakens

By the late 1970s the personal computer industry was growing fast. With a little capital, companies produced computers, wrote software, sponsored trade shows, and started magazines. Personal computers were beginning to do useful things for ordinary people, and new innovations, such as Adam Osborne's portable computer, continually broadened the market. These developments did not go unnoticed at the world's largest computer company.

IBM had already made two false starts before producing the PC in 1981. The SCAMP, which IBM designed but never marketed, used an IBM microprocessor called the PALM and included a standard IBM keyboard (a good one, not the PC version), 64K of RAM, and a cassette recorder for storage. Next came the 5100, which had 16K to 64K of memory, included the BASIC and APL languages, and sold for the prohibitively high price of $19,000. Not surprisingly, few people bought the 5100.

Jobs sold his VW bus, Wozniak sold his HP calculators, and Apple Computer was born.

In 1980, three years after the introduction of the Apple II, IBM made the decision to enter the personal computer market in earnest. For a company with 365,000 employees, Big Blue moved very quickly once the decision had been made. IBM entrusted the

project to an internal entrepreneurial-style group, led by Philip Estridge, which was given access to the computer giant's vast resources but shielded from its bureaucracy. The group's mission was to develop a personal computer worthy of IBM's name and have the product ready to sell in one year. The result, the IBM Personal Computer, was introduced in September 1981.

The entrance of IBM both legitimized personal computers in the eyes of corporate America and signaled the end of much of the informal, free-spirited character of the industry in its early days. But just as IBM changed the personal computer movement, that movement also changed IBM. Observers were startled by how many of its own rules IBM broke in bringing the PC to market.

The first rule that IBM smashed was that of closed architecture, the tendency to build computers around its own proprietary technology. In the mainframe market, this practice ensured that Big Blue would control the lucrative aftermarket for add-on equipment. With the PC, however, IBM loosened its iron grasp.

Like the Altair, the IBM PC sported open slots, allowing users to enhance the capabilities of their machines to meet their particular needs. And just as

Observers were startled by how many of its own rules IBM broke in bringing the PC to market.

Steve Wozniak had done with the Apple II, IBM let other companies see the PC's technical specifications. Outside manufacturers were free to produce the many add-on boards, peripherals, and programs that made the PC popular.

The manner in which IBM entered the personal computer market shows how far the personal computing movement had come since the introduction of the Altair. Whatever Big Blue's ultimate designs might have been for dominating the market, it first had to adapt to the nature of personal computing, a movement that rewarded manufacturers that chose to work with, rather than against, the myriad of user groups, independent software publishers, computer dealers, and other entrepreneurs.

Nowhere was the change in IBM's way of doing business more striking than in its choice of an operating system, the foundation for all other software. Here the computer giant turned to 25-year-old Bill Gates, who had written BASIC for the Altair with his partner Paul Allen. The two later formed Microsoft, flagship for the new subindustry devoted to personal computer software publishing.

That IBM was willing to deal with an outside company on such a crucial aspect as the operating system shows something besides the flexibility of "the new IBM." It illustrates the increasingly dominant role that software was assuming in the personal computer industry.

The Ghost in the Machine

Software hadn't always held center stage in the personal computer market. In fact, thousands of Altairs sold despite the fact that once a hobbyist had succeeded in assembling a machine from the kit, there was virtually nothing that could be done with it.

In *Fire in the Valley* (see the sidebar "More Legend and Lore"), computer historians Paul Freiberger and Michael Swaine recount one of the first simple applications of the Altair, demonstrated by Steve Dompier in April 1975 at a meeting of the Homebrew Computer Club in Palo Alto. Dompier had purchased and assembled an Altair, but had a problem finding something for it to do. He accidentally discovered radio interference when he noticed that the operation of the computer created noise on a nearby radio.

For his demonstration, Dompier had to spend several minutes entering his program by flipping switches on the front of the keyboardless computer. Treated to renditions of "Bicycle Built for Two" and the Beatles' "Fool on a Hill" played on a radio positioned next to the Altair, the ever-supportive Homebrewers rewarded Dompier with a standing ovation. It would take some time before more serious applications appeared.

John Hayes was one of the first people to see the possibilities for inexpensive computers in the office. Hayes had served as executive secretary to Georgia Senator Herman Talmadge. When Talmadge was appointed to the Watergate Committee in 1974, Tal-

More Legend and Lore

For those interested in digging deeper into personal computer history, a variety of books have appeared over the past few months. Here is a sampling:

Bit by Bit: An Illustrated History of Computers, Stan Augarten, Ticknor and Fields, New York, NY, 1984. $17.95.

Digital Deli, Steve Ditlea (editor), Workman Publishing, New York, NY, 1984. $12.95.

Fire in the Valley, Paul Freiberger and Michael Swaine, Osborne/McGraw-Hill, Berkeley, CA, 1984. $9.95.

Hackers: Heroes of the Computer Revolution, Steven Levy, Anchor Press/Doubleday, Garden City, NY, 1984. $17.95.

The Little Kingdom: The Private Story of Apple Computer, Michael Moritz, William Morrow and Company, Inc., New York, NY, 1984. $16.95.

madge's already heavy load of constituent letters increased dramatically, and Hayes was given the job of somehow handling the mountains of mail. A Wang minicomputer system was eventually designed around Hayes' specifications, and the Wang people called it a word processor.

That experience convinced Hayes that small, low-cost computers could perform useful office functions such as word processing and accounting. "When I saw the article on the Altair, I knew that we had found the answer," Hayes recalled. "It was close to being a complete general-purpose computer."

Subsequently, Hayes and several other Atlanta businessmen visited Albuquerque and arranged a joint venture with MITS to market business software. Their company was later to become Peachtree Software.

Although Hayes envisioned word processing on personal computers, credit for creating the first word processing program for the Altair, *Electric Pencil,* goes to Michael Shrayer, who with great effort eventually converted the program to run on scores of computers and printers.

Yet no software had more of an impact on personal computing than *VisiCalc,* (Visible Calculator), introduced in 1979. Suddenly an application existed that automated the common business chore of spreadsheet calculations. During the first year of its existence *VisiCalc* helped sell thousands of Apple IIs, since it did not run on any other computer at that time.

The PC Puts on Pinstripes

With *VisiCalc,* serious business software came into its own, introducing an entirely different sort of user to computers. The new breed of business users were not like the original hobbyists. They wanted solutions to practical, everyday problems, not hardware for its own sake.

Today's software industry, with its fancy packaging and multimillion-dollar advertising budgets, seems a far cry from the days when Altair owners laboriously entered their programs one bit at a time by flipping switches. Yet software development retains one very significant element of its original character: a single resourceful person working alone on a creative idea can still make a difference.

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Circle 930 on reader service card

Robert Carr, chairman of Forefront and the principal author of *Framework*, makes an important distinction about today's software: "It is no longer possible for a single individual to completely program even one function for the most advanced integrated software. But it *is* vital that a single individual, or at most two or three people, have total design responsibility."

Even in today's sophisticated personal computer market, the basic programming and design for *Framework* were done by Carr over an 18-month period while he lived off his savings in an apartment in San Francisco. It took Ashton-Tate's resources to finance completion of the program and market it, but the program remains very much the product of Carr's personal insight and motivation.

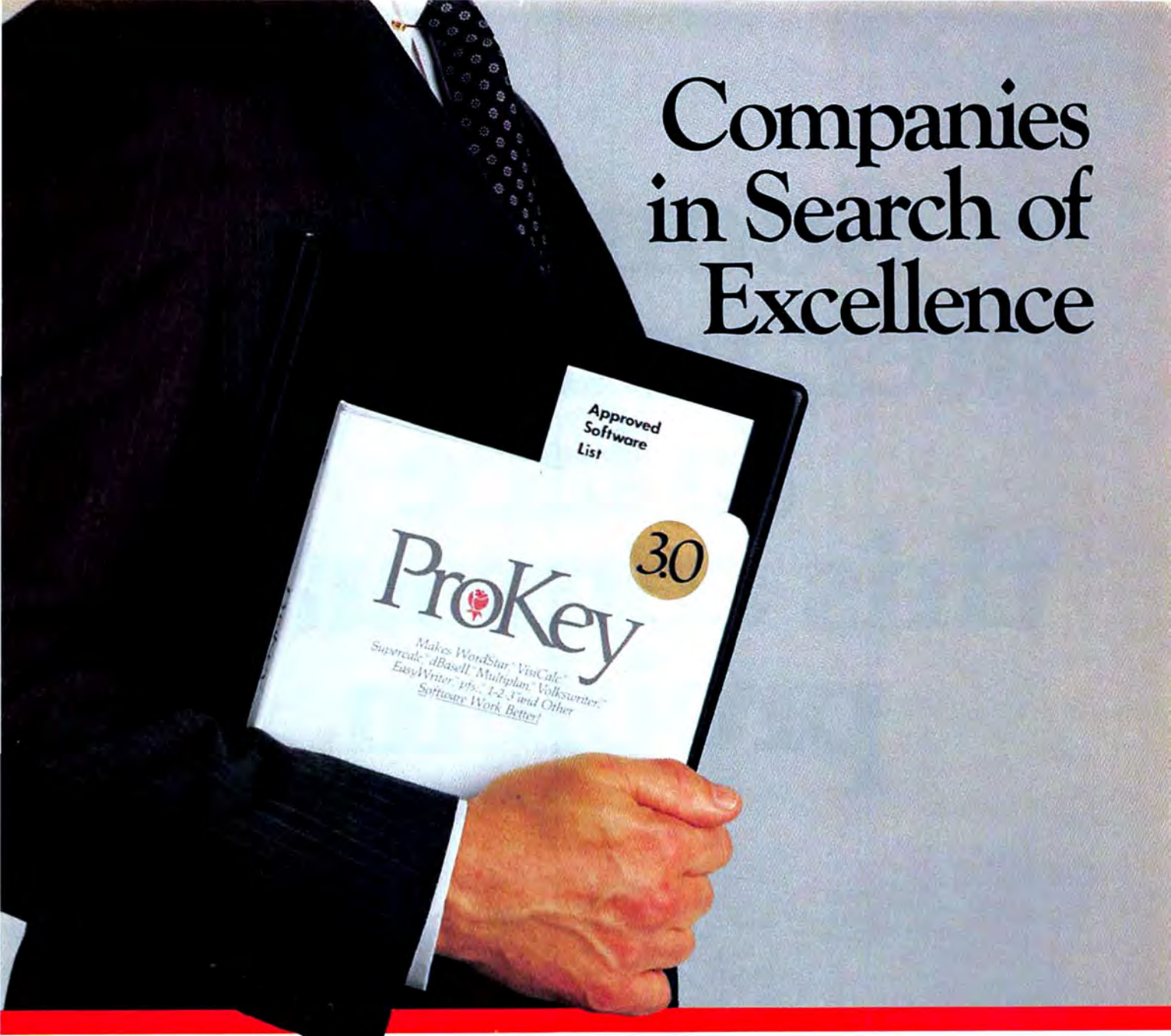
Power to the People?

Large and powerful organizations have enjoyed the benefits of big, powerful computers for decades. What's new about the personal computer is that it empowers the individual.

Out of the vision of Ed Roberts and others, the machine built to tap into the capabilities of microprocessor chips finds a continually expanding number of practical uses. As computers become more powerful, they enable people to begin ever more ambitious tasks.

It's been only ten years. Yet the personal computer is already having as much impact as the telephone, the automobile, the airplane, radio, or television did in their infancy. We can hope that the usefulness of personal computers will someday be available to everyone who needs it.

Wayne Parker is product manager for Comsell, Inc., an Atlanta-based producer of interactive videodisc systems.



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Sometimes, the simplest ideas are also the best formulas for success.

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To run ProKey, you'll need an IBM PC, XT or jr., or a compatible, and DOS (any version including 2.1.) dBase II is a trademark of Ashton-Tate. Corporate and OEM licenses available.

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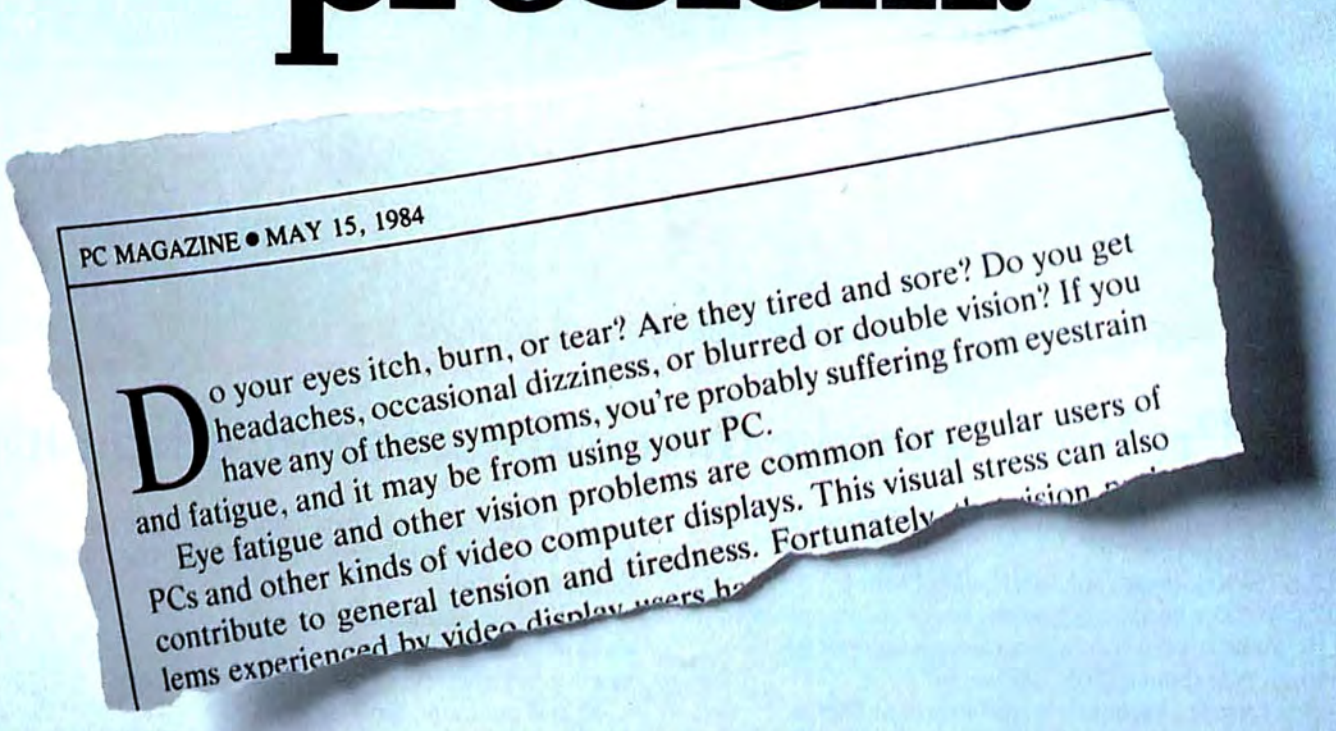
Sooner or later, you'll have to face this computer problem.



PC MAGAZINE • MAY 15, 1984

Do your eyes itch, burn, or tear? Are they tired and sore? Do you get headaches, occasional dizziness, or blurred or double vision? If you have any of these symptoms, you're probably suffering from eyestrain and fatigue, and it may be from using your PC.

Eye fatigue and other vision problems are common for regular users of PCs and other kinds of video computer displays. This visual stress can also contribute to general tension and tiredness. Fortunately, [illegible] vision [illegible] lems experienced by video display users ha[illegible]

Better sooner.

Better Sooner.

Computers don't ever get headaches.

But the people who use computers do.

Quite clearly, as PC Magazine spells out, that's not the only trouble they're having.

In case you're tempted to dismiss this as trivial, there are two things you should be aware of:

First, more than twenty states are already preparing legislation to force some improvements.

Second, if computer users suffer, so does business.

Because computers are only as fast and accurate as the people who operate them.

You are not a machine.

Computers are designed by engineers.

They usually know a lot about technology but very little about people.

Which is why so many computers are technically impressive but strangely unnatural to use.

Computer-induced problems (%)	
Eye strain	55%
Back pain	43%
Headaches	30%
Shoulder	25%
Hand/wrist	18%
Neck pain	15%

(Source: "Ergonomic Principles in Office Automation" Pub. 1983 by E.I.S. AB, Sweden.)

Ericsson, in its very Swedish way, has always believed that excellent ergonomic design isn't a privilege.

It's a right.

That it isn't a noble gesture but demonstrably good for business.

It's an attitude that has made Ericsson No. 1 in Europe twice over:

First, as the giant of European telecommunications.

Then again as Europe's biggest workstation company by far.

(You couldn't ask for a better marriage of technology for the future.)

Here is one example of how they got there.

It's the first of a whole range of computers to be introduced in the U.S.A.

The Ericsson PC. It's Ergo-Intelligent.™

Ericsson has spent $300 million finding ways to make people and computers work better together.

Here are some of the results.

Ergo-Screen.™

Aspirin gets rid of a headache. Ergonomics gets rid of the cause.

The Ericsson PC monitor has a non-glare screen.

With restful amber characters on a specially developed, low-fatigue background color.

Even the shape of the actual characters was specially developed to allow easier recognition of difficult to distinguish letters like O and Q.

On the monochrome monitor, the resolution is double that of IBM's, so clarity is remarkable.

You can even have characters and graphics on the same screen.

Ergo-Arm.™

Thousands of people get neck and muscle pain from inadequate height and angle adjustment.

The Ericsson Ergo-Arm lets you move your screen exactly where you want it.

Better than back pain, wouldn't you agree?

Ergo-Touch.™

The keys are full-size and the layout is ergonomically planned for greater accuracy and speed.

Yet the keyboard is 20% more compact and less than half the weight of IBM's.

Even the cord is adjustable to suit left- or right-handers.

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The system unit is one-third smaller than IBM's.

It even fits under your desk in a vertical rack.

So your desktop is your own again.

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Many companies claim to be compatible.

Some are. Some are stretching the truth.

The Ericsson PC boasts the highest compatibility rating there is.

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Don't buy a disk/tape system that can't grow with you.

Get the Sysgen™ XL™ *expandable* hard disk and tape back-up system.

Most popular disk/tape systems offer 20 Megabytes of hard disk, plus a 20-Megabyte tape back-up.

That may seem ample now, but do you know whether, a year down the road, 20 Megabytes will give you enough storage?

You don't. So it makes sense to get the *only* disk/tape system that gives you room for expansion later on.

And that doesn't cost you any more now.

The new Sysgen XL comes with 20 Megabytes of fast, reliable hard disk storage, a built-in 60-Megabyte tape for fast, reliable back-up, *plus* room for an additional hard disk drive.

What happens if you later need more hard disk storage?

With the XL, you simply add a second 5¼" disk drive. It fits inside the cabinet, and plugs right into the XL controller.

You can add an additional 20 Megabytes, and back-up with a single pass of the 60-Megabyte tape.

Or add up to 100, and back-up with two tapes.

With the low cost of hard disk drives, expansion is *much* more economical than buying a whole new $3,000 system. Plus, you save desktop space by expanding *inside* the cabinet.

The XL sells for $3,295, including cabling, host adaptor, and utility software. You get everything you need.

(Watch out. Some companies charge extra for cabling and the host adaptor.)

Installation? Just snap in the controller, plug in the system, install the system software, and you're running.

Compare before you buy.

You'll find the XL to be the outstanding disk/tape system for your PC, XT, AT™, or compatible today. And the only system that can expand for your needs for tomorrow.

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1985 World Class PC Contest

PC World proudly announces the third annual World Class PC contest, in which readers will choose their favorite hardware and software products.

Christine Whyte

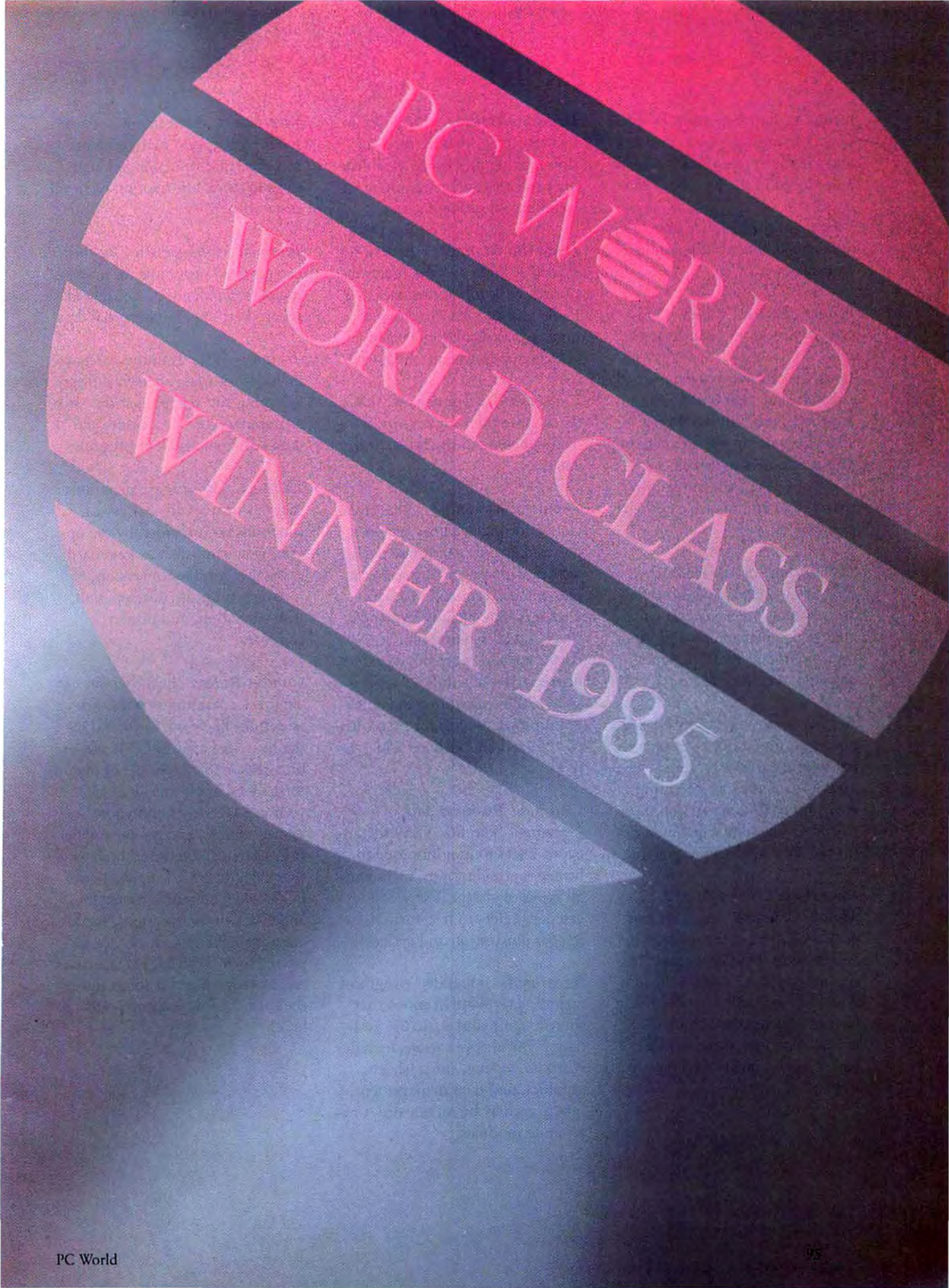
Once again we are asking you to design a World Class PC system by voting for your favorite PC-compatible products. We are soliciting your opinion to determine the most popular products (and runners-up) in the hardware and software categories listed on the contest entry form. In each category you are familiar with, vote for the one product you would recommend for outstanding performance and value.

The thousands of votes will indicate to manufacturers and the wide audience of PC users which products deserve to be named World Class Winners. The results will also help identify trends in the types of products our readers prefer and point out rising stars in the industry as well as those products whose popularity is slipping. Your reward for taking part in this reader poll could be thousands of dollars' worth of prizes.

After the most popular products are chosen, *PC World* will award them to four lucky winners whose entry forms will be selected in a random drawing. The first-prize winner will take home the entire World Class PC system, worth $30,000–an increase of almost $7000 over last year's system. The World Class PC system includes the most popular product in each of 33 hardware and software categories (we've added four more categories this time around) plus our readers' favorite desktop computer. And unlike our previous contests, this one won't automatically award an IBM PC as part of the system–it's the readers' choice. The eligible computer can be an IBM PC, XT, AT, or any other PC-compatible desktop computer.

Second prize will be our readers' favorite transportable computer–any PC-compatible computer designed to be portable but not lap-size. For the first time, readers can vote for the third- and fourth-place prizes. Third prize will be the most acclaimed lap-size computer, which need not be PC compatible. Fourth prize will acknowledge the most popular recreational computer used at home or at school. This computer must cost less than $1200 and need not be compatible with the IBM PC. This category includes, but is not limited to, computers such as the IBM PCjr, the Apple IIc, the Commodore 64, and the Tandy 64K Extended BASIC Color Computer 2.

We want to thank you for participating in this contest, which provides us with valuable information about your preferences and, of course, awards much-deserved


PC WORLD
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recognition to important PC products. The most popular products and the four prizewinners will be announced in the October 1985 issue.

Some of the product categories are defined here to help you in casting your votes.

Printer: Letter Quality This category includes laser printers.

Local Area Network This is the only category that will not be awarded as part of the World Class PC system. We are including it in the contest to learn how many of our readers are familiar with LANs and to discover their preferences.

Accounting Software in this category manages such functions as accounts receivable and payable, general ledger, payroll, inventory, order processing, job costing, and check writing.

Applications Integrator An applications integrator is an operating system extension or replacement often called an operating environment. Such software is designed to integrate any number of off-the-shelf application programs.

Data Base: Index File and Major The first data base category includes index-card-type data base management programs. The second category includes the more powerful, typically relational data base programs that feature command languages, large record capacity, and sophisticated report writers.

Decision-Making Products in this category organize the decision-making process by establishing priorities and assigning weights to deciding factors.

Desk-Top Manager A desk-top manager duplicates the functions of such desk-top accessories as a name and address directory, a notepad, a calculator, a calendar, and an appointment scheduler.

Education All programs that teach classroom subjects or do testing belong in the Education category.

Financial Modeling The Financial Modeling category includes descendants of mainframe packages that create and analyze complex financial models. Today's packages may include a spreadsheet, a goal-seeking function, corporate and personal tax tables, depreciation schedules, a regression analysis function, and a programming language for preparing customized applications and reports.

Graphics: Business and Drawing The first graphics category refers to graphics used in business presentations, including all types of charts. The second category refers to free-form drawing for illustration and artwork.

Integrated Integrated programs include several applications that share a command structure and data. Typical applications include word processing, spreadsheets, graphics, and data management; functions may be on one disk or in separate modules.

Investment Investment software refers to portfolio management, technical and fundamental analysis, and stock information retrieval programs.

Personal Management In this category are programs for managing personal finances, household record keeping, and personal data.

Training The Training category includes tutorials on such subjects as typing and on applications such as popular word processing and data base management programs.

Utilities Utilities are programs that perform a wide variety of functions not provided by the operating system, such as keyboard enhancement, file conversion, file recovery, program development, disk emulation, and printer support.

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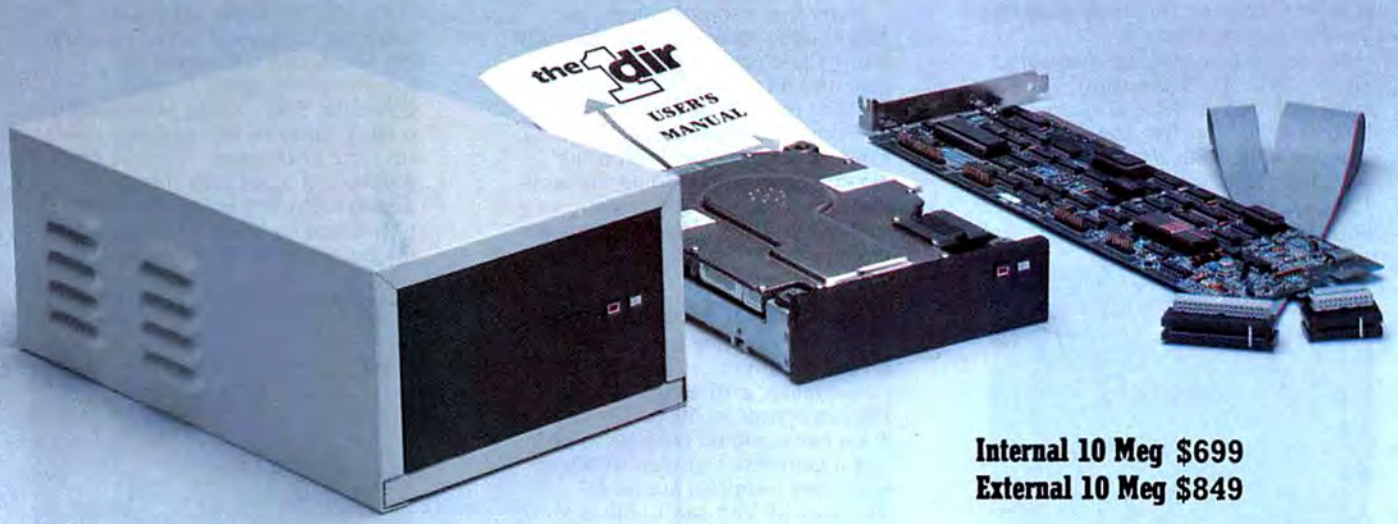

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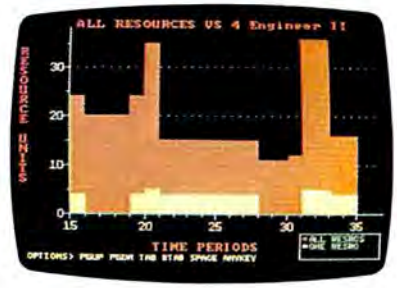

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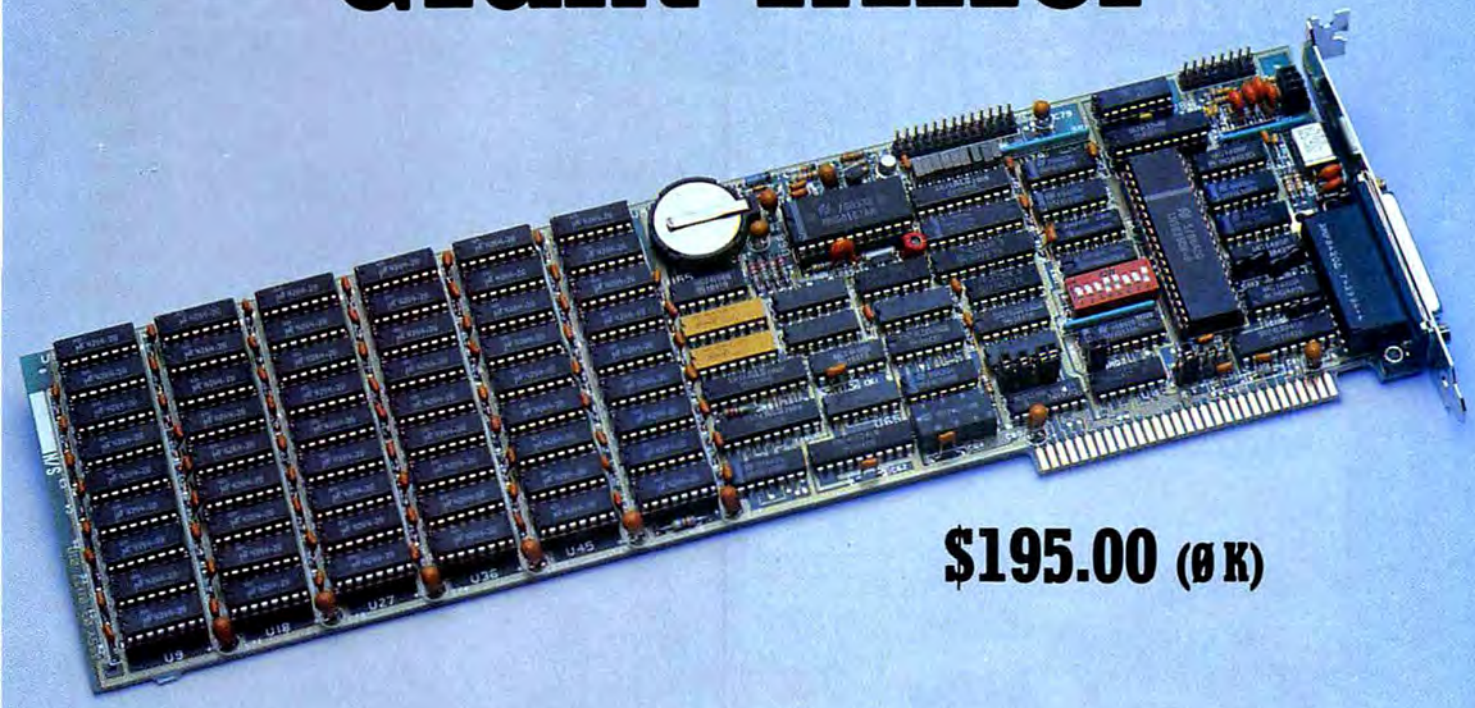

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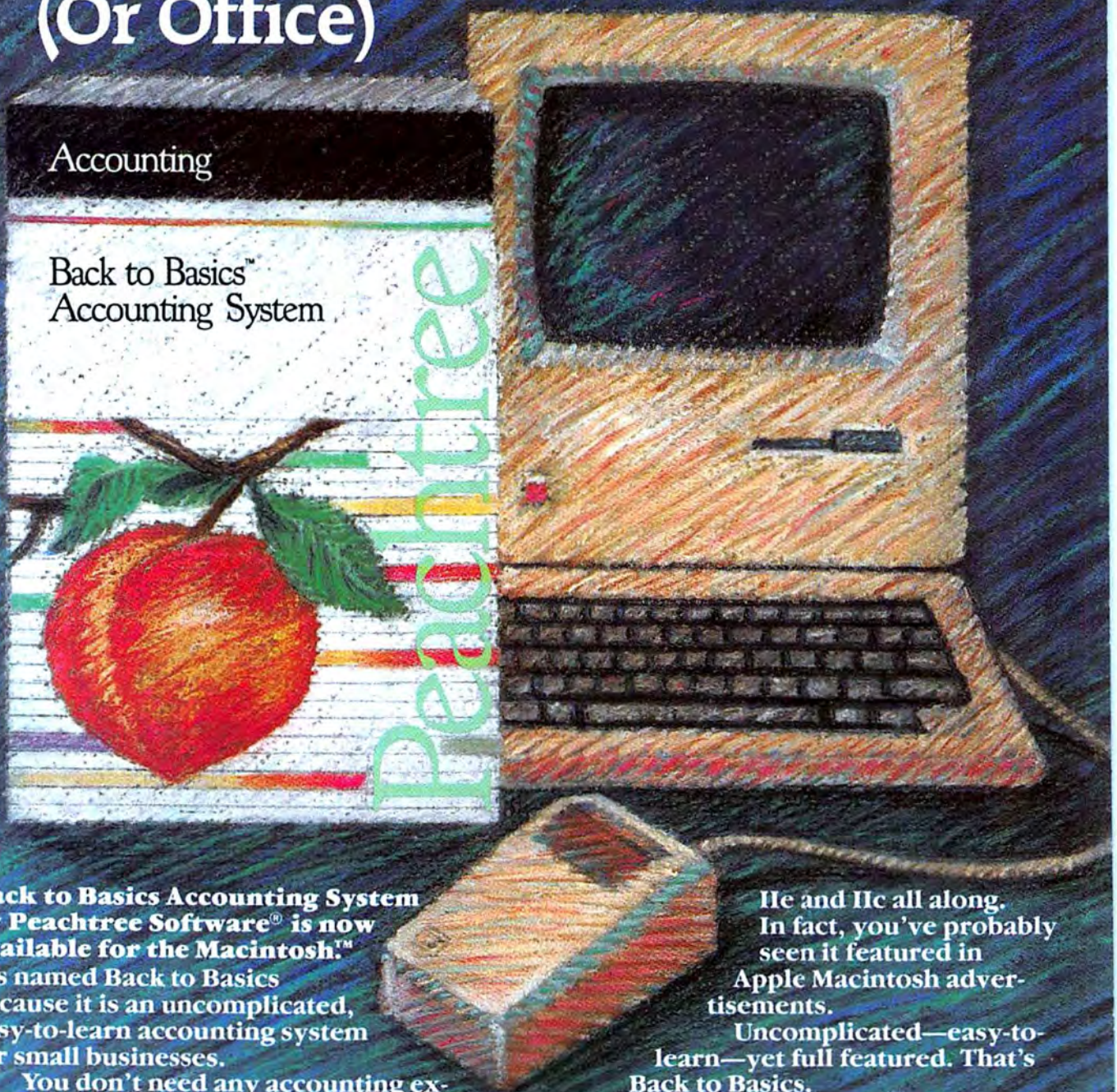

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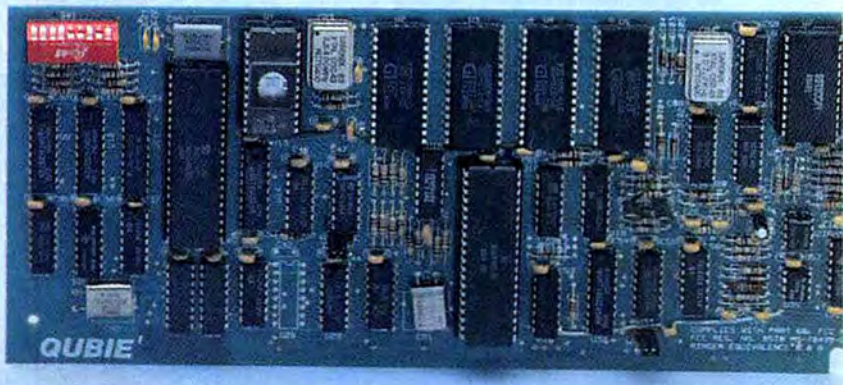

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Compatibles Update

The latest developments in the PC-compatibles marketplace

Pop music discovers computer graphics—and we assess the Mindset, the machine that produces them. Also, a postmortem on two recently defunct compatibles and a peek at Tandy's new software package for the masses.

Ken Greenberg

Trends

Mindset, Meet the Residents

Maybe you've never heard—or heard of—the Residents. But even if you've heard them, there's little chance you've actually *seen* them. During the past dozen years this decidedly quirky San Francisco band, which occupies a niche in the outermost reaches of the "art rock" scene, has garnered as much notoriety for the anonymity of its members as for the demented music they produce. Obscurity is the group's trademark; members routinely take refuge beneath tuxedos and giant eyeball-heads.

So when the Residents set out to produce a video chronicling their eccentric reworking of James Brown's "It's a Man's, Man's, Man's World" for image-conscious MTV, they went after the jazziest graphics machine they could find. The group opted for the Mindset, a PC compatible that boasts a special flair for the visual. The finished product betrays no one: wacky cartoon characters mouth their way through Brown's lyrics in a brilliantly-colored melange of dissolving images. It's a radiant signature for the creative, iconoclastic quartet.

The group's video was created entirely on the Mindset (manufactured by the company of the same name; see "In Review" for a detailed assessment of the machine) at Ralph Records, the Residents' San Francisco label and home address. There, co-owners and animators Hardy Fox and Homer Flynn work amidst babies, cats, synthesizers, two Apples, and the Commodore and Koala Pad that they used to generate images for earlier videos. The Mindset entered the Ralph realm courtesy of Warner Brothers Records as part of an advance toward the MTV project. "We saw the Mindset at a computer graphics show in southern California and decided that the machine was in a class by itself," says Fox. "For the money, it has great resolution and it's extremely fast."

For $3700 the Ralph Records folks obtained a computer with RAM expanded from the standard 64K to 224K, plus an RGB monitor. The monitor's crisp visuals proved particularly useful during the conception and design phases of the video, but as Flynn notes, "The important thing is that the Mindset has an output that supports a standard TV signal. Using a composite monitor, we can run the output directly to video." By contrast, when Fox and Flynn relied on the Commodore, they were required to shoot single-frame animation from the screen with 16mm film and then translate the film to video.

Although the Mindset can run dozens of off-the-shelf PC programs, an MTV extravaganza is no place to be plugging data into *Multiplan* cells or *dBASE II* records. Flynn and Fox generated the video with *Lumena*, a color graphics package from Time Arts that takes full advantage of the Mindset's capabilities. In addition to offering scores of functions and commands, *Lumena* has 11 resolution modes, ranging from 320 by 200 pixels in 16 colors (selected from a palette of 512 colors) to 640 by 400 pixels in 2 colors. Fox and Flynn do their painting with a two-button mouse.

The Residents (above left), attired in their inimitable but anonymous style, strike a foggy San Francisco pose. The group harnessed the Mindset to generate a suitably wacky video, as the stills (above right) illustrate.

Hardy Fox is by now a seasoned veteran at turning computer art into an entertaining counterpoint to music, and his company continues to explore the medium. "We plan to experiment with a stylus and pad rather than the somewhat clumsy mouse we've been using," Fox says. "We're also anxiously awaiting the more advanced animation software that Time Arts has promised. Commodore is threatening to come out with the Amiga, the $1000, 32-bit graphics computer that's supposed to do really wonderful things. But right now as far as we're concerned, the Mindset has no competition."
–Suzanne Stefanac

Suzanne Stefanac is a freelance music critic in the San Francisco Bay Area.

Bowing Out

The party's definitely over. Liquidations, buy-outs, and bankruptcies are depleting the ranks of the so-called boutique PC-compatibles manufacturers–those modest, venture-capital-powered start-ups that seemed to control the market in the heady days before IBM achieved peak PC production. Depending on how you count them, two or three have recently closed up shop, and a few more are struggling to shake off the demons.

At last year's Spring COMDEX in Atlanta, Jim Linder, president of Otrona Advanced Systems, was aglow. Linder brandished the Otrona 2001, a 19-pound PC compatible suitable for lugging or desktop use. Less than a year later, the Colorado-based company issued layoff notices to all 175 employees and quit the personal computer fray. Ironically, Otrona's sales and dealer contacts were up. But even the promise of Defense Department contracts and volume purchases by the Fortune 1000 weren't enough; Otrona simply ran out of credit and liquidated its assets, ending seven years of red ink.

North of the border, Bytec Comterm, the Montreal-based manufacturer of the Hyperion, has ceased turning out the snazzy-looking, not-very-PC-compatible portable. The Hyperion was something less than a hit in the retail marketplace, and the computer's dismal sales–a scant

12,000 units since 1982–forced Comterm to take a one-time, $45.7 million write-off on its stockpiles of the machine and shut down its Bytec division. Hyperion fans need not fret, however; there just might be a phoenix-like ending to this tale. Comterm's move won't affect a recent agreement licensing Commodore International to manufacture and market the machine.

In a stranger turn of events, Tava Corporation, maker of the Tava PC, went out of business and then came back virtually overnight, surely setting a record for phoenix-like recoveries. Battered by IBM's price cuts and the limitations of a one-product line, Tava was swallowed by Replitech, one of the Tava PC's primary distributors. Tava management sold all manufacturing and marketing rights to the New York firm, which promptly began producing a PC compatible of its own–under the Tava label. Still with us? Coinciding with Tava's metamorphosis, CompuShack, the California-based computer wholesaler that originally spawned the Tava PC, ceased operations. Because Replitech is holding the Tava name aloft, however, this corporate switcheroo will not be accompanied by the usual Chapter 11 ministrations.

Replitech claims that the new Tava line hasn't lost one whit of PC compatibility, although the company is no longer using Faraday motherboards–the source of Tava's tight adherence to the PC standard. The Tava-Faraday relationship was on the rocks anyway; a pending Faraday suit (against the old Tava) alleges BIOS ROM copyright violations.

Who's on First?

No, indeed–you can't tell the clones without a scorecard.

Leading Edge Products has agreed to market what the company calls "a low-end PC compatible" manufactured by Daewoo Telecom of Seoul, a division of Daewoo Ltd., the giant South Korean concern. The Daewoo box won't supplant the Leading Edge PC–a Mitsubishi product–now on desk tops and dealer shelves, but its price and features reportedly will pit it against PCjr. Daewoo is also cranking out PC compatibles for Corona Data Systems (which in turn seems to be making machines for just about everyone else).

For ITT the moral may be, "Watch what we sell, not where we sell it," as the conglomerate plumbs the various avenues of the PC-compatibles marketplace in quest of profits. ITT Information Systems, whose Xtra Personal Computer failed to capture the hearts, minds, and wallets of corporate America, has taken the

The Mindset offers graphics with elegance–and a mouse.

