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The Sound-Alike list of the Turbo Lightning Proofreader

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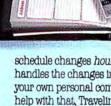
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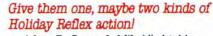
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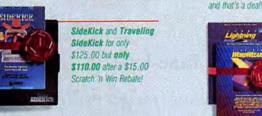


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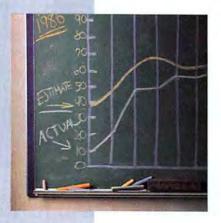
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Case in point. The formidable 24-pin Brother 2024L. It sets a new pace by marrying the speed and graphic capabilities of a dot matrix printer to letter quality printing that, at 96 cps, is two to three times faster than any daisy wheel. At 160 cps, drafts are faster still.

But that's not the half of it. The 2024L comes with four typefaces and the ability to add virtually any other fonts available. It handles a host of versatile print functions. And it profits from a buffer memory plus built-in tractor and optional cut-sheet feeders. With either parallel or serial interfaces, it works with almost every system made. And it helps keep the office blessedly quiet.

Of course, maybe you don't need a printer like the 2024L. But even on a shoe-string budget, you net many of its best features.

The compact Brother M-1509 sizzles with bi-directional printing at a racy 180 cps for drafts...45cps for near

printers.

letter quality. It credits both serial and **Dot matrix** parallel interfaces to its features. And, along with most of the 2024L's print functions, it's equipped with a one-inch paper cut function

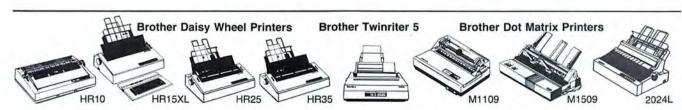
to save paper and a buffer memory to save time.

And if your budget's even less than a shoe-string, the new Brother M-1109 is for you. Its standard features include both a friction-feed platen and a built-in tractor feed. Like the M-1509, it has dual interfaces and a spectrum of print options. All of which adds up to big system advantages at a small system price.

So if you're looking for the top-of-the-line, but worried about the bottom line, look no more. See your nearest Brother dealer or contact: Brother International Corp., 8 Corporate Place, Piscataway, NJ 08854.

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# The Write Stuff

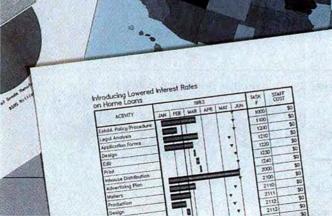
AST TurboLaser:
full-page 300 dpi
IPGL graphics
TurboLaser:
TurboLaser:
full-page 300 dpi
IPGL graphics
TurboLaser:
So fast it leaves
LaserJets on
TurboLaser:
Feature
Original Page
(text and g
Full Page
I 1.5 MB RA
Built-in Ra
Wide Ranc
Styles and
Style



AST's TurboLaser has it all. The best combination of high-speed, sharp graphics, typeset-quality text and unlimited software compatibility on the market. Printed in a moment's notice, newsletters, charts, letters, drawings, reports, forms, manuals and more, never looked more professional. Judge for yourself—feature-for-feature AST's desktop laser printer writes off the competition.

#### TurboLaser Versus LaserJet Desktop Laser Printer Comparison

Feature	AST TurboLaser	HP LaserJet	HP LaserJet PLUS	HP LaserJet 500 PLUS
Original Pages per Minute Speed (text and graphics)	8	<b>«8</b>	<b>«8</b>	<b>«8</b>
Full Page 300 dpi Graphics	Yes	No	No	No
HPGL Graphics Compatibility	Yes	No	No	No
1.5 MB RAM	Yes	No	No	No
Built-In Rasterizer (RIP)	Yes	No	No	No
Wide Variety of Standard Fonts, Styles and Sizes (resident and instantly accessible)	Yes	No	No	No
Wide Range of International Fonts	Yes	?	?	?
Built-in Page Description Package	Yes	No	No	No
Standard Serial and Parallel Interface Support	Yes	No	No	Yes
Input Tray Capacity (pages)	250	100	100	500
Output Tray Capacity (pages)	250	20	20	500
Collated Face-Down Output	Yes	No	No	Yes
Diablo 630 Emulation	Yes	Yes	Yes	Yes
Epson Emulation	Yes	Yes	Yes	Yes
Monthly Duty Rating (pages)	5K-10K	2-3K	2-3K	2-3K
Life Expectancy (pages)	600K	100K	100K	100K
Fully Compatible With All AST Products:	Yes	?	?	?



deplet aveletted



**Eight "ORIGINAL-Pages-**Per-Minute" Speed. AST prints originals at the rate most laser printers can only produce additional copies. Other desktop models boast eight-pages-per-minute, but are referring to the time it takes to make copies of an original. Printing eight-ORIGINAL-pages-per-minute, TurboLaser obsoletes the "pages-perminute" standard.

Full-Page, High-Resolution Graphics. Complete 81/2" x 11"-page graphics with 300 dpi (dots per inch) resolution makes TurboLaser an ideal business graphics and CAD/CAM presentation tool. The competition is confined to small "token" graphics output.



Wide Range of Emulation Capabilities and Software Compatibility. TurboLaser provides a complete emulation of HPGL, the plotter language used by over 90 percent of all business graphics and CAD/CAM software. Likewise, TurboLaser fully emulates Lasergraphics Language™ (LL) and popular printers, such as Epson, Diablo 630° and the extended 630 (X-630™). As a result, you can print virtually all PC-based application software, including Lotus, Symphony, Framework,

WordStar, dBASE, Chart," Word," etc., and CAD/CAM graphics such as AutoCAD, CADVANCE, VersaCAD™ and many others.

**Multiple Fonts**, Styles and Sizes. Perfect for desktop publishing, TurboLaser provides a wide variety of fonts, type styles and point sizes for versatile and creative communications.

Sophisticated Paper Handling. Run large print jobs unattended with TurboLaser's large input and output trays. And facedown output reduces collating time, so you can produce reports on the run.

**Full Compatibility With AST** Products. Best of all, there's never a question of compatibility with AST's present and future products, including data communications, local area networks and micro-to-mainframe solutions.

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> AST Research, Inc., Subsystems Group, 2121 Alton Avenue, Irvine, California 92714-4992.

BENEELL PLAN EMPLOYEE Corporation World Wide

Desktop publishing graphics courtesy of Studio Software

A Few of the Standard Fonts:

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	User ☐ Desktop Publishing ☐ CAD/CAM ☐ Business Graphic Name
	Title
	Company
A	Address
	City/State/Zip
A 100	Phone



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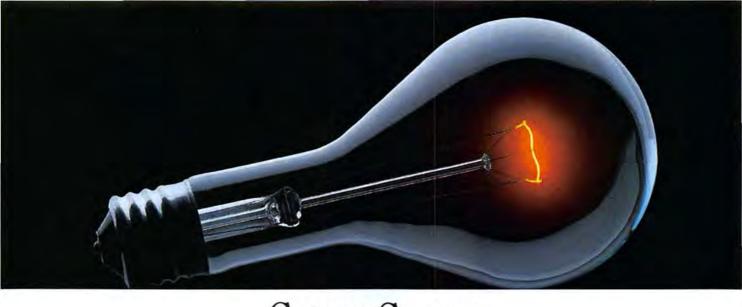


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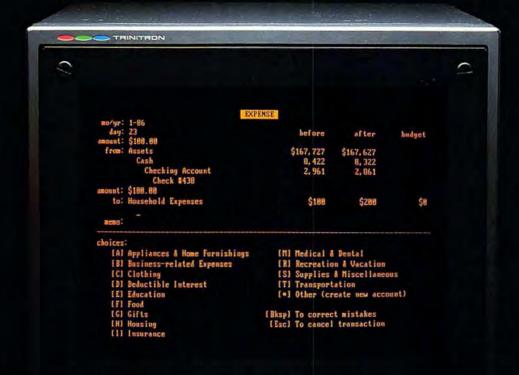
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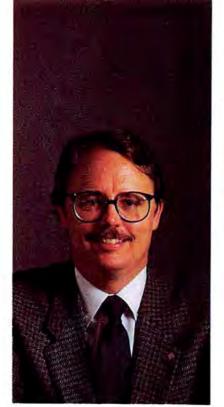
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David Bunnell

#### Welcome to the first annual David Bunnell Personal Computer Achievement Awards, honoring 12 of the year's best and brightest PC players.

# 12 Who Made a Difference in 1986

his is the time of year when a lot of magazines announce their awards. Most of the time the recipients are chosen by the editors of those magazines. And most awards go to companies and products. *PC World* has its annual World Class PC awards, which are based on a poll of readers. (Winners of the 1986 awards were announced in the October issue.)

This year, *Macworld* will also present World Class awards based on a readers' poll.

We feel that readers' polls are especially meaningful because they are the voice of the consumer computing in the wilderness. Such a contest is a hands-on revelation.

However, the temptation for an editor-in-chief to make awards selections—to play at being omnipotent and all-knowing—is not one I can easily resist. Frankly, it's too much fun to pass up.

So I have decided to establish the Personal Computer Achievement Awards for 12 people who have made a significant difference to computing during the past year.

Dance and	C	Achievement	A
Personal	Compilier	Achievement	Awards

John Sculley	Apple Computer	
John Warnock	Adobe Systems	
Paul Brainerd	Aldus Corporation	
Burrell Smith	Radius	
Jean-Louis Gassée	Apple Computer	
Bill Gates	Microsoft	
	Corporation	
Gary Kildall	KnowledgeSet	
Rod Canion	Compaq Computer	
Michael Dell	PC's Limited	
Kevin Jenkins	Hercules Compute Technology	
Dan Bricklin	Software Garden	
Trip Hawkins	Electronic Arts	

In making these awards I have relied on my own instincts, as well as on nominations that I received from the editors of *PC World*.

(continues)

### IBM's new 2,400 bps PC Modems

give you an easy choice:

# Either

Stand-alone. The IBM 5842 2,400 bps Modem.



Either way, you can't go wrong.

With IBM's new modems and a personal computer you can tap into information at a very impressive 2,400 bits per second (bps).

That translates into a binary file transfer speed of nearly 13 K characters per minute— or over six pages worth. Now imagine the impact that can have on your long distance telephone bill.

But these new modems aren't just fast, they're also versatile. They can both send and receive data asynchronously at speeds rang-

ing from 2,400 bps down to 75 bps.

Both modems are compatible with the popular "AT" command set, as well as the IBM command set. And they have been tested for compatibility with leading PC communications software such as Crosstalk™ XVI, Microsoft® Access, Kermit, Smartcom® and Smartcom II®

# Or

The Automatic Modems
These modems feature
Automatic Adaptive Equalization at 2,400 and 1,200 bps—
which means they will continuously fine-tune themselves to compensate for changes and noises on the telephone line. The result is, you can receive data over a wider range of telephone line conditions.

Both modems also feature automatic or manual answering and dialing. They'll automatically switch to pulse dialing if tone dialing doesn't work. They have automatic redialing. And once a connection is made, automatic speed detection. They also have automatic detection of a voice or a failed call.

A Modem with a Memory of Its Own

The stand-alone IBM 5842 2,400 bps Modem offers some additional features. It can also send and receive data synchronously at speeds of 2,400 bps or 1,200 bps. You'll find extensive "Help" menus. A dial directory for 20 phone numbers. A log-on directory for five log-on sequences. A built-in pattern generator for self testing. Diagnostics implemented from the front panel as well as from the computer keyboard. And a complete array of LED Status Indicators to give you a quick visual check on what's happening.



The stand-alone IBM 5842 2,400 bps Modem is compatible with all models of IBM Personal Computers. And, in addition to the features mentioned above and its internal power supply, the significant difference is that a stand-alone modem can be moved from PC to PC more easily than an internal modem.

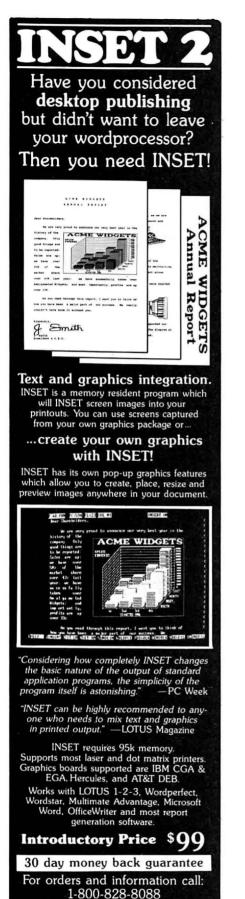
If you feel that 2,400 bps is more modem than you need, we also offer the stand-alone IBM 5841 1,200 bps Modem, and the internal IBM Personal Computer 1,200 bps Modem.

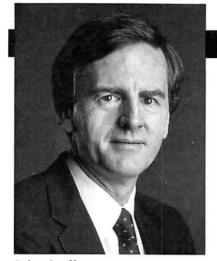
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Or you can contact your IBM marketing representative.

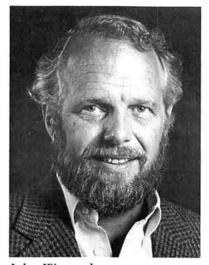
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John Sculley



John Warnock



Paul Brainerd

Macworld, and Publish! magazines. There are other, more systematic ways of selecting winners, but ultimately the process is arbitrary.

One of the people on my list is John Sculley, chairman and CEO of Apple Computer. Sculley wins a Personal Computer Achievement Award for leadership.

In 1986 he successfully brought Apple back to the forefront of personal computing. Apple not only launched the Mac Plus, and virtually created a new market with desktop publishing, but the company also turned in record quarterly earnings and once again became the darling of Wall Street. All this at a time when its main competition, IBM, was receiving a severe battering in the marketplace.

The next award goes to John Warnock, president of Adobe Systems. He is making PostScript the standard page-description language of most laser printers and thereby helping to spread the gospel of desktop publishing throughout the world. He wins the Bunnell Peace Prize this year.

Similarly, Paul Brainerd, president of Aldus Corporation, wins the Literature Prize for coining the term *desktop publishing* and for creating *PageMaker*, which became the 1-2-3 of 1986. *Page-Maker* is the program that proved once and for all that the Macintosh can be a highly productive tool for creating documents, newsletters, and even magazines such

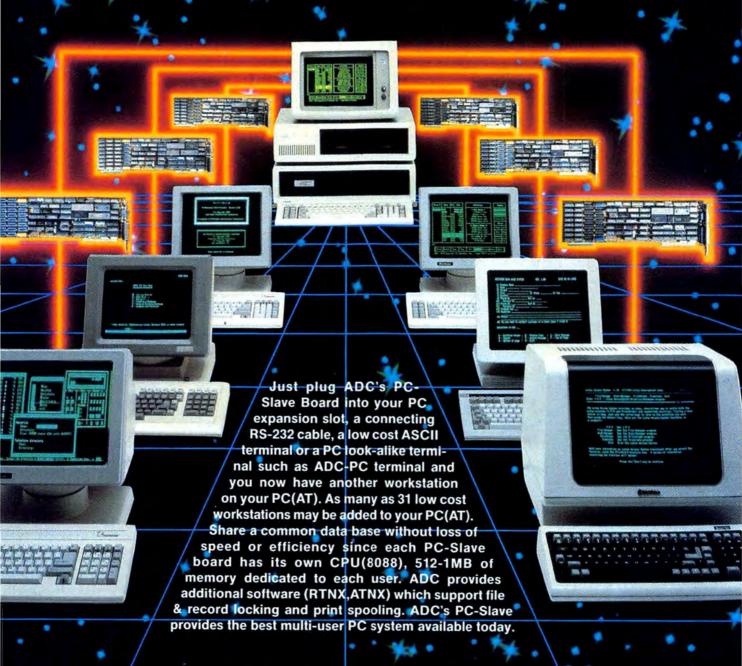
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# Two Powerful Networks...

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On the other hand, the ability of a local area network to share programs, files, and peripherals among PCs has made it an invaluable productivity tool in the workplace.

Thanks to the synergy (and 100% compatibility) of MultiLink Advanced™ and LANLink™ you can choose the networking solution you need today and let it evolve into the system you'll need in the future.

MultiLink Advanced™...The Software-Driven, Multi-User System That Runs Programs Under PC-DOS. MultiLink Advanced™ represents the next generation of multi-user systems. The software package transforms a single XT or AT into the CPU of a multi-tasking, multi-user network. Programs, files, and peripherals can be shared by multiple users locally, or by using a modem.

Designed to take advantage of the AT, the system enables as many as eight terminals, connected to a single computer, to emulate IBM PCs having up to 420K RAM. Our PC-Shadow™ Workstation (shown left) even has an AT look-alike, as well as work-alike, keyboard, display, and serial printer port.

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MultiLink Advanced™ is the ideal departmental networking solution for small businesses and departments of large corporations, alike. And because it's fully compatible with LANLink™ each multi-user cluster can be linked together, as well as connected to the LAN, in order to access network disks, files, programs, and peripherals.

# MultiLink

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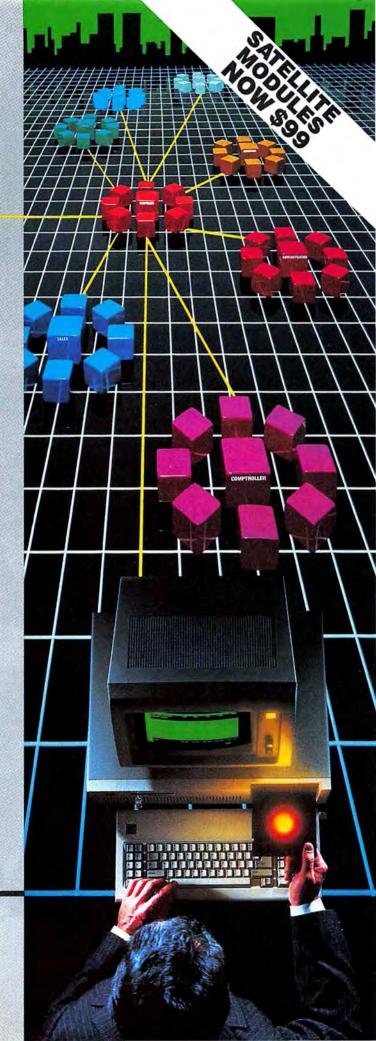
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**Burrell Smith** 



Jean-Louis Gassée



Bill Gates

as *Publish!*. Brainerd deserves a full page in the history book of personal computing.

Moving along in my personal awards ceremony, a plaque goes to Burrell Smith, vice president of engineering at Radius, for designing the Radius large-screen monitor for the Macintosh. To my mind, this was the most exciting hardware product of 1986. Smith wins Bunnell's CRT kudos for this second major hit: His first was helping to engineer the original hardware for the Macintosh.

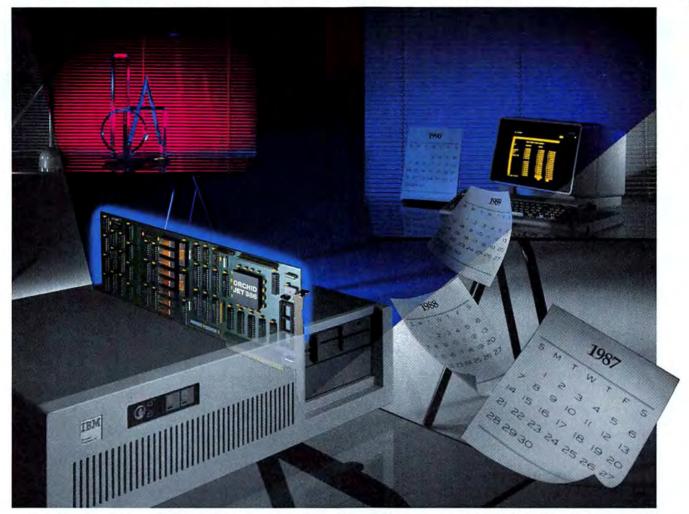
Then we come to Jean-Louis Gassée, vice president of product development for Apple Computer. Jean-Louis receives an award for his vision of future personal computer development.

Thank goodness Jean-Louis has a vision, because Apple needs it. Sometimes his notions do not seem relevant to anything in particular, but the important thing is that he has a vision and that he expounds it so well.

Next I solemnly canonize Bill Gates, chairman of Microsoft Corporation, for championing CD ROM—for having the foresight to recognize the significance of this new information technology and for actively campaigning to make it happen. I also applaud him for steering the effort to take Microsoft public in what has probably been the most successful public offering in corporate history.

(continues)

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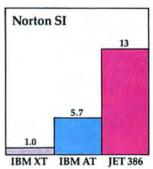
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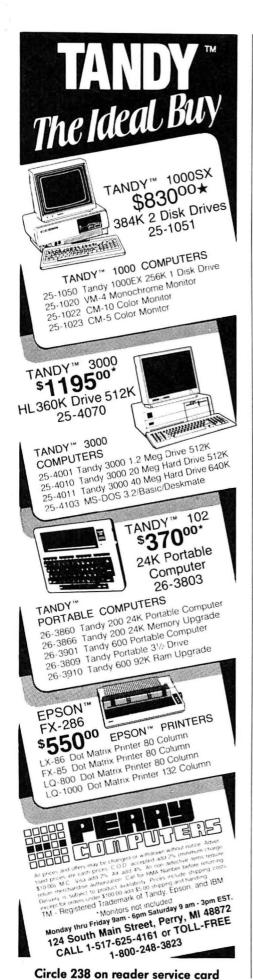
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Gary Kildall



Rod Canion



Michael Dell

Gary Kildall, founder of Digital Research and president and founder of KnowledgeSet Corporation, makes the awards list for being the hands-on activist behind CD ROM and for creating many of the tools that make it all possible. He wins my Science Prize.

Another real winner is Rod Canion, president and CEO of Compaq Computer. I applaud him for his bold strike of announcing Compaq's amazing 386 machine before IBM's, and for successfully steering Compaq Computer through the difficult waters of the compatibles world.

Michael Dell, president of PC's Limited, wins my stamp of approval for pioneering the mail-order PC-clone and PC AT-clone business—and for proving that there can be other channels for delivering products besides computer stores and direct sales to large corporations.

Kevin Jenkins, president of Hercules Computer Technology, wins for having established Hercules as the graphics standard on the PC and for promoting the RamFont text mode of the Hercules Graphics Card Plus.

Dan Bricklin, cocreator of Visi-Calc and president of Software Garden, wins Best of Class with Dan Bricklin's Demo Program. In fact, Dan is his own best demo. He wins for bringing out his second big software hit and for proving that his true value to the industry is really the gray matter

(continues)

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\*\*\*\*\*



Kevin Jenkins



Dan Bricklin



Trip Hawkins

between his ears and not just his past achievements.

And finally there's Trip Hawkins, president of Electronic Arts. He scores for continuing to be wildly successful in the socalled nonexistent home computer market. Recently, Electronic Arts racked up four awards at the Software Publishers Association meeting in Washington, D.C.-for best creative product, best graphics, best sound effects in music, and best computer adaptation from the original. Trip is certainly one of the brightest minds in the industry.

These are the winners of the first annual Personal Computer Achievement Awards.

Now, as I read the tea leaves, flip through the tarot deck, and gaze into the crystal ball, who are some of the people to watch in 1987?

Here are a few of my hunches: Jonathan Sachs, cofounder of Lotus Development and creator of 1-2-3. Will his Manuscript word processing program for Lotus be a major hit like 1-2-3?

C. Wayne Ratliff, chief scientist of Migent and creator of dBASE. Wayne's bold move from Ashton-Tate almost earned him a place on the top 12 list for 1986. This year, we'll see if he can come up with a hot data manager that will make his former creation obsolete.

Philippe Kahn, president of Borland. Expect Philippe to gain wide recognition for introducing a

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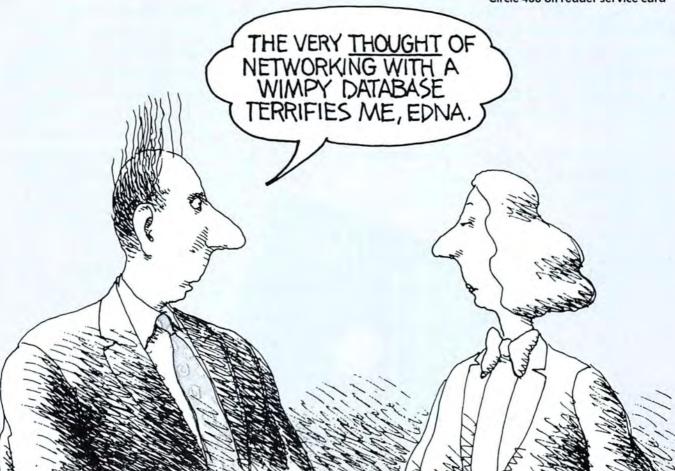
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window.

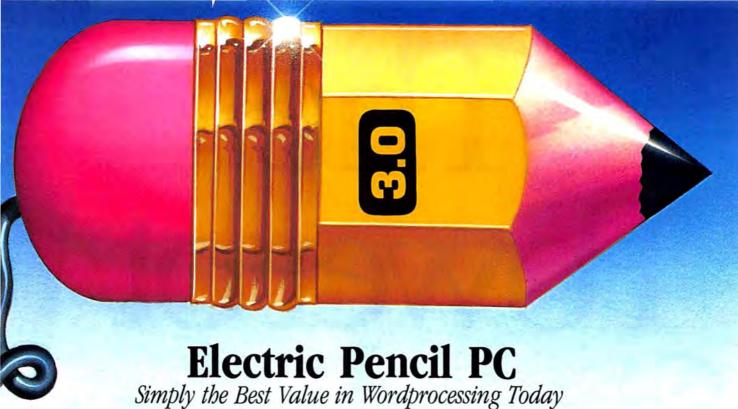
truly revolutionary and astonishing new program. Even though he's had good programs like Side-Kick and Turbo Lightning, his fame has come about largely because he created a new, low-cost software marketing approach. Now Philippe is going to soar to new heights of software success.

Andy Hertzfeld. Andy nearly made my 1986 list of winners because of his involvement with Burrell Smith at Radius. Andy is the software genius who created Switcher for Apple Computer, and he's a man from whom you can always expect the unexpected. There may be some pleasant surprises from him this year.

Next, but not least, there's Steve Jobs. Because he's Steve Jobs, and because he's still a major force to be reckoned with. For that, we should all be "insanely grateful."

I'd like to see all the players have a great year ahead because I believe that, overall, 1987 is going to be so fantastic that it will cover any mistakes we might have made.

See you at next year's Personal Computer Achievement Awards. And remember, I'd love to hear from you. I'm open to nominations.



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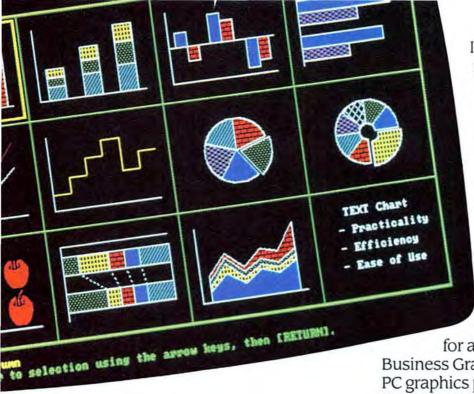
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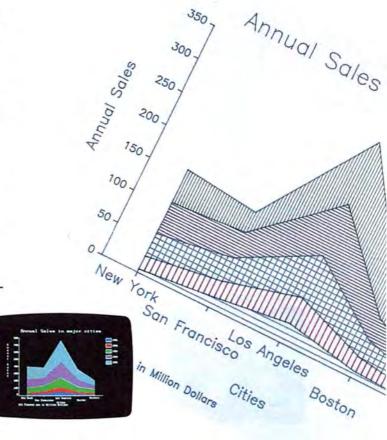
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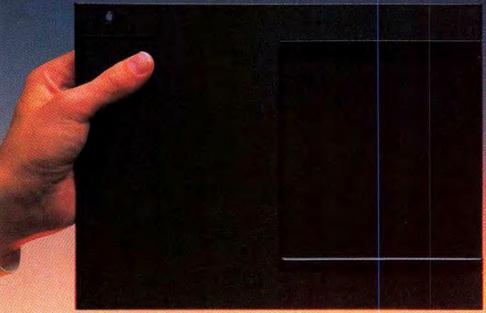
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available 6/1/86.

Bernoulli system costs you \$2695, plus \$280 for their controller. And at \$3775 for their 40 Mbyte dual-drive system with controller, it's easy to understand why *they* don't want you to see this comparison!

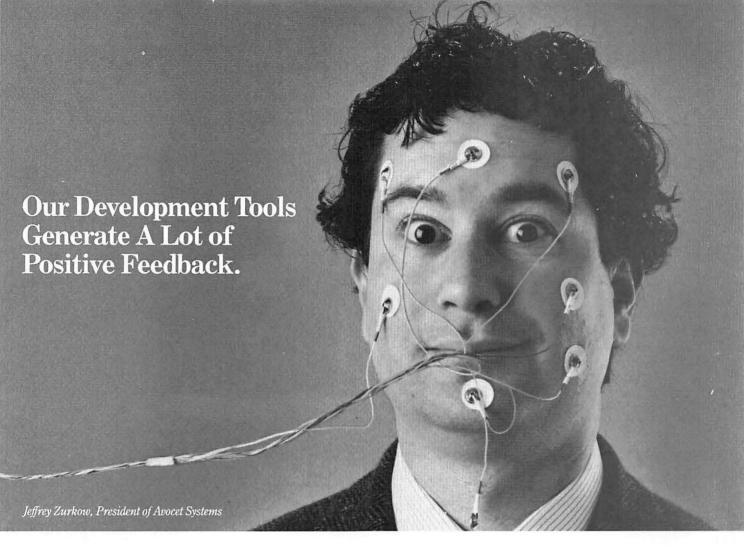
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# Letters

Reactions and responses from the PC World community

### Storm Warnings

David Bunnell's column "The Software Storm Ahead" [PCW, September 1986] focused on the latest quasi-legal flap to burst upon the software industry: the attempt by legislators in Washington to prevent software rental.

In their rush to deal with this "crisis," our representatives in Washington failed to examine a significant parallel. I refer to the policy of software retailers such as Egghead Software on the West Coast that offer no-questionsasked refunds to customers who return products within a specified time period. I see no fundamental difference between software rental and paying for a product and then returning it for full refund. What if the government suddenly said that no store could offer moneyback guarantees on software? That, in essence, is what this legislation would do.

Mr. Bunnell correctly points out that the solution isn't protection from piracy but recognition from the software industry that the consumer has rights. These rights ought to include the right to try out expensive software before paying for it. Rather than lobby legislators for protection from their own folly, software industry leaders should spend their time making products that consumers will buy and use.

Dan Shafer Redwood City, California

## Garland or Glitch?

As much as I deplore the repression of the many factional groups in South Africa (most of which are black), I hope your editors will recognize the need for a correction in "Garlands and Glitches" [PC World View, PCW, August

1986]. A recent trip to South Africa convinced me that the overwhelming majority of South African blacks live under economic conditions that would be the envy of almost every black person on that continent.

Politically, the governments of dozens of "free," "independent," and "democratic" African nations are as repressive as the government of the Republic of South Africa, if not more so. The massive illegal influx of blacks into South Africa from neighboring countries should tell you something.

Those who are determined to create turmoil in South Africa subvert the cause of freedom throughout the world. I hope you will replace the Garland with a Glitch and refrain from political judgments in your otherwise excellent magazine. If you neither publish my letter nor editorially retract the posture indicated in your column, please cancel my subsciption.

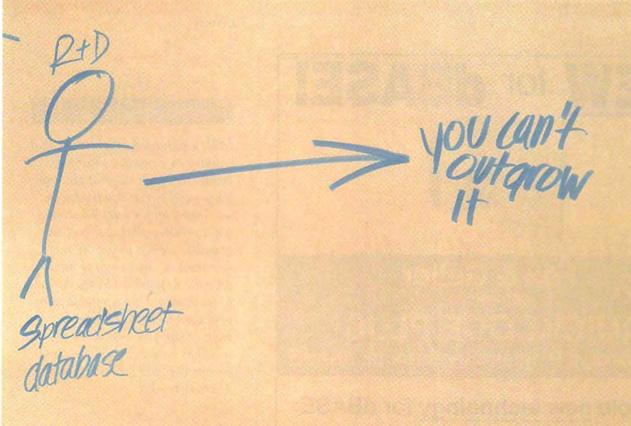
Robert Lookabaugh Ceresco, Nebraska

While we focus almost exclusively on the personal computer, I think we would be foolish to pretend that the environment in which we compute is not a relevant topic. I would be glad to personally refund your subscription money because frankly I think you are out to lunch! —David Bunnell

That AT&T, Microsoft, and dozens of other PC-related and non-PC-related businesses have terminated South African trade to protest the practices of the apartheid regime is fact and not editorial license on PC World's part.

(continues)

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IBM, which tried to remain in that country as a positive force for change, couldn't tough it out any longer and put its South African subsidiary up for sale. We remind Mr. Lookabaugh that even Congress has seen fit to impose trade sanctions in an attempt to influence the Republic of South Africa to institute a more equitable form of government. We reserve the right to report events in the PC world as we see fit, and we stand by our Garland for AT&T and Microsoft. —Ed.

## MaynStream Revisited

Your article on tape backup systems was interesting and informative ["Protection Money," PCW, August 1986]. However, I'd like to update the information on the Maynard MaynStream 20. In March 1986 Maynard issued a new version of its tape backup software. Version 1.6 addresses information on changing the DMA channel, the IRQ interrupt, and the I/O addresses used by the software and the backup card. At the time of your review, only file-byfile backup was available; now MaynStream users can specify an image backup of their hard disk.

Bill Ernest Andover, Massachusetts

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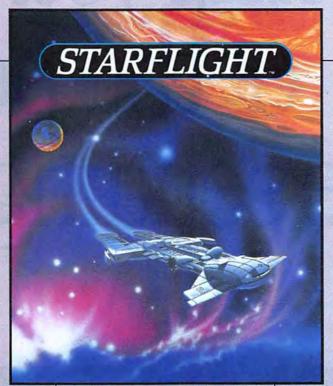
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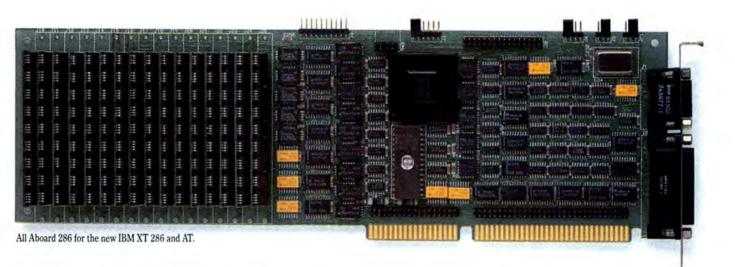
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Model 200s manufactured by Wells American in South Carolina. Two of us decided to install AboveBoards even though Intel warned us that we'd have to start our machines at 6 MHz, despite the Model 200's dual-speed clock. After installing the AboveBoards, we also found that our machines would spontaneously boot in the middle of application programs. Intel suspected the A-Star BIOS.

Wells American technical support had never encountered this problem before but assured us they'd find a solution. Within four days we received new ROM chips along with detailed instructions on how to replace the old ones. After switching ROMs not only did the spontaneous restart problem disappear, but we could now start at 8 MHz-something we were prepared to live without.

That a manufacturer resolved our problem isn't remarkable. We'd expect that service from any vendor. But Wells American also called us to follow up on the modification and sent free replacement chips for all the machines we purchased. We don't think a foreign manufacturer could have sent us replacement parts that soon, nor in all likelihood could it have identified the problem and worked out a solution that quickly. Choosing the American-made label certainly paid off for us.

D. Paul Dalton Dallas, Texas

Demystifying The Mist Stephen King's The Mist from Mindscape is a great game that

(continues)



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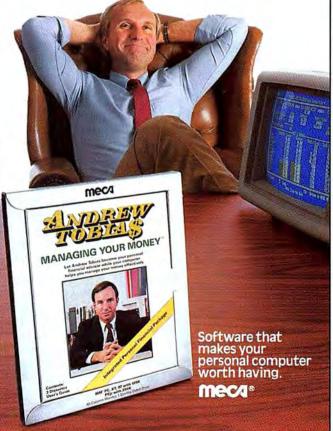
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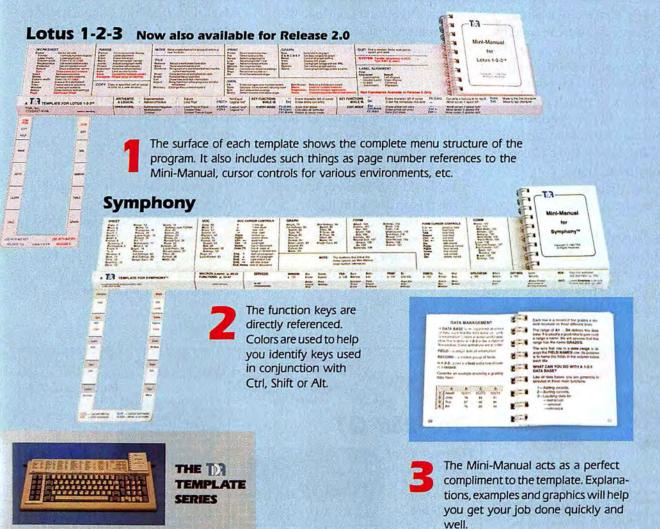
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now collects dust on my bookcase. The Mist is a wonderful. well-paced adventure marred by copy protection. I own a Leading Edge M-H with a 30MB hard disk and 2.5MB of RAM, but I constantly have to switch floppies and play at a snail's pace because Mindscape is afraid of big bad pirates. Personally, I've had enough of copy protection.

Frank Meschler Phoenix, Arizona

We at Mindscape certainly agree that under ideal circumstances copy protection would not be necessary; however, we do not live in an ideal world. Entertainment software in particular is subject to blatant copying. We continue to research product protection methods that provide maximum flexibility to our customers and at the same time protect authors, programmers, and ourselves from undue and intolerable losses. If, in the course of this pursuit, we lose a valued customer like Mr. Meschler, we are both saddened and angered: It means the thieves are winning.

Ian Hadley Technical Director Mindscape Northbrook, Illinois

### Iron Curtain PCs

Magazines from the United States addressed to Czechoslovakia pass through a few too many hands and sometimes don't reach their intended destination. It was almost accidentally, and therefore a bit belatedly, that I happened across the July 1986 issue of PC World. I read it nearly cover to

I'm a data analyst at a research institute in Czechoslovakia, I work with mainframes, so I've had little contact with the "PC world." However, it's obvious that the PC revolution is under way here and definitely gathering strength.

(continues)

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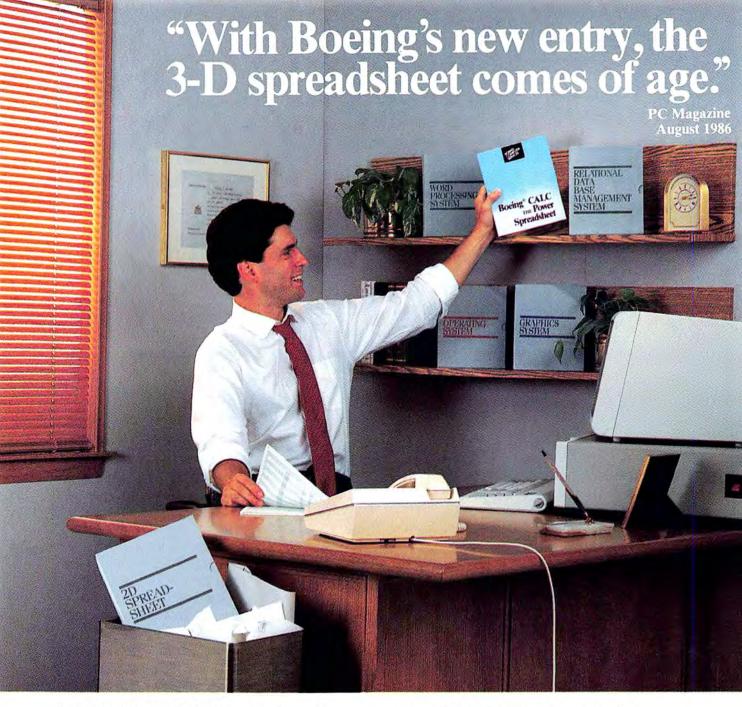
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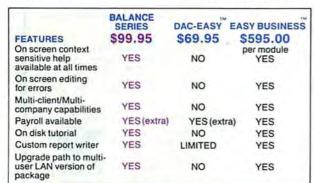
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The number of personal computers in this country grows daily. Although the market is rather narrow and supplies are limited, IBM PCs as well as machines from Olivetti, ICL, and Commodore sell fairly well. Occasionally, obscure brands like the IBMcompatible Novotec 1000 from Peru show up. I can't really be sure that this letter will make it through, but I'd like to say that all in all, your magazine is a very good-though rather advancedguide through the PC jungle.

Michael Čakrt Prague, Czechoslovakia The Enlightenment Gambit

We were pleased with Eric Knorr's review of our product, Paul Whitehead Teaches Chess [From the Software Shelf, PCW, June ·1986]—in more ways than one. We felt we had developed a superior product, the world's only in-depth chess tutorial software; but without the money to adequately market the program, we toiled in relative obscurity. Then came the PC World review, and among the many calls we received was one from a venture capitalist. He'd read your article, bought our product, agreed with your analysis, and ultimately invested in our company. As a result, we now have a decent chance at software

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Martin Marshall President Enlightenment, Inc. San Francisco, California

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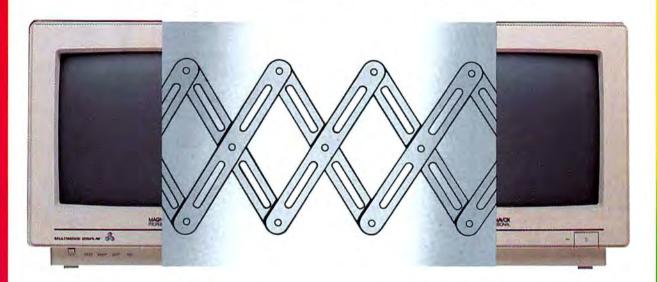
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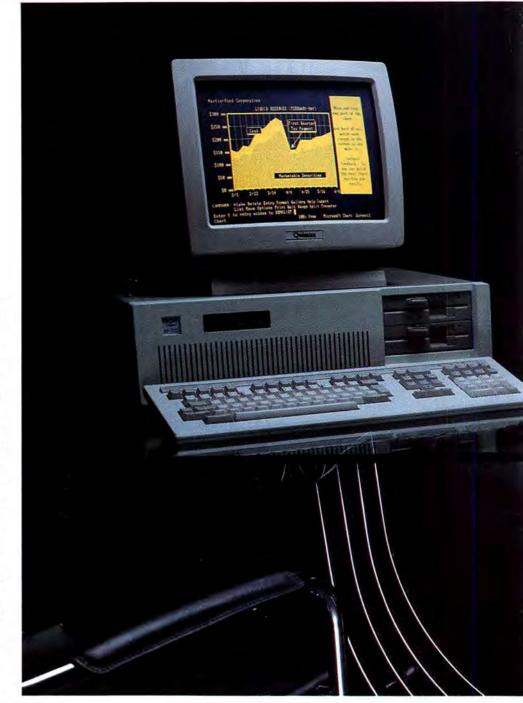
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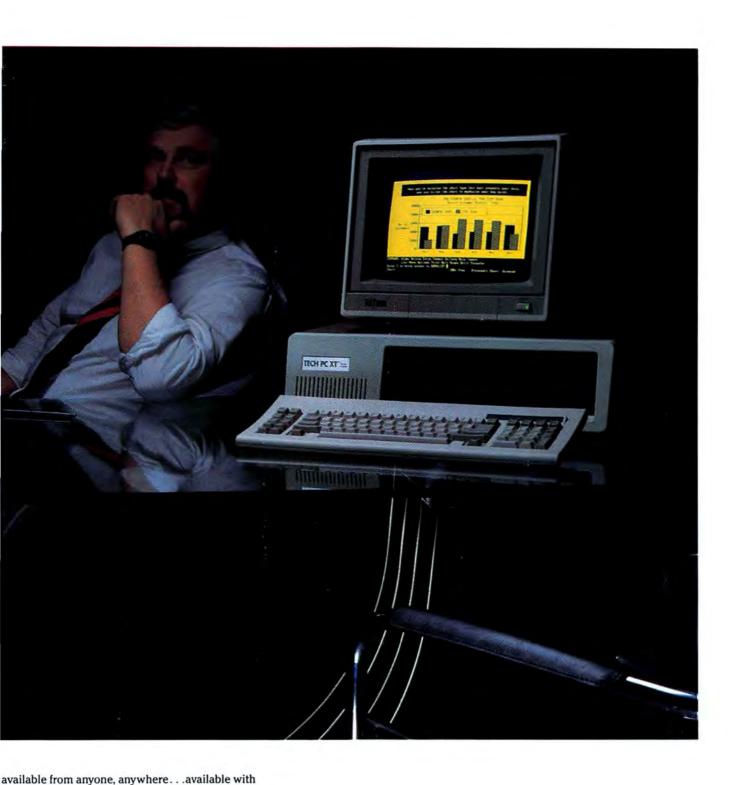
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Harry Miller

The evolution of desktop publishing as a discipline forms a model for technology in the service of market and user needs.

# **Desktop Destiny**

esktop publishing.
Clearly, that's this season's catchphrase. But there's a difference this year: Behind the hook is a tremendous potential for utility. This time, the much-needed excitement is generated by users' recognition of their own needs.

The early popularity of personal computers resulted from the efforts of a few creative thinkers. Those ingenious pioneers saw a better way for people to perform their day-to-day work, and they set about convincing the business community that computers small enough to fit on a desktop could be trusted. For the most part, those pioneers (some of whom can be found on Forbes's list of the 400 wealthiest Americans) came to their vision in the course of their exploration of computers rather than as the result of market research or user needs analysis.

But this is 1987; the market's grown tremendously and matured some in the process. When the technology for desktop publishing became available, the end users didn't need anyone to tell them

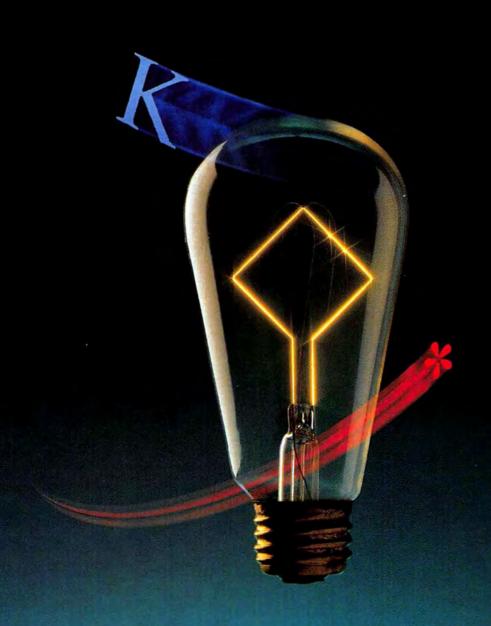
why it was exciting. In fact, desktop publishing as a discipline is being driven and developed by user demand. Rather than settling for the generic tools that technology might offer, users are asking for solutions to their (very real) existing problems. And in so doing, they are creating the specifications of new products in this genre. In this case, the demands are there, just waiting for the technology to satisfy them.

As you might imagine, all this user demand has generated a good deal of excitement in the personal computing industry—excitement that had been sapped by a serious new get-down-to-business attitude. Just as the industry needed to mature, it now needs this boost. And it will need other such stimuli as desktop publishing itself matures and becomes more integral to our personal computing lives.

There's been some serious discussion about whether desktop publishing will exist as an entity

(continues)

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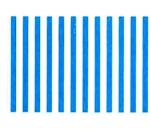
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NO POSTAGE NECESSARY IF MAILED IN UNITED STATES separate from word processing in three to five years. I can say with some confidence that I have the answer: It doesn't matter.

First of all, both applications are developing along converging lines. As traditional word processing products refine their formatting, printer control, and graphics integration features, page-makeup programs will enhance their textediting functions. But it will be some time before either type of program can afford the memory and speed required to take full advantage of the other's usefulness.

Meanwhile, applications environments such as Microsoft Windows will enable these kinds of products to complement one another. It will matter little what you call the genre; the functionality will be with us for a long time

The industry's renewed energy sparks the creativity of our best product designers, and the demand it creates ensures that hardware and software companies will dedicate the necessary resources to fulfill their visions. While the functionality of the two disciplines-desktop publishing and word processing-may merge, I doubt that their features and functions would evolve as quickly or as usefully without the activity that desktop publishing is currently generating.

The excitement and demand started with design and typography professionals who saw much less expensive and more efficient ways of doing the work

(continues)

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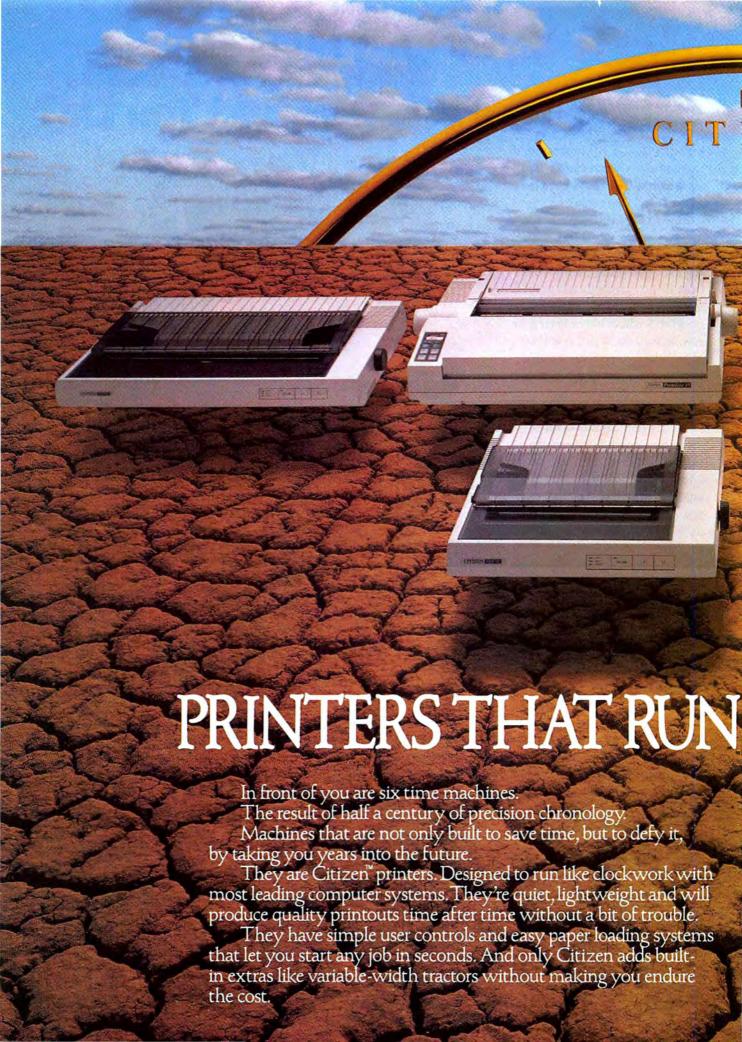
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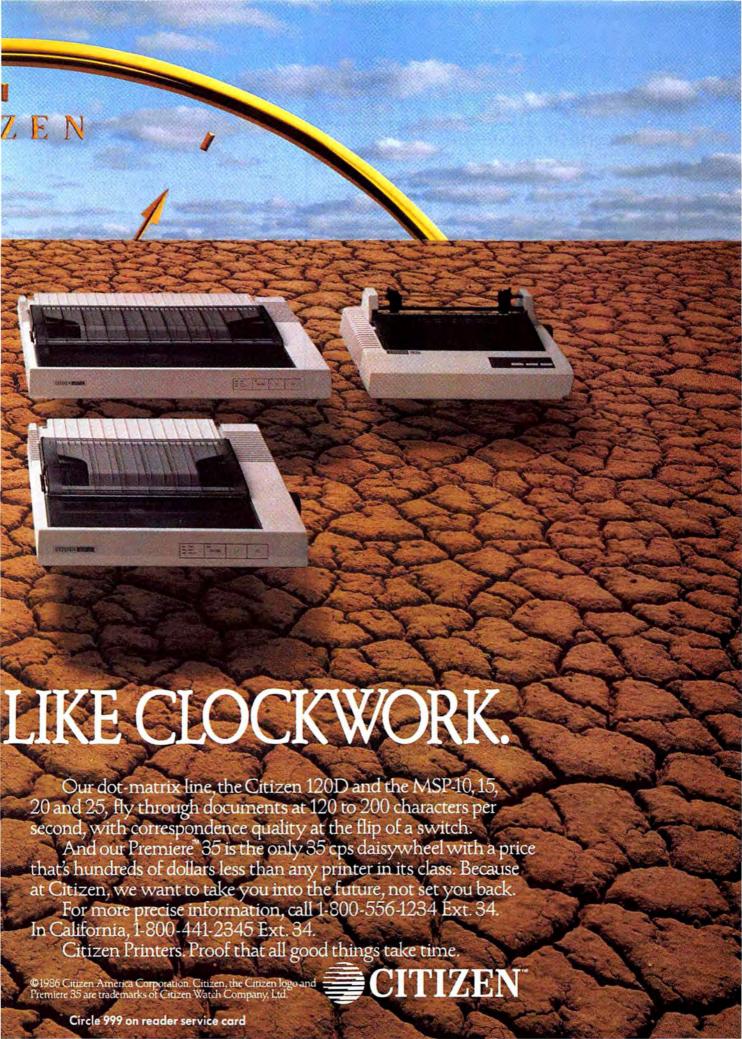
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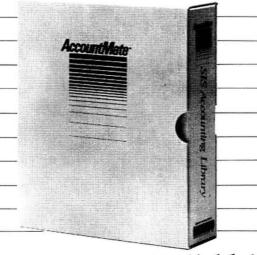


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they'd always done. But now a second wave of nascent desktop publishers is tempted by the promise of enhanced productivity and more professional-looking documents. The result: less time wasted separating the informational wheat from the chaff. This much larger group of users will work with fewer fonts and won't balk (as graphic artists do) at inexact displays. But the fruits of desktop publishing will be theirs in the form of spruced-up documents.

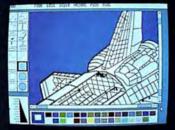
Of course, until desktop publishing applications become transparently easy to use, the activity threatens to become a productivity drain as end users waste valuable time (not to mention reams of paper) getting documents "just right."

As the discipline evolves technically, it moves away from being primarily a centralized activity in which several people contribute to a document that's processed with desktop publishing software at a workstation dedicated to the task. Instead it becomes an individual activity in which all aspects of document preparation are decentralized. As the technology develops, it begins to make sense to give individuals the hardware and software they need to fulfill the broader publishing responsibilities that are within their reach. In almost every aspect of the process, the technology is becoming both more capable and more affordable. In short, the potential of the PC as a desktop publishing environment has never been closer to reality.

(continues)

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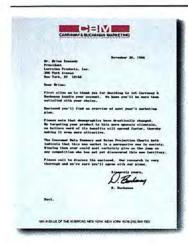
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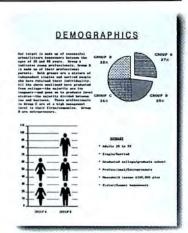
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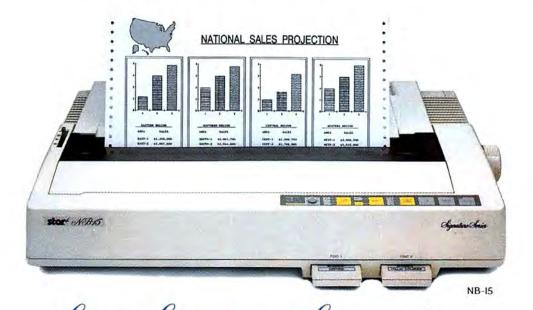
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The ease of mixing words and images is a large part of what gives desktop publishing its impact. But just where will the images come from? Paint, draw, and graph programs are all being enhanced with publishing requirements in mind. A multitude of clip-art images are becoming widely available in machine-usable format. And perhaps most important, scanners with adequate resolution and accuracy, accompanied by simple-to-use software, can import printed images. A crucial development in the world of integrated images is the imminent standardization of file formats. Microsoft Windows' metafile and Tagged Image File Format (TIFF)

are the most visible of these efforts.

To display an accurate representation of a printed page, several vendors have produced highresolution, black-on-white, full-page monitors. Some of these displays can even show a full spread (two pages side-by-side) just as it will appear in the final book or periodical. Offering resolutions between 1280 by 680 and 2800 by 1024, these display devices produce readable 10- or even 6-point type.

Finally, the page printers that have made the whole phenomenon possible are continually increasing throughput speeds and resolution. With processor power and memory capacity that rival or exceed the capabilities of the computers that drive them, these printers also offer the flexibility of multiple software-controlled fonts. And typesetting equipment is becoming more accessible as well, either as in-house equipment or with the desktop publishing workstation acting as a front end to a remote typesetter.

As desktop publishing matures and the PC becomes a truly viable and desirable publishing environment, the whole process may be a model for how market needs can and should determine the course technology takes.





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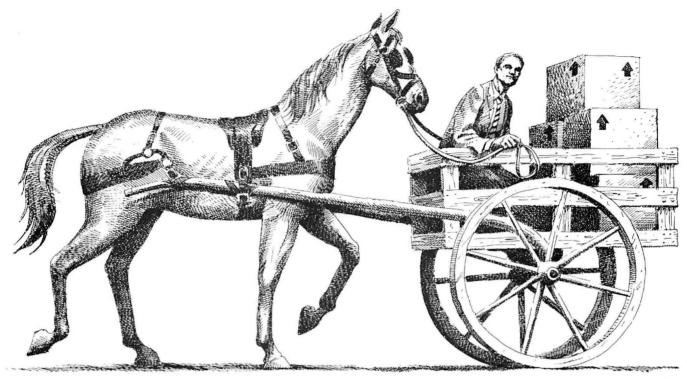
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  Cut & paste multiple spreadsheets
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  Format: Global, Column, Row, Entry
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  20 special math functions
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  Maximum size: 255 Rows x 64 Columns
  Variable print formatting options
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  User-defined page breaks, soft hyphen, tab, indent
  and margin settings
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#### Out Front for 1-2-3

Bill Gross-who taught English to 1-2-3-is now teaching users that HAL is more than just a friendly interface.

PC World View reports items of interest to computer enthusiasts and significant insights about industry trends and personalities. -Eric Bender

Despite the smile, Bill Gross is worried. Slightly.

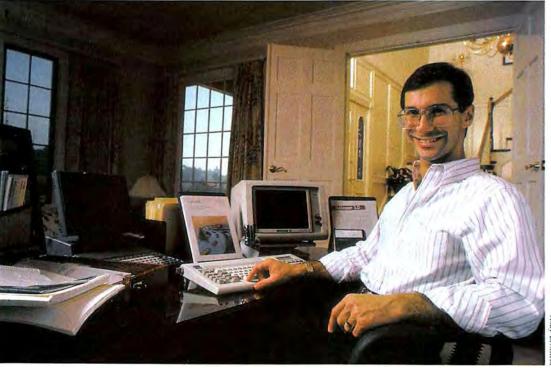
The 28-year-old software whiz is hoping that corporate mavens won't regard HAL (Human Access Language), his masterful Englishlanguage front end for 1-2-3, as a subtle repudiation of the venerable spreadsheet package.

Never mind that GNP, the company founded by Gross and his brother Larry, is now a satellite of Lotus Development's sun. Or that HAL may prove an elixir for 1-2-3, breathing new life into the product just as cheap PC clones

are cultivating a bumper crop of novice users.

"It's not that we don't believe 1-2-3 is incredible," enthuses Gross. "In fact, we've got to be its greatest devotees. 1-2-3 was so good, it was getting unmanageable. Our idea is to let it do the dirty work-the stuff it's truly great at."

Gross certainly isn't fretting about HAL itself, which is less an addition to 1-2-3 than a profound enhancement of it. (HAL will set



Bill Gross, author of the HAL front end for 1-2-3, in a rare moment of repose at his Pasadena home. Despite HAL's naturallanguage features, Gross discounts any claims to artificial intelligence for the package. He maintains that HAL simply represents "intelligent programming."

## View

#### News and notes for the computing community

you back \$150 and 100K (see Product Outlook in this issue).

HAL empowers 1-2-3 to link worksheets, undo commands, create graphs in a flash, manipulate data tables with a word or two, record transcripts of sessions, instantly analyze worksheets, and much more. Macro martyrs can kiss their tildes goodbye; plain English macros can be fashioned with a word processor and fed to HAL. "Programming is now paragraph writing," Gross declares.

Peeking behind the curtain at 1-2-3's source code has helped the GNP team add maturity to its own brainchild. "Originally, we reverse-engineered 1-2-3," Gross explains. "Given a look at the code, we discovered some surprises. And we told Lotus a few things."

The road from consummate power user to Lotus insider is only a bit shorter than the distance separating Cambridge, Massachusetts, from the southern California foothills that serve as GNP's home. GNP evolved from loudspeaker designer and manufacturer to computer retailer to software developer, pumping out the critically acclaimed Lotus templates CPA+ and Macro+.

HAL was inspired by the travails of CPA+ users who couldn't get 1-2-3 to jump through some elementary hoops. The GNP team, its interest piqued, spent a year scrutinizing what 1-2-3 buffs strived to do. Translating their findings into "millions of assumptions," GNP programmers packed those assumptions into the software at every turn, then gave users the ability to override any of them.

Today at Lotus, Gross carries the prosaic title "software consultant." *HAL* is similarly understated; its ease of use masks a sophistication that is likely to appeal more to power users than to 1-2-3 neophytes.

In the movie classic 2001: A Space Odyssey, the mission computer, HAL, did a number on the astronauts; GNP's founders once sensed that Lotus might be doing a number on HAL. Lotus acquired the program and hired its creators shortly after HAL played COM-DEX in November 1985. The product quickly submerged into further development, slipping from view for about eight months. It surfaced briefly at the Boston Computer Society last April and finally took a formal bow last October.

Was Lotus buying time—and burying a product that both enriched its mainstay and highlighted its flaws? "We weren't entirely happy at first," Gross admits. He notes that the uncertainty wasn't limited to GNP; a who-are-these-guys incredulity shot through Lotus. "It was a matter of orientation," he recalls. "Lotus wanted to fix the documentation, not the product."

Any doubts are now history. Gross suggests Lotus's commitment to the product now rivals his own. "They'll go crazy marketing HAL," he predicts. "We couldn't have asked for better acceptance, even with the initial skepticism. This was a fifty-fifty effort—Lotus put its best people on the product, and the links with 1-2-3 are very tight." The revamped HAL hasn't lost a single feature—not even a reporting capability—that could nibble away at Lotus's 1-2-3 Report Writer.

Gross maintains a healthy respect for AI-flavored programs like Q&A, Clout, and Paradox, all of which adorn the rosewood shelves in his office. But he insists HAL isn't a member of the artificial intelligence club. Instead, he says, the program "reflects intelligent programming decisions. HAL is really a gathering of rules and assumptions about the way people work, applied to spreadsheets." –Ken Greenberg

#### No Small Affair

Unconvinced that small businesses have fallen in love with personal computers and that local area networks are the wave of the future? The findings of a major new survey could well lay such doubts to rest. At the same time, the study reveals that small businesses are keenly interested in improving the match between programs and specific problems.

The survey, conducted by the Touche Ross Enterprise Group, consisted of interviews with key players at 526 companies that have sales between \$1 million and \$75 million. Touche Ross found that 86 percent of the sample have PCs installed; what's more, 72 percent own more than one PC, and 56 percent plan to buy additional systems in the near future. Although only 10 percent of the companies have linked machines, the plunge into networking is imminent for 17 percent.

An overwhelming number of the small businesses surveyed believe their move to automation was



a wise one. In 85 percent of the companies in which the PC has a presence, the machines have made a "significant difference" in the operation of the business, and 75 percent report general satisfaction with their systems. "For me, using the micro has brought a gain in productivity equivalent to that brought by the electric adding machine," exults one respondent.

Most companies got up to speed on their systems quickly. For a remarkable 24 percent, PCs became effective in less than a month; 42 percent say integration into the routine took up to five months; only 11 percent spent more than a year trying to make the gears mesh. PCs are put to work on tasks in accounting, financial analysis, word processing, and data management, in that order of frequency.

Many of the "less satisfied" 25 percent cite inadequate or inappropriate software as the culprit. In particular, respondents mention that extensive training is required,

that software isn't suited to the job, and that packages are just too complicated.

"The software I need may be out there, but I can't find it," complains one company official. Two statistics suggest a clue to the problem: 70 percent of the user population note that their software wasn't custom-designed for their industry; and 61 percent selected software without benefit of outside advice.

"Given these problems in choosing software and the applications for which respondents are using micros, these companies may not be using their machines as effectively as they could," concludes Joel Koening, director of the Touche Ross Enterprise Group. "But one thing is sure: The future for the micro in small business looks bright." —John Eckhouse

## Away From the Pack

Ashton-Tate says it's bent on becoming the world's leading source of software and information services. So does Lotus Development. And the two often seem to follow each other's moves as closely as tango partners.

Young, rich, and famous, the two powerhouses naturally strike similar poses in their day-to-day business as well as in their operating styles. But several of their recent moves differ dramatically from those of the software community at large—including Microsoft, the third member of the PC software triumvirate. Based on this circumstantial pairing, the two seem as though they're next door to each other rather than at opposite ends of the country.



For starters, Lotus set up its Information Systems Group almost two years ago. Not to be outdone, Ashton-Tate last year established its own Systems, Services, and Information Division. Initially, neither firm was successful in explaining just what the new outfits would do.

Both companies have plunged into financial data delivery. Both are quietly working on consulting-for-pay services, a novel concept for mainstream PC software houses. Both are actively seeking to expand their business to include minicomputers and mainframes.

Last summer Lotus extended a long string of acquisitions by scooping up Graphic Communications, which publishes *Freelance*. During the first week of August, Ashton-Tate revealed plans to buy Decision Resources, a competing graphics software developer (and home to *Chart-Master*).

The following week, Lotus rolled out a ten-point service and support plan. "This is the most important announcement for us this year," declared chairman Jim Manzi. Six days later, Ashton-Tate stripped away copy protection and unveiled its own revamped service plans. "This is more significant in many ways than any product introduction we have ever undertaken," then president (and now chairman) Edward Esber proclaimed.

Esber laughed off suggestions that his company's timing might have something to do with Lotus's, saying only that Ashton-Tate simply couldn't pull together such a complex announcement in a week.

Most industry pundits agree that the two giants have just been making strategic moves that reflect the direction of the market. "They're both responding to the same forces," notes Jeffrey Tarter, editor of the *Soft-letter* newsletter in Cambridge, Massachusetts. "In most cases, there's really only one appropriate response." – E. B.





#### **Thundering Words**

Some software companies prefer that their advertisements bespeak quiet good taste. Then there's Thunderstone, which bills itself as "Lightningsmith of the New Artificial Intelligence Establishment."

"Our success has effectively stomped the mortal spit out of the brain-damaged geeks whose rancid cells have been polluting the gene pool of legitimate AI professionals," roars a typical promo.

You may have missed Thunderstone's debut. The firm first grabbed the spotlight not with this chip-on-the-shoulder attitude but with *Rockware*, a sort of naturallanguage query package for aficionados of rock music lyrics. With the \$20 package, you can, for example, tap into Bob Dylan's collected works. (Ask Bob a question, any question, and you'll get an associative answer. "What's the weather like today, Bob?" "You don't need a weatherman to know which way the wind blows.")

Who are these brash folk who boast that their software can "save the free world"? And what software is it, anyway?

At the summit—\$90—there's Logic-Line 1, which permits you to "clone the world's greatest minds on your PC." The program is, as Thunderstone says a bit more poetically, "a specialized natural language manipulator for textual data retrieval and cross-referenc-

ing designed as an aid to free-form information correlation, content analysis, and expert system generation."

Literally speaking, Logic-Line doesn't hew to the house rules of AI, such as they are: The program matches words and concepts based on mathematical pattern recognition rather than on emulation of human thought processes. But Thunderstone insists that you can plug in, say, Albert Einstein's speeches and then transfer his thought patterns to other subjects, such as ecology.

Thunderstone's \$50 Comprehension is billed as "an expert system that helps you debug your own thinking and learning," while Assimilation, at \$75, is "a regulating subprogram which effects sequential instruction through [an accompanying] text." Both possess a simplicity that can only be described as breathtaking.

Got a learning difficulty? Well then, just write an essay on "how a misunderstood unit of communication can hold back a person's ability to do something." Can't fathom something you've read? "You should reread it." Bump into a new word lately? "Pull out a good dictionary."

When you have trouble digesting information, *Assimilation* turns on the empathy. "[Comprehension difficulties] can feel like you are being physically squashed," the manual affirms. "You feel sort of bent over by a big weight, or sort of dizzy, or get headaches, or your eyes might start to hurt."

Thunderstone turns out to be a year-old division of Expansion Programs International, a 5-year-old consulting company in Chesterland, Ohio. Comprehension and Assimilation are offspring of "a massive data correlation study" aimed at ferreting out "the underlying techniques or rules for a generic global learning-type process," claims Thunderstone president Michael Pincus.

"We studied famous Renaissance educators," Pincus says.
"We were actually studying what made da Vinci and Michelangelo tick as students." The natural audience for the two programs, he explains, consists of teachers, students, and the military.

A pity that Leonardo never had a computer. –*Marina Hirsch* 

#### A Few Minutes With ...

Jack Shields, senior vice president at Digital Equipment: "The Little Tramp was a visionary; he stole the show. But the Little Tramp was a hero of the silent pictures and had to remain silent. When talking pictures came in, when technology changed, when user demand changed, the Little Tramp could not. He became an anachronism in his own time."

Jeffrey Tarter, editor of the Soft-letter industry newsletter: "All [another potential graphics standard] does is make life miserable for software vendors. What the PC needs is a nice, tightly integrated graphics standard. Until you can get all PCs to draw circles and boxes—much less typefaces—in the same way, the situation will remain a disaster."

#### Tracking the CPI

The International Computer Exchange (ICE), an on-line data base of low-cost personal computer equipment and supplies offered by IBC/Innovention, is now presented in capsule form on a Consumer Price Index floppy disk.

Once you've mastered a few program quirks and key abbreviations, the package enables you to search for products by their features or by exact model. You then obtain a screenful of possible buys, sorted by price, along with relevant phone numbers. You can ferret out 1200-bps modems priced under \$100, or note that quotes for IBM PCs with 64K seem to exceed those with 256K, or confirm that buying floppy disks in sufficient quantity entitles you to pay less than 50 cents a pop.

You can just as easily view a listing of all printers in ascending price order. "While this is about as exciting as sitting around

watching paint dry, it does assure that you don't miss a bargain on a model with better specifications or brand pedigree that happens to be on sale," the company points out.

At \$4.95 per issue, the Consumer Price Index does not claim to provide comprehensive information on the best buys—it merely offers a lot of buys. The company suggests that committed bargain hunters also pick up a copy of the Red Book, a hard copy version of the on-line data. The Red Book carries an identical price tag and comes in handy, as ICE notes, "if you find it inconvenient or uncool to carry your PC to the computer store to help in your price comparison." —E. B.

PC World 83

#### Big Blue's News

IBM's disclosure last fall of a deal to share custom-chip technology with Intel, the big silicon foundry that makes the microprocessors for all IBM PCs and compatibles, sent a chill through much of the PC industry.

The agreement seems to promise rich payoffs for Intel, which hopes to charge into the fast-growing market for chips tailored to specific computer systems. (Not surprisingly, these chips have been bequeathed a clumsy acronym—ASICs, for application-specific integrated circuits). But the heavy betting is on IBM, as the giant adds a powerful weapon to the technological arsenal committed to defending its PC base.

IBM owns a significant chunk of Intel, so the move was not unexpected. But the deal fanned the flames of paranoia that perpetually flicker among Big Blue's competitors.

Analysts expect that IBM will initially modify and combine the chips that support primary processors like the 80286, thereby creating enhanced PCs that can be built for much less than IBM's current

lines. That, in turn, will require anyone who wants to stay compatible to "reverse-engineer" equivalent silicon designs. Doing so will entail fancy footwork and significant bucks, but competitors are accustomed to such a lifestyle.

More strikingly, the agreement gives IBM a green light to build its own versions of such CPUs as the 80286 and 80386. If IBM decides to do so, hardware vendors could find themselves grappling with a new kind of threat.

For those who delight in conspiracy theories, this one has IBM building a slightly modified version of, say, the 80386 chip that takes advantage of a new proprietary operating system. IBM releases all the information that software developers need—but no more.

The modifications are substantial enough to ensure that emulating the new chip (by adding circuitry outside a standard 80386) will slow the engine dramatically. To stay compatible, hardware suppliers must then reverse-engineer the 80386 itself, putting 275,000 transistors on a slice of silicon the size of a fingernail (a trick that cost Intel about \$100 million). They must also dare the combined legal staffs of IBM and Intel to take offense.

So no one dares. IBM walks off with the software base. Software vendors all sign on for the new machine, because there's no reason not to, and all existing applications already run on it. IBM has its cake—and eats its competitors, too. —*E. B.* 

John Eckhouse is a business reporter for the San Francisco Chronicle; Ken Greenberg is PC World's Southwest Editor; and Marina Hirsch is a writer and editor with Autodesk. 

■

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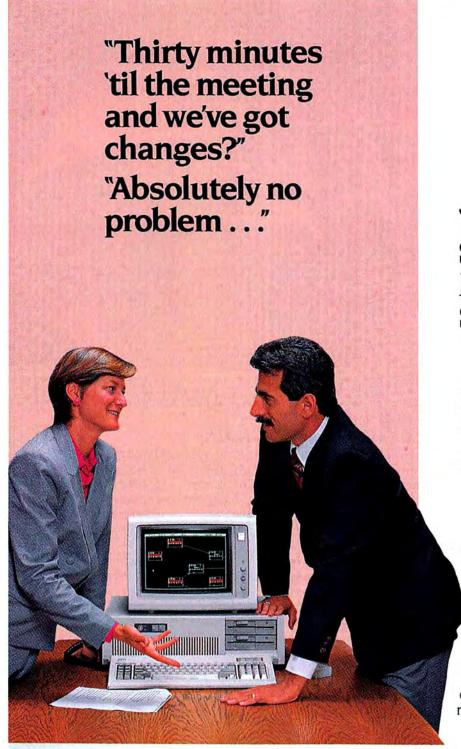


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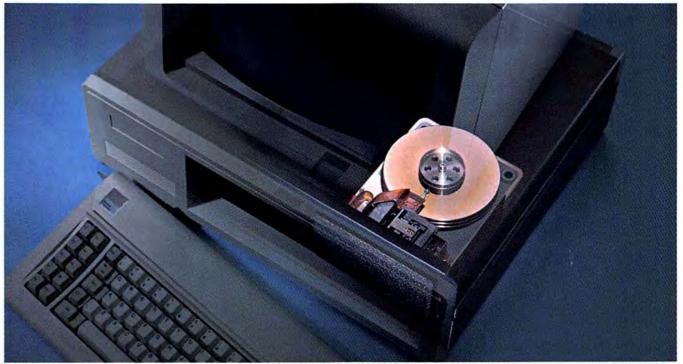
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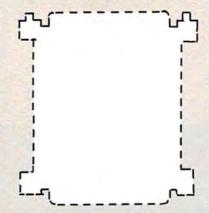
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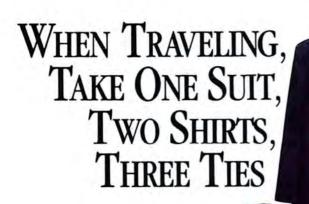
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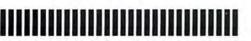
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#### Product Outlook

News you can use on recent PC product announcements and upcoming releases



This month: Ashton-Tate strives for simplicity, a new face for 1-2-3, Wang's do-itall laptop, Crosstalk dials a new number, a sadder but wiser Javelin, a printer that will help you make connections—and the premiere of a new column

Ken Greenberg

In the personal computer arena, the Olympian credo "higher, farther, faster" has been branded like a serial number into the psyches of software developers and hardware engineers. Users perpetually live on the cusp of a new hardware or software generation, of course, but this time it's for real. The harbingers of the coming era-Microsoft Windows, the 80386, graphics coprocessors, Advanced DOS, CD ROM, ISDN, LU 6.2are here, or so close you can practically buy them. Even when segments of the PC industry dwell in the doldrums, the sheer momentum of technology has a way of reinvigorating the business. That momentum is at full gallop right now.

Consider Product Outlook as your eyes and ears on the expanding universe of PC hardware and software. In the months to come, we'll be shining a spotlight on major product announcements and reporting on enhancements and alterations of existing productsall with a sharp, critical look at how well various new offerings might lighten your everyday workload. The column will also assist you in pinpointing offbeat but ultimately influential products by up-and-coming vendors-from utilities to state-of-the-art systems. With any luck, Product Outlook will help you make sense of the seemingly endless bounty that flows from labs and vendors the world over.



#### Son of dBASE

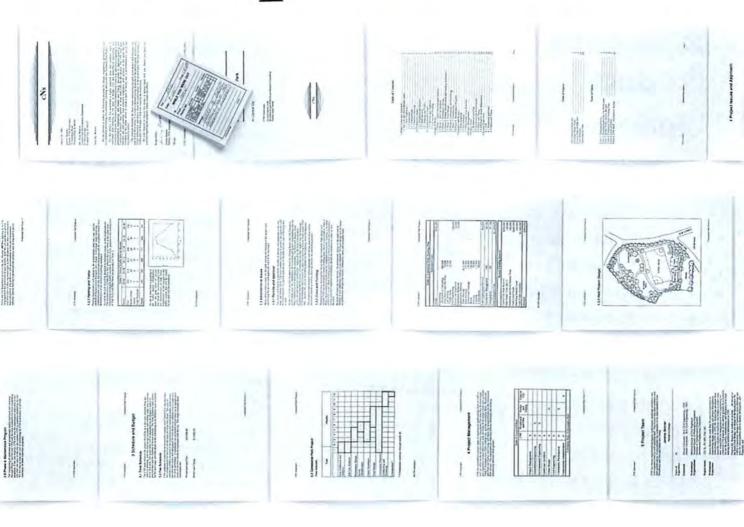
Since it exiled *Friday*, Ashton-Tate has regarded the file management market with a lean and hungry look. A year and a half ago, the company assembled a fresh team to develop a successor. The result of their labors is •*RapidFile*, which a cynic might describe as *Friday* with its mind on business rather than on a weekend with Crusoe.

True to its name, RapidFile makes quick work of slicing and dicing a single data base. For Ashton-Tate, the program's design is tinged with irony. As if RapidFile's columnar spreadsheetlike interface weren't familiar enough, its pull-down menus can be peeled away to reveal—yes—1-2-3-style top-level commands, all just a slash key away.

Ashton-Tate has managed to squeeze all you need into 256K and one floppy disk. RapidFile supports variable-length fields, sorting on up to 15 key fields, mail merge without programming (dubbed "form letters by example"), keyboard macros for regular routines, a Framework-like (albeit Spartan) word processor, and multiline page breaks. Table, form, and label layouts can be modified in a blink; it's equally easy for the built-in pfs:-like report writer to generate columnar or free-form reports. Although disk-based, RapidFile owes its speed to virtual memory, which treats disk storage like RAM.

(continues)

## How to process docum



You may be content with your present word processor. And it's easy to understand why.

Even the clumsiest word processor is light years beyond the electric typewriter, the accepted standard only a decade ago. Plus, just the term word processing conjures up a rather modest expectation, ho hum, the ability to process words.

But, the mere processing of words is hardly the challenge today. When you're creating a 20-page report, an 80-page proposal, a 200page specification, or just a 2-page letter, you often have to work with graphics, equations, tables and more.

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Manuscript you can import spreadsheets and charts, as well as diagrams and scanned images.

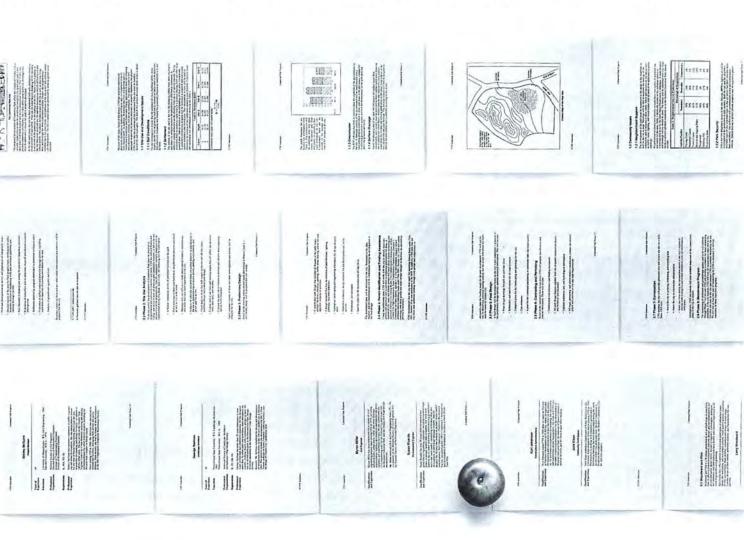
Another feature that goes beyond conventional word processing is Manuscript's integrated Outliner. When you collapse the document you're

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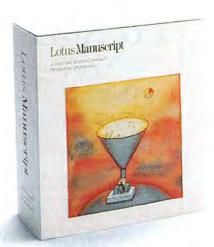
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#### 



Screen 1: Rapid File's export facility, which enables the program to write dBASE files, is just

a pull-down menu away.

Alas, nothing is ever simple. RapidFile is indeed on speaking terms with dBASE, but their conversations demand a translator. The program reads dBASE files directly, but you'll need its export program to write .DBF files. With the proper utility, RapidFile can read and write Framework II, pfs:file, 1-2-3, and ASCII data.

Ashton-Tate excuses the annoying flicker that accompanies screen refresh as the price one pays for blinding speed. While its price of \$395 places it in a class with O&A, Alphalthree, and pfs:professional file, RapidFile isn't in a price league with Reflex, Borland's \$149 flat-file, RAM-resident data analyzer.

Still, thank gosh it's not *Friday*. Ashton-Tate, 20101 Hamilton Ave., Torrance, CA 90502-1319; 213/329-8000.



#### Wanging It

Wang Laboratories is making serious noises about ending its alsoran status in the PC-compatibles sweepstakes.

Wang's new \$3500 portable, the \to Wang LapTop, is as interesting for what it lacks as for what the company has crammed into its 14-pound chassis. You won't find an internal floppy disk drive anywhere; a battery-powered 10MB hard disk is standard fare. The Wang unit also lacks a parallel port, which isn't much of a sacrifice given the built-in Epson MX-80-compatible thermaltransfer printer.

Under the hood is an 8-MHz NEC V30 processor, 512K that you can boost to 1MB, and an optional 2400-bps Hayes-compatible

(continues)

# \*79

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\$395.00 you want to be sure your choice is the very best. Here at PCSG we sell our IBM PC disk access speedup software by the thousands. But software doesn't do any thing about speeding up the microprocessor (or CPU) speed. As you know the microprocessor is the brain of the computer that controls all the operations like screen updates and calculations like a spreadsheet makes.

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HERE IS WHAT MAKES IT SO SPECIAL.

First, it installs so easily. It is a half slot card, only five inches in length. You don't even have to give up a full slot. What's more, unlike competing products it works in the Compaq and most clones. The instructions are so simple we considered showing a picture of a child putting it in. Easy diagrams show how you just place the card in an open slot, remove the original processor and connect a single cable. There is no software required. From that moment you are running faster than an AT.

Second, it is advanced. The BREAKTHRU 286 replaces the CPU of the PC or XT with an 80286 microprocessor that

is faster than the one found in the AT. A 16K cache memory provides zero-wait-access to the most recently used code and data. In benchmark tests the card accelerated software programs—both custom and off-the-shelf anywhere from 200% to as much as 700%. Wow!

Third, you have full compatibility. All existing system RAM, hardware, and peripheral cards can be used without software modification. It operates with LAN and mainframe communication products and conforms to the Lotus/Intel/ Microsoft Expanded Memory Specification (EMS). Software

compatibility is virtually universal.

Fourth, it is the best there is. There are several other boards on the market. Some are priced about the same as the BREAKTHRU 286 and some are cheaper. We at PCSG have compared them all, but there simply was no comparison. What we discovered is that many cards being sold offer only a marginal speed up in spite of their claims. We found some to be merely versions of the obsolete 8088 or 8086, and others to be just poorly engineered. The 8MHz BREAKTHRU 286 is unequivocally the best executed and most completely reliable speedup board manufactured today.

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Beneath its sleek exterior, Wang's compact portable packs a hard disk drive and a thermal transfer printer.

modem. In quest of a readable LCD, Wang settled on a supertwist 640-by-200-pixel screen with an aspect ratio similar to the PC Convertible's. External floppies connect via an SCSI interface, and a separate adapter turns the unit's serial port into a parallel connector. The 16 function keys help keep the LapTop in the Wang family, as does a software showcase that stars Wang Systems Networking, Wang VS terminal emulation, and Wang Integrated Word Processing.

Wang's direct sales force is pitching the machine to users in government, insurance, manufacturing, and financial services. Wang Laboratories, One Industrial Ave., Lowell, MA 01851; 617/459-5000.



#### Making Its Mark

What looks and feels like Crosstalk but isn't likely to run afoul of Crosstalk's lawyers?

The correct answer is

◆Crosstalk Mark 4, an eagerly awaited but oft-delayed communications powerhouse from Crosstalk Communications (for-

merly Microstuf), the sales leader in communications software. A completely new package, *Mark 4* isn't apt to be mistaken for Softklone's *Mirror*, a *Crosstalk* knockoff that had its share of scrapes with Microstuf's legal department.

Like Microsoft Access, Mark 4 is equipped with a rich script language—180 statements' worth. Indeed, Mark 4's programming tools could well spawn an applications subindustry. If you'd rather not write your own routines, you can prevail upon boilerplate log-in scripts to access MCI Mail, CompuServe, AT&T Mail, Dow Jones, and others.

Thanks in part to such generic routines, *Mark 4* is a program for the truly peripatetic. With its support for X.PC, you can orchestrate up to 15 simultaneous communications sessions, synchronous and asynchronous alike. *Mark 4* can handle an array of terminal emulation modes, from DEC VT100 to IBM 3101, as well as the usual filetransfer protocols. The product lists for \$245. Crosstalk Communications, 3150 Gateway Dr. #200, Norcross, GA 30071; 404/263-6540.

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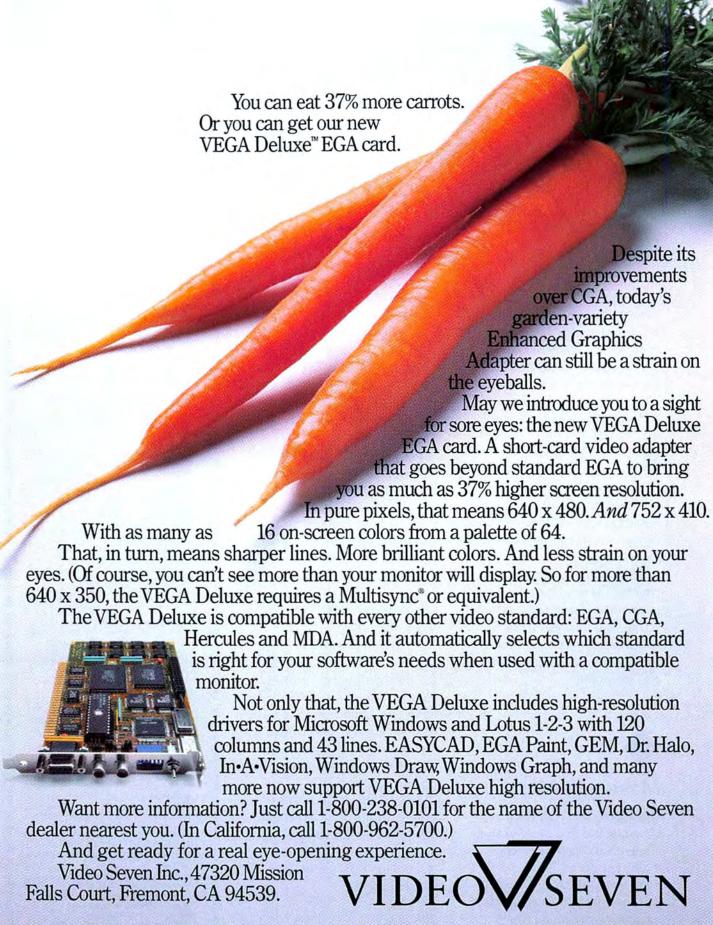
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	Lopes	Chicago	275	52	78	11	45	0.284
ı	Sandberg	Chicago	689	113	186	26	83	0.305
	0ester	Cincinnati	526	59	155	1	34	0.295
	Parker	Cinca						
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			request	trans	lates	into	this 1-	2-3 command:
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	Doran Cruz Marshall	Hous Your Hous Los /DSRQ/D	•					
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	Doran Cruz Marshall Scioscia Guerrero Raines Hernandez	Hous Your Hous Los Los Los Mont New Pres	SDA3H s [RETU	24 <b>↓</b> J	PF1	F24 ◀	J A ◀-	G El to cancel

Screen 2: HAL obligingly translates its plain English macros into 1-2-3's slightly more cryptic notation.



#### HAL: A Spreadsheet Odvssev

While Lotus Development continues maintenance updates of its mainstay products, it's dangling a breakthrough with the release of ◆*HAL* (Human Access Language) for 1-2-3. HAL, an Englishlanguage interface and much more, does what every good program is supposed to do: build power while reducing complexity.

1-2-3 macros too arcane? Compose them in words, or mix English and macro commands. Can't find the flaw in a formula? Instantly analyze worksheets by

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(continues)

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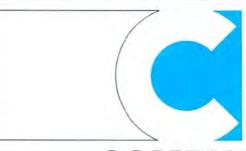
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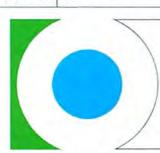
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Priced at \$150, HAL consumes 100K and supports the Lotus/Intel/ Microsoft Expanded Memory Specification. Lotus Development, 55 Cambridge Pkwy., Cambridge, MA 02142; 617/557-8500.



#### The VisiCalc Touch

It's an increasingly popular phenomenon: Leading lights of the software business—folks like Vern Raburn, Carl Gritzmaker, and Dan Bricklin—parlay their exper-

tise and experience into new ventures. You can add the names of Julian and Richard Lange and Tracy Licklider—formerly president, chief financial officer, and chief operating officer, respectively, of Software Arts—to the roster.

The trio has formed Ontio Computer Products and brought forth •Ontio 259, a feature-laden rendition of 1-2-3 at about onetenth the price of its inspiration. Like 1-2-3, Ontio 259 consists of integrated spreadsheet, file management, and graphics compo-

nents. Ontio claims full literacy with .WKS files (including thirdparty templates), 1-2-3 macros, commands, and @ functions. The package also tosses in pop-up menus of command paths, a graph-preview feature, fail-safe provisions to avoid overwriting data, and a "hot link" capability that redisplays a graph automatically when worksheet data is modified. Ontio 259 retails for \$29.95; if you'd prefer to skip the documentation, the list price is \$19.95. Technical support is pay-as-yougo. Ontio Computer Products, 1692 Massachusetts Ave., Cambridge, MA 02138; 617/661-0259.

### Infocom introduces four new gan

Infocom, ™ the crazy people who brought you "Zork"® and "The Hitchhiker's Guide to the Galaxy," ™ has a habit of coming up with games that add a new dimension to interactive fiction. And the best keeps getting better. Case in point: "Leather Goddesses of Phobos." ™ It has a scratch n'sniff card and a 3-d comic book to excite all your senses. Once your interest is

piqued, you'll embark on a rowdy romp through the solar system. This hilarious spoof of 1930's pulp science fiction has 3 "naughtiness levels," for the prude to the lewd. "Leather Goddesses" is sure to amuse members of either sex.

#### One's really warped.

Then there's "Trinity."™ It answers the question of whether a game can be both light-hearted

and profound. You journey through a time warp into a mischievous fantasy world where all atomic explosions are mysteriously connected. "Trinity" takes you back to the dawn of the atomic age and puts the course of history in your hands.

#### One's a real circus.

It has been said that the circus is the only really mysterious thing left in civilization.

One thing's for sure, there is plenty of mystery in "Ballyhoo."™ While trying to locate the circus owner's kidnapped daughter, you are somersaulted into a threering world of deception and crime. To solve the crime



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#### Intel's Fast Work

If you've been eyeing the Compaq Deskpro 386 but can't bring yourself to cough up the cash for the added horsepower, Intel is offering an alternative.

The firm's Personal Computer Enhancement Operation (PCEO) has released \*Inboard 386/AT, an 80386-based accelerator board for 80286 machines only. The board, which you can pop in any ATcompatible 16-bit slot, effectively replaces the 80286 with a 16-MHz 386 accessing memory 32 bits at a time. Once you've removed the

286, a custom ribbon cable connects the board with the empty socket.

The basic \$2495 board is equipped with 1MB of RAM and a 64K cache buffer. That buffer is Intel's way of keeping the product from being a budget-buster; the cache enables the board to use slower, less expensive RAM chips than the 386 would otherwise mandate. Memory can be boosted to 3MB with two piggyback 1MB boards; eventually, Intel will populate each daughterboard with 1megabit RAM chips, elevating the total to 9MB. An 80386 socket is included, and Inboard is said to be fully compatible with Intel's Aboveboard product line. Intel PCEO, 1800 N.W. 169th Pl., Beaverton, OR 97007; 503/681-8080.



#### Still Aiming High

· lavelin looked like a worldbeater just a year ago. The innovative analysis tool garnered product-of-the-year accolades and seemed intent on dethroning 1-2-3. Since then, a flurry of changes has hit Javelin the product and Javelin the company.

es. One really smells.

Every package includes an integral set of props to excite your senses and enhance the game.

and save your hide from a permanent spot in the freak show, you'll need to stretch your puzzle-solving skills to the limit.

One's really haunting.

Wrapping up this new quartet is a classic gothic mystery set in a haunted castle on the mistshrouded seacoast of Cornwall. In "Moonmist"™ you'll explore the darkest reaches of Tresyllian

Castle and get involved with an eccentric cast of characters, including British nobility, while trying to save your best friend from a vengeful ghost. "Moonmist" offers four distinctly different sets of clues, problems, solutions and hidden treasures. So you'll die to replay it again and again.

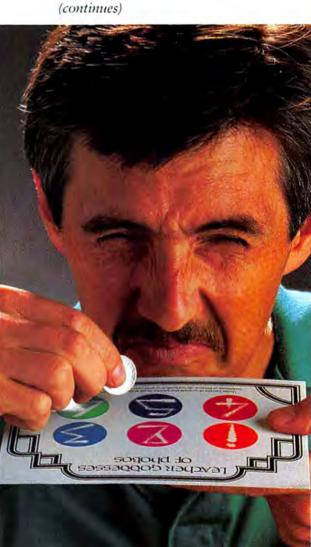
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Circle 949 on reader service card



# If you're satisfied with Lotus 1-2-3 Rel. 2, don't read this ad.

Lotus\*1-2-3\* just isn't what it used to be.

Because Hercules<sup>™</sup> has just introduced the revolutionary Hercules Graphics Card Plus.

The people who brought you the original Graphics Card and put 1-2-3's graphics on the monochrome screen in the first place, have done it again.

Because the new Graphics Card Plus not only does everything the original did —for 1-2-3, Symphony<sup>™</sup> and for hundreds of other text and graphics programs—it does a whole lot more.

Take a look at the screen on the right

and you'll see what we mean.

#### Lotus blossoms.

Now, what was the first thing that caught your eye? The cute little graphics window, of course.

You can thank the Graphics Card Plus for that. Because now you can pop up that graphics window in 1-2-3 any time you're in the mood.

And still keep your spreadsheet in the background.

And speaking of spreadsheet, you now can show nearly twice as much on your screen at once (90 columns by 38 rows, to be precise).



The heart of the Graphics Card Plus: the V112 microchip, Hercules' next generation video processor that makes the RamFont mode possible.

While scrolling at speeds you'll remember nostalgically from the days of Version 1A.

You can do the same with Symphony,

too. (Or with Framework™ II, for that matter.)

And while you're at it, you can really burn rubber with Symphony's word processor. (Framework's, too.)

#### Three modes are better than two.

If all these improvements seem, well,

Herculean, you've got the right idea.

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RamFont is a radical new hardware mode that combines the speed of text with the flexibility of graphics.

port on a chip.

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Including the slightly smaller ones that let you show so much more spreadsheet and scroll faster, too.

RamFont also makes it possible to mix true text and graphics on a single screen.

Like the one on

this page.

And if you like to

see your italics, boldface, superscripts and subscripts on screen before you see them on paper, you'll love what the Graphics Card Plus does for Microsoft\* Word3.

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Circle 77 on reader service card



#### 

The program now supports the Lotus/Intel/Microsoft Expanded Memory Specification; thus an 8MB Javelin model can contain up to 16,000 variables. The addition of networking routines enables Javelin to live successfully on Novell, 3Com, IBM Token-Ring, and Banyan local area networks. The package has even made its peace with 1-2-3, and is now able to read and write .WKS and ASCII files and write DIF files. The \$695 offering was stripped of copy protection-and, temporarily, of its lofty price. During its winter promotion, the company cut the tab to \$99.95 for 10,000 lucky buyers. That promotion is expected to raise morale and revenue at Javelin.

The company, which latched on to Ashton-Tate for overseas distribution last year, recently pared its employment rolls by 50 percent, dismissing most of its direct sales staff. Javelin, One Kendall Sq. #200, Cambridge, MA 02138; 617/244-4035.



#### Asking for More

Symantec's Q&A, another stellar rookie from the Class of '85, had a more intriguing and successful sophomore year. Symantec has simultaneously beefed up its file manager and the program's price (\$349, from \$299).

In a nod to power users, Symantec tweaked the product in a hundred ways. • *Q&A* version 2.0, which will run on any DOS

3.10 network, enables you to access another program from its main menu. It also makes room for extensive lookup tables and nested macros, adds programming muscle via new math and text functions, provides data recovery in the event of power loss, and drops in a utility that will import and export dBASE files. In general, sorting is quicker, the program's Intelligent Assistant query facility is about as fast as it is smart, and the Q&A report writer can now generate report breaks by day, month, and year.

But the big theme running through the overhaul is  $Q \circ A$ 's bear hug of Lotus. Integration with 1-2-3 and Symphony is tighter than ever: 1-2-3 worksheets and graphs can be included in  $Q \circ A$  documents, and worksheets can be plugged into  $Q \circ A$  data bases. Version 2 also includes a utility that can import data from any version of 1-2-3 or Symphony. Symantec, 10201 Torre Ave., Cupertino, CA 95014; 408/253-9600.



### Follow That Convertible

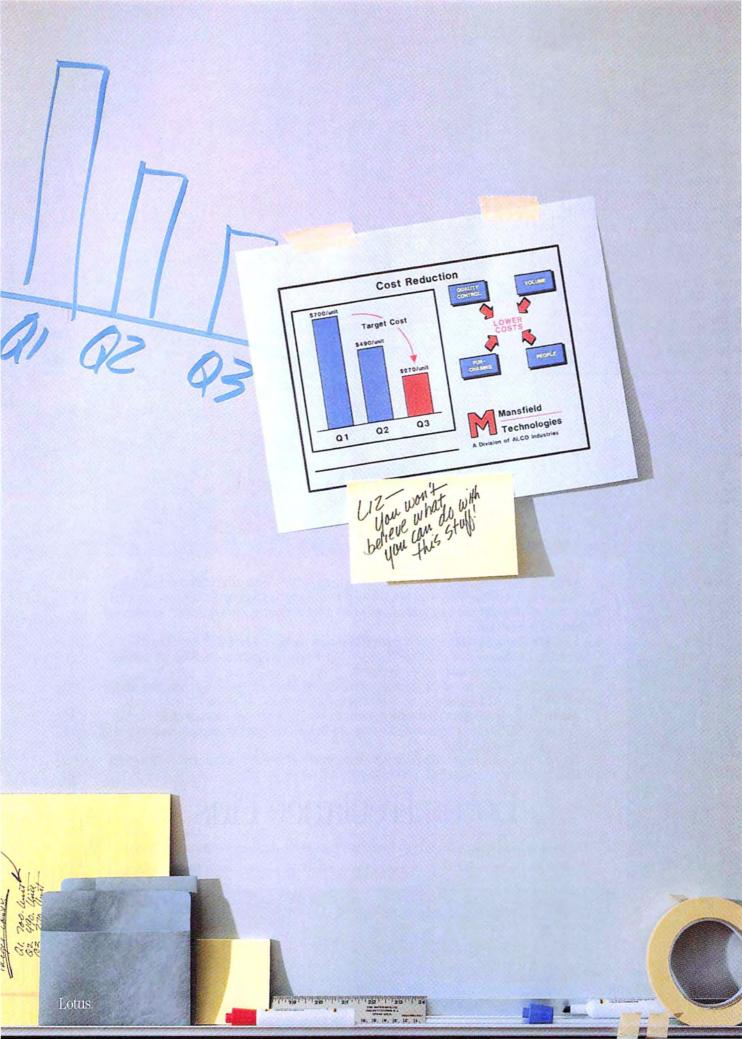
PC Convertibles are rolling off humanoid assembly lines, with or without incompatible modems and despite a screen that understandably gets no respect. That hasn't stopped hardware vendors from taking the IBM laptop to their bosoms. Board-maker STB is the first to endow the Convertible

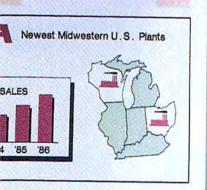
with additional RAM, while Alloy Computer Products has released a multifunction mass-storage unit for the littlest PC, and Hayes may have the Convertible's modem problem licked.

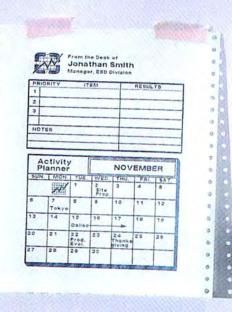
Hayes has put its stamp on an internal 1200-bps modem that supports the standard command set—which IBM's optional modems for the Convertible don't. The \$439 ◆Smartmodem 1200C, which is functionally identical to its larger Hayes kin, plugs into the Convertible's modem option slot. Also new from Hayes is a pint-size version of ◆Smartcom, suitable for the IBM laptop's 3½-inch disk drive. Hayes Microcomputer Products, 705 Westech Dr., Norcross, GA 30092; 404/449-8791.

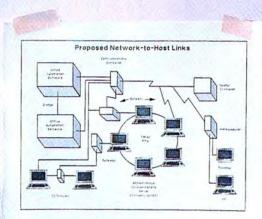
STB's **C-RAM** 384 board boosts the Convertible's 256K of CMOS RAM by—surprise—384K, bringing the machine to 640K—128K more than you get from IBM. The \$495 STB board occupies the same real estate as a single 128K IBM memory module. STB Systems, 601 N. Glenville #125, Richardson, TX 75081; 214/234-8750.

Alloy's \$2495 ◆Starbase III integrates a panoply of memory and storage options within a single chassis, including a 51/4-inch floppy, a 20MB hard disk, a 40MB tape backup unit, 512K of RAM, and a parallel port. At \$1995, ◆Starbase II is identical, sans tape drive. Prices aside, you can bet that determined users will









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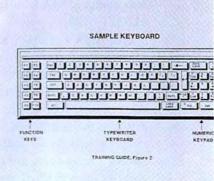
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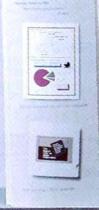


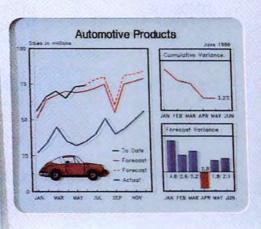




# One Program Charts, symbols charts, etc., etc., dagrams, etc., etc.

Overheads & Slides &





#### 

flock to either Starbase for the 51/4-inch floppy—a regrettable omission from IBM's Convertible catalog. Alloy, 100 Pennsylvania Ave., Framingham, MA 01701; 617/875-6100.

Like Alloy's offering, the

\*Diskit family of external hard
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unit has been clocked at 65 milliseconds. Head-parking is automatic. Systems Peripherals Consultants, 9747 Businesspark Ave., San
Diego, CA 92131; 619/693-8611.



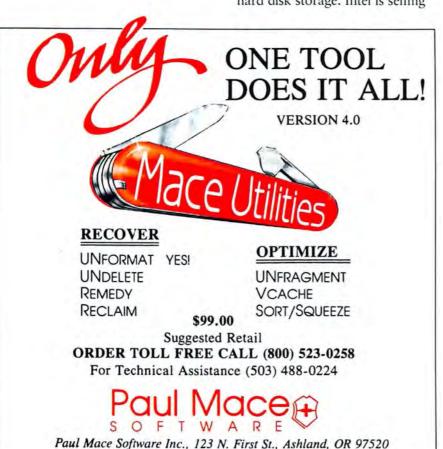
#### **Bubble Is Back**

Give credit to Intel for persistence in the face of user ambivalence, cheap 64K-bit and 256K-bit RAM chips, and affordable 1-megabit RAMs.

Nonvolatile bubble memory is once again rising to the surface, thanks to the advent of the 4-megabit bubble chip—and to a corresponding groundswell of demand, largely in factories, for storage capable of weathering brutal environments. The ◆iPCB-76 PC-Bubble Card fits into any PC or AT expansion slot, then mimics hard disk storage. Intel is selling

the 512K version of the board through OEM channels for \$795; the 1MB version will set you back \$1449. Both renditions include a controller, a bus interface, and DOS BIOS in EPROM. Intel Corp., Memory Components Division, 1900 Prairie City Rd., Folsom, CA 95630; 408/351-2746.

Not to be outdone, Bubbl-tec has released \*Bubbl-Dek, which will happily supplant your floppy disk drives. Looking for all the world like a stacked pair of floppy drives, Bubbl-Dek houses two 128K Bubbl-Pac cartridges. The





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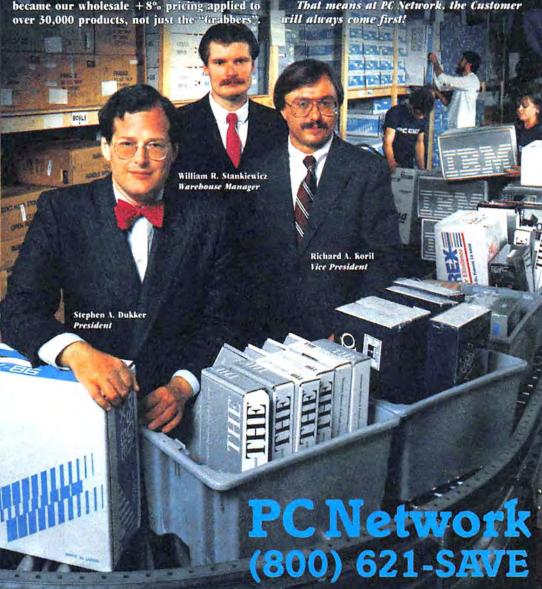
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The brains behind the operation is a Motorola 68000-based communications processor, augmented by a 300/1200-bps Hayes-compatible modem and a nine-pin Brother dot matrix printer. The communications front end features 128K of nonvolatile RAM, three serial ports, and input and output parallel ports; a keyboard is optional. An additional 128K of ROM contains the unit's operating system and programming language, from which custom retrieval profiles can easily be built. The Telecommunicating Printer lists for \$1500; the Postmatiq without printer runs \$1000. Dynax, 6070 Rickenbacker Rd., City of Commerce, CA 90040; 213/727-1227.



#### Turning the Page

It's rare when an industry holds its breath for a single product.

That's been the enviable, if somewhat ticklish, position of Aldus Corporation, whose

◆ PageMaker page composition program has been the object of intense anticipation and approbation. Desktop publishing buffs can breathe again: PageMaker is now available for the PC.

The PC edition matches the Macintosh release feature for feature, adding automatic hyphenation (with a 90,000-word dictionary you can supplement); manual or automatic kerning (letter spacing), depending on the printer; and an ability to create 128 newspaper-size pages using double-page spreads.

PageMaker is adept at mixing text and graphics, supporting multiple fonts in a document, and flowing text from one column to the next. You can set up master formats, position up to 20 columns of varying widths on a page, select images from a graphics library, and doctor documents with the program's text editor. If there's a Mac PageMaker user in the house, you can share files. Aldus is also readying a set of templates for form design, newsletters, memos, and brochures.

PageMaker is hardware-hungry: You'll need an AT with 512K, at least a 10MB hard disk, an EGA or Hercules-compatible graphics board, and a mouse. The package can handle both bit-mapped and object-oriented graphics, and will send your handiwork to the HP

LaserJet Plus, the AST TurboLaser, or any laser printer that supports PostScript. The program's appetite for software is almost as robust: You can't run *PageMaker* without *Microsoft Windows*. Aldus is removing some of the bite from that requirement by bundling *Windows* with *PageMaker* for the first 90 days of its release.

PageMaker is priced at \$695 and works with most leading word processors. Aldus, 411 First Ave. S #200, Seattle, WA 98104; 206/622-5500.



#### **DOS Lives**

While Microsoft fends off rumors of a do-everything DOS, the company continues to push an incremental evolution of the PC's operating system. And so, \*DOS 4.00 is unceremoniously upon us.

Version 4.00, which debuted in France with ◆Microsoft Networks (MS Net) 2.0, is a single-user multitasking operating system that does nothing to disturb the 640K barrier. DOS 4.00 has been crafted for the 8086 and 80286 CPU families, and supports foreground and background partitions. Existing DOS applications—including memory-resident utilities—will swear the DOS 4.00 foreground is DOS 3.20.

To make 4.00 sing, developers will need to write to the background mode, which is reportedly capable of loading—and running—several programs at once.

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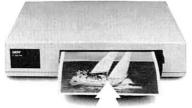
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PC Scan is not to be confused with PC Scanner a product of Cacer Corp.

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Outside California, 800-538-7582. In California, 408-946-7100.

Under 4.00, you'll be able to keep track of background noise via a new pop-up facility. This facility gives the well-tempered 4.00 application access to the keyboard and the screen. Whether developers in fact write for any mode of DOS 4.00 is an open question; IBM has yet to endorse the product, which might mean that DOS 4.00 will never make that trip across the Atlantic.

MS Net 2.0 is noteworthy chiefly for its support for nondedicated servers. Previous versions of MS Net tolerated only dedicated servers, and thus crossed cables with IBM's PC Network Program. Nondedicated servers can act simultaneously as individual workstations and as the network's nexus.

In a separate development, Microsoft has amended ◆DOS 3.10, enabling applications to access CD ROM files that adhere to the High Sierra file format. These extensions essentially shatter the DOS 32MB file-size limitation for CD ROM. For files on optical media, it's now open season on all 550 megabytes. Microsoft, 16011 N.E. 36th Way, Redmond, WA 98073-9717; 206/882-8080.



#### **Briefly Noted**

Tired of gnashing teeth as you try to reconcile differing versions of a report-in-progress? JuriSoft, a small Cambridge software house geared to legal applications, has Reading file C:1984 Reading file C:1985 Analyzing... Comparing...

20 changes found

Total comparison time = 1.15 seconds

It was a brite bright cold day in April, and the clocks were stiking thirteen. Winston Smith, hss his chin nuzzled into his breadst breast in an effort too ekscape to escape the vile wind, slipped quickly through through the glass doors of Victory Mansion, s though Mansions, though not quickly enough to prevent a swirl of gritty dust from entering along with him. The llway smelt hallway smelled of boiled cabble cabbage and old rang rag mats. At one ne dof it end was a colored poster, m tool too large for indoor display, m that had been takeed tacked to the wall. 10yt depetected a It depicted simply an enormous face, more than a metere. mid. The meter wide; the face of a manabout man about 45 m about forty-five with a heavy black mustouche mustache and ruggledly ruggedly handsome features. features.

Screen 3: JuriSoft's CompareWrite tabulates and flags discrepancies between versions of a document—and highlights those differences via underlining and inverse video.

developed *Compare Write*, a generic text "redliner" that will give your drafts the once-over, flag changes, and then display or print them in color, boldface, strikeout type, or what have you. *Compare-Write*, at \$99.95, works with *WordStar*, *WordPerfect*, *XyWrite*, *MultiMate*, *Microsoft Word*, *Volkswriter* 3, *OfficeWriter*, and *DisplayWrite* 3. JuriSoft, 6 Story St. Penthouse, Cambridge, MA 02138; 617/864-6151.