VAR (value-added remarketer) road. The ITT division recently signed a $2 million deal with PC Delta of Houston. PC Delta will add external disk capacity and a local area network to the Xtra, then resell the package to Fortune 1000 accounts.

Even Compaq, known for its strategy of piggybacking the PC's dealer network (and for its disdain of OEM and VAR channels), has shown signs of switching rather than fighting. According to a company statement, Compaq is allowing selected dealers to "work with high-quality resellers" who augment the basic Compaq product with proprietary hardware and/or software. The company intends to zero in on vertical markets.

For Compaq, the move could be a trial balloon. On the ground in Houston, however, things appear firm. The company reported third-quarter sales of $87 million, a 140 percent improvement on its 1983 performance. Expansion is still the mode: Compaq recently applied the finishing touches to a 107,000-square-foot manufacturing complex and beefed up its Deskpro line by adding a 30MB hard disk and an 8087-2 math coprocessor. The hard disk lists for $2995, the coprocessor for $375.

In Review

The Mindset: Grace and Graphics

In designing an advanced graphics engine around the MS-DOS operating system, Mindset has brought to the market a versatile and appealing personal computer. Most popular business applications–including *WordStar*, *1-2-3*, the *dBASE*s, and a great many more–run unaltered on this attractive desktop machine.

The Mindset, however, was principally designed to be a low-cost workhorse for graphics professionals–that is, for graphics designers, architects, engineers, illustrators, animators, artists, and game designers. For someone starting or expanding a small business, the availability of an inexpensive computer that can do justice to professional CAD (computer-aided design) applications, as well as numerous business functions, can be a real boon.

The Mindset is also distinguished by its "genlocking" ability and closed architecture. Genlocking is a process by which video images and computer graphics can be synchronized on videotape, a feature previously available only on expensive professional graphics systems. The closed architecture ensures that future upgrades will remain relatively compatible with previous models, but it discourages third-

party hardware manufacturers from producing accessories for the machine. Mindset sells a 128K RAM expansion module for $349, and a hard disk is scheduled for release this spring.

Physically, the Mindset is a stunning product; it is, in fact, one of only two personal computers in the permanent design collection of New York's Museum of Modern Art. The Mindset is available in various configurations, but graphics professionals are likely to require the fully configured system, with two 360K 5¼-inch floppy disk drives and 288K of RAM (including a dedicated 32K frame buffer for the display; the buffer holds the video signal en route to a monitor). This loaded model retails for $2400. The layout of the detachable keyboard is a distinct improvement over the PC's, but tactile response could be improved–it's sometimes difficult to tell whether a key press has registered. Minus the keyboard, the unit's footprint is a relatively compact 12 by 15 inches.

The Mindset is a true 16-bit computer. Its central processor is Intel's powerful 80186, which runs at 6 MHz and is a first cousin to the PC AT's 80286. Supporting the CPU is a custom VLSI (very large scale integrated) chip set capable of extremely fast bit-mapped graphics generation and screen display. But the machine's developers didn't focus exclusively on the visual. The Mindset's Custom Sound Processor chip can generate as many as six voices (or fewer with higher fidelity), and a second sound chip can be added to create stereo.

An abundance of graphics modes lifts the Mindset above your average PC clone and underscores the machine's versatility. Several Mindset screen modes simply aren't available on the PC. One mode includes 16 colors in a display 320 pixels wide by 200 high; another offers 640 by 200 resolution in 4 colors. A third offers 320 by 200 resolution in 4 colors and features two 16K frame buffers. These buffers permit "page-flipping," the rapid switching of the display between the two buffers for smooth, full-screen animation. (Synapse Software's *Vyper*, the first arcade-style game released for the Mindset, uses this technique so convincingly that you can't help ducking as you fly through an alien city in 3-D.) There's also a double-buffered mode with 640 by 200 resolution in two colors.

Two additional modes consist of 320 by 400 pixels in four colors and 640 by 400 with two colors. Both double the machine's effective vertical resolution by using "interlacing," a method of image creation that requires two passes of the video raster (similar to the approach used for TV broadcasts). Unless you use a special monitor with these modes, however, the image is likely to flicker.

The Mindset will accept an RGB monitor, a composite monitor, or a TV. With an RGB, the color range is restricted to the monitor's standard palette, which consists of two luminances of each of seven colors (red, green, blue, yellow, cyan, magenta, and gray), plus black and white. Using a composite monitor or a TV, you can choose from a palette of 512 colors, although resolution and color saturation will suffer.

Only a few packages have been written exclusively for the computer; most of them are marketed under the Mindset label. In addition to Time Arts' *Lumena*, there's Datasoft's *Designer*, a paint program with animation capability. *4-Point Graphics Plus*, from IMSI, eases the creation of sophisticated presentation graphics and charts. *CADDRAFT*, from Personal CAD Systems, is a professional CAD program geared to circuit design and architecture and can use a plotter. In the third-party arena, packages include Odesta's *Chess 7.0*, which features 3-D graphics, and a version of Mycroft Labs' *MITE* telecommunications program.

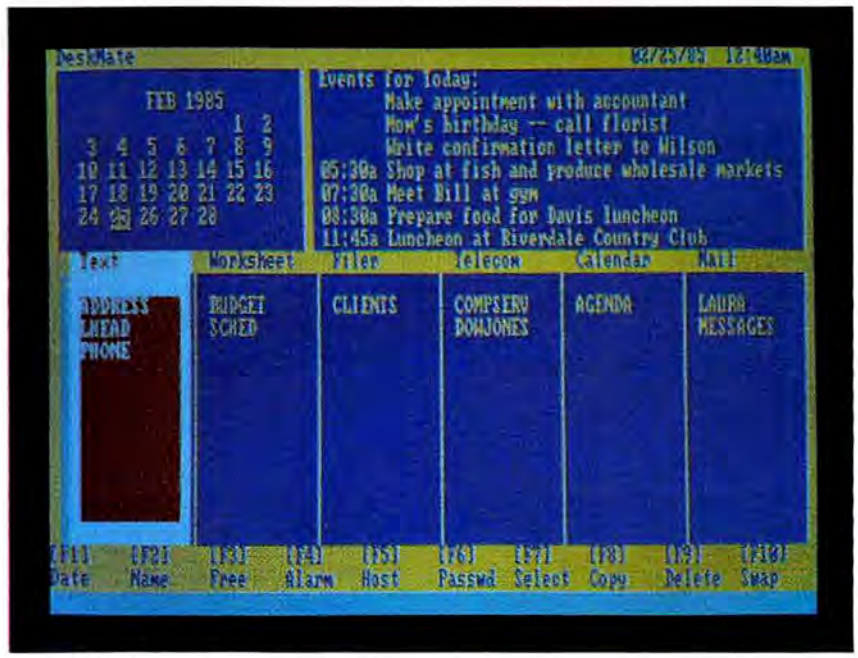
Mindset is also distributing GW BASIC and a macro assembler, both by Microsoft. The disk-based BASIC includes special commands for animation and several other graphics functions. Unfortunately, using two or more of these capabilities simultaneously can slow BASIC's execution to a crawl; this is a result of interruptions from the machine language routines that the special commands invoke.

In addition, animated images in the 16-color mode flicker badly, probably due to the inefficient nature of Interpreted BASIC.

Nonetheless, if you have the creative spark, the Mindset may prove to be the ultimate high-tech toy. With a little extra hardware, you can connect it to your video system and thereby add computer graphics to your favorite TV show or to homegrown productions. Imagine a videotape that features a group of your friends tossing around a beach ball that metamorphoses with every exchange: now it's a smoke-snorting reptile ... now it's an ice cream sundae dripping raspberry syrup ... now it's the World Trade Center ...

Alone among PC compatibles, the Mindset fosters such whimsy as much as it encourages more serious applications. The machine's potential for creating images and movement is limited only by that peripheral atop your shoulders.
–David Duberman

David Duberman is a technical writer and formerly the technical editor of Antic *magazine.*



DeskMate's main menu doubles as the program's directory.

Software

Have Column, Will Travel

Not long ago *Compatibles Update* hit the road, visiting Tandy Corporation in Fort Worth. Tandy, Radio Shack's parent firm, has for several months been applying a Texas-strength bear hug to MS-DOS.

Company officials dote on the Tandy 1000, which, at $1199, is the current price leader in the PC compatibles stable (for a first look at the 1000, see *Compatibles Update, PCW,* January 1985). The Tandy 1000 comes with 128K installed, a single 5¼-inch floppy disk drive, a ROM BIOS from Phoenix Software Associates, a diminutive footprint, three 10-inch expansion slots, and several touches certain to endear the machine to consumers (including a reset button and mouse, joystick, and light pen ports on the front of the unit).

The giant retailer is sticking with the Tandy 2000's 90-key keyboard, thus adding a few sour notes to a machine that otherwise harmonizes with the PC. But only an industry behemoth like Tandy would have the nerve to engineer an irresistible little program that plays off the 1000's very incompatibility.

For your $1199, Tandy is tossing in *DeskMate,* a homegrown, integrated "primer" on the major areas of application software. *DeskMate* defies easy categorization; it is neither "full-featured" in the *Framework* sense nor an executive's organizer, à la Software Arts' *Spotlight.* However you classify it, *DeskMate* is even more intriguing than the Tandy 1000 itself. Not coincidentally, the program serves as a clever sales tool for Radio Shack personnel.

The goal of the program, according to Tandy marketing executive David Frager, is to foster immediate productivity among the 1000's (largely novice) users. Based on our sneak peek, *DeskMate* succeeds. The package pro-

jects an elegant simplicity. Written to run on a 128K machine, it represents integration on a human scale.

DeskMate features a smattering of everything: text processor, electronic mail, spreadsheet, filer, calendar, and telecommunications. Frills include a four-function calculator, an alarm, a telephone auto-dialer, and a host mode for remote access. For speed and simplicity, Tandy's software engineers eschewed windows. Instead, they scaled each of the six primary elements to modest proportions. The spreadsheet, for example, measures 99 columns by 99 rows. The filer consists of 21-line (essentially one-screen) records and lets you define your own fields, to a maximum of 255 characters each.

Because the program deals exclusively with ASCII files, *DeskMate* applications form a seamless web. Cutting and pasting text and graphics is a breeze. Files are listed, without extensions, in simple directories separated by application; commands are intuitive and limited to just ten per application. In virtually every instance, commands are uniform–and correspond to the same function keys–from application to application.

DeskMate's first incarnation is wedded to the Tandy 1000 and uses the function keys on the 1000/2000 keyboard extensively. But Tandy moved with alacrity to woo owners of other PC compatibles by releasing a version for the Tandy 1200, a PC XT work-alike that barely veers from the PC standard. The 1200 version of *DeskMate* is distributed exclusively through Radio Shack stores and lists for $199.95.

Postscript: Tandy appears to have learned from its bout with Not Being Sufficiently Compatible, a syndrome characterized by sluggish sales, diminished stock performance, and lower profits. Last fall, just prior to its release of *DeskMate* and the Tandy 1000, Radio Shack sponsored a series of "showcases" in five cities. Designed to enlist third-party software support for Tandy's machines, the shows seemed to have an immediate payoff as Ashton-Tate announced shipment of $5 million worth of its products for the Tandy line (including *dBASE III*, *Framework*, and *Friday!*).

Wang's Growing Library

Wang PC users can now check out selections from *TOM (The Office Manager) Software* business applications library. The collection includes some 60 accounting and job-specific programs, among them residential and general construction, property management, manufacturing, distribution, and food service.

If there's a Burroughs system buried deep in the basement and a Wang PC on your desk, you'll now be able to speak mainframe. Wang has released *Burroughs Terminal Emulation*, a communications package that enables Wang PC users to access a variety of Burroughs host systems and applications. The program offers emulation for Burroughs TD832, TD834, and MT983 terminals and supports NDL and MCP systems and CANDE and ODESY applications software.

Let's Get Vertical

Next time you go out for a burger, an NCR machine will probably eat your money. In those hallowed halls of American cuisine, NCR's Personal Computer appears to be gaining acceptance. Not surprisingly, using the NCR PC4 as a sophisticated extension of a cash register is exactly what the company has in mind.

Restaurant Systems, a Georgia-based software developer for the fast food industry, is among the first software firms to cater to NCR's strength both behind the counter and in the office. Restaurant Systems has introduced a trio of vertical market packages for the hard disk version of the NCR PC. The firm's software serves as a bridge between NCR's point-of-sale systems and its PC compatible. Restaurant Systems is targeting 2000 fast food outlets nationwide.

DG One: A Peripheral?

The DG One may be a stand-alone machine, but Data General is banking on the laptop's ability to communicate with the company's ubiquitous minicomputers. DG

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has released *The CEO Connection*, a package that links the DG One with the company's Eclipse MV series of minis. The program also permits file transfers between some MS-DOS word processing and spreadsheet packages and DG's *CEO (Comprehensive Electronic Office)* software.

At first blush, Data General's strategy looks like a winner. The Life Insurance Company of Virginia, a subsidiary of the Continental Group, has snapped up 2000 DG Ones for its agents. Life of Virginia's brokers will use the machines as point-of-sale tools and as terminals for Eclipse systems based in Richmond.

Sanyo Adopts Lotus Position

Sanyo owners who've longed to run *1-2-3* graphics applications can now do so. Sanyo Business Systems has unveiled a video board for the Sanyo MBC 550 series of MS-DOS-compatible computers, a board the company claims will run *1-2-3*, *pfs:*, and other PC-based graphics packages. The board supports 16 colors with 320- by 200-pixel resolution, or monochrome at 640 by 200.

Graphically Compatible

Grafpoint has modified *TGRAF-05*, its Tektronix 4105 and DEC VT100 terminal emulation software package, for a host of PC compatibles. Versions of the product are now available for NEC's Advanced Personal Computer III, the TI Professional, and the AT&T PC 6300, plus machines from Compaq, Columbia, Direct, TeleVideo, Seequa, NCR, and Zenith.

TGRAF-05 offers users access to host-based programs—among them *Plot-10*, *SASgraph*, and *Tell-a-graph*—that support Tektronix terminals.

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

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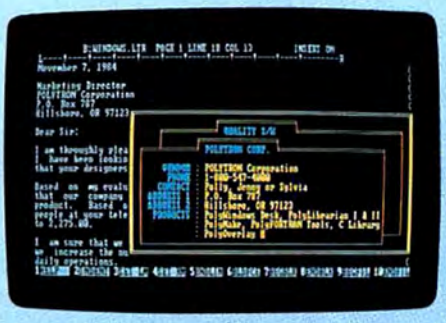

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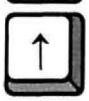


Press the (up) arrow key You've selected Outline.

Press the Return key A skeleton outline appears.

Type the word Outline "Outline" (the name you've given the outline) appears on the frame border.

Press the Return key You've finished entering the name of the frame.

Press the grey + key The blinking cursor moves from the border into the frame to heading 1.

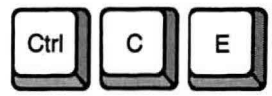
Type the heading you want for 1. The words appear in the outline and at the bottom of the screen.

Press the Return key Heading 1. is complete.

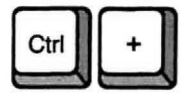
Press the (down) arrow key The cursor moves to 1.1.

Type what you want and press the Return key Heading 1.1 is filled in.

Press the (down) arrow key The cursor moves to 1.2.



To add a heading anywhere, **press the Ctrl key and C key together, then press the E key.**



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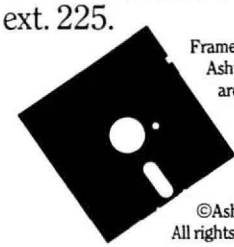

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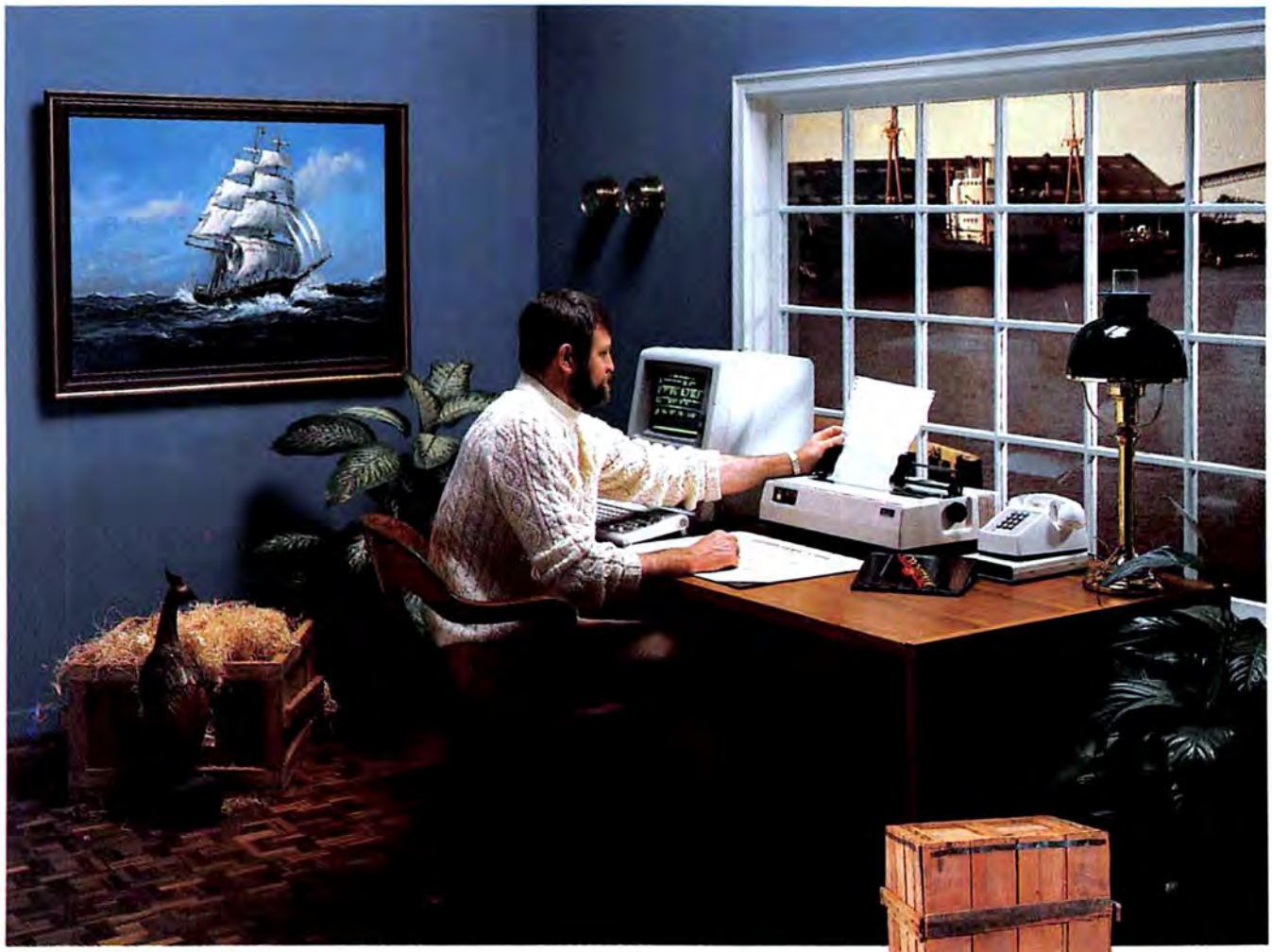

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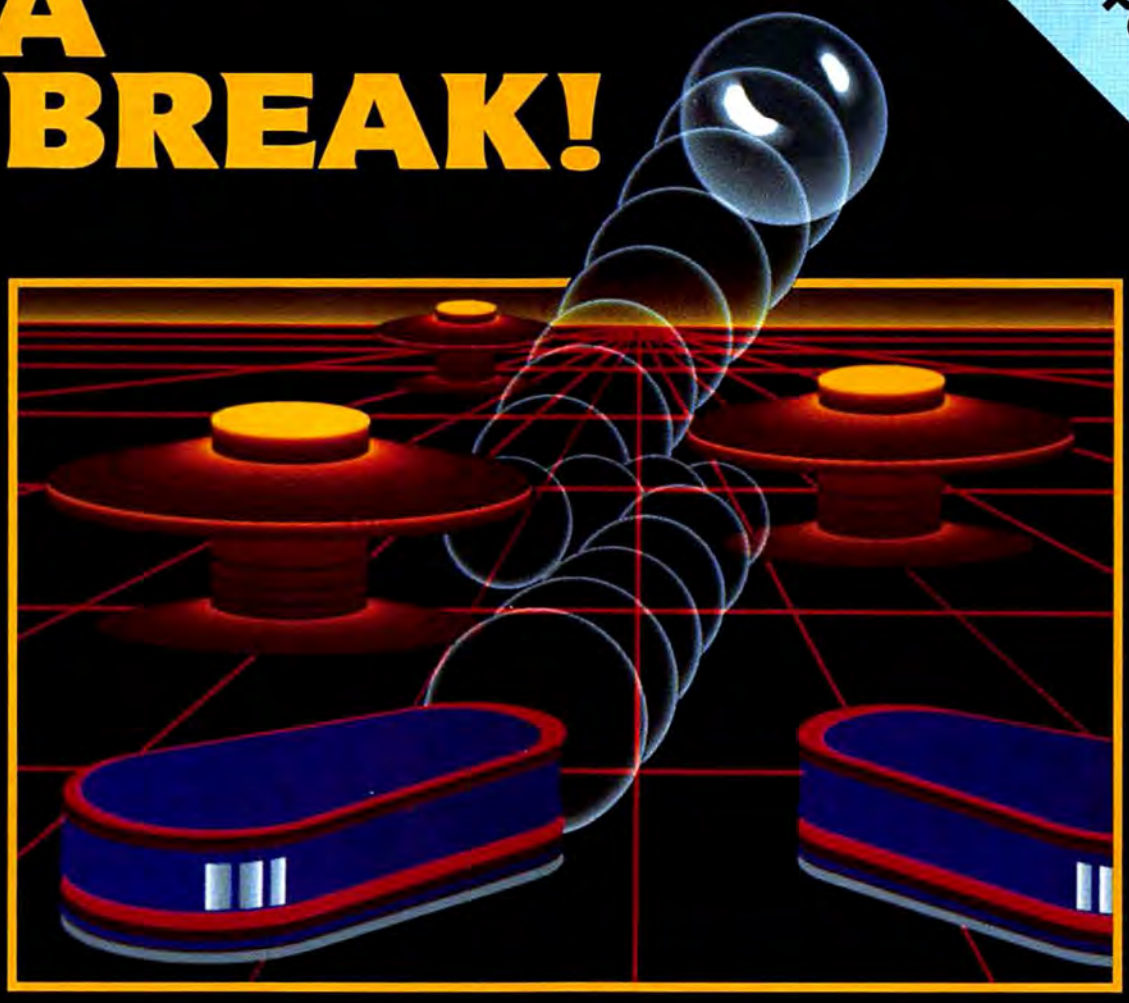

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InfoWorld Magazine

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You may not have been satisfied with WordPerfect's 30,000-word dictionary. And neither were we. So, WordPerfect 4.0 includes a new phonetic dictionary with 85,000 words (which take up less space on the disk than did 30,000 previously). Plus, the new dictionary includes a document word-count feature and the ability to search entries using any letter in the word.

> ... this fall we can expect new WordPerfect features such as table of contents and index generation ...

PC Magazine

Right on time.

WordPerfect 4.0 features automatic generation of indexes and five types of tables, including table of contents. You simply mark words to appear in the desired tables, and generation is accomplished with just one keystroke.

> ... Footnoting is a good example of WordPerfect's sensible style. ...

Business Computing

Sensible, but not good enough.

The same footnoting capabilities garnering much praise for WordPerfect are even more enhanced in WordPerfect 4.0. Now lengthy footnotes can span multiple pages, and footnotes can be placed either at the bottoms of pages or at the end of the document. In fact, footnotes and endnotes can both be used in a single document.

> ... Earlier versions of WordPerfect were plagued with poorly organized documentation. ...

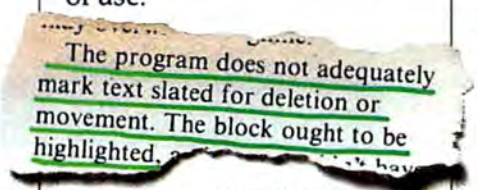
Softalk Magazine

We agree.

The documentation for WordPerfect 4.0 reflects a great deal of reorganization and improvement. Following a number of suggestions

highest marks yet.

from users and after extensive testing of the new format, SSI is excited to introduce this significantly enhanced documentation package. Many new diagrams have been added and tutorials are more extensive. In addition, the reference section is expanded and better organized for ease of use.



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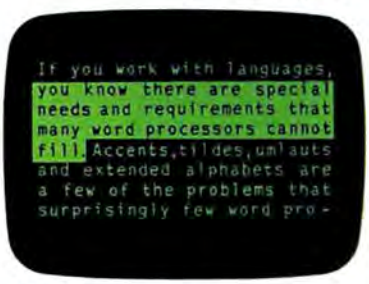
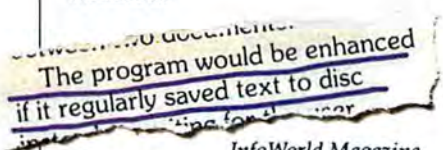


Makes sense.

A new block highlight feature of WordPerfect 4.0 lets you know exactly what block of text you have defined.



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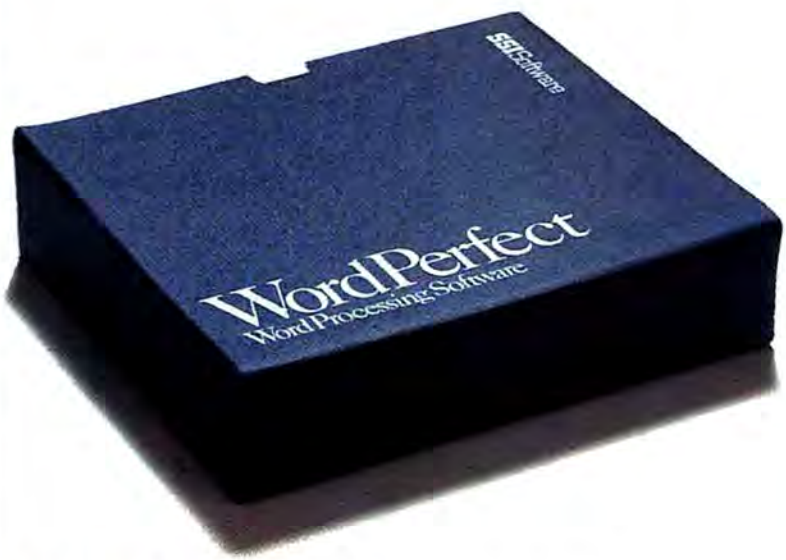

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Non-Taxing Software

Two tax preparation programs—PC/TaxCut and Tax Preparer—can help you organize your tax-time morass and chase away those 1040 blues.

Charles Humble

The IRS's annual rite of spring has never given me cause to celebrate. But until recently, paying my income tax was a relatively simple affair. The Feds took what they wanted from my paycheck on a monthly basis, and if an extra dam or aircraft carrier was needed, a little more was figured into the tax tables at the end of the year—or so I suspected. This uncomplicated relationship changed radically two years ago when I decided not only to buy a PC (and depreciate it), but to start up a small business on the side. These two minor events changed my carefree April days forever.

Instead of two forms to fill out I had ten; where once I breezed through my 1040, I was now faced with scores of figures to calculate, carry forward, and weave throughout an alphabet soup of schedules. As anyone who has had this frustrating experience can attest, the IRS publications and telephone hot lines were often less than helpful. Rather than fight a losing battle, I turned the mess over to my accountant.

But if a PC could help me write an article or plan expenses, couldn't it also drain my personal tax swamp? One Sunday I decided to find out. I cracked open a copy of *Tax Preparer* from HowardSoft and prepared myself for an assault of jargon, tables, and forms. To my shock, I emerged an hour and a half later with a completed tax return. Well, not quite complete, for I discovered I'd failed to include one important schedule. Instead of spending several hours recalculating and recopying my tax forms, I merely loaded the program, filled in the overlooked schedule, and printed out a new 1040 and a complete set of schedules. No muss, no fuss.

Still unsure of *Tax Preparer*'s handiwork, I submitted it to my accountant, who scrutinized the results and gave them his blessing. I tucked my adding machine away in a closet next to my old porkpie hat; a convert was made.

PC Promise

Tax preparation is one area where the PC has long held out the promise of making our lives easier and more orderly. If your personal finances are as convoluted as mine, a tax preparation package may well be a sanity saver when tax time rolls around. Of course, plunking down several hundred dollars for such a program isn't the solution for everyone. Those who use the 1040A short form or who file rather straightforward 1040 returns probably won't need a tax program. But if you find yourself hip deep in amortization schedules, investment tax credits, income from an outside business, and the like, a tax program is well worth the investment.

The two tax preparation programs reviewed in this article, *Tax Preparer,* from HowardSoft, and *PC/TaxCut,* from Best Programs Incorporated (BPI), can help you counter tax-time confusion. *PC/TaxCut* is designed solely for the individual taxpayer; *Tax Preparer* is a sophisticated program for use with more demanding returns; it is ideally suited for the tax accountant or small preparation firm that churns out dozens of returns every spring. Happily, neither program is copy protected, so hard disk installation presents no obstacles.

Both programs come with comprehensive, typeset user manuals that are largely devoted to answering questions about tax rules and regulations. While neither manual can take the place of an accountant, each provides sufficient information to help users complete returns. But don't expect *PC/TaxCut* or *Tax Preparer* to supply extensive help screens; the winds of change blow frequently through the federal tax code. Both HowardSoft and BPI accommodate such changes by making program updates available every year—an additional cost you should consider when making a purchase.

Both companies emphasize that their programs are not legal or financial advisors. As *Tax Preparer*'s user manual cautions, "The IRS has the last word." It's up to the user to supply accurate information. What these programs will do is logically organize tax information, put it in the proper places on the proper forms, and make quick work of many tedious calculations.

Table 1: Tax forms and schedules prepared by Tax Preparer and PC/TaxCut

Forms	Tax Preparer	PC/TaxCut
1040	•	•
Schedule A	•	•
Schedule B	•	•
Schedule C	•	•
Schedule D	•	•
Schedule E	•	•
Schedule F	•	
Schedule G	•	•
Schedule R	•	
Schedule SE	•	•
Schedule W	•	•
Form 2106	•	•
Form 2119	•	•
Form 2210	•	•
Form 2441	•	•
Form 3468	•	•
Form 3903		•
Form 4562	•	•
Form 4797	•	
Form 4952		•
Form 5695	•	
Form 6251	•	•

Tax Preparer

Both *Tax Preparer* and *PC/TaxCut* are menu driven, but there the similarity ends. *Tax Preparer* clearly assumes a greater knowledge of income tax preparation on the part of the user. The program first asks whether you are preparing a single return or batching returns. In the latter mode, data for many tax returns can be entered in one session, saved, and processed later. This batch processing method is often used by professional tax preparers who work on a number of returns.

Once this issue is settled, *Tax Preparer* gets down to business and displays a menu listing 21 commonly used forms and schedules from the IRS's portfolio (see Table 1). When a selection is made, a rough likeness of the form or schedule, including line numbers, is displayed (see Figure 1). Cursor, <Home>, <End>, and page keys are used to maneuver around the form, as in a word processing document. <Enter> confirms an entry; the function keys are assigned to program functions such as restore, move, print, and help.

Tax Preparer also supports +, −, ×, and ÷ math functions, though not in the form of an on-screen calculator such as *TenKey*. The math feature is used primarily to change existing entries. For example, to add $5000 to a $25,000 entry on the wage line in form 1040, you place the cursor under the entry, type **+5000**, and press <Enter>. The two numbers are summed, and the result inserted.

Because *Tax Preparer* is designed for professionals, it can accommodate several returns on a single disk. The program also allows you to work on any form or schedule without regard to sequence. Though this anything-goes approach is probably a plus for the professional, to prepare your own return it makes more sense to follow the 1040 form and plow through its questions, moving to supporting forms when a blank in the 1040 must be filled. Switching between forms is relatively easy because interdependent lines in different forms are linked by the program. For example, line 12 on form 1040 and line 32 on Schedule C are always equal. To transport the value on line 32 to line 12, place the cursor on line 12 and press **I**, which displays Schedule C. Pressing <Esc> returns you to line 12 and inserts the value from Schedule C. This sequence is followed whenever you need to view or edit a form or schedule different from the one currently displayed.

Tax Preparer's flexibility makes it useful as a year-round tax planning tool. Editing forms and schedules is easy, so you can quickly create alternative tax models and discover which will save you the most money. For example, a jump in personal income may prompt you to try income averaging. But if the increase is below a certain amount or is offset by another change (such as marriage during the tax year), the IRS tax table may provide a still lower rate. Manipulating all these variables to determine which approach results in the lowest tax would normally be a laborious process. But with *Tax Preparer* the necessary global changes and recalculations are processed automatically.

From Disk to Printer

Tax Preparer is designed to use official IRS forms or create facsimiles on a printer. The IRS will not accept a facsimile of form 1040 (though facsimiles of other schedules are acceptable), but transferring the numbers to a preprinted 1040 form by hand is easy enough. You may find yourself doing that even if you have IRS-approved tractor-fed 1040

Figure 1: An on-screen facsimile of the 1040 tax form produced by Tax Preparer

forms, because the program's alignment procedures are clumsy and don't always work.

Since *Tax Preparer* is geared to the tax professional, it provides several printing niceties, such as the ability to generate a custom cover letter or billing statement for inclusion with a return. *Tax Preparer* works with most parallel printers and supports a number of graphics options, enabling you to use different fonts for cover letters, bills, and even tax forms.

Tax Preparer's major flaw is that it is excruciatingly slow. The program is written in interpreted BASIC, and it spends an inordinate amount of time reading the disk. HowardSoft claims that the 1985 edition of *Tax Preparer* will pick up the pace.

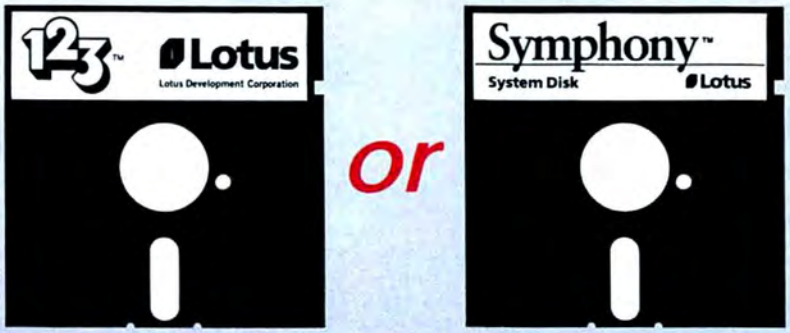
PC/TaxCut

PC/TaxCut assumes less experience on the part of the taxpayer than *Tax Preparer* does and accordingly never confronts the user with an on-screen IRS form. Instead the program uses a question-and-answer format to gather information. Though *PC/TaxCut* is friendly, the user must have some familiarity with credits, itemized deductions, adjustments to income, and other tax basics.

PC/TaxCut is designed to trap logic errors. For example, if you select the "single" filing status, the program won't let you enter data for a spouse. Of course, this hand-holding approach reduces the program's flexibility. *PC/TaxCut* will make certain decisions for you on everything from itemizing deductions to income averaging, based on the answers you give. The program is limited to one tax return per data disk.

PC/TaxCut initially asks for basic filing status information so it can determine your eligibility for income averaging. From there, the program collects information not by schedule or form but by subject area. Each PC function key is assigned a certain area. For example, <F1> triggers personal-data and income-averaging questions, while <F6> prompts the program to query you about credits. At the end of each module, *PC/TaxCut* displays a summary of your answers and a total. As each subject area is completed, the status line at the bottom of the screen notes that fact.

Because of the program's subject-oriented approach, editing data can be a bit tedious. For example, Schedule C has income and deduction sections; changing entries in both would require you to load the first module, move the cursor to the appropriate field, make the change and save it, and then repeat the process for the second module. Keep in mind, too, that *PC/TaxCut* does not automatically recalculate the tax return when you enter additional information or edit existing data—you must activate this option by pressing <F9>. The program does, however, require that a tax return be recalculated before it is printed.



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Troublesome Forms

Printing is one critical area in which *PC/TaxCut* falters. The program can use only preprinted 1040 forms–it cannot print out a usable 1040 facsimile. (Strangely enough, *PC/TaxCut* produces acceptable facsimiles of other IRS forms and schedules.) As with *Tax Preparer,* successfully lining up the 1040 form in a printer is an exercise in frustration. The 1040 forms supplied by BPI have a small box at the top; when an *x* is printed in the center of the box, the form is correctly aligned. After a number of fruitless attempts, I finally gave up. A BPI spokesperson said that my complaint wasn't the first and that the company is developing a better alignment procedure.

PC/TaxCut is already set up for the IBM and Epson dot matrix printers. The program also supports a number of other printers, including the MX-100, NEC Spinwriter, Diablo 630, Prism 80 and 132, and five Okidata models.

Changes for '85

Both BPI and HowardSoft plan to release enhanced versions of their programs by tax time. *Tax Preparer* will include IRS form 3903 (moving expenses), while *PC/TaxCut* will add forms 1040ES (estimated payments), 4797 (supplemental gains and losses), 5695 (energy credit), and Schedule F (farm income). Aside from adding new forms and schedules, BPI will guarantee all calculations performed by *PC/TaxCut*–to the point of paying any IRS fees resulting directly from mathematical errors. The company plans to add a calculation feature similar to the one in *Tax Preparer.*

Making the Cut

Though HowardSoft promotes *Tax Preparer* as suitable for both novices and professionals, the program is clearly designed for the latter. *Tax Preparer* is not difficult to master, but if you don't need its extra features–batch processing and multiple tax returns per disk among them–don't spend the extra $100. If your tax return is comparatively simple and you need a program that's a bit more solicitous, *PC/TaxCut* is a better choice. Note too that BPI offers *Professional Finance Program,* a personal-budget and money-management program that can be integrated with *PC/TaxCut.*

Of course, either program is overkill for a simple tax return. But if you have complicated finances and need to explore or organize your taxes painlessly, these programs will make quick work of the April ritual.

Charles Humble is a business and computer columnist for The Oregonian *in Portland, Oregon.*

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619/454-0121
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PFS:Access ..... 59.
PFS:File ..... 85.
PFS:Graph ..... 85.
PFS:Plan ..... 85.
PFS:Proof ..... 59.
PFS:Report ..... 77.
PFS:Write ..... 85.
Softword Systems
MultiMate *(version 3.3)* ..... 259.
Sorcim
Supercalc 3 ..... 199.
Virtual Combinatics
Micro Cookbook ..... 29.
Soups & Salads *(add-on disk)* ..... 15.
Warner Software
The Desk Organizer ..... 139.

TRAINING

ATI
SKILL BUILDER PROGRAMS
Intro To:
Word Processing Accounting
Business Software Data Bases
..... *each* 32.
How to Use:
Compaq MS-DOS (2.0)
CP/M-86 PC-DOS (2.1)
PC-Basic Home Accountant
IBM-PC VW Deluxe
..... *each* 32.
TRAINING POWER PROGRAMS
How to Use:

dBase II	dBase III	Lotus 1-2-3
MS Word	Easywriter II	Multimate
Multiplan	Supercalc 3	Framework
Symphony	Wordstar	TK!Solver

Peachtree *(specify A/R,A/P,G/L, sales invoice, inventory)* ..... *each* 49.
Comprehensive Software
Intro to Personal Computing ..... 39.
Intro to Databases ..... 39.
Intro to Communications ..... 39.
Intro to the Operating System (PC Tutor) 39.
Individual Software
The Instructor ..... 35.
Professor DOS ..... 47.
Tutorial Set *(both items above)* ..... 75.
Professor Pixel ..... 47.
Typing Instructor ..... 39.

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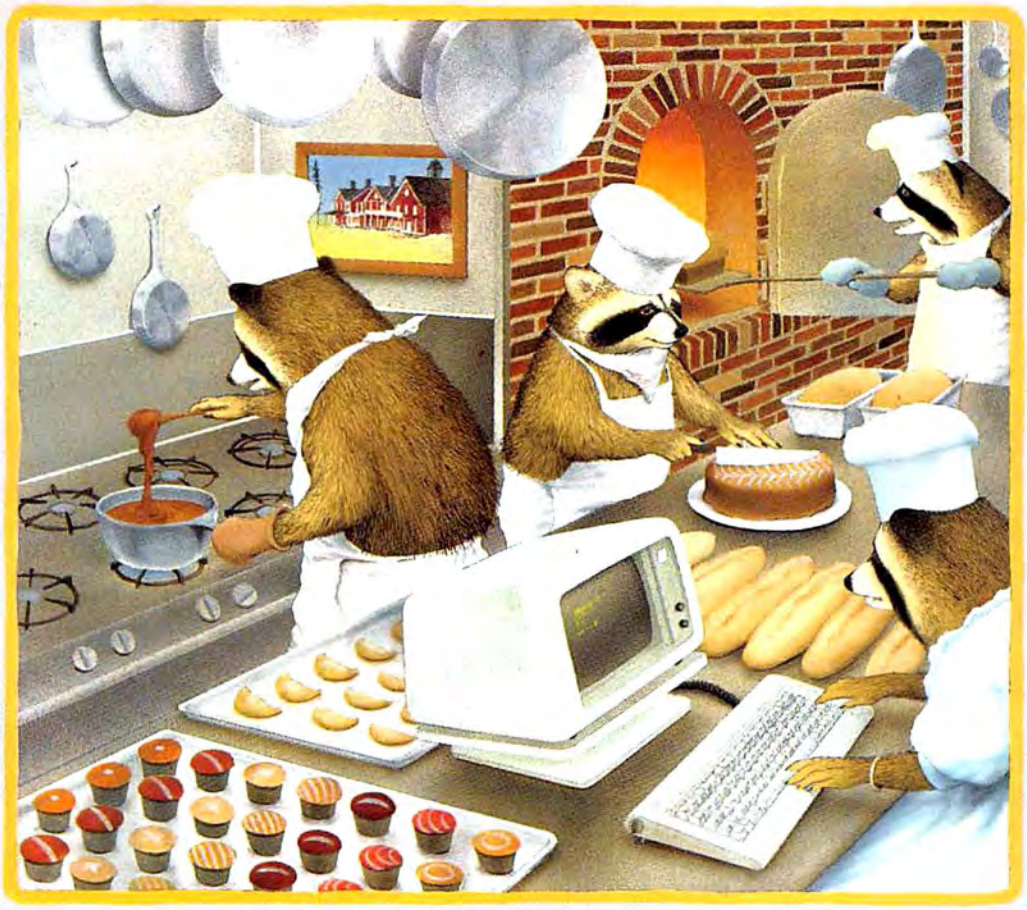

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- Can be used as stand alone system or as a fully integrated component of Financier II ..... 93.

Financier II

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- Unique autochecking capabilities: prints check directly from user-maintained database while updating bank, budget, and tax records
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LEARN - PC Video
Introductory to Lotus 1-2-3 *(videocassette training)* specify VHS or BETA..... call

Scarborough Systems
Master Type..... $35.

EDUCATIONAL

Davidson
Speed Reader II *(high school & college)* 49.
Math Blaster *(grades 1-6)*..... 35.
Word Attack *(grades 4-12)*..... 35.
Spell It *(grades 5-adult)* ..... 35.

Digital Research
Diagnostic Test (PSAT) ..... 14.
OwlCat SAT *(15 hour)* ..... 63.
OwlCat SAT *(60 hour)* ..... 169.

FriendlySoft
FriendlyWare/PC Introductory Set..... 35.

Spinnaker
Educational Games for Young Computer Users. *(All require graphics board).*
Delta Drawing *(ages 4 to adult)* ..... 34.
Snooper Troops I *(ages 10 to adult)* ... 30.
Snooper Troops II *(ages 10 to adult)*... 30.
Most Amazing Thing *(ages 10 & up)*... 27.
President's Choice *(ages 13-adult)*..... 27.
Face Maker *(ages 3 to 8)*..... 23.
Kids on Keys *(ages 3 to 9)* ..... 23.
Story Machine *(ages 5 to 9)*..... 23.
Fraction Fever *(ages 7 to adult)* ..... 23.
Kinder Comp *(ages 3 to 8)* ..... 20.
Rhymes and Riddles *(ages 5 to 9)*..... 20.
Hey Diddle Diddle *(ages 3 to 10)*..... 20.
Alphabet Zoo *(ages 3 to 8)* ..... 20.

Stone *(requires graphics board)*
My Letters,Numbers,Words *(ages 1 to 5)* 29.
Kids Stuff *(ages 3 to 8)*..... 29.
Across the U.S.A. *(ages 5 and up)* .... 22.

GAMES

Blue Chip
Millionaire ..... 39.
Tycoon ..... 39.
Baron..... 39.

Broderbund
Lode Runner ..... 25.

CBS Software
Match Wits..... 21.
Murder by the Dozen..... 23.

FriendlySoft
FriendlyWare/PC Arcade..... 35.

Funtastic
Snack Attack II *(a favorite)*..... 27.
Cosmic Crusader *(as good as above)*.. 27.

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Sargon III ..... 35.

Infocom *Difficulty levels shown in italics.*
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Zork I *(standard)*..... 25.
Enchanter *(standard)*..... 25.
the Witness *(standard)*..... 25.
Planetfall *(standard)*..... 25.
Cutthroat *(standard)*..... 25.
Hitchhiker's Guide *(standard)* ..... 25.
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Zork III *(advanced)*..... 29.
Infidel *(advanced)*..... 29.
Sorcerer *(advanced)* ..... 29.
Suspect *(expert)* ..... 33.
Deadline *(expert)* ..... 33.
Starcross *(expert)*..... 33.
Suspended *(expert)*..... 33.
Invisiclues (hint booklets) are available for all Infocom games. Specify game ..... 7.

Microsoft
Flight Simulator ..... 35.

Origin Systems
Ultima III ..... 39.

Orion
J-Bird *(you'll never sleep)*..... 29.
PC-Man..... 25.

PCSoftware
Armchair Quarterback..... 27.
Chess 2001 ..... 27.
Championship Blackjack..... 23.

Professional Software
Trivia Fever..... 23.

Sir-Tech
Wizardry ..... 42.

Sierra/On-Line
Frogger..... 27.
Crossfire *(keyboard or joystick)*..... 23.
Ulysses and the Golden Fleece ..... 27.

Spectrum Holobyte
GATO ..... 27.

Sublogic
Night Mission Pinball ..... 29.

HARDWARE

AST Research *(For IBM-PC or XT)*
All AST Boards come with SuperDrive, SuperSpool, and one year warranty.
SixPakPlus 64k upgradeable to 384k, with clock calendar, serial and parallel ports *(game port optional)*..... 259.
MegaPlus II 64k upgradeable to 256k (or more with MegaPak) with clock calendar and serial port *(parallel, game, or second serial port optional)*..... 259.
MegaPak 128k *(not upgradeable)* .... 239.
MegaPak 256k ..... 339.
I/O Plus II with clock calendar and serial port *(parallel, game, or second serial port optional)* ..... 129.
Parallel, Game, or second Serial Port *for any AST board (specify board)*..... 35.
Connectall *connector bracket (PC only)* 19.

PC CONNECTION®

xities is here.

AST-5251 ..... $559.
AST-3780 ..... 629.

Amdek
Video 300G monitor *(green)* ..... 139.
Video 300A monitor *(amber)* ..... 149.
Video 310A monitor *(amber)* ..... 179.

Compucable
Plastic Keyboard & Drive Cover Set .... 17.
IBM Mono Screen Enhancement ..... 17.
Printer to IBM Cable *(specify printer)* ... 27.
Smartmodem to IBM Cable ..... 25.

Cuesta Systems
Datasaver *(200w power back up)* ..... call

Curtis
STANDS
PC Pedestal *(for IBM Mono or Color)* ... 39.
PGS or Quadchrome Adapter for above 9.
Low Profile Tilt and Swivel Pedestal .... 39.
AD-2 Adapter for Portables ..... 15.
System Stand ..... 21.

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SURGE SUPPRESSORS
Diamond *(similar to EPD Lemon)* ..... 39.
Emerald *(similar to EPD Lime)* ..... 49.
Sapphire *(similar to EPD Peach)* ..... 59.
Ruby *(similar to EPD Orange)* ..... 69.

Epson
RX-80 with GRAFTRAX-Plus ..... call
RX-80 F/T with GRAFTRAX-Plus ..... call
FX-80 with GRAFTRAX-Plus ..... call
RX-100 with GRAFTRAX-Plus ..... call
FX-100 with GRAFTRAX-Plus ..... call
LQ-1500 *(letter quality dot matrix)* ..... call
Printer to IBM Cable (specify printer) ... 32.

FTG Data
Light Pen (Push Tip) ..... 195.
Demo Disk Set for Light Pen ..... 39.

Hayes
Smartmodem 300 ..... 199.
Smartmodem 1200 ..... 459.
Smartmodem 1200B *(w/Smartcom II)* 389.
Smartcom II ..... 89.
Compucable's Smartmodem-to-IBM Cable ..... 25.

Hercules Computer
Hercules Graphics Card *(parallel port)* 309.
Hercules Color Card *(parallel port)* .... 169.
Graph-X Software ..... 42.

IOMEGA
Bernoulli Box 20 Meg ..... 2695.
10 Meg cartridge ..... 56.

key tronic
Deluxe keyboard (KB 5151) ..... call

Koala
Koala Touch Tablet *with software (connects to game port)* ..... 89.
Speed Key System ..... 119.

Kraft
Joystick ..... 35.

Maynard Electronics
Floppy Drive Controller ..... 135.
Internal Hard Disk (10 Meg) with WS-1 Controller ..... $879.
Internal Hard Disk (10 Meg) with WS-2 Controller ..... 1079.

Mouse Systems
PC Mouse (w/software & desk pad) ... 129.
PC Paint (software) ..... 75.

NEC
Pinwriter P2(IBM) 80 column ..... 679.
Pinwriter P3(IBM) 132 column ..... 897.
Spinwriter 2050 *(3550's little brother)* .. 699.
Spinwriter 3550 *(IBM-PC compatible)* 1397.
Spinwriter 8550 *(IBM-PC compatible)* 1789.

Orchid Technologies
All Orchid Boards come with PCnet Drive (Ram disk), PCnet spool (print spooling), disk caching & partitioning.
Blossom 64k upgradeable to 384k, with clock calendar, serial and parallel ports ..... 229.
PCnet Daughter Board (piggybacks to Blossom) with version 2.4 networking software ..... call
PCnet Blossom 64k Blossom Board with the Daughter Board installed ..... call
Turbo Board 128k ..... call
Diskless Boot Rom, Cluster Kit, etc. ..... call

Paradise Systems
Modular Graphics Card ..... 275.
Multidisplay Card ..... 289.

Princeton Graphics
HX-12 RGB monitor *(690 x 240)* ..... call
SR-12 RGB monitor *(690 x 480)* ..... call
Scan Doubler Board (for SR-12) ..... call
MAX-12 Amber monochrome monitor .. call

Quadram
New Expanded Quadboard 64k expandable to 384k, with clock calendar, parallel, serial & game port, I/O bracket, and Quadmaster software ..... 249.
Microfazer Printer Buffer (parallel) w/copy
MP 64 (64k) *upgradeable to 512k* .... 169.
Quadcolor I ..... 197.
Quadchrome RGB Monitor ..... $469.
Quadchrome II ..... 469.

SMA (Systems Management)
PC-Documate Keyboard Templates *available for:*

DOS/Basic 1.1	Supercalc 3
DOS/Basic 2.0-2.1	Wordstar
Lotus 1-2-3	Turbo Pascal
Symphony	WordPerfect
Multiplan (IBM)	dBase II
Multiplan (Microsoft)	dBase III
Peachtext 5000	Framework
Easywriter II	Multimate

Volkswriter Deluxe ..... *each* 12.

STB
Graphix Plus II ..... 339.

WICO
Joystick ..... 35.

DRIVES

All drives are completely pre-tested. Specify Drive A or Drive B for your PC. Comes with complete step by step installation instructions. Drives are 320k/360k.

Tandon
TM 100-2 (5¼") *full-height drive (DS,DD)* 159.

TEAC
FD-55B (5¼") *half-height drive (DS,DD)* 129.
Free 'y' cable & bracket with each pair.

MEMORY

64k Memory Upgrade Set for IBM-PC or XT system board ..... 39.
64k Memory Upgrade Set for any memory board *specify make of board* ..... 39.
Install memory upgrades & run diagnostics *at time of board purchase only* ..... 10.

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Verbatim *(with 5 year guarantee)*
Datalife Disks SS/DD *plastic box of 10* 21.
Datalife Disks DS/DD *plastic box of 10* 29.
Disk Drive Analyzer ..... 19.
Flip Sort *(holds 75 disks)* ..... 19.

We're junior compatible!

If you own an IBM-PCjr, you should be talking with our resident junior experts at Jr. CONNECTION. 1-800/IBM-jrPC or 603/446-7761 Monday thru Friday 9:00 to 5:30. They have the latest information concerning both hardware and software compatibility.

Need a new keyboard, monitor, memory upgrade? Not sure whether that new game will run on junior? The staff at Jr. CONNECTION will make sure you get the product that's right for you and your system.

By the way, we don't sell computers. Make the best deal you can on a basic IBM-PCjr and come to us for the works. You'll save a lot of money and be able to pick from the best add-ons and software programs on the market.

1-800/IBM-jr PC

PC CONNECTION®

Circle 136 on reader service card

The Portfolio Masters

In the crowded field of stock portfolio management software, two programs excel at enabling you to account for your victories and defeats in the market –and at helping you decide whether to stay in the fray.

Stephen A. Blumenthal

A Wall Street adage explains the mentality of the market in this way: "There are only two motivating factors on the trading floor: greed and fear." In an environment fueled by such powerful motives, it's easy to see why investors tend to trade–perhaps more often than necessary–and sometimes make money at it. If you understand this, you may recognize the attraction of portfolio management programs that keep investors apprised of their standing among the bulls, bears, and other varmints on Wall Street.

Portfolios Unbound

What is portfolio management and who needs it? Portfolio management involves assessing the balance and the performance of an investor's securities to guide investment decisions. Portfolio management programs can help traders in the stock, options, and bond markets stay informed of their positions in the market and maintain accurate records of their holdings. If your participation in the market is limited to waiting for payouts from a T-bill or two, portfolio management software probably isn't for you. But if your holdings include a cash account, a margin account, or an Individual Retirement Account (IRA), or if you're the beneficiary of or trustee for a trust account, you're apt to benefit from a portfolio management program.

As your sophistication in the market grows, and you start to rely on professional investment techniques such as *hedging* and *leveraging* (see "1-2-3 Plays the Options Market" in this issue), the sophistication of your record keeping must grow as well. A large number of transactions in many accounts can create an avalanche of purchase confirmations and monthly reports. Portfolio management software enables you to keep comprehensive, useful records and, at its best, make wiser trades. Your accountant and IRS auditor will be grateful.

Selection Criteria

Before you invest in a portfolio management package, look for certain basic features. The program ought to include record-keeping facilities that enable you to track a variety of portfolios, even if you intend to use the program only for your own investments and wouldn't think of touching portfolios for a brokerage or a business. A basic portfolio manager should be able to calculate a stock's value automatically. It should also produce reports listing all securities in a portfolio and all transactions in-

volving capital gains or losses—summaries of what you own, what you've bought, and what you've sold. These reports are indispensable for tax purposes.

The better portfolio management programs do more. They report income and dividends received, unrealized capital gains, and all purchases and sales. They also go beyond the mere enumeration of transactions. A tax preparation package or any good spreadsheet is more than adequate if the sole purpose of your record keeping is to help fill out Form 1040. Once you know what you've done, what stocks you have and how they're doing, and what you want to do, a portfolio management program should help you unearth the securities that will enable you to achieve your goal.

Caution is recommended here; establishing a goal and an investment strategy goes beyond the domain of portfolio management and into fundamental analysis (finding stocks that are underpriced by scrutinizing earnings and other company-specific financial factors) or technical analysis (determining the direction of market movements by studying trading volume, market indexes, and other broad-based indicators).

A top-flight portfolio manager accepts price updates from information services; calculates current value, percentage gains, and capital gains holding periods; adjusts for stock splits and stock dividends; and makes use of all this information. It should also be easy to use. Ideally, you want to spend more time on research and investment decisions and less time recording transactions that are now history.

For the purposes of this review, cost was also a key consideration; after you buy a program, you want to have enough cash left to invest in something. Another consideration was appropriateness. A score of whiz-bang programs are designed for the Dean Witters of the world; they help securities salespeople maintain complex transaction records on many types of investments for large numbers of clients. Such programs can cost thousands of dollars and are unnecessarily elaborate for the typical investor. Excluded from this review, too, were packages that offer transaction accounting but are designed primarily for fundamental or technical analysis.

The Pick of the Bunch

Two popularly priced portfolio management programs set industry standards for meeting these criteria and stand out from the crowd: *Pear Portfolio Management System* by Hale Systems and the *Market Manager Plus*, new from Teleware and Dow Jones & Company.

Both *Market Manager Plus* and *Pear Portfolio Management System* (the *Pear System*) are well conceived and well designed. They are apt to meet the portfolio management needs of serious investors, whether employed by financial institutions or acting on their own behalf. Both programs are easy to learn and use; you can get to the information you need without devoting weeks to mastering the quirks of an intricate program. Neither program is cheap, and although *Market Manager Plus* costs a good deal less than the *Pear System* package, both are good values—and in many cases tax-deductible as an expense incurred in the production of income.

Double File

Both programs use separate securities information and portfolio position files. Both have communications modules that can be used to enter current price information automatically into securities information files. The programs then automatically update stock prices in each portfolio and recalculate figures accordingly. The key word is *automatically*; not all portfolio software is automatic, and you shouldn't even consider buying a package that is not.

Unless you are a broker, you will probably use the automatic update feature to adjust prices in only one portfolio—your own. The ability to automatically update prices on the same stock in many portfolios is a useful tool, however, if you want to monitor trust accounts set up for your children, manage your own IRA, maintain a number of accounts with different brokers, or oversee an investment club. Brokers or securities professionals using this software in banks or insurance companies will think they have died and gone to heaven.

Transaction Logs

Both programs create the portfolio appraisal, capital gains, and income statement reports basic to portfolio management packages. But both outshine the competition by making report creation a snap and by offering such additional features as the ability to create a complete transaction log (see Figure 1). This log lists all transactions in the order in which they were made.

A transaction log report is invaluable for demonstrating compliance with tax or securities regulations. For example, capital gains holding periods are interrupted if options are used to protect a gain in a stock. The log allows an investor to show an IRS auditor the date on which the option was sold and the date on which the holding period began again. Investors with capital gains need to know exactly where they stand before they buy or sell, and if audited by Uncle Sam, they must be able to defend their actions. Although this information is available from the confirmation forms dispatched by your broker, having it at your fingertips before and after you invest is a major convenience of portfolio management software.

Hale Systems has modified *Pear Portfolio Management System* to reflect recent changes in the capital gains holding period, with the new version scheduled to be available in time for calculating 1984 tax returns. Dow Jones is one step ahead. In *Market Manager Plus*, you set the holding period during your initial configuration of the reports. If the law changes, you can modify the data.

Reports Galore

Reports are the most important part of any portfolio management program, and both *Market Manager Plus* and the *Pear System* provide essential and elegant summaries. Even though the information in such reports is often destined for the IRS, both programs present data in a format that enhances investment decision-making itself.

Both programs outshine the competition by making report creation a snap and by offering such additional features as the ability to create a complete transaction log.

Pear Portfolio Management System produces six reports: the transaction log, which lists all transactions in the order in which they were made; a portfolio appraisal report, which shows what you bought, when, for how much, and its current worth; a realized capital gains report, which lists what you sold, when, for how

SECURITY AND CASH TRANSACTION REPORT

FROM 08/07/84 TO 08/07/84

PORTFOLIO: B NAME: TRADING ACCOUNT Y-T-D COMM: 1,146.00
CMNT: SAMPLE REPORTS CASH BALANCE: 249,846.37

TYP	DATE	DESCRIPTION	COMMISSION	AMOUNT	FSM12
TRN	08/07/84	S 50 DJ @ 67.000	109.00	3,241.00	
DIV	08/07/84	450.000 DJ@1.20000	-----	540.00	F 1
DIV	08/07/84	450.000 DJ@1.56000	-----	702.00	
DIV	08/07/84	DIVIDEND FOR DEPOSIT	-----	123.00	SM 2
DIV	08/07/84	XYZ SPECIAL	-----	45.89	
INT	08/07/84	450.000 DJ@1.78000	-----	801.00	FS
INT	08/07/84	CASH INTEREST	-----	1.89	
INT	08/07/84	QUARTERLY PAYMENT	-----	108.97	FSM12
INT	08/07/84	XYZ PAYMENT	-----	45.90	F M 2
TRN	08/07/84	B 100 DD @ 23.000	10.00	-2,310.00	
TRN	08/07/84	B 200 DD @ 24.000	12.00	-4,812.00	
TRN	08/07/84	B 350 DD @ 25.000	134.00	-8,884.00	
TRN	08/07/84	S 100 DD @ 34.000	14.00	3,386.00	
TRN	08/07/84	S 200 DD @ 34.000	17.00	6,783.00	
TRN	08/07/84	S 350 DD @ 34.500	167.00	11,908.00	
TRN	08/07/84	S 100 DJ @ 54.000	23.00	5,377.00	
TRN	08/07/84	B 1000 XON @ 38.500	123.00	-38,623.00	
TRN	08/07/84	S 100 XON @ 40.000	12.00	3,988.00	
TRN	08/07/84	S 400 XON @ 41.000	134.00	16,266.00	
TRN	08/07/84	S 300 XON @ 37.000	-----	11,100.00	
TRN	08/07/84	S 100 XON @ 23.000	12.00	2,288.00	
TRN	08/07/84	S 100 XON @ 34.000	134.00	3,266.00	

Figure 1: Market Manager Plus' Security and Cash Transactions Report shows all transactions for any or all portfolios within a range of dates.

much, and your profit or loss; a statement of investment income, which shows dividend and interest income by stock, enabling you to assess an individual stock's performance against the total income generated by the portfolio; a stock cross-reference report, enumerating portfolios that include the same stock, bond, or commodity; and a report of unrealized capital gains, which indicates the additional profits or losses that could be realized by selling certain holdings.

Market Manager Plus produces all the reports offered by *Pear Portfolio Management System* except the unrealized capital gains report, and it adds separate tax reports for dividend and interest income. It also includes a "security alert" that informs you when a stock has broken the high/low price parameters you set for it. You can use this feature to determine what stocks are about to go "long-term"–that is, which stocks you have held long enough to gain preferential tax treatment. Since it is a good idea to close out your losses before they go long-term and hold on to your profits until after they are long-term, the security alert provides a very useful reminder.

Portfolio appraisals in both programs report the number of shares, the cost, the current price, the current market value, the interest or dividend rate, the annual income, the yield, and the percentage of your total portfolio that each entry represents (see Figure 2). This last element is used to determine whether your portfolio is weighted more heavily than you desire in one type of security, such as debt instruments rather than equity issues. If that were so, you would sell bonds and buy stock.

Both programs also provide full *tax lot accounting*. Each purchase of a security is recorded as an individual record. Not only does this allow the usual examination of possible gain or loss on the securities, but when you sell shares against more than one lot, this system lets you choose the lot from which to sell. If the total number of shares to be sold is greater than one lot, that lot is closed out, costs

PAGE 1 — PEAR SYSTEM DEMO — 04/15/83

PORTFOLIO APPRAISAL

SOC.SEC.#123-45-6789 — JOHN E. CASH — ACCT.#123456

SHARES OR PAR VALUE	SECURITY	UNIT COST	INVENTORY	CURRENT PRICE	CURRENT MARKET VALUE	INT/DIV RATE	ANNUAL INCOME	YIELD %	% OF TYPE OR TOTAL
3,000	GEORGIA PACIFIC	28.20	84,614	26.250	78,750	1.20	3,600	4.57	31.6
1,685	GRACE W.R.	26.85	45,250	42.375	71,402	2.30	3,875	5.43	28.6
80	IBM CORP.	99.20	7,936	110.125	8,810	2.00	160	1.82	3.5
1,130	MOBIL OIL CORP.	28.05	31,700	29.375	33,194	2.50	2,825	8.51	13.3
3,000	NL INDUSTRIES	17.31	51,938	15.125	45,375	1.20	3,600	7.93	18.2
267	WESTINGHOUSE CORP.	18.78	5,015	44.750	11,948	2.00	534	4.47	4.8
9,162	TOTAL COMMON STOCKS		226,453		249,479		14,594	5.85	38.6
800	ARCATA CV.A	26.98	21,584	27.750	22,200	2.16	1,728	7.78	45.4
600	JOHNSON CTRL CV.B	35.36	21,214	44.500	26,700	2.00	1,200	4.49	54.6
1,400	TOTAL PREFERRED STOCKS		42,798		48,900		2,928	5.99	7.6
35	ENGLHRD APR 60 CALL	4.48	15,672	2.875	10.062	0.00	0	0.00	83.4
10	HMSTK APR 32 CALL	13.58	13,577	2.000	2,000	0.00	0	0.00	16.6
45	TOTAL OPTIONS		29,250		12,062		0	0.00	1.9
50,000	BENEFICIAL CORP DEB. 8% 06/15/01	100.00	50,000	97.000	48,500	80.00	4,000	8.32	48.7
50,000	PFIZER DEB. 9.25% 08/15/00	99.50	49,750	102.174	51,087	92.50	4,625	9.00	51.3
100,000	TOTAL CORPORATE BONDS		99,750		99,587		8,625	8.66	15.4
25,000	BOSTON MASS. G.O 6.25% 08/01/97	98.05	24,513	93.293	23,323	62.50	1,562	7.00	42.9
30,000	LITTLE ROCK ARK. 7.3% 09/01/11	87.00	26,100	103.677	31,103	73.00	2,190	7.00	57.1
55,000	TOTAL MUNICIPAL BONDS		50,613		54,426		3,752	6.89	8.4
50,000	GEN'L MOT ACCEPT 4.5% 06/30/85	100.00	50,000	90.000	45,000	45.00	2,250	9.63	40.5
75,000	GEN'L MOT ACCEPT 4.625% 06/30/86	100.00	75,000	88.250	66,187	46.25	3,469	8.92	59.5
125,000	TOTAL COMMERCIAL PAPER		125,000		111,187		5,719	5.14	17.2
50,000	U.S. TREASURY 9.75% 05/31/83	101.75	50,875	100.093	50,046	97.50	4,875	9.00	100.0
50,000	TOTAL U.S. TREASURIES		50,875		50,046		4,875	9.74	7.7
21,000	NAT'L LIQUID RESERVE	1.00	21,000	1.000	21,000	0.10	2,163	10.30	100.0
21,000	TOTAL LIQUID ASSETS		21,000		21,000		2,163	10.30	3.2
	TOTAL PORTFOLIO		645,738		646,689		42,657	6.60	100.0

Figure 2: Pear Portfolio Management System's Portfolio Appraisal Report lists all the holdings of a portfolio by type (common stocks, preferred stocks, options, etc.).

and proceeds are allocated, and the programs show how many shares remain to be sold and the remaining open lots. A nice capability, indeed.

The two programs diverge in one major area. *Market Manager Plus* can be used to access the Dow Jones News/Retrieval service data bases automatically for financial data and price information. The *Pear System* cannot. It can receive information only from Hale Systems' proprietary information service, which is limited to price information. Although access to Dow Jones can be useful, the principal purpose of these programs is investment portfolio record keeping and analysis. Even if you retrieve historical quotes or other financial data from Dow Jones, neither program offers a truly useful way of putting that information to work. You'd need a fundamental or technical analysis package to do that.

Obeying the Laws of Documentation

People who document software ought to take their lead from those who write legal briefs: First you tell your readers what you're going to tell them, then you tell them, then you tell them what you told them. Documentation for the *Pear System* obeys this model nicely. It includes a fine introductory explanation of what the program does. This is followed by text that explains each menu option, feature by feature. Finally, examples walk you through the program step-by-step. The manual is detailed and somewhat complex, but only because the subject matter is no picnic.

The manual for *Market Manager Plus* is a little less detailed, but a sample session included on the program disk more than adequately teaches you how to use the program. In both cases the operation of the software is so straightforward that you'll be able to wean yourself from the documentation in short order.

Nonfatal Flaws

There are a couple of clouds in the otherwise blue sky that both programs inhabit. It's a drawback, for example, that the *Pear Portfolio Management System* requires that you subscribe to the Hale Systems Dial Data service for automatic price updates. This and the program's price tag are perhaps its most serious liabilities.

The Dow Jones package has one peculiar flaw. Reports produced for computer systems using an 80-column printer include less information than those generated for use with a 132-column printer. Because several critical reports are treated in this way, you would be well advised to examine the instructions for compressed printing in your printer's manual.

The communications portion of the Dow Jones program operates through COM1:, which is a minor annoyance. If you've installed a serial or multifunction board as COM1: and your modem as COM2:, you'll have to flip switches and move jumper plugs. It would be nice to have the ability to reconfigure the software to use COM2: instead of COM1:, just as

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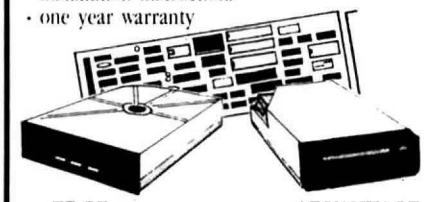

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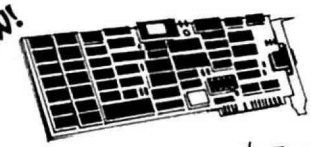

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you can with any good communications software. Nontechnical people like me break out in hives when we have to open up the computer and play with the squiggly things back there.

In addition, neither program generates Data Interchange Format (DIF) files, so you cannot load data into your spreadsheet and play with the numbers. Unfortunately, both programs are copy-protected, and I've destroyed enough disks to hate copy-protection schemes. I'm certain I will destroy the system disk one hour before the post office closes on April 15.

A Pleasant Choice

I should close by stating a bias. I have used Dow Jones software in the past and haven't been impressed. Having tried *Market Manager Plus*, I've changed my tune; this is an admirable package. It almost seems as though Dow Jones examined the *Pear Portfolio Management System* and then emulated it. They did so very well indeed, and the price difference—$245 for *Market Manager Plus* compared to $695 for *Pear Portfolio Management System*—could be a major factor in deciding which to buy.

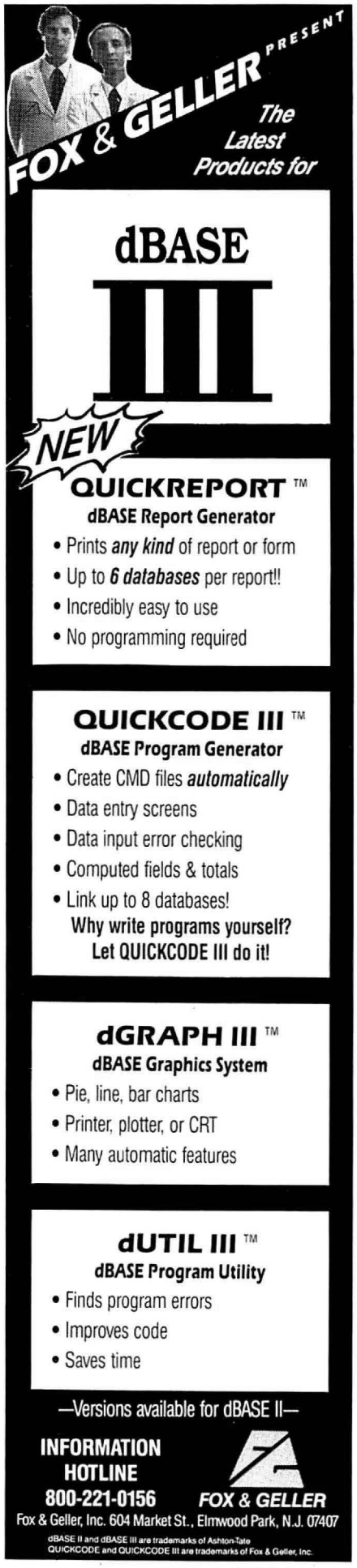
The *Pear Portfolio Management System* lists for more than twice the cost of *Market Manager Plus*, but is it twice as good? I don't think so. The *Pear System* boasts some very nice features and clear report formats; its solid reputation is warranted. But for my money, I'd go with Dow Jones.

Do not misunderstand this conclusion. Both programs are first-rate and neither is so expensive—especially if you can deduct it—that it would not be worth its price to an active investor. The whole purpose of this exercise, however, is to purchase software that helps you make or save money. Take stock of the two programs and savor the choice; the market rarely offers such attractive win-win situations. ●

Stephen A. Blumenthal is a Washington, D.C., attorney and the director of regulatory relations for the Securities Industry Association.

Market Manager Plus
Teleware, Inc., and Dow Jones & Co., Inc.
P.O. Box 300
Princeton, NJ 08540
800/257-5115, 609/452-1511
New Jersey, Alaska, Hawaii, and Canada
List price: $245
Requirements: PC or XT with 128K, one disk drive, serial port, RS-232C-compatible modem or asynchronous internal modem, parallel printer

Pear Portfolio Management System
Hale Systems Inc.
Remote Computing Division
1044 Northern Blvd.
Roslyn, NY 11576
800/645-3120, 212/895-3810
List price: $695
Requirements: 128K (192K for PC XT), serial port, two floppy disk drives or one floppy disk drive and 10MB hard disk, 132-column printer



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Quality is why Intel, DEC and Wang chose to distribute MWC86. These industry leaders looked and compared and found Mark Williams to be best.

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MWC86 is the easiest to use of all compilers. One command runs all phases from pre-processor to assembler and linker. MWC86 eliminates the need to search for error messages in the back of a manual. All error messages appear on the screen in English.

A recent review of MWC86 in *PC World*, June, 1984, summed it up:

"Of all the compilers reviewed, MWC86 would be my first choice for product development. It compiles quickly, produces superior error messages, and generates quick, compact object code. The library is small and fast and closely follows the industry standard for C libraries."

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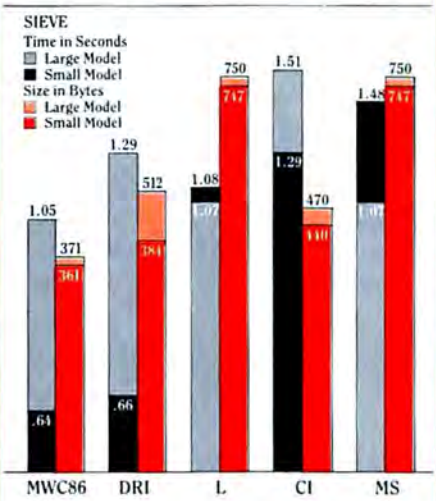

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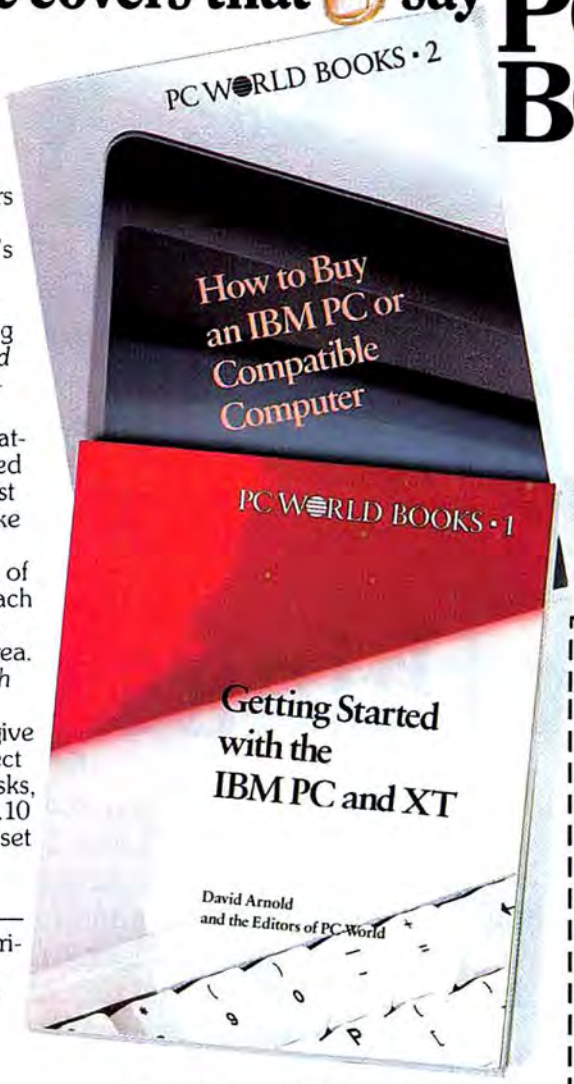

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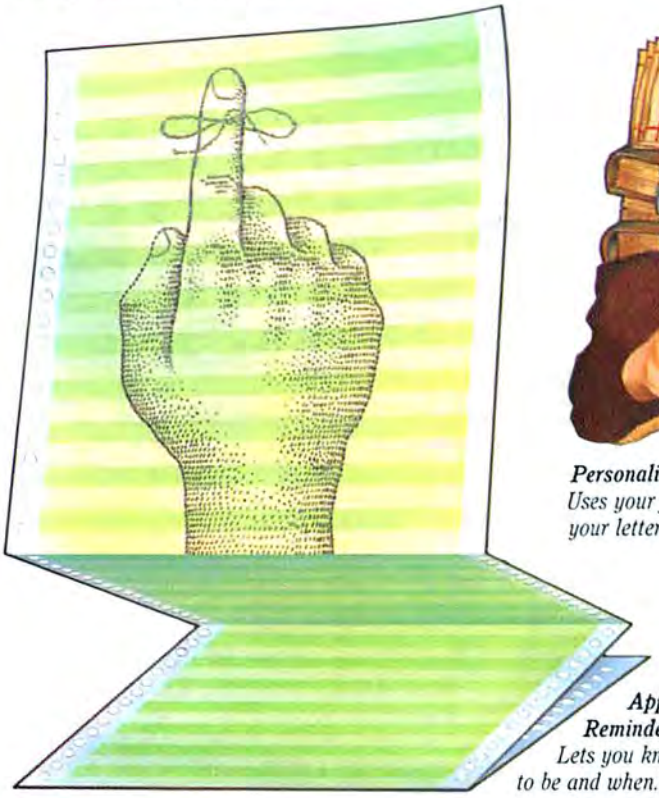

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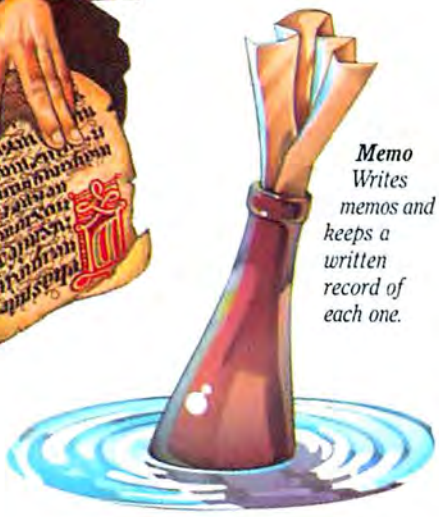

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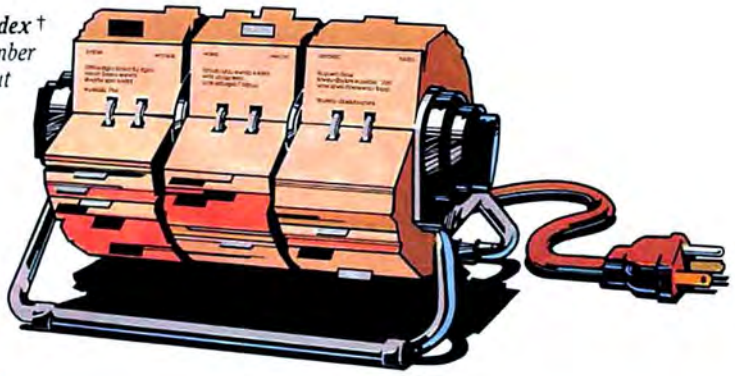

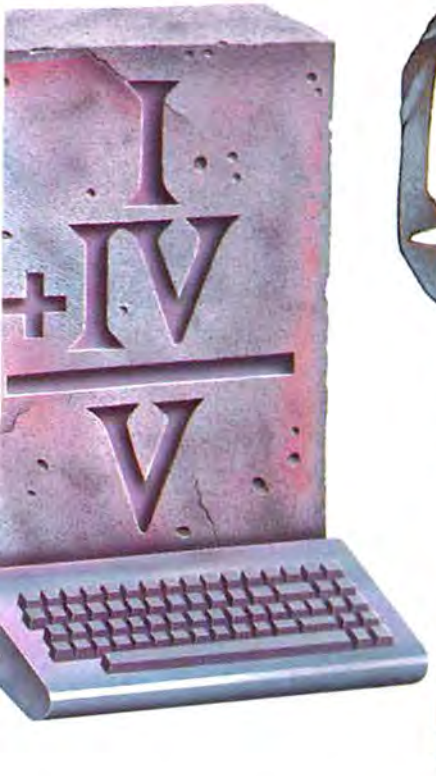

Hardware Diagnostics
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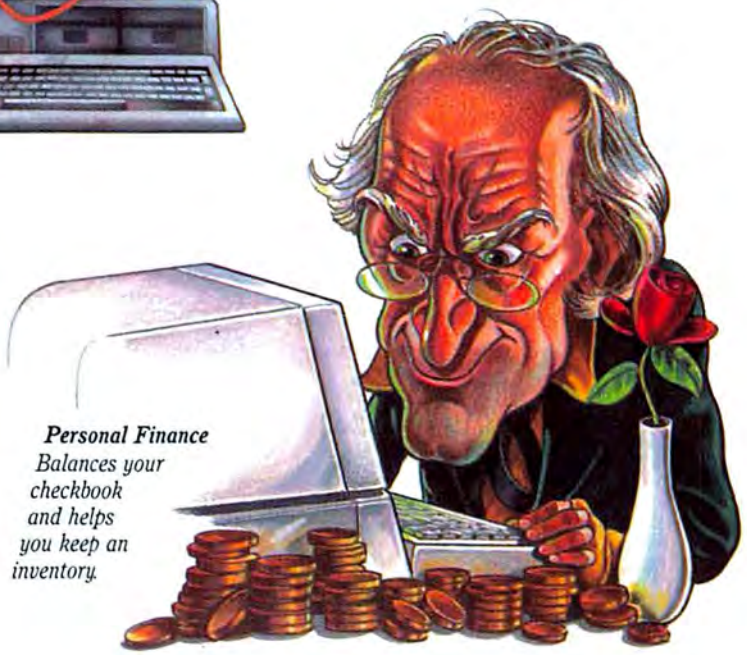

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The Many Faces of Aura

Aura's integrated program modules look a lot like dBASE II, Multiplan, and WordStar, but they don't have to. You can reconfigure Aura's menus and keystrokes to resemble almost any package you admire or something entirely new.

Bill Crider

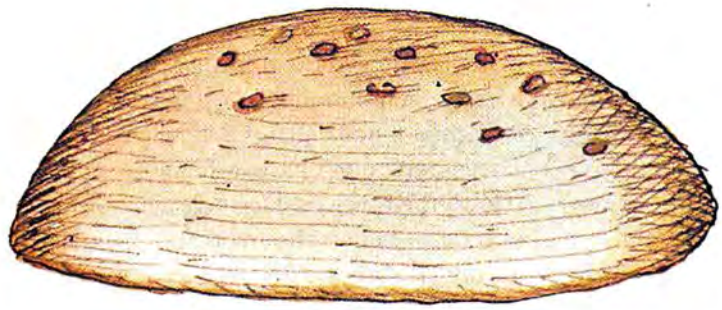
In the war of the hamburgers, one franchise chain has rallied behind the slogan "Have it your way." That seems to be the philosophy behind Softrend's *Aura,* which combines data management, spreadsheets, graphics, and word processing into a menu-driven integrated package that can easily be customized.

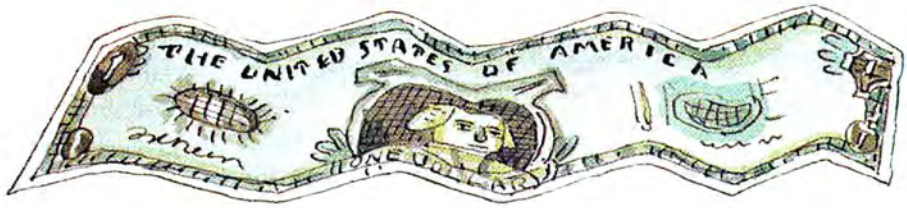
Three of the four *Aura* applications are unblushingly similar to some of the best-selling standalone software packages: Ashton-Tate's *dBASE II,* MicroPro's *WordStar,* and Microsoft's *Multiplan.* Yet you can reconfigure the commands and menus of these program modules to make them look completely different from the originals. You can change the keystroke sequence of almost any command to match what you think is logical. If you prefer *MultiMate*'s keyboard commands, you can use them. If you want to establish a data entry screen with a help screen listing the most common area codes, you can do it. If you don't like the menus in *Aura,* go ahead and change them. Have it your way.

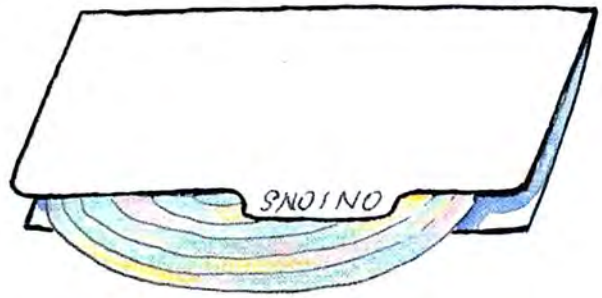
Data Management à la dBASE

Aura's data base management system (DBMS) has capabilities very similar to *dBASE II*'s but lacks the extensive command language that made *dBASE* both popular and hard to learn. Like the other modules in *Aura,* the Information Management module is completely menu-driven and functions by means of "formats." *Aura*'s DBMS provides four format types: file, screen, select/sort, and report. File formats determine the form and content of a data base and include a smorgasbord of data types: C (strings, with all characters allowed), A (strings, with only letters and spaces allowed), N (numeric, accurate to 16 digits), $ (monetary, accurate to 16 digits), D (Julian date), P (phone numbers), and S (social security numbers). Although some of the categories may initially seem unnecessary, they simplify data entry checking.

A file format can have up to 256 fields per record, and, unlike in *dBASE II,* the total number of records is limited only by disk space. Required fields, calculated fields, and field-type conversion are all supported. You can also define "filled fields," which require that you fill the complete field (for example, with a zip code, when a partial field wouldn't make sense). *Aura* uses the fast B-tree sort in-







wolf, wedged between Mollie and Raphael
py. His mission was a delicate and dangerous
nd it did not seem to be going well. He kept as
himself why Kisi had not let him into the apartm
first off, why he had forced him to pick the lo
Only one explanation seemed plausible: Kisi di
trust him. Perhaps Kisi even questioned wh

dexing method and allows up to eight indexed fields per file.

Aura's screen formats determine how information in the data base will be displayed during adding, editing, or review. One file format can have several screen formats associated with it. For example, you might want one screen format for adding new records to a customer data base, another for changing addresses, and yet another for updating credit information (this last might show just the customer's name, number, and credit terms). With screen formats you can keep the screen free of unnecessary information.

The select/sort formats allow you to define index parameters for a file format or define a subset of a file format. For example, if you wanted to look at only those records that have an outstanding credit balance, you could define a select format to bring only those records to the screen.

Report formats create reports to be printed and offer a remarkably friendly feature that prompts you as to which form to place in the printer. For example, the program might suggest that you 'Use 3-Up labels' or 'Put invoice forms in the printer' before printing the report. You can print reports to the screen or to the printer, but you cannot save them to disk.

These are only some of the many features in the Information Management module, but thanks to the ubiquitous menus and help screens, you don't have to memorize all the routines. During each step of format creation you are prompted with the possible choices, and help is only a keystroke away. No other DBMS of comparable power lets you create a data base so easily. For new and infrequent users this is a big plus. For experienced users, it is likely to be a drawback. The program needs a command language that would allow you to create a data base quickly without the impediment of menus.

During each step of format creation you are prompted with the possible choices. No other DBMS of comparable power lets you create a data base so easily.

Spreadsheets à la Multiplan

If you are used to *Multiplan*, you will be able to use *Aura*'s spreadsheet mode immediately. The command structure and menus are virtually identical. Even the spreadsheet size is the same (255 rows by 63 columns). The only major *Multiplan* feature that *Aura* lacks is the ability to display multiple windows.