#### \*\*\*\*

While we're on the subject of text revisions, Microsoft's new network release of *Word* version 3.0 may come in handy in departments where documents are designed by committee. *Word* now sports a "hidden text" feature that can mask comments while a draft wends it way through the review process. Hidden text can be incor-

porated or deleted before printing. The Word network Master Pack lists for \$750; workstation packs are \$150 each. The network release only slightly precedes an upgrade to the stand-alone version-Word 3.1, which incorporates a thesaurus (Wordfinder), adds a line-count feature, and supports more graphics displays and laser printers. It also adds support for the special Microsoft font cartridge for the Hewlett-Packard LaserJet. Microsoft Corporation, 16011 N.E. 36th Way, Redmond, WA 98073-9717; 206/882-8080.

#### \*\*\*\*

In its LAN version of *Open Access II*, Software Products International has hit on a novel—and long overdue—notion: sharing models.

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John Hart was already convinced his new computer could make life easier. What worried John was that it would take him weeks, maybe months to get the most out of a software program.

PFS\*: First Choice changed all that. The first thing John noticed was the instruction manual. It wasn't huge and complicated like other software

programs. In fact, First Choice let him get started immediately.

Then John found out First Choice was one integrated program that could handle all his business needs. A versatile word processor with spell checking, flexible file management, a powerful spreadsheet program, and resourceful electronic communications were right at his fingertips. And they all worked faster and more efficiently than he ever imagined. First Choice

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With IRMAcom APA Graphics™ you can easily turn remote PCs into



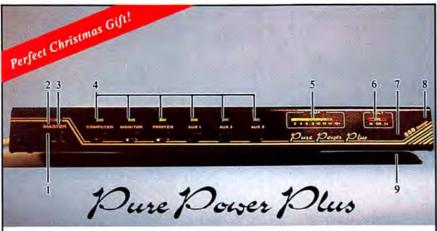
mainframe graphics workstations.
And now with IRMALAN
APA Graphics,™PCs on your IBM™
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great work in pictures too.

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SSB Design

17971 - G Sky Park Circle, Irvine, CA 92714 Telephone: (714) 261-6855 Fax: (714) 261-2837

- 1. Master Switch to power system and peripherals.

  2. Red Indicator-Lights up
- when power surge protec-tion is inoperative.

  3. Green Indicator-tells you
- surge protection is on.

  4. Individual Switches to control up to six different
- peripherals.

  5. Current Indicator-tells you how many Amps. of current your equipment is using
- Voltage Indicator-tells you the condition of line voltage.
- 7. Total steel constructiondissipate static discharge.
- 8. Swivel Base to adjust your monitor to a com-fortable viewing angle.

  9. EMI Protection-Pure-
- PowerPlus has one of the highest quality design specifications.

MECHANICAL SPECIFICATIONS Weight: 8% lbs.
Dimensions: 14%" W x 14%" D x 1%" H

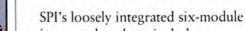
**ELECTRICAL SPECIFICATIONS** 

Input Overvoltage Protection

Type: Two stage. MOVs at line input. MOVs at

- Response Time: < 1 nanosecond
- Energy Rating: 120 Joules Total Common & Transverse Energy Rating: 120 Joules Total Common & Transverse
   Peak Short Term Current: 4000 Amps
  Output Current Protection
   15 Amp Circuit Breaker
  Noise (EMI) Filtration
   Type: LC low-pass filters
   Cutoff Frequency: 16 KHZ Differential 225 KHZ Common Mode
   Attenuation:

- Attenuation: Differential: 60 db from 500 KHZ to 25 MHz Common Mode: 12 db @ 500 kHZ, 32 db from
- Common Mode: 12 db @ 500 kH2, 32 db from 2-25 MH2. 
  Line Voltage Indicators 
  Lo<110 VAC-Norm 110-130 VAC-Hi>1300 VAC 
  Accuracy: 2?-5% of reading 
  Line Current Indicators 
  Passolution: 2 Amps per LED indicator 
  Accuracy: +/- 1 Amp, +/-5% of reading



integrated package includes a spreadsheet component that can, for instance, enable multiple departments to tinker with portions of a single budget model. Regions can be specified and locked to ensure data integrity. The basic networked Open Access II, licensed to the server, retails for \$995. SPI, 10240 Sorrento Valley Rd., San Diego, CA 92121; 619/450-1526.

If you're like 230 million other Americans, you haven't quite digested every last morsel in last year's tax simplification act. Tax Reform Impact Analysis, a \$195 template for 1-2-3 release 2, will slog through the sludge for you, calculating estimated tax payments through 1988. Research Press, P.O. Box 8137-B, Prairie Village, KS 66208; 913/362-9667.

1-2-3 users who need data consolidation capabilities but aren't interested in retiring the old workhorse for a 3-D spreadsheet may be candidates for XYZ:Spread. The \$145 offering from Intex Solutions endows 1-2-3 and Symphony with a talent for shifting and sharing data ranges-like moving profit-and-loss data to a balance sheet-among up to 12 worksheets. Intex has also released a \$395 version it claims will work with 1000 worksheets; both versions permit keyboard macros. Intex Solutions, 568 Washington St., Wellesley, MA 02182; 617/431-1063.

Circle 451 on reader service card

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But don't put your trust in The right surge suppressor. Get one that gives your whole system superior protection. One that's engineered to the highest specifications.

Get a Kensington Master Piece or Master Piece Plus. Computer dealers will tell you they're the most popular PC surge suppressors. And the most serious. Because at Kensington, we're dedicated to giving your PC the best possible protection.

That's why Master Piece contains a unique

two-stage surge suppression circuit incorporating a high-speed silicon semiconductor for the quick reaction necessary and a heavy-duty metal oxide varistor for the brute force

required to keep even the largest surges from penetrating into your system.

Master	Piece	and
Master	Piece	Plus

Meets IEEE 587-1980 Category A	
Meets IEEE 587-1980 Category B	
UL Listed	

The right surge suppressor passes all the tests.

And that's why Master Piece Plus is the communications user's dream-cometrue. Its additional circuitry smoothes surges, spikes and noise on the telephone line, protecting your modem and increasing the reliability of your data communications.

The circuitry in both Master Piece and Master Piece Plus is designed to exceed Category A of IEEE\* specification 587-1980, as well as those established by UL<sup>1</sup>.

Sound good? Keep reading, it gets even better. Our circuitry also exceeds Category B of IEEE specification 587-1980. Under this category, created to guard against the severe spikes near the main power distribution panel of a building, Master Piece will even protect your PC from a simulated 6,000 volt lightning strike with a 3,000 amp follow-on current.

Now, this may look to you like we're taking more than the necessary precautions. And actually, we are. But after all, isn't that what you expect from the best?

Master Piece (\$149.95) and Master Piece Plus (\$179.95). For the dealer nearest you, or to speak to a Kensington sales representative, call (800) 535-4242. In NY (212) 475-5200. KENSINGTON..



# From the Software Shelf

PC World offers first impressions of recent software releases

This month: a
WordPerfect companion,
a Commander without
a ship, Webster's
easy-as-pie word
processor, heavyweight
communications for a
pittance, the end of
screen flicker, and
faster dBASE indexing

Edited by Robert Luhn

#### WordPerfect Library

In the beginning, there was *Side-Kick*. And for \$49.95 (copy protection included), it was good. Good enough, in fact, to spawn a whole industry of general purpose, memory-resident organizers designed to replace adding machines, Rolodexes, calendars, and other desk-bound clutter.

Since those heady days, software specialization has become the rage. WordPerfect Corporation has wisely joined the charge with WordPerfect Library, a clever mélange of SideKick, Xtree, and bare-bones text processors, tailored specifically for WordPerfect users.

Along with the usual desktop accessories (calendar, calculator, DOS commander, and phone dialer), Library incorporates a competent ASCII editor for programmers, a simple list manager, a clipboard dedicated to toting data from one WordPerfect application to another, and best of all, a topnotch macro editor. Managing the entire congregation is a menudriven shell with which you can load WordPerfect, MathPlan, Library utilities, and other applications in any combination with just a few keystrokes.

Unlike many front ends to DOS, the shell can easily be modified to list any program and include submenus you create. Submenus are a particularly effective way of insulating PC-wary users from DOS and can be used to automatically load *WordPerfect* with different options and document files (see Screen 1).

If you've ever been late for a business meeting, Library's 24hour calendar is for you (see Screen 2). Forget fixed increments-you can post appointments for any time, and the program will adroitly flag scheduling conflicts. There's also a background alarm that pops onto the screen and beeps at times set from 10 minutes to 1 second before an appointment. Professional procrastinators will undoubtedly make good use of the calendar's To Do list, which automatically transfers uncompleted items to the next day. As with the calendar, you can easily reorder entries and print out appointments and goals for the day, week, month, or year. The forgetful can even search the calendar and To Do list for character strings. If WordPerfect ever includes time tracking, task accomplishment, and a place to jot down expenses, the calendar could easily replace a Day-Timer-high praise indeed.

The Library's calculator is similarly first-rate. You can work in decimal, binary, hex, or octal and call on a host of financial, statistical, scientific, and programming functions. The calculator displays a tape à la TenKey that can be slapped onto the clipboard and pasted into a WordPerfect or MathPlan file. The Library's list manager is the weakest utility. Designed for maintaining mailing lists and secondary merge files for WordPerfect, it can sort only one field at a time in ascending order.

But most experienced Word-Perfect users will probably turn first to the Library's macro editor. When you open a WordPerfect macro file, the editor translates keystrokes into a readily understandable syntax. For example, if during a WordPerfect session you pressed the line format key, the macro editor displays it as '<Line Format>'. The editor furnishes WordPerfect-like editing functions, such as search and replace, autoindent, and the moving, copying, and deleting of characters, lines, and blocks; keystrokes can be interpreted as macro input by simply pressing two keys.

The program editor likewise mimics WordPerfect functions but naturally generates files in ASCII rather than WordPerfect's proprietary format. Although both editors are extremely useful, Word-Perfect command conventions are not faithfully followed throughout; the package includes a function key template for each editor—for good reason.

Like all mortals, *Library* has its flaws. The program takes the lion's share of memory and locks up the system whenever it encounters *Ready*. And though *Library* readily lists active programs, it does not automatically notify you when memory is running low. Load a program without adequate memory, and *Library* may bring everything to a grinding halt. (*Library* does support expanded

memory boards and will automatically store installed but inactive programs in your system's EMS attic.) Note, too, that versions of *Library* made before July 9, 1986, may not work on some compatible systems—WordPerfect will swap old versions for new.

In short, WordPerfect Library is not as mature as its namesake. As with WordPerfect, a sense of evolution prevails, and I suspect the future versions will be drum tight. But even in its present form, WordPerfect Library is unusually well executed. It's a must-have program for serious WordPerfect users. —Daniel J. Rosenbaum

WordPerfect Library 1.0
WordPerfect Corp.
288 W. Center St.
Orem, UT 84057
801/227-4040
List price: \$129
Requirements: 384K, one disk
drive (hard disk strongly
recommended), DOS 2.10 or
later version
Not copy protected

#### The Norton Commander

Peter Norton has set sail onto a sea already heavily populated with hard disk management programs. With *The Norton Commander* (actually written by John Socha), Norton offers users "quick disk navigation" and "point and shoot" operations. But for all the starcovered ensigns and braided caps paraded on the box, the *Commander* doesn't have the guns to carry the day.

Like other DOS shells, the Commander enables you to scan directories and peek into files. You can copy, delete, rename, and move files, either singly or in groups; create directories; set screen colors; access most DOS commands; and execute .COM, .EXE, and batch files. You can set the Commander's defaults for sorting directory listings by name, extension, time, or file size. Yet even with his predecessors' products to learn from, Norton chose



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Circle 455 on reader service card



Screen 1: WordPerfect Library's straightforward DOS shell allows you to run programs from a menu. Asterisks indicate programs currently in memory.

1986 Sun	M	on		Octobe Wed		hu	Fri	1986 Sat	Appointments Tuesday, October 21, 1986
				+ 1	+	2	3		T 8:30am -9:45 Lawyer re audi
5	ţ	6	7	8	÷	9	10	1	9:45am
12		13	14	15		16	+ 17	1	-10:00am -10:30 Accountant re audit
19	+	20	Į⇒• <u>∰</u>	22	+	23	24	2	-10:30am
26		27	28	29		30	31	31 11:	-11:00am -2:30 Write PC World review
			1 Me	emo	+ A	ppt	. 1	o-Do	₹ 2:15pm -3:30 Call White How
			ing an				renenb	er to	2:30pm 1 3:30pm

Screen 2: The Library calendar and To Do list. Bullets indicate a task has been done; leftovers are automatically transferred to the next day's list.

not to provide a tree directory, perhaps the most useful visual metaphor for beginners and PC pros alike (see Screen 3).

Many of the Commander's extras are of limited value and complicate operations unnecessarily. Unlike many disk managers, for example, the Commander allows you to display two directories at once. But to view a second directory, you must close the program's status window (which notes resident programs, available memory, number of files, and the current drive), move the directory window to the right corner of the screen, and at the DOS prompt displayed at the bottom of the screen, type CD\directory.

Some features set Commander apart from the competition. Users will probably cotton to the Commander's mouse-oriented pop-up menu system and find the built-in mini word processor handy indeed. And, in addition to executing .COM, .EXE, and batch files, Commander can pair data files with application programs. Once you've made a match, simply pointing to a data file loads it and the appropriate program.

If you're looking primarily for basic disk housekeeping, there are cheaper, easier-to-use programs. If you're after the *Commander*'s more esoteric features, be prepared to plow through an inanely

# Save 3000 on Windows.



any other compatible pointing device or tablet without using up an extra slot.

"Mach 10 offers performance as good as or better than the majority of the more expensive Intel 80286-based turbo boards from lesser known vendors..." William Zachmann, Computerworld, September 15, 1986\*

If superior performance, extra speed,

an extra port and the knowledge that the Mach 10 comes from Microsoft aren't enough to

get you hurrying to the store, okay. We've included Windows and the InPort version of the Microsoft Mouse, the best selling mouse. Are you out of your chair yet? This should get you moving: The Mach 10 with InPort, Windows, and the Microsoft Mouse costs only \$549.

Can you think of a smarter way to open your Windows and save \$3000?

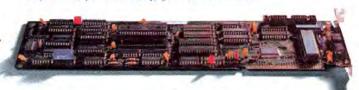
\*Reprinted from: PC Week, September 23, 1986, copyright 1986, Ziff-Davis Publishing:

If you thought you needed a PC AT to get the speed to take maximum advantage of Microsoft<sup>®</sup> Windows, cancel your order. You can get a Microsoft Mach 10 for about \$3000 less than an IBM<sup>®</sup> PC AT.

"...the Mach 10 goes a long way toward turning a PC into a Windows machine".
Paul Bonner, PC WEEK, September 23, 1986\*

Microsoft Mach 10 is a hardware performance enhancer. Your own IBM PC or IBM PC XT can go up to twice as fast when you're running Windows and Microsoft Word or other favorite applications.

Speed isn't all you get, though. Microsoft's exclusive InPort™ Device Interface, the new graphic input device standard, is built into Mach 10. You can use our new InPort version of the Microsoft Mouse or



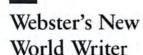
#### Microsoft Mach 10

Mach 10 is also available without Microsoft Mouse or Windows.

Microsoft is a registered trademark and InPort is a trademark of Microsoft Corporation IBM is a registered trademark of International Business Machines Corporation. Price shown is Microsoft's suggested retail price and is subject to change without notice. written manual. Make no mistake: The Commander is a powerful hard-disk manager, but it's not particularly elegant or innovative.

—Patrick Marshall

The Norton Commander 1.0
Peter Norton Computing, Inc.
2210 Wilshire Blvd. #186
Santa Monica, CA 90403
(213) 453-2361
List price: \$75
Requirements: 128K, one disk
drive (hard disk recommended),
DOS 2.00 or later version
Not copy protected



When Simon and Schuster follows a critically acclaimed spelling checker and an industry-standard thesaurus with a new word processing program, it had better be good. It almost is.

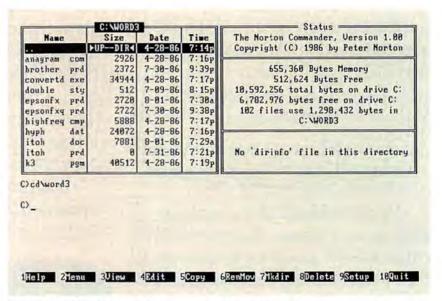
Although not designed for the WordStar and Microsoft Word crowd, Webster's New World Writer has plenty of features and ease of use to recommend it. For starters, Writer is run from a command menu so much like 1-2-3's that I kept pressing the slash key instead of the <Esc> key that Writer uses. Once the menu is displayed, you select a command by highlighting it with the cursor or typing its first letter. The implementation is slightly marred by some curious inconsistencies. For example, when the menu displays

'Hide ¶ yes', paragraph markers are in fact not hidden. Yet when 'Justified' is displayed on the menu, text is indeed justified.

Because Writer displays true-tolife formatting, setting margins and indentations and verifying page breaks are a snap. Boldfacing or underlining text is a matter of selecting the appropriate command from Writer's menu, painting out the text, and pressing <Enter> (see Screen 4). The program automatically reforms a paragraph as text is inserted or deleted, and it won't strand lines at the top or bottom of a page. One nice feature is the ability to reprint any single page of a documentimportant for those who are always spilling coffee on page 26 of a manuscript. Writer supports

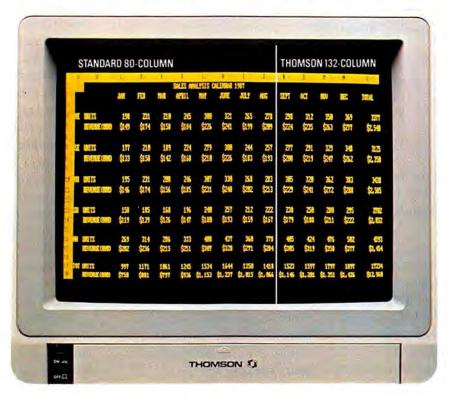
many popular printers, including the microjustification option available with some letter quality models. However, Writer cannot turn on a printer's proportional spacing function. Although you can achieve the same effect by embedding the appropriate escape codes in a Writer document, it's a particularly annoying omission in an otherwise easy-to-use program.

Writer lacks some of the goodies found in top-of-the-line word processors, such as automatic index generation, two-column format, and multiple windows, but it has some compensating features. Aside from context-sensitive help



Screen 3: The Norton Commander in action. On the left is a directory listing; the status window on the right shows memory and disk allocation.

# Thomson Is About To Increase Your Workload. By 65%.



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Because our new 14" flat face monitor lets you see 132 columns of your application all at once—with 80-column quality.

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And speaking of graphics, you can have an inexpensive, crystal-clear alternative to color monitors by using any IBM CGA or compatible graphics adapter. Which means more beautiful shades of amber. And at \$250, a lot more green in your pocket."

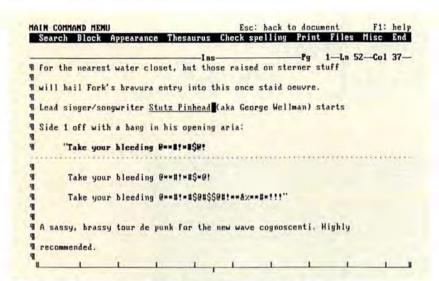
How's that for color from a monochrome monitor?

#### Call 1-800-325-0464 (in Calif.

1-213-568-1002) to find out more about increasing your workload, the name of a dealer near you, and a list of compatible adapters.



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Screen 4: Familiarity breeds sales: Webster's New World Writer displays true-to-life formatting and borrows 1-2-3's command line.

screens and a word count function, Writer incorporates its deservedly praised cousins New World Spelling Checker and New World On-Line Thesaurus.

At 200 pages, Writer's user manual is imposing but not always enlightening. Half of the tome is devoted to the mechanics of writing: "Words Likely to be Misused," "Punctuation and Manuscript Preparation," "The Right Preposition," and so on. The index is lacking in some places-there are no entries for orphan or widow lines-and misleading in others. For example, I looked up "Footnotes" and was delighted to discover four pages devoted to the subject, but it turned out the coverage dealt with how to write footnotes, not how Writer implements them-which it doesn't.

Along with these few rough edges is one major flaw: Version 1.03 of Writer cannot read a file from a write-protected disk; the program simply responds with the erroneous message 'Invalid File Name'. However, the company claims it will squash this bug in future releases.

And perhaps it's best to wait until the program's wrinkles are ironed out and a few key features are added. As it stands, Webster's New World Writer is a promising program that doesn't yet live up to its fine name. - Donald B. Trivette

Webster's New World Writer 1.03 Simon & Schuster 1 Gulf + Western Plaza New York, NY 10023 800/624-0023 List price: \$150 Requirements: 256K, two disk drives (hard disk recommended), DOS 2.00 or later version Not copy protected



#### **BitCom**

Looking at new communications software just gives me the blues. It's always the same: manuals with the girth of Sidney Greenstreet, screen displays with a Rasputin multiplicity, and command syntax obfuscation that would make William F. Buckley tip back his chair and gurgle with glee. So when my editor handed me the BitCom disk and a slim 5-inch notebook, I amiably blurted, "I've got plenty of brochures brimming with bromides-where's the manual?" With unwavering patience, he gently slipped 10cc of Novocaine into my logic centers and said "You're holding it, Buster." I zipped my lip, went home, and took this \$69 program for a spin.

And what a ride it was. BitCom is a spunky light middleweight with the potential for handling heavyweight communications chores. Beneath its facile menudriven interface lurks a powerful script language that can deliver fully automated turnkey systems.

The beauty of BitCom is its simplicity. The main menu presents just four options: Select/Edit Phone Numbers (a dialing directory cum data base), Invoke Script File, Change Configuration, and Issue DOS command. At the Change Configuration menu you enter seldom-changed communications values, such as modem dialing strings, COM and printer port

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assignments, and so on. If you forget the name of a file while on line, you can quickly slip away with the Issue DOS command function, snoop around, and return to your place with a single keystroke. To run a previously written script file, you naturally select Invoke Script File.

But the heart of BitCom's operations is its excellent dialing directory, which acts like a command center. From here you dial or answer calls, review or edit communications parameters, and add new systems to call. When you pick Select/Edit Phone Numbers from the main menu, the program displays a listing of configuration files (the systems to be called), their phone numbers, a short description, and a BitCom-assigned ID number (see Screen 5). Within each file are stored parameters and other relevant information. Because the directory (which can easily hold 100 listings) is structured like a data base, you can sort file names and numbers and quickly find otherwise elusive information.

Once connected to another system, *BitCom* shows its stuff. The program can capture data directly to disk and/or a printer, take quick screen snapshots, and transfer ASCII and binary files using Checksum XMODEM, CRC XMODEM, or YMODEM (a sophisticated offspring of the two). If you're communicating with a *BitCom*-equipped system or one using YMODEM, you can perform file transfers using DOS

Recld Defaults BIT COMPUTEL COMPUTYM	Description Initial Communication Settings BIT SOFTWARE INC. (Voice) CompuServe via TELENET (1200) CompuServe via Tumnet (2400 bps)	Phone Number 488-262-1854 956-4281 543-8691	RecNum 8 1 2 3
Directc Dumb Easylink KNOWTEL KNOWTYH	Direct connect or access modem Dumb Terminal, local connect	888-325-4112 956-5777 543-8691	4 5 6 7

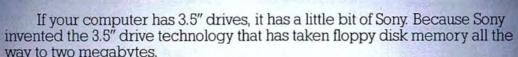
Screen 5: The heart of BitCom is the dialing directory. Each system or host name at the left is linked to a configuration file containing communications parameters. Unlike most dialing directories, data on this screen can be sorted.

wildcards. You needn't worry about which XMODEM to use—simply select XMODEM as the transfer protocol and *BitCom* will match the other system's version.

BitCom can slug it out in the heavyweight system world as well, emulating DEC VT 100 and IBM 3101 terminals. With BitCom at the helm, your PC carries off the charade with aplomb, right down to supporting terminal function keys, numeric keypads, specialfunction keys, and-unique among most communications software-132-column display on systems with the appropriate graphics boards installed. In keeping with its role, BitCom will also strip out unwanted mainframe control characters, expand tab characters, convert outgoing data to uppercase, and slow data transmission to match that of a persnickety mainframe.

BitCom's haymaker is its script language, which can duplicate every program action from file transfers to printer toggle mode. A script can execute any DOS command, reassign keyboard values, and even call another script. The secret of such power is the language's ample assortment of programming tools that includes conditional statements, variables, constants, and labels. Thus a Bit-Com script can log your PC onto a host system late at night, download several files, print them, and sever the connection.





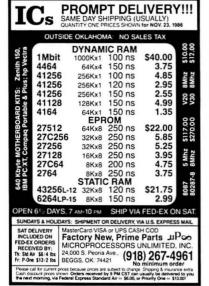
So nobody knows better than Sony how important high standards are for producing 3.5" floppy disks. But then, Sony invented those, too, as well as the most demanding methods for making 3.5" disks.

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Circle 103 on reader service card



Circle 328 on reader service card

Unfortunately, *BitCom*'s script language is accessible only to those with programming experience. That problem is exacerbated by the user manual's lack of thorough and carefully explained examples and by the program's lack of a learn mode, which would at least allow new communicators to generate log-on scripts automatically without resorting to the language. These complaints notwithstanding, experienced programmers can still make the program jump.

BitCom won't nudge Crosstalk XVI and Microsoft Access off the best-seller lists, but among inexpensive communications programs, it's clearly a champ. The program's svelte interface and approach to secure file transfers set an example that other software developers would do well to follow. The user manual, however, definitely needs rethinking; it's unorganized and lacks an index, a complete alphabetical listing of script program commands, and tutorials dedicated to communications concepts and script programming. Still, at \$69, BitCom is a steal; with a bit of fine-tuning, it might even knock some of the big boys out of the ring. -Art Wilcox

BitCom 3.01
BIT Software, Inc.
P.O. Box 360619
Milpitas, CA 95035
408/262-1054
List price: \$69
Requirements: 256K, one disk drive, DOS 2.00 or later version, Hayes-compatible modem
Not copy protected

#### FlickerFree

Did you ever wonder why the PC, which executes thousands of instructions per second, takes such an interminable time to display a line of text? And why scrolling produces an annoying flicker on most color monitors? Steve Gibson, machine language programmer extraordinaire and developer of the first commercially successful light pen, wondered too—and solved both problems with a nifty memory-resident program called *FlickerFree*.

Gibson found that the display instructions buried in the PC's BIOS ROM are inefficient. By rewriting those instructions, he increased display speeds by as much as 1700 percent and eliminated the flickering associated with IBM's Color/Graphics Adapter and compatible boards. Of course, not even Gibson could permanently alter a ROM chip; *FlickerFree* routes program requests for BIOS ROM video routines to its own efficient instructions residing in memory.

Normally, when a program wants to display a new line of text, the routines in the BIOS ROM turn off the monitor's electron gun, shift the text up one line, and turn the gun back on. *FlickerFree* takes the opposite approach; instead of moving text up, it moves the screen down. This bit of magic is accomplished by manipulating that part of video memory that holds the addresses of the begin-



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ning of the screen. The effect is instantaneous display without the annoying flicker.

Software companies have long recognized the BIOS ROM's imperfections. Not surprisingly, commercial programs from 1-2-3 to *Microsoft Word* that rely on their own video routines to speed screen display are not improved by *FlickerFree*. But BASIC programs, DOS commands, *dBASE*, and other applications that play by the rules will practically zoom.

Will *FlickerFree* clean your screen? IBM's Monochrome Display Adapter and monitor don't exhibit flicker, but *FlickerFree* can boost display speed by three to four times. On a system equipped

with a Color/Graphics Adapter and color monitor, the program will kill flicker and likewise hasten display. FlickerFree puts zip into the notoriously slow Professional Graphics Adapter (by a factor of 10, so some users claim) and kicks the Hercules Graphics and Color cards into high gear. Most compatible video boards and monitors will be similarly affected, but keep in mind that FlickerFree won't work with the Enhanced Graphics Adapter (EGA) or compatible setups. (Gibson claims a new version will indeed speed up EGA display.) FlickerFree also won't eliminate video snow-a problem caused by programs trying to access memory at the same time the processor does.

I've become so accustomed to *FlickerFree* that I wonder if something's wrong when I sit down at someone else's PC. *FlickerFree* won't necessarily change the way you use your computer, but it will make the experience easier on your eyes. – *Donald B. Trivette* 

FlickerFree
Gibson Research
9 Lago Sud
Irvine, CA 92715
714/854-1520
List price: \$39
Requirements: 7.2K, one disk
drive, DOS 2.00 or later version
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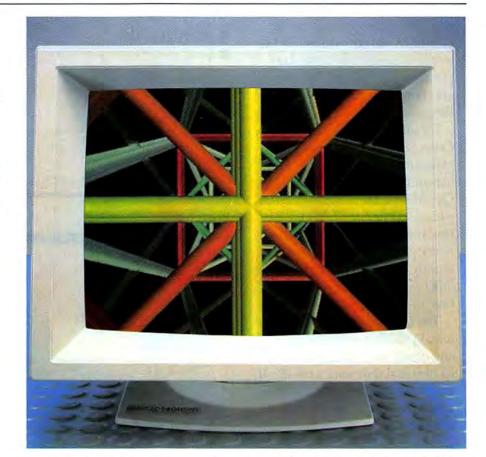
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#### Quickindex 1.0

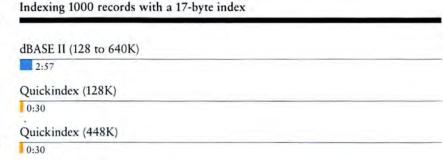
If you're one of those PC stalwarts who still uses *dBASE II*, don't despair. Although Ashton-Tate's war-horse is quickly being supplanted by *dBASE III, Plus*, there are companies that still support the legion of *dBASE II* diehards.

Foremost among them is Fox & Geller, a New Jersey firm that makes its living enhancing members of the dBASE and 1-2-3 clans. Quickindex, the company's latest release, creates dBASE II index files at warp speed—nothing more, nothing less. If you are even slightly interested in hastening this otherwise laggard process, it's time to crack open your wallet.

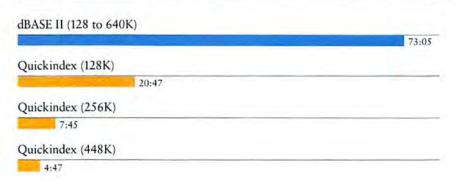
The Quickindex disk holds two files, QX2.EXE and QX3.EXE, and comes with a very short, concise manual. Indexing a dBASE II file is a matter of typing QX2 followed by data\_file index\_key index\_filename at the DOS prompt and pressing <Enter>. If you just type QX2, the program prompts you to supply this information. (As you may have surmised, QX3.EXE indexes dBASE III files in the same manner. Given Ashton-Tate's generous upgrade policy for dBASE III owners, your money is better spent on dBASE III Plus, which beats all comers in this category.)

Quickindex always outperforms dBASE II's indexing function, particularly on large files (see Figure 1). And unlike dBASE II, Quickindex's performance improves as available memory increases. For

Figure 1: Indexing with dBASE II and Quickindex (times in minutes: seconds)



#### Indexing 10,000 records with a 17-byte index



example, in 448K Quickindex ran through 10,000 records in 1/14 the time dBASE II required. In 256K, the program did the job in 1/10 the time; even in 128K, Quickindex still waxed dBASE II's tail.

Of course, if the files you want to index are rather small, *Quick-index* may not be worth the price. But if you have a mountain of *dBASE II* records, or an obese array of key fields, crack open that wallet. – *David Jenkins* 

Quickindex 1.0 Fox & Geller 604 Market St. Elmwood Park, NJ 07047 201/794-8883 List price: \$149 Requirements: 128K, one disk drive, DOS 2.00 or later version Not copy protected

Daniel J. Rosenbaum is executive editor of Wiretap, a monthly analysis letter covering the information industry. Patrick Marshall edits the Commentary Page of the Oakland Tribune. Donald B. Trivette is a consultant and freelance writer living in Wrightsville Beach, North Carolina. Art Wilcox and David Jenkins are Contributing Editors to PC World.

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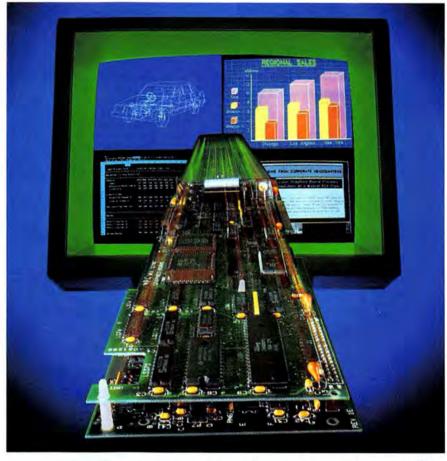
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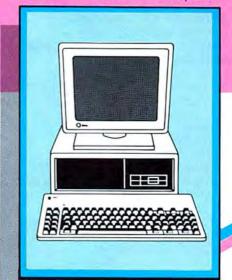
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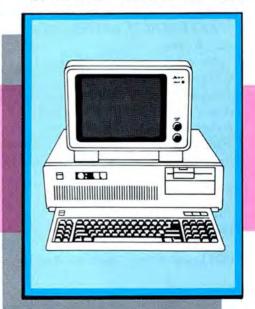
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# From the Hardware Shelf

PC World offers first impressions of recent hardware releases

Can Multitech's AT clone squeeze into an already crowded market? Has Sharp outsmarted itself? How did Core capture the hearts of hard disk users? Can boards have two brains? Is there room for another dot matrix printer? What's the easy way to swap data between PCs and mainframes?

Edited by Eric Knorr

#### The Multitech Accel 900

As unknown ATs sprout like mushrooms in a rain forest, prospective buyers need to scrutinize both the machine and the manufacturer to make sure they don't end up with an orphaned clone. So if you're considering buying an Accel 900 from Multitech Electronics, take heart: The largest personal computer manufacturer in Taiwan is unlikely to vaporize any time soon. Multitech is the number one supplier of PCs to the Third World, and it OEMs to everyone, currently manufacturing ITT's Xtra XP as well as the Franklin PC sold by Sears.

The Accel 900 is one of the first machines marketed in this country to bear the Multitech logo. Intended to compete with AT compati-

bles in the same class as Epson's Equity III or the Tandy 3000, the Accel 900's price is actually on a par with the ultracheap mail-order wonders (see "An AT by Any Other Name," PCW, December 1986). For \$2395, you get 512K RAM (expandable to 1MB on the motherboard), a half-height 1.2MB floppy drive, a monochrome monitor and adapter (with a parallel port), a floppy/hard disk controller with a 25-pin serial port, and an I/O board with one serial and one parallel port. An additional \$900 nets you a 30MB Seagate hard disk with a 40ms average access time.

The machine features both high performance and solid, functional design. Using a keyboard command you can toggle the Accel 900 between 6-MHz and 10-MHz modes, the latter offering 2 more

(continues)



Delivering 10-MHz 80286 performance and backed by a TRW service contract, Multitech's \$2395 Accel 900 may be this year's sleeper AT clone.

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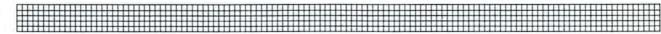
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megahertz of hustle than most of the competition. As with IBM's AT, you'll find six 16-bit slots and two 8-bit slots, as well as a socket for an 80287 coprocessor. With the video board, the controller, and the I/O board, you'll have a respectable five slots free for other options. In addition, the Accel's five half-height drive bays supply ample-and accessible-room for three floppy and two hard disk drives, which are backed up by a 196-watt power supply. A batterypowered clock/calendar is standard motherboard equipment.

Ergonomically the Accel 900 is a mixed bag. Its big AT-like footprint and noisy fan might convince you that the best place to stow your unit is under the desk. Nonetheless, the box offers a front-mounted reset button in addition to the usual status lights and keylock, plus a light that turns on when you're running in 10-MHz mode. The monitor's unique "soft-white" display is easy on the eyes, and the tilt-and-swivel pedestal is a balm for strained necks and bloodshot eyes. The Accel's keyboard features a layout identical to that of an AT, but with an added cursor movement pad. The keyboard's feel, however, is considerably less snappy than that of an AT.

Nothing pops a happy cloneowner's bubble like software incompatibility, but if the Accel 900's Award Software ROM BIOS has problems, I couldn't unearth them. Throughout several weeks of daily use, the AT clone sped through WordStar 3.3, Microsoft

Table 1: The Accel 900 fares well against both the AT and the 28612\*

	Multitech Accel 900	IBM 8-MHz AT	PC's Limited 28612
Run Globe** in compiled BASIC	9.1	11.1	7.4
Run Globe** in interpreted BASIC	65.9	95.0	62.2
Find all prime numbers less than 10,000 in compiled BASIC	15.6	19.6	15.5
Find all prime numbers less than 1000 in interpreted BASIC	8.2	13.6	9.1
Reformat a 150K WordStar document	3:19.4	4:15.4	3:03.0
Sort a 76K 712-record dBASE III file	22.1	21.9	22.2
Save a 243K 1-2-3 release 2 worksheet	10.1	11.1	10.2
Recalculate a 243K 1-2-3 release 2 worksheet	10.2	9.2	8.5
Retrieve a 243K 1-2-3 release 2 worksheet	17.9	19.1	17.8

<sup>\*</sup> All times in seconds

Word 3.0, WordPerfect 4.1, Crosstalk XVI, SmartCom II, and the sometimes irksome 1-2-3 release 2 at both 6 MHz and 10 MHz. Nor did the mischievous Jet, SideKick, or TenKey falter. The only minor failing is that the copy-protected versions of dBASE III and Framework must be started in the 6-MHz mode, but they run happily at 10 MHz thereafter. Just how fast is 10 MHz? Running the standard array of PC World tests, the Accel 900 was quite a bit faster than the new 8-MHz IBM AT and, more surprisingly, kept pace with the PC's Limited 28612 (a 12-MHz 80286 machine) in several operations (see Table 1).

Multitech's desire to produce a class act is evinced by the Accel

900's high-quality upgrade options and an excellent service policy. Because Multitech makes most of its own add-ons, the prices are truly competitive; for example, a Multitech EGA board and monitor together cost a mere \$600. And to prove that it's not out to dump the clones and run, Multitech includes a year's free parts-and-labor warranty. Service is provided by TRW-the largest supplier of warranty service in the computer industry-and Multitech's West Coast offices offer a free tech-support hotline.

It's unfortunate that Multitech's documentation lacks this same

<sup>\*\*</sup> A calculation-intensive graphics program

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thoroughness. Though the Accel 900 comes with no fewer than five manuals, poor organization makes finding information an onerous task. For example, locating proper instructions for the two-stage hard disk formatting process requires a search through three separate sections of two different manuals. Worse yet, nowhere is it expressly stated that FDISK *must* be performed prior to FORMAT—an oversight that could cause novices severe headaches.

Its subpar documentation notwithstanding, the Accel 900 is a well-designed machine that delivers enough power and features to qualify as an extremely attractive buy. Though cheaper clones beckon from the back pages of industry magazines, you'll be hardpressed to find companies with Multitech's business heritage or TRW support. Moreover, the company clearly intends to compete over the long-term: A spokesperson avers that a new Multitech 80386-based dynamo will be unveiled at spring COMDEX. This AT manufacturer plans to be more than a flash in the pan, and it looks like it's got the savvy to pull it off. -Art Wilcox

Accel 900 Multitech Electronics, Inc. 1012 Stewart Dr. Sunnyvale, CA 94086 408/773-8400 List price: \$2395, 30MB Seagate hard disk \$900, EGA board and monitor \$600



#### Sharp PC-7000

Gas plasma displays, 3½-inch drives, snap-on printers, eternal-life battery packs ... where else do bells and whistles abound as in the realm of computers-to-go? With the PC-7000, Sharp has pulled together yet another intriguing assemblage of features, including two 5¼-inch disk drives, a switchable clock, and a backlit LCD display.

Weighing in at 19 pounds and addicted to AC power, the PC-7000 measures a substantial 15½ inches by 6 inches by 8 inches. Although these specs qualify the machine as a portable rather than a laptop, Sharp has priced it at \$1795—about the cost of an average LCD laptop. The price includes the two disk drives and 320K RAM, expandable in 128K increments to 734K.

Resembling an oversize lunchbox, the PC-7000 sports a design similar to that of the Zenith Z-171-it has a keyboard that folds down rather than a flat panel LCD screen that flips up. The two quiet floppy drives are built into the right side of the machine; lining the machine's backplane are a serial port, a parallel port, and an AC socket for an external monitor or printer. To the right of the LCD screen are a contrast control knob and indicator lights that tell you which disk drive is operating and-ingeniously-whether the display is currently being blanked out by the included screen-saver utility.

At the heart of the PC-7000 lies an 8086 microprocessor. Its true

16-bit data path and 7.37-MHz clock speed (which you can toggle to 4.77 MHz from the keyboard) suggest impressive performance. In practice, however, many operations seem to drag as a result of the LCD screen's sluggish updating.

The PC-7000 uses a backlit, 4½-inch-by-9¾-inch LCD display that shows a full 80 columns by 25 lines. The screen can tilt up a few inches from its recess in the face of the unit, and its readability is hardly diminished when viewed from the side. Although the screen has a uniform surface, however, its 3-to-1 contrast ratio leaves much to be desired. Moreover, with some programs the slow screen painting takes a strange tack, partially rewriting in random areas until the rest of the screen catches up.

Sharp's electroluminescent (EL) backlighting scheme makes the 7000's screen readable even in very low light. Unfortunately, like any display of this type, the waferthin EL panel behind the LCD element has a relatively short life expectancy. Sharp claims the panel has a half-life of approximately 1000 hours, which means that in roughly six months of frequent use the screen will appear about half as bright. (Quadram's Datavue 25, which uses the fluorescent backlighting method, has a half-life ten times as long.) Luckily, the EL panel costs only \$49 to replace, and installing it is a simple task. The panel is available in

Graphics;

It has been said that the more powerful a spreadsheet is, the harder it is to operate. While this may have been true before, now there's SuperCalc®4, the integrated spreadsheet that makes molehills out of mountains.

Unlike Lotus 1-2-3<sup>10</sup>, SuperCalc4's new LEARN mode retains keystroke sequences, eliminating the need to learn macros, and SuperCalc4 is non-copy protected. SuperCalc4 has higher quality graphics than Lotus 1-2-3 and offers a tremendous array of features including: disk-based macro library, an extra large spreadsheet (including Sideways print utility) and over 75 functions. Also, it's compatible with Lotus 1-2-3...making conversion to SuperCalc4 a snap. Best of all, you can order it today and get it tomorrow at a great price, from Logicsoft.

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two colors—bright green and the standard light gray tone. To help you lengthen the panel's life, the included screen-saving utility cuts the display's power if the keyboard sits untouched for 5 minutes.

The detachable keyboard connects to the main unit via a coiled cord with modular telephone connectors at each end. The key layout is nearly identical to that of the IBM AT, except that the function keys line up horizontally along the top of the keyboard, and the <CapsLock>, <NumLock>, and <ScrollLock> keys all have built-in LED indicators. The keyboard's touch seems a little light, which can result in unwanted repeat characters if you're not careful.

One of the 7000's most original features is the <SetUp> key, which replaces the AT's <SysReq> key in the upper-right corner of the numeric keypad. <SetUp> suspends whatever you're working on and summons a convenient system configuration screen. Without leaving an application, you can use the setup routine to change the system time, the serial port parameters, the parallel port settings, the cursor's shape and blink rate, the speaker volume, and the clock speed.

In a series of informal compatibility tests, the PC-7000 ran a number of common productivity packages in a skillful fashion. PC-Write, WordStar, SideKick, Crosstalk, and 1-2-3 releases 1A and 2 cranked along without any sur-

prises. Framework, dBASE III, and Flight Simulator also seemed right at home with the portable unit.

Although the machine has no standard expansion slots, Sharp offers a number of useful options for the PC-7000. If you go for the internal Hayes-compatible 1200/300-bps modem, plastic knockouts on the rear panel will accommodate two modular phone jacks. And for \$255, you can remove another knockout and install a color graphics board.

To accommodate IBM-compatible boards, you can purchase a \$400 expansion unit that contains three free XT-type 8-bit slots. This unit can also house a 10MB hard disk, which is available for an additional \$495. Finally, you can buy an Epson-compatible printer that offers four fonts and three printing modes: draft, near letter quality, and very near letter quality. The printer clips on to the back of the machine for travel and adds another 11.4 pounds to the package.

The entire bundle packs up quite nicely and feels as though it could withstand considerable banging around. Assuming the unit is as durable as it feels, the \$1795 price tag isn't too objectionable, particularly with an established firm like Sharp standing behind the machine. In addition, many users should welcome the full-size disk drives, which obviate tedious copying between 51/2-inch and 3½-inch formats. Considering the machine's sluggish screen updating and low LCD contrast ratio, however, you could probably find a better deal from Toshiba or Data General. -Robert Cowart

PC-7000 Sharp Electronics Corp. 10 Sharp Plaza P.O. Box 588 Paramus, NJ 07652 201/265-5600 List price: \$1795, expansion unit \$400, 10MB hard disk \$495, 1200/300-bps modem \$349, Epson-compatible printer \$400, color graphics board \$255, EL backlight panels \$49, 128K RAM module \$79



#### Core XT26

When it comes to a system's overall performance, hard disk speed is just as important as processing speed, and Core International is gaining well-deserved recognition for making the fastest hard drives around. Designed to replace an IBM XT's hard disk, Core's speedy XT line comes in 20MB, 26MB, 30MB, 40MB, 43MB, 56MB, and 72MB flavors. The 26MB XT26 reviewed here is a half-height model that tips the register at \$1395-about twice the price of a comparable mail-order unit.

With that kind of sticker shock, you should expect a top-notch combination of quality and swiftness, and the XT26 measures up on both counts. Core's reputation for sound workmanship is legendary, and its entire line has an advertised average access time

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of 26ms and a data transfer rate of 5 megabits per second. These rapid speeds are due to the company's edge in voice coil technology, a method that positions the read/write head far faster than the stepper-motor approach used by most older drives.

Speed isn't the only concern with hard disks, as anyone who's ever typed C: and received DOS's 'Invalid drive specification' message can attest. The XT26 and its brethren all have an automatic park-and-lock feature that prevents the read/write head from crashing onto the platen even when power is suddenly interrupted. However, because of the unit's speed and the read/write head's proximity to the disk, the XT26's shock rating is surprisingly low: 32g's when idle and 2g's when operating. In other words, if your machine is on, be careful how hard you bump the desk.

If you have an IBM XT with the original controller, installation is as simple as unplugging the signal, data, and power cables from the old drive and plugging them into the new XT26. But if your machine's controller is from another manufacturer, you may have to purchase a Core controller for an additional \$395. Because a few unscrupulous dealers swap original XT drives and controllers for inexpensive replacements, one of your biggest obstacles to smooth installation could be determining what kind of equipment you already have. More likely, the most

irksome problem you'll face is the 10-page, mimeographed manual, which is adequate for the technically minded but a little sketchy for the beginner.

Once seated, connected, and formatted, the XT26 singsquietly. How fast it sings, however, is the real question. I used Core's own hard disk test, because even Core's competitors consider it to be one of the most equitable tests in the industry. XT26 produced surprising results: an average access time of 38ms, 12ms slower than the stated rate. The problem, it turned out, was caused by an incorrect ROM chip in the controller. Once the chip was replaced, the XT26 hummed along a millisecond or two faster than its advertised speed.

Whether this blunder tarnishes Core's sterling reputation depends on your point of view. On the one hand, \$1395 should net you a picture-perfect drive; on the other, even Compaq makes mistakes. If in doubt, you can always buy a copy of Core's hard disk test for \$20 (although company representatives advise that you can probably pick it up at a trade show or download it from a bulletin board for free). That way, you'll be sure of getting not only one of the bestcrafted drives, but also the fastest. -Donald B. Trivette

XT26 Core Int'l 7171 N. Federal Hwy. Boca Raton, FL 33431 305/997-6055 List price: \$1395, controller

\$395

Requirements: original IBM XT controller or Core controller



#### Orchid TurboEGA

To keep pace with today's demanding applications, 8088-based PCs need all the help they can get—whether from expanded memory boards, turbo boards, or IBM's Enhanced Graphics Adapter (EGA). For those whose expansion slots are at a premium, Orchid Technology has combined the functions of two of these addons into a single full-slot board: the TurboEGA.

The accelerator portion of the TurboEGA uses an 80286 microprocessor and 8K of cache memory to boost your PC to near-AT speeds. In fact, TurboEGA's accelerator is a carbon copy of the Orchid Technology Tiny Turbo board (see "Accelerate!", PCW, November 1986). As with the Tiny Turbo, the TurboEGA's turbo mode clocks in at 7.2 MHz; you can backpedal to 4.7 MHz for timing-sensitive applications by using an externally accessible toggle switch.

As with a number of EGA compatibles, the EGA portion of the board uses the Chips & Technologies chipset and a proprietary EGA BIOS (see "Seven Up on EGA," PCW, August 1986). And like many of its competitors, the TurboEGA uses software to activate the on-board logic chips that emulate the Hercules Graphics Card and IBM Color/Graphics Adapter. With CGA or Hercules emulation, you must load the

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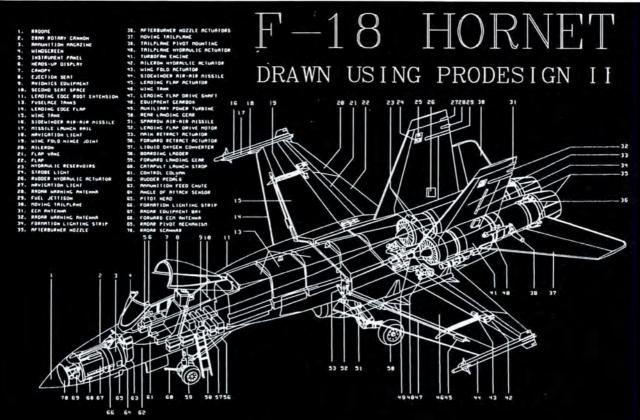
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right software before starting a graphics application or the system will crash—a sad state of affairs compared with Paradise's Auto-Switch EGA (see *From the Hardware Shelf*, *PCW*, December 1986).

Running Symphony, Microsoft Windows, Flight Simulator, Microsoft Word, and 1-2-3 releases 1A and 2 in all three graphics modes, the TurboEGA proved itself a mediocre display adapter, due largely to occasional "ghosties"-unwanted characters that appear randomly on the screen. Incredibly, Orchid seems to accept this problem as a fact of life for CGA and Hercules modes, recommending that if you experience the phenomenon, you begin the emulation file with a /D extension, which causes the board to bypass the BIOS routines and write directly to the screen. Nonetheless, ghosties seem to crop up just as frequently in EGA mode, and in the other modes the extension appears to have no effect on the little apparitions. To top it off, the scan lines sometimes suffer from an odd rippling effect in all but EGA mode.

Installing the board is no easy trick. To configure the video section of the board for the desired display, you must check or reset four on-board jumpers and one switch. The accelerator portion of the board has six jumpers, and you'll have to inspect or reconfigure three DIP switches on the



Among the many good reasons why IBM is the giant of the microcomputer industry, the AT stands tall. Big on advanced features, the AT is probably the fastest and most sophisticated personal computer on the market. But even bigger is IBM's emphasis on quality workmanship and reputation for service. You can see that in IBM's case, biggest is truly best.

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motherboard before the system is ready to start. Finally, you need to remove the 8088 microprocessor from its socket on the motherboard and relocate it to a socket on the TurboEGA board. You then connect the empty microprocessor socket to the TurboEGA with a ribbon cable, completing the setup procedure.

Two problems thwarted my initial attempts to get the TurboEGA board to operate properly. First, a ribbon cable with an intermittent short crashed my system four days after I installed the board. (Lost? The first draft of this review and a

fistful of much-needed hair. Orchid claims the newly designed cable they sent me is much less likely to fail.) More perplexing was the lack of acceleration in the turbo mode, a mystery eventually explained by the discovery of a misaligned jumper pin.

Once my machine was up and running, things went more smoothly, and the board produced a noticeable speed increase. Had the TurboEGA's connections been flawless, however, it would still have had a tough time measuring up as an EGA compatible. A number of boards on the market are better at emulating the CGA and Hercules boards, and few have any trouble in EGA mode. Needlessly complex installation, a sizable \$945 price tag, and those pernicious ghosties prevent this board from being a winning combination. –TJ Byers

TurboEGA Orchid Technology 47790 Westinghouse Dr. Fremont, CA 94539 415/490-8586 List price: \$945

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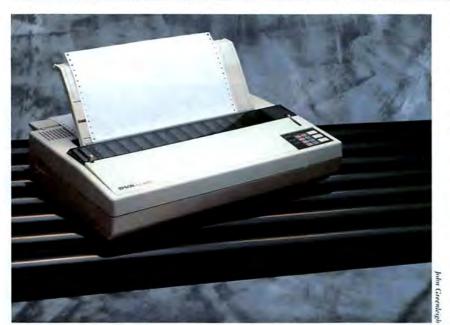
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#### First Annual Andrew Fluegelman Award — 1987

#### Purpose

The Andrew Fluegelman Award is given annually to encourage personal computer software excellence and to recognize a software programmer or team of programmers. We are looking for people who have made a substantial, innovative contribution to the personal computer community in commercial, shareware or public domain software.

The award was established in 1986 by PCW Communications, Inc., to commemorate Fluegelman's contributions to the software field. Fluegelman developed *PC-Talk*, the first easy-to-use and powerful communications program for the IBM PC. His concept of freeware remains one of the most innovative means of sharing and marketing software. Fluegelman died in July 1985, and a fund was established in his name. The annual award is made possible through this fund.

#### Eligibility

Any commercial, shareware, or publicdomain personal computer software developed by an individual or a team—including utilities, applications, and languages—is eligible. The program must have been released between January 1, 1983, and December 31, 1986. Nominations can be submitted by anyone who did not participate in the software's development. Companies are encouraged to submit nominations for software that they market; but only individuals, not companies, are to be nominated.

#### Prize

The award winner will receive \$5000 and a commemorative plaque. The first award will be presented at a ceremony in California in March 1987.

#### Judging

Each program will be evaluated according to the following criteria:

- It advances the state of the art of personal computing
- It manifests innovation in concept and design
- It demonstrates orientation to personal computer users

#### Selection of Winner

The award recipient is selected in a two-step procedure. First, an independent screening committee will review nominations and select the ten finalists.

Second, a panel of judges will evaluate the work of the ten finalists. From these ten, one award recipient will be selected.

This year's 1987 judges are Daniel Bricklin, president of Software Garden; Harry Miller, editor of *PC World*; Jerry Schneider, president of Capital PC User Group; Bob Wallace, president of Quicksoft; and Camilo Wilson, chief executive officer of Lifetree Software.

#### Deadline

Nomination entries must be postmarked no later than February 1, 1987.

PCW Communications, Inc. 501 Second St. San Francisco, CA 94107 For further information, please call Shirley Gines at (415) 546-7722.

Mail to: Andrew Fluegelman Award

#### **Program Copies**

Finalists will be asked to submit five copies of their program for the judges' evaluation. These will be returned after judging. Please do not send programs until you are notified that you are a finalist.

#### 1987 Andrew Fluegelman Award Nomination Form

Please type your entries; no handwritten entries will be accepted. If you need more room, attach additional pages to this form.

Name of program:						
Creator (if more than one, designate team leader):						
Brief description of program (100 words	or less):					
	or less):					
Nomination submitted by:						
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Address:						

Please send five completed copies of this nomination form to:

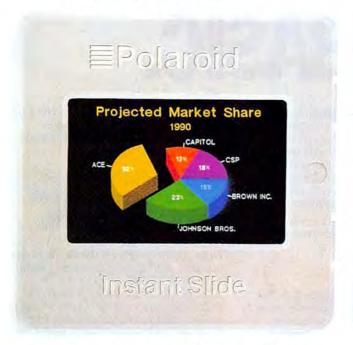
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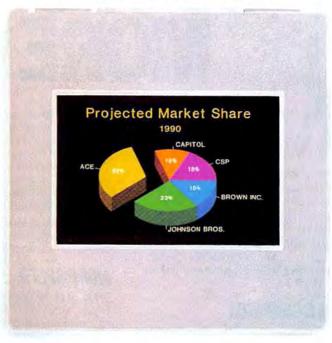
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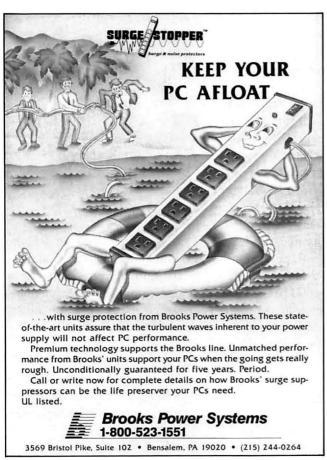
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(cps) in near letter quality mode with proportional spacing, and quite acceptable drafts at speeds up to 120 cps. Although draft printing is far slower than the 300 cps the manual describes, it's still quite competent. The 9-pin printhead makes one pass for draft mode and a second, slightly offset, pass for letter quality text and high-resolution graphics.

The EX-1000 is also versatile; you can select any of 15 different print styles from a front control panel (see Figure 1). Gone are the hassles of changing printer codes and escape sequences from draft mode to Roman Pica. All you

Draft Pica Normal Draft Flite Normal Draft Proportional Normal Draft Fica Condensed Draft Elite Condensed Roman Pica Normal Roman Elite Normal Roman Proportional Normal Roman Pica Condensed Roman Elite Condensed San Serif Pica Normal San Serif Elite Normal San Serif Proportional Normal San Serif Pica Condensed San Serif Elite Condensed

Figure 1: Epson's EX-1000 struts its selection of output styles.





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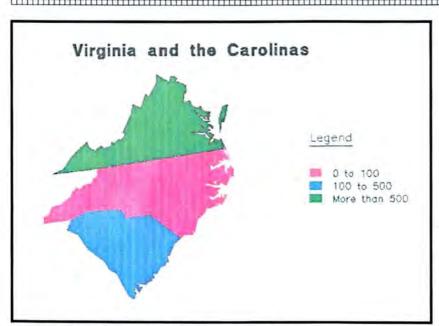


Figure 2: The Epson EX-1000 dot matrix printer provides clear, even color output using its \$80 color option.

need to do is press the Roman button, the Pica button, and the Normal button. Of course, you can still switch type styles via software commands, and character attributes—such as italics and boldface—must be software selected.

Of the available fonts, the Draft Elite Condensed style is the smallest—just the ticket for cramming a 272-column spreadsheet onto a 14-inch-wide sheet of paper. At the other end of the scale, proportionally spaced Sans Serif produces distinctive, easy-to-read characters that are more than adequate for letters and reports.

The EX-1000 also has an inexpensive color option. A mere \$80 gets you a kit containing a fourcolor ribbon (black, blue, red, and yellow) and a motor. The motor screws into the print carriage and positions the ribbon up or down to the proper color band. The mechanism is designed so you can use inexpensive black ribbons for normal text and snap in the colorribbon cartridge when it's needed. Graphics printing in color is both fast and spectacular: In 12 minutes the EX-1000 and Decision Resources' *MapMaster* printed the presentation-quality map in Figure 2. The image has a graphics resolution of 240 by 72 dots per inch.

Finally, the EX-1000 has a semiautomatic single-sheet loader that takes the guesswork out of paper alignment. Inserting a sheet and moving the paper-bail lever forward causes the platen to roll the paper evenly through the machine. The EX-1000 also has a lowprofile tractor pin-feed for continuous forms, although the unusual paper path requires practice to navigate properly.

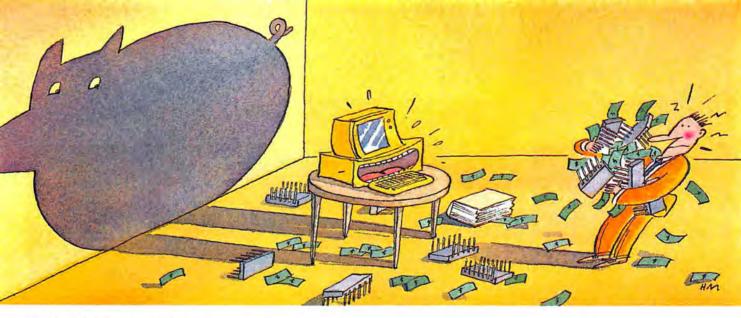
Fully backward compatible with the FX series of Epson printers, the EX-1000 runs with just about any PC software you can name. It may lack the sex appeal of a laser printer, but the EX-1000 offers a praiseworthy array of features, with a price tag less than half that of its laser cousins. —Donald B. Trivette

EX-1000 Epson America, Inc. 2780 Lomita Blvd. Torrance, CA 90505 800/421-5426 List price: \$995, color option \$80



#### Emerald MTM 80-8000 Tape Subsystem

With the increasing need for integrating PCs with mainframes, micro-to-mainframe communications is donning a growing number of guises. Perhaps the most original of these is the Emerald MTM 80-8000 Tape Subsystem, an external tape drive that reads and writes data on nine-track ½-inch magnetic tape in the EBCDIC format used by IBM mainframes.



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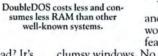
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The MTM 80-8000 comes with a full-slot controller board and cable. The unit itself is similar to a reel-to-reel tape deck and can accommodate two reels up to 101/2 inches in diameter. It reads and writes EBCDIC data in two common formats: 1600 characters per inch (at 50 inches per second) and 3200 characters per inch (at 25 inches per second). The heart of the unit is its tape import/export (TIE) utility that converts your PC's ASCII data to and from the EBCDIC mainframe standard. Perhaps the most notable feature of TIE is its record format specification, which allows you to define your own input and output data formats. This facility is particularly useful when you want to read tape data directly into file formats that are compatible with desktop applications like 1-2-3 and dBASE III.



A PC peripheral that reads and writes data in EBCDIC format, Emerald's MTM 80-8000 tape drive provides an ingenious approach to the microto-mainframe connection.

When put to the test, TIE and the MTM 80-8000 together displayed lightning speed. Within 30 to 40 seconds, a large mainframe text file was converted into a 460K PC text file and transferred to an AT's hard disk. According to Emerald, the speed is due in part to the virtually simultaneous occurrence of conversion and file creation.

The MTM 80-8000's archival storage protector utility is used to back up and restore data residing on your PC's hard disk. You can perform these operations by file or by volume. The former approach enables you to selectively back up files that have been created or updated since a specific date and time, and its inherent flexibility makes it the preferred method.

The volume method creates a mirror-image backup with subdirectories intact. In either mode, a 20MB hard disk can be backed up in a mere 2 to 5 minutes, compared with the 20 minutes PC-based tape backups often take.

Installing the MTM 80-8000 is best left to the data processing technician. The controller board is laden with DIP switches and jumpers for such fine-tuning procedures as adjusting the inter-record gap on tape-write operations or generating internal/external parity. Unless you're familiar with mainframe operations, a number of the settings that the software demands for data transfer may



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And Cubit works just as well with floppies and tape cassettes as it does with hard disk drives.

take less time, as well as less space. And communicating compressed files means significant savings on phone line charges.

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Buy Cubit now and you'll save even more. Because for a limited time, you can buy Cubit at the special introductory price of just \$49.95. But hurry. This special price won't last long.

Ask for Cubit at your computer dealer. Or order directly from SoftLogic Solutions by calling 800-272-9900 (603-627-9900 in NH), or mail in the coupon below.

Special pricing is available when you buy Cubit along with other SoftLogic products including DoubleDOS, Software Carousel and Disk Optimizer. Ask for details.

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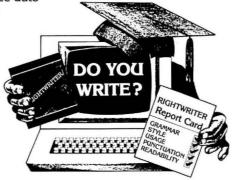
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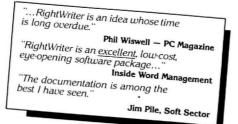
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also require technical wisdom. Once a data processing technician has set up the appropriate batch files, however, you should be able to run the MTM 80-8000 unassisted. For nontechnical users, the manual is a little too opaque for the do-it-yourself approach.

While the backup and restore functions are impressive, it's obviously PC-to-mainframe data transfer that justifies the MTM 80-8000's high price tag. With a terminal emulator board, the data transfer rate is typically 9600 bps, or 60K per minute. Compare this velocity with the 3MB to 4MB a second common in tape-mediated data transfer, and the advantage of this system for transferring large quantities of data between environments becomes clear.

–Sanjiva Nath

Emerald Systems Corp. 4757 Morena Blvd. San Diego, CA 92117 619/270-1994 List price: \$4950

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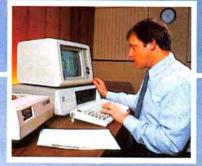
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Everything takes longer because your disk has to work harder.

Problem is, it's something that happens so gradually you may not notice the difference. At least, not until you see the dramatic improvement after using Disk Optimizer.

#### File fragmentation—It's a problem vou can see.

Watch your hard drive the next time it reads or writes a file. Each "blip" of the LED means the drive-head is moving to another place on the disk-either to pick up or lay down another chunk of data.

And the truth is, head movement takes time. Far more time than actual reading and writing. What's worse, all this head movement causes extra wear and tear that can shorten the life of your drive.

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Plus, there's built-in data security that lets you assign passwords to as many files or file groups as you want.

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# PC to PC: Fundamental Connections

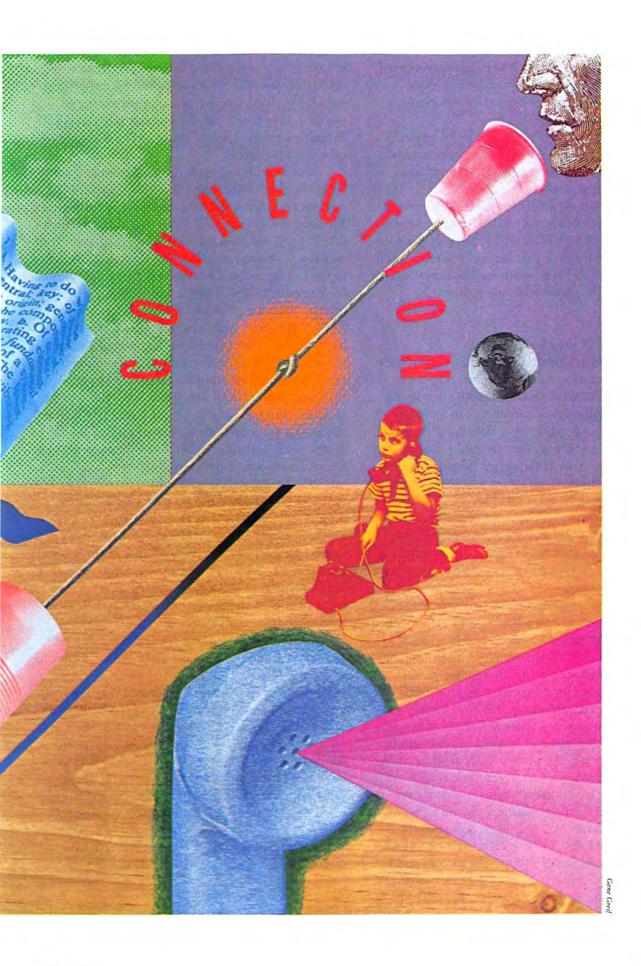
Reaching out to a distant PC isn't as tough as you think. With a modem, some software, and a little pluck, you can discover the value of instant communications.

#### David Benchley

As PC applications go, communications has gotten a bad rap. People who spend hours setting up multiple-column documents, writing labyrinthine 1-2-3 macros, and building disk-busting data bases shudder at the thought of conducting a simple PC-to-PC communications session. But if you've struggled with and mastered an application and its peripheral (such as *Microsoft Word* and a printer), your angst needn't be for naught. The lessons (and patience) you learned can be fruitfully applied to the concepts and operations behind PC-to-PC communications.

Why does trepidation persist? Perhaps because the telephone, a familiar and facile instrument, has been stirred into a strange brew of modems, serial





PC World

ports, and software arcana. Uneasiness is reinforced when your company (which long ago embraced the PC revolution) still sends vital information via Federal Express.

Yet there are times when a financial report, a worksheet, or even a graphic absolutely, positively has to be there *now*, not overnight. In many instances, linking your system directly to another PC is not only the most expedient way of delivering the goods, it's the cheapest. As you shall see, making this fundamental connection doesn't require an engineering degree. With a little practice and patience, you'll find that sending a file to another PC is almost as easy as picking up the phone and calling Mom.

#### Meeting of the Modems

You wouldn't give a report file formatted with *Microsoft Word* to a business associate who uses *WordPerfect*. The same principle applies in telecommunications. Before two computers can recognize each other and coherently swap data via their modems, formats known as *communications parameters* must be agreed on by both parties. Parameters are set with a communications program, and they govern transmission speed (expressed in bits per second, or bps) and the way data is packaged (the number of data bits and stop bits and the type of parity). Although only a handful of parameters are involved, a single mismatch can make it impossible to cement an on-line relationship.

To set the transmission rate, call your partner at the other end and ask what speed his or her modem is set at. If you fail to gather this basic information, you'll quickly discover that sending a file at 1200 bps to a PC equipped with a 300-bps modem passes nothing more than digital garbage. Mismatched transmission speeds, however, won't necessarily garble data or terminate a session. If your 1200-bps modem supports 300-bps communications, it might be able to automatically downshift to the slowest common denominator.

How characters are formatted is equally important to successful communications. If you recall your computer fundamentals, characters are represented by bytes, and a byte usually consists of 8 bits. However, the standard ASCII coding scheme common to all personal computers requires only 7 bits. (The 128 characters in the standard ASCII set—upper- and

lowercase letters, numbers, and miscellaneous symbols and codes—are generated by most word processors and by *WordStar* in nondocument mode.) If you're transmitting a file that consists solely of ASCII characters, merely specify 7 data bits as a communications parameter.

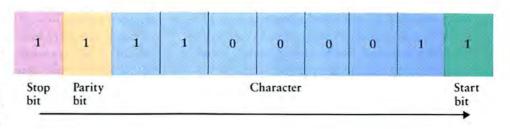
But few files are made up of just text and numbers—and that's where the 8th bit plays a role. 1-2-3 worksheets holding formulas and macros, formatted WordStar documents, dBASE III Plus data base files, BASIC programs, and the style sheets Microsoft Word attaches to documents all include special characters or formatting codes. These special characters, part of IBM's extended ASCII character set that includes graphic characters, math symbols, and letters from foreign alphabets, define the 8th bit as 1. If a communications program ignored this bit, it would be impossible for a PC receiving a file to distinguish between standard and extended ASCII characters sharing the same first 7 bits. Therefore, your communications program must be set for 8 data bits before you send a file containing any extended ASCII characters. In fact, when in doubt about the contents of a file, always specify 8 data bits.

Of course, data is not shuttled over a phone line unaccompanied. Each transmitted 7- or 8-bit character is prefaced by a start bit, which tells the receiving modem that a byte of data is coming, and is followed by a stop bit, which signals that the byte has been sent (see Figure 1). A start bit is always supplied, but you have the option of specifying either one or two stop bits. A single stop bit suffices in most situations; if you are sending data directly to a much slower device, such as a teletype, an extra stop bit gives the machine time to literally move its printhead to the next line.

A parity bit can also be included if you're sending 7-bit standard ASCII data. Parity is a crude way of ensuring accurate data transfer and can be set as even, odd, or none. If both sides of the connection decide to use even parity, a 0 or a 1 is added as the 8th bit of each transmitted byte to ensure that the sum of all the bits is an even number. For example, when the transmitting system adds up the ASCII binary representation of the letter *a*–1100001–the result is 3, an odd number. Under the even parity scheme, a 1 is appended to the 7 bits and the char-

178 January 1987

Figure 1: Every transmitted character is framed by a start bit and a stop bit, which tell the receiving system when a byte of data begins and ends. A parity bit can be added for simple error checking.



acter is sent on its way. The receiving PC expects to see only an even number of bits per byte—so if a character with an odd number of bits arrives, a parity error occurs and the PC knows the byte has been damaged in transit. Depending on the communications program, the character may be ignored or replaced with a question mark or a similarly eyecatching character. Once a character is received and accepted, the parity bit is discarded.

You can also use the odd parity scheme with 7-bit data, but the effect is essentially the same. Parity cannot be used when transmitting files that contain extended ASCII characters, because the 8th bit is already taken. In short, consider the 8-data-bits and "none" parity parameters as a matched set. Whatever type of file you're sending, remember that parity status must always be indicated.

You now know the basic settings for a PC-to-PC communications session. If you want to send an unformatted *WordStar* document at 1200 bps to another PC, set the parameters with your communications program at 1200, E, 7, 1; that is, 1200 bps, even parity, 7 data bits, 1 stop bit. If a 1-2-3 worksheet is the transportee, specify parity as none, 8 data bits, and 1 stop bit. But don't flick on your modem just yet; conducting a PC-to-PC session also involves mastering a few other details.

#### **DIP Tricks**

Inside almost every modem—or attached to an internal modem board—is a bank of DIP switches resembling tiny teeth. Like a vestigial organ, these switches are evolutionary leftovers from the days when modems were manually operated by flipping relays. Although contemporary modems are largely controlled with software commands (see the discussion under "AT Commands at Your Service"), DIP switches are often dedicated to setting transmission speeds, auto-answer modes, and other functions.

Modem manufacturers eliminate much of the guesswork for novice telecommunicators by configuring their units to act like the ubiquitous Hayes Smartmodem 1200. And most popular communications programs straight out of the shrink-wrap issue commands that a Haves-compatible modem can understand. Nonetheless, the factory switch settings and your communications program may not mesh successfully. If the program's user manual doesn't supply the appropriate switch or software settings or if the suggested settings don't work, make sure that the data terminal ready (DTR) and carrier detect (CD) switches common to almost all modems are in the "on" or "closed" position. When the DTR line is on, the modem can execute AT commands, and the PC can transmit or receive data. Carrier detect is always on when your modem is connected to another system. With the CD line forced on, your PC will accept your modem's result codes (such as OK)-even when the modem is off line.

#### AT Commands at Your Service

By all accounts, DIP switches are not long for the PC world. In personal computers, printers, and modems, the tiny teeth are giving way to software control. Most modem manufacturers save themselves time and effort by using the AT (attention) commands created for the Hayes Smartmodem line. AT commands, which can be entered either individually or in a string of up to 40 characters, enable you to adjust a substantial range of modem settings, from dialing sequences to speaker volume, before and sometimes during a communications session. Even though communications programs issue most of these commands for you, sometimes typing an AT command directly from the keyboard is the only way to solve a problem.

For example, to successfully connect your PC to another system, one modem must be in call mode and the other in answer mode. Unfortunately, most modems are set in call mode by default—and programs such as *PC-Talk III* can't alter this state. To force a Hayes-compatible modem to answer an incoming call on the second ring, load the communications program, enter the terminal mode (the equivalent of the DOS command line), and type **ATS0 = 2**. ("AT" must always be in capital letters.) Depending on the program, you may have to type + + + before issuing an AT command.

If a command is valid, the modem will respond with an OK result message. Other result messages, such as CONNECT, RING, NO CARRIER, and ER-ROR, pop up depending on the command.

AT commands aren't necessarily cryptic-and playing with them can be a useful way of exploring your modem's capabilities. Set communications parameters at 7 data bits, even parity, and 1 stop bit. To determine if your PC and modem are connected, type AT < Enter > . (The on-screen response should be 'OK.') Enter the program's terminal mode and dial a local recording (such as Time) by typing ATDT phone number; < Enter > . (If your modem is hooked up to a rotary or pulse line, replace DT with DP.) DT tells the modem to dial the number, while the semicolon holds the line open so the modem can receive further commands. The modem chirps as the number is dialed; there's a pause, a click, and, eventually, the drone of a recorded voice through the modem's speaker. If a computer was on the other end of the line, you would hear its high-pitched carrier signal whine, indicating that you and the other telecommunicator could "chat" from the keyboard or send or receive files. For now, simply hang up by typing + + + < Enter > ATH < Enter > .

Aside from dialing numbers and establishing a communications session, AT commands control a hundred-and-one other functions. ATO places a modem on line, ATS7 = sets the maximum length of time a modem will wait for a carrier signal from another modem before hanging up, and ATZ restores a modem's default settings. One noteworthy command is ATX1, which activates special messages. Depending on the modem, such messages might supply the transfer rate of the answering modem or note that the computer just called is busy. These messages can also

help the novice telecommunicator quickly discover mismatched parameters. For example, if you accidentally call a 300-bps modem at 1200 bps, the CONNECT 300 message quickly informs you to change transmission speed.

Two general-purpose commands are particularly helpful. If your company runs its telephone lines through a PBX and uses a long-distance carrier such as Sprint, calling an outside number may involve dialing 9, waiting for the dial tone, dialing Sprint's local exchange, waiting for a computer tone, punching in an access code, and, finally, tapping in the number you want to reach. You can easily duplicate this sequence with the aid of a comma—the 2-second pause command. A typical sequence might be: ATDT 9,543-1919,,,44225,415/546-7722.

The AT escape sequence, + + +, always returns a modem to the command state. For example, to sever a connection, you would type + + + < Enter > ATH; to go back on line, you would type + + + + < Enter > ATO. If the modems and phones on both ends of a connection share the same line (a common cost-cutting measure), both communicators could rest their typing fingers and switch to voice by typing + + + and simultaneously picking up their respective handsets.

As noted earlier, communications programs generally insulate users from arcane AT commands—but knowing a handful of these useful controls can sometimes save a session.

File Transfer Protocols: Beyond Parity
You may have noticed that your last longdistance telephone call was punctuated by static,
crackling, and other aural impedimenta. While such
interference makes human conversation merely irritating, it can turn telecommunicated data into digital
Hamburger Helper.

Repairing a garbled document is a minor annoyance—you might have to correct a few misspelled words or remove some unusual characters peppered throughout the file. But a missing bit in a program file can render it useless, and subtle errors introduced during the transmission of critical financial data could be disastrous. Base your company's planning on

an accounts receivable worksheet that's lost a few key zeros, and you could be staring insolvency in the face.

Riding to rescue your data are file transfer protocols, the clever programs designed to identify and correct mangled data of all types. When a file is communicated under the aegis of a protocol, data is grouped into blocks, the ASCII values of all the characters in a block are added, and the sum is then forwarded to the receiving system. The PC at the other end performs the same calculations on the block and compares the results. If the totals don't match, it asks that the same block be sent again. Protocol file transfers are considerably slower than sending data unadorned (and unprotected), but the wait is worth the security thus gained.

Repairing a garbled document is a minor annoyance, but subtle errors introduced during the transmission of critical financial data can be disastrous.

The XMODEM protocol, a public domain program written by Ward Christensen, is the dominant error detection/correction program in PC communications and is incorporated into almost every communications package. The most common version of the protocol is Checksum XMODEM, which performs the operations outlined above. CRC XMODEM, which relies on sophisticated cyclical redundancy-checking techniques, can detect many errors that Checksum XMODEM can't, such as transposed bits. (For more information about CRC protocols, see "Fast-Talking Modems" in this issue.)

Employing XMODEM is relatively straightforward, but keep certain essentials in mind. The 8-data-bits parameter must be set and the same version of XMODEM must be present on both ends of the connection. (Some variants of CRC XMODEM can detect and switch automatically to Checksum XMODEM.) If XMODEM cannot send a block error-free after ten tries, it terminates the transfer, and you have to start over. When sending data over especially noisy telephone lines, you can probably guarantee an uninterrupted session by breaking large files into smaller ones.

Since XMODEM divvies up data into 128-byte blocks, the last block is usually padded with extra characters. A data base file may be unusable in this form if your data management program is particularly sensitive to file length, so be prepared to do some postcommunications cleanup.

#### Making the Right Connection

If you're like most new telecommunicators, your first on-line session unfolds like an Abbott and Costello routine. "AARRee YYOOUU rreeaaDDyy ttoo rreecceeiivvee TTHHee ffiillee LLOOuu??" "rECEIVE?! I THOUGHT YOu already seNT IT!" Such on-line conversations are not uncommon, even among experienced users. As with most PC applications, you have to sweat the small stuff to ensure success.

That means not only agreeing on parameters with the other communicator but also remembering to change the communications settings accordingly. Are modems on both ends set at the same speed? Do parameters match and are they correct for the kind of data being sent? If you see the RING message on the screen but the calling computer never connects, your modem may have defaulted to the call mode—you must issue the ATS0 = command. When nothing seems to work, consider more mundane omissions: Is your modem turned on? Are all cables connected properly? Have you paid your phone bill lately?

Once the CONNECT message appears, obstacles to mutual on-line conversation may lurk. Your communications program's echo feature displays your keyboard input. In most instances, both modems are operating in full-duplex mode (data is simultaneously sent and received), so your keystrokes are automatically echoed back to the screen. If you turn the echo command on, every character you type will appear twice (see Screen 1). Conversely, if you rattle away on the keyboard and the screen remains blank, chances are you are running your modem in half-duplex mode—data flows only in one direction at a time and your keystrokes are not automatically echoed back to you. The solution? Toggle the echo feature on.

When it comes time to send a file, some software features may similarly complicate matters. For example, *PC-Talk III* includes a message function CONNECT 1200

hheelllloo??

What's happenin'?

www.hhaatt''ss ggooiinngg oonn hheerree?

Looks OK on my end

Screen 1: Double your pleasure? Not if you're trying to chat with someone at the other end of a communication. The typical result when one modem is running at half-duplex and the other at full-duplex.

CONNECT 1288

| \( \lefta \righta \rig

Screen 2: A whole lotta nothing going on: When two modems are set at different transfer rates, the screen fills with digital garbage, and the connection is usually broken.

CONNECT

HELLO?

hi==R#±1±G

ARE YOU THERE?

Uéééâääëèòæ##£ääô¥#|-UUUoooéñ#\_g\*\*\*\*

Screen 3: When two communicating PCs use different parity settings, recognizable text and Martian poetry may share the screen. Mismatched parity settings can be changed on line.

that notifies both communicators that a PC can accept a file and that a file transfer is complete. When transmitting a standard ASCII file, turn the function off or else messages will be included in the file. Do likewise when sending a file to, or capturing a file from, an on-line service such as MCI Mail or CompuServe, because the message may be interpreted as a command.

Other headaches await. Every line in a transmitted standard ASCII file should end with a carriage return and a linefeed. This allows a communications program to scroll data up the screen. If your communications program isn't set properly, each transmitted line might lack a linefeed or it might include two linefeeds. Data in either form is indigestible and may wreak havoc with your word processor, spreadsheet, data manager, or other application.

The warning signs are obvious: With no line-feeds, successive lines of transmitted text are displayed on top of one another; with two linefeeds, text is displayed double-spaced. Corrective action is usually taken at the receiving end. In the first case, direct the communications program to treat each incoming carriage return as a carriage return plus a linefeed. In the second, turn off the linefeed option to display incoming text single-spaced.

But the biggest source of on-line snafus is mismatched parameters. If you manage to make a connection, only to find the screen filled with happy faces, diamonds, little cubes, and reams of what appears to be Martian poetry, it's time to reexamine those basic settings.

As you might expect, each mismatched parameter produces a somewhat different type of on-screen garbage. If you see a string of angle brackets interspersed with odd characters, data transmission speeds are probably different (see Screen 2). To resolve the problem, end the session, change your modem's transmission rate accordingly, and try again. Most Hayes-compatible modems in the answer mode will automatically adjust to the transmission speed of the calling system. However, if a 1200-bps modem calls a system limited to 300 bps, a NO CARRIER message will flash on the screen and the connection will be severed.

If a received file is liberally sprinkled with extraneous symbols and punctuation, parity is mismatched (see Screen 3). In most cases you can adjust parity during the session without breaking the connection. Just make sure that both systems use the same parity scheme and that files with extended

===DIALING DIRECTORY 3 === Modem dialing command = ATDT = 495-3523,,885-6557 Long distance service +# Name lesq Strip Pace 31-Alf Landon 300-E-7-1 201/861-3861 32-Alvin Feltzer 202/362-2707 300-N-8-1 Y Y N N 33-Ruth B. Hayes 717/656-4635 1200-N-8-1 Y 34-C. Eppington Tems 413-463-9023 300-E-7-1 Y Y H N 35-Babs Worthington 607/522-9084 Y 1288-N-8-1 Y H N 36-Fidelity LTD 1-800/554-3689 1200-E-7-1 N N 37-Rashida Doubtless 614/607-3512 2400-N-8-1 H N N 38-Anderson M. Ferderberder 331-8965 1288-N-8-1 H N N 655/362-8745 39-Alan Walmsley 1288-N-8-1 H H 212/344-5649 40-Lennie Bernstein 1200-N-8-1 Y Y N 300-E-7-1 H N 47-388-F-7-1 N N 43-MCI Mail 543-1560 1200-N-8-1 H H 300-E-7-1 N 45-Club Ted 408/979-5613 300-E-7-1 Dial entry #:36\_ ! or . . . Enter: R to revise or add to directory M for manual dialing F / B to page through directory X to exit to terminal ! For long distance service, precede entry # with +/-

Screen 4: PC-Talk III's dialing directory allows you to set speed, parameters, and on-line amenities from a single screen.

ASCII characters are transmitted with the "none" parity setting. If you have difficulty resetting any parameters on line, observe a rule of thumb: The receiving system's parameters should remain constant (provided they are merely different, not incorrect), while the transmitting system's values are changed.

#### Package Deals

The functions that do all the grunt work constitute only a small part of the communications program's code. Between these hard-working functions and the user is a layer of features for accepting input; handling errors; and presenting data, prompts, and menus.

The job of communicating with another PC is made all the easier if you are comfortable with a program's interface and way of doing things. Before immediately snatching up a copy of *Smartcom II*, *Crosstalk XVI*, *Microsoft Access*, or *PC-Talk III*, ask yourself if you prefer to enter commands at a prompt, à la DOS, or if you'd rather select functions from a series of menus, as in *pfs:file*.

The command-oriented Crosstalk XVI offers a wealth of features, but they can be obscured by the package's crossword of cryptic commands and arguments. This program is better suited to more experienced users. Smartcom II is the MultiMate of com-

munications software. If you like menus, you'll like *Smartcom II*. The program lacks some advanced features (such as 9600-bps communications), but making selections is quite easy; and if you buy a Hayes internal modem, *Smartcom II* is free.

Probably the best program for first-time communicators is *PC-Talk III*, an easy-to-use shareware program that is neither menu- nor command-driven. The program initally starts up in full-screen terminal mode. You can enter AT commands at this juncture or, with a single <Alt>-key combination, display a simple dialing directory and set a full range of parameters (see Screen 4). Other features—on-line help, file directories, and so on—are available by typing other <Alt>-key combinations.

Whatever program and modem you settle on will require patience and perseverance. Reaching out to another PC may be frustrating at first, but the savings in time and money will be worth the effort.

David Benchley is a San Francisco-based writer who writes about graphics and communications.

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Richard Meyer (front left), a structural engineer, heads the new user subgroup of the Silicon Valley Computer Society. Members met at Tek/Link, a training center in Mountain View, California, to learn about hard disks.



# PC Users Unite!

Need some computer-related advice? Your best bet may be to turn to your local user group, an invaluable source of information for PC users.

#### Steve Cummings

In a culture that spawned associations for tropical fish enthusiasts, model train collectors, and antique car buffs, it was inevitable that PC owners would find one another. In the mid-1970s, informal aggregations like the Homebrew Computer Club sprang up to puzzle out the mysteries of building microcomputers. When IBM introduced the PC in late 1981, the complexion of microcomputing changed, and so did user groups. Instead of treating PCs as a hobby, most of today's groups focus on work-related computing concerns. Three of the largest organizations, the Boston Computer Society, the Capital PC User Group, and the Silicon Valley Computer Society, cater primarily to business users, although they vary widely in other respects (see the

Hansa Bhaskar is an educator in the Los Baños, California, school district who drove about 70 miles to attend the gathering of PC users.



sidebar "A Portrait of Three Groups"). Of course, user groups aren't a panacea for business computing problems, but they're a good place to begin looking for solutions. In recognition of the merits of user group activities, some companies even underwrite their employees' membership dues.

#### Mecca for Information Seekers

Typically, user groups meet once a month, collect yearly dues, and publish a newsletter. Meetings range from simple get-togethers at members' homes to fairly formal programs featuring presentations by computer industry representatives. Except in the largest groups and those sponsored by corporations, all group activities are organized and administered by volunteers.

For most members, meetings provide a forum for sharing ideas and exchanging information. You're sure to meet people who face business computing challenges similar to your own and who can offer strong opinions about the latest products. Moreover, the informal atmosphere at most meetings makes the learning process enjoyable.

For John DeBay, an information center analyst who helps support 450 XT and AT users at Boston's Shawmut Bank, the Boston Computer Society (BCS) has been a priceless source of information. When he first joined the group in 1983, he was a mainframe

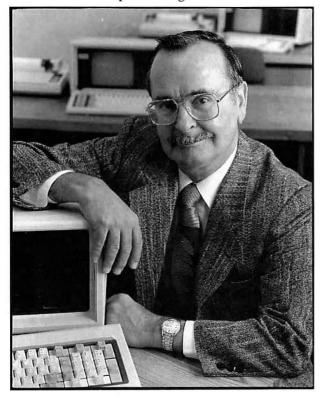
User groups aren't a panacea for business computing problems, but they're a good place to begin looking for solutions.

programmer at another large corporation and had just purchased a PCjr. "I came from the DP world, so I knew more about programming than most other people. But the PC was a new machine, and there was no place to go when you needed help."

Since then, BCS contacts have helped DeBay solve many computing problems. "The group gives you a social network for finding people who know more than you do. Once I got help when I was trying to figure out how to program a communications port. Another time I couldn't understand how Lotus video drivers worked, so I called someone who knew."

For users who need information about specific hardware and software, special interest groups (SIGs), which usually operate under the aegis of the main user group, are a helpful resource. SIGs run the gamut from 1-2-3 to screenplay writing to programming in C. Numerous SIGs have also sprung up for owners of discontinued computer models, such as the ill-fated IBM PCjr. Enthusiastic users often help prolong the usefulness of particular brands of PCs by writing new programs, eliminating bugs, and finding ingenious ways to upgrade and repair these computers. If information or spare parts are difficult to obtain, a user group may become, by default, your sole source of support and service.

Frank Nehse, an engineer at Amdahl Corporation, delivered a lecture to new users on upgrading old computers and purchasing clones.



Other groups address more specialized concerns. The Society for the Management of Professional Computing, for example, is a user group for Boston area managers who supervise PC-using employees. MIS managers trained on mainframes flock to the Society's meetings to trade suggestions for selecting microcomputer software and hardware, ensuring data integrity and security, and training end users.

All the News That's Fit to Print
In a typical user group, a fair-size chunk of membership dues and a good deal of volunteer labor is channeled into producing the group newsletter. Activity calendars and announcements always figure largely in these publications. Larger groups publish full-fledged magazines stuffed with reviews, tips, product announcements, and specialized columns. For groups whose members are scattered around the globe, the newsletter may replace meetings as the main means of group participation.

Most newsletters draw heavily on the expertise of group members. Andy Solomon, vice president of Houston Jewelry and Distributing Company, reads the Lotus question-and-answer column in the Houston Area League of PC Users' newsletter; in return, he contributes his own discoveries about 1-2-3. "There are lots of little tips in the column that can be useful," he says. A recent column explained how to use standard IBM extended ASCII characters in *Symphony* and 1-2-3, how to handle a bug that causes a mistaken "formula too long" error message, and how to call DOS batch files within a *Symphony* macro.

Sorting Through Software
Although a prodigious quantity of publicdomain software and shareware is in circulation, tracking it down can be difficult, and weeding out mediocre or bug-ridden titles takes considerable effort. Most user groups make shareware more accessible by housing it in a library and issuing a program catalog annotated with comments and sug-

Because many user group members influence their companies' PC purchasing decisions, vendors seek them out to share opinions on product ideas and perform beta tests on new software.

gestions. Program disks sell for a nominal fee (about \$5 each). In BCS's PC group, a software screening policy ensures that only programs of reasonable quality are placed in the library.

Public-domain and shareware utilities from Capital PC's library are installed on all the desktop computers at NUS Corporation, a Gaithersburg, Maryland, engineering consulting company for utility companies and government agencies. Says Harold Flamenbaum, senior systems engineer at NUS Corporation and an active Capital PC member, "Almost

### A Portrait of Three Groups

Founded in 1977 by 13-year-old Jonathan Rotenberg in his high school library, the Boston Computer Society has evolved into a vigorous group with eight paid staffers and more than 20,000 members worldwide. BCS is an umbrella organization that embraces users of just about every type of microcomputer ever made. Once you join BCS, you automatically become a member of the main society and its 45-plus specialized groups.

BCS's PC group is by far the largest of these groups, with a membership of 10,000. About 700 people, predominantly professionals in business and engineering, attend each monthly meeting. Those who don't live in the Boston area can sign up for an associate membership (at \$28 instead of the regular \$35 fee) and get BCS's newsletters, the BCS Buying Guide featuring members-only discounts, access to the society's public-domain software library, and a downloadable magazine.

Groups all over the United States are affiliated with BCS, and a group in Denmark recently became BCS's first international chapter. Affiliates can obtain organizational advice from the parent society in addition to using BCS member services. Rotenberg, who still heads the group, likes to imagine a membership of more than

one million users by the twenty-first century, with BCS functioning as the AAA of computing.

BCS's breadth, coupled with its appetite for national hegemony, makes it a one-of-a-kind organization. Most other large user groups are devoted to a single type of computer operating system, and their members are local. In the Washington, D.C., area, for instance, Capital PC User Group has about 4500 members. The organization is run entirely by volunteers, but its structure is quite businesslike: The board of directors, which meets monthly, is made up of seven officers; several directors responsible for membership, media relations, and other concerns; and the leaders of about 30 SIGs.

Capital PC has its own building, equipped with computers for meetings and educational seminars. Group activities and services include monthly general meetings, buying group meetings, and educational training seminars, as well as a newsletter and access to a software library. Members can also call a help line to locate experts who have volunteered to answer questions. The group also sponsors several electronic bulletin boards, including a special conference line for intragroup communications.

Not surprisingly, Capital PC members are active in politics. The group has lobbied state and national legislators extensively on such issues as software rental and bulletin board service legislation and has spear-

headed a long campaign against copyprotected software. The group advocates legislation that would require software vendors to sell rather than license their products to end users, and has drafted a user bill of rights.

On the West Coast, the Silicon Valley Computer Society (SVCS) offers typical user group fare to more than 1100 PC-using members—general meetings, a newsletter, a BBS, and several special interest groups.

The main group's monthly meetings feature a speaker or panel, and vendors are invited to set up booths at the meetings as long as they offer a special discount to group members. A monthly newsletter keeps members informed; the SVCS enriches the publication's content by culling articles from other user group publications as part of a nationwide newsletter exchange program. SVCS also has a public-domain software library of almost 130 disks, according to executive director Kent Safford. "That adds up to well over 2000 programs," he says. "Members get a copy of the catalog on a disk. It seems to be one of the major attractions of the group-a lot of people join just because of the software library." -S. C.

every utility we have came from the shareware library." Among the programs used at NUS Corporation are *PC Status*, which displays available memory, disk drive speeds, and other system details, and *Cover*, a program for printing floppy disk labels with an Epson printer.

When User Groups Talk, Vendors Listen
Because many user group members influence
their companies' PC purchasing decisions, vendors
seek them out to share opinions on product ideas and
perform beta tests on new software. Many manufacturers introduce new products at group meetings.
The IBM Portable PC and the Apple Macintosh, for
example, were both demonstrated for the first time at
BCS.

The benefits of these exchanges go both ways: Vendors reach an influential audience, and members have a chance to help shape the products they need. "One of the real strengths of user groups is the power of numbers," says Jerry Schneider, president of Capital PC. "Most vendors and manufacturers respond more quickly to corporate users than to individual users. When we go to manufacturers as a group and say, 'I'm from EDS,' 'I'm from GM,' 'I'm from Volkswagen,' they start to listen."

When a special task force from Capital PC wrote a carefully documented bug report on the first PC release of *dBASE II*, Ashton-Tate used the report as a guide during its extensive redevelopment efforts, says Schneider. What's more, Ashton-Tate issued a point-by-point response to the task force report.

During the early development of dBASE III and dBASE III Plus, Ashton-Tate approached Capital PC and several other large user groups for suggestions. According to Schneider, user group members contributed significantly to dBASE III's new user interface, the Assistant.

Capital PC's influence extends beyond product development to the sensitive area of copy protection. "We had meetings in the boardrooms of every major software company across the country and got commitments from all of them to address the copy protection problem," Schneider says.

# An In-House Group Takes Off

At Hughes Aircraft Company's Space and Communications Group in El Segundo, California, microcomputer users meet every six weeks to hear presentations on new hardware and software. The topics are chosen by group participants on write-in ballots at each meeting.

"Everyone was trying to figure out what kind of local area network to get, so we had our second or third meeting on LANs," says Marshall Taxer, supervisor of education services at the Hughes PC information center (a division of the company's MIS department). "We brought in four vendors, and each one gave a 15-minute presentation on their product. Then we had an open panel discussion with questions from the audience."

The Hughes user group evolved from a series of seminars sponsored by the information center in 1985, and drew its members from smaller user groups that sprang up within the Space and Communications Group. These efforts were eventually consolidated into one large group managed by the information center.

The Hughes group is successful because it has the backing of managers. "The problem with holding a user group during business hours, of course, is that most managers are reluctant to allow employees to take off time," says Taxer. "By making the topics current, we've developed a good enough reputation to get management support."

The Hughes user group attracts a broad spectrum of users to its meetings, Taxer reports. "We have some people who could practically build a microcomputer themselves, and others who have used a PC for a month and are finally comfortable with turning it on and getting into a program."

Although beginners are welcome, the group does not attempt to teach them the rudiments of computing. "Beginners rely heavily on formalized training. The information center has a whole range of services, including classes and technical support over the telephone. Those who need a lot of hand-holding go through one of these other channels or use them in addition to the user group," says Taxer.

Although his group has been successful, Taxer doesn't think the Hughes experience is directly transferable to other companies. "We didn't plan to start a user group," he explains. "There were fortuitous chains of events that had a lot to do with it, so I don't have a formula to recommend." Still, prospective user group organizers can probably cull some lessons from the Hughes example: Obtain official sanction from a high-level company department, preferably MIS, and make the meetings genuinely useful by polling members about what they want to learn. -S. C. "We worked with users to educate them about the damage piracy can cause, and we showed the vendors that we're a group of professionals who recognize that the success of the software industry is our success. Most of the vendors, including Microsoft, Ashton-Tate, and Lotus, said our lobbying had a lot to do with their decision to change copy protection policies."

User groups have also contributed to the development of entire genres of software. Doug Roberts, a BCS member, was teaching an assembler class to beginners in 1984 when he and his students decided to review existing debugging software. The group evaluated such products as IBM's *Professional Debug Facility*, Data Base Decisions' *Periscope*, and Visual Age's *CodeSmith* and wrote up the results in a three-part article that appeared in the BCS newsletter. Subsequently, Roberts organized a well-attended debugger fair. "At that time," says Roberts, "there were huge gaps in the features the debuggers offered. The articles made the vendors aware of what features were out there, and all have dramatically increased the capabilities of their debuggers."

Similarly, BCS organized a forum last summer on the development of super PCs based on the 80386 microprocessor. "We invited the leading 386 developers to make presentations to a group of seasoned assembly users," says Mike Rohrbach, director of BCS's PC group. "We had people from Intel, Phoenix, Microsoft, Lotus, and IBM. We videotaped the whole session, and we're making it available. It's unprecedented for IBM to speak publicly about products in development and make its comments available on tape."

#### Strength From Within

Some companies have established in-house user groups to help support PC-using employees. These groups may meet on company time (see the sidebar "An In-House Group Takes Off") or serve interested employees after hours. However, the in-house user group is by no means a universal feature of the corporate landscape. Many companies have never lent official support to user group activities. At other firms, user groups have disbanded once effective training and support services were put into place.

Boeing, the aerospace giant headquartered in Seattle, used to sponsor a large companywide user group. "When the numbers of PCs were in the low hundreds, and when they were mysterious and outside the main support services, we had an in-house group and it made a lot of sense," says Roger Jones, who helped administer the group in his previous position as manager of distributed services. "But when the numbers of PCs climbed into the thousands, we set up more formal support and training mechanisms, and the group ceased to exist.

"Each major Boeing organization now has its own method of supporting its users, and some still sponsor small user groups," Jones says. "But they also use telephone hot-line support, training seminars, and product evaluation."

#### Jumping on the Bandwagon

Even if your company doesn't sponsor a user group, you probably won't have to look far to find one (see the sidebar "A National User Group Listing"). If no appropriate group exists, you may want to take the initiative and form your own. BCS's *Manual for User Groups and Special Interest Groups* provides detailed information on organizing users who share your interests; it is available through the Society for \$30.

In the past few years, user groups have won the allegiance of thousands of professionals and gained clout in the PC marketplace. Many related factors have fueled the development of the user group phenomenon: the proliferation of PCs in the corporate arena, the difficulty of making new computer systems productive, and the lack of adequate hardware and software support systems. As user groups grow, they will continue to play a leading advocacy role while serving as an important resource for PC-using professionals. "When you need to get answers and honest opinions," says NUS Corporation's Flamenbaum, "a user group is the only place you can go."

Steve Cummings is a freelance writer in Santa Cruz, California, who specializes in computer topics.

(turn page for sidebar "A National User Group Listing")

# A National User Group Listing

These groups serve IBM and compatibles users; most meet monthly.

#### Alabama

Birmingham IBM PC User Group c/o Fred Hilbers P.O. Box 19248 Birmingham, AL 35219 205/871-1939

Montgomery PC Users Club c/o Tony Drake 3505 McGehee Rd. Montgomery, AL 36111 205/281-6100

#### Alaska

Anchorage IBM PC Users Group 3605 Arctic Blvd. #1320 Anchorage, AK 99503 907/562-2161 ext. 1320

#### Arizona

Phoenix IBM PC Users Group P.O. Box 44150 Phoenix, AZ 85046 602/954-7519

Tucson Computer Society c/o Brian Wagner P.O. Box 1489 Tucson, AZ 85702 602/795-9437

#### California

IBM Users Group of California c/o Neil Zachary P.O. Box 4136 Los Angeles, CA 90078 213/937-1314

San Diego Computer Society c/o Joseph Dorner

P.O. Box 81444 San Diego, CA 92138 619/284-5196

San Francisco PC Users Group c/o Dray Ristenpart 3145 Geary Blvd. #155 San Francisco, CA 94118 415/221-9166

Silicon Valley Computer Society c/o Kent Safford 2464 El Camino Real #190 Santa Clara, CA 95051 408/286-2969

#### Colorado

PC Users Group of Colorado c/o Larry Hayden P.O. Box 944 Boulder, CO 80306 303/442-4815

#### Connecticut

Central Connecticut User Group c/o William G. Bourn, President P.O. Box 964 Glastonbury, CT 06033 203/633-3154

#### District of Columbia: see Maryland

#### Florida

Miami PC User Group, Inc. c/o Jeffrey Feinberg 2500 E. Hallandale Beach Blvd. #707 Hallandale, FL 33009 305/457-7744 305/944-6203

South Florida Computer Group c/o Richard Strysick P.O. Box 22267 Fort Lauderdale, FL 33335 305/584-4141

#### Georgia

Athens IBM PC User Group c/o Hugh Christian 255 S. Milledge Ave. Athens, GA 30605 404/549-6222

#### Hawaii

Hawaii IBM PC Users Group c/o Dick Colven P.O. Box 22967 Honolulu, HI 96822 808/545-2153

#### Idaho

Boise PC Users Group c/o Marty Hand 7978 Fairview Ave. Boise, ID 83704 208/322-5770

#### Illinois

Chicago Computer Society P.O. Box 8681 Chicago, IL 60680-8681 312/942-0705

Central Illinois PC Users Group c/o William Crampon P.O. Box 10053 Springfield, IL 62706 217/787-1948

#### Indiana

IBM PC Users Group c/o Tony Moleta P.O. Box 2532 Indianapolis, IN 46206 317/849-7745

#### Iowa

Quad Cities PC Users Group c/o Lew Roberts P.O. Box 464 Bettendorf, IA 52722 319/391-9437

Des Moines Area IBM PC Users Group, Inc. c/o Ralph Gandy 1876 S.E. Park Ave. Des Moines, IA 50320 515/282-7273

#### Kentucky

Kentucky-Indiana PC Users Group c/o Robert Hastings P.O. Box 3564 Louisville, KY 40201 502/583-4501

#### Louisiana

Baton Rouge PC Users Group c/o Tom Wichser 5233 Bullrun Baton Rouge, LA 70817 504/292-0749

#### Maryland

Capital PC User Group c/o Jerry Schneider P.O. Box 3189 Gaithersburg, MD 20878 703/425-9896

Baltimore IBM PC Users Group c/o Bob Ebersole 1910 Trout Farm Rd. Jarrettsville, MD 21084 301/557-8118

(continues)

#### Massachusetts

Boston Computer Society One Center Plaza Boston, MA 01059 617/367-8080

#### Michigan

Southwest Michigan PC Users Group c/o R.K. Schmitt 2320 Crosswind Dr. Kalamazoo, MI 49008 616/349-5381

#### Minnesota

Twin Cities PC User Group c/o Jane Mitchell P.O. Box 3163 Minneapolis, MN 55403 612/473-0307 (recording) 612/546-0059

#### Missouri

Columbia PC Users Group c/o Jennifer DuPont 1560 Daniel Boone Blvd. Columbia, MO 65201 314/442-6171

IBM PC Users Group of St. Louis c/o Ed Van Horn P.O. Box 837 St. Louis, MO 63188 314/653-0767

#### New Hampshire

Portsmouth IBM PC Group c/o Cynthia Harriman 57 S St. Portsmouth, NH 03801 603/436-1608

#### New Jersey

Philadelphia Area IBM PC Club c/o Bennett Landsman 2041 Harbour Dr. Palmyra, NJ 08065 609/786-1441

#### New Mexico

Albuquerque PC Users Group c/o Mike Patrick 708 11th St. NW Albuquerque, NM 87102 505/842-9229

#### New York

Buffalo IBM PC User Group c/o Don Leslie 4242 Ridge Lea #23 Buffalo, NY 14226 716/832-1415 (recording) 716/632-1749

New York IBM PC Users Group c/o Margaret Levine 80 Wall St. #614 New York, NY 10005 212/533-NYPC

#### North Carolina

IBM PC User Group of Asheville c/o Richard Davis 142 Edwin Pl. Asheville, NC 28801 704/252-7529

Business Computer Club of Charlotte c/o T. Scott Brumley 2109 S. Tryon St. Charlotte, NC 28203 704/399-3074

#### North Dakota

Grand Forks IBM PC Users Group c/o John Hilley 717 Ives St. Buxton, ND 58218 701/847-2935

#### Ohio

IBM PC Users Club c/o Chuck Harrington 315 Cutler Hall Ohio University Athens, OH 45701 614/593-2575

Greater Cincinnati IBM PC Users Group c/o Mark Gintner P.O. Box 3097 Cincinnati, OH 45201 513/671-2339

Greater Cleveland PC Users Group c/o Roy McCartney 30704 Royalview Dr. Willowick, OH 44094 216/944-5173

#### Oregon

Portland PC Users Club c/o Mike Lane P.O. Box 1727 Beaverton, OR 97075-1727 503/643-9087

Pennsylvania: see New Jersey

#### Rhode Island

Greater Rhode Island IBM PC Users Group c/o Hilda Gesch University of Rhode Island Kingston, RI 02881 401/792-2301

#### Texas

North Texas PC Users Group Bob Russell, Membership Director 2025 Rockcreek Dr. Arlington, TX 76010 214/422-4269 Houston Area League of PC Users c/o Duane Hendricks P.O. Box 61266 Houston, TX 77208-1266 713/831-3367

#### Virginia

IBM PC Users Group c/o Wes Merchant 2906 Montauk Ct. Falls Church, VA 22042 703/243-3482

Central Virginia IBM PC Users Group P.O. Box 34446 Richmond, VA 23234 804/790-1007

#### Washington

BorderLine IBM PC Users Group c/o Gary B. Rohrabaugh 2812 Cedarwood Ave. Bellingham, WA 98225 206/671-3181

#### West Virginia

Huntington PC Users Group c/o Levi Lauvray/Huntington Alloys P.O. Box 1948 Huntington, WV 25720 304/743-6241

#### Wisconsin

Madison IBM PC User Group Pete Wagner, President P.O. Box 2598 Madison, WI 53701-2598 608/274-6600

# Twas days before Christmas,

and all through the offices, many creatures were stirring, even the bosses. Year-end figures were wrung by the accountants with care. In the hopes that black ink would somehow appear there.

~	denotes	IBM-AT compatibility.
		IBM-PCjr compatibility

(call for specific requirements)

#### **SOFTWARE**

We only carry the latest versions of products. Version numbers in our ads are current at press time.

time.
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Alpha Software (not copy-protected)
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See what your printer's been missing 35.
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* - Turbo Database Toolbox 1.2 41.
* Turbo Graphix Toolbox 1.0 41.
* ~ Turbo Editor Toolbox 1.0 41.
* - Turbo Newpak (Gameworks and Editor) 52.
* ~ Turbo Lightning 1.0
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* - Turbo Pascal 3.0 w/BCD & 8087 support 59.
* Turbo Pascal w/Turbo Tutor
* ~ Turbo Prolog 1.1
* - Turbo Family Jumbo Pack 187.
* - Sidekick 1.5
* ~ Traveling Sidekick 1.0 43.
* - Traveling Sidekick w/Sidekick 73.
*-Reflex 1.1
* Reflex Workshop 1.0 41.
* - Superkey 1.1
* - Superkey/Sidekick Package 69.
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Business Builder
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through January 31, 1987

#### STONE & ASSOCIATES

- \* 2nd Math
- \* Algebra + Level 1

Are you the only one who ever has fun with a computer? Do your kids think that all it does is spreadsheets and checkbooks? These two educational programs for children not only teach them how to add, subtract, and so forth, but they're also fun, colorful, and the kids will actually learn something!

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- Animated characters, colorful objects, playful sounds
- Big, bold graphics that can be easily seen and understood
- Increasing levels of difficulty to provide a continuing challenge
- Great fun for children of all ages

For the IBM PC, XT, AT, PCjr 2nd Math (requires CGA, BASICA or GW-BASIC) . . . . . \$24 Algebra + Level 1 (requires CGA, BASICA or GW-BASIC) . . . . \$24

Broderbund (copy-protected)

★ → Bank Street Writer Plus (not copy-protected)

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* Print Shop	35.
* Graphics Library 1	22.
* Graphics Library 2	
Computer Associates (not copy-protected	
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Consumers Software (not copy-protected)	
Spreadsheet Auditor 3.0 (check your work)	
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Clout 2 0	1

Microsoft Word 3.1
 279
 ★ Microsoft Project 3.0
 239

For the IBM-PC (XT & AT) Exclusively.



# When inside my brain,

there arose such a clatter,
I looked up from my keyboard to see what
was the matter. Away to my notepad I flew like a flash,
to see what I'd done in Christmases past.

LANGUAGES	Springboard (copy-protected)	Scarborough (copy-protected)
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* - Fortran Compiler 3.31	★ Clip Art Volume 2 (for Newsroom) 25.	
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Cobol Compiler 2.1 439.	Symantec (not copy-protected)	
Microstuf (not copy-protected)	~Q & A 2.0 call	All educational programs listed are
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Transporter 1.4	Runtime 1.0	Barron's
Migent Software (not copy-protected)	True BASIC Libraries each 32.	*Computer SAT
Ability 1.0A 65.	Turner Hall (not copy-protected)	Designware (reqs. CGA)
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Clipper (Autumn '86)	* Art Gallery 1	Harcourt Brace Jovanovich
North Edge Software (not copy-protected)  Timeslips 2.26	* Art Gallery 2	* Computer SAT
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*-VP-Info 1.0	processors)	*Piece of Cake Math (ages 7 to 13)
Personics (not copy-protected)	processors)	* Easy as ABC (ages 3 to 6)
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Peter Norton (not copy-protected)		* Memory Master (ages 2 to 6) 2
* Norton Commander 1.0	ATI (copy-protected)	* My Letters, Numbers, Words (ages 1 to 5) 2
* Norton Utilities 3.1		* Kids Stuff (ages 3 to 8)
Powerbase (not copy-protected)	Intro and How to Use:	* - 2nd Math (ages 5 to 8) speci
Powerbase 2.2	PC-DOS MS-DOS	*-Algebra+ Level 1 (ages 13 & up) speci
Quarterdeck (not copy-protected)	Compag Typing Tutor	The Learning Company (regs. CGA)
DESQView 1.3	IBM-PC BASIC each 33.	* Magic Spells (ages 6 to 12)
Sierra On-Line	* ~TRAINING POWER PROGRAMS	*-Word Spinner (ages 6 to 10)
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* - Webster's New World Speller 1.3 39.	WordStar Displaywrite 3 R:base 5000	* Rocky's Boots (ages 9 and up) 3.
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* - Webster's New World Writer 1.01 (includes	Symphonyeach 43.	True BASIC, Inc. (not copy-protected)
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* PFS First Choice 1.0 (includes word processor,	* Learning DOS (for any version)	copy-protected except where noted.
spreadsheet, database, communications). 89.	The Education of the Control of the	copy protected except where noted.
Professional Write 1.0	4 000/049 0000	Blue Chip
Personal Publisher 1.0	1-800/243-8088	Realistic financial simulations.
Professional File 1.0		* Managing for Success (American Dream) 36
-Harvard Presentation Graphics A:01 245.	PC Connection	*-Baron
-Harvard Total Project Manager 1.12 289.	6 Mill Street 320W	*-Millionaire
Softstyle (not copy-protected)	Marlow, NH 03456	*~Squire
* Printworks Dot Matrix 1.05	603/446-3383	*~Tycoon

For the IBM-PC (XT & AT) Exclusively.