However, *Aura* has two features that *Multiplan* doesn't. One is an interface to the graphing functions. Creating a graph from spreadsheet cells is quick and easy compared to graphing from other spreadsheets, especially Lotus Development's *1-2-3*. The other feature is a nifty zoom command. When a spreadsheet cell is linked to another spreadsheet on the same disk, you can place your cursor on that cell and zoom to the referenced spreadsheet. The other spreadsheet will be loaded into memory and displayed on the screen so you can see how the value in the original cell was calculated. Then you can "unzoom" back to the spreadsheet you were using before. You can also reference data from an Information Management file; this enables you to do such things as create a spreadsheet that calculates inventory value by pulling inventory levels from a data base.

Word Processing à la WordStar

Aura's word processing mode is patterned after *WordStar*, with a few improvements such as better help menus and a more logical command structure. *Aura* also adds some new page-layout commands ("dot commands" in *WordStar*). For example, centering is accomplished with .ce, and .ce4 centers the next four lines. Justification, word wrap, and special printing modes such as expanded print can be turned on and off during printing. You can define a layout format from a menu, save it, and use it with any document.

Unlike *WordStar*, *Aura* can hold up to three documents in memory at a time. For example, you could keep the annual report in memory to refer to while writing memos to the various departments in your company. You switch between documents by pressing <F9>.

The main advantage *Aura*'s word processor has over *WordStar* is its ability to integrate information from all the other *Aura* modes. You can include a spreadsheet (either the formulas or the values) in your document, and you can import a graph. The link with the data management module leaves MicroPro's *MailMerge* in the dust.

Aura's word processor can also add variable data at print time. For example, the @TIME command inserts the actual print time, @DATE adds the current date, and @PAGE prints the page number. These commands can be used in headers and footers and within the body of text.

Unfortunately, *Aura* has failed to improve on *WordStar*'s prehistoric manual reformatting method. In fact, *Aura* throws a quirk of its own into the reformatting process by automatically inserting an extra space after punctuation. Regrettably, Softrend did not provide an option for turning off this feature. Punctuation style should be a matter of choice, not a software edict.

Graphics à la Aura

Aura's graphics mode doesn't appear to be modeled on any particular package, but then no single graphics package has emerged as a recognized leader ripe for imitation. The graphics mode is split into two sections: "graph formats" and "diagram formats."

A graph format creates standard business graphs from spreadsheets, data bases, or manually entered information. You can select from pie, line, bar, and stacked bar graphs and include up to 128 data items per graph. If the data doesn't fit on your screen, you will have to print the graph to view it all. After you create a graph, you can change its colors, legends, and scaling and even move the graph to a different location on the screen or rotate it to a new orientation.

The diagram format is a free-form drawing program for creating flow charts, organization diagrams, presentation graphics, and simple illustrations. Unfortunately, you cannot bring a graph format into the drawing program to spruce it up. Instead, you have to duplicate a graph manually. You can either draw freehand or use graphics primitives such as lines, arcs, boxes, and circles. Character styles for text labels in graphs include roman, italic, and script. Text can be any size and any orientation, including upside-down. One helpful feature is the program's ability to create a library of diagram formats as building blocks for future diagram formats.

Although *Aura*'s drawing program is an unexpected pleasure in an integrated package, the diagram format suffers from a serious bug. Throughout *Aura*, <Ctrl>-<Break> is used to escape from a mistake without saving a format. However, if you use the delete command to erase a portion of a diagram format, and then press <Ctrl>-<Break>, *Aura* freezes up. You have to turn the computer off and back on again to recover.

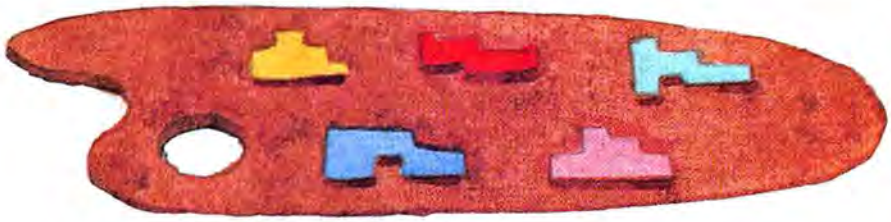
Formats and Menus

Aura provides two unique tools that greatly enhance integration and the ability to customize applications—"user menus" and "series of formats." The user menu function allows you to customize any menu in *Aura* and create new menus and help screens of your own. You can also customize the display colors and command keystrokes.

On the series of formats menu you can define a list of up to 32 tasks to be performed in sequence. A series operates somewhat like a DOS batch file. For example, suppose your company—Betty's Burger Barn—makes a monthly report to corporate headquarters. The head office is primarily concerned that you do not have any one inventory item that represents over 30 percent of your inventory value. For this report you must take a physical inventory and show its results to your head office.

Figure 1 shows a series of formats that leads you through the steps of drafting the report. The first step calls up a data base

screen on which you can update the inventory list (see Figure 2). The series then loads and recalculates a spreadsheet that figures the relative values of the various items (see Figure 3). Next, the series displays a pie chart of the relative values (see Figure 4) and prints the graph for your records. It then loads a memo containing the spreadsheet and a command (.GR) that prints the pie chart (see Figure 5). The final task is printing the memo. This entire sequence runs virtually without user intervention; the user need only enter the new inventory levels and edit the memo.



One for the Guru

In most offices there is a "computer guru," a highly computer-literate individual who is called upon to solve the hardware and software problems that inevitably arise. The guru spends much of his or her time answering the questions of the computer illiterati of the office. With *Aura*'s user menus and series of formats, a computer guru can create tasks and help screens appropriate to the company and can even include such specific help as 'Call Bill at extension 228 if you have problems'.

Another item that will please both gurus and novices is *Aura*'s excellent documentation. The manual is well written and includes plenty of illustrations and examples, and the tutorial is extensive and logical. The graphics portion is the weakest part of the manual. Somehow Softrend neglected to include such necessary information as the need to specify the center point, not the starting point, of text in a diagram.

Aura even provides its own easy-to-use versions of DOS commands. If you use *Aura*'s directory mode, the only DOS command you will ever need is FORMAT. Everything else can be done within the program. In fact, *Aura*'s directory is more powerful than DOS; it allows you to enter comments about the files, which are displayed along with the file names.

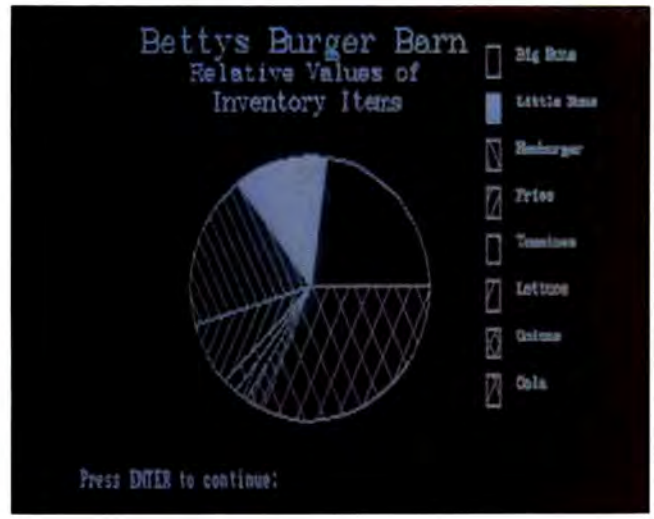
Here's the Beef

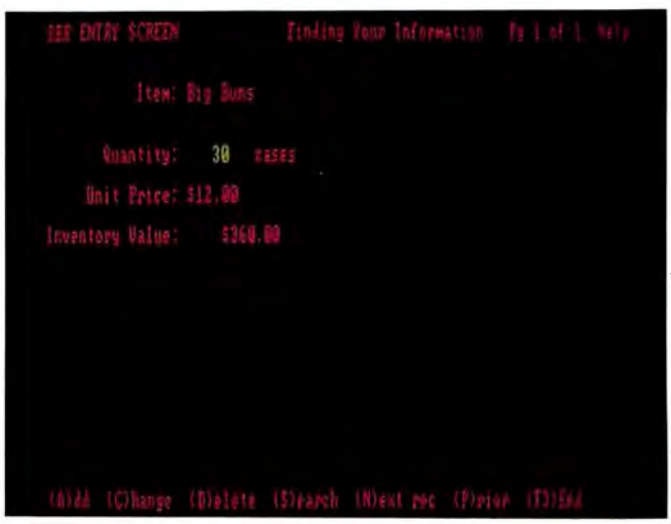
Aura is a good choice for novices, but experienced users who demand high performance from their PCs will quickly grow impatient with the program's deliberate pace. Almost every action requires a menu choice. Menus are great for beginners, but they slow you down once you have learned the program. Further, *Aura* is highly modal–each part of the program is distinct from the others. To change from one part to another, you have to swap disks and wait for the computer to load the new program. The result is a lot of floppy disk handling (the program resides on nine disks). Even if you use a hard disk, you get plenty of 'Please wait . . . ' messages, and the wait between modes can take as long as half a minute. *Aura*'s slow, line-by-line scrolling technique produces even more delays.

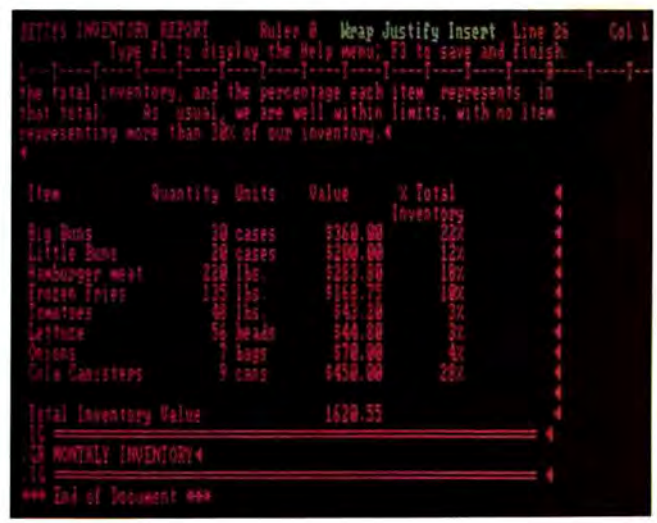
Another problem is *Aura*'s lack of compatibility with other programs. You cannot import *dBASE*, *Multiplan*, *1-2-3*, or *WordStar* files, nor can you load *Aura* files into other stand-alone programs. The word processor can load ASCII files, but that is the current extent of *Aura*'s compatibility with other programs. Softrend has promised to develop *dBASE*-to-*Aura* and *1-2-3*-to-*Aura* conversion programs, but neither was available for this review. Softrend is now a subsidiary of BPI Systems, and plans are in the works to create a software bridge between *Aura* and the *BPI Accounting Series*. This will make *Aura* very attractive to BPI users.

Building a Better Burger

Aura's customizable menus, series of formats, and use of similar commands throughout the program provide a high degree of integration between the modules. However, these benefits are somewhat offset by the delays incurred when moving between programs. Although the package lacks compatibility with the file formats of other programs, its command structure is very similar to some of the most popular stand-alone packages for the PC. Current users of *dBASE II*, *WordStar*, and *Multi-*







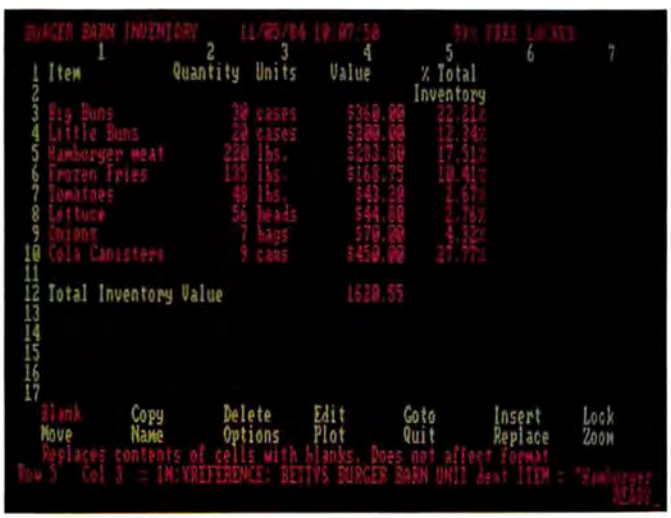
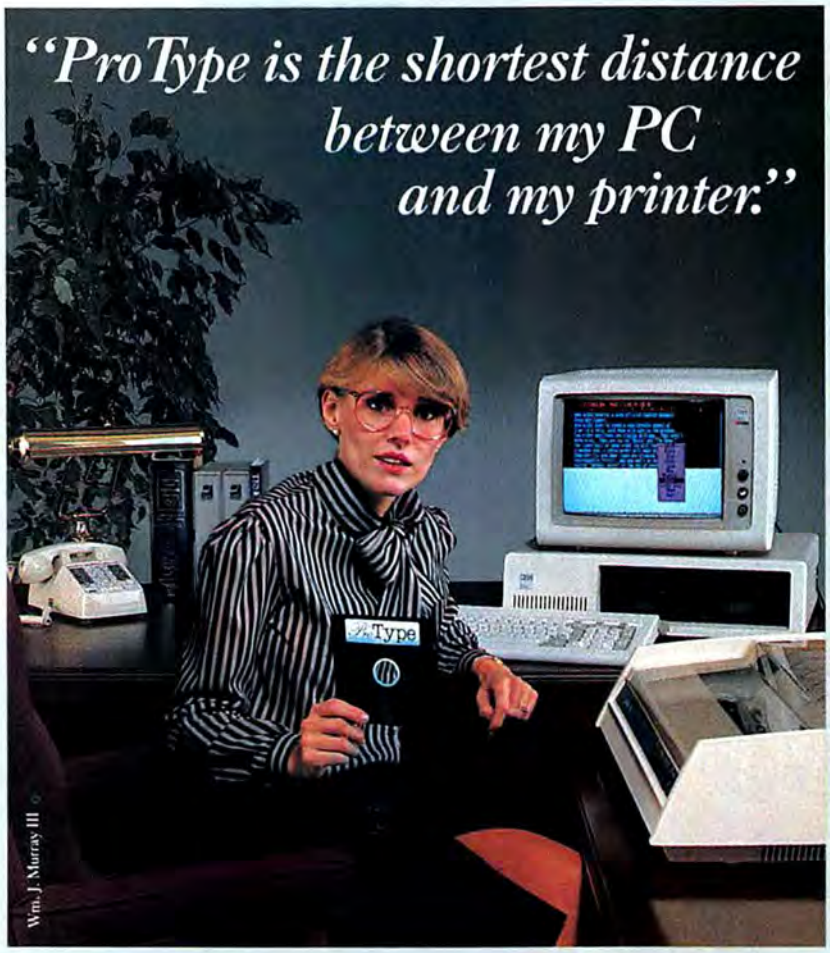


Figure 1 (top left): A series of formats that sequentially presents the screens shown in Figures 2 through 5. An Aura series can act somewhat like a batch file, automatically switching between the program's four modes. Figure 2 (middle left): An inventory entry screen in the Information Management module. Aura's DBMS is similar to dBASE II but lacks the dBASE command language. Figure 3 (bottom left): Aura's spreadsheet module is closely patterned after Multiplan, and it also sports a quick interface to the graphing function and a zoom command for viewing linked spreadsheets. Figure 4 (top right): Aura's graphics module offers two formats, a graphics format for standard charts and a diagram format for freehand drawing. Figure 5 (bottom right): The WordStar-like word processor can easily import graphics, spreadsheet, and data base files from elsewhere in the Aura system.



"I wanted more out of memory-resident software. I realized it takes more than an organized desk to get the job done. ProType gives me the productivity I really need.

"ProType is the memory-resident software that lets me instantly access my printer from inside any other program. Now I can type a letter, address an envelope, print out a form, even select my favorite type style without having to save and exit my word processor or spreadsheet, or turn to my typewriter. With the touch of a key, ProType instantly windows over my other program and provides direct access to my printer.

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"In the typewriter mode, I can print text on a line by line basis — just like a memory typewriter. It's great for printing checks or addressing envelopes.

"In the forms mode, I can complete our own office forms using my pc and printer. I fill out the form on-screen, put the blank form in my printer, and hit the "print" command. The form is printed out — everything in place.

"ProType lets me take full advantage of my printer's capabilities because it allows me to select any type characteristic my printer will support. If I want, I can even print my spreadsheet in bold-green-condensed-italics.

"ProType is fast and easy to use — it's menu driven and has on-line help.

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plan should have little difficulty mastering *Aura*'s doppelgangers–but they may have even less desire to do so.

There are as many integrated programs on the market as there are hamburger franchises in Tucson. Like hamburger stands, many programs will survive simply because the demand is so great. *Aura* will be a survivor, but it is not the program for everyone. For software connoisseurs, more powerful programs are available. For beginners, *Aura* is a good place to start, but many will eventually move on to richer fare. The ideal environment for *Aura* is an office with a guru surrounded by co-workers who don't really want to learn any more about computers than what they need to get a specific task done. The computer gurus of the world have needed a program like this for a long time.

Bill Crider is a microcomputer training consultant and writer. He is vice president of the Tucson IBM PC User Group.

Aura
Softrend, Inc.
2 Manor Pkwy.
Salem, NH 03079
512/454-4677
List price: $595
Requirements: 256K RAM, two disk drives, DOS 2.00 or later version; color graphics board and graphics monitor required for on-screen graphics

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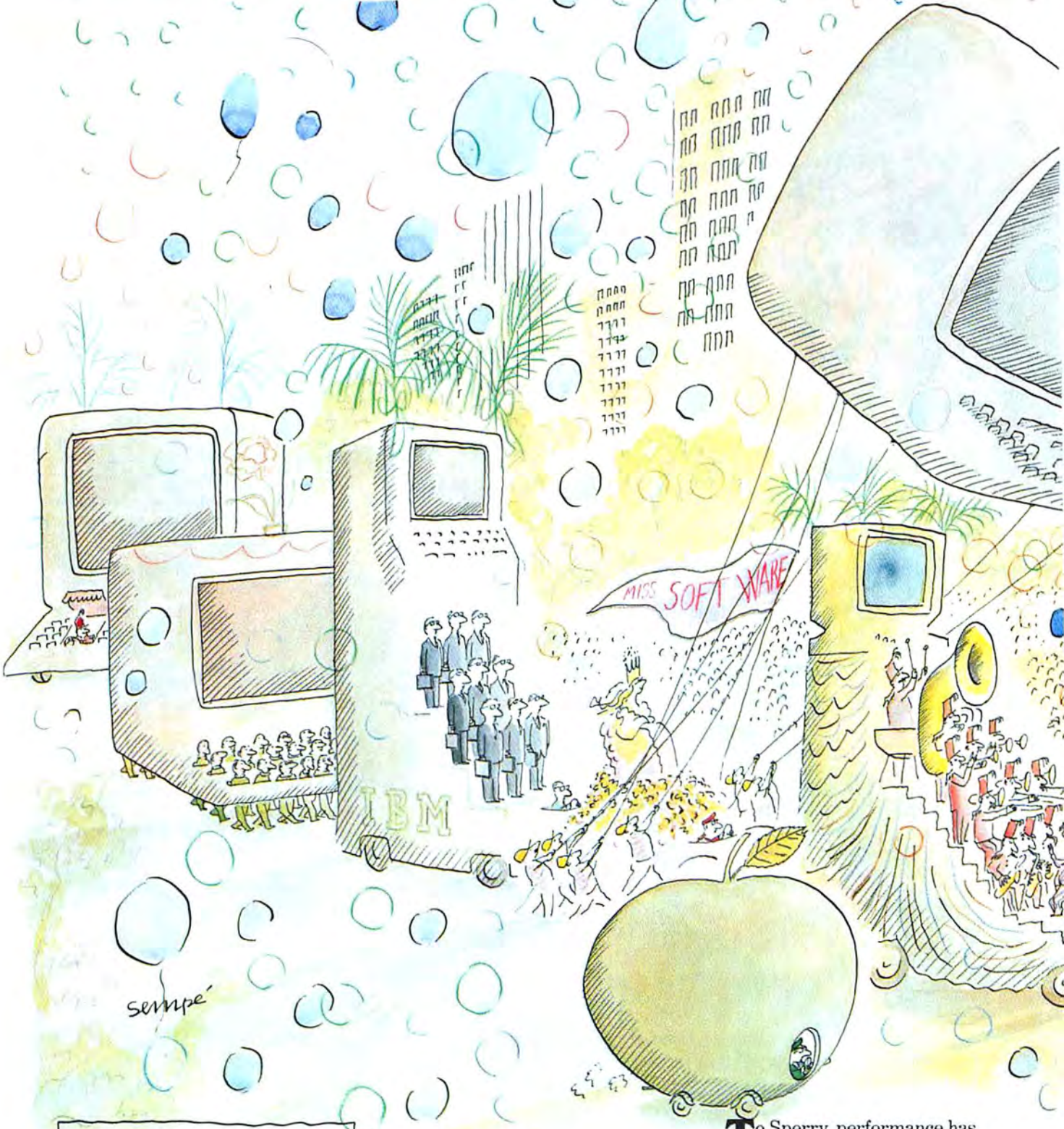

SPERRY PERSONAL COMPUTER SPECIFICATIONS

OPERATING SYSTEM	KEYBOARD
MS DOS Version 2.11 with G.W. BASIC	84 keys, 6 ft. cord
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16-bit 8088	Up to two internal 5¼" diskettes
DISPLAY SCREENS	10MB internal fixed disk when configured with single diskette.
High Definition monochrome display IBM compatible graphics.	USER MEMORY
COMMUNI-CATIONS	Standard 128K bytes, expandable to 640K
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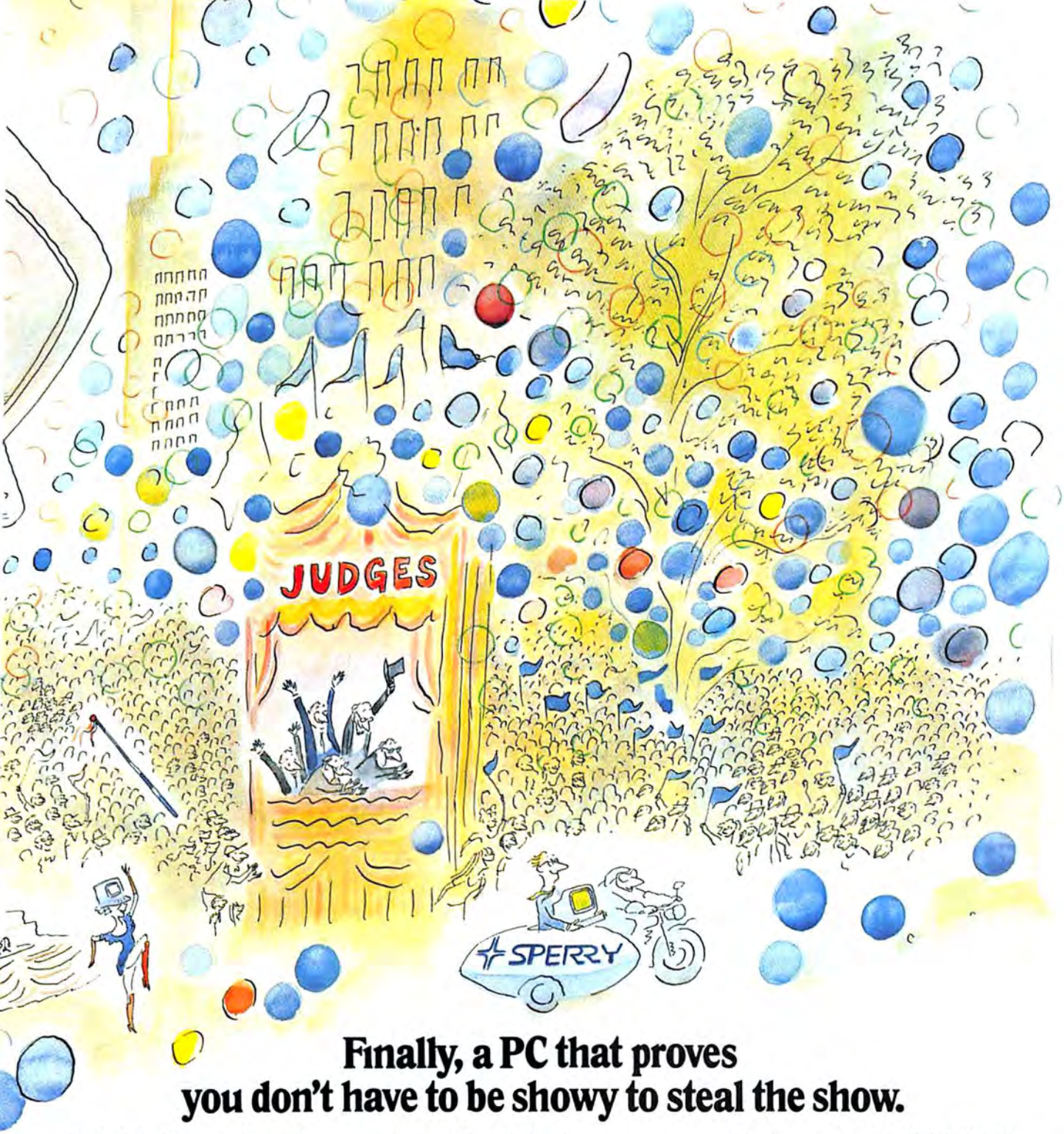

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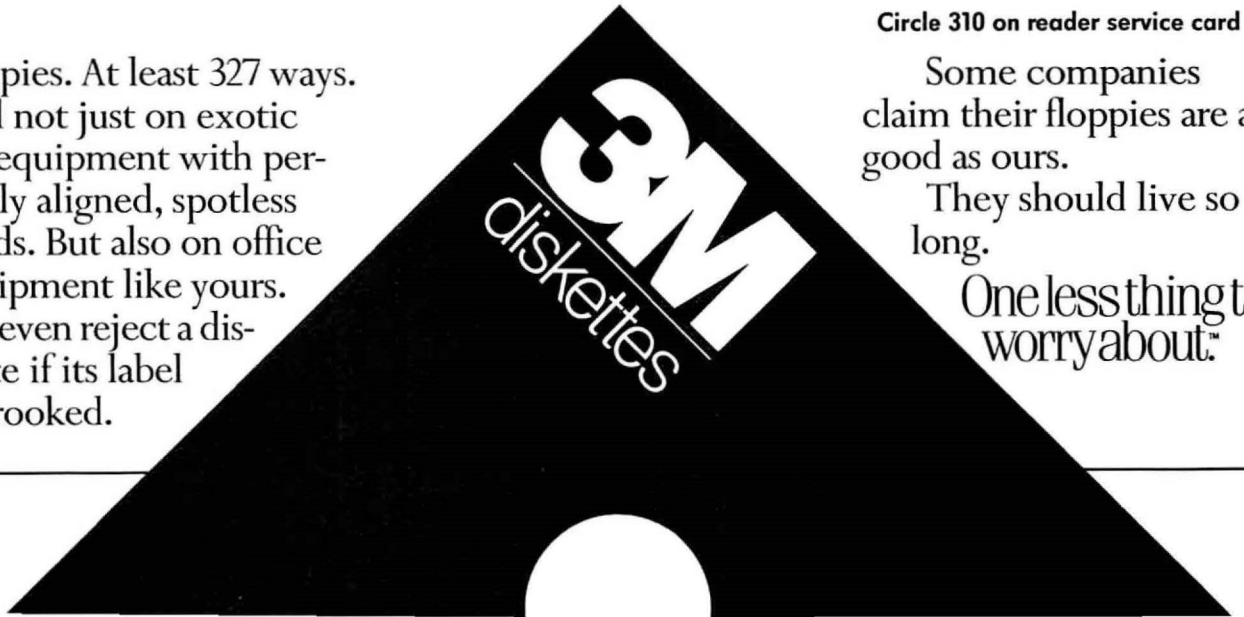

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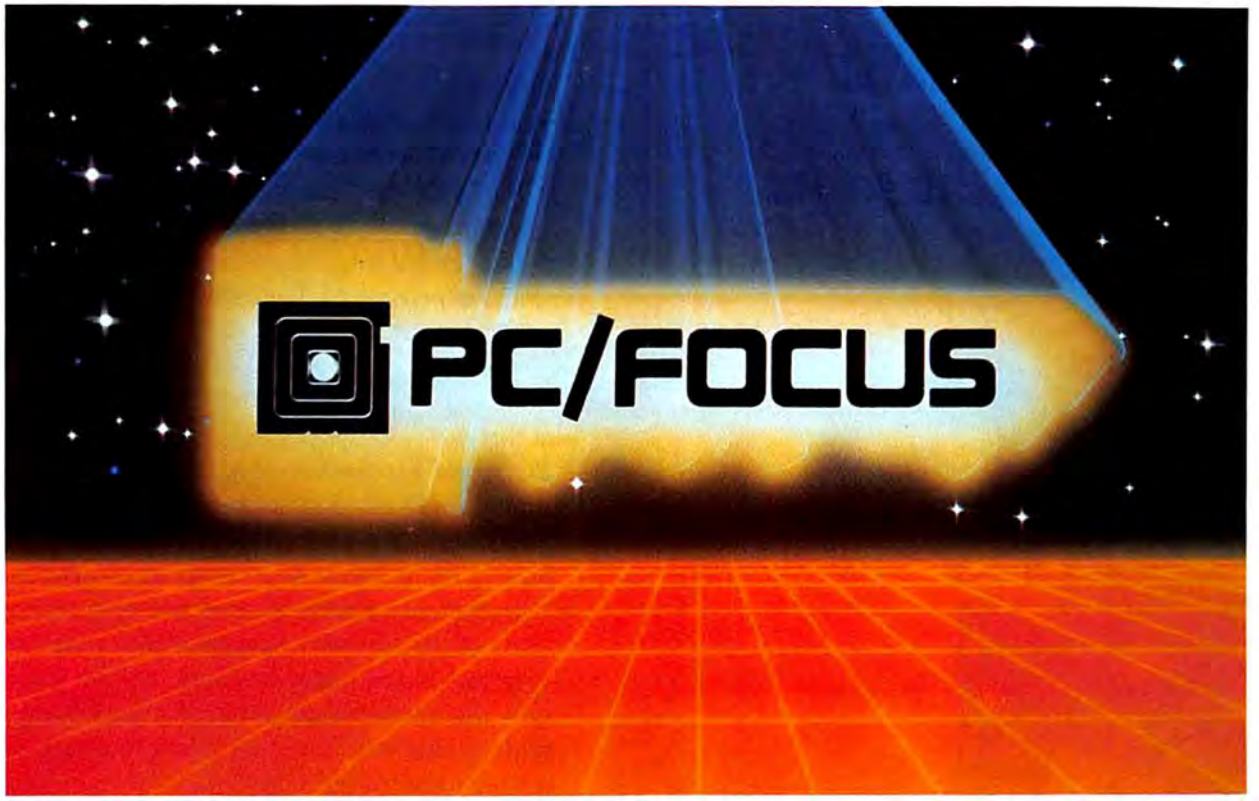

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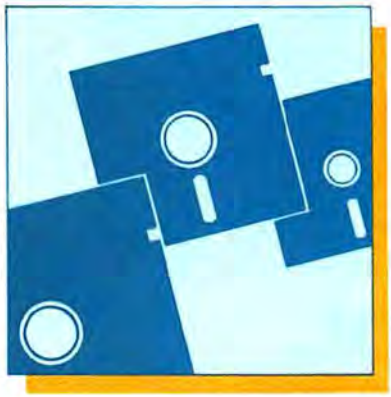

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From the Software Shelf

PC World editors offer first impressions of recent software releases

This month we discover programs that manage your money, organize your tax-time morass, teach your sluggish programs to hop, and ask the all-important question: "How ya feeling, bunky?"

Your Personal Net Worth

How can you not love a software package that comes emblazoned with a government-issued likeness of Dwight D. Eisenhower? Or that cares enough for your fiscal sensibilities to include an abridged version of *Sylvia Porter's New Money Book for the '80s*? Or that painstakingly (but painlessly) walks you through the rudiments of money management?

Your Personal Net Worth, from Scarborough Systems, is easy to like, if not love. Never mind the silver dollar, the free book, and the slick packaging; *Your Personal Net Worth* is a fine little program. It's home accounting without tears—a concise tool for the out-of-balance household. It's also as much a prescription for disciplined financial record-keeping as a primer on doing something useful with a computer.

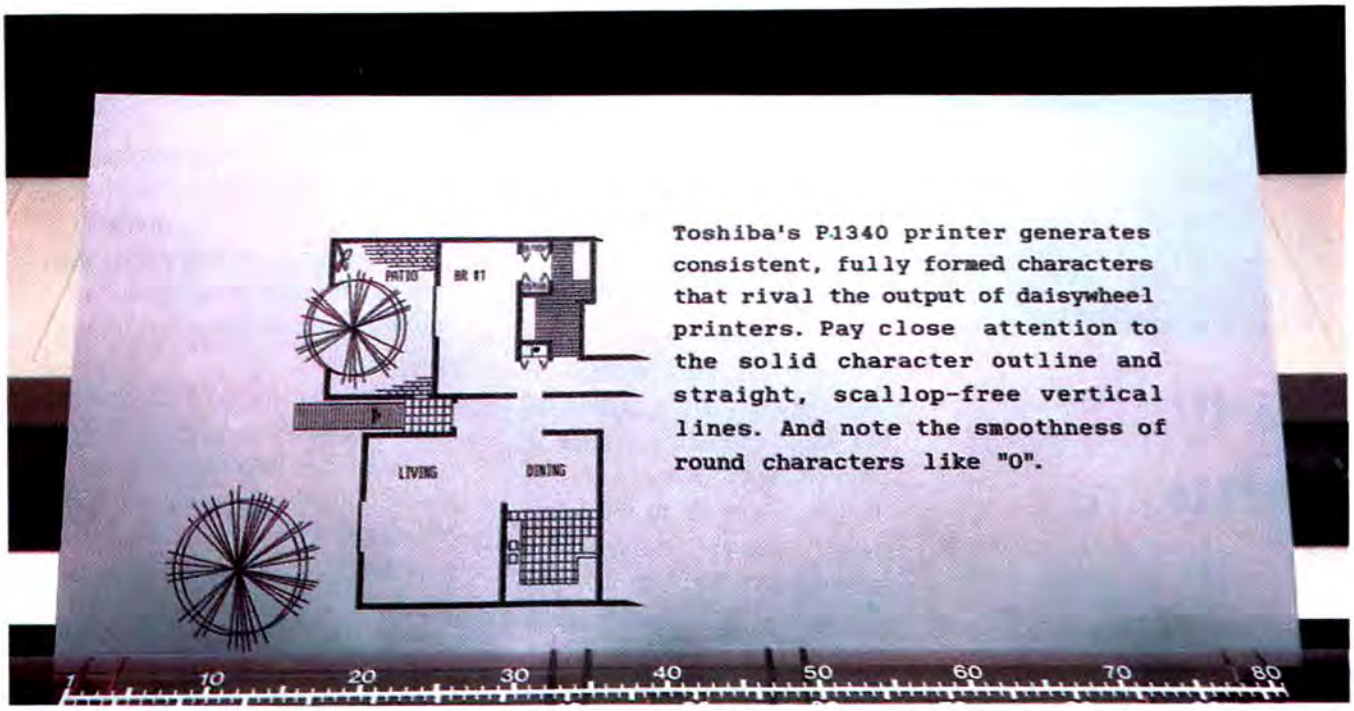
The emphasis here is on primer—this is software for those who nurse a mild aversion to personal computers. Scarborough has a knack for turning out accessible packages, among them the popular *Master Type*. In this case, Scarborough has erred on the side of coddling; there's a slightly patronizing tone to *Your Personal Net Worth* that mars an otherwise excellent presentation.

Your Personal Net Worth isn't quite as ambitious as Andrew Tobias's *Managing Your Money*, which is replete with counsel from an avatar of financial wisdom. But it is exceptionally easy to use, well organized, and guaranteed to get you up to snuff on budgeting, financial modeling, and accounting lingo. Program commands are consistent among sections and are accessed via the PC's function keys. Scarborough Systems suggests you use the program at least twice a month to get the jump on creeping profligacy.

Financial paperwork got you befuddled? *Your Personal Net Worth* is designed to help you set up a budget, monitor your income and expenses, organize a household inventory, record stock transactions, create a balance sheet of personal assets and liabilities, expedite tax preparation, reconcile bank accounts, handle loan setup and payment, and give you a sense of your overall worth (financial, not existential). The program can manage up to 4000 transactions per double-sided disk and juggle ten bank accounts.

The heart of the program is a lengthy chart of accounts divided into expenses, income, assets, and liabilities. Credit card transactions, an offshoot of liabilities, can be segregated into a separate category. The program can handle up to 350 different accounts, the bulk of which are supplied with the program. You can add, modify, or delete individual accounts, although the five basic subdivisions (as well as the program's record structure) are fixed. In case you don't have the manual on hand, a complete online listing of accounts is available; each is letter-coded according to its place in the chart of accounts.

Of the six main program functions—money management, tax records, personal property, stock portfolio, dollar analyzer, and maintenance—money management is clearly the workhorse. *Your Personal Net Worth* is also adept at



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scouting for the tax man. The program automatically flags and records tax-deductible items anywhere they appear. The tax-records component additionally segregates expenses by type–sales tax, income tax, deduction, and so on.

Need a "what if" scenario for a loan or a savings goal? Invoke the program's dollar-analyzer function to compute present and future value. You merely set the goal you want to reach; the program calculates how much you'll need to stash away each month and how long it'll take to reach that goal.

Your Personal Net Worth generates a panoply of reports–income statements, a net worth summary (in essence, a balance sheet), a transaction history, a credit card report, a list of all journals–and will print your checks to boot. If you have the necessary hardware, you can display and print color graphs.

Scarborough has produced a clean, lively user manual for *Your Personal Net Worth*. The manual is comprehensive and generously illustrated. A glossary and a detailed list of error messages (and suggested remedies) underscore the program's "computers-for-the-masses" approach. The on-line help screens are so packed with examples and tips that your trips to the manual should be few and far between. An on-line tutorial consolidates all help screens into a concise walk-through of the program's 16 major components.

Your Personal Net Worth is mortal, of course. The program is a palatable hybrid of accounting and data management, but it's hardly a full-blown rendition of either. In its zeal to be simple–and thereby spare you from having to define anything–Scarborough has sacrificed some flexibility. Records, for example, can't be sorted or displayed selectively. Note too that while changes in an account will ripple through corresponding accounts elsewhere in the program, stock records and dollar-analyzer components stand alone and thus require additional data entry.

While Scarbough encourages you to use *Your Personal Net Worth* in lieu of a check register, the program works best for money management. Computers truly shine when they simplify life and provide a glimpse of the big picture. Used wisely, *Your Personal Net Worth* can clean up your hitherto murky personal finances. Best of all, the program's probably tax deductible. *–Ken Greenberg*

Your Personal Net Worth
Scarborough Systems, Inc.
25 N. Broadway
Tarrytown, NY 10591
914/332-4545
List price: $99.95
Requirements: 128K, one disk drive

Jetdrive, Version 2.75

When I was young and inclined to ask simple questions that had complicated answers, I asked an electrical engineer how radio worked. "It's magic," he said resignedly. "Just magic. Don't delve too deeply into the mysteries of science," he added as he pushed past me, "and your life will be happier." I ignored that advice, of course, and have since spent many sleepless nights wrangling with concepts ranging from relativity to Better Living Through Teflon. When the chance of comprehending a subject seems particularly slim, I conclude, "It must be magic–it works!" and promptly fall asleep. Of such stuff are former physics majors made.

This same unscientific approach can be applied to RAM disk software, those clever programs that miraculously turn part of the PC's memory into the electronic equivalent of a disk drive. The essential fact to remember is that RAM disks work faster than mechanical disk drives because they use the lightning-fast solid-state components that make up the PC's memory. RAM disks can also exceed the 360K limit DOS imposes on floppy disk storage. So if you manipulate very large files, documents, or data bases, or if you simply want to speed up a program's operation, a RAM disk is the answer. But there is a catch: a power outage or rebooting your PC will send everything in the RAM disk to data heaven.

While *Jetdrive*, version 2.75, from Tall Tree Systems, can't do anything about a kicked-out power plug, it will retain RAM disk contents when the system is rebooted–something that not every RAM disk program can claim. And though *Jetdrive* isn't the fastest RAM disk program on the block, it offers performance comparable to such stalwarts as AST's *Superdrive*. *Jetdrive* can use any combination of

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memory boards to create RAM disks as large as 640K; RAM disks topping 2MB are possible using Tall Tree's JRAM-2 memory board. Like past versions of the program, *Jetdrive* 2.75 is installed solely via software; system switches need not be set.

Tall Tree has wisely enhanced *Jetdrive* to support up to four variably sized RAM disks. Multiple RAM disks are particularly useful with programs such as *Framework*, which can juggle several tasks at the same time. For example, if you're word processing a document and you need to simultaneously perform a disk-intensive chore such as sorting data base records, having all the requisite files in RAM disks can speed things up appreciably. Experienced users will have little difficulty setting up multiple *Jetdrive* RAM disks; new users, however, may find configuring and sizing several RAM disks a hair-pulling exercise, particularly since essential information is scattered throughout *Jetdrive*'s user manual. Owners of version 2.40 (which confines the user to a single RAM disk) can obtain a copy of version 2.75 for $20.

While all these features are important, it's performance that makes or breaks any RAM disk program. In informal speed tests pitting *Jetdrive* against *Superdrive*, the Tall Tree product did very well indeed. Jumping from the top to the bottom of a 75K, double-spaced *WordStar* document took both programs approximately 11

seconds; both saved the file in 3 seconds; reformatting the entire document into a single-spaced, 40-column format took *Jetdrive* 4½ minutes and *Superdrive* a little over 5 minutes. Conclusion: *Jetdrive* can hold its own in the speed category.

Jetdrive's user manual is relatively straightforward, though the small type will probably send you scurrying for a magnifying glass. Like most user manuals, it would greatly benefit from illustrations and a detailed discussion of some common applications. Tall Tree was thoughtful enough to provide a comprehensive list of error messages and their probable source, a glossary of computer terms, and several chapters on the use of JET.COM, a high-speed file copy program that's designed with the hard disk user in mind.

Jetdrive may not be the solution for every PC user who wants to speed up sluggish programs or perform electronic spreadsheet gymnastics. It's a bit more expensive than its peers, and it doesn't include a print spooler–a utility commonly packaged with RAM disk programs. But *Jetdrive* is fast and as reliable as any RAM-drive program can be; and it works with enough memory to satisfy even the most demanding user. *–Robert Luhn*

Jetdrive for DOS 2.00, Version 2.75
Tall Tree Systems
1032 Elwell Ct. #124
Palo Alto, CA 94303
415/964-1980
List price: $60
Requirements: 192K, one disk drive, DOS 2.00

Bin

It's a night that strikes fear in the heart of every procrastinating taxpayer: April 14. Antacid is in one hand; in the other is an 8-pound, hand-held calculator you bought in 1974 that gobbles batteries like a starving *Pac-Man*. Your desk groans under a pile of travel expense receipts, doctor bills, credit card statements, check stubs, and other tax-time clutter amassed during the year. Your 1040 form and schedules A through W await. Where do you turn for help?

If you're filing a personal or small-business tax return, you might turn to *Bin* from Superflight, Inc. Granted, the name *Bin* has a decidedly unglamourous ring to it, but this is intentionally a bare-bones program: it does a simple job, takes 15 minutes to learn, and doesn't cost much. *Bin* collates your tax information and totals it far faster than the traditional calculator and file folder (or bin) method permits.

If you're like me, you probably organize your receipts, statements, and other income tax papers by dropping them into file folders labeled Medical Expenses, Travel, House Payments, and so on. The next chore is calculating a total for each category for the IRS forms stacked in front of you. The problem with this manual method is

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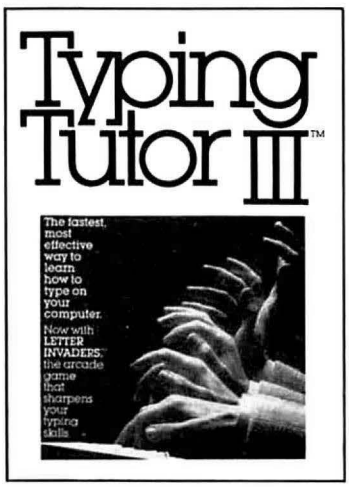

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that it's difficult to physically separate items on credit card statements or check stubs; avoiding duplication is a trick if you also have paper receipts for these items.

With *Bin*, tax information—expenses, income, deductions, and so on—is categorized and amounts are calculated simultaneously. For each item, an amount and notes of up to 256 characters can be entered in the appropriate column in a category (or bin) that you have created. *Bin* automatically assigns an item number for each entry in a third column. Each file can hold 20 categories, with each category containing up to 300 items. The type of amount entered (such as hours versus dollars or expenses versus income) must be consistent within a category because *Bin* automatically calculates the total for the amount column whenever an item is entered or deleted.