# The glow on the screen,

told a tale sad but true. I'd forgotten to get presents for people I knew! A modem for mother, Zork for the kids. Tycoon for the chief, and a hard drive for Sid.

Broderbund (reqs. CGA)	
	322.
*Championship Lode Runner	
* Ancient Art of War	27.
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Difficulty levels shown in italics	
-STANDARD	
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*Hitchhiker's Guide each	24.
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Zork II Zork III Sorcerer	
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Spellbreaker	29.
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Balance of Power (avoid nuclear war)	30.
1Step Software (reqs. CGA)	0.000
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* Golf's Best (St. Andrew's)	19.
Origin Systems (reqs. CGA)	
*-Ultima 3	39.
Parlor Software (not copy-protected)	

\* - Bridge Parlor (best Bridge simulation). . . . .

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Aren't you glad you waited to buy a printer? Epson's latest printer is another winner. Crisp, high-quality dot matrix printing with Epson's renowned reliability and compatibility. Loads of standard features, and some surprising options, too.

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* Star Scenery Disk—San Francisco		٠					\$15
* - Package of all 6 Western Airports .	-		w.	E			69
XOR (not copy-protected)							
NFL Challenge (be the coach)	ì	8	•	٠	ř	,	79

#### HARDWARE

Manufacturer's minimum limited warranty period is listed after each company name. Some products in their line may have longer warranty

periods.
AST Research 2 years
I/O Plus II C/S
Second serial, parallel or game port 35.
SixPakPlus 64k C/S/P includes Sidekick vers.
1.5 not copy-protected & DESQView 169.
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upgrades to 1 Meg on board, 2 Meg w/ opt.
piggyback board; EEMS compatible, includes
DESQView
SixPakPremium Piggyback Board 256k 189.
Flashpak (accelerator board)
Advantage 128k upgradeable to 1.5 Meg
includes Sidekick vers. 1.5 not
copy-protected and DESQView
Advantage Premium 512k S/P
upgrades to 1 Meg on board, 2 Meg w/ opt.
piggyback board; EEMS compatible, includes DESOView
DESQView
<u>-3780</u>
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Both RAMpage boards support EMS and fully

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Color 722 - EGA compatible		519
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IBM Mono Screen Enhancement		 . 17
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AT-to-Smartmodem cable		
15 foot Parallal Printer cable		27

27

39

support EEMS, and include DESQView.

-15-foot Par	a	lle	el	P	r	n	te	er	(	S	at	ole	9													2
DATA TRAN	V.	SF	E	EF	7	S	V	VI	7	C	H	lE	S	1	Ά	-E	3.	S١	N	ite	cł	7	b	0	xe	es)
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⋆ - 4-Position.								٠		*					٠		3	٠					ž	٠		7

#### Cuesta ... 1 year

Uninterruptable power backup units. \*Datasaver 200 Watt . . . . . . . . . . . . . . . . call Datasaver 400 Watt . . . . . . . . . . . . call

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# PC Pastimes.

The play's the thing.

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Just call 1-800/243-8088 or 1-603/446-3383, M-F 9:00 to 9:00; Saturday to 5:30. If you're planning to visit, call ahead to make sure what you want is in stock.



Give your PC the bird—with Hopper. Together at last with PC Man, on one disk. Offer not available to net accounts. Limit one per customer.

For the IBM-PC (XT & AT) exclusively.

# Call 800/243-8088.

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FD-55BV)	109.
Toshiba 1 year	
PC, XT 360k Drive (51/4" half-height)	109.
AT 360k Drive (51/4" half-height)	117.
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64k Memory Upgrade Set for IBM-PC or X	т
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ibivitat internory board (9 criips)	. აყ.

DISKS

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All disks have a lifetime warranty.

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(includes subscription, manua	1, \$2	5 us	age	crec	lit,
monthly publications)					24
* - Dow Jones Membership Kit	* * *	жек		*** x	24
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1-800/243-8088

#### **PC Connection**



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320W

#### **MISCELLANEOUS**

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Nylon Computer Covers PC, XT or AT (navy,	
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PC Connection	
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idea!)	29.
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- Your card is not charged until we ship.
- If we must ship a partial order, we never charge freight on the shipment(s) that complete the
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- Allow 1 week for personal and company checks to clear.
- UPS Next-Day-Air available.
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#### Hawaii:

 For monitors, printers, and drives, actual UPS Blue charge will be added. For all other items, add \$2 per order.

#### Alaska and outside Continental US:

Call 603/446-3383 for information.

For the IBM-PC (XT & AT) exclusively.



# It gave me great pain. There was so much to do!

There was so much to do!

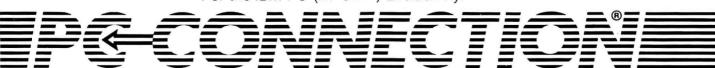
How could I possibly see this list through?

When what to my wondering eyes should appear, but
PC Connection's number big, bold, and clear.

Curtis lifetime	- Transet 1000	NSI Logic 3 years
ACCESSORIES	N² cables for Transet 1000 each 16.	EPIC (video adapter, EGA compatible) \$27
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System Stand (for IBM-PC & XT) 19.	Hercules Graphics Card Plus call	<u>Tiny Turbo 286</u>
Jniversal System Stand	Graph X Software	PC Turbo 286e w/1 Meg
Crystal 150 Watt (line conditioner) 123.	Intel boards: 5 years; chips: 1 year	PC Turbo 286e Ram Daughtercard 1 Meg 26
Crystal 300 Watt (line conditioner) 159.	Above Board PC 64k (upgrades to 2 Meg) call	<u>Turbo EGA</u>
CABLES	Above Board AT 128k (upgrades to 2 Meg) call	<u> EGA</u> 28
Smartmodem-to-IBM Cable (9 feet) 17.	Above Board PS-PC C/S/P (upgrades to 1.5	Princeton Graphics 1 year
(eyboard Extension Cable (3 to 9 feet) 27.	Meg) call	*-Text switch (green or amber) for HX-12 2
xtension Cables for IBM Mono Display 33.	-Above Board PS-AT S/P (upgrades to 1.5 Meg or	MAX-12E Amber monochrome monitor 17
Color and Monochrome Extension cables 39.	higher w/piggyback)	*-HX-12 RGB monitor (690 x 240)
Printer-to-IBM cable (9 feet) 17.	8087 (for IBM-PC & XT)	-HX-12E (EGA compatible) 53
SURGE SUPPRESSORS	8087-2 (for 8 Mhz computers) 169.	Quadram 1 to 2 years
Safestrip (6 outlets)	~80287 (for 6 or 8 MHz IBM-PC AT & XT 286) 195.	Quadcolor 1 (standard CGA card) 9
Diamond (6 outlets)	~80287-8 (for 10 MHz & faster IBM-PC AT) 269.	Expanded Quadboard C/S/P
Diamond-Plus (w/FAX & modern protection) 41.	Kensington Microware 1 year	Øk (upgrades to 384k)
merald (6 outlets; 6 ft cord)	* Masterpiece	384k (fully populated)
Sapphire (3 outlets; EMI/RFI filtered) 47.	* Masterpiece Plus	* Microfazer Printer buffer 64k (parallel) 15
Ruby (6 outlets; EMI/RFI filtered; 6 ft cord) 55.	*-Printer/portable computer stand 17.	
Ruby-Plus (w/FAX & modem protection) 65. Command Center SPECIAL 79.	key tronic 90 days	512k, selectable input/output modes)24
	5150 keyboard	QuadEGA+ (half-card)
OCA 1 year Smart Alec (5251 emulation board) 639.	5151 keyboard (deluxe)	SMA 30-day money-back guarantee
rma (3270 emulation board) 729.	5153 keyboard with touch pad	PC-Documate Keyboard Templates available for:
ma Keyboard	Joystick (2 button)	DOS/Basic 3.0-3.1 WordStar
pson 1 year	Joystick Adapter Card	-Lotus 1-2-3 -WordStar 2000
X-800 printer (80 col., 300 cps) 499.	New! 3 Button Joystick	Symphony MultiMate
X-1000 printer (136 col., 300 cps) 699.	Executive Cursor Control 2.0 w/joystick 37.	Framework -WordPerfect
X-85 printer (80 col., 160 cps)	Game Port for AST SixPak/SixPak Premium . 25.	∠dBase III each 1
X-286 printer (136 col., 200 cps) 529.	Microsoft 1 year	Some templates also available for Key tronics 515
X-86 printer (80 col., 120 cps)	Microsoft Bus Mouse with software 6.0 127.	keyboard and IBM enhanced keyboard.
Q-800 printer (80 col., 180 cps) 549.	* Microsoft Serial Mouse with software 6.0 135.	Toshiba 1 year
Q-1000 printer (136 col., 180 cps) special	Mach 10 (accelerator board)	Toshiba printers are 24 pin dot matrix.
Q-2500 printer(136 col., 324 cps) 1089.	Mouse Systems lifetime	*-P321 S/P printer (80 column, 216 cps) 51
20i printer(136 col., 420 cps) call	*Junior Mouse with PC Paint 2.8 (connects directly	* P351 S/P printer (136 column, 288 cps) 104
Printer-to-IBM cable (6 feet)	to PCir serial port)	Toshiba T1100 PLUS Laptop Computer c
everex 1 year	PC Mouse with PC Paint + 127.	Toshiba T3100 Laptop Computer c
vercom II 1200 Baud Internal modem (half	Bus Mouse with PC Paint + 129.	Tseng Labs 1 year
ard, w/software)	PC Mouse with Dr. Halo II 139.	-EVA (EGA card)
th Generation 6 months	PC Mouse with Ready and PC Paint + 149.	EVA 480 (supports 640x480 resolution, includes
ogical Connection Print Buffer 256k call	NEC 2 years	drivers for Lotus 1-2-3 ver. 1A)
TG 2 years	Multisync monitor (EGA compatible) call	Video 7 2 years
ight Pen		~VEGA (half-card)
Demo Disk for Light Pen	1 900/9/12 9099	VEGA Deluxe (w/FREE Microsoft Windows) 39
layes 2 years	1-800/243-8088	
martmodem 300		DRIVES
martmodem 1200	PC Connection	
martmodem 1200B (w/Smartcom II) 349.	MEMBER 6 Mill Street	I2 Interface 1 year
martmodem 1200B (no software) 319.	Marlow NIH 03456 320W	20 Meg Hard Drive Card (85 ms) 45
martmodem 2400	603/446-3383	IOMEGA 90 days
mannonem zaucie (w//smartcom III — 500		- BALLIOUIII BOY 20 MACO W/PC 2 COLO

For the IBM-PC (XT & AT) Exclusively.

Smartcom II 2.1 (software).....



10 Meg cartridge . . . . .

# Compaq Deskpro 386: Dare to Be Great

Should you go out and splurge on Compaq's new Deskpro 386? If you can put the lightning-fast 80386 processor to work immediately, you won't be disappointed. And even if you're investing in the promise of a multitasking, megamemory future, you won't have long to wait before the rest of the PC world feeds your hunger for applications.

Karl Koessel and Reed McManus



Compaq's Deskpro 386 with its 101-key keyboard and EGAcompatible monitor

Compaq Computer took a bold step last September. Without so much as a nod of approval from IBM, the Big Brother of PC standards, Compaq introduced the Deskpro 386. As the first major PC manufacturer to bring out a machine incorporating Intel's latest and greatest chip, the 80386 microprocessor, Compaq appeared to have made a move unprecedented in its short but successful history. Is the Texas-based company—normally a shrewd and conservative player in the PC game—putting its reputation on the line with the Deskpro 386?

The answer, surprisingly, is no. Although IBM's presence—or in this case, silence—is felt by all PC manufacturers, the rules of the PC-compatibility game have changed. IBM is no longer the sole fount of PC standards. The Deskpro 386 follows standards laid down long ago by IBM's original PC—criteria too pervasive for even the IBM monolith to contain. To-day, the shots are being called by all the players—Compaq, Intel, Microsoft, and any software developer who must choose which operating system(s) to support—and not just by IBM.

In spite of its image as a clone maker, conservative Compaq has never been a passive coattail-rider. Instead, it has consistently innovated within established standards. Compaq was the first to market a

portable PC, a portable PC with a hard disk, a dualscreen monitor, and a PC equipped with an internal tape drive. Most recently, it one-upped IBM's AT with the more sophisticated Deskpro 286.

With the Deskpro 386, Compaq is following what might be dubbed the Compaq/Intel/Microsoft 80386 standard. This development is no accident. For 18 months, those three industry giants collaborated to debug Intel's 80386 microprocessor—a project that placed Compaq in the catbird seat. The company's new AT-hardware and -software compatible is poised for the upcoming software that will take advantage of the 80386 chip's power and usefulness.

#### An Inside Look

Lurking inside an unremarkable Deskpro-286-like cabinet is a state-of-the-art powerhouse: Intel's 80386, running at a fast 16 MHz, shares space with a 32-bit-wide expansion slot that holds 1MB on a Compaq memory board. RAM can be increased to 14MB, 10MB of which is addressable via the 32-bit slot.

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For virtually all applications, memory expansion can be confined to the single 32-bit slot. The 1MB system memory board includes sockets for an additional 1MB of high-speed RAM. Either a 2MB or an 8MB 32-bit memory expansion board can be piggybacked to a fully loaded (2MB) system memory board. (The 2MB expansion board uses 256K-bit static-column RAM chips; the 8MB expansion board uses 1-megabit static-column chips.) Because either expansion board can be attached half populated, the 32-bit slot can hold 1, 2, 3, 4, 6, or 8 megabytes.

Pick a System

Hardware choices are plentiful. The Model 40 includes a half-height 40MB hard disk; the Model 70, a full-height 70MB hard disk; while the Model 130, not surprisingly, offers a full-height 130MB hard disk. Their average access times are better than 30, 35, and 25 milliseconds, respectively. Each model comes with a 101-key keyboard that's identical to IBM's recent offering except for a softer touch. If one of your applications is better suited to the 84-key keyboard and you holler loud enough at your dealer, you may be able to swap.

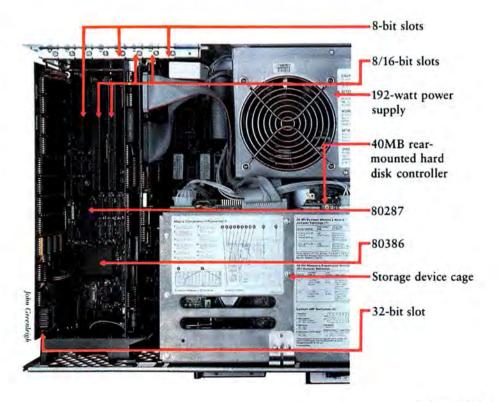
Compaq has unbundled the video and now offers a choice of adapters and monitors. The conventional Compaq Video Display Controller Board drives a Compaq Dual-mode Monitor (green or amber) and includes light pen, composite video, RF modulator, and RGB connectors. The Compaq Enhanced Graphics Board (EGB), the equivalent of a fully loaded IBM Enhanced Graphics Adapter, drives either the Dual-mode Monitor or the Compaq Color Monitor—the latter an IBM Enhanced Color Display compatible and Compaq's first color display. (Compaq's EGB originally incorporated Microsoft's InPort mouse-interface chip. However, with the InPort interface, the Deskpro 386 failed to meet the FCC emissions standard, and Compaq has removed the chip from current EGB production.)

Unbundling the video provides nothing earthshaking. However, the Deskpro 386 copies the EGB's BIOS ROM into 32-bit memory, where the BIOS routines run twice as fast as they would in the board's ROM.

With the exception of the lone 32-bit slot for the memory board, the rest is stock AT-compatible Deskpro 286: a 1.2MB floppy disk drive, four compartments for half-height storage devices in a shock-mounted cage, a 4- or 8-MHz 80287 math coprocessor socket, a 192-watt power supply, and a battery-powered real-time clock with system configuration memory.

The Deskpro 386's AT-compatible bus has four 8/16-bit and three 8-bit expansion slots. Of the four full-length 8/16-bit expansion slots, one is occupied

Inside, the Deskpro 386 offers a single 32-bit slot for a Compaq memory expansion board, three 8-bit expansion slots, and three 8/16-bit expansion slots (two with Model 130).



by a multipurpose board that includes a 25-pin serial port and a 9-pin parallel port and supports one or two 360K or 1.2MB floppy drives, a 40MB tape-backup device, and one or two 40MB drives. (Of course, the system unit can accommodate only four of these devices.) The multipurpose board—officially the Fixed Disk Controller Board—is not a complete hard disk controller; it supplies address decoding, buffers, and connectors for the 40MB drive's rearmounted controller.

With the multipurpose board in place, the Model 40 has three 8/16-bit slots free. Models 70 and 130, on the other hand, require a disk controller that takes up one more slot. All models have three 8-bit slots, one of them half-length.

The system DIP switches are located in the front left corner of the system board, where they are accessible without your having to remove any expansion cards. And, although you must remove the system memory and multipurpose boards to change their jumpers and switches, labels on top of the storage device cage clearly list the various settings and their respective meanings and map the position of major system components.

As you'd expect from Compaq, the mother-board appears to be well constructed and built from high-quality components. No patch wires were found, and because the motherboard does not hold the system's RAM, the board's components are widely spaced and easily identified. As with the Desk-pro 286, the system unit has a brace bar above slot 1, which makes it very sturdy. Because this is the Desk-pro 386's 32-bit slot, you need to remove the bar only when adding more 32-bit memory to the system.

All told, the Deskpro 386's throughput is two to three times faster than that of an 8-MHz AT. As operating systems and applications begin to take advantage of the 386's 32-bit architecture, the potential exists for a tenfold increase in throughput over 80286-based machines.

#### Downward and Outward

In true Compaq tradition, the Deskpro 386 pays strict homage to its PC lineage. Compaq's new machine currently runs both Microsoft's single-task DOS 3.xx and the multitasking Xenix V/286 operating system. The Compaq Expanded Memory Manager (CEMM), a software driver, enables the 386 to use its extended memory as expanded memory. (In-

stead of using memory-management chips, however, CEMM uses the 80386 processor's built-in memory management capabilities to emulate the Lotus/Intel/Microsoft Expanded Memory Specification.)

Also true to form, Compaq chose to copy the AT bus with its 8- and 8/16-bit expansion slots. In Compaq's estimation, only memory benefits from a 32-bit connection. Peripherals like hard disk controllers and I/O ports have speed bottlenecks that lie outside the bus. Exercising its customary caution, Compaq presents a product that reaps the benefits of the 80386 without deviating significantly from the current AT hardware standard.

The 386 is easy to set up. Clear and complete manuals lead you through the installation process. Partitioning and formatting the hard disk is painless, thanks to a utility included in Compaq's DOS. It also automatically copies the DOS disks to a subdirectory called \DOS and installs the Compaq's Enhanced Disk device driver, which supports the 40MB, 70MB, and 130MB hard drives. The 386 Supplemental User Programs disk contains a utility that automates the installation of the Compaq Expanded Memory Manager.

If you require IBM's DOS 3.20, a utility on the DOS 3.20 Support disk prompts you to insert the various disks required to replace the Compaq DOS 3.10 files with IBM's files and places the system files on the hard disk so it can start up DOS 3.20. You must recopy Compaq's BASIC files over IBM's—an essential step if you intend to use a BASIC interpreter on the Deskpro 386—the utility won't do it for you.

#### Promises, Promises

Although Compaq's inherent conservatism and the collective expertise of the Compaq/Intel/Microsoft design triumvirate provide reassurance, the dearth of operating systems and applications that exploit the Deskpro 386's power leaves many questions unanswered.

While Compaq tempts the consumer with the carrot of Xenix V/386 and a yet-to-be-named "advanced DOS"—two operating systems that will exploit the 80386 chip's capacity for both memory-intensive and multitasking operations—at press time the machine is still burdened by DOS's inability to harness the 386. (The 80386 operating systems are

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slated for delivery sometime in 1987.) Xenix V/286, whose command of protected mode enables UNIX users to immediately employ the Deskpro 386 as a multitasking desktop minicomputer, is hardly a solution for DOS users.

Until a revised DOS and 32-bit software arrive, the Deskpro 386 is simply a very fast, expensive AT. At \$6499, the Model 40 costs about \$4000 more than a comparably equipped bargain-basement AT clone and over \$1700 more than Compaq's Deskpro 286 with its 640K RAM and 30MB hard disk. Model 70 is priced at \$7299, and the Model 130 rolls in with a whopping \$8799 price tag.

Because current software is 16-bit and 80286-based, a 16-MHz 80286 machine would process at nearly the speed of the Deskpro 386 without as steep a price. Furthermore, current AT clones running at 8, 10, and even 12 MHz reach 50 to 75 percent of the Deskpro 386's speed and cost far less than 50 to 75 percent of its price (see Figure 1).

However, for programmers, engineers, and others thirsting for raw processing power, the Deskpro 386 is a blessing. With or without a true 80386 operating system, it gives a huge boost to CAD/CAM, artificial intelligence, and virtually any software development. It's faster than any available AT, and the

Compaq nameplate offers more reassurance of compatibility than does any other clone's.

For our review we ran 1-2-3 releases 1 and 2, Symphony, dBASE II and III, Framework and Framework II, Microsoft Windows, Microsoft Word, Word-Perfect 4.1, WordStar 3.30, Ventura Publisher, Side-Kick, Turbo Lightning, SuperKey, ProKey, PC-Talk III, SmartCom, ImageSet, Jet, Flight Simulator, and the IBM PC Network Program without any problems. In fact, the Deskpro 386 was "smart" enough to automatically slow down so that it could load copy-protected software (unlike some AT clones, which require the user to toggle down the speed). Furthermore, with the Deskpro 386 you'll be able to run software designed for 80386 processors the moment such software arrives.

Its capacious hard disk storage and its speed also give the 386 great potential as a capable network file server. Compaq, however, has never been a strong multiuser PC company. It already faces 80386-based server competition from more established network product manufacturers, such as Corvus and Convergent Technologies—although we've yet to see how serious this competition is.

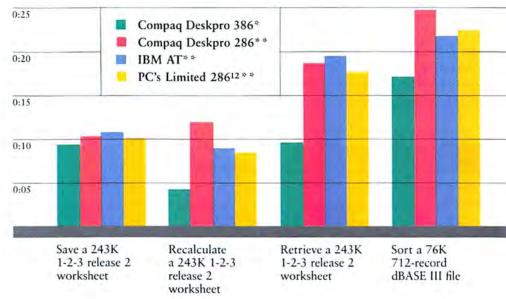
Should single-computer business users, Compaq's bread and butter, sit out the opening act and wait for more software and competition—and for standards? If you manipulate large data bases or spreadsheets and find yourself marking time during

Figure 1: By leaps and bounds. How Compaq's 16-MHz Deskpro 386 stacks up against its own 8-MHz Deskpro 286, IBM's 8-MHz AT, and PC's Limited's 12-MHz 28612 (times shown in minutes:seconds).



<sup>\*\*</sup> Globe test run with IBM Color/ Graphics Adapter, all others with a monochrome adapter

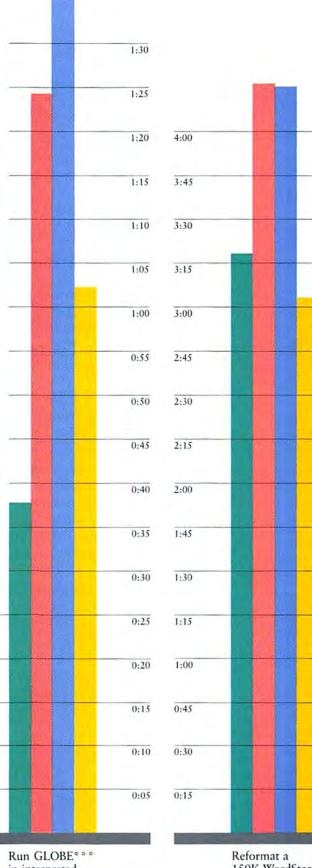
<sup>\*\*\*</sup> A calculation-intensive graphics program



sorts or recalculations, or if you consider yourself a power user, you'll be able to take advantage of the 386's processing speed immediately. But you must decide whether you're concerned that IBM may introduce an incompatible 80386 machine (see sidebar "The Clone Before the Horse").

Et Tu, Big Blue? What about IBM? While Compaq's mantra of downward compatibility is reassuring, no one can ignore the fact that IBM has yet to play its hand. There is much talk that IBM wants more control of the clone-ridden personal computer market and is preparing a machine containing a custom 80386 to tidy up the mess. IBM could also develop its own version of 32-bit DOS for its 80386 machine. Neither possibility is farfetched.

But even IBM isn't free of constraint. No company whose 80386 machine is aimed at the huge DOS market would dare ignore downward compatibility. This axiom holds for any form of custom DOS, such as one that might make special calls to a new graphics board. It's up to software developers to decide which operating system to support-not a simple choice when you want to expose your application to the largest possible number of customers. Will that choice be advanced DOS or a proprietary IBM oper-



Find all prime numbers less than 10,000 in interpreted BASIC

Find all prime numbers less than 1000 in interpreted BASIC

Run GLOBE\*\*\* in compiled BASIC

in interpreted BASIC

150K WordStar document

### The Clone Before the Horse

**Judy Getts** 

Those who've used it rave. Its graphics are as pyrotechnic as the Fourth of July over Staten Island. It runs supersized calculations in the bat of an eye. The Deskpro 386 is a screamer. But for many, enthusiasm is bridled by prospects of what IBM has waiting around the corner.

"My recommendation is don't buy it," says Andrew Seybold, editor in chief of Seybold Outlook on Professional Computing. "The prudent course of action is to wait and see what IBM does."

"We keep hearing from Bill Lowe that IBM is going to use proprietary silicon [in its 80386-based PC]," says Richard Stuckey, a partner in Arthur Andersen & Co.'s management information consulting division. He believes that until the Deskpro 386's compatibility with the upcoming IBM 80386 is assured, its success in the marketplace will be less than smashing.

A spokesperson for First National Bank of Chicago says of the bank's PC power users, "The threat of IBM coming out with its own 80386 machine is probably holding them back from requesting 386 machines. I think they're all waiting for IBM."

Not everyone agrees that all the world will hold out for Big Blue. Nor for that matter does everyone have faith that IBM's 80386-based PC will sufficiently outperform the Deskpro 386 to take over as king of the hill. Says Steve Bosley, an analyst with International Data Corporation (IDC) of Framingham, Massachusetts, "It's clear that Compaq's pulled a real good move, and IBM's going to be hurt by it."

Stella Kelly, an industry analyst with Dataquest of San Jose, California, says, "Ever since Compaq introduced its first PC, I've viewed it as the industry's high-performance leader. I think Compaq could emerge in the future as setting the new standard in the MS-DOS environment."

"It will take a while for people to trust [the Compaq 386]," according to Charles Watts, marketing specialist at MicroAge computer stores, but the chain is nonetheless bullish on the machine: "I don't think it will be hurt by IBM." Watts and others claim that although IBM is likely to come out with a proprietary 80386-based PC that may be incompatible with the first wave of 80386 PCs, the IBM machine's resistance to cloning will provoke one or more alternative standards. "I think Compaq is hoping to establish the other 386 standard," says Watts, "and I think the Deskpro 386 has a far better chance of doing it than the other 386 boxes out there."

"I think we'll see an end to what exists today, which is an incredible situation—a totally homogenous market," says Robert Carr, chief scientist at Ashton-Tate. He calls the MS-DOS standard "an aberration, not a normal

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state." Continues Carr, "I'm not saying we're going back to 20 or 30 different architectures but rather 2 or 3, and Compaq is a front-runner for one of those. They've done a good job with the Deskpro 386."

According to Seybold and others, IBM—as well as such companies as DEC and AT&T—appears to be waiting to introduce an 80386 PC until it can harness the full power of the 80386 with a chip-specific operating system. Such a machine will probably not be introduced until the latter half of 1987. Until then, says Michael Goulde, a market analyst for The Yankee Group in Boston, Compaq has "about an 18-to-24-month window" in which to establish the Deskpro 386 with the unique audiences it has targeted.

The market niches Compag is carving out for its 386 center on power users: spreadsheet jockeys, engineers, scientists, software developers. "It's not a shot at the heart of the PC market," according to IDC's Bosley, "but rather at the high end." He adds, "The potential market for such a high-end product is not very large, although I think Compaq will sell a lot of units." Arthur Andersen's Stuckey believes that "as they don't expect to produce the machine in vast quantities and they remain the predominant supplier for people who want a superfast PC, they'll do very well with it."

According to MicroAge's Watts, the CAD/CAM field has the greatest market potential. "We think [the Deskpro 386] will give some real competition to graphics workstation sellers. It will pit Compaq against Sun and Apollo rather than against IBM." As for the broader PC market, Watts says the machine will find its calling as a file server on local area networks (LANs). "It just happens that Novell's operating system is capable of utilizing some of the speed enhancements of the 80386 chip."

Among micro managers polled, none were too keen on the thought of the Deskpro 386 as a corporate desktop machine, even for the company power users. "It's very expensive and most people don't need that kind of power," says Jeffrey Ehrlich, manager of product technology at General Electric of Bridgeport, Connecticut. "There might be a few people around for whom one of the high-performance ATs won't do the job, for one reason or another, and who also have the money to spend, but they're few and far between." Says one micro manager, "We don't need [the Deskpro 386] for our power users. They can get by."

Cost was the reason most often cited for lack of interest. "We're trying our hardest to cut down on the cost of equipment on each user's desk, not beef it up," says another manager. A second reason given is the fact that the Deskpro 386 currently outperforms ATs in speed only, and is

(continues)

not the start of a new generation of machines.

Although one micro manager states adamantly, "We buy only from IBM-period," none are intimidated by Compaq's sailing into waters as yet uncharted by IBM. "We all use Compaqs," says one manager, "so why should we care?"

Several micro managers reveal that their companies are considering using the Deskpro 386 as a LAN file server rather than a desktop computer. One manager informs *PC* World that, although his company plans to use 80386-based PCs in LANs, "We don't see the initial round of desktop 80386s as satisfying our long-term needs." Only when the 80386 has an operating system that provides multiple sessions on top of DOS, he believes, will his company take the machine seriously.

"The Deskpro's market will remain a niche," says Stuckey, "until it gets an operating system, until it's something more than a very, very fast PC, until it becomes clear whether it's compatible with the IBM version." As to what lies ahead for the Deskpro, only time and software will tell.

And what does Big Blue think of being beaten to the bus on the 80386? What machines of its own may be in the offing? The company, as usual, is keeping mum. "Ask me about our current product line," a spokesperson proffered cheerily.

Judy Getts is a Contributing Editor for PC World.

ating system? Big Blue will have to offer developers something awfully tempting to woo them away from the DOS standard. Even if it comes out with a proprietary machine, IBM will, at worst, establish a second set of 80386 standards—and software developers will more than likely try to support both.

### The Power and the Chip

When 80386 machines-Compag's or IBM'shit their stride, they will leave 80286 machines far behind. Its microcomputer heritage notwithstanding, the 80386 is, in effect, a minicomputer. It runs at 4 million instructions per second compared to the IBM PC's 330,000. With a maximum addressable physical memory of 4 gigabytes-256 times that of the ATand a maximum virtual memory of 64 terabytes (over 70 quadrillion bytes)-it will give a huge boost to personal computer incarnations of artificial intelligence, to desktop publishing, and to such graphics-oriented applications as CAD and CAE (computer-aided engineering). Even single-user applications written for the 80386 will benefit, because programs will be able to include memory-intensive artificial intelligence, work with gargantuan data files directly in RAM, and perform background processing-a word processor could repaginate while you edit, for example.

Intel's 80386 engine operates in two modes: real and protected. Real mode emulates the familiar 8086/8088 world, running DOS and the multitude of applications written for it. This mode maintains the 8086's limited 1MB addressing and provides no memory-protection features. The Deskpro 386 simply speeds up real-mode features. Protected mode, however, is the basis for multitasking, multiuser, and multiple-operating-system configurations. An 80386 operating system will run several applications concurrently while ensuring that none encroaches on another's code or data.

Protected mode offers three basic environments: native, segmented, and virtual 86. Native awaits a true 80386 operating system to unleash the full power of the chip—that is, protected multitasking, 64-gigabyte virtual memory addressing, and memory management. Segmented describes the environment of the 80386 that's driven by an 80286 operating system; that is, 16MB memory addressing and 64K segments. Virtual 86 enables multiple realmode applications to run simultaneously in separate 1MB partitions. With the appropriate software, the 80386 can host all three environments concurrently.

### Super Shells

While 80386 operating systems have yet to appear, operating system shells, also called host or control software, exploit the 80386's virtual mode. They don't include all the capabilities of a full-blown 80386 operating system—such as running 32-bit applications and handling multimegabytes of data—but they do run today's conventional and expanded-memory applications concurrently.

A shell, however, is an interim solution. Its most insistent problem is one common to more conventional applications integrators, such as Top View, GEM, and the original version of Desquiew: Different applications store data in different formats, making it difficult to pass data-especially graphics-from one application to another. Without standard data formats, you can't readily cut and paste data from, for example, a 1-2-3 worksheet into a Microsoft Word document, as is possible with the Apple Macintosh. Control software won't solve this problem (although most versions let you teach them each application's cut-and-paste commands to facilitate data exchange). Nor will such shells offer standard window- or userinterface routines. Most important, however, control software doesn't provide a complete operating system on which software developers can design their applications and master the 80386's memory and multitasking abilities.

### Covering the Bases

While the rest of the PC world catches up with the Deskpro 386, it remains a machine with much promise but limited practicality. Power users, of course, profit immediately, putting the 386's skills to work in power-hungry applications such as artificial intelligence and networks, and the everyday user is beginning to feast on multiple applications, each running within its own 1MB partition. However, 1988 will be well under way before we see applications based on a true 80386 operating system.

Compaq, of course, is fully aware of all this. It has a machine that runs—at lightning speed—virtually every DOS and Xenix application thrown at it and will be first in line when more sophisticated operating systems arrive. That sounds like Compaq through and through.

Karl Koessel is the Technical Editor and Reed McManus is an Associate Editor for PC World.

Compag Deskpro 386 Compag Computer Corp. 20555 FM 149 Houston, TX 77070 800/231-0900, 713/370-0670 List price: 1MB RAM, 1.2MB floppy disk drive, enhanced keyboard, 40MB hard disk (Model 40) \$6499; with 70MB hard disk (Model 70) \$7299; with 130MB hard disk (Model 130) \$8799; color monitor \$799, enhanced color graphics board \$599, dual-mode monitor \$255; video display controller board \$199; 1MB to 2MB 32bit memory expansion board \$849, 1MB memory upgrade kit \$549: 4MB to 8MB 32-bit memory expansion board \$2999, 4MB memory upgrade kit \$2699; 512K to 2MB 16-bit memory expansion board \$475, 512K memory upgrade kit \$150; half-height 360K floppy disk drive \$225, half-height 1.2MB floppy disk drive \$275, half-height 40MB hard disk \$2199, half-height 40MB hard disk backup \$799; 8-MHz 80287 coprocessor \$349; MS-DOS version 3, BASIC version 3, and reference guides \$85; Xenix system V/286 base operating system \$599, Xenix system V/286 software development system \$599, Xenix system V/286 text processing system \$199; Deskpro 386 technical reference guide \$149; enhanced color graphics board technical reference guide \$49

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# Fast-Talking Modems

In communications, faster is almost always better. New modems from Microcom and DCA can easily vault your data beyond 9600 bps—but are they worth the price?

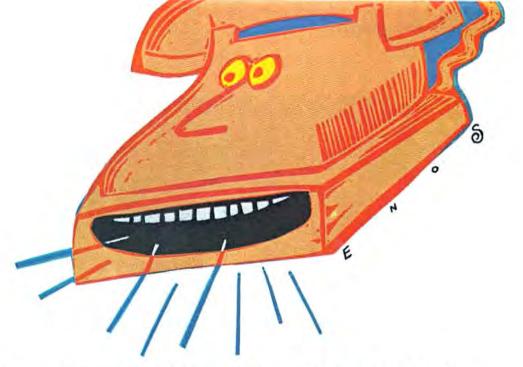
David McCune

Communications users raised on the putt-putt performance of 300- and 1200-bps modems got a welcome jolt last year with the introduction of affordable 2400-bps modems. Unlike many state-of-the-art products, 2400-bps modems are reliable, are compatible with existing software, and deliver twice the performance of their predecessors

for just a few dollars more. (For more information on 2400-bps modems, see "Safe at Any Speed?" PCW, May 1986.)

But before the merits of 2400bps communications were properly assessed, Electronic Vaults, Racal-Vadic, and a handful of other companies jumped into the market with 9600-bps offerings. These speedsters don't exactly live up to specifications (transmission rates average 7000 bps), but they are godsends to users who regularly transmit massive files, engage in lengthy PC-to-PC sessions, or edit files on remote systems.





from Digital Communications Associates (DCA), serious tele-communicators can now push the envelope beyond 9600 bps. Aside from slinging data across conventional phone lines with amazing alacrity, these external modems also solve some of the more net-tlesome problems associated with early 9600-bps modems, such as sluggish remote echo and the in-ability to work at 300, 1200, and 2400 bps.

No Cheap Thrills
Of course, high-speed modems aren't for everyone. If you typically gather on-line letters from MCI or browse commercial on-line data bases, even a 2400-bps modem might be overkill. Swiftness doesn't come cheap, either. At \$2395, the Fastlink is more expensive than many personal computers.

Although both modems rely on the Hayes AT command set for 300-, 1200-, and 2400-bps communications and can readily connect with CompuServe, MCI, and other low-speed services, popular error-checking protocols such as XMODEM and Kermit can't be used. At transmission rates above 2400 bps, you forgo familiar programs such as *PC-Talk III* and *Smartcom II* and say good-bye to the hail-fellow-well-met nature of standardized communications. Each modem uses special transmission techniques and proprietary error-checking protocols for high-speed communications; a Fastlink or an AX/9624c must be paired with a modem of identical make. If you're considering either modem, remember Noah—be prepared to do everything in pairs.

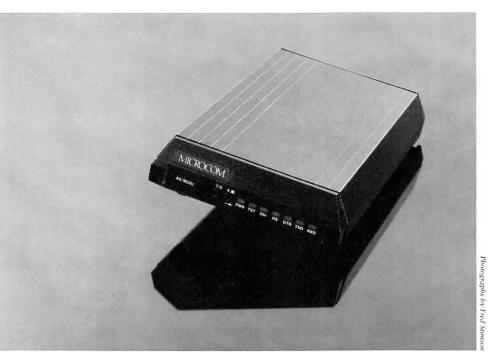
Still, if you frequently transfer large data files over long-distance phone lines, high-speed modems can save you a bundle. For example, my company sends 1MB graphics files to ten different sites around the country every night.

At 2400 bps, the transfers take nearly 13 hours. With a high-speed modern swinging along at 12,000 bps, the same job requires less than 3 hours. Over the course of a year, the line-charge savings amount to almost \$30,000.

High-speed modems also make remote document editing and graphics manipulation bearable. Link a PC to a remote VAX minicomputer with a 1200-bps modem, and you'll discover that deleting a single line in a text file takes 8 or 9 seconds. Even with a 9600-bps modem, "repainting" the screen may take 1 or 2 seconds. Attach an AX/9624c or a Fastlink to your PC and you'll never drum your fingers again.

Keep in mind, however, that manufacturer speed claims should be viewed with healthy skepticism. The AX/9624c and the Fastlink, which use radically different techniques to vault over the 9600-bps barrier, are rated at 19,200 bps and 14,000 bps, respectively. But as our benchmarks clearly indicate, typical performance rates can be significantly lower.

Configuration and Control
The AX/9624c's sleek black
case ought to win an industrial
design award. Spanning the front
panel are seven LEDs and two
buttons, one button for voice/data
switching and the other for setting
the mode to asynchronous or synchronous. Like most Hayescompatible modems, the LEDs indicate power on, data terminal
ready (DTR) status, on/off hook



Although Microcom's stylish AX/9624c can't achieve its advertised 19,200-bps transfer rate, it leaves most modems in the dust.

status, whether data is being received or transmitted, and current transmission speed. The voice/data button is a welcome feature if your PC and modem share the same phone line, but switching back and forth between modes will sometimes break the connection—a pesky inconvenience.

Popping off the modem's faceplate reveals a familiar block of DIP switches. Here you choose auto-answer, set the DTR status, and indicate if the modem should respond to English or numeric commands. One very important switch enables the AX/9624c to recognize the Hayes 2400 AT command set and thus work with the existing library of PC communications software. (Both the AX/9624c and the Fastlink add to the Hayes command set for highspeed communications.)

The back of the modem sports an RS-232C serial port, connections for a phone line and handset, a speaker volume knob, a handy Table 1). Oddly enough, the AX/9624c doesn't have a power switch. You simply plug it in to turn it on.

Of course, you can't just connect this state-of-the-art modem to your PC and start sending files. You must first grapple with a bewildering array of configuration settings to get the AX/9624c to work amicably with your communications package. You can fiddle with the DIP switches or, in truly high-tech fashion, configure the AX/9624c with software commands. If you opt for the latter approach, you can either issue the appropriate string of AT commands every time you turn on the AX/9624c or store the settings in the modem's battery-powered CMOS memory. (The rechargeable battery is not replaceable, but Microcom claims it will last far longer than the modem.) You can instantly save the current configuration by typing AT&W; type AT\S and all the resident settings are displayed. Software commands override DIP switch and CMOS settings.



Modem mavens can probably install either unit and make a successful connection in less than ten minutes. Novices, however, should definitely seek help.

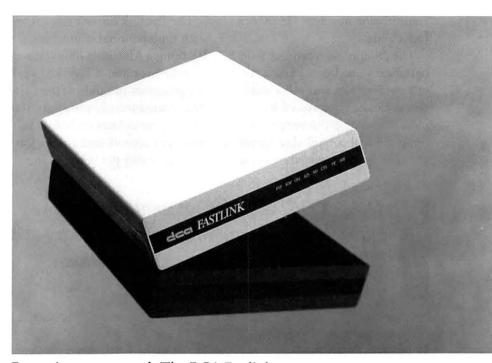
reset button, and a second block of DIP switches, which allow you to specify such high-speed functions as flow (to prevent outgoing data from flooding the modem's buffer), the speed of the serial port, and whether the modem should adjust to the transmission speed of a connecting modem (see Some commands, such as ATE1 (echo on) and ATH (hang up), will be familiar to anyone who has used a Hayes or compatible modem. Commands specific to the AX/9624c's high-speed operations will naturally seem a bit cryptic.

For example, AT\N3 triggers the auto-reliable mode, which directs the modem to automatically determine if the modem on the other end of the line is an AX/9624c. Luckily, the user manual is thorough and well organized—to the point of showing you which levers to pull or which AT commands to issue for *PC-Talk III* and *Crosstalk XVI*. The manual also includes a table listing DIP switch settings and their software equivalents, and offers concise directions on using other features.

If Microcom's AX/9624c looks like a sports car, then DCA's Fast-link resembles a truck. The box is too ungainly (12.6 inches by 8.6 inches by 2 inches) to perch on top of a system unit next to a monitor, but no matter. As soon as the Fastlink's clattering fan kicks in, you'll want to relocate it.

While aesthetics are desirable, they're hardly crucial. The Fastlink is sturdy and designed to get the job done. Like the AX/9624c, the Fastlink includes a front panel with eight LEDs and the requisite backplane connections for a serial port, phone line, and handset; it's also compatible with the Haves Smartmodem 2400 AT command set. DIP switches are absent, so all settings (including a collection of DCA high-speed functions) must be issued with AT commands before a session, or stored in the Fastlink's nonvolatile EEPROM. As with the AX/9624c, a single AT command lists all stored settings.

The Fastlink's complete reliance on software for control can be exasperating. For example, instead of pressing a simple voice/data button, communicators on both ends must issue the ATG command simultaneously and pick up



Expensive at any speed: The DCA Fastlink costs as much as some computers, but it can't match the AX/9624c's performance.

their receivers at just the right moment. Since the modem lacks a speaker knob, adjusting the volume involves typing ATS61 = followed by a number from 0 to 255. However, the designers deserve some credit—at least they included a power switch.

Modem mavens can probably install either unit and make a successful connection in less than ten minutes. Novices, however, should definitely seek help. Setting DIP switches or their software equivalents is no trivial endeavor, and the Fastlink user manual lacks explicit instructions for configuring the modem for popular communications packages. Note, too, that manuals accompanying both mo-

dems brush by communications fundamentals and give scant coverage to flow control, carrier detect, and other concepts.

Old Tricks, More Bits Although the AX/9624c can effectively shuttle data at rates topping 16,000 bps, within its chic box lies the same ubiquitous Rockwell chip set used by almost all 9600-bps modems. Microcom's secret? Data is compacted as it is transmitted, and then restored at the other end-one important reason an AX/9624c must be on both sides of a high-speed link. The technique is similar to filecompression methods employed by programming languages as old as COBOL and utilities as wet behind the ears as SOZ. The entire process is invisible to the user, but the results are plain to see-data

transmission averages 12,000 bps (see Figure 1).

The compression process works better on some kinds of data than others. Text files and 1-2-3 worksheets can be compressed by almost 40 percent, but binary files (graphics and compiled programs) can only be compressed by about

The Fastlink doesn't rely on such time-honored stratagems. Working a Motorola 68000 microprocessor and a TMS320 signal processor in tandem, the Fastlink simultaneously transmits 400 carriers, modulates each at 7.3 times per second, and encodes as many as 6 bits per wave. If you

The AX/9624c lacks automatic speed fallback and apparently compensates by blithely refusing to make a connection if a phone line is questionable.

15 percent. Purely random data (such as high-resolution digitized images) cannot be compressed at all.

The AX/9624c is remarkably reliable, even over the dirtiest phone lines. Much of the credit belongs to Microcom's adoption of a conservative transmission technique. Like most 9600-bps modems, the AX/9624c transmits data on a single carrier signal at 1700 Hz-roughly at the middle of the phone line's 300-to-3400-Hz bandwidth. Using a sophisticated encoding technique, the modem can pass 2400 "symbols" a second, each symbol representing 4 bits, for throughput equaling 9600 bps. (Microcom's data-compression routines effectively boost this number.) Because most telephone line impairments tend to distort the low and high frequencies of the bandwidth, the signal (and the data) usually escape corruption.

factor in the Fastlink's error detection/correction mechanism, transmission theoretically approaches 14,000 bps.

Unfortunately, the real world is fraught with electromagnetic perils. Since many of the Fastlink's carriers reside at lower frequencies, a small increase in line noise can easily mangle data. When the Fastlink senses a dirty line, it automatically transmits fewer bits over the weakest carriers. Your data is secure, but performance suffers accordingly—a point illustrated in Figure 1.

Watching Data

Nonetheless, reliable data transmission is what modems are all about. Because data errors multiply like *E. Coli* when transmission speeds climb, both the AX/9624c and the Fastlink have built-in cyclic redundancy check (CRC) error correction. CRC is far more accurate than the primitive checksum error correction used by the XMODEM protocol found in most popular communications

packages. Instead of examining one byte at a time, data is grouped into blocks. A number is generated from a complex polynomial computation based on the values of the bytes making up each block. If the computation performed on the transmitted block at the other end doesn't yield the same number, the block is sent again.

Data block size naturally affects a modem's performance. Sending small blocks means that more CRC numbers must be calculated and compared. On the other hand, if an error crops up, a small block can be retransmitted more quickly than a larger block. Both modems interactively optimize performance by sending large blocks over clean phone lines and proportionally smaller blocks as line quality erodes.

Of course, shuttling data safely from point A to point Z involves more than fancy error-checking systems. A modem's ability to automatically downshift or "fall back" to less error-prone speeds as a phone line gets noisier can be crucial. The Fastlink is very adept at making this kind of adjustment, dynamically dropping transmission speed in 16-bps increments until data is assured safe passage. The AX/9624c lacks this feature and apparently compensates by blithely refusing to make a connection if a phone line is questionable. Depending on the modem's mood, you may have to try three or four times before securing a connection. But once digital hellos have been exchanged, the AX/9624c will hold on to a line like a bullterrier. (Microcom's engineers recognize the usefulness of

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automatic speed fallback—the company claims that a recently released version of the AX/9624c supports fallback to 7200 and 4800 bps.)

Going With the Flow Data can flow out of a PC's serial port only at set speeds. DOS's MODE command restricts the port to an upper limit of 9600 bps, but with a little coaxing from the proper communications program, you can easily move data at 19,200 bps. As far as the PC is concerned, between the two transfer rates lies No Modem's Land-and this presents problems for the AX/9624c and the Fastlink. Both modems transfer data in excess of 9600 bps, so the PC's serial port must be configured at 19,200 bps. But as our tests show, the AX/9624c and the Fastlink peak at 16,393 and 13,699 bps, respectively. Without some kind of intermediary, the PC would easily drown both modems in data.

The burden, as you may have guessed, falls to the communications program. To stem the cataract of bytes from the PC, a communications program must be able to react to the modem's "flow control" requests and temporarily suspend incoming data. Hardware flow control, which governs both the transmitting computer and the receiving modem, is preferred because it's faster and safer than software methods such as XON/ XOFF. (Many communications programs can't always distinguish an XON or XOFF from data.) Not all high-speed communications packages support hardware flow control; Microcom and DCA recommend that users turn to Crosstalk, Crosstalk-Fast, Relay Gold, and Carbon Copy. You

Table 1: Two high-speed modems feature by feature

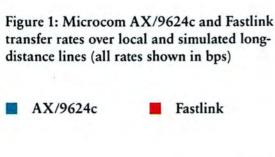
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eaker volume knob	Two-wire leased-line operation	0	0
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pice/data button	Speaker volume knob	•	
	Voice/data button	•	

Added just before press time

<sup>&</sup>lt;sup>2</sup> Emulated

<sup>3</sup> A, B, C, D, #, \*

<sup>4#</sup> 

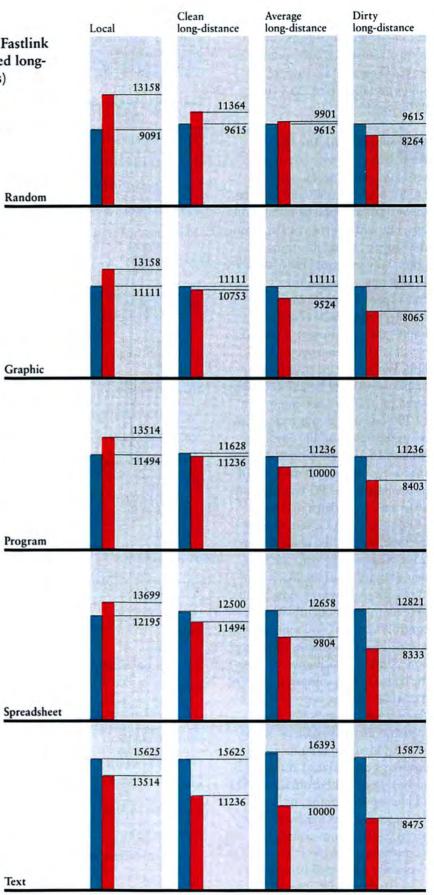


might also consider *Professional-YAM* from Omen Technology, which supports high-speed error correction and hardware flow control.

High-Speed Tests
It's no surprise that both modems work well on relatively clean local phone lines. But how do they fare on the often nasty long-distance connections populated by crackling, electronic snowstorms, echoes, or other aural clutter? To find out, *PC World* subjected both modems to a series of tough tests using the TAS 1010 Voiceband Channel Simulator from Telecom Analysis Systems.

The TAS 1010 can recreate the good, bad, and all-too-ugly nature of long-distance connections. With a pair of identical modems plugged into the simulator, data was transmitted to and fro while impairments were selectively added to reproduce conditions typically found on clean, average, and dirty lines. The same tests were also conducted over two real telephone lines on the same local exchange.

To arrive at the proper settings for each line type, we turned to the 1982-1983 AT&T Bell Labs' *End Office Connection Study*. AT&T measured ten impairments,



such as white noise, signal loss, amplitude jitter, and phase jitter, on 6500 pre-divestiture long-distance phone lines. The study revealed, for example, that a clean line had a maximum white noise level of 30 decibels (dBA), an average line a level of 32 dBA, and a dirty line a level of 35 dBA.

Once all the impairments were programmed into the simulator, five different 100,000-byte data files were pumped through each pair of modems. The 100,000-byte files consisted of an ASCII text file, a 1-2-3 worksheet, a binary program file, a digitized video image, and a file of random bytes. Transmissions were timed from the instant the first byte was sent, to the moment the last byte arrived at the receiving PC. Transmission rates were derived by dividing 100,000 by the elapsed times.

It's clear from the test results summarized in Figure 1 that the AX/9624c is the speed leader on noisy lines. The modem's filecompression feature works particularly well on text files-though perhaps not as well as the company's advertising would lead you to believe. Even on a crisp local line, transfer rates never approach the modem's 19,200-bps rating. The tests also show that while the Fastlink generally beats the AX/ 9624c on unfettered local lines, performance drops sharply on almost any long-distance connection. Examined on a price/performance basis, these rates may prove unacceptable. For less than half the price, a 9600-bps UPTA-96 modem from Electronic Vaults often performed only 20 percent slower than the Fastlink when run through the same gauntlet.

Despite its superior performance, Microcom's AX/9624c has its drawbacks. Although it is relatively immune to the distortions that flummox the Fastlink, any disruption to the AX/9624c's single carrier can have calamitous results. As we have seen, the AX/9624c can be terribly fussy about its connections. And its lack of automatic speed fallback is a disadvantage, as amply demonstrated by our tests. The "low frequency envelope delay" impairment had to be kept artificially low when testing the AX/9624c for average and dirty lines. When the impairment was raised to realworld levels, the modem refused to recognize the line. A spokesperson for Microcom contends that the original impairment levels were set higher than those specified in the Bell Labs studyand that this impairment would not occur often enough to significantly affect the AX/9624c's performance. However, both the Bell Labs study and tests over simulated and real long-distance lines belie these claims. Of course, if Microcom includes an automatic speed fallback function as planned, these objections may become superfluous.

Life in the Fast Lane
In any case, high-speed communications should be approached with caution. Getting into the fast lane can be expensive. Protocol standards don't yet exist, and that means buying at least two identical modems. And when standards emerge, your pricey investments could become obsolete. Before you leap, consider your needs carefully. A cheaper 9600-bps modem or even a 2400-bps Hayes-compatible modem may be the economically sound choice.

If you need something beyond 9600-bps communications, then the AX/9624c is a slightly better bet. It's cheaper than the Fastlink, offers some convenient features (such as a voice/data button, two methods of configuration, and synchronous communications), and can stand up to most impairments without flinching.

David McCune is president of The Proteus Group, a consulting firm in Brooklyn, New York.

AX/9624c Microcom 1400 Providence Hwy. Norwood, MA 02062 617/762-9310 List price: AX/9624c \$1799, AX/9612c \$1599 (does not include 2400-bps support) Requirements: RS-232C serial port

Fastlink
Digital Communications
Associates, Inc.
100 Alderman Dr.
Alpharetta, GA 30201
404/442-4000
List price: \$2395; internal
version \$1995 (includes
Crosstalk-Fast)
Requirements: RS-232C serial
port

TAS 1010 Voiceband Channel Simulator Telecom Analysis Systems, Inc. P.O. Box 635 86 Birch Ave. Little Silver, NJ 07739 201/530-9242

# Mainframe Copycats

A terminal emulator bluffs its way into the mini/mainframe game with a host of features that take the frustration out of asynchronous terminal emulation. PC World looks at five programs that let a PC imitate DEC's popular VT100 series terminals.