Items in a category are automatically sorted in ascending order by amount unless you specify another option, such as a reverse sort in order of descending amount, an alphabetical sort based on the first letter or number (as in a date) in the notes column, or no sort, so that items appear in the order entered. With automatic sorting, duplication is avoided because double entries can easily be spotted. A single keystroke produces a printed report for one category or a summary report that lists the total amount and number of entries for each category in a file.

Other *Bin* applications are equally practical. A consultant or a small business could use *Bin* to generate client invoices, with a bin assigned to each account. The traveling businessperson who must constantly tabulate receipts and file expense reports might also find *Bin* useful. Given its flexible design, *Bin* could also be used to inventory personal valuables for an insurance policy or stock for a small business.

Bin comes with an unusual money-back guarantee. The copy-protected disk you receive for $30 can be returned within 30 days for a full refund if you aren't satisfied. If you keep the disk, you can buy an unprotected version of the program for an additional $10. If you initially buy the unprotected disk for $40, you forfeit the money-back guarantee. The manufacturer claims that *Bin* will run on PC-compatible computers. *—Christine Whyte*

Bin
Superflight, Inc.
P.O. Box 4347
Stanford, CA 94305
415/493-5050
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Requirements: 64K, one disk drive

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An Apple a Day . . . won't tell you if you're going to live or die. But depending on the symptoms you specify, it can tell you what you may have. For instance, if you suffer from upper stomach pains an hour or two after eating and have a few other symptoms, the program tells you to 'See a doctor. You may

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have an ulcer.' If the malady comes in waves and is accompanied by a fever or diarrhea, it will urge you to 'See a doctor. You may have a gallbladder or a gastrointestinal problem.' On the other hand, if your symptoms point to simple heartburn, the program refers you to self-help hints under item 26 ('heartburn') in the health problems list.

For those mundane, benign ailments that plague everyday life, like heartburn, a bee sting, or diaper rash, *An Apple a Day . . .* gives practical advice on how to deal with the problem at home. It also tells you in clear, straightforward language what caused the ailment and what you can do to avoid it in the future. *An Apple a Day . . .* is a family's complete home health reference. The program also includes a Medical Records section, which stores health histories and offers useful information. The Immunization History category, for example, notes at what age certain vaccinations should be administered. There's also a Health Telephone Directory, where the names, addresses, and phone numbers of your health professionals can be stored. (Even Bowser's veterinarian has a category.) Data for both sections is entered in simple on-screen forms; printing records is a matter of a single menu selection. Clearly, the main use of these records is in their printed form: the telephone directory for next to the phone and the health records for your current and new doctors.

Whenever I look at a computer program that organizes records or provides information, I ask myself, "Could I do this more easily with a pencil and paper?" "Could I find the information I need more quickly in a book?" There's no question that more extensive medical information is available elsewhere; certainly there are faster sources to choose in a medical emergency. But *An Apple a Day . . .* is interactive, and therein lies its strength. By fine-tuning its questions in response to your answers, the program can quickly pinpoint a problem. If nothing else, *An Apple a Day . . .* will help you gather information that your doctor can use.

Of course, don't let being informed go to your head. I wouldn't stride into my doctor's office and authoritatively announce, "Doc, your problems are over and mine are just beginning! I've got a gallbladder or gastrointestinal problem. Whaddya think about that?" Chances are your doctor will unhook his or her stethoscope, arch an eyebrow, and ask, "Oh, do you have stomach pain? Is the lower right area of the stomach tender when you press it? Has the pain lasted more than one day?" Don't interrupt the fun–after all, that's what your doctor gets paid for.
–Darcy DiNucci

An Apple a Day . . .
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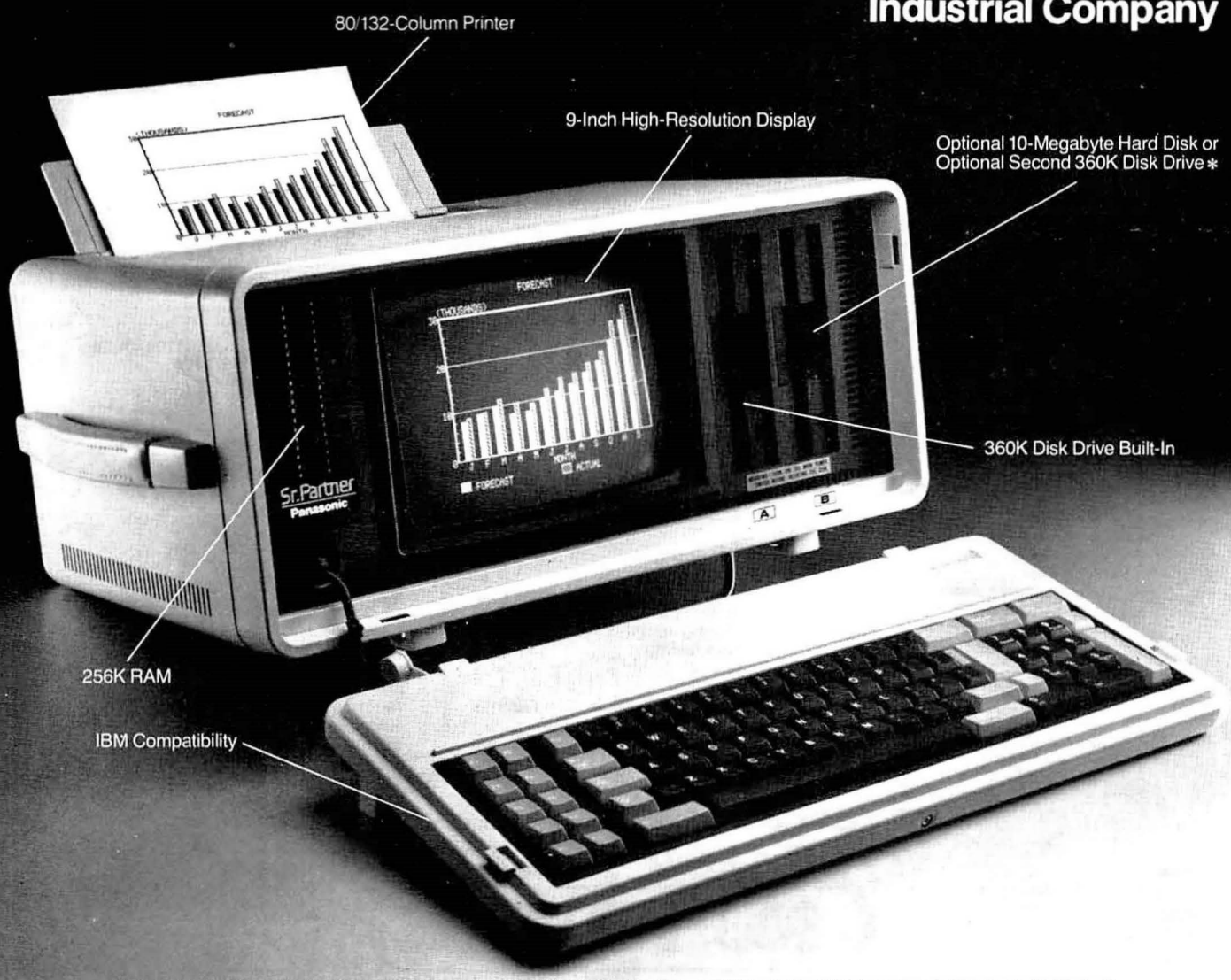

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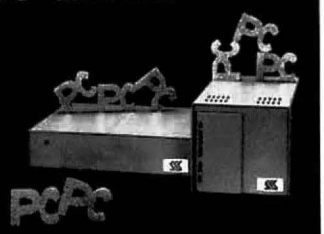

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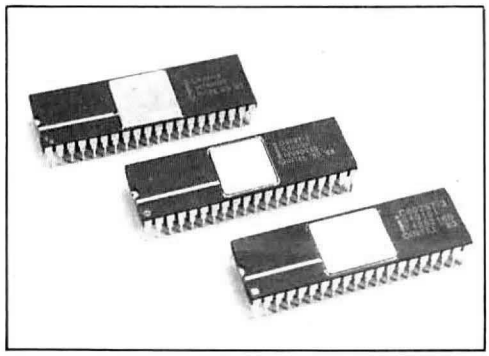

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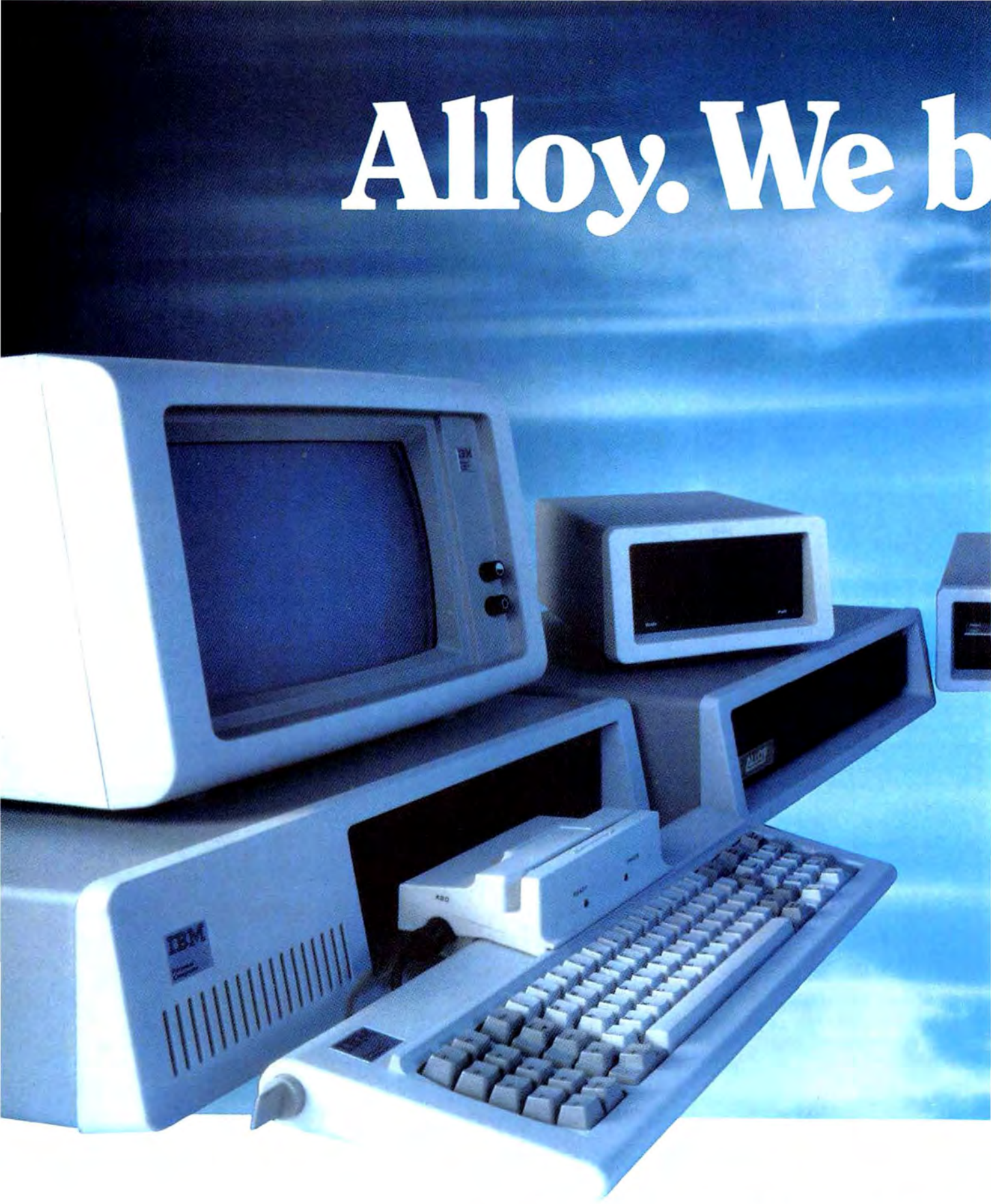

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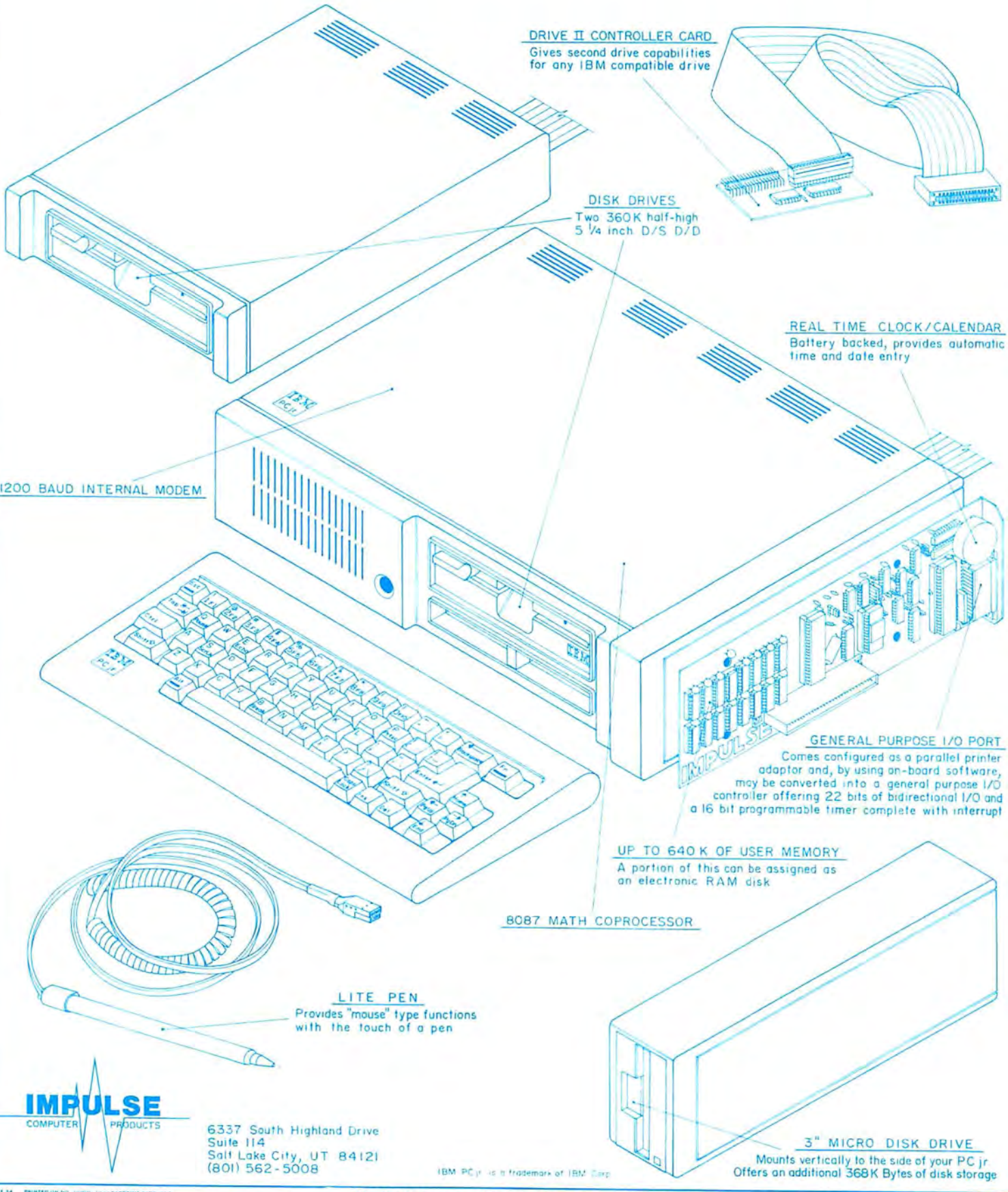

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PCjr WORLD

March 1985

The PCjr Magazine

Junior Meets Jr

Junior Meets Jr

Programs for 3- to 8-year-olds should be fun as well as educational.

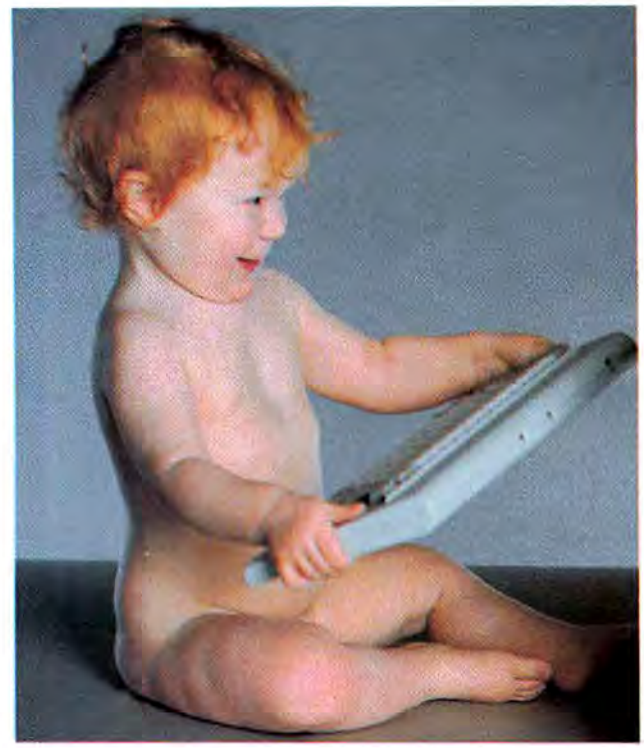
Linda Williams

Being a parent is a tough job in the 1980s. Gone are the good old days when all you had to do was cope with diapers and midnight feedings. The 1980s is the decade of Superbaby–kinderswim classes, designer jammies, and preschool software.

Turn on the television and you're confronted with a commercial that features a precocious tot learning computer skills at his mother's knee. This type of advertisement would have you believe that if your child does not use a computer before the age of 3, you can forget about Harvard–and maybe even the local junior college. Silicon Valley, with the help of Madison Avenue, has discovered the power of parental guilt.

Don't believe all the hype–a computer is not compulsory for preschool learning; it is simply one of many tools children can use to explore their world. As long as parents recognize that the best children's software possesses educational value comparable to snail watching, sand castle building, tree climbing, and finger painting, computers can be an enriching part of a young child's learning experiences.

If you're looking for a good way to introduce your youngsters to computers, any of the five programs reviewed in this article–*Kid's Stuff, Alphabet Zoo, Creature Creator, Facemaker,* or *Juggles' Butterfly*–should fit the bill. With the exception of *Alphabet Zoo,* which runs only on the PC, these disk-based programs run on both the PC and the PCjr.



Giggles and Chortles

If you can measure a program's success by the number of giggles, chortles, and other appreciative sounds it evokes from youngsters, *Kid's Stuff,* by Stone & Associates, is an all-out winner. In fact, the program, which is designed for 3- to 8-year-olds, is a winner by just about any standard.

Kid's Stuff consists of one counting and two early reading activities that are as entertaining as they are educational. The first activity presents the child with a picture of an animal or object and the outline of the animal or object's name. As the child types the letters that spell the name, the program colors in the outlined letters. When the name is completed, an appropriate sound effect or tune plays, and the picture becomes an-

imated. For example, when the child types **window**, a ball sails through the pictured window, leaving a hole in the pane.

The second *Kid's Stuff* activity is a counting exercise. The screen displays pictures and asks 'How many objects?' When the child enters the correct answer, the scene animates in amusing and unexpected ways: balloons pop, one by one, and their strings fall to the ground; ice cream cones melt and drip. If three incorrect answers are given in succession, the program hints at the answer by outlining the correct number on the screen.

Kid's Stuff *is more than educationally sound software; it is a program that delights as it teaches.*

The program's third activity displays an empty screen and lets children type their own words in large, easy-to-read letters. In contrast to the marvelous graphics of the other two activities, this third selection may seem rather dull, but young children are usually eager to write words they know, and *Kid's Stuff* gives them far more writing control than do pencil and paper.

Kid's Stuff has a set of options that allow parents to tailor each activity to their child's abilities. For example, in the first activity, parents can choose not to display the outlines of words, making the task more difficult and providing spelling practice that is challenging even for older children.

Kid's Stuff is a unique program. Its designers have a whimsical turn of mind and obviously believe learning can and should be fun. *Kid's Stuff* is more than educationally sound software; it is a program that delights as it teaches.

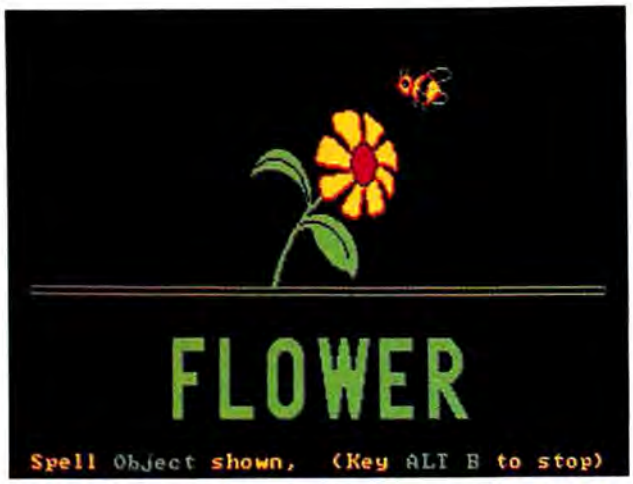
Zoo Story

Alphabet Zoo, an educationally valuable preschool program from Spinnaker, has pleasant music and graphics and should entertain children ages 3 to 8. But it lacks the fanciful quality that makes *Kid's Stuff* so much fun.

Like *Kid's Stuff*, *Alphabet Zoo* has three options. The first is much like the naming activity in *Kid's Stuff*. A letter of the alphabet appears on the screen, followed by a picture of an object whose name begins with that letter. *Alphabet Zoo* then plays a tune and displays the full name of the object below the picture. By pressing the first letter of the name, the player advances to the next letter and picture. If a correct answer is not typed within 45 seconds, *Alphabet Zoo* moves to the next letter and picture.

The second and third *Alphabet Zoo* activities are maze games. An object, such as a fox, is displayed in the middle of a maze, with various letters strewn throughout the labyrinth. In the second activity children must make their way through the maze and, using a special pick-up key, "capture" the letter that begins the name of the object in the center of the maze. When the correct beginning letter is picked up, the object's name appears on the screen. In the third activity the child must capture all the letters of the name in correct order. As each letter is captured it is displayed on the screen.

Like *Pac-Man* and similar video games, *Alphabet Zoo*'s maze activities require some manual dexterity, especially if children use the keyboard instead of a



Kid's Stuff colors in the outlined letters as a child types a picture's name.

Kid's Stuff has a whimsical design. The program sometimes animates pictures in surprising ways.

joystick to move through a maze. The difficulty of using the keyboard is aggravated by Spinnaker's choice of keys for moving the cursor up, down, right, and left. For example, if two children play together, one must use E, X, D, and S, with A as the pick-up key; the other player must use O, comma, L, and K, with J as the pick-up key. Children who've mastered the PC's cursor control keys may be frustrated and confused by these key groupings. At the very least, Spinnaker should include stick-on direction labels for the keys.

Doing the Monster Mash

Unlike the previous programs, *Creature Creator*, from DesignWare, does not teach specific subject matter, such as math or reading. Instead, the program develops sequential planning and memory skills. In addition, *Creature Creator* teaches children to write simple programs that direct the movement of the creatures they create.

DesignWare advertises *Creature Creator* as a program for 4- to 8-year-olds. The program consists of three progressively difficult activities, which makes it appealing to a range of ages and qualifies it as a game young children can both enjoy and grow into. Children even younger than 4 can probably master the first activity, while the hard level of the third activity can challenge 8-year-olds.

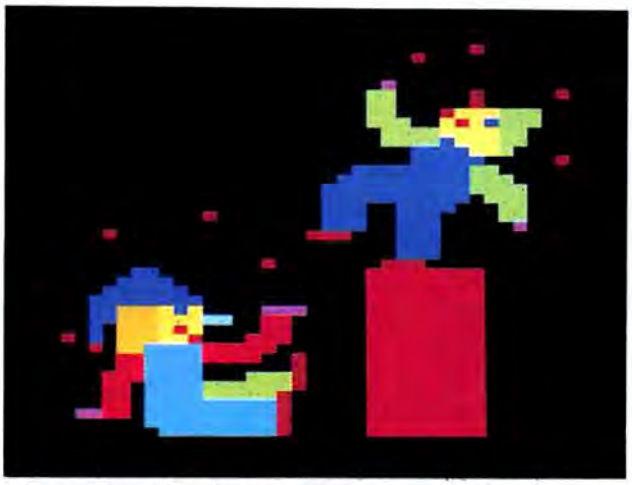
Creature Creator's first option lets children design a creature from an assemblage of heads, bodies, arms, and legs. In the second option, children determine how the creature will move and what noise it will make by typing a sequence of commands, such as H, W, and R for Hop, Wave, and Roar. In the third option the computer moves a monster in a sequence that players must try to duplicate.

Creature Creator is similar in design to *Facemaker*, a program from Spinnaker Software (see "Smarter With Age," *PCW*, Vol. 1, No. 6). *Facemaker* also has three activities. Children can design a face; create a program to make the face smile, frown, wiggle its ears, and stick out its tongue; and play a game in which they try to match movement sequences produced by the computer.

If this type of program appeals to you, how do you decide between creatures and faces? Chances are your children's taste will determine your choice. Children who enjoy chilling tales and aren't afraid of monsters should like *Creature Creator*. Children who find Grimm's Fairy Tales too grim should stick with *Facemaker*.

Creature Creator *does not teach specific subject matter, such as math or reading. Instead, the program develops sequential planning and memory skills.*

However, subtle differences between the two programs, particularly in the sequence-matching games, make *Creature Creator* educationally superior to *Facemaker*. *Creature Creator*'s design promotes better ob-



The graphics in Juggles' Butterfly are beautiful, but the program is poorly designed for its age group.

servation and pattern-recognition skills than the Spinnaker program. *Creature Creator,* unlike *Facemaker,* lets players compare their own movement sequences with the computer's and correct their mistakes.

Juggles' Butterfly

Juggles' Butterfly, from IBM, is designed for 3- to 6-year-olds. Although the program's graphics are striking, its educational goals are more limited and its activities less compelling and varied than those in the other games reviewed here.

The aim of *Juggles' Butterfly* is to teach the concepts *above, below, right,* and *left.* The program comes with two blue strips of cardboard, which are placed on top of the keyboard to divide it into halves and quadrants. The activities require children to press keys in the appropriate half or quadrant to signal above, below, right, or left. For example, to color a square above another square, children press any key above the horizontal blue line. The tasks are straightforward, but unfortunately, young children may be confused when they discover that pressing some keys such as <Esc> and <Shift> does not produce any result.

Each *Juggles' Butterfly* activity has a two-part practice section to familiarize children with the computer keyboard and the spatial concepts the program tries to teach. In the first part children press a key to see a picture such as a colored bar on one half of the screen. In the second part children are asked to respond to an on-screen picture clue. For example, a dot flashes in the lower of two squares on the screen and a message such as 'Now press below' appears. To say the least, these exercises are not enormously stimulating.

The best part of *Juggles' Butterfly* is the third element of each activity—a game. Pressing keys produces beautiful pictures and changes colors in portions of them. For example, children can change the colors of a butterfly's wings by pressing keys in the correct half of the keyboard.

"Sesame Street" and other children's television shows do a good job of teaching such concepts, so it's difficult to justify the cost of this $35 program. To make matters worse, the program is poorly designed for its age group: By the time children have the ability to read messages such as 'Now press below' and 'That was above', they probably have already mastered spatial concepts. Although the program may hold the interest of very young children, 5- and 6-year-olds will probably not be challenged by *Juggles' Butterfly.*

Careful Shopping

A child's age and ability are important considerations in selecting an educational program. Unfortunately, the age range listed on most packages provides at best a rough guide. Your children should test-drive any program before you buy it for them. Ideally, programs should include at least one activity that children can enjoy immediately and some others they can grow into.

Children's specific interests are, of course, an important factor. For example, those who are fascinated by letters and show signs of wanting to read will be delighted by *Kid's Stuff* or *Alphabet Zoo.* But don't overlook your own reaction to a program. Just as children like to hear their favorite stories a million times, they will want to play with their favorite software over and over—and they will want parents to join them or to "come see" every few minutes. Parents should choose a package that they can live with.

Linda Williams is an educational consultant and the author of Teaching for the Two-Sided Mind *(Prentice-Hall, Englewood Cliffs, New Jersey, 1983), a book that explores the educational implications of brain research. She is currently writing* Using Easy Writer II System.

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PCjr requirements: 128K, one disk drive, Cartridge BASIC

Alphabet Zoo
Spinnaker Software Corp.
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617/494-1200
List price: $29.95
PC requirements: 64K, one disk drive, color graphics board

Creature Creator
DesignWare
185 Berry St.
San Francisco, CA 94107
800/572-7767, 415/546-1866
List price: $29.95
PC requirements: 64K, one disk drive, color graphics board
PCjr requirements: 128K, one disk drive

Facemaker
Spinnaker Software Corp.
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List price: $29.95
PC requirements: 64K, one disk drive, color graphics board
PCjr requirements: 128K, one disk drive

Juggles' Butterfly
IBM
Systems Products Division
P.O. Box 1328
Boca Raton, FL 33432
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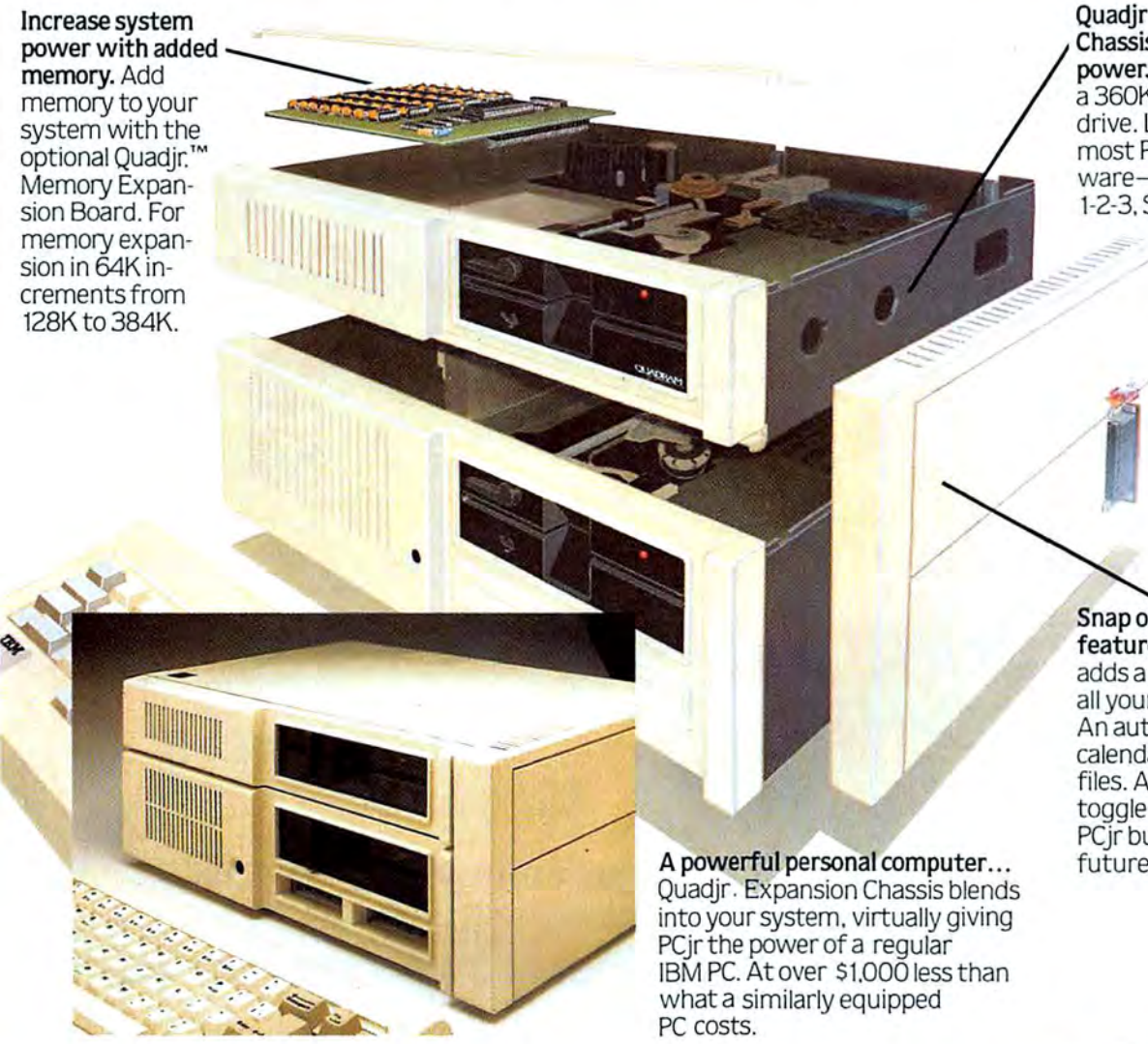

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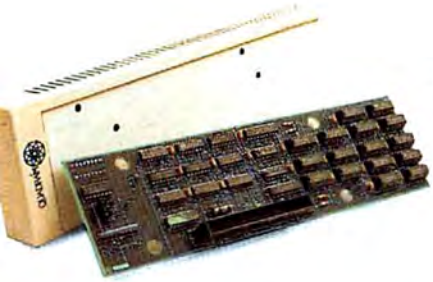

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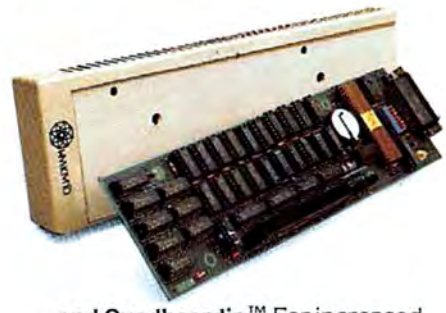

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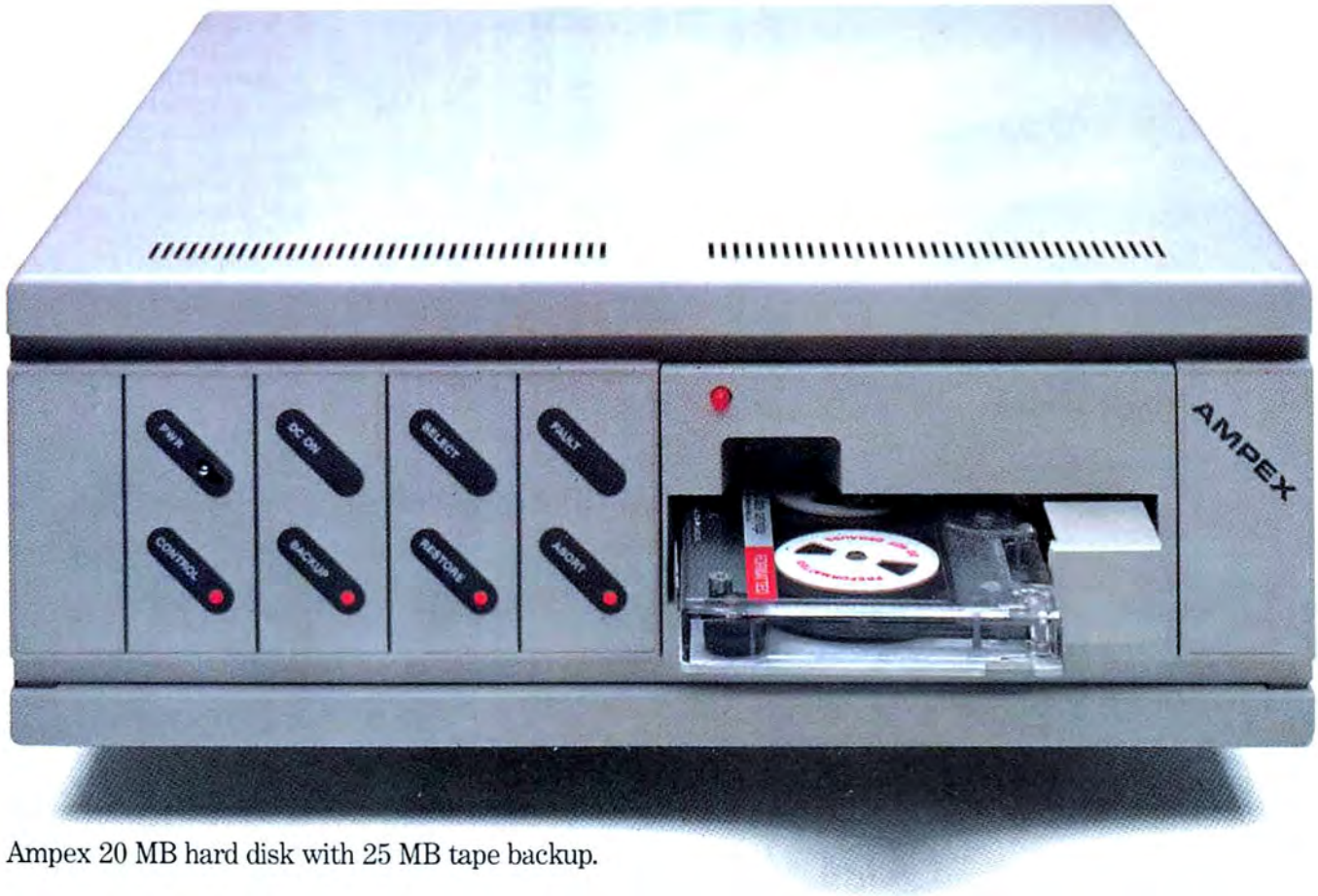

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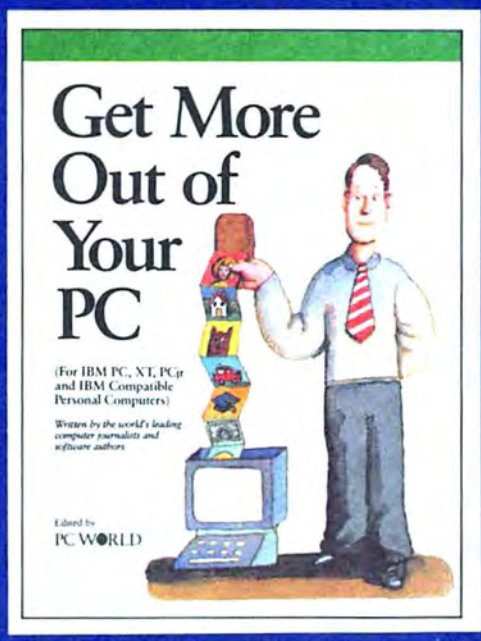

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Bar Code Bonanza

Fast and accurate, bar code readers are quickly becoming a popular input device for PCs in the retail and manufacturing industries.

Aubrey Pilgrim

If you bought this copy of *PC World* at a supermarket, chances are the sales clerk passed it over a light beam, and a beep indicated that the bar code symbol on the cover had been detected. That signaled the store's computer to deduct one *PC World* from inventory, to send a price to the cash register, and to add that price to the day's total sales. At the end of the day or week, the store manager could look at a computer report showing exactly how many copies of *PC World* and other bar-coded items were sold.

The advent of optical and laser technology, personal computers, and computerized cash registers has made the bar coding of America a reality. The little black and white stripes are printed on almost all commercially sold products. Their messages are read by wand readers or laser scanners and sent to computers for inventory control and accounting. From the factory to the stockroom to the point of sale, each bar-coded item can be tracked with a minimum of error and a maximum of speed. As the PC plays an expanding role in manufacturing and retail, more bar code hardware and software products are becoming available.

Bar code is not intrinsically different from the ASCII code that allows you to input data from a PC keyboard. When you press a key on the PC keyboard, a specific signal is sent to the PC and then translated into a sequence of high and low voltages. High voltages represent binary 1, and low voltages represent binary 0. For example, when you press the A key, the tone sent to the PC is translated into a voltage sequence representing 01000001, or decimal 65, the ASCII code for the letter *A*. When a bar code reader is passed over a bar code that represents the letter *A*, the same voltage sequence is generated and sent to the computer.

In the Grocery Store

After several years of study, the grocery industry adopted the Universal Product Code (UPC) in 1973. The UPC uses a series of vertical marks arranged to represent numbers from 0 to 9. Each product can be assigned and marked with its own number that is stored in a computer along with product information, such as the item's price and size, the quantity in stock, and the vendor.

The UPC bar code system quickly revealed itself to be an excellent labor-saving tool. Retailers discovered that many errors are made when a human enters prices on a cash register: Clerks can hit the wrong key or misread prices, or products can be labeled incorrectly. But with bar code entry, errors are almost nonexistent. Bar code readers are one of the easiest, fastest, and most accurate ways to enter data into a computer.

Yet when retailers first tried to use bar codes to replace prices on individual products, they met with consumer resistance. Many customers didn't trust computers, and they wanted to see a price that they could read on the products themselves, not just a label on the shelf. In response to this bar code backlash, some states passed laws requiring that products be plainly marked with their prices.

Although individual marking may be an advantage to the consumer, it is a hindrance to the supermarket. It requires extra labor to mark each item, and items must often be marked more than once because of special sales or price changes. Invariably, these costs are passed on to the customer. With a bar code system, a manager can call up a menu on the computer, press a few keys, and change all the prices in the store without reprinting the bar code labels. Many grocers who, by law, have to mark products, have not gone to the expense of installing bar code systems.

In the past many of the larger stores installed mainframes or minicomputers with large hard disk systems. Today, small computers that incorporate cash drawers and bar code scanners are more prevalent. For a small store, microcomputers can represent a relatively inexpensive way to take advantage of the benefits of bar codes. A store could even use a PC attached to a cash register or connect several checkout stands together with a PC or an AT.

Stripes

The number and variety of parts and assemblies that the military buys is mind-boggling. The armed forces stock most types and sizes of nuts, bolts, tools, computers, electronic parts, office equipment, automobiles, tanks, trucks, ships, planes, missiles, and much more. Keeping track of it all entails a fantastic amount of paperwork and labor. Just taking inventory of the warehouses and storage depots can take months and cost several million dollars.

In 1976 the Department of Defense (DOD) became interested in the grocery industry's bar code system. A committee called Logistics Application of Automated Marking and Reading Systems (better known as LOGMARS) was established to study the system. In January 1982 LOGMARS issued the MIL-STD-1189 standard for bar codes. LOGMARS also revised packaging requirements to include bar code markings on packages coming into the military stock system.

Many different bar code systems are used throughout the world. The DOD decided to adopt the 3 of 9 code (commonly known as Code 39),

Both wands and laser scanners are usually cabled to a small decoder box that is in turn connected to the computer.

which was originally developed by Intermec Corporation and is now in the public domain. With the grocers' UPC and most of the other bar code schemes only the numbers 0 through 9 can be generated. But Code 39 can generate 43 different characters, including the letters *A* to *Z;* the numbers 0 through 9; and the symbols *, -, ., space, $, /, +, and %. The asterisk is reserved to indicate the beginning and the end of a group of characters or a message.

Each character in Code 39 is made up of nine elements: five bars and four spaces. Three of the elements must be wide bars or spaces. Figure 1 shows the representation for the letters *ABC,* with an asterisk at the beginning and the end. Table 1 shows the configuration for the entire code and also the machine language 0's and 1's that are generated for each character.

The standard density of Code 39 is 9.4 characters per inch. Low density may have as few as 3 characters per inch. Densities up to 17 characters per inch are possible using film and photographic processes to produce the labels. Bars should be at least ¼ inch high for hand scanning. But a laser scanner can read high-density codes as narrow as 1/16 of an inch.

Wands and Lasers

Bar codes are read and transferred to a computer with the help of a bar code reader (see Figure 2). Most bar code readers use a light-emitting diode (LED) to focus either visible red or infrared light on the bar code. The light is absorbed by the dark bars and reflected by the white spaces. As the reflected light is detected, a square wave pattern of high and low voltages is generated. A bar code reader measures

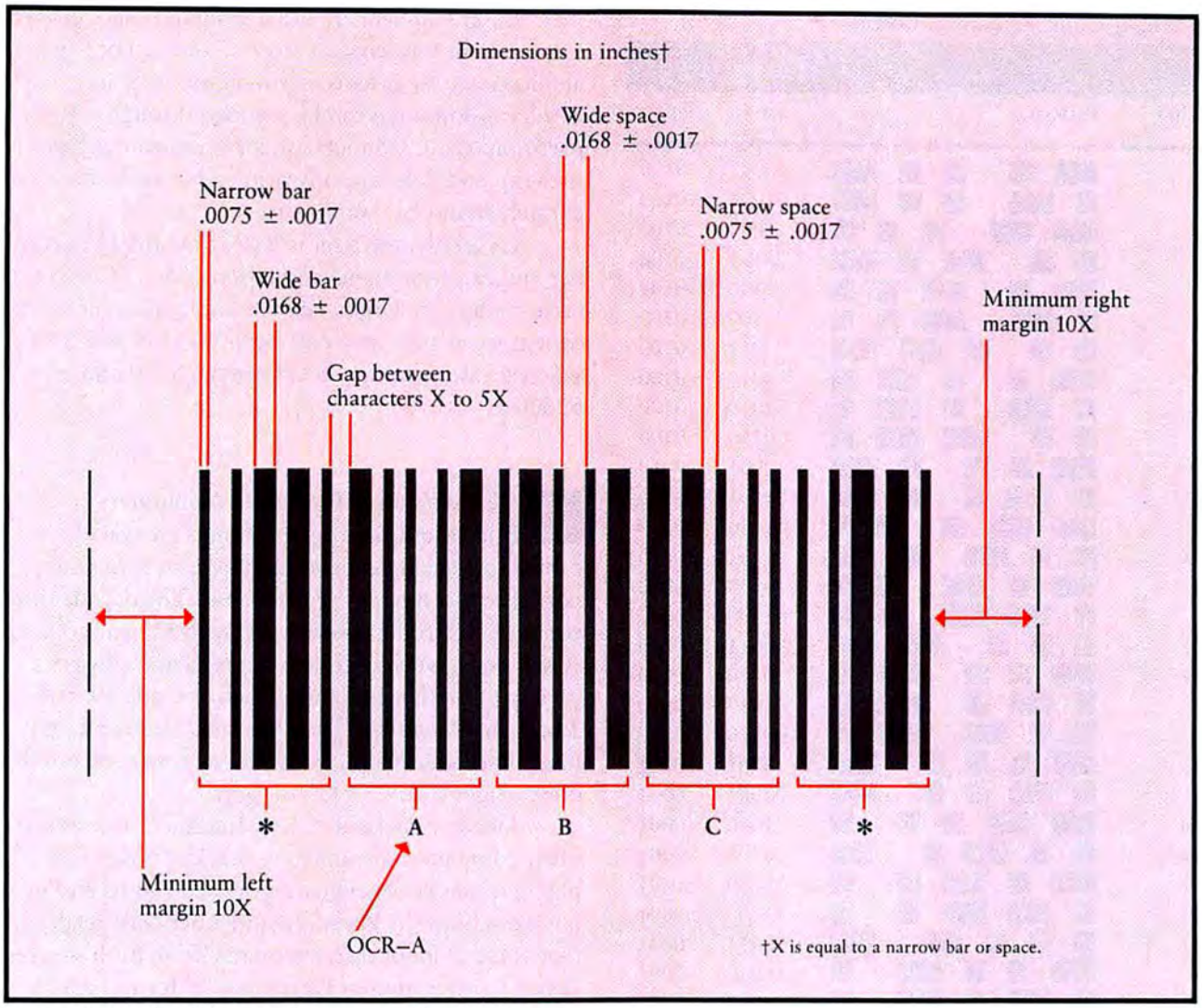

Figure 1: Code 39 bar code patterns for the letters A, B, and C. The width of each bar and space represents digitally encoded information.

Courtesy of Intermec Corp.

only the width of the bars; in general, their height is of no importance. The aperture in the wand that accepts reflected light must be no larger than the width of the smallest bar being read. However, if the aperture is too small, it may detect an ink speck and erroneously report it as a narrow bar.

Visible-light wands can scan both carbon- and alcohol-based inks. Infrared wands, which use less power, can scan only carbon-based inks. Infrared wands can decode high-security bar codes that are printed in carbon-based ink and then obscured by a plain black block of alcohol-based ink. The wands simply ignore the alcohol-based block and read through to the carbon-based bar code.

Wands also differ as to whether they are analog or digital. Analog wands tend to be larger because the signal must be internally converted to a digital signal for storage in a computer's memory. However, an analog wand will work at a greater angle differential from a vertical position (0 to 40 degrees) than will a digital wand (0 to 30 degrees).

An alternative to a wand is a laser scanner, which uses laser light to read bar codes at a distance (see Figure 3). The laser detects the bar code much as the LED wand does, except that the laser can be stationary and does not have to contact the code. Since the beam is very thin, the height of the bar code can be very small.

Table 1: Code 39 configuration

Char	Pattern	Bars	Spaces
1		10001	0100
2		01001	0100
3		11000	0100
4		00101	0100
5		10100	0100
6		01100	0100
7		00011	0100
8		10010	0100
9		01010	0100
0		00110	0100
A		10001	0010
B		01001	0010
C		11000	0010
D		00101	0010
E		10100	0010
F		01100	0010
G		00011	0010
H		10010	0010
I		01010	0010
J		00110	0010
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L		01001	0001
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R		10010	0001
S		01010	0001
T		00110	0001
U		10001	1000
V		01001	1000
W		11000	1000
X		00101	1000
Y		10100	1000
Z		01100	1000
-		00011	1000
•		10010	1000
Space		01010	1000
*		00110	1000
$		00000	1110
/		00000	1101
+		00000	1011
%		00000	0111

Courtesy of Intermec Corp.

Laser scanners are often mounted over conveyer belts or built into grocery store counters. For some applications, the laser is essential. For instance, codes in a hazardous area can be scanned through a glass partition. Laser scanners can also read through plastic wrap and detect poorly printed bar code more accurately than LED wands can.

Generally, the laser is faster than the LED scanner and can read higher resolution codes. However, laser readers are larger, heavier, and quite a bit more expensive. Wands may cost between $150 and $300, whereas laser scanners cost between $700 and $2000.

Decoders and Hand-Held Computers

Both wands and laser scanners are usually cabled to a small decoder box that is in turn connected to a computer (see Figure 4). The decoder box contains electronic controls and converts bar code to ASCII code. Most decoders can read and convert a variety of bar code schemes, such as Code 39, UPC, 2 of 5, and Codabar. The associated electronics on most units also enable the reader to scan code upside down, right to left, or left to right.

Hewlett-Packard, Caere, Intermec, and several other companies manufacture decoder boxes that plug into the PC's keyboard port and can receive input from both the keyboard and a bar code reader so that you can input data alternately from both sources. Aedex Corporation of Placentia, California, sells a bar code reader that replaces the decoder box and keyboard cabling and plugs directly into a short expansion board in the PC. You can alternate data entry between the bar code reader and the keyboard at any time.

In most inventory situations you need to move around to gather data, in which case a battery-powered, hand-held computer may be called for. After collecting data with the hand-held computer, you can cable the data to a PC.

Several small computers, such as the Epson HX-20, the Radio Shack Model 100, and the Hewlett-Packard 75D, can accept bar code input. Intermec Corporation sells a small, lightweight computer with a 32-character display that can store up to 128K of data. Instead of a keyboard, it uses a plastic overlay with bar code symbols for the alphabet and numerals. To enter data, the wand is swept across the symbols on the keyboard or any other bar code symbols.

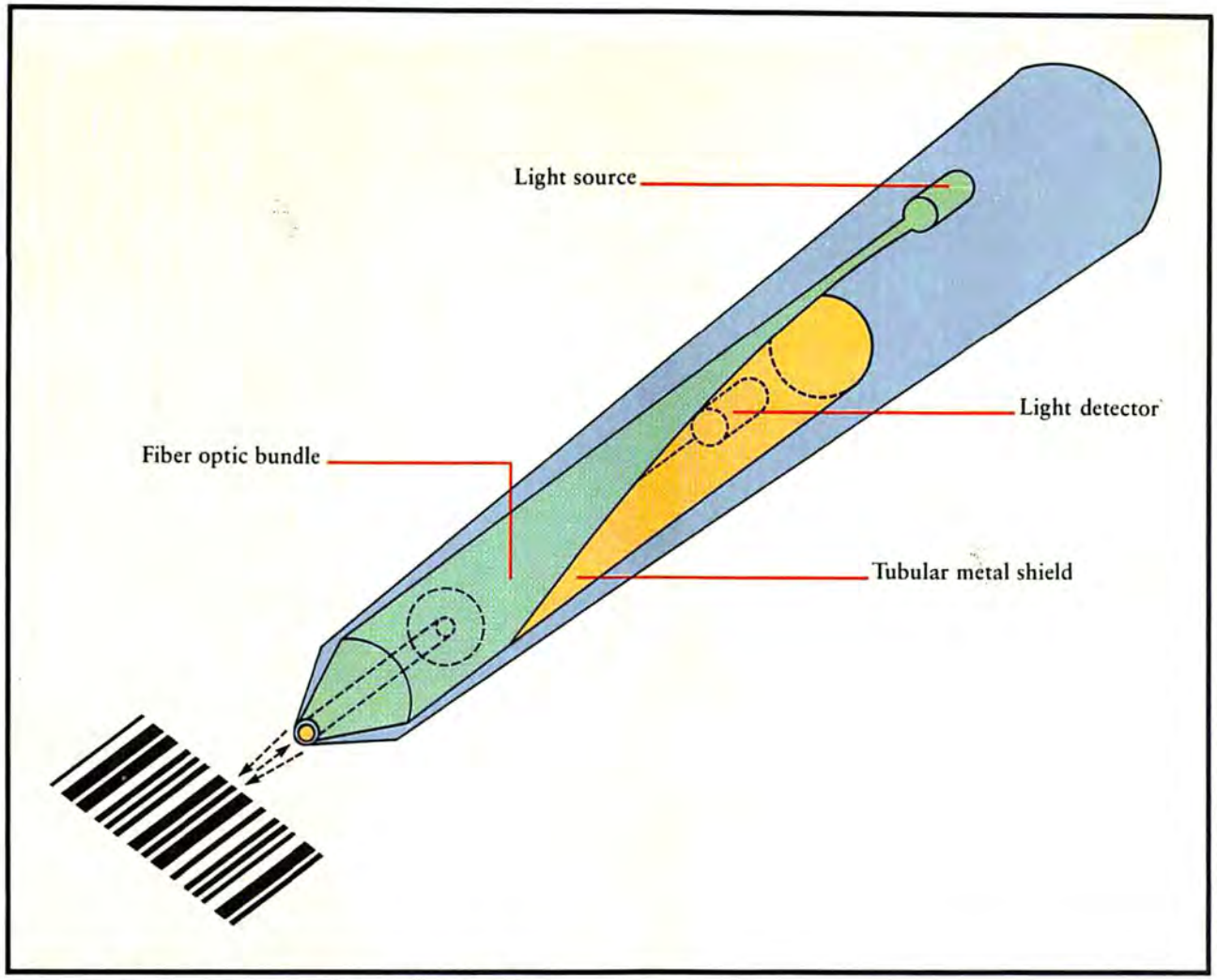

Figure 2: A wand bar code reader. Visible or infrared light is emitted by a light-emitting diode (LED). The dark bars absorb the light and the white spaces reflect it. The reflected light is detected by an aperture in the wand, translated into an ASCII signal by the decoder, and sent to a computer.

Courtesy MSI Corp.

MSI Corporation manufactures several models of hand-held bar code computers and readers. One of its wand readers can store 4K of bar code data internally. It is about the size of a cigar. Motorola, Electromagnetic Sciences, Telxon, and other companies sell bar code readers attached to two-way radio systems, so bar code data can be read and transmitted instantly back to a larger computer.

Bar Code Label Printers

When the DOD released the Code 39 standard in January 1982, it decreed that all military supplies would have to carry the proper bar code markings. (This caused a lot of groaning and gnashing of teeth among suppliers, although they later saw the advantages of such a system. See the sidebar "Bar Codes at Lockheed.") At that time, a bar code label printer system could cost as much as $20,000. Readers and other equipment might push the price up to $30,000 or more. But it wasn't long before some enterprising companies began to offer preprinted labels, so the small operator did not have to buy a printer.

Bar Codes at Lockheed

Many companies grumbled at first when they were forced to use bar codes to mark their military products, but they soon discovered that the military edict was a blessing in disguise. Most large manufacturers now bar code all their items, not just those destined for the military. Bar code systems save time and resources for receiving, inventory, and stock control–three areas of particular concern to the Lockheed Corporation in Sunnyvale, California.

"We have to receive, store, disburse, and keep track of 45,000 different items," says Pat Taylor, a programmer/analyst in the Lockheed Space Systems Division and an expert on bar code systems. She has designed and implemented programs for receiving and materiel operations. "I don't know of a better way to do it than with a bar code system."

When an item is received, a bar code label with information such as the item's part number and proper location in the storeroom is made up and attached. The person responsible for stocking the parts scans the label with a hand-held computer, which stores the data in its memory and then displays the stockroom location for the materiel. When the parts are dispensed the label is again scanned, and the data stored. If the hand-held computer's memory is filled before the end of the day, it is taken to one of the mainframes and downloaded. "This is an excellent system," says Taylor. "I don't know how we got by without it before."

El Mitchell is a manufacturing engineer in Lockheed's Missile Systems Division. His primary concern is factory data collection for work in process, labor and time charges, and location of parts and assemblies. Mitchell worked with a couple of sys-

tems manufacturers and suppliers to set up a system that could gather all the data he uses. Several stations tied to a mainframe were set up with bar code readers.

"Because we deal with the Department of Defense, we must maintain accurate records," says Mitchell. "Precise work instructions with discrete steps and operations are written for each assembly." When workers begin a job, they scan their employee number from their badge, then scan the code on the work order, then scan the operation number that will be worked. When the employees finish that job, they scan their badge again and then go to the next job.

"Later, if we want to know how much work has been accomplished on that particular part, we can access the computer and it will reflect exactly where it is within the manufacturing cycle," says Mitchell. "The bar code system has been a tremendous help for such things as collecting data for verification records, labor, scheduling, and forecasting."

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In the meantime technology has improved, and the cost of printers and related bar code equipment has come down. A fairly good label printer system can be bought today for about $5000.

Inexpensive dot matrix printers serve perfectly well for many bar code applications in factories, shops, offices, and stores. However, most dot matrix printers cannot print the high-density, high-resolution labels necessary in some environments. Some impact (letter quality) printers provide special fonts for the wide and narrow bars used in bar code. The labels are usually sharp and provide good resolution. Laser printers can produce very high resolution labels. Most of these printers are expensive, but prices are coming down.

Computer-controlled photographic processes can produce small, high-resolution labels with densities of up to 17 characters per inch. The photographic method is useful for tagging items such as circuit boards on which blank space is at a premium.

The W.H. Brady Company of Milwaukee manufactures photographically produced bar code labels that can withstand the high temperature of wave soldering. These labels can be placed on the top, the edge, or the bottom of a printed circuit board or other electronic components.

For more permanent bar code labeling, lasers can be used to etch bar codes directly onto metals. Lasers are used to mark items such as automobile engines, edges of printed circuit boards, plastics, and even wood.

Bar Code Software

Once bar code has been converted to ASCII, the PC can't distinguish it from keyboard data. So any software that works with keyboard data can also work with bar code data. However, some bar code applications can be streamlined with the help of specialized bar code programs, a number of which have appeared for the IBM PC.

Hillblom, of Los Gatos, California, markets a package for the PC called *DARTS,* which can be used for inventory tracking, shop orders, work center scheduling, route control, and shipping. ASAP Systems of Soquel, California, sells *!BARSOFT,* a data base management system that can be used for inventory and document control, capital asset accounting, freight management, work tracking, quality control, warehouse and shipment control, and product warranty tracking.

Helmsman Systems, of San Jose, California, sells *H-MRP,* a family of software that incorporates separate modules for billing, purchasing and receiving, inventory, planning, and monitoring work in process.

Unlimited Applications

Increasingly, companies are using bar code readers attached to PCs for point-of-sale retail and inventory, but there are thousands of other applications for bar codes. For example, some libraries now use bar-coded identification cards to speed up the checkout process. Other users include blood banks, hospitals, pharmaceutical companies, and logging mills. Some dairy farms even attach bar-coded tags to cattle.

Figure 3: The SP 2001 Laser Scanner from Spectra-Physics. Unlike wand readers, laser scanners can read bar codes from a distance.

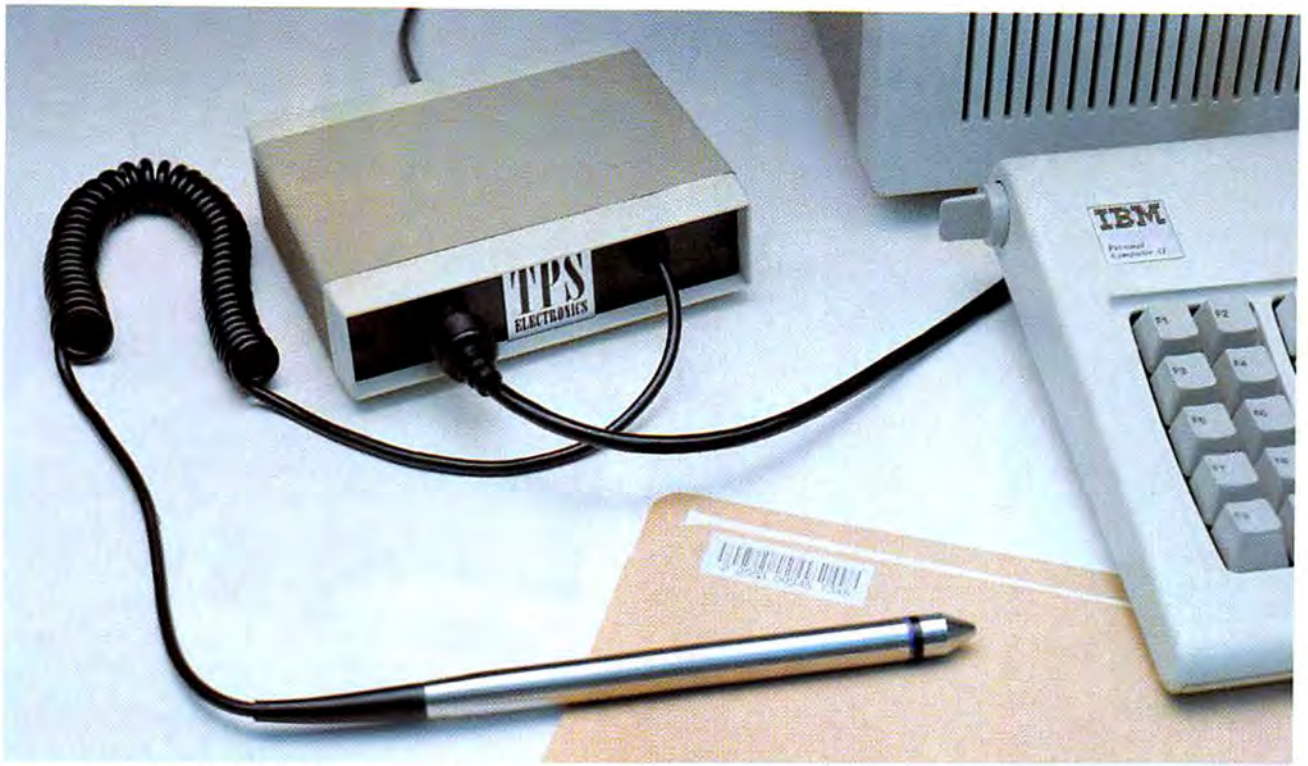

Figure 4: The TPC PC-300 AT wand reader and decoder box for the PC AT, from TPS Electronics. The decoder box translates bar codes into standard keyboard output code, allowing alternate keyboard and bar code input.

Another application for bar codes is security and identification. Some companies use bar-coded badges to clock employees in and out of work or to limit authorized access. Some marathon races issue bar-coded badges to runners to verify their identity and race time.

An unusual application for bar codes was developed by a magazine called *Databar,* which publishes bar-coded program listings. If you have ever typed a long program into a computer, you know how difficult it is to avoid errors. You can now enter programs into a computer by simply scanning the pages of the magazine with a bar code reader. Even sheet music can be published in bar code. The Casio Company markets an electronic organ with a bar code wand. By passing the wand over bar-coded sheet music, anyone can play almost as well as Liberace.

It takes almost no training to input bar code data into a computer. Bar code data can be entered at about 1700 words per minute with almost absolute accuracy. Know anyone who can type that fast? ●

Aubrey Pilgrim works in Product Assurance Engineering at Lockheed Corporation in Sunnyvale, California.

Addresses of bar code product manufacturers can be found in Bar Code Manufacturers and Services Directory, *published by North American Technology, also publishers of the magazine* Bar Code News. *The publishers can be reached at 174 Concord St., Peterborough, NH 03458, 603/924-7136.*

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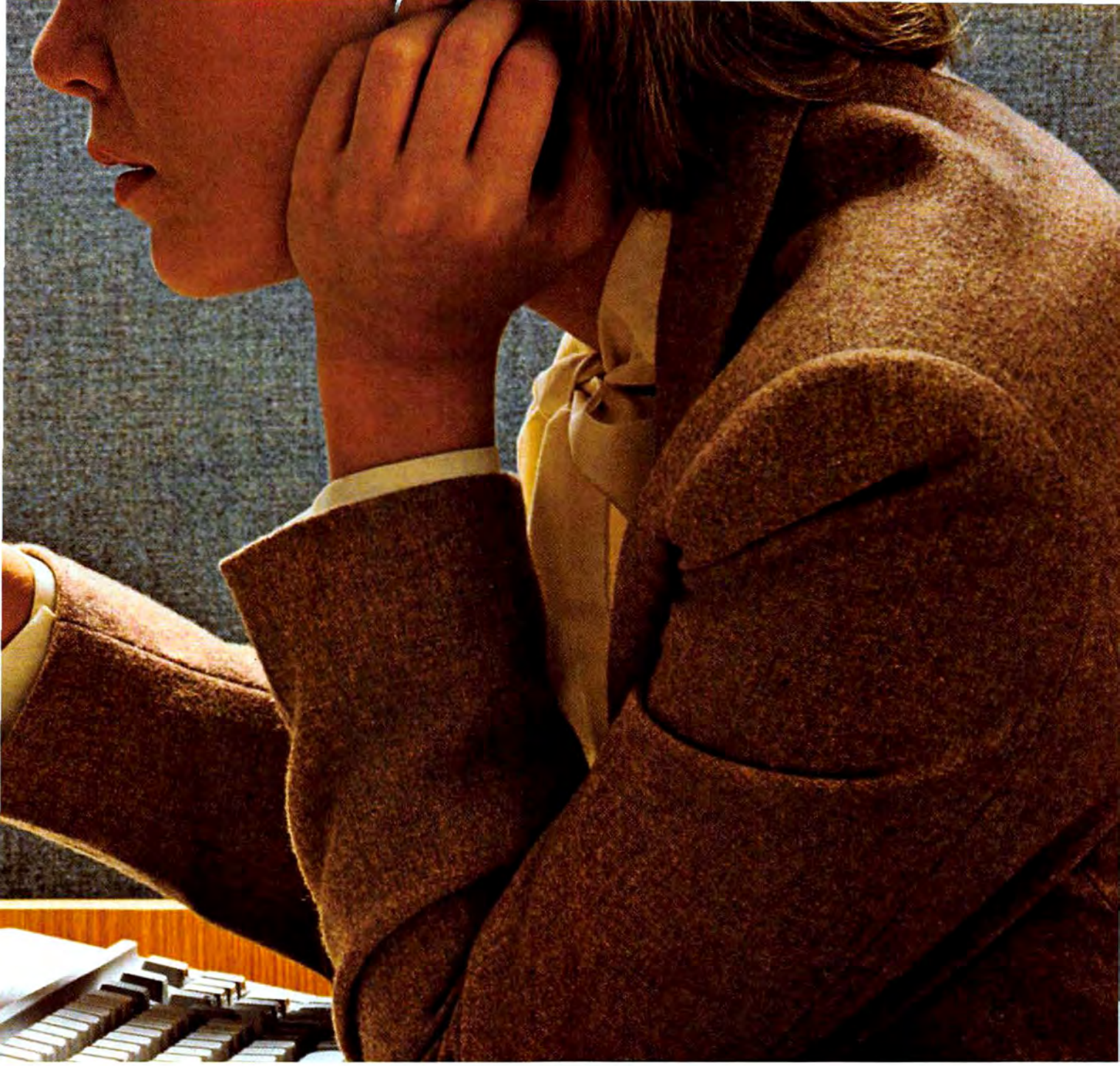

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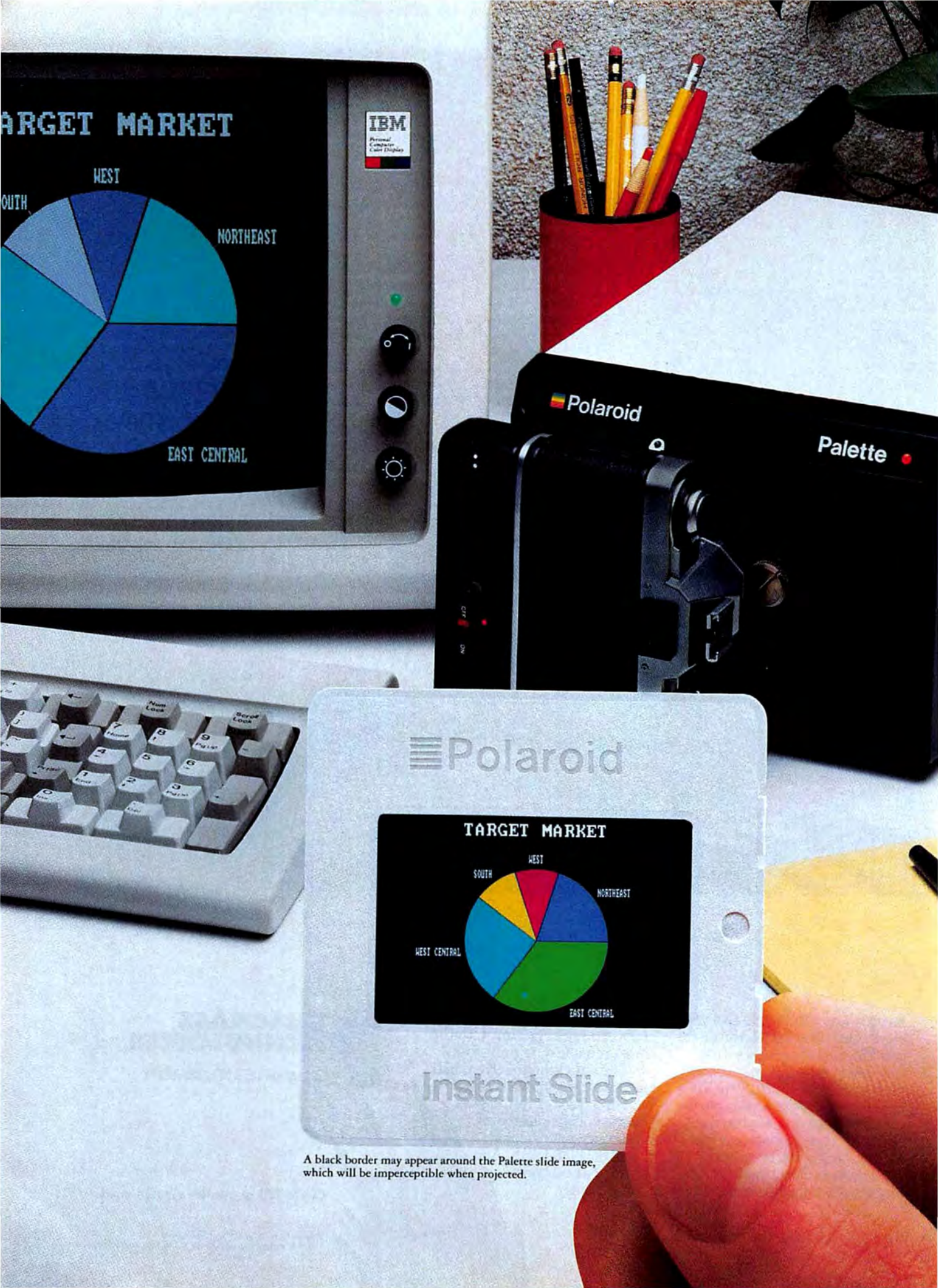

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1-2-3 Plays the Options Market

Explore the mysterious world of stock options with the help of 1-2-3. This template for covered call writing can help you analyze potential returns with one of the safest options strategies available.

Stephen A. Blumenthal

As a result of the strength of the stock market during the past two years, record numbers of people have invested in securities. Although recent price declines may have created moderate paper losses for some, many small investors believe that the market is continually improving, and they are reluctant to unload their shares.

These optimistic speculators often invest in options to make money from their stocks now and still take advantage of anticipated price increases. One options strategy is *covered call writing,* a relatively conservative approach that can safely be used by small investors. Some options strategies are extremely complex and risky; they usually require the simultaneous execution of numerous transactions on different exchange floors and incur multiple commissions. They can be effectively used only by professionals trading on behalf of their clients. The *1-2-3* template described here can be used to analyze the returns from a covered call writing strategy using price information available from the newspaper. You can track your options investments or simply investigate the market to see if you want to dabble in options.

Covered Calls Uncovered

In covered call writing you sell call options on a stock you own. A call gives the purchaser of the option the right to buy 100 shares of that stock at a predetermined price at any time during the life of the option (three, six, or nine months). For example, a holder of an April 130 IBM call can exercise his or her option and obtain 100 shares of IBM at $130 per share any time before April 20, 1985 (options expire on the Saturday following the third Friday of the month). The value of the IBM option on any day before expiration is determined by the current trading price of IBM and the amount of time the option has left to run. Obviously, an April option to buy IBM at $130 per share is not very valuable if IBM is trading at 122 on April 19. Conversely, an April IBM 130 call is worth at least $10 per share if, on the day before expiration, IBM is trading at 140. (For an explanation of terminology, see the sidebar "You're in the Money.")

Not surprisingly, the principal reason for writing covered calls is to make money. But you can make money (in addition to dividends) while you own the stock rather than only as a result of selling it, thereby decreasing the overall risk of stock ownership. Cov-

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ered call writing gives you the opportunity to make money whether the price of the stock increases, decreases, or stays the same. Indeed, owning a stock and writing calls against it is often more lucrative than simple stock ownership if the stock price falls, remains the same, or rises moderately. The only situation in which outright ownership always outperforms a covered write is when the stock price rises substantially.

Put another way, if you think your stock is headed for the stars within the options period you are considering, this strategy is not for you. A covered call limits the amount of money you can make from a stock sale because the sale will transpire at a predetermined price. In return, however, you get income from the options sale that may offset losses if the stock price falls.

Selling Time

If you have read this far, greed will probably induce you to learn more about the magical practice of selling time. To demonstrate covered call writing, let's use the example of a *buy-write;* that is, purchasing shares of a stock while simultaneously selling options against it. Other possibilities include selling options against a stock you already own and writing uncovered, or naked, options (in which you sell call options without owning an offsetting number of shares). Naked options writing is one of the most speculative activities in the securities industry and should be approached by only the experienced, and perhaps well-heeled, investor.

Assume that on September 21, 1984, you purchase 500 shares of Merrill Lynch (MER) at $31.75 per share. Simultaneously, you give your broker a *net* order, which is entered as the price of the stock minus proceeds from the option. (If your broker is not familiar with net orders, find one who is.) In this example, you sell five April 35 MER calls at 3⅜ per option. That is, you sell five calls, each representing 100 shares of stock, at 3⅜ per share. The purchase of the stock, including the broker's commission, costs $16,152, and the sale of the option produces sale proceeds to you of $1604–giving you a net purchase cost of $14,548. If you paid cash, that is the amount you would have to put up to perform the trade. However, because the purpose of this transaction is to maximize return, maximum use of *leverage* is appropriate, and covered writing is best done in a *margin* account. In this example the margin requirement for the transaction is $8076, and you can apply the options proceeds against it. This means you can purchase $16,000 worth of stock and sell options against it with only $6500. That, ladies and gentlemen, is true leverage. Executing this trade in a margin account has a dramatic effect on your rate of return. (If you do not have enough equity in the market to qualify for a margin account, this strategy is probably not for you.)

Naked options writing is one of the most speculative activities in the securities industry.

For $3.37 per share, you have sold someone the right to buy your 500 shares of MER at $35 per share until April 20, 1985. If on the expiration date the price of MER exceeds $35, the option will be exercised, and you will receive $35 for each share of stock you bought for $31.75, plus the proceeds from the sale of the options. If on the expiration date MER is below 35, the option expires and you simply keep the proceeds from the options sale. You sold the option for a period of time, the time is up, and the buyer did not exercise his or her rights. You are free to sell another covered option, use another options strategy, sell the stock, or just hold tight.

Calculating the Bottom Line

Assume that on April 20, 1985, the New York Stock Exchange closing price of MER is 36, one point above our option's *strike price* of 35. This means the options are exercised, because under options exchange rules 100 percent of *in the money* securities options are exercised upon expiration. Your broker informs you that the options you sold have been exercised, and your stock account is debited 500 shares of MER, which in turn are delivered to the holder of the option. Your account is credited with $17,223, the product of 500 shares multiplied by the strike price of 35, minus the broker's commission. This amount is added to the $1604 you received in premiums when

You're in the Money

To help you understand the differences between trading naked options (done on an exchange floor) and trading options naked (done on a beach in Maui), I offer the following explanations.

A *call* is an option to buy a specific number of shares of a stock at a specified price for a limited period of time. The call can be *exercised,* that is, converted into the stock, at any time before its expiration date. The opposite of a call is a *put,* an option to sell a specific number of shares of a stock for a specific price for a limited period of time.

All options share some common terminology. The price per share at which the option can be exercised (in our example $130) is called the *strike price.* The price you pay for the option is the *premium.* If an option purchaser pays $500 for a standard call of 100 shares, the premium per share is $5, and that is how prices are listed in the newspaper. If you own the option you are called *long,* and if you sell the option you are *short,* even if the sale is covered by your ownership of the stock. If you sell an option you are a *writer,* and if you buy one you are a *buyer,* unless you finance your speculation by writing articles for computer magazines, in which case you are also called a writer.

Options can be *in the money* or *out of the money.* If the strike price of the option is 130, and the stock is trading at 135, it is in the money. If the stock is trading at 125, the option is out of the money. The option will still cost you something to buy, however, so long as it has some time to run. This is called the *time value.* At any point during an option's life, price is a function of the price of the stock plus the amount of time the option has left to run.

Leverage is the use of borrowed funds to increase the total return on your investment. Obviously, the less money you put up, the greater percentage return you get on your investment. This is called *yield,* the percentage of income realized from an asset in comparison to its cost. Since most people are required to pay interest on the money they borrow, the return you get from your investment must not only recoup your initial investment, it must also pay back the interest you pay as *carrying charges.*

If the lender is your broker, the money lent to you is called *margin.* The amount a broker can lend you for the purposes of buying stock is governed by regulations of the Federal Reserve Board, the exchanges, and in some cases the brokerage's internal rules. Stock margins are currently at 50 percent. This means you can buy $1000 worth of stock by putting up only $500 of your own. The broker will lend the rest to you as margin and charge you interest. If the stock goes down, it eats up your money first, and the broker requires you to put up enough money to get you back to 50 percent—a process known as *marking to market.*

you sold the options. Deducted from this is the margin you borrowed from the broker, $8076, plus interest, for a net profit of $2206. On an out-of-pocket investment of $6471, the returns for the transaction for the period are 34.1 percent, or an annual return of 58.4 percent. Note that this high return is realized on a stock that rose just 3¼ points in nine months (see Figure 1 for a breakdown of the transaction for both margin and cash accounts).

By selling a 35 option for 3⅜—effectively selling the stock for 38⅜—you do better than you would if you simply owned the stock outright for the period and sold at 36. Also note, however, that you receive no more than 35 for the stock on exercise. Even if the stock goes to 50, you still receive only 35.

If the price of MER on the expiration date is less than the strike price of 35, the option expires. You pocket the 3⅜ premium per share and are under no obligation to deliver the stock. The returns on this example, assuming the option expires unexercised, are 17.54 percent for the period, or 30.06 percent annually (see Figure 1). An option expiring *out of the money* eliminates the threat of losing the stock. However, the income gained from the options sale does not provide unlimited protection against a price drop. The final calculation needed is a *break-even* analysis, which determines the point at which you will begin to lose money as prices drop despite receiving income from writing options. In our example the break-even point is 30.03 (see Figure 1).

Using the Template

1-2-3 is a superb tool for calculating the returns from covered options writing in both cash and margin accounts simultaneously. Substitution of different strike prices or expiration dates provides a "what if" analysis that allows you to compare opportunities in different options on a stock at any time. For a cell-by-cell listing of the template, see 1-2-3 Options Template in *Listings* at the back of this issue. To create a *1-2-3* options template, enter data as it appears in this grid. (Note that the widths of columns C, F, and I should be set to "3" and left blank to separate the template's calculation areas.)

Begin by mapping the spreadsheet to provide five columns for the calculation area. (The third column is left empty intentionally.) To aid "what if" analyses (what if I wrote the April 30 call instead of the 35?) and to make full use of *1-2-3*, the worksheet should limit data input to one section. All information necessary for the entire transaction is entered in cells B19 through B35. With most covered writing taking place in margin accounts, those calculations are done in the second column, and the information is automatically recalculated for the cash account transaction in the fifth column. The worksheet provides both a short summary and a detailed analysis of the potential returns from the transaction.

The worksheet provides both a short summary and a detailed analysis of the potential returns from the transaction.

Dividends received during the life of the options transaction are entered in cell B31. Depending on the stock and whether a three-, six-, or nine-month option is written, the input may be one or two quarterly dividend payments.

The stock commission calculation table, cells J1 through M26, contains a useful contribution to the *1-2-3* user's library. The formulas used here are those of a full-service New York Stock Exchange member firm. With the /File Xtract Formulas command, this information can be placed in other portfolio analysis spreadsheets. If you use a discount broker, obtain a copy of the firm's commission schedules. Commission rates for all brokers are based on the number of shares and the dollar amount of the transaction. The template performs minimum- and maximum-commission-per-transaction calculations using the commission table; the results are automatically transferred to the appropriate cells and formulas in the spreadsheet. Similarly, an options commission calculation table, contained in cells G1 through H10, includes minimum and maximum commission parameters. Its results are also transferred to the spreadsheet automatically.

*** MARGIN ACCOUNT SUMMARY ***		*** CASH ACCOUNT SUMMARY ***	
STOCK RISES, OPTION EXERCISED		STOCK RISES, OPTION EXERCISED	
Shares sold	500	Shares sold	500
Price/share	$35.00	Price/share	35
Sale proceeds	$17,500.00	Sale proceeds	$17,500.00
Commission	$277.03	Commission	$277.03
Dividends rec'd	$200.00	Dividends rec'd	$200.00
Margin debt	$8,076.01		
Interest charge	$668.96		
Out of pocket	$6,471.90	Total Investment	$14,547.91
Net profit	$2,206.10	Net profit	$2,875.07
Return (period)	34.09%	Return (period)	19.76%
Return (annual)	58.41%	Return (annual)	33.87%
STOCK UNCHANGED, OPTION EXPIRES		STOCK UNCHANGED, OPTION EXPIRES	
Options proceeds	$1,604.12	Options proceeds	$1,604.12
Dividend rec'd	$200.00	Dividend rec'd	$200.00
Interest charge	$668.96		
Total receipts	$1,135.15	Total receipts	$1,804.12
Return (period)	17.54%	Return (period)	12.40%
Return (annual)	30.06%	Return (annual)	21.25%
STOCK DECLINES, OPTION EXPIRES		STOCK DECLINES, OPTION EXPIRES	
Out of pocket	$6,471.90	Out of pocket	$14,547.91
Dividends rec'd	$200.00	Dividends rec'd	$200.00
Margin debt	$8,076.01		
Interest charge	$668.96		
Net cost of stk	$15,016.87	Net cost of stk	$14,347.91
Breakeven	30.03	Breakeven	$28.70

Figure 1: The 1-2-3 template calculates potential returns based on three market contingencies for margin and cash accounts.

When Options Expire

Cells G15 through H31 contain a list of dates for exchange option expirations through December 1985. If you wish to expand the list, remember that in any month all exchange-listed options expire on the same day—the Saturday after the third Friday of the month. *1-2-3*'s @Date function is used to calculate the exact number of days involved in the transaction.

Using the @Vlookup function in conjunction with the current date of the option expiration, *1-2-3* calculates the number of days the transaction runs. This is essential in order to calculate the return on investment for the period and the year and the interest charges. (An interest rate of 14 percent was arbitrarily chosen in this example.) Check with your broker to determine the appropriate margin interest rate, and insert it in cell B54.

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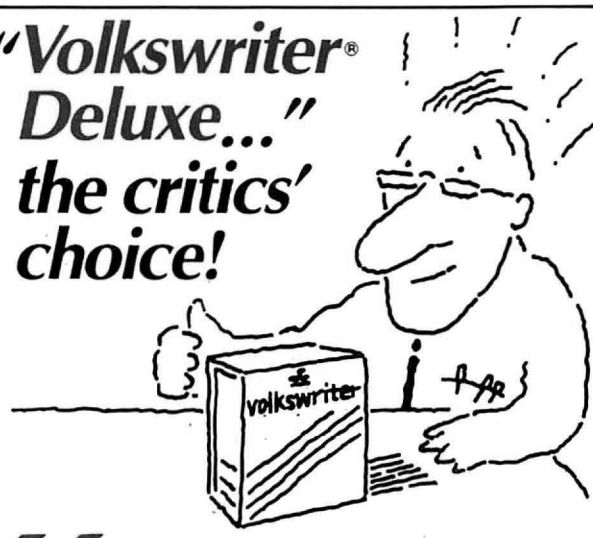

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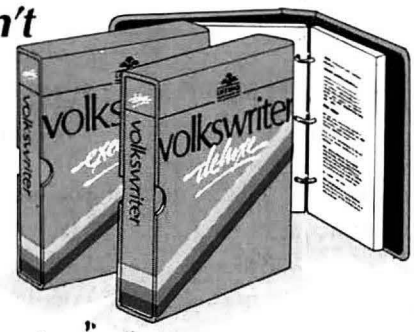

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In the final section of the worksheet, cells J29 through K41, macros allow you to compare margin and cash account results easily by splitting the screen, to "unsplit" the screen, to view a short summary, and to save the worksheet. The short summary recounts the transaction, the period and annualized returns, and the exact amount of money required to perform the trade. If the returns look interesting, you'll want to examine the more detailed breakdown contained in the upper cells.