Wayne Rash, Jr.

Linking a PC to a minicomputer or mainframe via a terminal emulation program seems like a dream too good to come true. Not only would you have access to the massive amounts of data and the staggering power of large computer systems, but you could also maintain the power and privacy that only your independent desktop computer can give you.

To raid the company mainframe you could, of course, hook up a host-compatible terminal and ignore the PC altogether. Dumb terminals, which simply allow you to send and receive data from a host computer, or intelligent terminals, which enable you to edit and manipulate data along the way, are readily available from any data processing department's storeroom shelf.

But having your PC manage the task has marked advantages. You retain full use of your PC and can

manipulate mainframe data without jockeying for mainframe access. And you gain a few more inches of desk space when you control two computers from just one keyboard.

#### Poker Face

The essential function of an emulator is to mimic the characteristics of the host system's dedicated terminal, hoodwinking the host computer into thinking it is working with one of its own. Terminal emulators range from barebones teletype impersonators to more complex programs that mirror every function of an IBM or DEC terminal. To earn its keep, though, your terminal-emulating PC must be more than a very expensive keyboard. You must be able to download mainframe or minicomputer data to the PC, manipulate it with PC applications, and return it to the host computer without skipping a beat. The DEC VT100 terminal emulators reviewed here-programs from Persoft, KEA Systems, Polygon, Coefficient Systems, and General



Micro Systems—are communications packages as much as they are terminal impersonators.

There are nearly as many types of terminals as there are minicomputers and mainframes. Fortunately, nearly all large systems work with terminals other than their own dedicated types, most often with members of DEC's ubiquitous VT100 series. This prevalence is due to the overwhelming popularity of such VT100-compatible minicomputers as the VAX and to the VT100's role as the model for ANSI (American National Standards Institute) standards.

The VT100-compatible host computers communicate asynchronously, the most common

way microcomputers exchange data. Your terminal-emulating PC connects to the host through the PC's serial port and either a modem or a cable. All you need to add is a relatively inexpensive software solution (\$200 on average). Most terminal emulators for IBM mainframes, on the other hand, rely on synchronous communications, which provides greater transmission speed but requires more sophisticated—and more expensive—interface and modem technology.

Successful Mimicry Despite the simplicity of asynchronous communications' physical connection, the software's task of emulating a sophisticated terminal like the VT100 remains complex. The mainframe software expects its terminals to exercise function keys unknown to the PC and to display graphics, formatted text, and special character attributes such as boldface, underlining, and blinking. A PC can do all this, of course, but in ways wholly incompatible with the host computer. Since the PC is tapping into the host computer, the host calls the shots, and the PC copies the host's terminal features.

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An accurate terminal emulator must master the host's display capabilities, character attributes, and keyboard functions. Besides simply displaying text, it must coordinate and translate all screen formatting and must tell the PC

**Key Problems** 

The thorniest problems for VT100 emulation, however, can be found right at your fingertips. The PC and AT keyboards differ greatly from the VT100 keyboard in arrangement, function, and

Especially helpful-and especially difficult to implement-are key arrangements that precisely mirror the emulated terminal (see Screen 1). Most minicomputer and mainframe program documentation assumes that the user is seated at a dedicated terminal, not at a PC. The more accurate the emulator's arrangement, the fewer mental gymnastics you need to use programs.

Unfortunately, all of this careful keyboard arrangement goes for naught if the keyboard itself changes. This is exactly what happened when IBM offered its "enhanced" 101-key keyboard for the XT and AT. The function keys are spread across the top of the new keyboard, and the editing keys and cursor arrow pad are now separate. (This arrangement is

very similar to the key layout on



Especially helpful—and especially difficult to implement—are key arrangements that precisely mirror the emulated terminal.

where to place text on the screen and what the text should look like. Many terminal emulators support color monitors, Tektronix or DEC REGIS (Remote Graphics Instruction Set) graphics language, and special text requirements such as double-high, double-wide, and foreign language characters.

Because the IBM Color/Graphics Adapter (CGA) does not support underlining, that text mode poses more of a challenge. Most emulators can provide underlined text on monochrome monitors but can only simulate it on color monitors (by changing the color of the text). A few programs simply ignore underlining altogether. All the emulators we tested provide actual or simulated underlining.

The PC does not duplicate a VT100's smooth text scrolling, but some emulators have found ways to provide it.

number of keys. An emulator must duplicate all of the host computer's keys in such a way that the user can make quick sense of the new arrangement, and it must enable the user to remap the keyboard to accommodate differences

*Individual failings were generally minor.* Of course, if you regularly need a feature that doesn't work, you may feel differently.

in PC, AT, and various clone keyboards. For example, most emulator packages make the PC's and AT's numeric keypads do double or triple duty to compensate for the fact that number and arrow functions are physically mapped into the same keys. The VT100 provides separate arrow keys, which let a large system's applications use the number keys for special functions.

Don't underestimate the importance of good design in keyboard arrangement, since that factor alone can determine user acceptance. Common key combinations should be relatively easy to invoke. the VT220 terminal, DEC's enhancement of the VT100.) Unfortunately, none of the emulators we reviewed take advantage of the new key arrangements.

File Transfer

File transfer protocols enable you to share data among PCs and host computers. With a PC-based word processor you may create a document that, as part of a larger document, needs to go to the mainframe for revision and printing, or you may need to download

financial data from the host computer's vaults. In addition to performing rudimentary ASCII-text file transfers, terminal emulators include proprietary binary file-transfer programs or the public domain Kermit or XMODEM transfer protocols. The most complete systems support all three transfer methods, enabling you to adapt the PC to the method required by any host.

Use and Convenience
An emulator's mainframe
bluff works best when program
features smooth the rocky road
between two unrelated computer
systems. Installation should be
quick; setup files for multiplesystem configurations should be
easy to create and save; frequently
used command sequences like automatic log-on should be executable from a macro (or soft key);
and either commands or hot keys

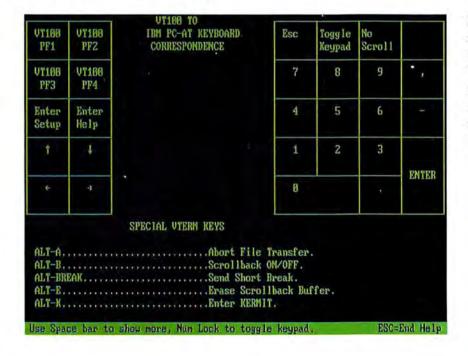
should allow you to move easily from the host computer to DOS without losing your communications connection. Finally, the program should provide well-written manuals and extensive on-line help screens for users caught between two systems.

The Tests
Keeping these criteria in mind, PC World tried out five
VT100-emulator packages with a
DEC VAX 8600 minicomputer running the VMS 4.3 operating system and Data Processing Design's word processor, Word-11. In addition, we tested these programs with three on-line systems—CompuServe, MCI Mail, and the Capital PC User Group Bulletin Board. At the PC end of the test was a Zenith Z-248 AT

clone with a Tecmar EGA board and a Hayes Smartmodem 2400.

All the programs emulated their host terminals well, although none passed every features test (see Table 1). Individual failings were generally minor. Of course, if you regularly need a feature that doesn't work, you may feel differently.

Persoft's SmarTerm 240 is an easy-to-use, flexible, and very effective emulator. It emulates DEC's VT100 and VT220 text terminals and the Tektronix 4010/4014 and DEC VT640 graphics terminals. SmarTerm 240 also supports DEC's REGIS graphics language. Even when performing the full-screen editing of Word-11 version 4–a demanding task for an emulator—SmarTerm



Screen 1: Vterm III shows on screen exactly how the PC's keys correspond to those of the VT100. <NumLock> toggles the functions of the keys on the numeric keypad; when engaged, the keypad performs VT100 functions.

worked well. It displayed the program's screen correctly, properly handled all characters, and performed all required keyboard functions.

The only problems cropped up when we used an automatic log-on sequence and when we tried to download on-line data using the Kermit file-transfer protocol.

SmarTerm can link soft-key macros, a sophisticated talent that permits you to automate intricate procedures such as log-on (see Screen 2). However, during our tests, automatic log-on intermittently suffered a timing problem that prevented the host from identifying the masquerading PC as a terminal within the time allotted.

According to Persoft, the latest version of *SmarTerm* resolves this problem.

Persoft's program is generally easy to use, but it has some glitches. For example, although *Smar-Term* is designed to be installed automatically, in reality the automatic installation failed, forcing us to copy files using the program's semi-automatic mode.

More promisingly, novices can quickly set system configuration parameters using pull-down menus (see Screen 3). Experienced users can bypass the menus and group their parameters in a single menu called—no kidding—My Favorite Parameters.

The manual is easy for both seasoned and inexperienced users to follow. It is saturated with screen shots and examples of program operations. In addition, *SmarTerm* includes extensive on-line help files.

Zstempc-VT100 KEA Systems provides one of the most flexible VT100 terminal programs available. It lets you emulate VT100 series terminals or an IBM 3270, and it also permits you to reconfigure your PC with a Dvorak keyboard. Sadly, the KEA documentation is loaded with technical jargon that inexperienced users will be hard-pressed to untangle, and all users will long for clearer explanations. For example, the section explaining how to create an automatic log-on stumped even KEA's technical support staff. (After considerable head-scratching, KEA eventually did provide the needed log-on sequence.) The company assured PC World that the next version of the program, due out by press time, would not have these documentation problems.

Screen 2: SmarTerm 240's softkey setup screen automates complicated command sequences. Here, automatic logon to CompuServe, including pauses for system responses, is reduced to two keystrokes. Each soft key is limited to fifty characters, but several soft keys can be linked to create one giant soft key.

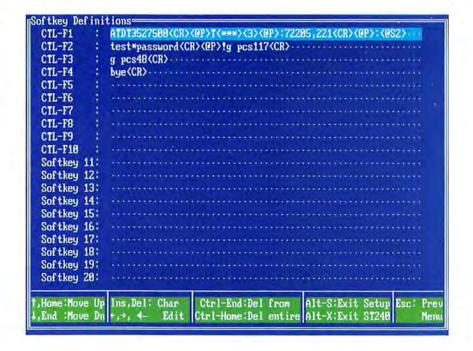


Table 1: VT100 terminal emulator features

	Persoft SmarTerm 240 Version 1.1	KEA Systems Zstempc-VT100 Version 2.6	Polygon poly-COM/240 Version 1.12	Coefficient Systems Vterm III Version 1.4	General Micro Systems PC4010 Version 2.0
Terminals emulated	VT52 VT100/102 VT220 VT125 VT640 Tektronix 4010	VT52 VT100/102 IBM 3270	VT52 VT100/102 VT220 VT125 VT240 VT241	VT52 VT100/102 Tektronix 4010	VT52 VT100/102 Tektronix 4010
Graphics software supported	REGIS Tektronix		REGIS	Tektronix	Tektronix
Binary transfer protocol	XMODEM Kermit proprietary	XMODEM Kermit	proprietary	XMODEM Kermit proprietary	Kermit
User-programmable soft keys	yes	yes	yes	yes	yes
Automatic log-on	yes	yes	no	yes	yes
Multiple configurations	yes	yes	yes	yes	yes
DOS access	command	command	hot key	hot key	command
Smooth scroll	no	yes (EGA)	no	no	no
Screen colors	16	3 (EGA) 8 (CGA)	white with monochrome mode, green with graphics mode	8	16
Underline	simulated	true (EGA)	simulated	simulated	simulated
Double-high, double-wide characters	true with graphics version, simulated with text version	yes (CGA, EGA)	no	simulated	no
Maximum bps rate	19,200	38,400	9600	19,200	9600
On-line help	extensive	limited	limited	good	limited
Manual	excellent	poor	fair <sup>2</sup>	good	poor <sup>2</sup>
Copy protection	no	no	no	optional	yes
Ease of installation	automatic for PC, good for AT	good	good	good	fair <sup>3</sup>
Ease of use	very good	fair	good	good	good

<sup>&</sup>lt;sup>1</sup>A separate package, Zstempc-4014, provides VT640 and Tektronix 4010/4014 graphics emulation.
<sup>2</sup>No index

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<sup>3</sup> Copy protected

Like *SmarTerm* 240, *Zstempc-VT100* supports DEC's REGIS graphics (provided your host computer also supports them). The graphics version runs on a PC with a CGA or an IBM Enhanced Graphics Adapter (EGA).

Not only is *Zstempc* a capable terminal emulator, the graphics version of the program shows underlining and produces doublehigh and double-wide characters, a feat beyond the capability of most such packages.

Virtually every aspect of Zstempc's configuration can be set by the user; there are no unchangeable defaults (see Screen 4). The program provides extensive help files and menus to lead you through any system configuration. However, unlike most emulators, which save configuration parameters in small setup files, Zstempc

program is notable for its ability to run at very high speeds. According to KEA, the program runs at speeds as high as 38.4 kilobits per second on an AT—twice the speed of most emulators. This is

log-on macros. More seriously, you can transfer binary files only by using Polygon's proprietary transfer protocol, *poly-XFR*.

The program is easy to learn and use. A series of setup screens



The graphics version of Zstempc shows underlining and produces double-high and double-wide characters, a feat beyond the capability of most terminal emulators.

largely a moot point, though, because few host computers allow their terminals to operate faster than 9600 bps. Only PC-to-PC communications allows you to open up the throttle. Even then, high-speed transfers aren't necessary unless you transfer huge files.

guides you through initial installation and multiple-system configuration. Most choices can be made using the arrow and function keys, and each setup is saved as a small configuration file.

poly-COM/240 is convenient for someone who must frequently switch between host applications and the PC. It is memory resident, and you can hot-key back and forth between DOS and the host system without losing your communications connection. The program coexists amicably with memory-resident programs such as SideKick. There are restrictions—you shouldn't try to run other communications programs that use the serial port, for example.

poly-COM's keyboard remapping is the best of the emulators tested. The top four keys on the AT's numeric keypad, for example, mirror the location and operation of the VT100's function keys. The cursor and numeric keys perform parallel functions. Anyone



According to KEA, Zstempc runs at speeds as high as 38.4 kilobits per second on an AT—twice the speed of most emulators.

takes the unwieldy step of saving an entirely new copy of its 50K self. On a floppy-based PC, you face the risk of running out of disk space. You must choose a new file name each time you set up a new configuration, or you will erase your original copy of *Zstempc*.

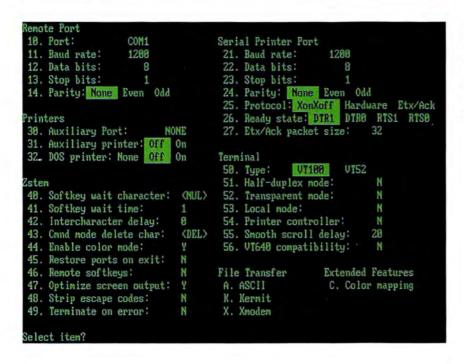
This specific concern aside, *Zstempc* performs with versatility. In addition to its flexibility, the

Despite its awkward manual, *Zstempc* works well. More polished documentation, and perhaps a keyboard template, would go a long way in simplifying its operations.

poly-COM/240
Polygon's poly-COM/240
provides glitch-free emulation. It is the emulator DEC sells to customers who want to emulate DEC's terminals on a PC. Unfortunately, poly-COM has a take-it-or-leave-it approach to some critical issues such as screen color and automatic



Screen 3: SmarTerm 240's straightforward setup menus. The communications setup window is superimposed on the main setup menu. A help line explains each highlighted option.



Screen 4: Zstempc's configuration screen shows its flexibility. You can set virtually any parameter to suit your needs and your systems' peculiarities.

familiar with a dedicated terminal will feel right at home with this program.

However, *poly-COM/240* is a different story if you use IBM's new 101-key keyboard. The new

the Kermit and XMODEM filetransfer protocols. While the program supports *poly-XFR*, you can use this proprietary transfer protocol only if the host computer also supports it. Polygon supplies

Polygon considers its protocol more efficient than the public domain versions, and the company is probably right. But the extra efficiency does little good if the host computer doesn't support the protocol.

keyboard's layout scrambles *poly-COM*'s good effect on the original 84-key keyboard, scattering the once-orderly function keys around the keyboard. Polygon Associates says that a future release will fix the problem.

Unfortunately, poly-COM lacks some basic features that other programs take for granted. You can't change the background color on a color monitor, for example, but must settle for basic white. Nor can you create an automatic logon procedure. You can assign strings of characters to soft keys, but you can't tell poly-COM to wait, either for responses from the host or for a set period of time, before proceeding with the next set of commands. At best, you can use separate soft keys for each stage of the log-on process and transmit the soft-key macros in the proper order yourself.

But *poly-COM*'s most severe limitation is its lack of support for

the appropriate software for your host computer, but if you need to transfer data from a large system that doesn't have poly-XFR or from an on-line service such as CompuServe, you're out of luck. Polygon considers its protocol more efficient than the public domain versions, and the company is probably right. But the extra efficiency does little good if the host computer doesn't support poly-XFR. poly-XFR worked well in our tests, however. It uses a convenient question-and-answer approach to downloading files and processes them faster than Kermit or XMODEM.

Vterm III
Like poly-COM/240, Coefficient Systems' Vterm III is memory resident. In its basic version, it emulates VT100 text terminals. Other available versions mimic Tektronix and VT640 graphics terminals and the VT220 text terminal. Vterm III can receive information from two host computers simultaneously if you use two serial ports.

Vterm III is strikingly similar to SmarTerm 240 in most regards. Its soft keys are programmed and used in a similar fashion. One major difference is an annoying, recurrent cursor key problem. This quirk surfaced only occasionally, but when it did, pressing any cursor key sent the cursor off in a random direction. Otherwise, Vterm III emulated the VT100 well. It handled normal terminal operations and applications without gasping, including Word-11's tricky full-screen editing.

Like the other emulators in our test, *Vterm III* enables you to capture ASCII text from a host computer and send text back to it. For binary file transfers, *Vterm III* covers all the bases. You can use Kermit, XMODEM, or Vtrans, a proprietary transfer protocol.

Vterm III is available in both copy-protected and non-copy-protected versions. Considering that the price difference is only \$35, there's little reason to buy the restricted edition.

PC4010

General Micro Systems' *PC4010* adeptly emulates VT100 and Tektronix terminals. Unfortunately, its copy-protection mechanism delivers a body blow to practicality.

Under the copy-protection scheme, you can install the program only twice and uninstall it only once. This restriction severely limits your ability to move PC4010 to a new or reconfigured system with a hard disk. On the bright side, PC4010's installation program is automatic. It copies required files to your hard disk's root directory and creates a PC4010 subdirectory. The installation program informs you of any hidden files it has created so you won't eliminate them by mistake.

PC4010 also adds some nice touches to terminal emulation, including an uncommonly broad number of ways to control display features such as boldface and underlining. It also features a status line comment that lets you know when the PC's keyboard has been remapped for a host application. Unfortunately, PC4010 can transfer files only by using ASCII-text capture or Kermit; it makes no provision for the XMODEM protocol or a proprietary system. Kermit works well for most PCto-mainframe communications, but XMODEM is the protocol of choice for PC-to-PC communications.

See the Dealer Although each emulator tested mimicked its host systems' terminals well, none did so seamlessly. Keep in mind that one omission or inconvenient feature quickly becomes a headache if you require that feature regularly. Before buying a terminal emulator, make a list of features you absolutely require. Once you have eliminated the systems that lack any of your must-haves, get a software dealer to demonstrate the contenders-on your system. Even after you've made your selection, buy just one copy and put it to the

test before purchasing emulators for an entire company. Terminal emulation is a complex and obscure process in which problems or inconveniences can surface only after extended use. Note that Persoft and KEA offer thirty-day buy-back guarantees with their programs. Once the appropriate emulator is running the show, you'll be able to use your PC on its own and as a gateway to a larger system. It's a two-for-one deal that's hard to pass up.

Wayne Rash, Jr., is a microcomputer and office automation consultant with American Management Systems in Arlington, Virginia.

SmarTerm 240
Persoft, Inc.
465 Science Dr.
Madison, WI 53711
608/273-6000
List price \$295
Requirements: 512K, one disk
drive, DOS 2.00 or later version
Not copy protected

Zstempc-VT100 KEA Systems Ltd. 2150 W. Broadway #412 Vancouver, B.C. V6K 4L9 Canada 800/663-8702 List price \$150 Requirements: 192K, one disk drive, DOS 2.00 or later version Not copy protected poly-COM/240
Polygon, Inc.
1024 Executive Pkwy.
St. Louis, MO 63141-6304
314/576-7709
List price \$300
Requirements: 256K, one disk
drive, DOS 2.00 or later version
Not copy protected

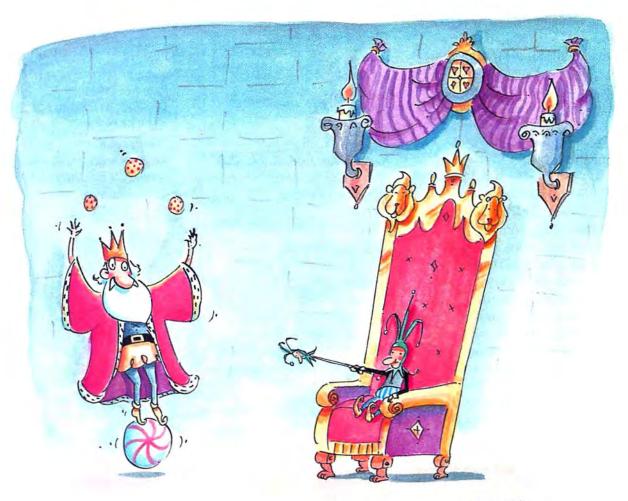
Vterm III
Coefficient Systems Corp.
611 Broadway
New York, NY 10012
212/777-6707
List price: Copy-protected
version \$160, non-copyprotected version \$195; with
Tektronix 4010 emulation (not
copy protected) \$249
Requirements: 256K, one disk
drive, DOS 2.00 or later version

PC4010 General Micro Systems P.O. Box 5330 Hopkins, MN 55343-1533 612/944-0593 List price: \$139 Requirements: 96K, one disk drive, DOS 2.00 or later version Copy protected

# PCs Teach the VAX New Tricks

For companies eyeing ways to unite PC users with DEC minicomputers, Datability's Remote Access Facility takes a leap beyond simple terminal emulation.

Thomas W. Madron and David J. Molta



-MCDONAEII-

Master/slave best describes the prevailing situation when large systems play host to PCs. The PC gives itself a quick software lobotomy so it can appear as a dumb terminal, then comes hat-in-hand to view the riches on the mainframe or minicomputer. The best terminal emulators do provide powerful tools for interacting with a central computer system, but even operations that should be simple—such as transferring files—often become arduous.

Fortunately, an end to this grim scenario may be in sight, thanks to an innovative crop of communications packages that help the PC turn the tables. These programs transform the big machine into a kind of peripheral device, letting the PC grab a chunk out of hundreds of megabytes of disk storage, or even run large-system applications by means of standard DOS commands (see "The Mainframe as Peripheral," *PCW*, June 1986).

Large systems not only offer the luxury of abundant disk space, they also promise vigilant backup and data security. Consequently, PC data stored on the large system will probably be there when you need it—quite unlike some personal computer environments.

Datability's *Remote Access Facility (RAF)* is a communications system sculpted for use with Digital Equipment's solidly entrenched line of minis. Exploiting disks on the big machine, *RAF* captures and saves PC files in a virtual-disk

format that, to the PC user, appears compatible with DOS.

RAF and products like it are designed to provide an organization's information systems staff with a host of such crucial tools. Often described as generic microto-mainframe or micro-to-mini links, these programs are not tailored to a specific application. Instead they work with an operating system, such as VMS on a DEC VAX, and provide an integrated link between a host package and a companion program running on a PC.

Generic links also help to overcome another problem many organizations face—the need for staff to alternate between PCs, minis, and mainframes to accomplish a task. This juggling act is far from a snap for most employees; ideally, they should deal with a single, standard interface.

Five Easier Pieces *RAF* is designed to provide a PC-to-mini file transfer and manipulation facility, enable execution of VAX applications in what looks like a DOS environment, and supply a tightly integrated PC front end to VAX program modules embarked on tasks too ambitious for a PC.

More precisely, *RAF* enables PCs to perform five distinct microto-mini interactions: automatic contact and log-on to a remote VAX, direct PC access to VAX

files, PC execution of entire VAX programs, PC calls to remote VAX subroutines, and access to multiple VAXes in a cluster environment.

Because users must sometimes interact with the target VAX directly, *RAF* also features a full DEC VT100 terminal emulation mode. This capability enables hotkey switching between a PC application and terminal mode. *RAF* communicates with a VAX over a standard RS-232C serial connection at speeds up to 19,200 bps or through an Ethernet local area network (LAN) link. (The Ethernet version was not tested for this review.)

### Getting Started

Installation of *RAF* is a relatively straightforward two-stage process that requires about 30 minutes. The first step involves installing *RAF* on the VAX host computer, using the standard VMS installation utility VMSINSTALL.

The VAX host must be running VMS version 4.0 or later, with at least 5000 512-byte blocks free for installation; 1600 blocks are permanently assigned. *RAF* is placed in a public directory where it is accessible to any user; it can also be installed on a multinode VAX Cluster. In order to access *RAF*, users must free up a minimum of 2000 blocks of storage in their root directories.

Working with VMSINSTALL, *RAF* asks for the directory in which it should reside (it creates a new directory if necessary). The

system then reminds you to include the RAFSTARTUP in the system start-up file, to ensure systemwide access to *RAF*.

The next stage involves executing the batch file INSTALL on the PC to create a start-up disk, configure the communications port, and set transmission speed. The installation program also creates a CONFIG.SYS file containing the requisite *RAF* device drivers.

To activate RAF, you must restart your system. DOS will read

the CONFIG.SYS file and allocate drives D: through S: to *RAF* as virtual drives on the VAX host. (If a RAM disk command resides in your CONFIG.SYS file, the first *RAF* drive will be E:.) Virtual drive size is limited only by the total amount of disk space allocated to your account—potentially, hundreds of megabytes. Under *RAF*, the DOS 32MB limitation is a memory.

*RAF* is copy protected but requires no key disk. The copyprotection scheme lets you install

the program twice. Fortunately, you can install *RAF* on a hard disk and then uninstall it for removal to another machine as many times as you wish.

Getting to the VAX
You can log on to the VAX
automatically via a *RAF* "conversation" or script file, which contains a series of control statements that access the mini with minimal user intervention. These files vary in complexity according to the type of application you're running and the degree of automation you want. Listing 1 consists of a sample conversation file, written for asynchronous serial communications access through a Sytek LocalNet 20 broadband LAN.

A conversation file can be executed with the help of two *RAF* utilities. LOGIN.COM and LOG-OUT.COM execute those parts of a script file that start with a LOGIN: or a LOGOUT: label. Each such segment must end with a DONE statement. *RAF* responds to the VAX 'login' and 'password' prompts and then executes the VAX program RAFPC, setting up the *RAF* server on the VAX.

Once the conversation file is completed, you have access to virtual drives D: through S:. With the DOS change directory command CD, you can change the directory associated with a specific *RAF* remote device. A slash (/) need not preface the command. From the PC's root directory,

for example, you can issue the commands CD D:USER:[ACCOUNT1] and CD E:USER:[ACCOUNT2] (where USER:[ACCOUNT1] and USER:[ACCOUNT2] are VAX directories). From that point on,

```
LOGIN: !remote monitor
TIMER 10
SEND /<13>/
WAIT /#/
CALL: SENDER /LOC 1/
WAIT /#/ /UNKNOWN COMMAND/
IF 2 GOTO CALL
ECHO: SENDCR /ECHO OFF/
WAIT /#/
SENDCR /CALL DEC/
WAIT /CALL COMPLETED/
IF TIMEOUT GOTO E1
SEND /<13>/
WAIT /Username:/
SENDCR /USER/
WAIT /Password:/
SENDCR /PWD/
WAIT /$/
SENDCR /RUN RAF: RAFPC/
WAIT /RAF/
DONE
PRINT / LAN PORT ON VAX/
PRINT /NOT AVAILABLE AT THIS TIME/
DONE
LOGOUT: send
/<03><03><03><03><03><03></
wait /$/
SENDCR /LOG/
wait /#/
sendor /loc 17/
DONE
```

Listing 1: A RAF conversation file that logs on to a VAX over a Sytek local area network

DOS commands such as TYPE or COPY require only a reference to drives D: or E:. For instance, to list a text file in a remote directory you issue the command TYPE E:XYZ.TXT.

To copy a VAX file from the VAX to the PC you enter COPY E:XYZ.TXT C:\TEXTFILE \XYZ.TXT. This command places the file XYZ.TXT in the DOS directory \TEXTFILE on drive C:, the local hard disk.

Once a RAF virtual drive is defined, applications can access VAX files and write directly to a VAX directory. You can store WordStar or 1-2-3 files directly on the VAX simply by saving to drive D: or E:. Utilities such as SideKick enable you to edit VAX text files directly. File conversion is unnecessary for files generated on a PC and for VAX-generated ASCII files. Of course, programs whose operations are hardware-dependent—like the Norton Utilities—may be useless on RAF virtual drives.

Just the VAX, Ma'am
PC users may also access
VAX applications as if they were
local PC programs. It's no trouble,
for instance, to execute an instruction like VTX, calling up the VAX
videotex system on the PC.

RAF offers two simple methods to accomplish such a task. First, the RAF utility REMOTE can write a small .COM file that submits a command to the VAX. The REMOTE command is straightforward: REMOTE filename "VAX\_command".

For videotex to appear as a local application, you only need to issue the command REMOTE VTX "VTX".

If the resulting VTX.COM file is placed in a directory with a path defined through DOS, executing

VTX from any DOS directory will display the VAX videotex program.

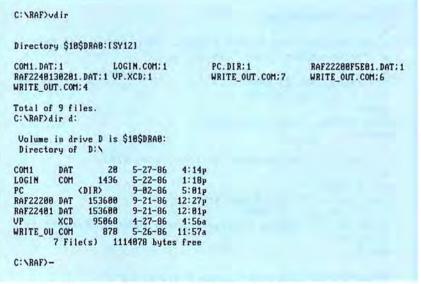
Screen 1 illustrates how the RE-MOTE command can be used. The .COM file VDIR has been created using the *RAF* command REMOTE VDIR "DIR". When VDIR is executed on the PC, *RAF* gives the VAX the DIR command. Alternatively, you can enter the command DIR D:. *RAF* will translate the VAX DIR command and display the directory listing in DOS format, as shown in the lower portion of Screen 1.

# Checking Out Library Facilities

RAF features a set of subroutines in a library called RAFLIB.LIB. These routines permit specially written PC programs to access VAX facilities. Those inclined to program can choose from an array of languages and compilers, including Microsoft FORTRAN, Lifeboat Associates C and Lattice C, Microsoft Pascal, Microsoft BASIC Compiler, Microsoft Business BASIC, and IBM BASIC Compiler.

These subroutines can, for example, check the communications line to ensure that *RAF* is active and, if it isn't, log on to the VAX using a previously defined conversation file (see Listing 2).

Even jazzier for PC-to-VAX buffs, *RAF* can call subroutines running on the VAX from a primary application running on the PC. This capability is particularly important in generic links because access to many large-system data



Screen 1: When the REMOTE command VDIR is executed on the PC, RAF issues the "DIR" command to the VAX; the results are displayed on the top half of the screen. Once the command DIR D: is entered, RAF translates the VAX "DIR" command and produces a DOS directory, shown at bottom.

managers occurs through subroutine calls issued from a program that acts as the user interface. This approach differs markedly from that of such PC packages as *dBASE III*, in which the data base is built and accessed through an application language.

Using *RAF*'s setup, corporate computer personnel can write friendly front ends to large-scale data bases. Similarly, computational problems beyond the scope

of the PC can be passed off to the VAX, with results returned to the PC-based application. *RAF* provides the means, for example, for a PC FORTRAN program to call a VAX FORTRAN subroutine. (Both programs must be compiled before *RAF* can go to work.)

Integral to this process is an easy-to-use, menu-driven *RAF* utility called RAFSL. This utility enables you to tell *RAF* what and where the remote and local subroutines are; it then produces a local subroutine with the same name

as the remote subroutine and generates the code necessary to grab the VAX's attention.

RAFSL can also create the final version of the VAX subroutine, an .EXE file, by requesting the subroutine name and the name of the library in which it resides. The result is a finished program that runs partly on the PC and partly on the VAX, doing whatever the programmer wants it to do.

# RAF Rifraff While *RAF* exhibits no obvious bugs, some operational anomalies should be fixed.

For instance, *RAF* preempts all device names from the last physical device through drive S:. Particularly with DOS 3.10 and subsequent versions, this wrinkle greatly detracts from the utility of the DOS SUBSTitute command when specifying paths as virtual disks on a hard disk PC. The arrangement is similarly inconvenient on a PC network.

Designating special keyboard characters as drive names permits limited use of devices named beyond Z:, but that solution is not much help to most users. A better approach would be to let users limit the number of virtual drives given to RAF. (Release 1.7 of *RAF*, scheduled to ship by press time, reportedly addresses this concern by permitting users to assign either 8 or 16 virtual devices to *RAF*.)

In addition, *RAF* lacks an easy way to change the transmission rate or communications port on the fly. Making such changes involves returning to the INSTALL program; ideally, the changes should be possible from the terminal emulator. (Alterations can be handled in the conversation file or,

```
program rtest
character file*20, param*50, prog*50, sys*50
   Initialize the program for RAF
call raffor
   check for a RAF link
10 call rafok(iflag)
   if the RAF link is not active, then login using the
   'conversation' file 'lan.cnv'.
if (iflag .ne. 1) then
file = 'c:\raf\lan.cnv'
param = ' '
call raflgi (file, iflag, param)
endif
  execute a VAX command (in this case, DIR)
sys = 'DIR '
call rafrun (iflag, prog, sys)
if (iflag .ne. 1) then
write (*,'('' Remote program/command ended in Error'')')
go to 20
endif
write (*,'('' VAX application finished'')')
  End this program's link with RAF
20 call rafend
end
```

Listing 2: A FORTRAN program on the PC that employs RAFLIB.LIB subroutines and performs remote process execution on the VAX

in release 1.7, through a subroutine in the RAFLIB.LIB library, according to Datability.)

If the *RAF* connection is not active when you call a program or command built by the REMOTE procedure, graceful recovery may be impossible. *RAF* may wander off for a few minutes before indicating that the link is inactive and then ask you to abort or retry. The DOS prompt occasionally doesn't return, necessitating a restart of the system.

Datability would do well to have these REMOTE procedures first check the connection, then provide a smooth path back to DOS. While it's possible to avert these problems with programming tricks, doing so limits *RAF*'s flexibility.

RAF's documentation is short and straightforward. Like most manuals, Datability's is inadequate in spots-particularly when explaining how to build applications in which a primary PC program calls VAX subroutines. For example, though RAF seems to mandate version 3 of Microsoft FOR-TRAN, the manual is silent on that requirement. It's also murky on the subject of alternative names for some RAFLIB.LIB library subroutines that conform to varying naming conventions. Datability reports that this fuzziness has been purged from the release 1.7 documentation.

Like other software that treats a mini or mainframe as a PC file server, an asynchronous *RAF* installation may not be suited to jobs in which speed is paramount. When operating in terminal emulation mode on a dedicated network, for example, the typical line speed for asynchronous devices is 9600 bps. Using

RAF to transfer a 100K binary file to the VAX takes well over 3 minutes. You say you can live with that? How about backing up a 20MB hard disk at 9600 bps? Do you have 10 hours to spare?

If you were to set up an unattended PC to perform backups in the dead of night, you might not encounter a problem. But in a large organization, doing such backups wholesale might overload both the central computer and the communications system.

With its compression algorithms, *RAF*'s proprietary full-duplex error-correcting protocol does speed things up a bit. Copying files at 9600 bps is certainly poky compared to executing a local DOS COPY command, but *RAF* offers significant performance enhancements over other error-correcting file-transfer protocols. Moving a 16K text file to the VAX using Kermit took 60 seconds; copying the same file with *RAF* required 20 seconds.

The obvious long-term solution is faster communications, directly coupling the big system with a high-speed LAN like Ethernet, DEC's preferred method of linking VAXes and peripherals; Ethernet support is included in *RAF* release 1.7. With an Ethernet board installed in a PC, VAX-to-PC transfers could exceed the speed at which the PC accesses a floppy disk. Datability claims that *RAF* moves data over Ethernet at 100 kilobytes per second.

These reservations aside, *RAF* generally lives up to its billing as a powerful and well-designed PC-to-VAX communications facility. Considering its

abundance of features, the program is relatively easy to use. For this evaluation, it worked equally well on an XT, an XT clone, and the AT-compatible Texas Instruments BusinessPro.

The technicians at the receiving end of Datability's toll-free technical support line responded knowledgeably to queries. And while micro-to-mini software pricing tends to be complicated—with separate charges at the PC and the VAX ends—the overall cost of *RAF* seems competitive.

RAF and similar products promise PC users a simple and flexible interface to large systems. As distributed processing environments gain a corporate toehold, software will offer increasingly sophisticated PC/big machine integration. ●

Thomas Madron is manager of computer services, and David Molta is data communications analyst at North Texas State University in Denton, Texas.

Remote Access Facility
Datability Software Systems, Inc.
322 Eighth Ave.
New York, NY 10001
800/342-5377
List price: \$395 per PC; bulk
license for up to 50 PC copies
\$15,000, additional copies \$125
each; VAX host prices from
\$2500 for Microvax I to
\$25,000 for the VAX 8800;
\$10,500 for Decsystem-20
Requirements: 256K, DOS 2.00
or later version
Copy protected

# A Bold New Face

A host of emulation modes in tow, AST's first laser printer is a quick-change artist that's also quick on the draw.

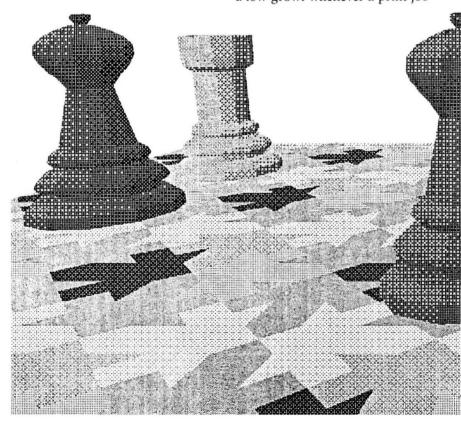
Ted Nace

Judging by the groans of the delivery man as he hoisted the carton containing the AST TurboLaser up my front steps, the beast within was clearly a heftier piece of machinery than the desktop laser printers to which I'd become accustomed.

Those machines—from the QMS KISS (Keep It Smart and Simple) to the Apple LaserWriter—use Canon's LBP-CX laser engine. Although that engine has

proven reliable, its light-duty mechanics are a telltale reminder that the LBP-CX is actually a cousin to Canon's inexpensive personal copiers.

There's nothing meek, though, about AST's Ricoh-engine-powered laser printer. Boasting a stocky 21-by-23-inch footprint and a rugged 81-pound chassis, the TurboLaser is also noisier than its competitors, with a fan that never quits and a tendency to emit a low growl whenever a print job



is in progress. Compared to its Yugo-like rivals, the TurboLaser is a small truck. The unit is engineered with stamina to spare: Its Ricoh engine travels 600,000 copies between overhauls, compared to the Canon's 100,000.

Controlling Interest TurboLaser setup begins with installation of the controller, which, like the Canon-based Cordata LP-300, resides in the computer rather than in the printer; a high-speed cable connects the

You can tell

the bishops

pawns in this

from the

two. The full-length 8-bit board is

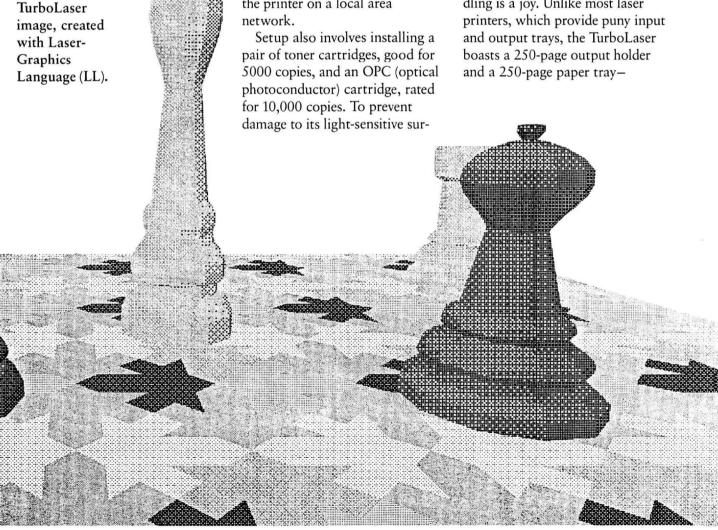
amply endowed with a Motorola 68000 microprocessor and 1.5MB of RAM. The TurboLaser sets aside 256K for disk-based fonts. 256K for controller software, and up to 1MB for bit-mapped images-enough memory to hold a full page of graphics at 300-dotsper-inch (dpi) resolution. AST claims the machine can pop out documents at a snappy 8 pages per minute (ppm).

The configuration of jumpers determines whether you'll send instructions to the printer from parallel port LPT1, LPT2, or LPT3 and serial port COM1: or COM2:. Your choice of port types has no impact on printer speed. Likewise, the controller's residence in the PC does not affect your ability to use the printer on a local area network.

face, the documentation advises installing the OPC cartridge no more than 5 minutes after unpacking it.

Heeding this admonishment (and goaded by a series of cautionary cartoons on the package), I dimmed the lights and followed instructions to pull the developer drawer "out of the printer until it stops." The awkwardness of the procedure convinced me that the design of the Ricoh developer drawer could stand improvement. After removing the drawer and installing the OPC cartridges, I found it difficult to return the drawer to its tracks.

Fortunately, other aspects of TurboLaser installation and operation went smoothly. Paper handling is a joy. Unlike most laser printers, which provide puny input



covered, no less. During several weeks of use, the machine experienced nary a paper jam. And the TurboLaser doesn't require you to rearrange sheets of paper every time you print a document; pages emerge facedown in the correct order.

#### How the TurboLaser Thinks

While the TurboLaser's sturdy construction and no-nonsense paper-handling features are certainly welcome, printers need brains as well as brawn. AST prevailed upon Lasergraphics Corporation, an Irvine, California, neighbor, to supply the printer's gray matter. In crafting the requested controller software, Lasergraphics sidestepped two existing approaches to the problem and proceeded to blaze an unconventional trail.

One traditional approach, taken with bargain laser printers like the QMS KISS, calls for the manufacturer to equip the printer with the popular Epson or Diablo protocol. This strategy ensures compatibility with existing software but does not tap such potent laser printer capabilities as graphics and multiple proportionally spaced fonts.

A second popular tack entails building a powerful page description language into the printer. Apple's LaserWriter, equipped with Adobe Systems' PostScript, best exemplifies this strategy. The LaserWriter's advantage is its full flexibility in merging text, graphics, and typographic fonts. But this approach also ups the monetary ante for buyers and may significantly slow printer throughput

in some applications. Furthermore, few PC programs currently include PostScript drivers.

The TurboLaser is AST's polylingual answer to the language question. Instead of betting all its chips on a single page description language, the TurboLaser can function in six different modes under the direction of a master language called Lasergraphics Package (LGP). As directed by LGP, the TurboLaser can switch between languages on the fly, if necessary drawing on the talents of more than one to create a single page. A description of the protocols follows.

Epson emulation. Emulating the highly popular Epson dot matrix protocol, this mode ensures compatibility with both word processing and graphics software. The TurboLaser supports 12 variations on the Epson standard, including IBM graphics, and Epson MX-80 or MX-100 with Graftrax (which permits generation of images at 240 dpi).

Diablo 630 emulation. The 630 is the dominant protocol for letter quality printers. Most word processors contain a driver for the Diablo 630.

Extended 630 emulation. A superset of Diablo 630 emulation, this mode adds additional commands for font selection and typographic formatting. The extended 630 mode offers especially good control (to 1/300 inch) over horizontal and vertical spacing of proportionally spaced fonts.

Hewlett-Packard Graphics Language (HPGL) emulation. HPGL,

a plotter language, is supported by a host of graphics and CAD packages. The TurboLaser can emulate a number of versions of HPGL, including those used in the HP 7470A, 7475A, 7440A, 7550A, and 7510 plotters, and in the IBM 7371 and 7372 plotters.

Lasergraphics Language (LL). This language executes graphics primitives—circles, line segments, rectangles, polygons, pie slices, and shades. Because you cannot apply to text such graphics operations as stretching, scaling, rotating, and highlighting, Lasergraphics Language isn't quite in PostScript's league. LL does, however, permit placement of text within graphics images and provides its own fonts for that purpose.

LGP Raster Placement Language. This language allows rectangular graphics images received by the TurboLaser in raster form to be placed at any location on the page. It thus provides a software bridge enabling the TurboLaser to receive digitized images and mix them with text.

In addition to the above modes, AST is promising to release a LaserJet emulation mode soon. However, current owners of the TurboLaser will need to purchase a new controller board to take advantage of that mode.

In theory, AST's unusual carousel of protocols and languages provides significant benefits. The first is speed: Because each mode is designed specifically for a particular type of image, the AST approach should encourage exceptionally quick printing. The second benefit is software compatibility. Several modes mimic standard protocols, thereby enabling the TurboLaser to be used

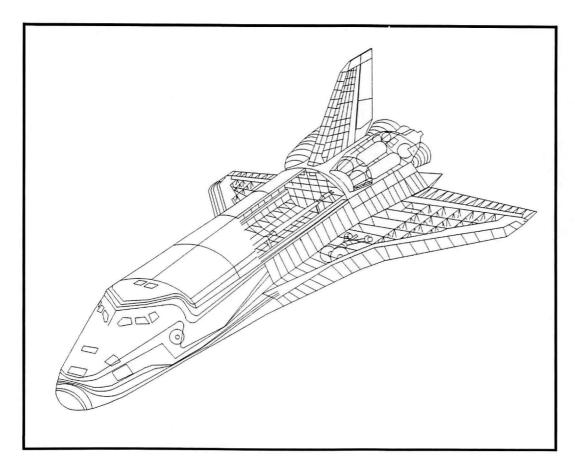


Figure 1: This plotter image, created with AutoCAD, was produced by the Turbo-Laser in HPGL mode.

with just about any program written for dot matrix or daisy wheel printers or for plotters. Finally, because LGP can combine text and graphics on any page, the Turbo-Laser can potentially support the coming generation of desktop publishing applications that freely mix the two.

But how well do these theoretical benefits of AST's innovative language and protocol scheme translate into actual performance?

#### Traffic Court

Let's start with speed, which AST is touting as the TurboLaser's greatest asset. The company has gone so far as to coin the term OPR—for original production rate. The implication is that other

printers can't touch the Turbo-Laser's 8-ppm output except when producing *copies* of a page. The TurboLaser, meanwhile, is said to cruise right along even when each page it prints is unique. Both the Canon and the Ricoh engines are rated at 8 ppm, but printers built around the Canon invariably perform at a less frenetic clip.

True to AST's claims, the TurboLaser is fleet indeed, although actual speed depends on the nature of the material printed. The most impressive aspect of its performance is the TurboLaser's ability to print scanner-generated digitized images. Using the original software that came with the printer, a single such image could require as long as 5 minutes to print, but AST was quick to remove the bottleneck with a free

software upgrade. The new software can print a full-page 300-dpi image in an astonishing 10 seconds.

Graphics generated by HPGL plotter emulation or the Lasergraphics Language are printed somewhat slower because of the time required to process the highlevel graphics commands used by these modes. For example, each figure shown in Figures 1 and 2 was printed in slightly less than 30 seconds. That's not 8 ppm, but for engineers and architects accustomed to taking a stroll while their plotter painstakingly grinds out an image, the TurboLaser makes a convincing case for laser printing.

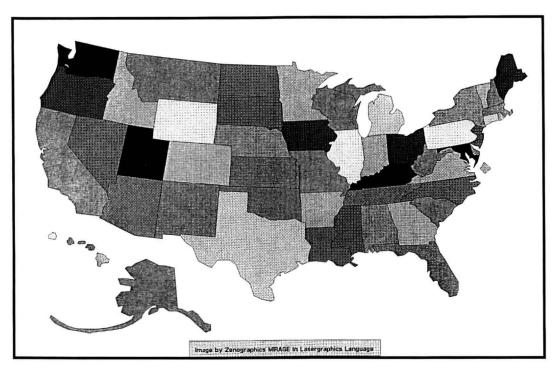


Figure 2:
Printing this
map in Lasergraphics
Language
mode
required 29
seconds. Note
the TurboLaser's
patternlike
shades of
gray.

Any comparative speed test of text production—the most common type of printing—should reflect times both for printing and for downloading fonts into the printer. For testing purposes, the HP LaserJet Plus went head-to-head against the TurboLaser on a typical job: producing an 8-page, double-spaced document containing four different fonts (with font-downloading time included).

As Table 1 indicates, the Turbo-Laser was dramatically faster at printing the document and left the HP in the dust when downloading fonts—a task at which the Turbo-Laser truly sizzles. Using a one-line batch file, you can copy all sizes of a typeface from a hard disk to the controller in about 25 seconds.

Compatibility: Pax Turbo
Corporate computer managers far and wide have long hankered for an output device capable of eliminating printer incompatibility. For them, the TurboLaser may well be a dream machine.
With Epson, Diablo 630, and HPGL emulation at the ready, users can print from virtually any PC program.

Less certain is whether the TurboLaser will be able to *fully* support every program. That is, will the printer take advantage of programs that include typographic formatting and multiple typographic fonts, and will it support desktop publishing programs that combine graphics and text?

At the time of this writing, precious few programs possess drivers that support the TurboLaser's advanced capabilities. I tested *Microsoft Word 3.0* and *Iprint*, a forms-generation program, two among the few. The *Word* driver

worked without a hitch but did not support landscape mode. *Iprint*, which combines text and graphics, also worked satisfactorily, aside from printing a supposedly light shade of gray quite dark. AST is reportedly nearing completion of a driver for *Microsoft Windows*, a crucial step before the TurboLaser can be used with *PageMaker* and an assortment of page makeup and other programs that run under the *Windows* operating environment.

Nine programs, including *Microsoft Chart*, are equipped with a Lasergraphics Language driver. In addition, Lasergraphics has released an LL conversion program for 1-2-3 and *Symphony*. But LGP's facility for merging text and graphics, although impressive, is likely to lie fallow without drivers.

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A dearth of drivers during the past two years has spelled doom for a number of laser printers, and it's not yet clear how many software developers will rally behind the TurboLaser. Given AST's clout and the TurboLaser's talents, driver development may accelerate. If you're scouting around for a program that combines text and graphics, or offers advanced typographic features, ensure that the application you choose is on friendly terms with the TurboLaser.

Font Déjà Vu
The TurboLaser is rich in fonts, but don't count on kneading them as you might with a Laser-Writer. While the TurboLaser lacks such flexibility, AST's aim is to provide business users with all the fonts they need for crisp, near typeset quality documents.

Table 1: Speed comparison of the HP LaserJet Plus and the AST TurboLaser (in minutes: seconds)<sup>1</sup>

Font download time	Print time	Total time		
1:20	2:08	3:28		
0:15	1:11	1:26		
	1:20	time 1:20 2:08		

<sup>&</sup>lt;sup>1</sup>Time elapsed to download four fonts and print an 8-page document containing those fonts

proportional fonts. Letter Gothic and Courier are fixed-space, type-writer-style fonts that, in the presence of an Epson driver, can be compressed and expanded. Both sets of fonts can be printed in portrait or landscape mode, and the two modes (or any number of text fonts) can be mixed on a single page.

If in some point sizes AST's text fonts bear a striking resemblance

somewhat less appealing fonts, which are best suited to labeling and titling charts and graphs (see Figure 4).

Unlike the LaserWriter, the TurboLaser stores fonts in bit-mapped form—that is, as patterns of digital bits. The amount of memory needed for each font varies. An 8-point font takes up only 7K of RAM on the controller, but large fonts have gluttonous appetites for memory: 36-point Dutch, for example, consumes a full 94K. The controller reserves 250K for holding fonts, sufficient for all sizes of one typeface or for a combination of typefaces in selected sizes.

AST's decision to use fonts that cannot be scaled or rotated may limit acceptance of the TurboLaser for high-end desktop publishing applications. As the success of PostScript and the LaserWriter suggests, growing numbers of users are willing to pay a premium for high-quality scalable fonts. Perhaps owing to its agreement with Lasergraphics, AST has yet to support a TurboLaser translation facility for PostScript.



# Will the TurboLaser take advantage of programs that include typographic formatting and multiple typographic fonts?

The TurboLaser's font library fills six floppy disks. For text documents, the selection includes Courier, Letter Gothic, Dutch (essentially Times Roman), and Swiss (imitation Helvetica), each in a range of sizes and styles. A sampling of Dutch and Swiss is shown in Figure 3. Dutch and Swiss, in sizes from 8 point to 36 point, are

to those of Hewlett-Packard's LaserJet Plus, it's because both sets were created by font-maker Bitstream. The TurboLaser lacks the useful 12-point regular-weight fonts in Swiss and Dutch but compensates by including both styles in 36-point fonts, a size absent from the HP set.

Five additional fonts are provided specifically for graphics programs that use Lasergraphics Language. Applications that talk directly to LL must rely on these

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<sup>&</sup>lt;sup>2</sup>Using serial connection at 9600 bps

This is Dutch 8.

This is Dutch 10.

This is Dutch 10 Bold.

This is Dutch 10 Italic.

This is Dutch 14 Bold.

## This is Dutch 24 Bold.

# This is Dutch 36 Bold.

This is Swiss 8.

This is Swiss 8 Bold.

This is Swiss 10.

This is Swiss 10 Bold.

This is Swiss 10 Italic.

This is Swiss 12 Bold.

This is Swiss 14 Bold.

This is Swiss 18 Bold.

This is Swiss 24 Bold.

# This is Swiss 36 Bold.

Figure 3: A sampling of the Turbo-Laser's fonts. Although the styles are identical to Hewlett-Packard's downloadable fonts for the LaserJet, the selection differs somewhat.

Prints of Darkness
Unlike the dark gray that
passes for black with Canonengine printers, the TurboLaser
prints black areas that really do
look black. Unfortunately, AST
seems to have erred on the side of
darkness.

In general, TurboLaser print is somewhat heavier than that of Canon-engine printers and is marked by hairlines that are slightly too thick and some fonts that appear too dark. Close inspection reveals that stray particles of toner surround many characters, especially those printed with bold typefaces. Unfortunately, the printing intensity of the Turbo-Laser's Ricoh engine is preset at the factory and cannot be adjusted. Compounding the problem of printing intensity is the way Lasergraphics Language attempts to produce shades of gray, which is adapted from the language's initial role as a vehicle for color ink iet printers and plotters. As shown in Figure 2, LL represents shades of gray with various crude crosshatching patterns-good for color, but disappointing in black and white. Generating light shades of gray is virtually impossible.

Darkness, of course, varies slightly from printer to printer, and quality may be acceptable if printer output is used as final copy. However, because gray shades consist of patterns, not halftones, print tends to darken when reproduced by a photocopier or an offset press. Likewise, TurboLaser output is apt to be inappropriate for business forms where subtle shading is required.

This is AIRPGL

This is SPARTIOL

This is GOTH10M

This is COMP14M

This is GOTH18B

TACS OS SACODOC

Figure 4: LaserGraphics Language fonts are not intended for text applications and serve best in captions and legends.

Merits and Demerits Is the TurboLaser the printer to add sparkle to your documents? The answer depends on the type of printing you intend to do. For flashy desktop publishing applications, the TurboLaser isn't as malleable as the LaserWriter and notably lacks the Apple printer's PostScript-based outlined fonts and superb graphics capabilities. Moreover, the TurboLaser's nonadjustable print darkness, coupled with general uncertainty about third-party software support, may give committed desktop publishers some pause.

But for just about everybody else, AST has come up with a winner. As an all-around office printer, the TurboLaser is unrivaled. If assigned the prosaic word processing tasks that fill the business day, AST's offering will handle everything that comes its way. And with some caveats, even if your plotter, high-resolution graphics printer, and daisy wheel printer all took the week off, you could continue to do business. The

TurboLaser essentially lives up to its billing as a whiz at rapidly churning out text and graphics. Your coffee won't even have time to cool. 