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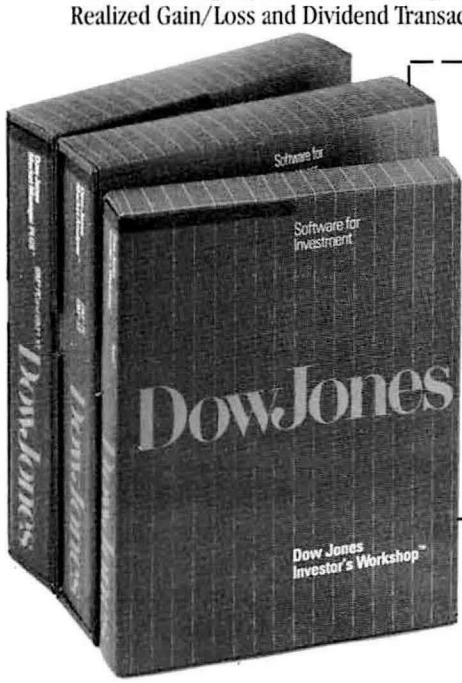

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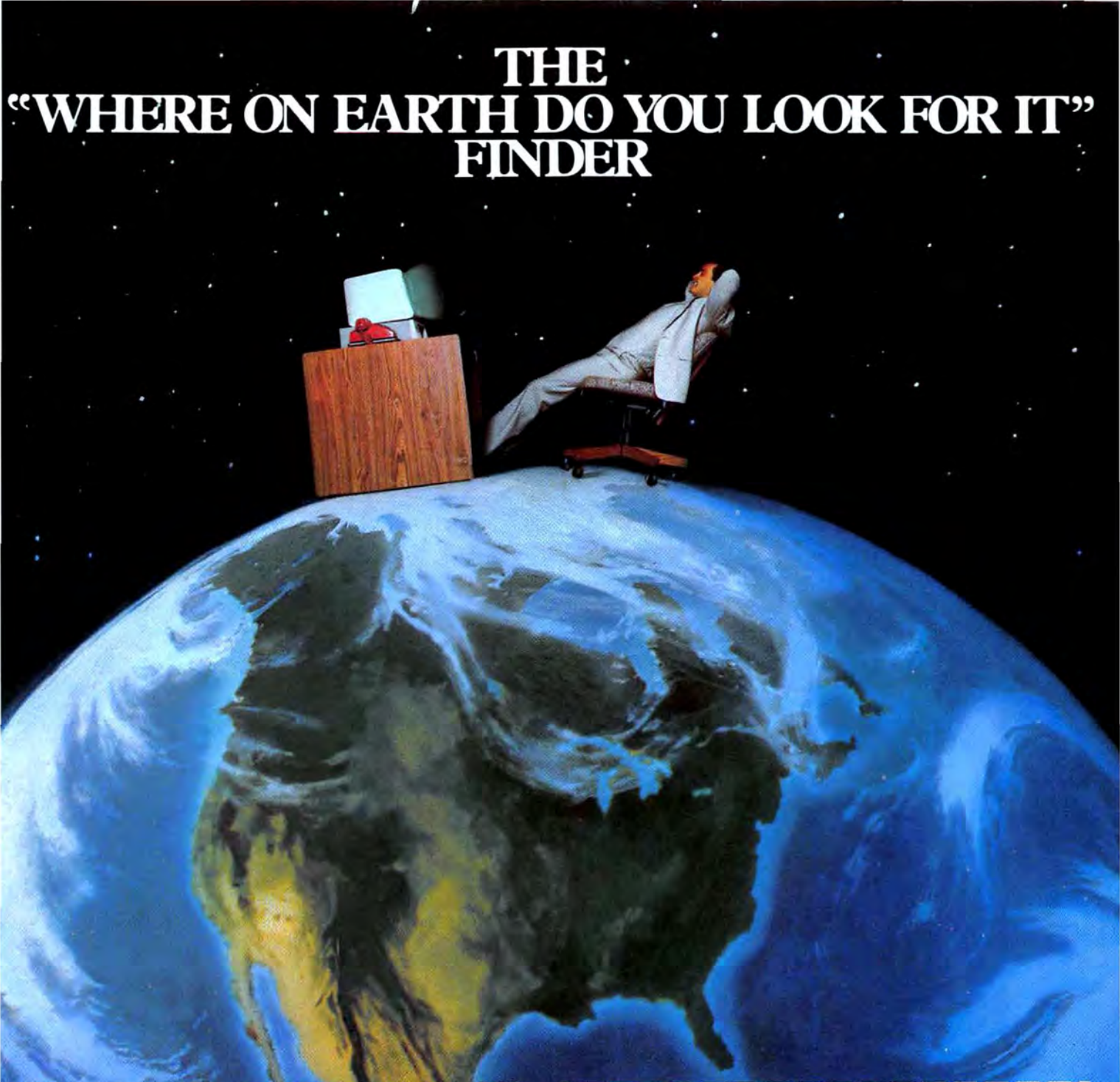

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Caveats for Custom Software

A carefully drawn contract with precise specifications is the key to obtaining custom software that meets your needs.

Jordan J. Breslow

The Fool family is going to have a custom dream house built by Careless Contractor Company. They meet in a coffee shop, and Careless speaks knowledgeably about joists, 16-inch centers, and solar exposure. The Fools have no idea what he is talking about. A contract is written on a napkin: "Custom dream house $150,000." Both parties ceremoniously sign. There are no blueprints, no specifications, no schedules—nothing but the unspoken visions of the Fool family. Two years and $200,000 later (due to "cost overruns"), the contractor reveals a one-room, triangular lean-to constructed solely of playing cards and model airplane glue.

No clear-thinking person would have signed the napkin contract. Yet every day, otherwise intelligent people purchase custom software in precisely this imprecise manner. Despite the growing number of specialized vertical packages for almost every type of enterprise, most businesses from time to time encounter a particular need that cannot be met by any off-the-shelf program. A common solution is to solicit an outside contractor to create a customized program.

Purchasing custom-made software can be as exciting and rewarding as purchasing a custom-made home. It can also be as disastrous. Lawmakers have standardized the contents of contracts for such things as auto repairs, swimming pools, mail order sales, and mortgages. But in the software industry no such standards yet exist. If you are a buyer of custom software, it is up to you to identify your needs and expecta-

tions and then ensure that they are met with the help of a carefully drawn contract.

If you follow a haphazard course in purchasing custom software, you stand a good chance of getting software that does not work, manuals that do not explain, hardware that is not appropriate, and little or no assistance from the contractor. Bugs in the program can destroy a business through the loss or distortion of valuable data. Less extreme, but more likely, the system simply may not be what you had in mind. By contrast, if you adopt an intelligent strategy, you are likely to receive a system that meets your needs and enhances the success of your firm.

Step One: Know What You Need

If you don't clearly define your requirements, you won't get the right software. Alfred Hunt, a computer consultant with Hunt and Associates in Pleasant Hill, California, suggests that the first phase of any custom programming relationship be a systematic definition of the buyer's needs. Hunt is dismayed to find that vendors often submit bids for hardware and software without having done any such analysis.

A custom system usually includes software, documentation, training, and arrangements for maintenance. In many cases the system also requires new hardware, which may be provided by the contractor. If you're like most buyers of custom software, you'll require assistance in defining the various parts of the system you want before you start working with a contractor. For this preliminary analysis, you should consider retaining a third-party consultant. The consultant can usually help find a competent, experienced contractor to do the programming.

Step Two: Draft Specs That Meet Your Needs

After you have carefully defined your needs and selected a contractor, your next step is the preparation of a set of specifications on which both you and your contractor agree. Unfortunately, this is easier said than done. Consultants, lawyers, and accountants insist upon definition, but programmers balk.

According to San Francisco programmer Marshall Dix, there is a "basic conflict of interest" between the customer, who wants clear specifications up front, and the contractor, who knows that over the course of a project, new things will come up that require the parties to reevaluate. "Unlike adding a room to a house, where every nail can be specified, you can't specify the program requirements [at the outset]," said Dix. The programmer typically needs to do a fair amount of work on the project before knowing what can and cannot be accomplished within the user's budget. "As you dig deeper, you find that things that were feasible in theory cause performance to degrade," Dix continued. "The contractor may want to propose trade-offs because certain features may turn out not to be cost effective, but the contractor can't predict that up front."

Given this conflict, the user and the contractor should attempt at the outset to define the product in as much detail as possible without being inflexible. The contract should provide a mechanism for refinement and reevaluation. Whether drawn with or without the aid of an expert, the initial specifications should describe the tasks that the software is to accomplish, the menus, the reports to be generated, and the hardware environment in which the software is to operate.

The agreement should also specify the other software with which the custom software is to be compatible and the programming language that will be used. Preferably it will be one with which an outside programmer would be familiar. To play it safe, you may want the program to contain internal documentation, such as comments and annotations. The contract should include answers to the following questions: Are security systems to be included? How much memory will the system require? What type of input data will be processed? How rapidly will the program execute?

Finally, you will want to define the level of the system's user-friendliness, perhaps by specifying the experience and training required of users and describing the user manuals, training manuals, and other instructional and reference materials the contractor will provide.

Step Three: Prepare a Written Agreement

An old legal aphorism states that an oral agreement is not worth the paper it's written on. Get it in writing. Another obvious but frequently overlooked premise is that the contract should be drafted and signed *before* the programming begins, not after.

Although they are attached to the contract as exhibits, the specifications form the most critical part of the agreement because they define precisely what you expect from the custom programmer. But having precise specifications is only the starting point in a careful process of outlining other important aspects of the transaction, such as prices, warranties, training, maintenance, ownership, delivery, testing, and payment.

Programming is as much an art as a science: every program poses problems requiring new and unique solutions. Even the most experienced programmer can give no more than an educated guess as to the amount of time that a project will require.

Price The contract should specify the price of the system you are buying, including software, hardware, service, and maintenance. Setting a fixed price for service, maintenance, and hardware is not difficult. However, setting a price for the software can be a problem.

Users generally prefer a fixed price up front, but the programmer faces quite a few unknowns. In many ways programming is as much an art as a science: every program poses problems requiring new and unique solutions. Even the most experienced programmer can give no more than an educated guess as to the amount of time that a project will require.

A fixed price can prove to be a hardship for the programmer, but an open-ended billing for time spent can exhaust the user's budget. One solution is to define a price range. The contractor is paid a fixed minimum, but if the time necessary to complete the project exceeds an agreed-upon number of hours, the contractor can bill at an agreed-upon rate for that extra time, as long as it does not exceed a stated maximum. You may have to renegotiate these prices if the need for major changes appears.

A similar conflict arises in setting the price for future enhancements and for the possible conversion of the software to run on other machines. If the contract gives the contractor the exclusive right to perform such work, it is fair that you insist upon a fixed price or at least a fixed percentage of the original price. A better solution, however, would allow you to obtain competitive bids, at least for conversions.

Tax Consequences As is often the case, common sense may conflict with the tax laws. For example, in the eyes of the IRS, software bundled–sold for a lumped price–with hardware is an asset worthy of the investment tax credit and is subject to depreciation allowances. But software by itself does not qualify for the credit and may be written off as a business expense. Consequently, for hardware bundled with software, the prices should not be stated separately unless you intend to write off the cost of the software in the current year.

At this writing, Congress was considering legislation that would reduce or eliminate investment tax credits and depreciation for personal computers. Anyone planning to buy a system should do so before those tax advantages are eliminated. In any case, because of the idiosyncracies and potential changes in the tax codes, you should consult a CPA about the tax implications of your arrangements with the contractor.

Warranties Programmers cannot promise perfection. Unlike a mass-produced toaster or car, a custom software package is almost certain to include bugs, even when produced by the most competent programmer. The program will be complex, and nothing precisely like it will have been created before; thus, you cannot expect the contractor to give you a bulletproof guarantee on the product. In fact, the contractor's attorney will probably seek to include an outright disclaimer of warranty in the contract.

If you agree to such a disclaimer and the program turns out to be flawed, your only effective remedy is to pay the contractor or someone else more money to fix it. However, a compromise can be made between your need for protection against a contractor's neg-

Licenses and Leases

In order to protect themselves against unrestricted use of their products by competitors and users, software developers usually do not sell outright the software that they develop. Instead, the contractor licenses the software, meaning that it grants you the right to use the software with certain restrictions. Consider those restrictions carefully. They might include permission to use the software on a single designated machine only or at a single location only, a prohibition against copying the software for anything other than backup or archival purposes, a prohibition against printing the code, and restrictions against transferring or sublicensing the program.

Another restriction may provide for a limited term of use, after which the license may expire automatically, renew automatically, or be renewable at the user's option. You may see a prohibition against enhancements by the user or a termination of the warranty if you alter the code. If it is agreed that only the developer can modify the software, you will be tied to that developer if the need for modification, expansion, or conversion to other machines arises. Enhancements by the user are typically owned by the contractor.

If the license prevents user access to the source code, i.e., the program listing, problems can arise if the programmer fails to complete the project or disappears after its completion. A solution is to include in the contract a provision that the source code be held in "escrow" by a neutral third party. The provision should be tied to an assignment or expanded license to use the code, which will take effect if the programmer defaults. The user can then have the program completed or modified without infringement. A requirement that the program be annotated and written in a common language will enable the user or another programmer to do the necessary work.

Lease Versus Purchase

If you are obtaining a system that bundles software and hardware together, you may have the option of a purchase-type or lease-type transaction. The legal, tax, and financial implications of the decision depend on your unique circumstances. "The client is customized, too," says CPA Jack M. Marzluft, a tax and business planning consultant in Danville, California.

According to Marzluft, many people have the misconception that it is always cheaper to lease or that leasing always carries a tax advantage. It is a myth, he says, that the lessor getting tax benefits will always pass the tax savings along in the form of a lower price. If the lessor will allow the user, rather than the lessor, to claim the investment tax credit (ITC), as the tax laws permit, Marzluft urges the user to take the credit. But he points out that the leasing company will often charge a higher rate if the user claims the ITC, so the cost may end up being identical. People in the computer field often try to convince users that they will get a better trade-in value if they lease instead of buy. This is not always true, says Marzluft.

From a tax standpoint, he notes, the subject of lease structures is "a can of worms," since the IRS distinguishes between actual leases and leases that are disguised sales. "The tip-off is the 'sweetheart' purchase price"—the option to buy the product for a nominal price at the end of the lease. If the transaction is a true lease, the rental payments are deductible by the user. If it is not a true lease, favorable tax treatment depends upon careful compliance with a host of complex, ever-changing regulations and rulings.

If you acquire your system through a tax-oriented lease, you may encounter a complex provision in your contract that assigns responsibilities and risks if the intended tax benefits fail. Lessors include tax indemnity provisions because they recognize that these leases are often judged by the IRS to be sales. You'll need to consult a qualified accountant to draw up this type of lease properly.

ligence or incompetence and the contractor's inability to guarantee a flawless piece of software. Instead of the blanket disclaimer, the contract should require the contractor to fix bugs, at the contractor's expense, for a reasonable period, such as one year. The contractor will have to anticipate that obligation when the original price is negotiated.

Indemnities Closely related to the warranty issue is the limitation of liability. Recognizing that programming is an imperfect and complex art, the contractor may want to avoid responsibility for injuries that your business might suffer because of flaws in the product. Thus, a contractor-oriented agreement may provide that "in no event shall programmer be liable for direct, indirect, special, incidental, or consequential damages (including loss of profits)."

From the user's point of view, the ideal agreement would stipulate that the contractor will indemnify you (pay you back) for any such losses, but most contractors will not accept such open-ended liability. As a compromise, the contractor should accept financial responsibility if the loss results from negligence. In other words, if it's established that the programmer did as good a job as any reasonably competent programmer would do, he or she is off the hook; but if the programmer's performance is found to be below the required level of competence, he or she has to pay for the results. This definition of responsibility should be spelled out in the contract.

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Training and Maintenance The contract should specify the contractor's responsibilities for training you and your staff in the use of the system and in maintaining the system once it is in operation. It should state how many hours of training will be provided, at whose convenience, and by whom. You should be able to receive training at your own facility and with your own data.

Maintenance responsibilities should include repairs by trained personnel; a local or toll-free telephone service to answer questions about the system, available during specified business hours; and a guarantee that repairs will begin within a stated period, such as 8 hours. You should also include a requirement that the contractor provide all enhancements and updates to both software and documentation either for free or at specified rates. You may want to add a prohibition against assigning these responsibilities to someone else without your consent.

Key-Person Clause Presumably, you will hire a contractor only after investigating the qualifications of the particular programmer who will create your system. The contract should specify the programmer by name and require that this person participate in the project. The contract should also prohibit the contractor from assigning the job to a third party without your written consent.

Ownership Ownership of the custom software system poses significant legal and tax issues. First, a contractor typically does not sell you the custom software package outright but instead grants you a license. The license places various restrictions on your use of the system. Second, the fact that custom software is often bundled with hardware carries with it a number of tax implications, depending on whether the system is acquired in a purchase or lease transaction (see the sidebar "Licenses and Leases").

Step Four: Take It for a Test Drive

The contract now includes specifications, prices, warranties, and assorted obligations, but it is not yet complete. You must also set up a specific sequence for delivery, acceptance, and payment. Don't accept a contract provision that the system is "accepted" when it is "installed and ready for use." The decision to accept or reject the system cannot be put off until the final delivery of the completed software. At that point if the product is not what you desired, it will probably be too late for any substantial changes to be made economically.

A better approach is to lay out a series of milestones toward the completion of the product. By tying each milestone to a payment, you can build meaningful incentives into the contract and ensure that you get what you bargained for. Incorporate into the contract a realistic timetable for the completion of each milestone. The success of the project will

then depend upon measuring and evaluating the work being done at regular intervals. This process must be applied to all components of the package: software, hardware, documentation, and user manuals.

the user's satisfaction" or "acceptable in form and content" are worthless. In fairness to the contractor, you should not be permitted to reject deliveries for subjective or poorly defined reasons ("It's not what I had in mind").

Commonly used acceptance tests such as 'to the user's satisfaction' or 'acceptable in form and content' are worthless.

The first milestone might be delivery of a "script" for the program describing the various menus and screens that a user will see. The next milestone might be the delivery of a discrete portion of the software.

Testing As each part of the program is delivered, it must be tested. To design the tests, you may want to enlist the services of a consultant. The software must be tested on your hardware, with your own data, and under your peak potential load, perhaps when weekly, quarterly, and year-end reports coincide. The tests must evaluate both performance and reliability.

Performance is a matter of conforming to the specifications attached to the contract. Reliability can be defined in terms of the system's ability to remain "up" a stated minimum percentage of the time and to fail a stated maximum percentage of the time. Commonly used acceptance tests such as "to

The contract should mark completion of each milestone by a prorated payment for acceptable materials or by the rejection, within a specified time following receipt, of materials failing the tests. In case the materials are rejected, a requirement that the reasons be articulated in writing will help both parties immeasurably. It will enable the programmer to revise the materials to the user's satisfaction, and if the programmer fails to do so, will provide a record for the user to rely on in withholding payment or canceling the contract. The contract should specify the number of working days in which the programmer is to correct the defects stated in the notice, and should give the user the option to terminate the contract if the programmer fails to do so.

An issue that may arise during contract negotiation is whether the user should be required to limit his or her review of resubmitted, corrected materials to the same areas that were objected to during the initial test. A sophisticated user will understand that by

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Circle 939 on reader service card

changing one aspect of the software, the programmer may inadvertently create new problems. On the other hand, the programmer will desire some finality to prevent a user from repeatedly rejecting the same materials for a different reason each time. As Marshall Dix pointed out, the parties need to be flexible during the evaluation cycle. If the need for or desirability of a substantial deviation from the original specifications becomes apparent, or if requests for revisions become excessive, the contract should not be an impediment to discussing changes. Instead, the contract should require good-faith negotiations as to modifications. Remember to put any changes in writing.

A thorough agreement offers you a real opportunity to head off problems that otherwise might end up being resolved in court.

The last milestone, tied to the final prorated payment, will be delivery and acceptance of all remaining parts of the system. This final payment should be substantial, as a means of ensuring that the contractor completes the project to your satisfaction.

Another Tax Hitch Unfortunately, the IRS has created a problem for setting up a testing cycle. In a "private letter ruling" (which is not legal precedent but suggests the position of the IRS), the IRS stated that a taxpayer who contracted for a three-month "lease evaluation" period and then bought the system could not take an investment tax credit because the equipment was neither "new property" when it was bought (because it was three months old) nor "used property" within the meaning of the Code (because it was used by the same party who bought it). Again, you should consult with an accountant to make sure that your contract does not contain any hidden tax problems.

Other Contract Issues of Consequence

The last few pages of a contract usually contain various standard, or "boilerplate," clauses that are too often casually dismissed. You should read these clauses carefully, because they often contain significant statements about the rights of the parties if something goes wrong.

One such boilerplate clause guarantees that the software will be original and will not infringe on anyone else's copyright or other proprietary rights. Typically, the clause requires the contractor to indemnify you (pay your damages) and defend you (pay your legal bills) if you find yourself on the receiving end of an infringement lawsuit.

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Circle 116 on reader service card

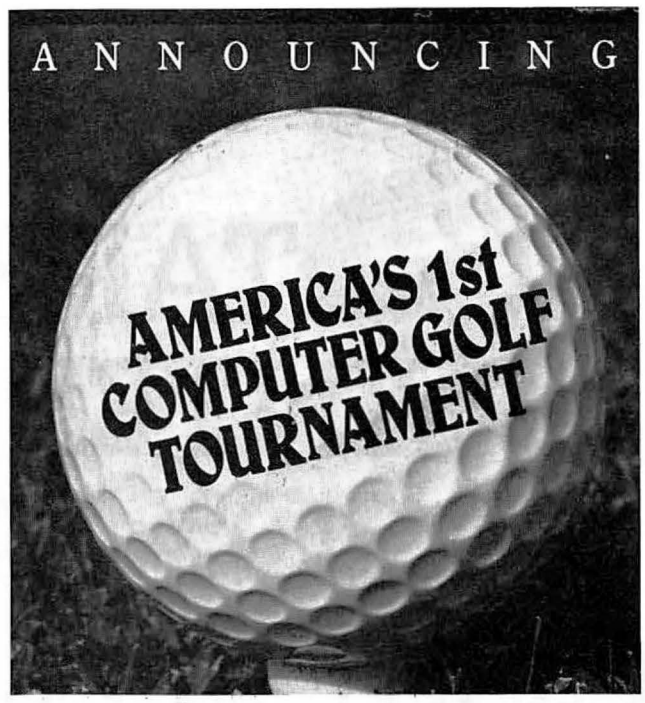
Another common boilerplate clause requires that the parties submit their disputes to binding arbitration rather than sue in court. Having such a clause may save you substantial legal fees down the road.

Yet another boilerplate clause states that the contract is "the entire agreement between the parties." If you go to court or arbitration, such a clause may prevent you from testifying about statements or promises that were made but not included in the written contract. But a prohibition against such testimony may apply even in the absence of such a provision. Therefore, any verbal promises should be set in writing and attached to the contract.

An Ounce of Prevention

No contract can anticipate every issue that might arise during the development of a custom software system. But working out a thorough agreement offers you a real opportunity to head off problems that otherwise might end up being resolved in court. Consider the effort that goes into preparing a good contract as a form of insurance, and take the time to do it right.

Jordan J. Breslow is a partner in the Walnut Creek, California, law firm of Stewart, Stewart & Breslow, which emphasizes computer and artistic practices law.



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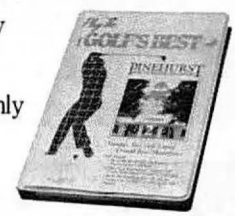

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Circle 918 on reader service card

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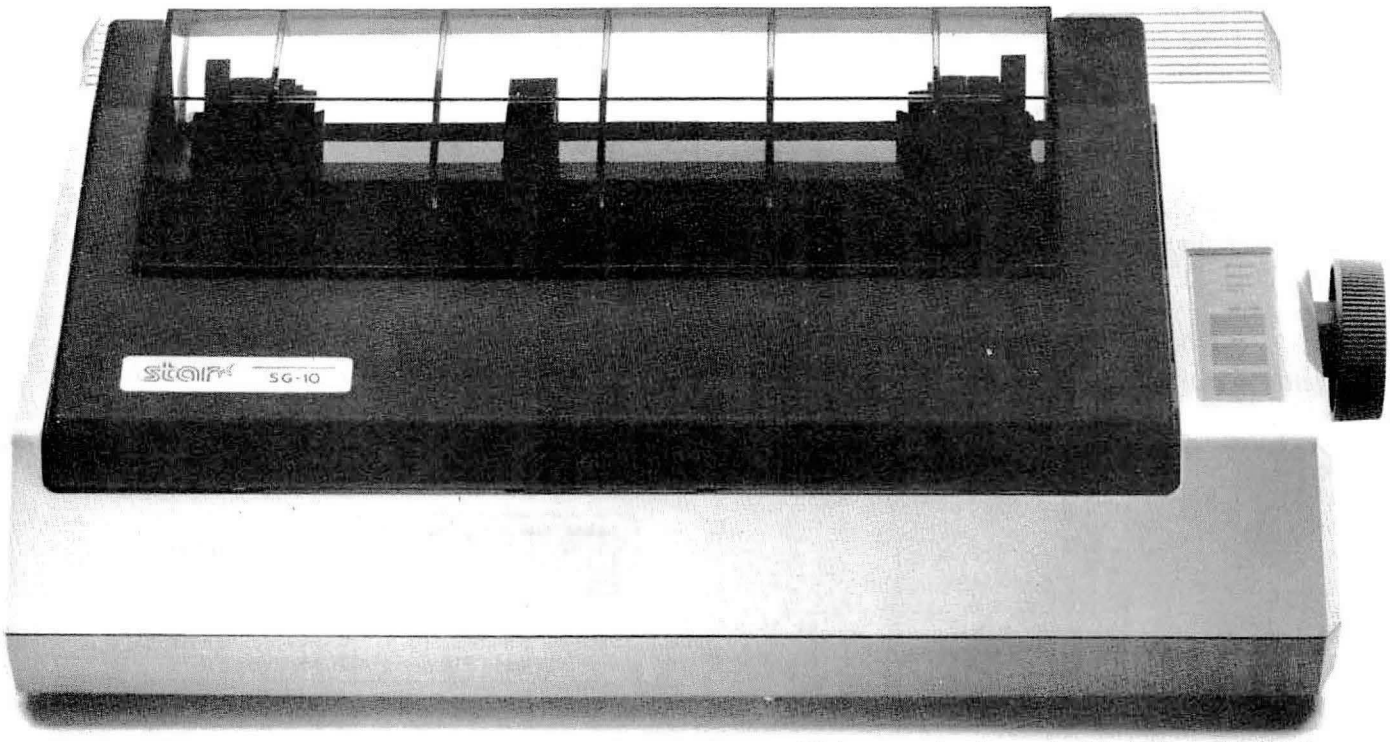

This new dual-mode SG-10 is only $299.

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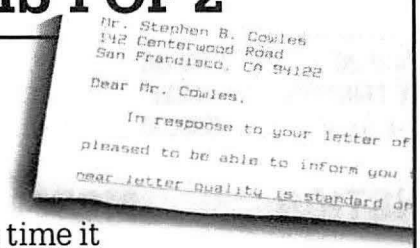
NLQ IS 1 OF 2



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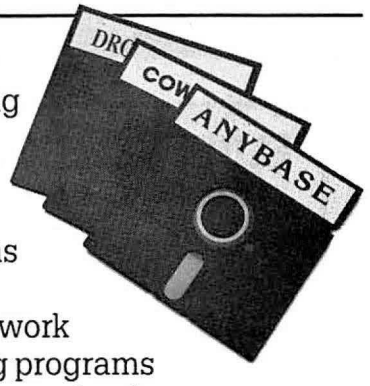

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This month: an improved WordStar-to-ASCII file converter; making the Gemini 10X measure up; automatic exit from a secondary command processor; a few patches for FORMAT; and a better BASIC printer checker

Edited by Steven Cook

High-Bit Strip Revisited

There is a problem with the program STRIPHI.COM ["Strip Ease," *.*, *PCW*, Vol. 2, No. 11] that causes it to lock up when converting *WordStar* document files that are multiples of 128 bytes long or files that do not contain an end-of-file marker (a Control-Z character).

I have fixed the STRIPHI.COM program by adding a DOS function call to test for the end of a file. This new version, shown in STRIP.DAT [see listing], also stops when it finds a Control-Z character in the file, even if it is a high-bit Control-Z, since there is little reason to continue once a Control-Z has been sent to the output file.

As with the original STRIPHI-.COM program, type **STRIP** *<infile >outfile*, where *infile* is the name of the file you wish to strip and *outfile* is a file name for the stripped result.

Roland Hutchinson
Stanford, California

Editor's note: To create STRIP-.COM, load BASIC, then type in the lines in X-MAKER.BAS (see listing) followed by the lines shown in STRIP.DAT. When everything is typed in, RUN the program and STRIP.COM will be written to the disk in the default drive. You may then use STRIP.COM as described. You may want to SAVE X-MAKER-.BAS, too. It's your key to many of the programs presented in this column, including the one that follows.

Star Fix

I, too, have a Star Micronics Gemini 10X printer and was surprised to find that the printer, though the manufacturer claims it is Epson compatible, uses a different vertical step size than the Epson, causing horizontal stripes to appear in printed graphics.

I have seen many modifications published to solve the problem for various graphics-generating programs [including a patch to GRAPHICS.COM, see "Gemini Graphics," *.*, *PCW*, Vol. 2, No. 10], but I wanted a more permanent solution, one that would work for all programs. The routine EP2GEM.COM does the job nicely. It is a memory-resident program that examines characters as they are sent to the printer. When it finds a "set vertical spacing" command (Esc 3), it intercepts the next byte (the vertical spacing value) and converts that value to the equivalent Gemini value.

The routine is completely transparent to the printer and graphics software, works well with print spooling software, and can be included in an AUTOEXEC.BAT file so that it loads into memory whenever you start the computer.

Stephen Davis
Greenville, Texas

Editor's note: Load BASIC, type in the lines in X-MAKER.BAS followed by the lines shown in EP2GEM.DAT (see listing), then RUN the program to create EP2GEM.COM. To use the program, type **EP2GEM** *when you see the DOS prompt.*

Note that EP2GEM.COM will translate all "set vertical spacing" commands. Even programs that are already configured for the Gemini 10X printer will be af-

```
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 BX$
130 READ LN:IF LN<0 THEN 160
140 READ H$:IF VAL(H$)<0 THEN READ CKSUM$:GOTO 130
150 LSET BX$=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
```

X-MAKER.BAS: A program used to create the machine language programs in this column

```
1000 DATA "strip.com"
1010 DATA 1,BB,00,00,B9,01,00,BA,24,01,B4,3F,CD,21,3D,00,00,-1,17
1020 DATA 2,74,10,8A,16,24,01,80,E2,7F,B4,06,CD,21,80,FA,1A,-1,3F
1030 DATA 3,75,E4,CD,20,00,-1,EB,-1
```

STRIP.DAT: A revised version of a program to remove special codings from WordStar document files

```
1000 DATA "ep2gem.com"
1010 DATA 1,EB,51,90,0F,0F,90,D6,80,FC,00,75,42,2E,80,3E,04,-1,F6
1020 DATA 2,01,00,75,13,2E,F6,26,05,01,2E,F6,36,06,01,2E,C6,-1,49
1030 DATA 3,06,04,01,01,EB,26,90,2E,80,3E,03,01,00,75,11,B4,-1,D0
1040 DATA 4,33,2E,88,26,03,01,2A,E0,2E,88,26,04,01,EB,0D,90,-1,15
1050 DATA 5,B4,9B,2A,E0,80,E4,7F,2E,88,26,03,01,32,E4,EA,00,-1,25
1060 DATA 6,00,00,00,B0,17,B4,35,CD,21,BD,4E,01,2E,89,5E,01,-1,FB
1070 DATA 7,2E,8C,46,03,BA,07,01,8C,C8,8E,D8,B0,17,B4,25,CD,-1,0B
1080 DATA 8,21,BA,53,01,81,C2,00,01,CD,27,-1,14,-1
```

EP2GEM.DAT: A memory-resident program to intercept Epson printer commands and translate them for Gemini 10X printers

fected, causing their output to be compressed. If this occurs, reconfigure the affected program to use Epson/IBM printer commands, or simply restart the computer without loading EP2GEM.COM into memory. Note also that the program will translate every occurrence of the Esc 3 sequence. There is a very slight chance that such a sequence would actually be part of the graphics data.

This technique of using a memory-resident printer-translation program could be used to provide Epson compatibility to almost any printer. Readers who wish to devise such a program for the Okidata Microline series (even better would be a routine to convert between values read from a disk file) are encouraged to submit their work to this column for publication.

No Exit

Commands can be passed to a secondary copy of COMMAND.COM without I/O redirection or the EXIT command. When you use the /C parameter of the COMMAND command, the secondary command processor will be loaded and the command or batch file name following the /C will be passed to the secondary command processor. When the command or batch file has finished, the secondary command processor is automatically EXITed. The syntax is **COMMAND /C** *command*, where *command* is a command or the name of a batch file.

Morris Sparks
Marietta, Georgia

*Editor's note: Passing commands to a secondary copy of COMMAND.COM is a powerful technique for streamlining otherwise tedious operations. For a more complete discussion, refer to "Defensive Disk Driving," *.*, PCW, Vol. 2, No. 10.*

Switch On

When you format a disk with DOS 2.00 or a later version, you can use the /V optional parameter to have FORMAT.COM, the format program, prompt you for a volume name to assign to the disk. If you use the patch FORMAT.PAT [see listing], FORMAT.COM will always ask for a volume name.

Darryl Linkow
Woodland Hills, California

Editor's note: If you use a hard disk, you may have encountered a situation in which FORMAT.COM was run but no disk drive was specified, causing FORMAT to operate on the default drive (usually the hard disk), often with disastrous results. IBM advises users to remove the FORMAT.COM program from the hard disk, but that is a rather ineffective and inconvenient solution. Several readers have provided batch files or patches to FORMAT.COM that alleviate the danger; the latest of these are presented here.

Drive A: or Else

The patch to FORMAT.COM to prevent the formatting of a hard disk ["Format Fix," *.*, *PCW*, Vol. 2, No. 12] prompts me to offer the patch FORMATFIX1 [see listing]. Use DEBUG to type in the lines as shown. With this patch, FORMAT will always default to drive A: unless you specify otherwise when you execute the FORMAT command.

I recommend changing the date to 12-12-2012 (which is displayed as 12-12-12) or some other easily recognizable value before you modify FORMAT.COM. That way you can look at the directory to easily determine that the original version of FORMAT.COM has not accidentally been copied onto the hard disk.

Bob Dodd
La Mirada, California

For DOS 2.00:

```
A> DEBUG FORMAT.COM
- E7C7 75
- W
Writing xxxx bytes
- Q
A>
```

For DOS 2.10:

```
A> DEBUG FORMAT.COM
- E647 EB 08 90 90 90 90
- W
Writing xxxx bytes
- Q
A>
```

For DOS 3.00:

```
A> DEBUG FORMAT.COM
- EB4D EB 08 90 90 90 90
- W
Writing xxxx bytes
- Q
A>
```

FORMAT.PAT: A patch to modify FORMAT.COM to always prompt for a disk volume label

For DOS 2.00:

```
A> DATE 12/12/2012
A> DEBUG FORMAT.COM
- E169 B0 00 90 90
- W
Writing xxxx bytes
- Q
A>
```

For DOS 2.10:

```
A> DATE 12/12/2012
A> DEBUG FORMAT.COM
- E174 B0 00 90 90
- W
Writing xxxx bytes
- Q
A>
```

For DOS 3.00:

```
A> DATE 12/12/2012
A> DEBUG FORMAT.COM
- E648 B0 00 90 90
- W
Writing xxxx bytes
- Q
A>
```

FORMATFIX1: A patch to modify FORMAT.COM to format the disk in drive A: unless another drive is specified

For DOS 2.00:

```
A> DATE 12/12/2012
A> DEBUG FORMAT.COM
- E169 EB F5 90 90
- W
Writing xxxx bytes
- Q
A>
```

For DOS 2.10:

```
A> DATE 12/12/2012
A> DEBUG FORMAT.COM
- E174 EB F5 90 90
- W
Writing xxxx bytes
- Q
A>
```

For DOS 3.00:

```
A> DATE 12/12/2012
A> DEBUG FORMAT.COM
- E648 EB D5 90 90
- W
Writing xxxx bytes
- Q
A>
```

FORMATFIX2: A patch that modifies FORMAT.COM to require that the user specify which drive contains the disk to be formatted.

Say What You Mean

The patch FORMATFIX2 [see listing] modifies FORMAT.COM so that it requires a drive specification. If you type the command **FORMAT** without specifying a drive, the program terminates with the message 'Invalid Drive Specification'.

James Morgan
Orlando, Florida

Editor's note: Remember, while these patches have been tested, we cannot guarantee that your version of FORMAT.COM is identical to ours. Please exercise caution if you elect to use any of these modifications. Do not modify your only copy of FORMAT-.COM; test the program after you have patched it to be sure that it works properly. If your computer has a hard disk, don't test anything until you have made a backup.

```
100 GOSUB 8000:END
8000 PRNTR=1 : DEF SEG=&H40 : BASE=(PRNTR*2) + 6
8010 IF PEEK(BASE)=0 THEN PRINT "No printer adapter present." : RETURN
8020 STAT=INP(PEEK(BASE) + PEEK(BASE+1)*256 +1) AND 160
8030 IF STAT = 128 THEN PRINT "Printer ready." : RETURN
8040 IF STAT = 0 THEN PRINT "Printer not ready."
8050 IF STAT = 32 THEN PRINT "Out of paper."
8060 IF STAT = 160 THEN PRINT "Printer not on."
8070 RETURN
```

PRTRCHEK.BAS: A BASIC program to test printer status for all IBM PC configurations

Printer Check Perfected

Many people will not be able to use the printer check program in "Easy Printer Check" [*.*, *PCW*, Vol. 2, No. 10] because it applies only to printers connected to the IBM Monochrome Display and Printer Adapter.

The PC can support three parallel printer adapters. When the system is started, it determines which adapters are present and creates a list of pointers to indicate the location (base port) of each one found.

The standard printer device designator, PRN:, is set to use the printer connected to the first adapter in the list (LPT1:). This may or may not be the Monochrome Display and Printer Adapter.

Rather than looking directly at a specific adapter, the printer check program should check the adapter indicated by the first pointer in the list. The program PRTRCHEK.BAS [see listing] does exactly that. You can change the value of PRNTR in line 8000 if you wish to check the status of one of the other adapters.

James Lisson
Concord, California

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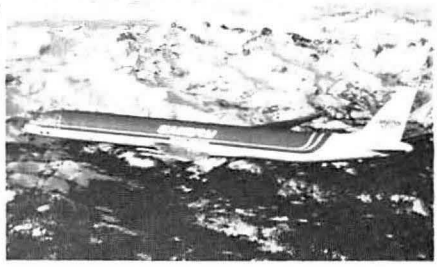
New customer service policy expected to set a new standard in the mail order industry!

BY MICHAEL CHRISTOPHER

GARDEN CITY, N.Y.—Mr. David W. Pasternack, President of Logicsoft, a major IBM PC software and hardware distributor, has announced the inception of a unique new customer service policy. . . .free overnight courier delivery on their entire product line.



In a recent interview, Mr. Pasternack stated that "We feel our new free overnight delivery service will set a new standard in the computer software mail order industry. In a study we conducted, we found that in addition to competitive pricing, expedience was a factor utmost in our customer's minds. Whether their order was $300 or $3000, the need to get their package as soon as possible was the same. Under our old procedures, between processing and shipping time, it could take up to a week and a half to two weeks for an order to arrive. With our new courier service, an order can be processed, shipped,and arrive in our customer's hands in only 3 working days. . .at no additional charge!"

The company is using Emery Worldwide to handle the large number of packages being shipped each evening for next day delivery. "We chose Emery for their competitive pricing structure and excellent delivery record", said Mr. Pasternack. Emery was quoted as saying, "This makes Logicsoft the largest single Emery account in the New York Metro area.

LOGICTIP OF THE MONTH

Choosing software can be mind-boggling. With the proliferation of publishers, how do you choose. Analyze your needs. . . what specific tasks do you want to perform. Read the software reviews; an excellent way to evaluate a package. Ask around. . . you'd be surprised how many associates may be using a package similar to your application. Finally, choose the best package (not always the most expensive). Upgrading will end up costing you more. Remember the key word is research.

Logicsoft's Lowest Price Guarantee Still Effective

GARDEN CITY, N.Y.—Logicsoft, Inc. has indicated that their long time policy of guaranteeing the lowest prices in the mail order market is still being offered and will not be affected by their new free overnight delivery service. "We will continue to beat any price by $10" a company spokesman said. "We'd be crazy to fool with success", he stated; "since the inception of our lowest price guarantee, sales have skyrocketed."

When asked how Logicsoft could afford to give their customers free overnight delivery plus beat any price by $10, they replied "Buying Power". "Very simply", they said, we buy at the best possible prices and pass those savings along to our customers".

CONTINUOUS STATIONERY: BIG BUSINESS, But "Where's The Class?"

NEW YORK—The growth of Logicforms, Inc., a member of the Logic Group, has been phenominal. Mr. Ralph Corso, President of Logicforms explains why. "Up until now, buying continuous stationery through the mail has been a take what's available situation". "First off", he said, "almost all mail order firms offer only stock letterheads & envelopes with limited typestyles, colors and stock logos from which to choose, but, 'where's the class'?"

"The individual style and design of a letterhead", said Mr. Corso, "reflects the professionalism and personality of a company and should not have to change because they now have a printer and the need for continuous stationery. While other mail order firms are limited in the variety they can offer, Logicforms *specializes* in custom stationery. Logicforms offers a large selection of quality paper, ink colors and special effects such as thermography, blind embossing, foil stamping and multi-color printing." Mr. Corso went on to say that "whether a customer chooses to supply his own artwork or printed letterhead, *or* wishes to select from our vast array of stock designs. . .We are the Logical Choice".

For a free sample/pricing kit and a handy re-usable shipping envelope for artwork, simply call toll-free 1-800-645-3491 or send a sample of your current stationery for a free firm price quote. Mail to Logicforms, Inc., 300 Garden City Plaza, Garden City, N.Y.11530

TOLL-FREE SUPPORT A Smashing Success

GARDEN CITY, N.Y.—A survey of Logicsoft's toll-free technical support policy was done to see if it warranted the continued costs of the 800 toll-free number, personnel costs, etc. After careful monitoring of these calls (both pre-sale and after sale) it was found that 92% of the calls were for legitimate technical support questions rather than for answers already contained in the softwares' operations manual. As a result of the survey, the decision has been made to continue toll-free support as an important part of their customer service.

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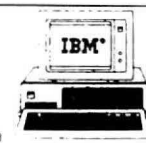

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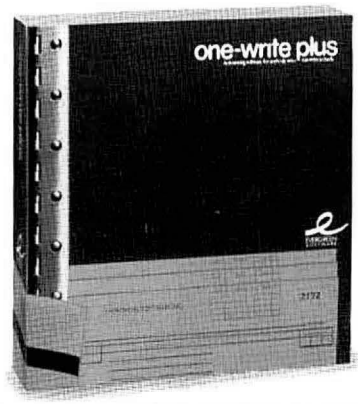

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Evergreen Software, Amherst, NH 03031

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Just Announced

An array of new PC products

Featured this month: four multifunction boards, three PC-compatible computers, a color printer, a low-cost plotter, three hard disk systems, a series of integrated programs from IBM, and an application integrator

Edited by Seth Novogrodsky

Hardware

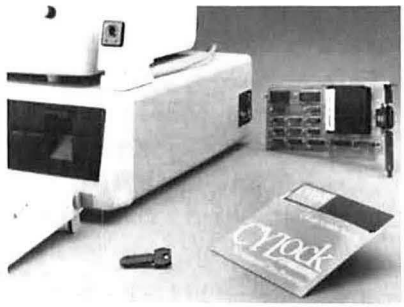
Boards

JRAM-2
A modular multifunction board, JRAM-2 holds either 512K or 2MB (2048K) of RAM when fully populated with 64K-bit or 256K-bit chips, respectively. The board has sockets for multifunction modules that include a clock/calendar; a serial port, a parallel port, and a clock/calendar; two serial ports; two serial ports and a clock/calendar; and a floppy disk controller. The Jetdrive RAM disk and the Jspool print spooler come with the board. List price: with no RAM $219, 64K bank (nine 64K-bit chips) $40, 256K bank (nine 256K-bit chips) $300, with clock/calendar and no RAM $299, with serial port, parallel port, and clock/calendar $399.
Tall Tree Systems
1032 Elwell Ct. #124
Palo Alto, CA 94303
415/964-1980

Advantage!
First in a new line of PC AT enhancements from AST Research, the Advantage! multifunction board adds up to 3MB of RAM to take advantage of the AT's larger memory address capability. The board holds either 64K or 256K chips. Advantage! also has a PC-compatible parallel printer port, two serial ports, and a game port. List price: with 128K $495.
AST Research, Inc.
2121 Alton Ave.
Irvine, CA 92714
714/863-1333

IDEA Minimax and IDEAmini
IDEAssociates has announced two expansion boards that fit into the short slots in the IBM Portable PC. IDEA Minimax holds up to 384K of RAM in a double-decker configuration, with 128K on the base board and 256K on the piggyback board. The IDEAmini I/O board offers two serial ports, a parallel port, and a clock/calendar option. IDEAmini has a COM3: port to link four PCs, XTs, or Portable PCs in an IDEAshare network. Both boards come with IDEAmenu, which lets you automatically configure a boot disk; RAMFloppy, which provides disk emulation in RAM; a parallel printer selection program for switching between printers; and print spooler, diagnostics, and clock-setting software. List price: IDEA Minimax with 128K $295, with 384K $625; IDEAmini with one option $195, with four options $270.
IDEAssociates Inc.
7 Oak Dr.
Bedford, MA 01730
617/275-4430

CyLock PC Access and Data Protection
A data security system for PCs and XTs, CyLock PC Access and Data Protection consists of a plug-in expansion board, an external key receptacle, a Datakey memory device, and CyLock software. The system prevents unauthorized persons from using the PC, allows authorized persons to encrypt and control data files for private or



CyLock PC Access and Data Protection, Cytrol Inc.

shared use, enables program owners to protect software, and produces a security audit trail. To access a PC protected by CyLock, a user inserts a Data Key and enters a password. List price: $449.
Cytrol Inc.
4620 W. 77th St.
Edina, MN 55435
612/835-4884

Computers

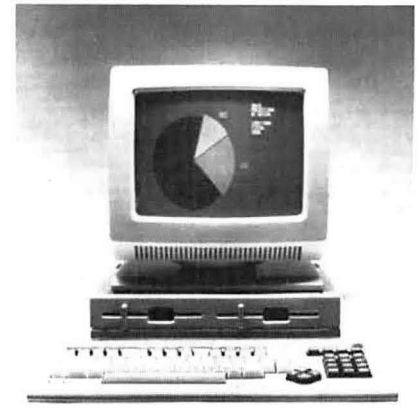
ES.3

An IBM PC-compatible computer and a telephone with advanced features are combined in ES.3. The system includes a telephone with handset and speakerphone, a 9-inch high-resolution nonglare screen, an internal 300-bps direct-connect modem, a detached keyboard, 128K (expandable to 640K), a 360K disk drive (a second drive is optional), a real-time clock, a parallel printer port, and business software. The ES.3 uses two telephone lines to transmit voice and data simultaneously. The unit includes a telephone directory with single-keystroke dialing and auto-redial of the last 15 numbers called. Options include an internal 1200-bps full-duplex modem, a serial port, and GW BASIC. List price: with 128K and one disk drive $2595, with 256K and two disk drives $3295.
Zaisan, Inc.
13910 Champion Forest Dr.
Houston, TX 77069
713/580-6191

ES.3, Zaisan, Inc.