■

Ted Nace is a PC World Contributing Editor and the coauthor of Desktop Publishing Skills (Addison-Wesley Publishing, Reading, Massachusetts, 1987).

TurboLaser
AST Research, Inc.
2121 Alton Ave.
Irvine, CA 92714
714/863-1333
List price: \$4495, toner kit \$96, optical photoconductor \$180
Requirements: hard disk
recommended, DOS 2.10 or later version

## Alpha/three: Simple, Powerful, Compatible



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For those who need a data management package with reasonable power, complete dBASE compatibility, and a user interface a child could grasp, Alpha/ three provides an elegant solution.

**Bob Cowart** 

If you're searching for your first data management program, sidestepping the dBASE family might seem like an excellent idea. Even with the Assistant, dBASE III Plus's spiffed-up front end, Ashton-Tate's flagship product is frequently intimidating. If you want to design an attractive report or flip through a few records, a number of dBASE III Plus's competitors can produce better results with less effort. The problem is, there's a good chance the people you work with have already standardized on a dBASE product, and converting mountains of data (and recalcitrant programmers) to Paradox or R:base 5000 is out of the question.

Now you can have your dBASE and avoid it too. Alpha Software's Alpha/three, a straightforward, menu-driven data management progam, uses the dBASE III file format while offering its own engaging approach to reporting, indexing, and creating forms. Alpha/three omits both a command language and most relational capabilities, trading these high-end features for easy access to most

common data management functions, some of which would require programming in *dBASE III Plus*. And because the two programs' file formats are interchangeable, you're not obliged to sacrifice reporting muscle; programmers can always generate a complex report with *dBASE III Plus* using an *Alpha/three* data

Nonprogrammers, however, should find *Alpha/three*'s reporting features particularly attractive. A quick report facility lets you easily plug fields into a default format; and you can create your own custom layouts with an on-screen preview reminiscent of *Paradox*'s template approach. *Alpha/three* even includes a built-in word processor for creating form letters.

But it's the overall command structure, which demands fewer keystrokes and pull-down searches than *dBASE III Plus*'s Assistant, that will attract most lay users. Offering respectable power, a reasonable \$395 price tag, and unprecedented compatibility with

America's favorite data base, *Al-pha/three* should gain a following among those who need *dBASE* files but don't need the program.

Alpha ABCs
Alpha/three requires at least
320K of RAM and 1.7MB of hard
disk space. The program can also
run on a dual-floppy system, although with five disks the amount
of disk shuffling involved is burdensome. Hard disk installation is
simply a matter of entering a single command and swapping floppies when prompted. Alpha/three
then creates one subdirectory for
program files and a second one
beneath it for sample files. The installation program automatically

renames your existing CONFIG-

.SYS file and creates a new one with the correct number of files and buffers. By editing a special configuration file, you can also determine the screen colors for each data base, alter the date format, change the currency name and symbol, and prepare the program to run on a RAM disk.

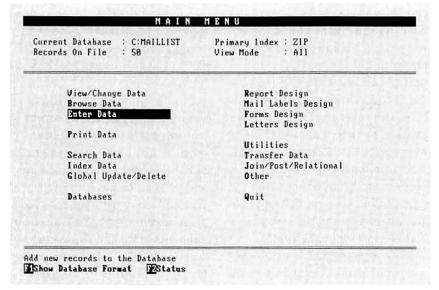
When you execute Alphalthree, a start-up screen asks you for the current data and program drives, the path name, the data base, and whether you are using IBM's Color/Graphics Adapter (CGA). Answering yes to the last question slows Alphalthree's screen updates; at normal speed, scrolling causes snow with the CGA. If you bypass the start-up screen, Alphalthree will automatically load the the last data base opened and dis-

play the main menu. Otherwise, answering no to 'Use default data base?' presents you with a data base directory. Pressing <F5> at this juncture produces the number of records and the date last modified for each data base—results similar to those produced by *dBASE III*'s DISP FILES command.

Menus appear either as full screens or as command lines at the bottom of the screen. In both cases you can invoke commands by pressing the first letter, although on full-screen menus you can also move a highlighted selector bar and press <Enter> or <F10> to execute the selection. Pressing <Esc> always takes you back to the previous menu selection, and <Alt>-<F10> returns you to the main menu from any point in the program (see Screen 1). The mnemonic, single-letter appellation for most commands means that you'll soon find referring to menus superfluous.

Laying the Groundwork The procedure for creating a data base with Alphalthree is similar to that of dBASE III Plus. You simply fill in the blanks defining the name, type, and length (and if necessary, the number of decimal places) for each field in a record. Also like dBASE III Plus, Alpha/ three records can contain as many as 128 fields, each of which may hold up to 256 characters. Alpha/ three's record capacity is 65,535 characters per data base, however, compared to dBASE III Plus's maximum of 1 billion.

Alpha/three's default format for records also resembles dBASE III Plus's. But without designing a special data input screen, you can



Screen 1: Unlike many programs, Alpha/three's main menu provides access to all the functions necessary for most data management and reporting tasks.

Figure 1: Alpha/three offers 57 functions and operators.

ABS-absolute value ASC-ASCII value

AT-starting position of character string

BOF-bottom of file

CDATE-converts date to character field CDOW-converts date to day of week name

CHR-converts number to character

CMONTH-converts date to month name

CTOD-converts character string to date

DATE-returns current system date

DAY-returns current day of month

DBF-returns current data file

DELETED-true if current record deleted

DOW-returns day of week in number form

DTOC-converts date to characters

EOF-end of file

EXP-exponent

FIELD-returns name of field 1, 2, etc.

F\_UPPER-capitalizes first letter in string

IF-examines logical expression

IIF-same as IF

INT-truncates fractional part of number

INVERT-inverts order of one field within multilevel index

ISALPHA-determines if character is a letter

ISBLANK-determines if character is a blank

ISUPPER-determines if first character in string is uppercase

ISLOWER-determines if first character in string is lowercase

LEFT-returns leftmost character of string

LEN-returns number of characters in string

LOG-natural log

LOWER-converts to lowercase

LTRIM-removes leading blanks

MAX-returns greater of two values

MIN-returns lesser of two values

MOD-returns integer remainder of value of n1/n2

MONTH-returns number of month in date

RAND-generates random number

RECCOUNT-returns number of records in current file

RECNO-current record number

RECSIZE-size of each record

REPLICATE-replicates character string

RIGHT-returns rightmost character of string

ROUND-rounds number to x decimal places

RTRIM-removes trailing blanks

SPACE-returns x spaces (blanks)

SQRT-square root

STR-converts numeric expression to characters

STUFF-replaces characters in context with alternate string

SUBSTR-returns substring of initial character string

TIME-current time

TRIM-removes trailing blanks

UPPER-converts to uppercase

VAL-converts character string containing numbers to

numeric expression

WORD-returns nth word of character string

W\_UPPER-capitalizes first letter of each word

YEAR-returns year portion of date

ZBLANK-converts numeric expression to characters, with

0 replaced by null character string

define up to 20 calculated fields per data base, which the program computes automatically as you enter or edit records. Computed fields can depend on input from other fields within a record, although not on input from other data bases.

Using a pop-up menu, you can select from a wide variety of functions to create equations of up to 254 characters, enabling you to establish complex calculated fields with little effort (see Figure 1). Computations are applicable to character and date fields, as well

as to numeric fields—a welcome feature eliminating a few of the boondoggles that lead novice *dBASE* users to hire programmers.

Viewing and editing memo fields, which can contain up to 5000 characters of commentary, is a snap with Alpha/three. Memo fields that contain text appear in reverse video and display the word ... memo ... when touched by the cursor, providing a clearer distinction from ordinary fields than that offered by dBASE III Plus. When paging through records, you can even open a memo field without putting the cursor on it, instead pressing <F5> to open the notepad. The memo editor has

the usual word-wrap feature and insert-mode toggle; and you abandon or save a memo field's contents by pressing <Esc> or <F10>, respectively.

Alpha/three provides numerous features to guard against entry errors, again without demanding that you create a special data entry screen. On a screen for defining field rules, you supply each field with its own data integrity parameters, which you can alter even after data has been entered in a file. These definitions include

Table 1: A performance comparison between Alpha/three and dBASE III Plus<sup>1</sup>

	Alpha/three <sup>2</sup>	dBASE III Plus
Indexing		
100 (1 index/2 indexes)	0:04/0:05	0:02/0:02
1000 (1 index/2 indexes)	0:56/1:18	0:09/0:10
10,000 (1 index/2 indexes)	15:07/23:13	1:51/2:17
Locating the last record		
100 (1 field/2 fields)	0:02/0:02	0:01/0:01
1000 (1 field/2 fields)	0:15/0:18	0:07/0:09
10,000 (1 field/2 fields)	2:35/3:05	1:06/1:38
Substring search		
1000	0:33	0:07
10,000	5:37	1:14
Replace one field		
100	0:02	0:01
1000	0:22	0:13
10,000	4:31	2:59

Times shown in minutes:seconds

making a field's entry mandatory, converting entries to the correct case, performing range checks for data in numeric and date fields, entering default field values automatically, and accepting one of a list of permissible entries. The program also enables you to set up standard formats for entering data-with interim characters such as slashes or hyphens-for phone numbers, dates, and so on. You can even create custom prompts that appear at the bottom of the screen whenever the cursor touches a given field.

If you prefer entering and viewing information using a custom data entry screen, a built-in editing facility provides the necessary tools for generating forms up to seven screens long. (You can design up to 26 forms per data base.) Besides enabling you to draw various lines and boxes, the forms editor makes it easy to put fields where you want them. You can even create multiple, wordwrapped lines for long fields, which appear as narrow vertical columns on screen. As with the default input screen, you can specify a variety of field criteria, although custom input screens naturally offer a broader array of formatting options. You'll also find it just as quick to update data displayed in a custom data entry form as in the no-frills default record screen-a distinct advantage over dBASE III Plus.

Like the dBASE family, you create Alpha/three indexes after you've set up the data base structure. The program can maintain up to seven indexes simultaneously, five of which can apply to any field; of the remaining two,

one is permanently designated for record numbers, while the other is committed to the last table produced by an *Alpha/three* query. Using the + symbol, you can combine fields to create multilevel indexes; and any valid *Alpha/three* function or expression can be used in index formulas.

Alpha/three offers a "unique only" option that prevents indexed fields from accepting duplicate entries. You can also reverse the index order and set up index sorts that are insensitive to case. These last two options make Alpha/three index files incompatible with dBASE III Plus, an important consideration if you're using both programs to manipulate the same data.

Like any data management program, Alpha/three's performance slows significantly if more than a couple of indexes are open at one time. To prevent this disk drag, it's wise to deactivate unnecessary indexes whenever possible and to update indexes during off-hours. The bright note here is that Alpha/three offers a menu-driven routine for index updates that supplies the names of all indexes, a godsend for dBASE users who've racked their brains trying to remember cryptic index names.

Finally, you can substantially alter the design of an *Alphalthree* data base without losing data. For example, you can change a date field into a character field and still retain your hard-earned entries. You can also change numeric into character fields, character into date fields, logical into character fields, and character into numeric fields (although only the numbers

<sup>&</sup>lt;sup>2</sup>Tests performed using a PC's Limited AT running at 6 MHz with 1MB of RAM and a 40MB Seagate voice-coil drive

are retained). When such modifications are made, the program is smart enough to remove all associated references, such as those pertaining to calculated fields. Changing a field's name and location simultaneously introduces one too many variables, however, guaranteeing data destruction.

Modes for the Record For entering, viewing, and editing data, Alpha/three offers three modes that provide overlapping functions: Enter Data, Browse Data, and View/Change Data. The latter is almost identical to dBASE's Edit mode, which enables you to scroll through records and edit or add entries. Unlike dBASE, however, you must type C to make any changes, a device that protects you from making accidental alterations. In all three modes, a status line above the command line displays the mode and record number, as well as the names of fields and commands pertinent to the current operation.

You can page through records one at a time using the up or down cursor key or the space bar, which takes you one record forward or backward, depending on the direction you last moved. When you flip through records, you'll immediately notice Alphal three's speed; if you hold down an arrow key for a second, you'll see at least half a dozen records flash by (see Table 1). You can zip to the beginning or end of a file using <Ctrl>-<Home> or <Ctrl>-<End>; and <Tab> or <Shift>-<Tab> takes you 10 records forward or 10 back, respectively. One command even pages through records automatically, one every two seconds.

When using the Change function of the View/Change Data mode, *Alpha/three* offers standard text editing features, plus a few unexpected perks. Options on the command line enable you to save or abandon changes, of course, but you can also erase an entire record or drop in the current date by pressing a function key. And if your data base has calculated fields, you can toggle between manual and automatic recalculation.

Aside from offering a blank record, *Alpha/three*'s Enter mode is only marginally different from the Change function of the View/ Change Data mode. Pressing <Enter> moves the cursor from field to field, and the rudimentary

field editing features are identical in both modes. The Enter mode's only additions are a command that copies all data from the previous record into the current one and another command that duplicates only the entry from the same field in the preceding record. With so little difference between the two modes, Alpha Software could save menu space and further simplify program operation by chucking the Enter mode altogether.

Like both dBASE III Plus and Paradox, Alpha/three offers a Browse mode that displays records in spreadsheetlike rows and columns (see Screen 2). Unlike the other programs, however, Alpha/three does not let you make

Cathy	Hite	Boston Software	45 Beacon Street
Herb	Cohen	Micro Magic	45 Federal Street
Dean	McDona 1d	Cambridge Micro	6 Prudential Center
Winston	Abraus	Micro Software Associates	178 May Lane
Ed	Jenkins	CommSoftCo	York Place
Linda	Dodd	Integrated Concepts	16 Newbury Street
Steven	Wendell	CompuStyle	42 Melrose Avenue
Wendy	Richardson	Software Center	38 B Street
John	King	Systems Plus	163 Cambridge Road
Martin	Dawson	Alpha Omega, Inc.	27 Summer St
Robert	Brown	System Center	6 Executive Park
Robert	Pollock	Computer Automation, Inc.	8 Zenith Drive
Henry	Smith	InfoCo	16 Main Street
Pete	Roberts	The Smart Office	3303 Bernuda Dr
Richard	Queen	Computervision	477 Cider Mill Drive
Lew	Litton	Computers Without Fear	1715 Cherry Street
Maurice	Oscar	Advanced Technologies	12003 Saxon Street
Brad	James	Samantha's Software Store	185 Albany St
Leonard	Burton	Active Corporation	14019 Pike Road
Simon	White	First Software	One Center Place
ROWSE		Record : 18	

Screen 2: Offering a tabular format similar to those offered by dBASE III Plus and Paradox, Alpha/three's Browse mode provides a convenient way to view-but not change-records.

changes while viewing records in this tabular format; to do so you must go into the Change half of the View/Change Data mode, which returns you to the singlerecord format. Because the Find command combs through already-sorted fields in the primary index, it's the fastest way to find the data you need. You simply press the F key and type in the character string;



Like Paradox, Alpha/three stores all records matching search criteria in a temporary search file.

Alphalthree's Browse table uses the same field order vou established with individual records and lists records sorted by the primary indexed field. A few commonsense kevstrokes move vou through the Browse table at a regrettably slow pace. When you scroll through records, Alphal three freezes the table heading so you know which field is which, but it won't freeze columns when panning, as does dBASE III Plus. Nonetheless, it's a cinch to alter column widths and reorder or delete fields and records, processes that would require fancy dBASE dot-prompt commands or several selections from the Assistant. You can save these rearrangements as templates, which Alpha/three automatically applies in the Browse mode to specified data bases.

Smooth Searching Alpha/three provides a number of moderately powerful techniques for retrieving data. For starters, the program's Find and Locate commands are virtually identical to their dBASE counterparts. Both are available from the command line in either the View or the Browse mode.

quotes are not necessary, as they are with *dBASE*'s SEEK command. If it can't find the string, Find always summons the record with the closest match.

Rather than take advantage of an index, the Locate command examines each record until a match is found. As you might expect, Locate is generally slower than Find, but you can speed things up by limiting its quest to certain fields. In addition, the Locate command is not case sensitive, and you can even find an embedded character string without entering any fancy commands.

For more powerful data retrieval, Alpha/three provides the Search Data command. This command is designed to work with multiple search criteria, which you can use to provide on-screen or hard-copy query reports when needed. Like Paradox, Alphalthree stores all records matching the search criteria in a temporary search file. Thus you can progressively hone a large data base, culling selected records until you single out the ones you want. Alphal three also makes it easy to edit and save the search file for later use.

The program provides two methods for setting up search criteria: Table mode and Equation mode. The menu-driven Table mode offers pop-up lists of available field names and operators. In a sense, this approach is a cross between dBASE III Plus's CREATE QUERY command and Paradox's query-by-example routine. You simply specify the field. select one of the elementary operators (which qualify searches for both numeric values and character strings), and enter the value or string of characters. By entering AND or OR operators, you can combine search criteria for up to 20 fields in a single query. As icing on the cake, a "sounds-like" operator retrieves close matches for misspelled character strings.

The Equation mode is the closest Alpha/three comes to being command-driven. To create a search formula, you're supplied with a blank line almost as intimidating as dBASE's dot prompt. Your apprehension will vanish, however, when you discover two pop-up menus, one listing all fields in the data base and another listing all of Alpha/three's functions and operators (see Figure 1). The latter menu will drop commands onto the blank formula line in the proper syntax; all you need to do is type in the substring or value surrounded by quotes.

Alphalthree's lack of relational capabilities is probably its weakest point. The program's limited multifile capabilities break down into two types: updating and joining. Updating is represented by the Post command, which could apply new values from, say, a sales transaction file to an inventory file. In this operation, the transaction file could add values to or subtract

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them from fields in the inventory file, or replace the fields in the inventory file entirely.

File-joining operations are represented by the Join, Intersect, and Subtract commands. Alpha/three's Intersect command is equivalent to dBASE's IOIN, which combines two files to yield a third output data base, but only when the original two files' field arrangements match. Alpha/three's Join command, on the other hand, simply combines all records in the two data bases to produce a composite third data base. Finally, the Subtract command creates an output file of records that have no matches in the two original files.

Reporting for Duty Alpha/three's report generator is one of the program's most appealing aspects. Up to 26 reports can be created for each data base, all of which are listed on the main report menu. Depending on your patience and needs, you can generate one of two report types: Quick reports are based on a default layout that you can modify, and custom reports enable you to arrange fields from scratch.

In both cases you position fields using a graphic report-layout screen (see Screen 3). Report pages are broken down into four sections: page header, titles, detail, and summary. These pages can be further enhanced by adding subgroups, subtotals, subgroup headers, and simple calculations on numeric fields. *Alpha/three* supports a whopping 120 printers and exploits the special printing attributes of most brands.

Defining either a quick report or a custom report takes only a few steps. First you specify general parameters, such as report width (up to 240 columns), levels of subgrouping, and so on. Then you select the subtotal fields and the fields from the data base you want to include and add headers or footers. The program supports three levels of report subgroupings—one more than *dBASE III Plus*, but fewer than *Paradox*'s essentially unlimited number. The report-layout screen is similar to that of *Paradox*'s, offering four auxiliary screens to speed the formatting process.

Alpha/three also enables you to print out input forms, a handy feature for collecting information for data entry. In addition, the program offers an unusually complete array of features for printing form letters and mailing labels. Using Alpha/three's built-in word processor, you can create form letters that include calculated fields and

paragraphs that print only under certain conditions. The word processor is fairly rudimentary, although it does include word-wrap, block-move, copy, and delete functions. The conditional paragraph feature is especially appropriate for dunning letters; based on the date and overdue penalty data computed by calculated fields, the program could insert paragraphs with progressively sterner messages.

Form letter design features include left or right justification and centering, plus the ability to remove trailing blanks, thereby eliminating the telltale form letter look. You can also omit a line of text in a letter if a field is empty and include dates in any of eight different formats. Other form letter features worth noting are

Customer List Report  Y- Titles  A First Last Name Mame Company City State Zip  A Y- Detail  Y- Summary Section	Customer List Report  V- Titles  A First Last Mame Mame Company City State Zip
o First Last Name Mame Company City State Zip	o First Last Mame Mame Company City State Zip
V- Detail	
	V- Summary Section
Number of Customers:	Mumber of Customers:

Screen 3: Like Paradox, Alpha/three provides default report templates that you can customize as needed.

automatic reformatting for field insertions and adjustable margins within the body of the text.

For mailing labels you can include messages and even calculated fields. Thanks to plainly worded parameter descriptions and four default label sizes, the label definition screen makes label design painless. In contrast to dBASE III Plus's command-driven approach to label formatting, Alphalthree enables you to place fields where you want them using a full-scale label mock-up on screen, which makes justification and last-minute index changes easy to perform.

A Time-Saving Solution In addition to the main program's ample features, *Alpha/three* offers a number of interesting utilities. Some of these help calculate field statistics and summarize information from different data bases, while others offer global updates, hard disk housecleaning, and extensive data translation.

Two utilities let you globally update, delete, or change all—or selected groups of—fields and records in a file. When altering numeric field data, you can either place a constant value into fields or insert formulas. In addition, a Condense command deletes records with duplicate entries in primary indexed fields; naturally, you can list these records first to make sure you want to get rid of them.

One of *Alphalthree*'s strongest selling points is its data translation ability. The Transfer Data utility not only recognizes numerous data file formats, it's also bidirectional—a rare commodity in a

world where vendors like to lock new users into proprietary schemes. In addition to using dBASE III files, Alpha/three imports and exports dBASE II, SYLK, DIF, pfs:file, 1-2-3, and comma-delimited ASCII files. The program will also import but not export MultiMate files.

Alpha/three's manual isn't as congenial as the program, but it does cover all you need to know in explicit detail. The reference section is well organized, mirroring the order of options on the main menu, and examples are plentiful. The tutorial section is logically structured and complemented by sample files on disk. A complete index and glossary—coupled with appendices for hardware configuration, performance optimization, and error messages—round out the package.

One significant omission is the lack of on-line help. Error messages are sometimes cryptic, and some are missing from the error message glossary. With an incorrect CONFIG.SYS file, for example, the program greets you with "Path error 75" when you try to open a data base; a subsequent screen—which you can escape only by restarting your system—tells you to put your data disk in drive C:.

Alpha/three has a few other rough spots, such as the redundant View/Change Data and Enter modes, but the overall intuitive design makes it unlikely that you'll run into trouble. In short, this is one of the most easy-to-use data management products available. And because Alpha/three's data, memo, and index files are all compatible with dBASE III, third-party products such as report generators and front-end applications

should also coexist with files created by *Alphalthree*.

With easy reporting, a low price tag, and a smoother user interface than the Assistant, it's safe to assume that a number of businesses that have standardized on dBASE will buy Alpha/three rather than more copies of Ashton-Tate's leviathan. Nobody but hardcore dBASE experts or those running custom programs will miss the high-end functions, and Alphal three's eminent compatibility will ensure that programmers can use dBASE routines on Alphalthree files without modification. In a sense, Alpha Software has beaten Ashton-Tate at its own game, delivering a way to handle dBASE files that lay users can live with.

Bob Cowart is a Berkeley freelance writer and the author of The ABCs of dBASE III Plus (Sybex, Berkeley, California, 1986). Benchmark tests were performed by the Lambda Group, a San Francisco-based consulting firm specializing in the integration of personal computers in business.

Alpha/three
Alpha Software
30 B St.
Burlington, MA 01803
800/451-1018
List price: \$395
Requirements: 320K RAM, two
floppy disk drives (hard disk
recommended), DOS 2.00 or
later version

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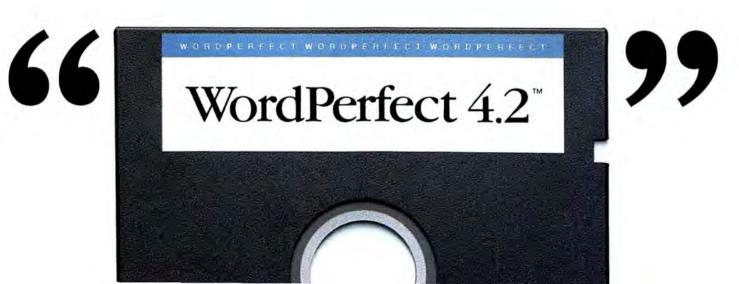
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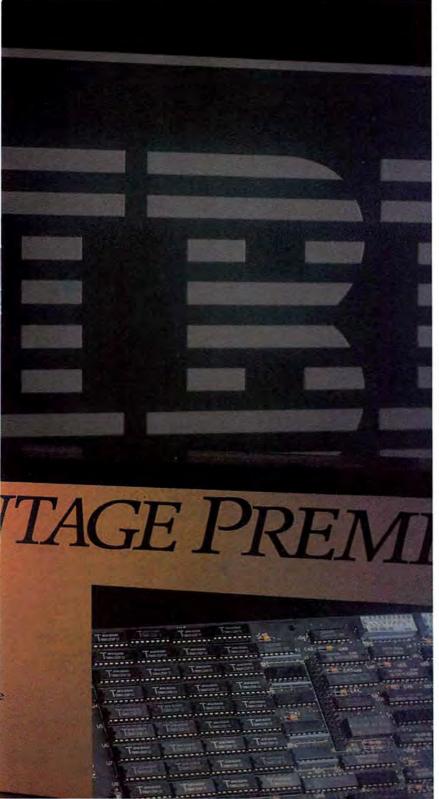
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# The Tailored Tabloid

With a few carefully crafted Microsoft Access scripts, you can call the shots and print only the news that you see fit—without lifting a finger.

Jim Heid

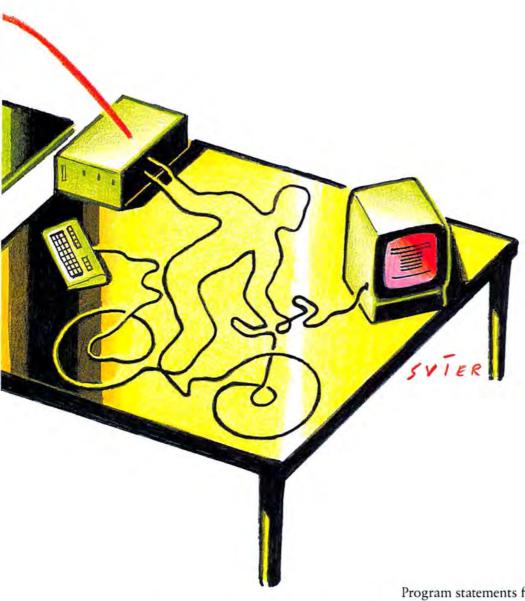
The idea of sampling late-breaking news by modem sounds better on paper than it plays. The problem is obvious: Few busy businesspeople have the time to rev up, log in, download, and print out first thing in the morning, especially when a tidy tabloid awaits on the front stoop.

But powerful communications programs like *Microsoft Access* are transforming the fanciful into the practical. With the Microsoft Access Script Command (MASC) language, you can create a series of scripts that automate the dirty work of compiling a truly personal newspaper (see "Equal Access," *PCW*, January 1986).

Any competent communications software permits unattended operation, in which the program awaits a specified witching hour before initiating a session. *Access*, however, is the first PC package with a complete programming language that empowers

scripts to display menus, respond to predefined user instruction, and capture data selectively based on information service responses.

Access's gift for automation was the inspiration for Personal Paper, a collection of MASC scripts that automatically assembles a personal newspaper by culling information from NewsNet, CompuServe, and Dow Jones News/Retrieval. Personal Paper takes advantage of NewsNet's NewsFlash and CompuServe's Executive News Service (ENS), which "clip" stories that contain the search keywords you specify (see "All the News That's Fit to Download," PCW, November 1986). These clipping services greatly simplify the writing of news-gathering scripts, because the scripts themselves need not contain the search keywords.



Personal Paper obtains closing stock quotations on companies of your choice from Dow Jones News/Retrieval, which it accesses through MCI Mail. And because both MCI Mail and CompuServe provide electronic mail service, Personal Paper checks your electronic mailboxes and retrieves any unread communiqués.

Taking full advantage of Personal Paper—or creating your own news-gathering empire on the fly—requires technical competence with a communications package, at least some mastery of a BASIC-like language, and—to a lesser extent—subscriptions to one or more information services. Access to CompuServe is mandatory: Program listings have been uploaded to that service.

Program statements fill roughly a dozen singlespaced pages—more than most rational individuals are willing to crib from the pages of a magazine. Because CompuServe is one of Personal Paper's information services, script files have been uploaded to a library on CompuServe's Microsoft forum. (For retrieval instructions, see the sidebar "Downloading Personal Paper.")

While Personal Paper is not truly generic, it's possible to build a similar operation within another communications program that features a high-level script language such as Crosstalk Mark 4. Mark 4's

PC World 257

#### **Downloading Personal Paper**

The seven Personal Paper script files are stored in the *Access* data library of Microsoft's forum on CompuServe. You can download the files by following these steps:

Sign on to CompuServe and type **go msoft < Enter >** at any menu prompt. If this is the first time you've accessed Microsoft's forum, you'll receive a short greeting and be asked for your name.

When the forum's main menu appears, type DL9 < Enter > to gain entrée to data library 9 (Access). You'll next see the data library's menu; type cat/des/key:personal paper < Enter > . This sequence tells the forum to display a catalog and description of all files that have the words personal paper in their keywords field.

A list of all files by their Compu-Serve name, size, and description will appear. The description includes the name you must give the file when downloading it in order to use it. Jot down each file's 9-character Compu-Serve name, as well as the name that appears in the description; you'll use both when downloading.

When the menu reappears, type dow filename, using CompuServe's name for the first file you're downloading. CompuServe will display a short menu of available transfer protocols. Select 1 (XMODEM) and press < Enter > . The service will advise you that the transfer has begun.

Press < F10 > to bring up Access's Session menu, then choose Transfer Protocol Receive. Type the name that appeared in that file's CompuServe description, and press < Enter > . Access's status lines will keep you posted on the progress of the transfer.

When the transfer is complete, repeat this process for the remaining six files. –*J. H.* 

string handling and disk input/output statements differ from MASC's, necessitating a slightly different approach to filtering extraneous material from captured text (see the sidebar "Unmasking MASC").

Looking Sharp

Capturing raw text is one thing; making it look good is another. Here, MASC's disk input/ouput and string-testing statements spruce up an otherwise lifeless mass of gray. Personal Paper's formatting script uses such statements to separate the wheat from the

chaff, examining captured text line by line and dispensing with information service commands. The formatting script also inserts escape codes that summon various Hewlett-Packard LaserJet fonts.

The end result? A painstaking process made painless: When you greet your PC in the morning, pressing Y prints your tailor-made newspaper.

Personal Paper consists of seven script files (see Figure 1). PAPER.SCR contains the code that displays the main menu, opens and reads the configuration file containing your ID numbers and passwords, and waits until the designated time before beginning the daily download. SETUP.SCR contains the routines for creating and saving the configuration file. The GETFLASH.SCR, COMPU.SCR, and MCIDOW.SCR files conduct the dialogue with NewsNet,

CompuServe, and MCI Mail, respectively. FILTER. SCR examines the captured news, discards information service prompts and other clutter, and formats the text for printing. Finally, HELP.SCR displays the brief help screen when you select the main menu's help command.

#### Setting the Stage

Personal Paper can be broken down into three basic elements: information service news-gathering profiles, MASC scripts that access the services and round up the news, and a script that formats output for a laser printer. Note that the information services do the searching—Personal Paper performs the collection and packaging chores. (Note also that there's one obvious caveat to producing a personalized newspaper: You'll need to leave your PC and modem on round the clock, or at least keep your system on a timer. To avoid branding images into your display, simply turn down the brightness or add a screen-blanking utility to your AUTOEXEC.BAT file.)

The key to automating communications is knowing what to look for. Scripts must recognize not only information service responses to commands but also the presence of given conditions (such as the existence of electronic mail). Barring any change in the information service's command structure, a properly written script will execute dutifully each day.

Because you may be writing scripts that others will use, keep in mind that most information services can be configured in various ways. You can tell News-Net to pause after every screen until you press <Enter>, for example, or instruct CompuServe to automatically access the EasyPlex electronic mail system. In the latter case, you'll want to ensure that no user intervention is required after each screenful of text is received. Because Personal Paper expects each information service to act in a certain way, be sure to configure NewsNet and CompuServe as specified in Figure 2.

In similar fashion, Personal Paper accesses NewsNet through the Telenet network, CompuServe through a direct CompuServe node, and MCI Mail and Dow Jones through Tymnet. The networks and configurations that Personal Paper uses are popular

#### PAPER.SCR

Checks for configuration file; enables you to create one using SETUP.SCR if one isn't found. Displays main menu; lets you display the help screen, run the setup script, and initiate the wait-for-start-time process.

#### SETUP.SCR

Runs automatically if no configuration file exists; otherwise, runs when you type C from Personal Paper's main menu. Lets you enter NewsNet, CompuServe, and MCI Mail IDs and passwords; start-up time; and up to five company symbols for Dow Jones quotes.

#### **GETFLASH.SCR**

Calls NewsNet and retrieves any NewsFlash hits.

#### COMPU.SCR

Calls CompuServe, retrieves any waiting mail, then retrieves any Executive News Service hits in your folder.

#### MCIDOW.SCR

Calls MCI Mail, retrieves any waiting mail, then enters Dow Jones/News Retrieval and retrieves stock quotes for the companies whose symbols you entered in the configuration screen.

#### FILTER.SCR

Reads the files containing the captured text, discards information service commands and prompts, then formats the text for printing.

#### HELP.SCR

Displays a brief help screen when you type H from the main menu.

Figure 1: This flowchart illustrates the execution sequence of six Personal Paper scripts. Note that the Help script, a seventh file, lives outside that sequence and thus can be executed at any time.

#### **Unmasking MASC**

While Personal Paper is too extensive for a line-by-line description, a look at key statements and routines—along with a completed script—can help demystify MASC and give you a head start on writing your own scripts.

Personal Paper is built around MASC's MATCH and SEND statements. MATCH causes the script to wait until the host computer sends specified text. The statement MATCH "Godot", for example, would tell Access to wait for 'Godot' to come over the line. If the text didn't appear within a certain amount of time (the default is 30 seconds), MASC would generate an error code. Personal Paper uses the error code along with the ERROR statement to verify that a connection has been established and that the log-on attempt was successful (see Listing A). As its name implies, SEND transmits a text string to the computer on which the service resides.

Personal Paper also uses the MATCH statement's big brother, the MATCHBEGIN/MATCHEND construct. With this structure, you can test for up to 16 text strings. The CompuServe and MCI Mail scripts use MATCHBEGIN to determine whether mail is waiting (see Listing B).

To use text-matching statements, you need to know what text to expect and when to expect it. Before writing

script files, conduct a communications session and print and examine the ensuing dialogue. You could prototype your scripts with the Access Learn command, which records keystrokes as they occur. The drawback to this, however, is that error traps and multiple matches (MATCHBEGIN/MATCHEND) must still be added manually. Learn is most appropriate for quick-and-dirty auto-log-on sequences. NewsNet sends 'NewsFlash Notification' when news awaits, while an empty mailbox prompts MCI Mail to advise, 'There are no messages waiting in your INBOX.'

You need not include an entire text string in the MATCH statement; instead, limit text to a few key words. The longer the text string, the greater the risk of a match failure due to a momentary glitch on the phone line. Personal Paper's MCI Mail script, for instance, checks only for the text 'There are no' to determine that no mail is present.

MASC's IF... THEN conditional statements are also key elements in Personal Paper. Paired with the CONFIRM statement, IF... THEN lets you select commands. CONFIRM is a handy way to display a prompt and wait for keyboard input. Accomplishing the same thing in BASIC would involve a PRINT statement followed by an INPUT statement or INKEY\$ loop followed by a test to ensure that you typed only acceptable characters.

(continues)

```
attempt = 1
sign on:
        type "Connecting to MCI/Dow Jones. Attempt", attempt;
        type "at ", time$
connect "MCIMAIL"
         if error then goto connect failed
        wait 2
send "a";
        match "log in: "
        if error then goto connect failed
        (log-in statements here)
connect failed:
        disconnect
        type "Attempt", attempt;
type "unsuccessful."
         attempt = attempt + 1
         if attempt < 4 then goto sign_on
         type "Unable to establish MCI/Dow Jones connection after three tries."
         mcidow = 0
        chain next_script$
```

Listing A: Using an error code and the MASC ERROR statement, Personal Paper ensures that connections have been made.

```
matchbegin
case "There are no"
type "No mail.";
goto get_quotes
case "Your INBOX has"
goto get_mail
matchend
```

Listing B: This excerpt from the MCI Mail script demonstrates the MATCHBEGIN and MATCHEND statements in action.

Notice, too, that Personal Paper's prompts follow Microsoft's style: 'Enter command letter' rather than 'What is your choice?' This touch gives scripts a familiar feel. And with Microsoft's custom menu developer's kit, you can create bottom-of-the-screen, Microsoft-like menus.

Personal Paper also exploits MASC's text-formatting and window-control statements to produce screen displays. MASC's CLW statement clears the current window, POS moves the cursor to the row and column denoted by its arguments, and TYPE puts text on the screen without sending it over the communications line. TYPE and the TIME\$ function generate the status messages in Personal Paper's lower window.

The windows themselves are built with the WINDOW function. WINDOW is a bit unorthodox; its actions vary depending on the keywords or values between its parentheses. For example, WINDOW(2,1) closes window number 1; WINDOW(3,2) assigns the active communications line to window number 2.

Because (3,2) and (2,1) are fairly cryptic, MASC's authors wisely defined constants that represent WINDOW arguments. WINDOW statements that include these constants are easier to decipher—WINDOW (WCLOSE,1) to close window 1, and WINDOW(WASSIGN,2) to assign the communications line to window 2. Personal Paper also uses WSPLIT to split the opening window into two, WSCRIPT to assign the output of

TYPE statements to the lower window, and WBORDER to turn on window borders.

Another unorthodox characteristic of the WINDOW function is its requirement that you precede it with a dummy variable and equal sign, as in DUMMY = WINDOW (WCLOSE,1). Omitting them evokes the error message 'Not a valid syntax'.

Your incoming news would evaporate into free electrons without MASC's text-capturing and diskaccess statements. CAPOPEN and CAPCLOSE open and close capture files. CAPOPEN followed by a file name tells Access to open that file and wipe out any existing text. Adding a value (other than zero) to the end of the statement-as in CAPOPEN filename,1-tells Access to tack incoming text on to the end of existing text. This append option appears in the MCI Mail and CompuServe scripts (see Listing C, the entire MCI Mail/ Dow Jones script, for a look at CAPOPEN in action).

FILTER.SCR, Personal Paper's text-formatting script, exercises a group of MASC disk access statements—OPEN, CLOSE, READ, and WRITE. (Unlike CAPOPEN, which writes a file at a time, these lower-level statements deal with one record at a time.) FILTER opens one capture file for input and another for output. It then reads each line of the capture file, examining it with MID\$, a string-slicing function. Information service prompts or commands are skipped; otherwise, text is written to the new file. Personal Paper prints the

(continues)

```
' ---- MCIDOW.SCR - Part of Personal Paper
' (c) 1986 by Jim Heid & PC World Communications, Inc. All rights reserved.
' Permission is hereby granted for noncommercial distribution
' provided this copyright message remains intact.
' MCI Mail/Dow Jones script: accesses MCI Mail and Dow Jones
 and retrieves mail and stock quotes for the companies defined in the
 configuration screen
' Last revised October 15, 1986
next_script$ = "filter"
attempt = 1
wait 3
sign on:
        type "Connecting to MCI/Dow Jones. Attempt ", attempt ;
        type " at ", time$
        connect "MCIMAIL"
        if error then goto connect failed
        wait 2
        send "a";
        match "log in: "
        if error then goto connect failed
        send "mcimail"
        match "user name: ",14
        send dowid$
match "Password: ",10
        send dowpass$
        type "MCI Mail/Dow Jones log-in completed at " , time$
matchbegin
        case "There are no"
                type "No mail. ";
                goto get_quotes
        case "Your INBOX has"
                goto get_mail
matchend
get_mail:
        type "Mail found.";
        match "EXIT): ", 60
        send "read"
        match "EXIT): ", 60
        send "inbox"
        match "^J"
        capopen "mcifile"
        type "Mail capture started at ", time$
        match "EXIT): " , 180
        send "next"
test_for_more:
        matchbegin
               case "Your READ"
                       capclose
                       type "Mail capture completed at ", time$
(continues)
```

Listing C: The entire MCI Mail/Dow Jones script

PC World

```
goto get_quotes
                 case "ANS EACH"
                        match "EXIT): "
                         send "next"
                         goto test for more
        matchend
get_quotes:
        match "EXIT): "
        send "dowjones"
        type "Activated Dow Jones at " , time$
        match "ENTER QUERY"
        wait 1
              "//cqe"
        send
        match "^J
        send companies$
        match "^J"
        capopen "mcifile", 1 match "^M^M "
        capclose
        type "All quotes received at " , time$
        send "disc"
        type "Left Dow Jones at ", time$
        match "EXIT): ",12
        send "exit"
        type "Left MCI Mail at ", time$
        match "log in: ",10
        disconnect
        type "Disconnected at ", time$
        mcidow = 1
        chain next_script$
stop
connect_failed:
        disconnect
        type "Attempt ", attempt ;
type " unsuccessful."
        attempt = attempt + 1
        if attempt < 4 then goto sign on
        type "Unable to establish MCI/Dow Jones connection after three tries."
        mcidow = 0
        chain next script$
```

Listing C (continued)

new files using the PRINTFILE statement.

Personal Paper calls two other MASC disk-oriented statements, EXISTS and DELETE, to clear capture files left over from a previous session. EXISTS lets you check for a file's existence, while DELETE lets you expunge it. Together, they work nicely: IF EXISTS(filename) THEN DELETE (filename).

Finally, Personal Paper makes good use of labels, the names that you assign to sections of code. In any programming language, labels are a better way to refer to code than line numbers (assuming you choose label names that accurately describe a routine's purpose). GOTO GET\_EMAIL, for example, is far clearer than GOTO 1500. –J. H.

ones; if you use different networks or access a service like MCI directly, you'll need to change settings or edit the appropriate scripts. (For insights on tinkering with Personal Paper scripts, see the sidebar "Customizing and Troubleshooting.")

The remaining setup step involves creating entries in *Access*'s Phonebook for the three Personal Paper services. Each Phonebook entry stores the telephone number, communications settings, and Quickey (macro) assignments for a given service. Using the Phonebook circumvents the need to store phone numbers and settings in the scripts themselves and makes Personal Paper setup that much easier. Personal Paper looks for Phonebook entries named NEWSNET, COMPUSV, and MCIMAIL.

Use the Session menu's Phonebook selection to create entries. Alternatively, you can enter Phonebook information from the Session menu's Connect selection; your log-on scheme will be added to the Phonebook before you exit the program.

#### Keywords Are the Key

The real workhorses behind Personal Paper are NewsNet's NewsFlash and the CompuServe ENS clipping folder. It's important that you configure their news-gathering operations carefully. The more accurately you describe your fields of interest, the more personal your newspaper will be.

Access provides custom menus for NewsNet, CompuServe, and MCI that enable you to connect with these services through Access even if you don't know their native commands. To set up a NewsFlash profile, use the Access custom menu Flash. Its Add command enables you to specify keyword phrases and service codes. Or, you can create your NewsFlash profile manually by typing the required NewsNet commands.

Although Access offers a custom menu for CompuServe, it lacks one that's specific to CompuServe's ENS. To create a clipping folder, type go ens < Enter > at any CompuServe menu prompt. From there, menus walk you through the process of creating a clipping folder.

Before attempting to use custom menus on a hard disk, make sure the custom menu script files

Figure 2: Configuration requirements for Personal Paper services

#### CompuServe

- Create Executive News Service clipping folder.
- Configure EasyPlex mail to display short prompts, with no pauses between pages.
- Enter EasyPlex, choose 6, SET Options, then use options 2 and 3 to change mode of operation to PROMPT and paged output to NO.
- Configure service options to disable paged display.
- Type go profile at any prompt; choose 1, Terminal Settings; choose 6, Setting Your Service Options; then choose 2,
   Paged Display, to alternate between paged and continuous display. Command should read 'Paged Display Disabled'.
- Configure CompuServe to enter EasyPlex when you have mail waiting.
- Type go profile from any prompt, then choose 3, Setting Your Logon Actions, and specify that EasyPlex be activated when mail is waiting.

#### MCI Mail/Dow Jones

- Configure MCI Mail to keep from pausing after each screenful of text.
- Type account < Enter > and answer yes when asked if you wish to see your current account settings.
- Type term < Enter > ; MCI Mail asks, 'Do you have a video or paper terminal?'
- Type paper < Enter > . Press < Enter > again, then type perm when asked if the new settings should be permanent or temporary.

#### NewsNet

• Create NewsFlash profile (no other special configuration required).

have been copied to the MSTOOLS subdirectory. On a floppy system, place the Information Services and Utilities Disk in drive B:, select the Connect command, and type the service's name as it appears in the Phonebook (or simply confirm that selection as it appears). Once you're logged on to a service, you can activate its custom menu by selecting the Run Script command and typing the name of the appropriate script. To skip a custom menu (as you would to change the service's configuration, for example), use the Bypass command.

#### **Customizing and Troubleshooting**

Any program contains room for customization, and programs that automate communications sessions are roomier than most. In that light, you may want to tackle the basic modifications of Personal Paper that follow.

Removing a service or changing the sequence of services. Within the first few lines of Personal Paper's PAPER, GETFLASH, COMPUSV, and MCIDOW scripts is the line NEXT\_SCRIPT\$ = "filename" (where a script name replaces "filename"). Each script passes control to the script set off in quotes. To remove a service or to change the order in which Personal Paper calls services, simply replace the name in quotes with a different script name.

Changing a service's log-on sequence. If you access a service through a network that Personal Paper doesn't use, your log-on routine will necessarily depart from those included in the program. To change log-on sequences, print a log-on session, and then edit the MATCH and SEND statements in that service's SIGN\_ON routine to reflect the new log-on dialogue.

Modifying printer escape codes. The three lines that open the FILTER script contain the Hewlett-Packard LaserJet escape codes for headline text (the string variable HEAD\_TEXT\$) and body text

(REGULAR\_TEXT\$). To change the control codes, replace text that appears in quotation marks with your printer's codes. Similarly, to increase or decrease the width of the left margin (which may be advisable when using a dot matrix printer), add or remove spaces from the line that defines LEFT\_MARGIN\$.

Even if you don't need to modify the program, sooner or later you'll probably need to figure out why things have momentarily gone astray. In telecommunications, after all, Murphy's Law is strictly enforced. You may want to refer to the following roundup of representative problems and likely solutions.

Unsuccessful sign-ons. Personal Paper makes three attempts to access a service before giving up. If the program consistently fails to connect to a given service, recheck the ID number and password in Personal Paper's setup screen; do the same for the service's phone number and settings in the Access Phonebook. If you can't access any services, use Access's Options command to verify that settings for the modem and dialing method (pulse or tone) jibe with your hardware.

Mismatched communications. If a given service fails to respond to a script's commands, or if the script isn't responding to data that the service sends, the service may have revised its commands or rephrased a response, thus rendering the script's SEND and MATCH statements obsolete. You can remedy the situation by conducting a session without scripts, printing the ensuing dialogue, then editing the script to reflect the change.

Alternatively, noise on the phone line may be disrupting your attempts to make a connection. Scroll through Personal Paper's upper window to examine the communications session. Garbage characters in the text indicate a poor connection.

Errors or inactivity. If an information service displays an error message or sits idle awaiting a command, watch the screen closely. Should Personal Paper begin issuing flawed marching orders or send nothing at all, press <Esc> twice, and then type Y to confirm the Access prompt, 'Enter Y to terminate script run or N to continue'. Select the Disconnect command to stop the on-line meter.

Of course, it's always conceivable that the script contains some bugs. While all scripts have been thoroughly tested, nothing seems to bring out the critters faster than labeling a project complete. If you squash a bug or enhance a script, upload it to the Microsoft SIG. The dynamic nature of life on line ensures that Personal Paper will evolve. –*I. H.* 

#### Specifying the Search

Whether you're creating an ENS clipping folder or a NewsFlash file, the same imperative applies: Build your lists of search keywords carefully. If you specify vague search phrases like 'United States', you'll receive a welter of articles irrelevant to your concerns. If you're interested in U.S. involvement in Nicaragua, specify 'United States + Nicaragua'. For NewsNet, CompuServe, and many other services, an asterisk serves as a wildcard to locate various permutations of a given keyword.

Remember, the premise behind a personal, idiosyncratic newspaper is selectivity. If you're coming up with effluvia, fine-tune your search phrases.

Personal Paper is ideal for the individual with eclectic tastes. Suppose you manage a Boston firm that manufactures products for cleaning up toxic waste sites. You might regularly peruse a host of publications available on NewsNet, including the Hazardous Waste News, Toxic Materials News, Toxic Materials Transport, Sludge Newsletter, and Nuclear Waste News. Your interest in these periodicals may not be entirely professional; you might own a vacation home on a New Hampshire lake, near a spot the federal government has targeted for a high-level nuclear waste dump.

As an avid PC user, you also regularly monitor the latest tidbits from the Seybold Report on Professional Computing. In the wider context of the day's events, you rely on CompuServe's ENS, which offers news from the Associated Press (AP) and the Washington Post. At the moment, you're keenly interested in South Africa and in nuclear arms talks. On the local level, you want to keep tabs on Massachusetts and New Hampshire politics, and you're a jazz fan, so you tap the AP entertainment wire for the latest on jazz artists in the Boston area. And, like many Massachusetts masochists, you're a New England Patriots fan: You must keep abreast of happenings in Foxboro, even if it hurts. Finally, you own shares of AT&T, USX, and three mutual funds, and want Dow Jones News/Retrieval to ferret out their closing prices. Figure 3 outlines several search phrases that suggest how you can shape your periodical to reflect the full spectrum of your interests.

Figure 3: With these sample profiles for NewsNet's NewsFlash and CompuServe's Executive News Service, the key word is specificity.

#### NewsNet NewsFlash

Service code:	Keywords:
CH	hazardous waste + transport* + massachusetts
CH	waste + clean* + massachusetts
EV03	nuclear waste + new hampshire + dump
EC20	IBM + personal computer

#### CompuServe Executive News Service

#### Search wires:

AP Datastream Washington Post MA/RI and NH/VT State News Wires

#### Categories:

Entertainment, International News, Regional News, Sports, Washington News

#### Keyword phrases:

football + new england + patriots govern\* + massachusetts govern\* + new hampshire jazz + music\* + boston nuclear + arms + negotiation\* south africa + apartheid

Personal Paper on the Launch Pad
Once you've retrieved Personal Paper's script
files from CompuServe and established clipping service profiles, it's time to play Perry White. If your system is equipped with a hard disk, copy the script files to the directory in which *Access* resides. If you use a floppy-based system, place the disk containing the Personal Paper scripts in drive B:.

Set the PC's clock using the DOS TIME command, start Access, choose the Run Script command, then type paper < Enter > . (Alternatively, you can type access/paper < Enter > from the DOS prompt to start both Access and Personal Paper at once.) The first

time you run Personal Paper, you'll need to supply all user IDs and passwords, which will be stored in a configuration file called PAPERSET.CON.

The setup routine will prompt you for each ID and password, the time Personal Paper should go to work, and up to five company symbols used to retrieve Dow Jones quotes (see Screen 1). Verify your entries carefully before selecting the Save Changes



If you want to add pizzazz to the output, be prepared for an adventure in manual text formatting.

command; a miscue in a user ID or password will lock you out of that information service. In addition, leaving any item blank will prevent you from accessing the Personal Paper menu.

At the main menu, your choices increase (see Screen 2). You can summon help by pressing H, return to *Access*'s main menu by pressing Q, or wait until your start-up time by pressing W. If you opt to wait, a message will indicate both the current time and the start-up time.

If you're feeling impatient, type \*\*\* (<Shift>-8) to start immediately. When the program begins, the screen splits into two windows. The upper window monitors the dialogue that *Access* conducts with each information service; the lower window displays status information that indicates when each log-on occurred, whether news or mail was found, the number of attempts made to sign on to a given service, and so on.

#### Access in the Driver's Seat

As soon as the windows appear, the PC is on cruise control. While your presence isn't mandatory, it's advisable to conduct a test drive to make sure all systems are go. With an eye on the upper window, note how *Access* threads its way through each information service, capturing news "hits" and retrieving any correspondence. Once Personal Paper concludes its run, you can move around both windows by using the cursor keys, switching between windows with <F1>.

Personal Paper -- Change Setup

1. Change NewsNet user ID and password
2. Change CompuServe user ID and password
3. Change MCI/Dow Jones file user ID and password
4. Change automatic start-up time
5. Change Dow Jones stock quote companies
6. Save changes and return to Personal Paper's main menu.
7. Discard changes and return to Personal Paper's main menu.

Your current settings are

1. NewsNet ID: newsid Password: newspass
2. CompuServe ID: 55555,555 Password: pass?word
3. MCI/Dow Jones ID: pword Password: thisandthat
4. Automatic start-up time: 5:00:00
5. Closing stock companies: ibm aapl tan

Screen 1: The Personal Paper setup screen prompts you for information service IDs and passwords, a start time, and company symbols for Dow Jones quotes.

Enter command number lacksquare

Access: MCIMAIL OFFLINE L1W1

Personal Paper (c) 1986 by Jim Heid and PC World Communications, Inc.

W)ait until start time, then compile paper C)hange your user IDs, passwords, or stock quote symbols. H)elp Q)uit Personal Paper and return to Access' main menu

nter command letter 🛘

Access: MCIMAIL OFFLINE L1W1

Screen 2: From the Personal Paper main menu, you can choose to wait until your designated publication time or opt to accelerate the process.

Figure 4: The finished, laser-printed product bears a headline in Hewlett-Packard's 14-point Helvetica and body text in 10-point Times Roman.

#### COMPUSERVE NEWS

1/15/87

By MARYANN MROWCA Associated Press Writer

BOSTON (AP) -- A Rowley man took his rural town's fight against the Seabrook, N.H., nuclear power plant to Washington Sunday with high hopes of persuading federal officials to prevent the plant from starting up.

federal officials to prevent the plant from starting up.
Stephen Comley said he was taking to President Reagan petitions signed by about 2,000 residents opposed to Seabrook, which is 12 miles north of the Massachusetts town of about 4,000 people.

"It doesn't matter whether the population is large or small. It's still a good cross-section and anytime you've got more than 80 percent of the registered voters' signatures, people listen" said Comley, who has been organizing the town's efforts to stop the plant for the past four months.

Although he has no appointment to meet with the president, Comley said he plans to pound on the doors of congressmen and anyone else in Washington who will listen in an attempt to get the town's message across.

"There's no question in my mind that the material is going to get to the president's desk," he said.

The petition asks Reagan to request a moratorium on the startup of any new nuclear plants awaiting licenses "until you and we can be assured that we have the full information back from (the Soviet Union's) Chernobyl (nuclear accident) to make a responsible decision ... whether we should continue thinking that nuclear power is a safe (energy) alternative."

It also asks the president to set up a commission to investigate whether the Nuclear Regulatory Commission, which issues the operating licenses, is acting responsibly in saying the safety and concerns of people living near nuclear power plants are being addressed.

power plants are being addressed.

"We feel that the Nuclear Regulatory Commission has been negligent in not making themselves available and not calling us or being up on the issues in our town," the petition says.

"It seems that they have represented the nuclear industry very well but they have not encouraged the input of the people that may not be for nuclear power or (who) have concerns for safety in our area."

Federal regulations require nuclear plant officials to work with local communities within a 10-mile radius of the plant to develop evacuation plans in case of a plant emergency. The plans are required before the plant can receive its operating license.

NOR'TH HAMPTON, N.H. (AP) -- Former Secretary of State Alexander M. Haig Jr., attending a series of weekend receptions and political fund-raisers in New

Its collection chores complete, Personal Paper runs the text-formatting script. The program creates three files—MCIFILE, CISFILE, and NEWSFILE—that are not concatenated. Unless you intervene to change file names, Personal Paper will overwrite these files each day. (To maintain Personal Paper during your vacation, just name files by date and modify the FILTER script to avoid overwriting each day's files.) Once the captured files are formatted, you can print them by pressing Y. On a typical news day, Personal Paper is likely to be eight to ten pages in length.

Personal Paper sends escape sequences for the Hewlett-Packard LaserJet equipped with the F font cartridge. The final product bears a headline in HP's 14-point Helvetica that identifies the originating service. The date and the news itself are in 10-point Times Roman (see Figure 4). If you use a different printer or font cartridge, you'll need to edit these two lines of FILTER.SCR. Look for the comment line in FILTER.SCR that is followed by two string variables, HEAD\_TEXT\$ and BODY\_TEXT\$.