RamJet PC

The RamJet PC features 80188 and Z80A microprocessors. The 80188 allows many programs written for the IBM PC to run on the RamJet using the MS-DOS 2.11 supplied. The 8-bit Z80A runs 8-bit programs under the CP/M operating system, also included. The system features a 90-key detachable keyboard with 12 function keys and a 12-key numeric keypad. Two double-sided, double-density 5¼-inch disk drives come with the unit. Hard disk options include 10MB, 20MB, and 30MB capacities. List price: $1995.
Polo Microsystems Inc.
2570 El Camino Real W
Mountain View, CA 94040
415/948-2990



RamJet PC, Polo Microsystems Inc.

Star*PC

The Star*PC is designed to be hardware and software compatible with the PC or the PC XT, depending on the configuration selected. The computer has one serial port, a parallel printer port, an 8088 microprocessor, two 360K disk drives, and 256K of RAM. Hard disks are available in 11MB, 22MB, and 44MB capacities. An optional board contains a Fairchild 9445 microprocessor that permits the execution of applications software for the Iris and Bits operating systems used by the Data General Nova series. The Star*PC can be attached to the Star*Net LAN (local area network)—an implementation of the Arcnet LAN from Datapoint—with a special interface

Star*PC, Star Technologies

board. List price: $2600, Star*Net interface board $800.
Star Technologies
5 Studebaker Rd.
Irvine, CA 92718
714/768-6460

Plotters

CE-515P

A low-cost four-color plotter, CE-515P produces a variety of graphics, including bar graphs, broken-line graphs, pie charts, band graphs, and many types of characters and patterns. The plotter prints in black, blue, green, and red on paper from postcard to letter size and accepts transparencies up to 8½ inches wide. Both serial and parallel interfaces are provided as well as SoftKey's *KeyChart* software. List price: $399.
Sharp Electronics Corp.
10 Sharp Plaza
Paramus, NJ 07652
201/265-5600

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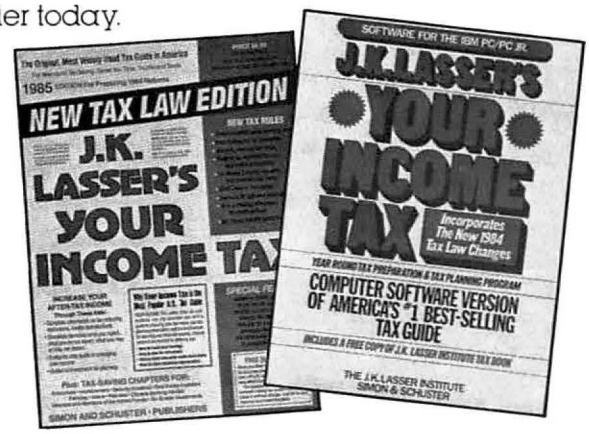

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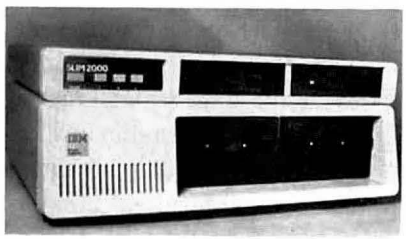
Printers

GP300LC

Billed as the quietest high-speed dot matrix printer in the industry, the GP300LC can print 95 character fonts at up to 120 cps in letter quality mode and 300 cps in draft mode. The printer also has color and graphics capabilities. It uses an 18-needle printhead that allows single-pass dot resolution of up to 18 by 50 dots per character in text mode and up to 144 by 144 dots per inch for graphics. A four-color ribbon generates up to eight colors. Available character sets, which are downloaded and controlled with software, include OCR-A, OCR-B, bar codes, dot-addressable graphics, and logos. The manufacturer also designs custom type fonts. The GP300LC includes a 2K buffer and can be configured for various paper-handling devices, including platen, tractor feed, and an automatic single-sheet feeder. An RS-232C serial interface is standard; a Centronics parallel interface is optional. List price: $3200.
Philips Peripherals, Inc.
385 Oyster Point Blvd. #12
South San Francisco, CA 94080
415/952-3000



Slim 2000, Datatron, Inc.

Storage Devices

Slim 2000
A "slimline" hard disk and tape subsystem for the IBM PC, the Slim 2000 provides 10MB of formatted hard disk storage along with 10MB of tape backup. The Slim 2000 fits on top of the PC's system unit, can supply power to control three separate devices, and includes a surge-suppression feature. Only one slot is required for both the hard disk and the tape backup. List price: $2995.
Datatron, Inc.
Enhancement Products Division
2942 Dow Ave.
Tustin, CA 92680
714/544-9970

PS Series
The PS series consists of hard disk expansion subsystems for the PC, the XT, the AT, and the XT/370. The subsystems come in formatted capacities of 35MB, 56MB, 119MB, and 238MB. Options include an integral 60MB ¼-inch cartridge or ½-inch nine-track tape capable of streamer or file-oriented operation. The subsystems provide access to files larger than 32MB, overcoming the

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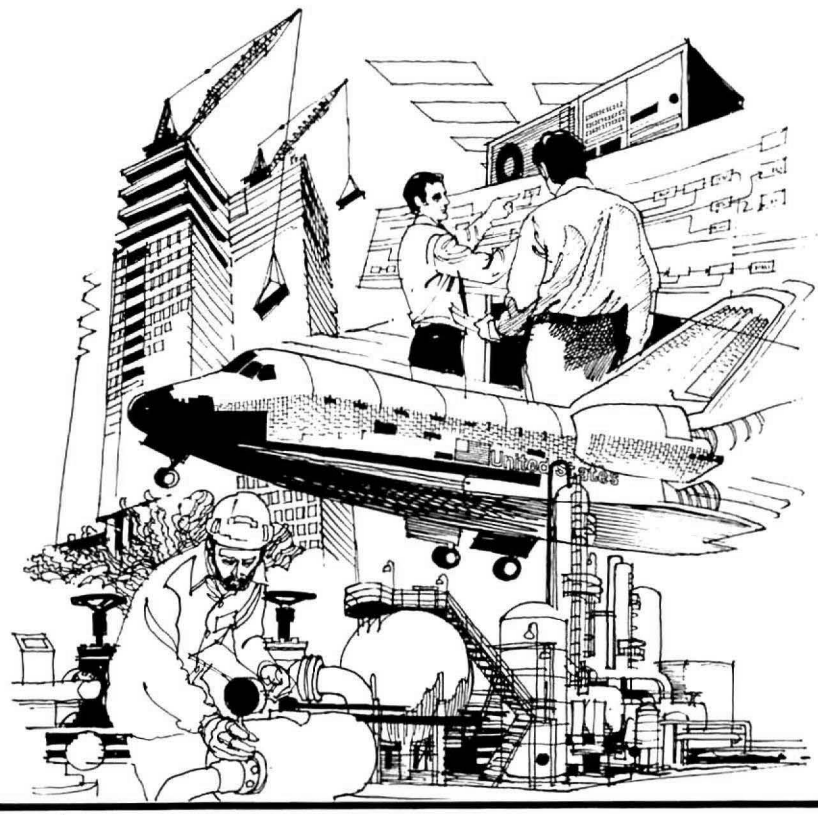

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Emerald Systems Corp.
4901 Morena Blvd.
San Diego, CA 92117
619/270-1994

PS Series, Emerald Systems Corp.

Hidey

Hidey is a 10MB hard disk subsystem for the PC that "hides" underneath the PC system unit. The unit has its own power supply and a multioutlet, transient-protected power strip with a single power switch for system control. Hidey elevates the PC system unit, providing a place to store the keyboard, raising the monitor, and providing easier access to floppy drives. The Hidey controller board plugs into a full-size expansion slot and connects to the unit with short ribbon cables. DOS can be loaded directly from the hard disk if the PC has the newer versions of ROM installed. A model called Bare Hidey is available without the hard drive, controller, or power supply, for PC owners who need only a keyboard hiding place and a switched power outlet with transient protection. List price: $1795, Bare Hidey $149. Requirements: DOS 2.00 or later version.
Personal Micro Computers, Inc.
275 Santa Ana Ct.
Sunnyvale, CA 94086
408/737-8444

Miscellaneous

Microsoft PCjr Booster With Mouse

This expansion system for the PCjr includes a Booster assembly that attaches to the side of the PCjr and contains an expansion board with sockets for 128K of RAM, an interface for the two-button mechanical Microsoft Mouse, and a battery-backed clock/calendar. Also included in the package is JBASIC, a software enhancement

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(317) 255-6476

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Circle 493 on reader service card

to IBM Cartridge BASIC that runs BASIC programs up to 22 percent faster with twice the screen memory. Other supplied software includes a clock/calendar driver, a mouse driver, Mouse Menu, Piano, Life, Doodle, RAMDrive, and sample configuration files. List price: without RAM $295, with 128K $495.
Microsoft Corp.
10700 Northup Way
Bellevue, WA 98004
800/426-9400, 206/828-8080

Speed Key With KT 2010 Touch Tablet
The Speed Key system includes software and overlays that convert the supplied KT 2010 touch tablet into a customized keyboard that supports business software packages such as *1-2-3*, *SuperCalc*, *WordStar*, *dBASE II*, and *pfs:write*. Speed Key also supports PC-DOS and IBM BASIC. The touch tablet provides up to 37 programmable function keys and a cursor controller with features similar to those of a mouse. Any of the Speed Key overlays can be customized to meet special requirements. In addition, Speed Key comes with 25 blank overlays for custom programming. Speed Key works with programs that use the PC-DOS operating system. List price: $199, Speed Key software alone $99.
Koala Technologies Corp.
3100 Patrick Henry Dr.
Santa Clara, CA 95052-8100
408/986-8866

Speed Key, Koala Technologies Corp.

Application Software

Financial

ESP
ESP, the Econometric Software Package, is a forecasting and planning tool that is a full-scale version of the *ESP* mainframe program. The package integrates econometric and statistical analysis with graphics and data management. *ESP* includes on-line tutorial and help features. List price: $795. Requirements: 256K, two double-sided disk drives, 8087 coprocessor, DOS 2.00 or later version.
Alpha Software
30 B St.
Burlington, MA 01803
617/229-2924

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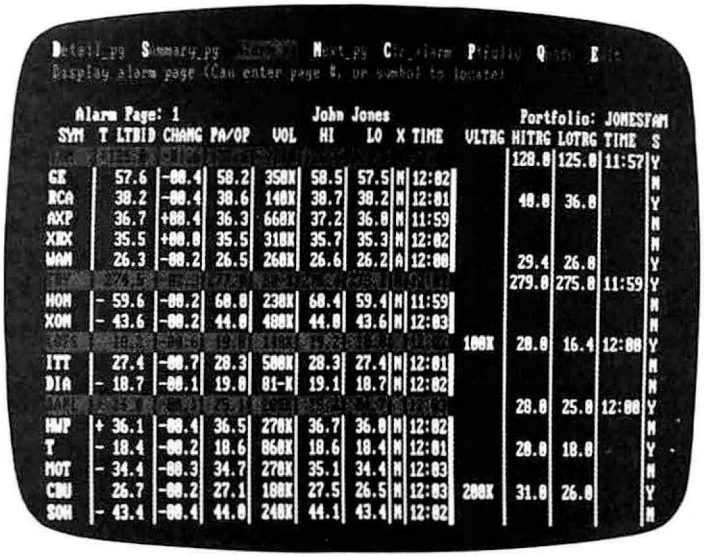

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Circle 962 on reader service card

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IBM Personal Decision Series
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Circle 879 on reader service card

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IBM
Systems Products Division
P.O. Box 1328
Boca Raton, FL 33432
800/447-4700, 800/322-4400 Illinois, 800/447-0890 Alaska and Hawaii

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Application Executive Corp.
600 Broadway #4C
New York, NY 10012
212/226-6347

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F. L. Gunter & Assoc.
486 Tanglewood Ln.
Dallastown, PA 17313
717/246-2242

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Morris Software
3029 Oregon St.
Paducah, KY 42001
502/554-2722

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Listings

Example programs from the articles in this issue

```
                    -A-                  |              -B-
'COVERED WRITE                           ^USE DOWN
'TEMPLATE FOR                            ^ARROW AND
'LOTUS 1-2-3                             ^ENTER DATA IN
                                         ^COLUMN B ONLY

'* ALL OTHER CELLS ARE PROTECTED *



' TO BEGIN PRESS ALT S

                                         ' MARGIN ACCOUNT

'* BEGIN DATA ENTRY *


'1.ENTER TODAY'S DATE
'Year(yy)                                (G) U 84
'Month(mm)                               (G) U 9
'Day(dd)                                 (G) U 21

'2.ENTER STOCK INFORMATION
'Shares Bought                           (G) U 500
'Price/share                             U 31.75

'3.ENTER OPTIONS INFORMATION
'Num. calls sold                         (G) U 5
'Strike price                            U 35
'Premium/call                            U 3.37
'Dividend rec'd                          (C2) U 200

'4.ENTER EXPIRATION DATE
'Expiration date
'(e.g. 4/85=485)                         (G) U 485

'* END DATA ENTRY *


'PRESS ALT M FOR SHORT SUMMARY
'  OR USE DOWN ARROW FOR
'   DETAILED SUMMARY

'*** MARGIN ACCOUNT SUMMARY ***

'STOCK RISES, OPTION EXERCISED

'Shares sold                             (G) +B24
'Price/share                             (C2) +B29
'Sale proceeds                           (C2) +B48*B49
'Commission                              (C2) (J26)
'Dividends rec'd                         (C2) +B31
'Margin debt                             (C2) +B91-B92
'Interest charge                         (C2) (0.14*B114/360*B53)
'Out of pocket                           (C2) +B98
```

(continues)

1-2-3 Plays the Options Market
From page 212
1-2-3 Options Template

```
56   'Net profit                          (C2) +B50-B51+B52-B53-B54-B55
57   'Return (period)                     (P2) +B56/B55
58   'Return (annual)                     (P2) (365*B57)/B114
59
60   'STOCK UNCHANGED, OPTION EXPIRES
61
62   'Options proceeds                    (C2) +B94
63   'Dividend rec'd                      (C2) +B52
64   'Interest charge                     (C2) +B54
65   'Total receipts                      (C2) +B62+B63-B64
66   'Return (period)                     (P2) +B65/B55
67   'Return (annual)                     (P2) +B66*365/B114
68
69   'STOCK DECLINES, OPTION EXPIRES
70
71   'Out of pocket                       (C2) +B55
72   'Dividends rec'd                     (C2) +B63
73   'Margin debt                         (C2) +B53
74   'Interest charge                     (C2) +B64
75   'Net cost of stk                     (C2) +B71-B72+B73+B74
76   'Breakeven                           (F2) +B75/B24
77
78   '*******************************
79
80   'SHORT SUMMARY                       'PgDn for More
81
82   'Shares purchased                    +B24
83   'Price/share                         +B25
84   'Num.options sold                    +B28
85   'Option expires                      (D3) @VLOOKUP(B35,G16..H31,1)
86   'Strike price                        +B29
87   'Premium                             +B30
88
89   'Stock cost                          (C2) +B24*B25
90   'Commission                          (C2) (J22)
91   'Total stk cost                      (C2) +B89+J22
92   'Margin debt                         (C2) +B91/2
93
94   'Options proceeds                    (C2) (B28*B30*100)-B95
95   'Options comm.                       (C2) @IF(G3<187.5,G10,G9)
96
97   'Out of pocket
98   'Investment                          (C2) +B92-B94
99
100  '*******************************
101
102  'RETURNS
103
104  'STOCK RISES, OPTION EXERCISED
105  ' period                             (P2) +B57
106  ' annual                             (P2) +B58
107
108  'STOCK UNCHANGED, OPTION EXPIRES
109  ' period                             (P2) +B66
110  ' annual                             (P2) +B67
111
112  'BREAKEVEN                           (F2) +B76
113  ' Number of days
114  ' for transaction                    (G) +J45-J44
```

(continues)

1-2-3 Plays the Options Market
From page 212
1-2-3 Options Template
(continued)

```
                -D-             |          -E-
2    ^INFORMATION IS
3    ^AUTOMATICALLY
4    ^ENTERED IN
5    ^COLUMN E
6
7
8
9
10
11   '  ALT U WILL UNSPLIT SCREEN
12
13   'CASH ACCOUNT
14
15
16
17
18   'TODAY'S DATE
19   'Year(yy)                      (G) +B19
20   'Month(mm)                     (G) +B20
21   'Day(dd)                       (G) +B21
22
23
24   'Shares Bought                 (G) +B24
25   'Price/share                   +B25
26
27
28   'Num. calls sold               (G) +B28
29   'Strike price                  +B29
30   'Premium/call                  +B30
31   'Dividend rec'd                (C2) +B31
32
33
34   'Expiration date
35   '(e.g. 4/85=485)               (G) +B35
36
37
38
39
40
41
42
43
44   '*** CASH ACCOUNT SUMMARY ***
45
46   'STOCK RISES, OPTION EXERCISED
47
48   'Shares sold                   +E24
49   'Price/share                   +E29
50   'Sale proceeds                 (C2) (E48*E49)
51   'Commission                    (C2) +J24
52   'Dividends rec'd               (C2) +E31
53
54
55   'Total investment              (C2) +E96
56   'Net profit                    (C2) +E50-J24+E52-E55
57   'Return (period)               (P2) +E56/E55
58   'Return (annual)               (P2) (365*E57)/E114
59
60   'STOCK UNCHANGED, OPTION EXPIRES
```

(continues)

1-2-3 Plays the Options Market
From page 212
1-2-3 Options Template
(continued)

```
61
62   'Options proceeds                (C2) +E93
63   'Dividend rec'd                  (C2) +E52
64
65   'Total receipts                  (C2) +E62+E63
66   'Return (period)                 (P2) +E65/E55
67   'Return (annual)                 (P2) (365*E66)/E114
68
69   'STOCK DECLINES, OPTION EXPIRES
70
71   'Out of pocket                   (C2) +E96
72   'Dividends rec'd                 (C2) +E63
73
74
75   'Net cost of stk                 (C2) +E71-E72
76   'Breakeven                       (C2) +E75/E24
77
78   '*******************************
79
80   'SHORT SUMMARY
81
82   'Shares purchased                +E24
83   'Price/share                     +E25
84   'Num.options sold                +E28
85   'Option expires                  (D3) +B85
86   'Strike price                    +E29
87   'Premium                         +E30
88
89   'Stock cost                      (C2) +E24*E25
90   'Commission                      (C2) +B90
91   'Total stk cost                  (C2) (E24*E25)+E90
92
93   'Options proceeds                (C2) (E28*E30*100)-E94
94   'Options comm.                   (C2) +G8
95
96   'Total investment                (C2) +E91-E93
97
98
99
100  '*******************************
101
102  'RETURNS
103
104  'STOCK RISES, OPTION EXERCISED
105  ' period                         (P2) +E57
106  ' annual                         (P2) +E58
107
108  'STOCK UNCHANGED, OPTION EXPIRES
109  ' period                         (P2) +E66
110  ' annual                         (P2) +E67
111
112  'BREAKEVEN                       (F2) +E76
113  ' Number of days
114  ' for transaction                (G) +B114
```

(continues)

1-2-3 Plays the Options Market
From page 212
1-2-3 Options Template
(continued)

```
                    -G-                  |        -H-
'OPTIONS COMMISSION CALCULATION

(B28*B29*100)                          'principal
(1.6*(B30)+14)*(B28)                   'base commission
@IF(G4>0.17*G3,0.17*G3,G4)             'max comm calc
(G) (0.028*G5)*B28                     'discount
@IF(G6>0.48*G5,0.48*G5,G6)             'max disc.calc.
(C2) (G5-G7)*0.97                      'option comm
@IF(G3>187.5#AND#G8<29.1,29.1,G8)      'a.min comm calc
@IF(G3<187.5,0.15*G3,G8)               'b.min comm calc




                                       (D1) 'EXPIRATIONS
(G) 185                                (G) @DATE(85,1,22)
(G) 285                                (G) @DATE(85,2,20)
(G) 385                                (G) @DATE(85,3,17)
(G) 485                                (G) @DATE(85,4,22)
(G) 585                                (G) @DATE(85,5,19)
(G) 685                                (G) @DATE(85,6,16)
(G) 785                                (G) @DATE(85,7,16)
(G) 885                                (G) @DATE(85,8,20)
(G) 984                                (G) @DATE(84,9,18)
(G) 985                                (G) @DATE(85,9,22)
(G) 1084                               (G) @DATE(84,10,20)
(G) 1085                               (G) @DATE(85,10,17)
(G) 1184                               (G) @DATE(84,11,21)
(G) 1185                               (G) @DATE(85,11,19)
(G) 1284                               (G) @DATE(84,12,16)
(G) 1285                               (G) @DATE(85,12,21)

                        -J-                      |                -K-
                                                  "STOCK COMMISSION CALCULATION

                                                  1
^stk cost                                         "Up to 100 shares
(C2) @IF(B89<=800,B89,800)                        (C2) (0.02696*B89)+8.43
(C2) @IF(B89>801#AND#B89<2500,B89,2500)           (C2) (0.01685*B89+0.0315*B24+16.85)
(C2) @IF(B89>2501#AND#B89<5000,B89,5000)          (C2) (0.01236*B89+0.0315*B24+29.21)
(C2) @IF(B89>5001#AND#B89<20000,B89,20000)        (C2) (0.01236*B89+0.0315*B24+31.46)
(C2) @IF(B89>20001#AND#B89<30000,B89,30000)       (C2) 92
(C2) @IF(B89>30001#AND#B89<300000,B89,300000)     (C2) 92
(C2) 300001                                       (C2) 92


'MINIMUM COMMISSION CALCULATION
@IF(B24<=100,1,0)
@IF(B24>101#AND#B24<=1000,2,0)                    0.87*B24
@IF(1001<=B24,3,0)                                0.92*B24
+J15+J16+J17

(C2) @VLOOKUP(B89,J5..M11,J18)                    'stk comm on buy
@IF(J20<30#AND#B89>300,30,J20)                    'min.comm calc
@IF(J21>J20,J21,J20)                              'min.comm
```

(continues)

1-2-3 Plays the Options Market
From page 212
1-2-3 Options Template
(continued)

```
23
24   (C2) @VLOOKUP(B50,J5..M11,J18)                    'comm on exercise
25   @IF(J24<30#AND#B50>300,30,J24)                    'min.comm calc
26   @IF(J25>J24,J25,J24)                              'min.comm
27
28
29   '*************
30   'MACROS
31
32   '{HOME}{GOTO}C1~                                  'ALT S- SPLITS SCREEN
33   '/WWV{WINDOW}
34   '{WINDOW}{HOME}
35   '{RIGHT}/WGPE
36
37   '/FS~R                                            'ALT A - SAVES WORKSHEET
38
39   '/WWC~                                            'ALT U - UNSPLITS SCREEN
40
41   '{GOTO}a80~                                       'ALT M - GOTO SHORT SUMMARY
42
43   '*************
44   @DATE(B19,B20,B21)                                'Date Calculation
45   @VLOOKUP(B35,G16..H31,1)

File OPTIONS7
                                                -L-
3    2
4    "  101 to 1000
5    (C2) @IF(K16<(0.02696*B89)+8.43+0.0785*B24,K16,(0.02696*B89)+8.43+0.0785*B24)
6    (C2) @IF(K16<(0.01685*B89+0.0893*B24+18.95),K16,(0.01685*B89+0.0893*B24+18.95))
7    (C2) @IF(K16<(0.01236*B89+0.0893*B24+31.31),K16,(0.01236*B89+0.0893*B24+31.31))
8    (C2) @IF(K17<(0.01236*B89+0.0945*B24+33.56),K17,(0.01236*B89+0.0945*B24+33.56))
9    (C2) @IF(K17<(0.0843*B89+0.0945*B24+114.45),K17,(0.0843*B89+0.0945*B24+114.45))
10   (C2) @IF(K17<(0.0562*B89+0.0945*B24+199.84),K17,(0.0562*B89+0.0945*B24+199.84))
11   (C2) @IF(K17<(0.0225*B89+0.0945*B24+1209.86),K17,(0.0225*B89+0.0945*B24+1209.86))


                                                -M-
3    3
4    "1001+
5    0
6    (C2) @IF(K16<(0.01685*B89+0.0615*B24+46.67),K16,(0.01685*B89+0.0615*B24+46.67))
7    (C2) @IF(K16<(0.01236*B89+0.0615*B24+59.03),K16,(0.01236*B89+0.0615*B24+59.03))
8    (C2) @IF(K17<(0.01236*B89+0.0615*B24+66.9),K17,(0.01236*B89+0.0615*B24+66.9))
9    (C2) @IF(K17<(0.0843*B89+0.0615*B24+147.79),K17,(0.0843*B89+0.0615*B24+147.79))
10   (C2) @IF(K17<(0.0562*B89+0.0615*B24+233.17),K17,(0.0562*B89+0.0615*B24+233.17))
11   (C2) @IF(K17<(0.0225*B89+0.0615*B24+1243.2),K17,(0.0225*B89+0.0615*B24+1243.2))
```

1-2-3 Plays the Options Market
From page 212
1-2-3 Options Template
(continued)

Advertiser Product Indexes

Products

Reader Service Number

Computers

— Data General Corp., 74-74
938 Ericsson Information Systems, Inc., 90-91
694 Panasonic Industrial Co., 173
668 Sperry Corp., 158-159

Hardware

Boards
18 AST Research, 8-9
77 Hercules Computer Technology, 21, 28
153 IDEAssociates, 34-35
963 Impulse Computer Products, 182
967 Jeden, 63
149 Quadram, 189
906 Qubie', 99
169 Sigma Designs, 37
190 Tecmar, 14, 146-147, IBC
707 Tseng Laboratories, 33

Storage Devices
820 ACT Marketing Corp., 58
315 Alloy Computer Products, 178-179
930 Alpha Omega Comp., 88, 188
17 Ampex, 190-191
963 Impulse Computer Products, 182
967 Jeden, 63
683 Kammerman Labs, 1
905 Qubie', 97
922 Space Coast Systems, 175
— Sysgen, 93
188 Tallgrass Technologies Corp., 208-209
193 Ven-Tel, Inc., 24

Reader Service Number

Monitors
827 Power R, 289
296 Princeton Graphics Systems, 38-39

Printers, Plotters, and Typewriter Interfaces
966 Applied Creative Technology, Inc., 31
685 Datasouth, 36
— Gould, 180
79 IBM, 17
328 Rainbow Technologies, 288
319 Star Micronics, 236-237
285 Toshiba America, 166
— Texas Instruments, IFC

Communications
944 Advanced Digital Corp., 193
962 Dataspeed, 257
869 General Datacomm, 18
133 Orchid Technology, 111
193 Ven-Tel, Inc., 17

Miscellaneous
966 Applied Creative Technology, Inc., 31
634 Creative Computer Products, Inc., 113
895 Electronic Protection Devices, 73
78 Genest Technologies, 285
947 Imperial Technology, Inc., 205
683 Kammerman Labs, 1
827 Power R, 289
907 Qubie', 101
328 Rainbow Technologies, 288

Systems Software

Operating Systems
160 Rickerdata, 285

Utilities
961 Apex Resource, 254
31 Central Point Software, 252
853 Essential Software, 288
894 Opt-Tech Data Processing, 288
950 Opt-Tech Data Processing, 289
575 Photon, 156
— POLYTRON Corp., 112
— Quaid Software Limited, 254
162 RoseSoft, 89
587 SoftStyle, Inc., 255
948 WyssWare, 168

Languages
862 Software Bottling Co. of N.Y., 197

Reader Service Number

Applications Software

General Business
867 Ashton-Tate, 114-115
493 Ecosoft, 255
888 Evergreen Software, 248
913 HFK Software, Inc., 289
— Insight, 46
830 IBM, 6-7
575 Photon, 156
— POLYTRON Corp., 112
— Primavera Systems, 253
889 Project Software Development, Inc., 62
— Scitor Corporation, 98
587 SoftStyle, Inc., 255
253 Software Arts, Inc., 60-61
— Walonick Associates, 172
948 WyssWare, 168

Financial & Spreadsheets
875 Austin Scientific, 126
747 Barron Ross, 69
202 Best Programs, 41
3 Dow Jones, 223
532 Futures Group, 288
59 Gamma Productions, Inc., 68
891 H & E Computronics, 25
— HowardSoft, 59
286 Peachtree Software, Inc., 100
928 Simon & Schuster, 251
704 Zylab, 288

Job and Industry Specific
596 Autocad, 26-27
726 Software Shop Systems, 289

Data Management
436 Cosmos, 13
— Direct Net, 225
71 Fox & Geller, 138
949 Infocom, 48-49
83 Information Builders, Inc., 163
— Primavera Systems, 253
920 Seaside Software, 157
253 Software Arts, Inc., 60-61
932 Unlimited Processing, 142
196 Warner Software, 143

Word Processing/Text Editing
879 Command Technology, 258
93 Lifetree Software, 218
165 SSI, 118-119

Communications
199 Diversified Computer Systems, 245
624 Inner Loop Software, 288
275 Microstuf, 116
142 Persoft, Inc., 51
193 Ven-Tel, Inc., 24

Graphics
596 Autocad, 26-27
243 Emulex/Persyst, 76

Reader Service Number

77 Hercules Computer Technology, 21, 28
241 Polaroid, 210-211
169 Sigma Designs, 37

Integrated Systems
6 Alpha Software, 10

Desk-Top Manager
760 Borland International, 50
— POLYTRON Corp., 112
253 Software Arts, Inc., 60-61

Educational, Personal, Entertainment & Misc. Software

Educational
7 American Training International, 219
463 Blue Chip Software, 175
928 Simon & Schuster, 170
308 subLOGIC Corp., 117

Personal
875 Austin Scientific, 126
3 Dow Jones, 223
— Ortho Information Services, 72
928 Simon & Schuster, 251

Entertainment
463 Blue Chip Software, 175
918 1 Step Software, 235
308 subLOGIC Corp., 117

Miscellaneous
142 Persoft, Inc., 51
587 SoftStyle, Inc., 255

General

Accessories
Anthro Corporation, 192
721 Borg Industries, 289
146 ComuterAid, 288
276 Contemporary Computerwear, 168
895 Electronic Protection Devices, 73
576 Pacific Exchanges, 288, 289
886 Secure-It, Inc., 285
310 3M Data Recording Products, 160-161

Services
— ALF Products, 197
856 Compuserve, BC
781 IBM, 92

Advertisers

Reader Service Number

Books, Catalogs, and Periodicals

— D-Comp, Inc., 162
224 Inmac, 252
733 Lionheart Press, 289
797 Pico, 169
806 Prentice Hall, 181
— Simon & Schuster, 145

Mail Order

205 Applied Computer Products, 120-121
825 Arlington Computer Products, 232
784 Better Products, 288
865 Bulldog Computer Products, 221
90 Compuclassics, 246
803 Compumail, 224
943 Compumart of Tustin, 245
754 Computer Discount Products, 247
951 Computer Inventory Control, 243
420 Computer Mail Order, 292
800 Computers Direct, 149
554 Conroy-La Pointe, 140-141
110 Creative Microsales, 137
58 Diamond Software, 144
880 Discount Computer Center, 220
923 Disk Jockey, 245
780 Disk World, 222
214 800 Software, 174
768 47th St. Computers, 194-195
— Logicsoft, 244
784 PC Components, 245
136 PC Connection, 128-121
460 PC Network, 260
737 PC Warehouse, 238
286 Peachtree Software, Inc., 100
960 Peripheral Marketing, Inc., 110
274 Progressive Micro Distributors, 77, 286-287
850 Soft/Plus Research, 245, 289
921 Telasoft, 171
— VLM Computer Electronics, 289

820 ACT Marketing Corp., 58
944 Advanced Digital Corp., 193
— ALF Products, 197
315 Alloy Computer Products, 178-179
930 Alpha Omega Software, 88, 188
6 Alpha Software, 10
7 American Training International, 219
17 Ampex, 190-191
Anthro Corporation, 192
961 Apex Resource, 254
205 Applied Computer Products, 120-121
966 Applied Creative Technology, 31
825 Arlington Computer Products, 232
867 Ashton-Tate, 114-115
18 AST Research Inc., 8-9
875 Austin Scientific, 126
596 Autocad, 26-27
747 Barron Ross, 69
202 Best Programs, 41
784 Better Products, 288
463 Blue Chip Software, 175
721 Borg Industries, 289
760 Borland International, 50
865 Bulldog Computer Products, 221
31 Central Point Software, Inc., 252
879 Command Technology, 258
90 Compuclassics, 246
803 Compumail, 224
943 Compumart of Tustin, 245
856 Compuserve, BC
146 ComputerAid, 288
754 Computer Discount Products, 247
951 Computer Inventory Control Inc., 243
420 Computer Mail Order, 292
800 Computers Direct, 149
276 Contemporary Computerwear, 168
554 Conroy La Pointe, 140-141
436 Cosmos, 13
634 Creative Computer Products, 113
110 Creative Microsales, 137
— D-Comp, Inc., 162
— Data General Corp., 74-75
685 Datasouth Computer Corporation, 36
962 Dataspeed, 257
58 Diamond Software, 144
— Direct Net, 225
880 Discount Computer Center, 220
923 Disk Jockey, 245
780 Disk World!, 222
199 Diversified Computer Systems, 245
3 Dow Jones, 223
493 Ecosoft, Inc., 255
214 800 Software, 174
895 Electronic Protection Devices, 73
243 Emulex/Persyst, 76
938 Ericsson Information, 90-91
853 Essential Software, 288
888 Evergreen Enterprises, 248
768 47th Street Computers, 194-195
71 Fox & Geller, 138
532 Futures Group, 288
59 Gamma Productions, 68
869 General Datacomm, 18
78 Genest Technologies, 285
— Gould, 180
891 H & E Computronics, 25
77 Hercules Computer Technology, 21, 28
913 HFK Software, 289
— HowardSoft, 59
79 IBM, 17
781 IBM, 92
830 IBM, 6-7
153 IDEAssociates, 34-35
947 Imperial Technology, Inc., 205
963 Impulse Computer Products, 182
949 Infocom, 48-49
83 Information Builders, Inc., 163
224 Inmac, 252
624 Inner Loop Software, 288
— Insight, 46
967 Jeden, 63
683 Kammerman Labs, 1
93 Lifetree Software, Inc., 218
733 Lionheart Press, Inc., 289
Logicsoft, 244
965 Logistics Software, Inc., 245
231 Mark Williams Company, 139
98 Maynard Electronics, 5
657 Meca, 16
332 MICROGRAFX, Inc., 40
112 Micro Mart, 290-291
939 Micromission, 233
103 Microprocessors Unlimited, 245
116 Microshop, 234
— Microsoft Corporation, 15
275 Microstuf, Inc., 116
118 MicroWay Inc., 176
832 Moore Business Center, 285
531 Natural Microsystems, 148
124 Nec Information Systems, 22-23
124 Nec America, Inc., 102
918 1 Step Software, 235
950 Opt-Tech Data Processing, 289
894 Opt-Tech Data Processing, 288
133 Orchid Technology, 111
— Ortho Information Services,72
576 Pacific Exchanges, 288, 289
694 Panasonic Industrial Co., 173
784 PC Components, 245
136 PC Connection, 128-131
460 PC Network, 260
737 PC Warehouse, 238
286 Peachtree Software, Inc., 100
960 Peripheral Marketing, Inc., 110
142 Persoft, 51
575 Photon, 156
797 Pico, 169
241 Polaroid, 210-211
— POLYTRON Corporation, 112
827 Power R, 289
806 Prentice Hall, 181
148 Primavera Systems, Inc., 253
296 Princeton Graphic Systems, 38-39
274 Progressive Micro Distributors, 77, 286-287
889 Project Software Development, Inc., 62
149 Quadram Corporation, 189
— Quaid Software Limited, 254
583 Quarterdeck, 70-71
905 Qubie' Distrubiting, 97
906 Qubie' Distributing, 99
907 Qubie' Distributing, 101
328 Rainbow Technologies, Inc., 288
160 Rickerdata, 285
162 RoseSoft, 89
165 SSI, 118-119
— Scitor Corporation, 98
920 Seaside Software, 157
886 Secure It, 285
169 Sigma Designs, 37
928 Simon & Schuster, 145, 170, 251
850 Soft/Plus Research, 245, 289
587 Softstyle, Inc., 255
253 Software Arts, Inc., 60-61
862 Software Bottling Co. of N.Y., 197
726 Software Shop Systems, 289
922 Space Coast Systems, 175
668 Sperry Corp., 158-159
319 Star Micronics, 236-237
308 subLOGIC Corporation, 117
— Sysgen, Inc., 93
188 Tallgrass Technologies Corp., 208-209
190 Tecmar Inc., 14, 146-147, IBC
921 Telasoft, 171
— Texas Instruments, IFC
310 3M Data Recording Products, 160-161
285 Toshiba America, 166
707 Tseng Laboratories, 33
932 Unlimited Processing, 142
193 Ven-Tel, Inc., 24
— VLM Computer Electronics, 289
— Walonick Associates, 172
196 Warner Software, Inc., 143
948 WyssWare, 168
704 ZyLab Corporation, 288

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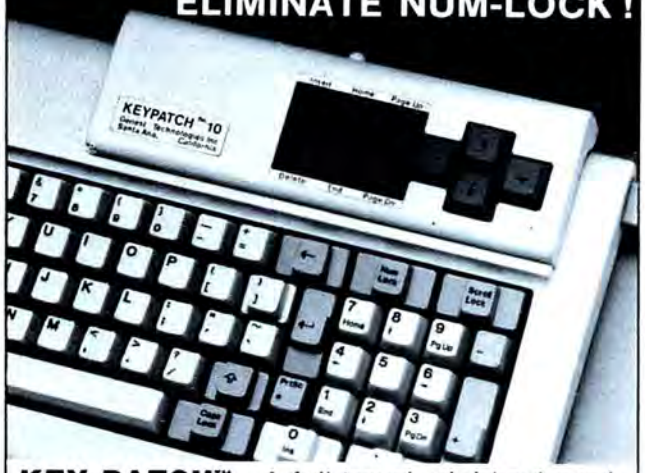

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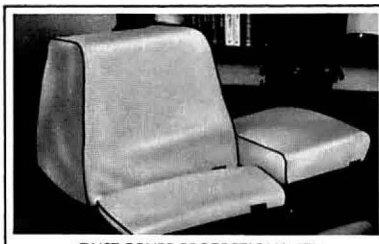

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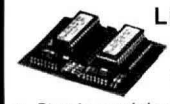

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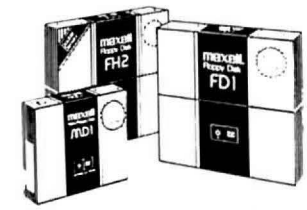

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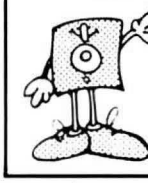

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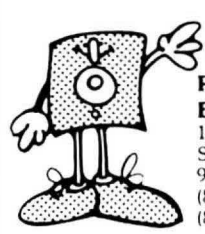

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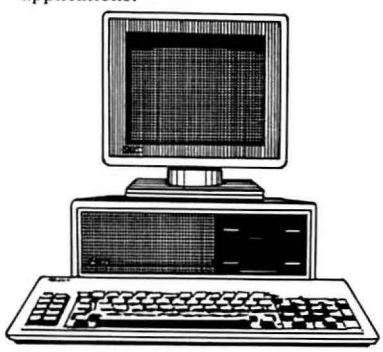

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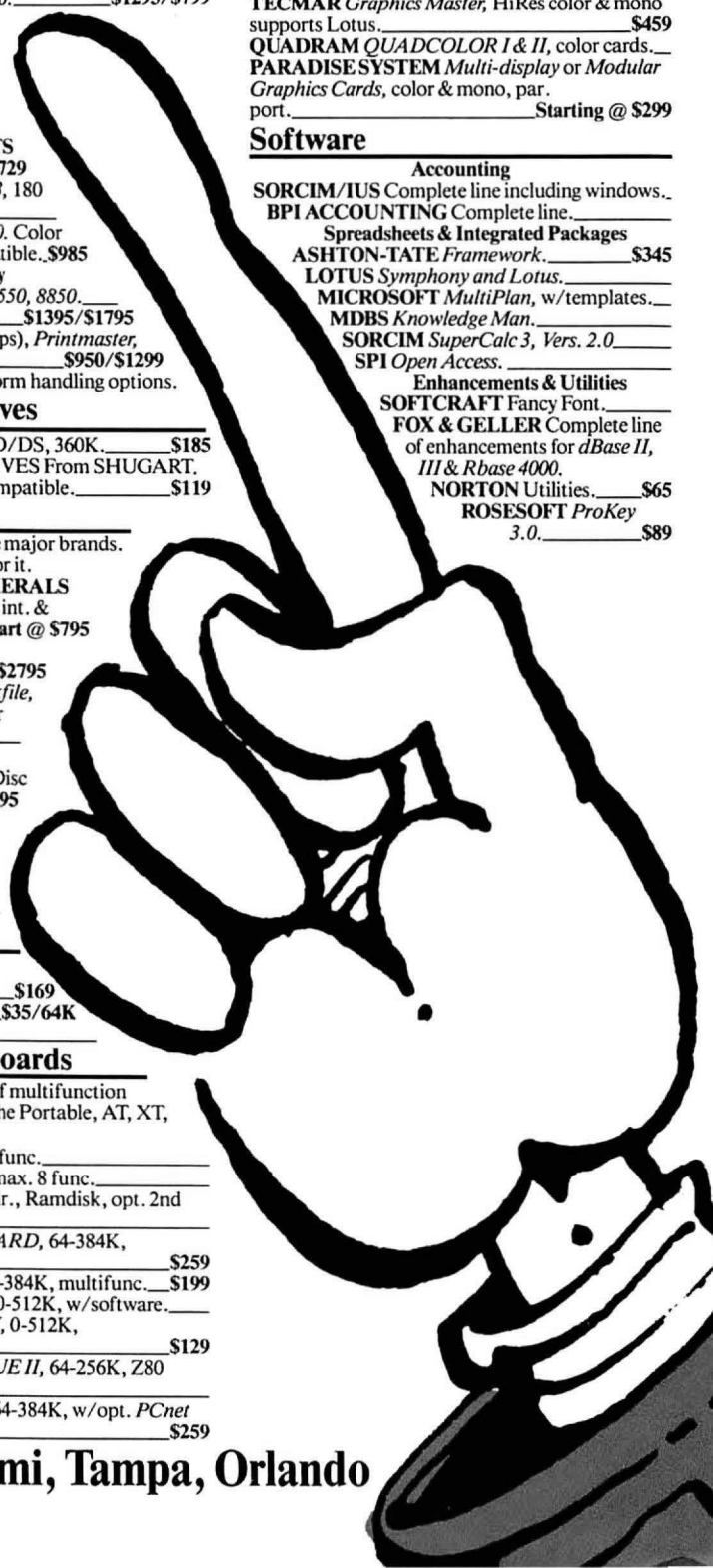

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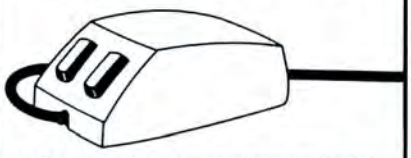

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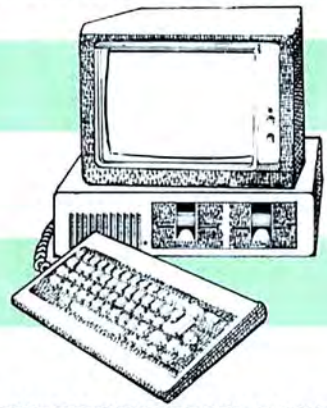

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