As hard copy, Personal Paper cuts a respectable figure, but the *Wall Street Journal* it isn't. Personal Paper is utilitarian; it accepts the 80-column ragged-right format of its news services and includes all hard carriage returns. You could, of course, load Personal Paper's captured text files into a desktop publishing program like *FrontPage* or play with a *Microsoft Word* style sheet to create headlines and multiple columns.

If you want to add pizzazz to the output, however, be prepared for an adventure in manual text formatting. To tailor the copy to your chosen margins, you'll need to strip out carriage returns after every



MASC's disk input/ouput and string-testing statements spruce up an otherwise lifeless mass of gray.

line but not after each paragraph. You'll also have to format each article headline in the desired font and style. And you'll want to throw in headers, footers, page numbers, and section headings to distinguish world news from sports, and so on. So while a spiffy presentation is possible, it can't be done automatically. And with Personal Paper, the accent assuredly is on automation.

Putting the Issue to Bed

You may be tempted to photocopy your handiwork for circulation throughout the office, especially if your publication is packed with industry-specific tidbits. You should know, however, that information services vary in what they allow you to do with captured text.

CompuServe's ENS permits you to distribute its AP and Washington Post material to "persons or companies affiliated with the user." NewsNet isn't quite as definitive: While the documentation condones "limited copying in the course of conducting day-to-day business," the very same manual states that anyone who routinely distributes search results to friends or clients could be prosecuted for copyright infringement and have his or her account canceled.

It's best to simply use common sense. You can't sell a desktop-published newsletter containing captured news, but you probably won't serve any time for routing your paper through the office.

How much will you pay for a personal communiqué? At this writing, NewsNet costs \$36 for non-prime-time, 1200-bps access; each NewsFlash hit costs 37 cents. CompuServe connect charges for 1200-bps access run \$12.50 per nonprime-time hour, and the tab for Dow Jones's quotes service is 44 cents per minute. A 12-minute session consisting of a 5-minute NewsNet access (to download ten stories), 5 minutes on CompuServe, and 2 minutes on Dow Jones would cost roughly \$10, including network access fees and phone charges. Clearly, the daily download isn't within everyone's reach. If you can live without daily industry-specific news, dropping the rather pricey NewsNet from your editorial staff would cut costs considerably.

Personal Paper demonstrates how *Access*'s MASC language can team up with the clipping features of NewsFlash and CompuServe's ENS to produce a newspaper that's yours alone.

Personal Paper also confirms that *Access*, already an impressive communications package, is a viable tool for developing communications-oriented applications. And it's particularly adept at delivering you from those nagging morning downloads.

Freelance writer Jim Heid is the author of dBASE Mac in Business (Ashton-Tate Publishing, Torrance, California, 1986) and the coauthor of The Complete Guide to the Tandy 1000 (Ashton-Tate Publishing, Torrance, California, 1986).

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### 1-2-3 Budget Tune-Up

Yearly budget estimates often fail to reflect reality as the months go by. An easy 1-2-3 application lets you incorporate current sales and cost figures into your budgetary forecasts.

#### Gregory R. Glau

If you use 1-2-3 to prepare your company's annual budget, you're well acquainted with the tedious process of revising estimated budget figures with every change in the wind. Despite your careful projections, sales don't always reach desired heights, costs often overleap estimates, and changes in market conditions can make your original forecast look ill-advised. Typically, estimates are reasonably accurate early in the budget period, but as the months pass and business conditions change, the numbers veer further and further off course.

One way to keep your budget figures meaningful is to build a 1-2-3 formula that combines actual budgetary data (up to the current month) with your budget estimates for the entire year. For example, if your company's sales increase 5 percent during the first few months of the year, the formula automatically increases your projected sales figures by 5 percent for the remaining months.

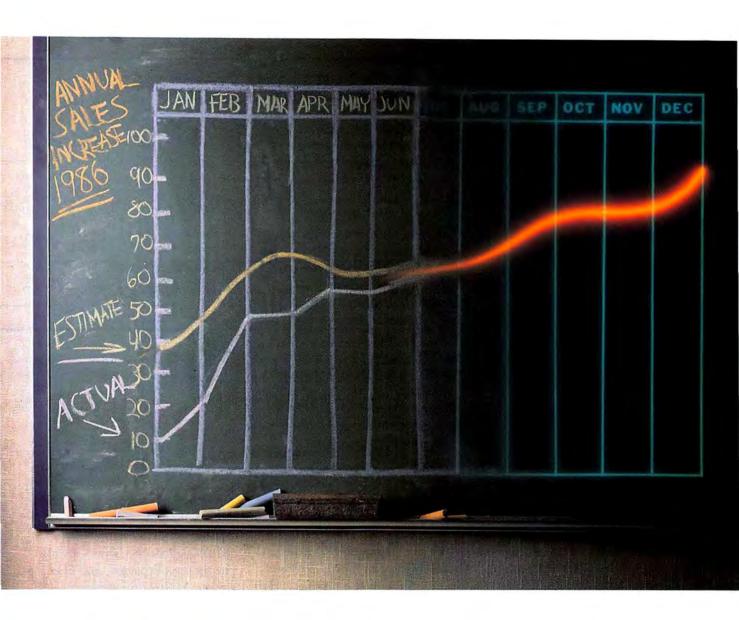
Early in the budget year, the projected figures won't be as accurate as they will be when there is more data on which to base projections. As you collect more actual data, the formula automatically averages the percentage increases and decreases in sales, costs, and other items, and the projected figures become more refined.

Budgeting From A to M
Budgeting is a tricky business that requires careful evaluation of alternative scenarios. Most people use cost and sales data from previous years in their budget estimates, combined with educated guesses about what the future holds. Figure 1 shows a sample estimated budget for monthly sales, costs, and cash balances from January through December. The example assumes an

all-cash business; that is, the company collects all money owed at the time of a sale. Your business might be different. If you allow customers to charge their purchases through your accounts receivable system, you'll collect only a portion of the money owed each month. In that case, you probably use the accrual method of accounting, in which sales and costs are recorded on a monthly basis, whether or not your company gets paid or pays its bills during the same month. The forecasting technique described in this article works well with either accounting method.

In Figure 1 monthly sales are estimated at \$100,000 for each month from January through June, and all costs are identical for those months. In real life, monthly sales and costs (even estimated ones) are never the same. However, using round figures as base monthly amounts makes it easier to see the dollar changes that occur in the actual and projected budgets. So as not to lose sight of the real world, more realistic business estimates are used from July through December.

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To set up the sample estimated budget, bring up a clean worksheet and use /Worksheet Global Column-Width to set the global column width to 10. Then widen column A to 24 spaces using /Worksheet Column Set-Width, and in cell A1 type in the label Cash Budget Worksheet (estimated at the start of the year) and press < Enter > . Type in the line items in cells A4 through A18 and enter the names of the months in rows B3 through M3 as shown in Figure 1.

To justify the names of the months at the right side of the columns, return to cell B3, select /Range Label Right < End > < CursorRight > < Enter > . Now, format the worksheet globally so that numbers appear with commas and without decimal fractions by selecting /Worksheet Global Format 0.

In this estimated budget grid and in the other two—which you'll create for actual and projected figures—rows 4, 5, 13, 14, 16, 17, and 18 require formulas. Of course, the formulas for January in column B are slightly different from those in columns C through M because January's formulas don't re-

fer to figures from December of the previous year. For example, row 5, Cumulative Sales, is the sum of the sales/cash figures of the previous months, but for January no previous sales/cash figure exists. Cell B5 simply contains January's sales/cash figure, so enter +B4 into cell B5. February's cumulative sales figure is generated by adding two values: January's cumulative sales from cell B5 plus February's total sales from cell C4. Type the formula +B5+C4 into cell C5.

All the cells in row 13, Total Costs, use the same formula because they add a similar series of numbers. Enter @SUM(B8.B11) into cell B13. To copy the formula into cell C13, place the pointer on cell B13 and select /Copy < Enter > < CursorRight > < Enter > . The formula in cell C13 should now be @SUM(C8..C11). Each cell in row 14, Cumulative Costs, is the sum of the total costs of the previous months, plus that of the current month. Because there isn't a total costs figure before January's, enter the formula +B13 into cell B14. For February's cumulative costs, add February's total costs to January's cumulative costs by typing + B14 + C13 into cell C14.

Most businesses carry over a cash balance from year to year. However, for the purposes of this example, January contains no beginning cash balance, so type 0 into cell B16. To make February's beginning cash balance reflect January's total cash balance, enter +B18 into cell C16. Similar formulas calculate the Net Cash Inflow (Sales/Cash minus Total Costs) for January and February; enter + B3 - B13 into cell B17 and use /Copy to copy the formula into cell C17. Finally, for January's and February's cash balance, enter + B16 + B17 into cell B18 and copy the formula into cell C18.

To separate the sales, costs, and cash balance sections of the grid, go to cell A6 and enter \\_ (backslash, underscore). Then type \(/Copy < Enter > . < CursorRight > < CursorRight > < CursorRight > < Enter > . To put repeated underscores on lines 15 and 19, type \(/Copy < Enter > A15.C15 < Enter > ./Copy < Enter > A19.C19 < Enter > . Next, you should copy the formulas and repeated under-

	A	В	C	D	E	F
	Cash Budget Worksheet	(estima	ted at th	e start o	f the yea	r)
		JAN	FEB	MAR	APR	MAY
	Sales/Cash	100,000	100,000	100,000	100,000	100,000
	Cumulative Sales	100,000	200,000	300,000	400,000	500,000
	Cash Out:					
	Office Payroll	15,000	15,000	15,000	15,000	15,000
	Other Overhead	20,000	20,000	20,000	20,000	20,000
Ü	Material Costs	25,000	25,000	25,000	25,000	25,000
1	Direct Labor Costs	30,000	30,000	30,000	30,000	30,000
2						
3	Total Costs	90,000	90,000	90,000	90,000	90,000
4	Cumulative Costs	90,000	180,000	270,000	360,000	450,000
5						
6	Beginning Cash Balance	U	10,000	20,000	30,000	40,000
7	Net Cash Inflow	10,000	10,000	10,000	10,000	10,000
8	Cash Balance	10,000	20,000	30,000	40,000	50,000

Figure 1: This sample budget contains estimates for sales and costs. For the first half of the year, the numbers are rounded off to make percentage changes more obvious in Figures 2 and 3.

scores in column C throughout the estimated budget grid. Type /Copy C5.C19 < Enter > D5.M5 < Enter > .

Once you've completed these basic setup tasks, type in the sample estimated budget figures for each month, as shown in rows 4 and 8 through 11 of Figure 1. Until you've filled in the grid with numbers, the rows containing formulas will display zeros.

Putting It All Together
The next step is to set up
two similar grids, one containing
actual budget figures and another,
projected data. But before rushing
headlong into this procedure,
pause to consider what you'll end
up with. Figure 2 is an example of
a monthly budget; actual data for
the first five months of the year
has been recorded. If you compare
Figure 2 to Figure 1, you'll notice

that January's sales are higher than anticipated (\$102,090 compared to \$100,000) and that costs are a bit lower (\$89,177 compared to \$90,000). As a result, the cash balance is \$12,913 instead of \$10,000. February's sales are also better than expected, and costs lower; March brings higher sales, but costs have edged up a bit. These figures are typical for any business with a good budgeting process; actual sales and costs approximate estimated figures.

A simple formula will generate projections by averaging the actual budget figures, comparing the result to the average of the estimated figures, and then raising or lowering the anticipated sales and cost figures for each remaining month in the projected budget grid. Figure 3 shows the result—a grid that forecasts expected sales and costs, based on estimated figures from January through December (Figure 1) and actual figures from January through May (Figure 2).

G	н	I	J	K	Y.	м
G	п	1	J	K	L	ry.
JUN	JUL	AUG	SEP	ост	NOV	DEC
100,000	102,902	103,671	102,982	101,992	102,992	104,095
000,000	702,902	806,573	909,555	1,011,547	1,114,539	1,218,634
15,000	16,776	14,094	16,982	14,009	17,771	15,875
20,000	21,090	21,090	20,010	17,010	21,090	21,090
25,000	26,766	28,872	20,092	23,982	27,767	32,090
30,000	31,090	31,090	34,555	33,093	31,090	31,091
90,000	95,722	95,146	91,639	88,094	97,718	100,146
540,000	635,722	730,868	822,507	910,601	1,008,319	1,108,465
50,000	60,000	67,180	75,705	87,048	100,946	106,220
10,000	7,180	8,525	11,343	13,898		3,949
60,000	67,180	75,705	87,048	100,946	106,220	110,169

The first month for which you can project figures is February. Using monthly sales as an example (row 4), the projected figure for cell AC4 will be based on February's estimated sales (\$100,000) and January's actual sales (\$102,090). Because January's actual sales increased by \$2090 (or 2.09 percent) over that month's estimated sales, February's estimated sales figure is increased by 2.09 percent in the projected budget. The result-\$102,090-is the projected February sales figure. March's projected sales figure is calculated the same way, except that now the program has more figures to work with. January's and February's actual sales (\$102,090 and \$103,003) are averaged and compared to the average of the first two months of estimated sales (in this example, of course, that average is \$100,000). The two months of actual sales data average 2.547 percent more than the original estimates, so March's projected sales figure is \$102,547 (cell AD4 in Figure 3).



#### Creating a Projected Budget

Setting up the grids and formulas for actual and projected budget figures takes time, but once the grids and their formulas are in place, you won't need to revise them. To create the new grids, copy the names of the months from your first grid into a second grid for actual data (/Copy B3.M3 < Enter > 03.Z3 < Enter > ) and into a third grid for projected data (/Copy B3.M3 < Enter > AB3.AM3 < Enter > ). Columns N and AA remain empty, so you can easily differentiate between grids. You don't have to copy the line items from column A into the new grids; instead, you can use the /Worksheet Titles Vertical command while in column B to keep column A on screen as you move about the worksheet.

To avoid confusion, label both new grids. Into cell O1, type Cash Budget Worksheet (actual data), and into cell AB1, enter Cash Budget Worksheet (projected figures), as illustrated in Figures 2 and 3, respectively. Next, copy all the underscores, figures, and formulas

from the first grid into the third grid by typing /Copy B4.M19 < Enter > AB4 < Enter > .

Now you're ready to type the projected budget formulas into the third grid. The rows that do not sum data (that is, row 4 and rows 8 through 11) require the projected budget formula. January's projected values will be the same as its estimated values because no previous months' actual values exist to alter January's estimates. So go to cell AB4 and enter the formula + B4; then type /Copy < Enter > AB8.AB11 < Enter > . Also enter + B16 into cell AB16 so that January's projected beginning cash balance is the same as its estimated cash balance.

Begin the projections for the other months with cell AC4, the monthly sales cell for February. Type in the projection formula, (1+((@SUM(\$04.04)/@COUNT(\$04.04)) - @AVG(\$B4.B4))/@AVG(\$B4.B4)) \*C4 into cell AC4.

Then copy the formula into cells AC9 to AC12, February's cost cells, by typing /Copy < Enter > AC8.AC11 < Enter > . Finally, copy February's formulas into the remaining months' columns using /Copy AC4.AC19 < Enter > AD4.AM19 < Enter > .

The first calculation of the projection formula, @SUM(\$O4.O4) /@COUNT(\$O4.O4), sums the value in cell O4 only and divides it by the number of months for which you have data. Even when this formula is copied into other cells across the grid, the formula's starting point remains in column O. That's because the formula uses mixed cell addresses, a

	0	P	Q	R	S	Т	U	٧	W	X	Y	Z
1	Cash Budg	et Worksh	eet (	actual da	ta)							
2	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	ОСТ	NOV	DEC
4	102,090	103,003	104,093	101,010	100,991				02.			
5	102,090	205,093	309,186		511,187							
6	,			,								
7												
8	14,994	15,502	14,940	13,993	15,666							
9	20,092	21,021	19,009	20,091	19,998							
10	23,098	23,093	26,009	25,553	24,474							
11	30,993	29,982	31,009	30,993	31,091							
11 12 13 14												
13	89,177	89,598	90,967	90,630	91,229							
14	89,177	178,775	269,742	360,372	451,601							
16	0	12,913	26,318	39,444	49,824							
17	12,913	13,405	13,126	10,380	9,762							
18	12,913	26,318	39,444	49,824	59,586							
19												

Figure 2: This grid contains actual sales and cost figures, which are entered at the end of each month.

combination of absolute and relative addresses. In \$O4, the \$ preceding the O marks it as an absolute address (a permanent reference point); the 4 is a relative address (one that changes as you move across the spreadsheet). So the column remains constant even when the row changes.

The @AVG function can't calculate the average of the actual data, because when @AVG runs into blank cells—and it will until you've entered information for every month—it treats those cells as zeros, throwing off your calculations. To avoid this problem, the formula uses the @SUM function to add up the data and then divides the result by the number of cells containing information. The number of cells is found using the @COUNT function.

The -@AVG(\$B4.B4) part of the formula subtracts the average of the estimated sales from the calculated average of the actual sales. This part of the formula can use the @AVG function to generate

estimated figures because the estimated value cells to which it refers aren't blank. Figure 4 shows a section of the projected budget grid that lists the formulas for April's figures.

Last but Not Least

The only task that remains is to complete the second grid. Begin by copying the formulas from rows 4, 13, 14, 17, and 18 in the first grid. To copy the data from January's and February's columns into the second grid, type /Copy B4.C19 < Enter > 04.P19 < Enter > . (Remember that the formulas for January and February differ; that's why you need to copy both columns.) Now enter the actual sales and cost figures from Figure 2 (row 4 and rows 8 through 11) for the first two months of the year, and the grid with your projected figures will begin to show some meaningful

Here's what has happened in the example: The actual sales for one month (\$102,090) were totaled and then divided by the number of months (1). Then January's and February's estimated

values.

sales were averaged, and that result, \$100,000, was subtracted from the average actual sales, leaving \$2090. Then that figure was divided by the estimated average to get the percentage increase or decrease, using @AVG(\$B4.B4)  $(2090 \div 100,000 = .0209)$ . The 1 at the beginning of the formula was added to this result, yielding 1.0209. Finally, the formula multiplied this figure by the amount you estimated for February, using C4;  $1.0209 \times 100,000 = 102,090$ , which is the figure 1-2-3 puts into cell AC4.

The projection formula will always start its calculations at the beginning of both the actual and the estimated data ranges (the January columns) because those columns are listed as mixed cell addresses. When you copy the formulas and enter the actual data for each month of the year, the projection formula will automatically extend to the right, one cell at a time. When March ends, you simply copy February's column from the actual data grid into that grid's March column, using /Copy

ŝ	AB	AC	AD	AE	AF	AG	AH	AI	AJ	AK	AL	AM
1	Cash Budg	et Worksh	eet	projected	figures)							
3	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
4	100,000	102,090	102,547	103,062	102,549	102,237	105,204	105,553	104,428	103,179	104,094	105,036
5	100,000	202,090	304,637	407,699	510,248	612,485	717,689	823,242	927,670	1,030,849	1,134,943	1,239,979
6												
7												
В	15,000	14,994	15,248	15,145	14,857	15,019	16,797	13,877	16,881	13,737	17,575	15,461
9	20,000	20,092	20,557	20,041	20,053	20,042	21,134	20,971	19,783	16,841	21,219	21,107
10	25,000	23,098	23,096	24,067	24,438	24,445	26,172	27,949	19,108	23,374	27,182	31,098
11	30,000	30,993	30,488	30,661	30,744	30,814	31,933	31,768	35,173	33,163	30,920	30,911
12												
13	90,000	89,177	89,388	89,914	90,093	90,320	96,037	94,566	90,944	87,115	96,897	
14	90,000	179,177	268,565	358,479	448,572	538,892	634,929	729,495	820,439	907,554	1,004,451	1,103,028
15												
16	0	10,000	22,913	36,072	49,220	61,676	73,593	82,760	93,747	107,231	123,295	130,492
17	10,000	12,913	13,159	13,148	12,456	11,917	9,167	10,987	13,484	16,064	7,197	6,459
18	10,000	22,913	36,072	49,220	61,676	73,593	82,760	93,747	107,231	123,295	130,492	136,951
19												

Figure 3: With the appropriate formula, 1-2-3 can generate this projected grid. The projections are based on a combination of actual budget data and estimated budget figures.

	AB	AC	AD	AE
	Cash Budg	et Worksh	eet (	projected figures)
2	JAN	FEB	MAR	APR
	100,000	102,090	102,547	(1+((@SUM(\$04.Q4)/@COUNT(\$04.Q4))-@AVG(\$B4.D4))/@AVG(\$B4.D4)*E4
;	100,000	202,090	304,637	+AD5+AE4
,	100,000	202,070	50.,05.	
,				
3	15,000	14,994	15,248	(1+((@SUM(\$08.Q8)/@COUNT(\$08.Q8))-@AVG(\$B8.D8))/@AVG(\$B8.D8)*E8
3	20,000	20,092	20,557	(1+((@SUM(\$09.Q9)/@COUNT(\$09.Q9))-@AVG(\$B9.D9))/@AVG(\$B9.D9)*E9
0	25,000	23,098	23,096	(1+((asum(\$010.Q10)/acount(\$010.Q10))-aavg(\$B10.D10))/aavg(\$B10.D10)*E10
11	30,000	30,993	30,488	(1+((@SUM(\$011.Q11)/@COUNT(\$011.Q11))-@AVG(\$B11.D11))/@AVG(\$B11.D11)*E11
12				
13	90,000	89,177	89,388	asum(AE8.AE11)
4	90,000	179,177	268,565	+AD14+AE13
15				
16	0	10,000	22,913	+AD18
7	10,000	12,913	13,159	+AE3-AE13
8	10,000	22,913	36,072	+AE16+AE17
9				

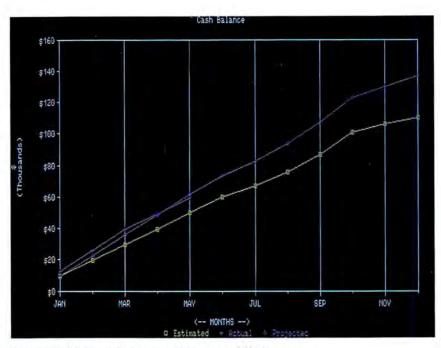
Figure 4: This grid shows the formulas used to generate the projected figures for April.

P4.P19 < Enter > Q4 < Enter > , and then enter the actual sales and cost figures into row 4 and rows 8 through 11 for March.

Similarly, at the end of April, copy March's column into April's column and then enter the current month's actual data, and so on throughout the year. But don't copy the formulas into a given column until you have actual data to enter for that month, or your projected budget grid will reflect the erroneous figures you've copied.

A Graphic Analysis A line graph makes it easy to picture the differences between estimated, actual, and projected budgets. Screen 1 shows a line graph that compares the Cash Balance (row 18) of the three budgets. The actual budget figures appear through May (the latest month for which there is data in Figure 2). To create this graph, first copy February's column from the actual data grid into the actual data grid's March column and enter March's actual sales and cost figures, as shown in Figure 2. Repeat this process for April and May. Then use /Graph Type Line to select a line graph. Press A in order to specify the first data range, the estimated budget, and enter B18.M18. Press B to specify the actual budget figures from January through May as the second data range, and enter 018.Z18. Finally, press C and enter AB18.AM18 as the third data range, the projected figures.

To put the names of the months across the bottom of the graph, press **X** and enter **03.23**. For a more readable graph, select *Options Scale Skip 2*—only every other month will be displayed below the *x*-axis. To display the *y*-axis labels



Screen 1: Using 1-2-3's graphing capabilities, you can plot estimated, actual, and projected budget figures and get a clearer picture of your company's financial direction.

with dollar signs, select Scale Y-Scale Format Currency 0 < Enter >. Type U140001 < Enter > M to scale the graph manually to an upper limit of 150,000. Then, to set the legend for the A range, select Quit Legend A and enter Estimated. To set the legend for the ranges of the other two grids, select Legend B and enter Actual; then select Legend C and enter Projected. Now select Titles X-Axis and enter < -- MONTHS -- > . To add the title at the top of the graph, type TF and enter Cash Balance. Finally, press **Q** and then **V** to view the graph.

The graph indicates that the company's cash balance has surpassed its original budgetary estimate. With that knowledge, the company can plan for a better

year than expected and consider spending the surplus on such investments as equipment or capital improvements. Moreover, the projected budget tells what to expect in the coming months if current trends continue. To use the worksheet with your own estimated and actual data, use /Range Erase Q4.S18. Then enter your estimated budget figures into the estimated grid and your actual sales and cost figures for January and February into the actual data grid. As the year goes by, the projections will be more precise, yielding an increasingly accurate financial forecast.

Gregory R. Glau is a freelance writer in Prescott, Arizona, and the author of Controlling Your Cash Flow with 1-2-3 or Symphony (Dow Jones-Irwin, Homewood, Illinois, 1986).

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Microsoft Word 3.0	
Multimate 3.31	.239
Multimate Advantage	319
Multiplan	
Norton Commander	49
Norton Utilities	59
Office Writer	239
Open Access II	327
Paradox PC Option Board	.323
PFS 1st Choice	. PO7
Q & A	
Quick Code III	145
Quick Report	
R Base System V	360
Reflex	99
Revelation	
Squeeze	
Super Calc IV	
Symphony 1.2	439
Turbo Lightning	
Turbo Prologue	
Volkswriter III	
V.P. Planner	69
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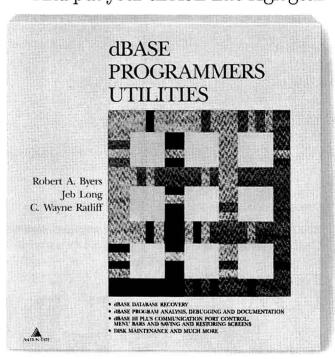
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#### Password: Communicate

A hands-on resource for PC communications

This month: matching applications to 9600-bps modems, time and cost tests for downloading from CompuServe and The Source, the redialing controversy, plus updates and tips

#### Start Bit

#### Speed With a Purpose

Modems are getting fast-very fast. A 100-kilobyte file, which takes about 30 minutes to transmit at 1200 bps, takes about 4 minutes to transmit with the increasingly popular 9600-bps modem. Since these faster models are still pretty new to the marketplace, however, their features vary widely from modem to modem (see "Fast-Talking Modems" in this issue). If you anticipate using one of these speed demons, you'll do yourself and your company a favor by examining the available models with an eye toward your specific applications.

To make the best choice, you must first understand the differences in the way these modems send data. Regardless of other distinctive features, all modems transmit in one of two ways: half-duplex or full-duplex.

In half-duplex mode, one modem waits until the other completes a transmission before sending its data down the same pathway (the telephone line). Full-duplex modems share the data pathway, dividing it so that they can send and receive data simultaneously. Most 1200-bps modems are capable of operating at both full- and half-duplex.

For technical reasons and cost considerations, manufacturers of some of the first 9600-bps modems failed to include a full-duplex capability. Instead, they offered full-duplex emulation, which assigns most of the data pathway to the sending modem and only a small portion of it to the receiving modem. With a transmission speed of 9600 bps, it hardly matters that the receiving modem has relatively little room to send a return message.

Among the manufacturers offering half-duplex modems that emulate full-duplex are Codex, Microcom, Telebit, Electronic Vaults, and Racal-Vadic, with models ranging in price from \$900 to \$1500.

These half-duplex 9600-bps modems are well suited to most applications. After all, one-way file

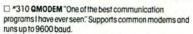
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Edited by Jeremy Joan Hewes

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transfer is the primary reason for using a modem. Only real-time applications, such as computational modeling, robotics control, or shared graphics, require data transfer in both directions simultaneously.

For instance, if your company has software-development sites scattered throughout the country, individual locations can use 9600bps modems to transfer code and comments to the central site at a fraction of the cost of lower-speed transmissions. In one such recent software project, programmers for Borland International sent Turbo Prolog code back and forth between the United States and Europe using Telebit's 9600-bps Trailblazer. Despite the static associated with transoceanic transmissions, the modem is reported to have performed admirably.

The half-duplex models are often used in facsimile transmissions—another one-way, data-intensive application. A real estate firm in Ohio, for instance, uses the Racal-Vadic 9600VP to show graphics representations of its properties on a PC.

Although half-duplex models handle transfers well, people who send messages back and forth before or after a data transfer will occasionally experience frustrating lags. Similarly, any sequence of commands that depends on data received from another computer can be disrupted by even minuscule delays.

The length of the delay-or turnaround time-for half-duplex

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transmission is determined in part by the modem's design. Thus, some models feature shorter turnaround times than others. If your applications call for interactive communications in addition to file transfers, you should compare the data-transfer rates of the various half-duplex models.

Full-duplex models form the newest breed of 9600-bps modems. Concord, Codex, and U.S. Robotics all offer full-duplex models, at prices ranging from \$1000 to \$3000. Because these modems operate without any delay in interactive communications, they are ideal for such activities as remote operations in real time, computational modeling, and interactive graphics applications.

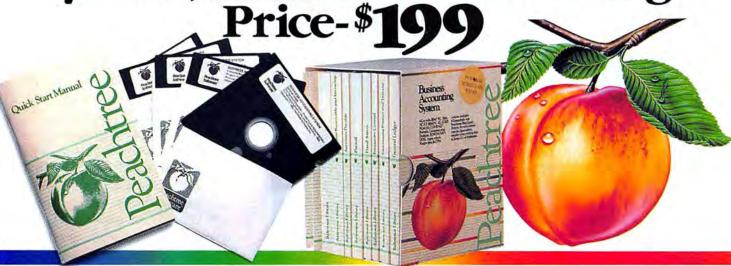
With remote operations in real time, for instance, a large company with many branch offices can program its main computer to automatically call and query each branch computer for payroll data. A full-duplex modem enables the main (host) computer to send queries and the branch (remote) computer to answer without waiting for the first computer to finish its transmission. Because no waiting is necessary, the entire process can be conducted by a series of command scripts, or macros, executed by the main computer. And since no one has to direct the operation, the data gathering can be done when phone lines are relatively free of traffic and connect time is less expensive.

(continues)

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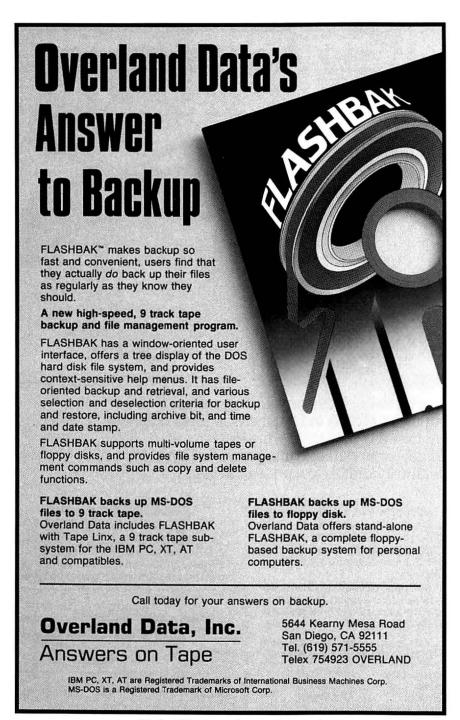
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Full-duplex operation makes a critical difference in the efficiency of certain applications. For example, PCs, other workstations, and large computers that share data as part of computer-aided design (CAD) or computer-aided engineering (CAE) operations can exchange complex graphics data quickly and reliably using full-duplex 9600-bps modems. Without the capability to send and receive data simultaneously, the operators of CAD and CAE workstations would experience long, unproductive interruptions in their work.

Another application that relies on simultaneous data exchange is statistical modeling, in which a PC or other workstation receives data from a large computer, performs calculations on it, and then exchanges more data with the large computer based on those calculations.

This kind of data swapping is common in university research labs, where physics researchers must share a mainframe computer with many other departments. The mainframe handles the most complex data and mathematical operations, while PCs perform the more routine functions and less time-critical calculations. In many instances, the PCs and the mainframe work simultaneously, each performing calculations or transmitting data that the other then uses as part of the ongoing research project. In such situations, full-duplex communication ensures efficient, economical use of the mainframe's power.

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Table 1: Transmission times for on-line connections at 300 and 1200 bps\*

Service	Transmiss	ion Time
	300 bps	1200 bps
CompuServe	7.7.7.5	1.1.1
via CIS node	10:43.7	3:05.8
with XMODEM	11:48.9	4:36.1
via Tymnet	19:32.2	3:51.7
The Source		
via Telenet	9:36.7	2:43.1

<sup>\*</sup> Times shown in minutes:seconds

Such data exchanges have been somewhat simplified with the 9600-bps modems because the error detection and correction provided by software at lower transmission speeds is built into the hardware. This is cause for both celebration and concern if you are contemplating a move into the 9600-bps arena.

The good news is that you won't have to use XMODEM, Kermit, or some other errorchecking protocol during transmission; the bad news is that most manufacturers of 9600-bps modems have their own proprietary protocol schemes. (See Password: Communicate, PCW, March 1986, for a discussion of this protocol conflict.) So if you need this highspeed dial-up capability, be prepared to stick with one manufacturer; its modems will be compatible with one another (although they are not likely to operate compatibly with those of other manufacturers when transmitting at 9600 bps).

Standards committees are working to adopt one official protocol, but at this writing no decision has been announced. The market-place, once again, may well determine the standard.

Despite the proliferation of protocol schemes, however, one fact is inescapable: High-speed modems for PCs are here to stay, and the list of suitable applications will grow steadily as desktop computing power continues to burgeon.

—Steve Bosak



#### On Line

#### Time and Cost Comparisons at 300 and 1200 bps

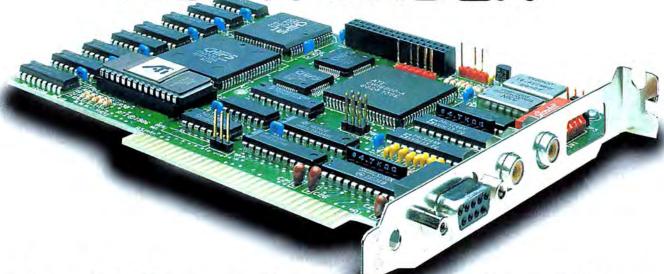
Most information services charge different rates for daytime and evening use and for access at various transmission speeds. In an experiment to compare costs and connect times, I recently logged on to CompuServe and The Source at both 300 and 1200 bps and downloaded a specific data file. Here are the details of that test.

The test results listed in Table 1 include the time needed to type commands from my keyboard and sit through menus and sign-on bulletins for both services. Specifically, on CompuServe I began timing when I gave the command to go to the IBM forum (GO IBMNET), where I cycled through six menus before downloading the file.

On The Source, I started timing at the log-on, where the system reported the status of my mail and sent me to the Computer Press Association's menu and bulletin. From there I gave the Files command and copied the same data file I downloaded from CompuServe. (I had already uploaded it to The Source so that the timing tests would be as similar as possible.)

The file I used for this experiment was a 14.2K text document. My equipment included a PC with a hard disk and two floppy disk drives, PC-Talk III, and a Hayes external Smartmodem 1200. In all but one test, I saved data to the hard disk. Because of such variables as network delays and the time required to type commands, these time measurements are not scientifically precise, but they are reasonably representative of each system's operation at the two transmission speeds.

With the exception of the XMODEM file transfers on CompuServe, all tests were performed during prime time. The



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Table 2: On-line service costs at 300 and 1200 bps

		Time o	f Access
Service	Speed	Day	Evening
CompuServe	7.8	1.00	
via CIS node	300 bps	\$2.31	\$1.10
	1200 bps	1.00	0.84
with XMODEM	300 bps	2.52	1.20
	1200 bps	1.25	1.05
via Tymnet	300 bps	7.52**	5.32*
A LO AND AND A LONG TO A L	1200 bps	2.08	1.88
The Source	7-44	7	
via Telenet	300 bps	\$3.60	\$1.40
	1200 bps	1.29	0.48

<sup>\*</sup> Tymnet cost includes a \$10-per-hour surcharge.

XMODEM tests were done on a weekday between 6 a.m. and 7 a.m. PST. I logged on to Compu-Serve through the service's San Francisco node and through Tymnet; I logged on to The Source through Telenet. The test times in minutes and seconds appear in Table 1.

As these test results show, 1200-bps transmission is seldom four times as fast as 300 bps. (The Tymnet exception—in which the 300-bps test took five times as long as the one at 1200 bps—was probably due to heavy traffic on the network.) Not surprisingly, the XMODEM protocol added appreciably to the transmission time—10 percent at 1200 bps and 49 percent at 300 bps.

The hard disk appeared to make little difference in times. In one

test I used XMODEM at 1200 bps and saved the file to a floppy disk in 4 minutes 41.5 seconds, a mere 5 seconds longer than with a hard disk.

The cost comparisons are easier to interpret, despite the different hourly and transmission-speed rates charged by the two services and, in the case of the Tymnet connection to CompuServe, the additional communications fee. The costs for daytime and evening access for all tests appear in Table 2, rounded to the next highest minute for cost calculation.

Clearly you can save a bundle with a 1200-bps modem, especially considering their bargain-basement prices (less than \$150 for a Hayes-compatible internal or external device). And certainly, if you can arrange to conduct your transmissions and on-line browsing during evening and weekend hours, you'll save a lot of cash no matter how fast or slow your data flows. –J. J. H.



#### ACK/NAK

#### Redialing Raises Havoc

Placing a phone call with a modem is easy. All you do is enter the number from your keyboard and issue the command to begin dialing—and then the modem goes to work. If the number you're calling is busy, the modem can automatically redial—and not just once or twice, but from now until Armageddon.

Persistent redialing may seem innocuous at first; after all, what harm does it do other than tie up your telephone line and modem? Local phone companies insist, however, that this practice hamstrings everyone else's telephone equipment and say they'd give anything to see it stopped.

"Redialing tends to use up all the trunk capacity in a phone network," says Scott Alexander of communications supplier Ameritech Services. "When you get congestion in trunk switches, other customers experience delays in getting dial tones and call connections." Central office switches are similarly affected.

According to Alexander, the initial stages of making a phone call—freeing a circuit, processing a phone number, and locating free circuits to establish a connection—use the bulk of a switch's

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"smarts." Once a call is connected, its demand on switches drops. "Repetitive redial attempts eat up more resources than many completed calls put together," says Alexander.

Telephone networks are engineered to handle the normal number of calls placed at peak hours while retaining some extra capacity. Only rarely, during local disasters and radio call-in contests, for instance, does demand exceed capacity such that the entire system becomes overloaded.

Modem dialing can push a switch's load beyond its reserve capacity, according to Paul Daniel, regulatory counsel for the National Telephone Cooperative Association (NTCA). "Switch and trunk capacities are designed for normal call loads," says Daniel. "Computers create a problem by adding a lot of unanticipated calls."

Why are local phone companies leading the charge against repetitive redials while their longdistance cousins sit back and watch? According to Federal Communications Commission (FCC) officials, it's the local service suppliers that end up paying for redials. Long-distance carriers are not billed by the local suppliers for using their switching facilities until a call is actually completed.

In December 1985 the FCC solicited comments from the local phone companies, AT&T, Haves

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Microcomputer Products, Compu-Serve, and several professional organizations, including the NTCA, concerning possible restrictions on modem redialing. Last August the FCC decided that limits are unnecessary for the time being. In deciding the issue, the commission relied heavily on a brief, filed by modem-manufacturer Hayes, which argued that there is no reason a computer user would want to engage in repetitive redialing.

"Redialing with modems has not been a problem," says Hayes president Dennis Hayes, who labels modem redialing a "nonissue." He asserts that computer users have little to gain from continuously redialing a phone number, since most are calling another PC at a prearranged time to transfer files, or they are connecting to an on-line service for which busy signals are not a significant problem. What about modems redialing to connect with popular bulletin boards? "I find it hard to believe that bulletin board users are going to bring down the nation's phone network," Hayes responds.

At present several foreign countries have redial restrictions, including Canada, which limits to 15 the number of consecutive calls a communications application can be programmed to make to a single phone number. Several U.S. developers conform their communications programs to this limit in order to ship across the border.

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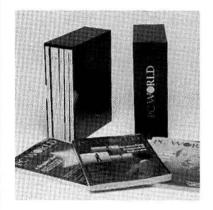




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For the time being, though, restrictions on modem redialing seem unlikely in the United States.

—Judy Getts and Peter Olson



#### **Data Bits**

#### Updates, News, Tips

+++ Since we last covered it in this column's "On Line" section in September 1986, Western Union has enhanced its InfoMaster data base service. The service now includes an on-line directory of data bases, as well as a corporate information feature called Company Name Scan, which allows users to search multiple data bases with one command. InfoMaster is available through the EasyLink electronic mail service or as a standalone service. (EasyLink, 800/247-1373)

+++ Ashton-Tate, publishers of dBASE II and III, Framework, MultiMate, and other software, has announced that it will use the CloseUp communications program from Norton-Lambert of Santa Barbara, California, for its on-line support service. (For a review of CloseUp, see "Remote Quadrille," PCW, September 1986.) Subscribers to this special service will receive the customer version of CloseUp; Ashton-Tate's

technical staff will use the support version of the program to diagnose and correct problems interactively.

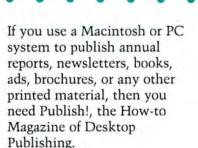
+++ If your telephone has a callwaiting service (provided by many local phone companies) and you use that line for modem communications, the modem may be knocked off the line by an incoming voice call. To avoid this problem, contact your local phone service supplier and ask for the code that overrides call waiting. On touch-tone phones, you usually punch one of the phone's special symbols (the asterisk or pound sign), followed by a number. This signal turns off call waiting until you hang up the phone. You can routinely enter the override code as the first digit(s) of any phone number you dial with the modem and thereby prevent a disconnection. Be sure to add a comma (or other pause command) between the code and the number you are dialing so that the override is certain to be implemented.

Steve Bosak is a freelance editor and writer who covers technology for the Chicago Tribune and other publications. Judy Getts is a freelance writer based in Wisconsin and a regular contributor to this column. Peter Olson is a freelance writer who manages a special interest group on Delphi in Cambridge, Massachusetts.

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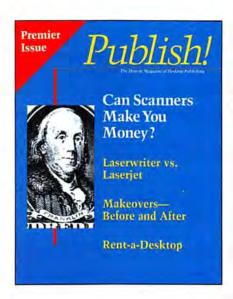
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Jeff Duntemann, author of "Turbo Pascal, Second Edition — Revised and Enlarged" convinced publishers Scott, Foresman & Co., to include the data strips as a service to readers.

Some programs included in the book are lengthy — up to 800 lines. All 300K of listings are incorporated in the SOFTSTRIP data strips for easy entry with the Reader. An index indicates which files are contained in each strip.

Duntemann said inclusion of the data strips will let readers spend more time learning the intricacies of working with Turbo Pascal and significantly less time typing in the various programs.

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This month: transmitting 8-bit files with a 7-bit protocol, COM port complications, an error in the IBM AT Technical Reference manual, a space in a file name puts a file in space, and videotaping the PC's screen

Karl Koessel

#### A Bit Too Much

Q. As a freelance author I often telecommunicate documents using Microsoft Access, both to E-mail boxes and directly to editors. Recently I switched from MicroPro's WordStar to Microsoft Word and found that formatted Word documents-that is, those with style sheets attached-and documents containing upper ASCII characters require an 8-bit transmission protocol such as XMODEM at both ends. (Unformatted Word documents containing only standard ASCII characters are 7-bit files and are, of course, no problem to telecommunicate.)

Word's 8-bit upper ASCII characters and 8-bit style sheets pose two problems for me: How can I telecommunicate my 8-bit document files to people who don't have XMODEM or some other 8-bit protocol, and how can I store my documents in 7-bit E-mail boxes?

Mark DeLuca Pittsburgh, Pennsylvania

A. Lacking an 8-bit communications protocol, you must convert 8-bit files into 7-bit files that can later be reconverted to their original form. Bulletin boards often carry such conversion programs. Two different implementations, CONV.BAS and PC-HEX.BAS, are discussed on pages 131 and 132 of The Fully Powered PC (Simon & Schuster/PC World Books, New York, 1985) and are included on the disk accompanying the book. You could even use \*. \* 's DATAMAKR.BAS and X-MAKER.BAS programs for this purpose. (See the revised versions X-MAKR2.BAS and DATAMKR2.BAS in \*.\*, PCW, December 1986.)

The problem with this convert/ telecommunicate/reconvert technique is the size of the transmittable file—it's often twice as large as the original. If your *Word* documents contain only 7-bit characters, you can send them unformatted and use a conversion program only on the style sheet. The recipient would then reconvert the style sheet and attach it to the document.

COM Down and Try Again
Q. I set my internal modem to
COM1. I also set my communications program to use COM1.
However, when I try to dial out, I
get a message that the modem is
not responding on COM1. Any
suggestions as to what might be
wrong?

Ronald Sommers Beaverton, Oregon

A. Incorrectly configured serial communications ports are a common affliction. DOS is set up to handle two ports-COM1 and COM2-and each must have its own uniquely configured interrupt level and port address. Some addons, such as a mouse or a hard disk controller, may be set to use the same interrupt or port address that a serial port-perhaps the one on your internal modem-has been set to use. Pull out the documentation for your system's expansion boards and check to make sure that each uses a different port address and interrupt level.

Or maybe you have an expansion board with a serial port. On the board are switches (or jumpers) that designate whether it is



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tory setting intact. When you try to dial out, your communications software informs you that it can't find the modem or, worse, tells you the connection's been made when all you see is a blank screen. If this is the problem, set one of

COM1 or COM2. Wanting to stay on the safe side, you install it with the factory setting-COM1intact. Then you add an internal modem, also with the COM1 fac-

make sure the controlling software is set to the correct COM port.

the serial ports to be COM2 and

#### AT Tech Ref Errata

Q. Is it true that in the IBM AT Technical Reference manual, the illustration in the section on the Serial/Parallel Adapter has the jumper settings for COM1 and COM2 backwards?

Christina Costa New York, New York

A. Yes.

#### Lost in Space

Q. Using PC-Talk III to telecommunicate files, I received a file and stored it on a floppy disk with the <Alt>-R command. But I accidentally typed B:DECE 17 instead of B:DECEM17 when prompted for the file name. Although a directory listing shows that the file is present, my word processor does not find the file, nor do the DOS commands TYPE, REN, or COPY. I believe that the blank space in the file name is at the root

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of the problem. In any case, how can I get at the file when even DOS can't find it?

Roger Ingram Boise, Idaho

A. Your suspicion about the embedded space in the filename is correct. DOS interprets spaces as delimiters to the commands and parameters that you type on the command line (after the DOS prompt) and, therefore, considers DECE and 17 as two separate parameters. DOS cannot directly access a file whose name contains an embedded space. You were able to create such a file name because some programming languages use single or double quotes, not spaces, to delimit file names; such languages will accept a space as a valid file name character. (BASIC is one of those languages, and PC-Talk is a compiled BASIC program.)

To rename the file, first type DIR **DECE?17.** (don't forget the period) and press < Enter > to check for other files that match DECE 17 but have some other character in the fifth position. If any such files exist, either rename them or move them to another disk. When the DIR DECE?17. command returns only DECE 17, type REN DECE?17 DECEM17 and press < Enter > .

#### RGB to VCR

Q. In preparation for many of the medical conferences that my colleagues and I participate in at the hospital where we work, we use a standard video camera mounted on a microscope and record the

images on an eight-year-old Panasonic 3/4-inch-tape VCR.

I just purchased a 640K IBM XT with a 20MB hard disk. Ouadram enhanced graphics adapter (OuadEGA +), and NEC MultiSync monitor. It would be helpful if we could record graphs, tables, diagrams, and other screen images from the PC on the VCR. The hospital recently bought a video projector that has an RGB input plug, but this does not help us with taping, and the colors differ somewhat from those that appear on the MultiSync.

I called Quadram, and they said the QuadEGA + does not output the signal needed by a VCR. Our local experts, as yet, have been unable to help. Is there a "black box" that would change the signal generated by the QuadEGA + so that what we see on the MultiSync can be recorded (in substantially the same format) on the VCR?

I am way beyond my level of competence in this area and would like to know whether I am chasing an illusion.

Roger D. Hilbert Rockford, Illinois

A. I know of one company that has a partial solution to your problem of videotaping a PC screen. Lenco, which makes welding tools, custom brass castings, custom plastics, auto body repair tools, and leather safety garments, has been producing television broadcasting equipment since 1971 and has recently organized a Computer Graphics Products Group. This division manufactures, among other products, the

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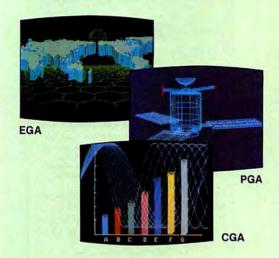
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mode (640-by-350-pixel resolution) is 21 kHz, that mode is incompatible with the 15.75-kHz frequency required for NTSC video. More information can be obtained by writing or calling Lenco.

You might also consider using slides for your presentations. PC World will be publishing a roundup of film recorders in an upcoming issue. These devices produce slides of the PC's screen, and if you really want the images on the VCR, you could videotape the projected slides.

Do you have any questions concerning the IBM PC or compatibles? Send them to The Help Screen, PC World, 501 Second St. #600, San Francisco, CA 94107, or electronically to CompuServe 74055,412, MCI Mail PC-WORLD, or The Source STE908. €

EN-10 and EN-15 Encoders Lenco, Inc. 300 N. Maryland St. P.O. Box 348 Jackson, MO 63755 314/243-3147 List price: EN-10 \$695, EN-15 \$1395

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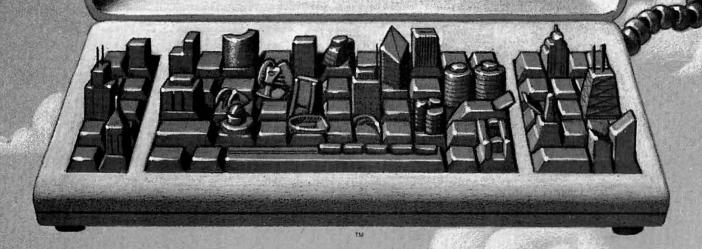
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- 57) and Statements.
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A quick and dirty BASIC banner program; an 'Abort, Retry, Ignore' error message caution; machine language prime numbers; assembly language Quicksort routines for compiled and interpreted BASIC; and the flag of Texas flies again

Edited by Steven Cook

### Banner Performance

A friend of mine recently asked me to create a quick banner program. He also needed to keep the banner on disk for later printing. With these objectives in mind, I wrote the program BANNER-.BAS, shown in Listing 1.

To simplify the program I designed it to make use of the character patterns contained in the PC's BIOS ROM. This eliminates the time-consuming process of designing characters. BANNER.BAS uses a simple routine to enlarge the characters' patterns and then "prints" them into a file called BANNER.DAT. You can use the DOS PRINT command or even a text-editor program to print this file when needed.

The letters are not perfectly formed, but this disadvantage is offset by the convenience of not having to key in a lengthy character-set definition.

If you prefer to have the program print the banner directly rather than send its output to a disk file, simply replace the name of the BANNER.DAT file in line 170 with the name of the printer device (usually LPT1: or PRN:).

David Minster Wyckoff, New Jersey

Editor's note: Not all compatible computers keep their character-set definitions at the same address in memory. I've added a test to the beginning of BANNER.BAS to ensure that the character set is stored where the program expects to find it.

### Disk Danger

I've discovered a flaw in DOS's design that could spell disaster for unsuspecting floppy disk users.

In the course of using my PC, it's easy for me to forget which disk is in the drive. Once, when I tried to delete all of the .BAK files from a disk, DOS responded with the message 'Write protect error writing drive A; Abort, Retry, Ignore?', and I realized that I had inserted the wrong disk. I removed the write-protected disk from the drive and replaced it with the correct disk; then I pressed R to retry the operation. The drive whirred and the DOS prompt returned, leaving no hint of the damage that had occurred. Later, when I tried to list the directory of that disk, I discovered the directory had been completely garbled.

I have subsequently noted several scenarios that result in similar disasters. Any attempt to copy to, or rename files on, a write-protected disk will result in the 'Abort, Retry, Ignore' message, and changing disks at that point will cause the directory from the write-protected disk to be written onto the second disk. The only recourse is to reconstruct the files using a disk utility program, a task that ranges from tedious to impossible.

To prevent trouble, always choose the Abort option before changing disks, and then reissue the command.

Raymond T. Brown Sewell, New Jersey

Editor's note: Remember too that using the Ignore option can adversely affect the integrity of your data. Use it only as a last resort.

### Fastest Primes

When I saw Thomas J. Myers's prime-number-generating program (\*.\*, *PCW*, August 1986), I couldn't resist creating its assembly language equivalent.

My program, FAST!.BAS (shown in Listing 2), can find all 3245 prime numbers less than 30,000 in less than 1.5 seconds. To compare it realistically to Mr. Myers's program, I ran both to find all primes less than 10,000. In interpreted BASIC his program took 92 seconds; my version performed the same task in a blinding 0.5 second.

John D. Pace Gainesville, Florida

Editor's note: The program uses the first element of the variable ARRAY() to return the number of primes found. I've made a slight modification so the program can keep track of the prime numbers it finds. Subsequent bytes of the variable now indicate whether the corresponding number is prime. For technical reasons and to minimize effects on the program's speed, a byte value of 3 indicates a prime number.

### An Even Faster Sort

Martin Knebel compared the Shell-Metzger sorting algorithm implemented in SHELL.BAS [\*.\*, PCW, May 1986] to the Sedgewick Quicksort algorithms implemented in JSORT21.BAS and JSORT31.BAS (\*.\*, PCW, January 1986). I am surprised that SHELL.BAS sorts string arrays six times faster than JSORT31.BAS

```
100 DEFINT A-Z
110 DEF SEG = &HF000
120 START = &HFB6E
130 C=0 : FOR I=0 TO 7 : C=C+PEEK(START+I) : NEXT
140 IF C>0 THEN PRINT "Character set not found!":STOP
150 DARK$ = STRING$(10,"*")
160 BLANK$ = SPACE$(10)
170 OPEN "BANNER.DAT" FOR OUTPUT AS #1
180 CLS
190 PRINT "BANNER!"
200 PRINT "----"
210 INPUT "Enter the string to be printed: ",S$
220 PRINT
230 FOR I=1 TO LEN(S$)
        C$ = MID$(S$,I,1)
240
        PRINT CS;
250
260
        C = ASC(C$)
        INDEX = C-32
ADDRESS = START+(INDEX*8)
270
        FOR ROW=7 TO O STEP -1
290
300
            FOR COL =7 TO D STEP -1
310
               PATTERN=PEEK (ADDRESS+COL)
320
               PX=(PATTERN AND 2 ROW)/2 ROW
330
340
               IF PX=1 THEN MS=DARKS ELSE MS=BLANKS
350
               Z$=Z$+M$
            NEXT COL
370
            FOR J=1 TO 3
380
               PRINT Z$
390
            NEXT J
        NEXT ROW
400
410 NEXT I
420 PRINT
430 CLOSE
440 FND
```

Listing 1: BANNER.BAS. A "quick and dirty" sign-printing program

```
100 CLS:DEFINT A-Z:DEFSNG T
110 DIM SUBR(27):I=0:J=0:P=0:N=0
120 FOR I=0 TO 27:READ B1$,82$
130 B1=VAL("&h"+B1$):B2=VAL("&h"+B2$)
140 H$=CHR$(B1)+CHR$(B2)
150 SUBR(I)=CVI(H$):NEXT
160 P=VARPTR(SUBR(O))
170 INPUT "Primes up to what number"; N
180 IF N>30000 GOTO 170
190 DIM ARRAY((N+1)/2):ARRAY(0)=N+1
200 CALL P(ARRAY(O))
210 PRINT ARRAY(0); "primes found."
220 P=VARPTR(ARRAY(0)):PRINT 1,
230 FOR I=2 TO N
240 IF PEEK (P+I)=3 THEN PRINT I,
250 NEXT:PRINT
260 END
270 | machine language program follows
280 DATA 55,86,ec,86,76,06,86,0c,86,e6,03,c1,ba,00
290 DATA 00,bb,02,00,80,38,01,73,13,83,c2,01,86,fe
300 DATA 03, fb, c6, 05, 01, 80, 0d, 02, 03, fb, 3b, f8, 76, f7
310 DATA 43,3b,d9,76,e3,8b,76,06,89,14,5d,ca,02,00
```

Listing 2: FAST!.BAS. A BASIC program with a machine language prime-number generator

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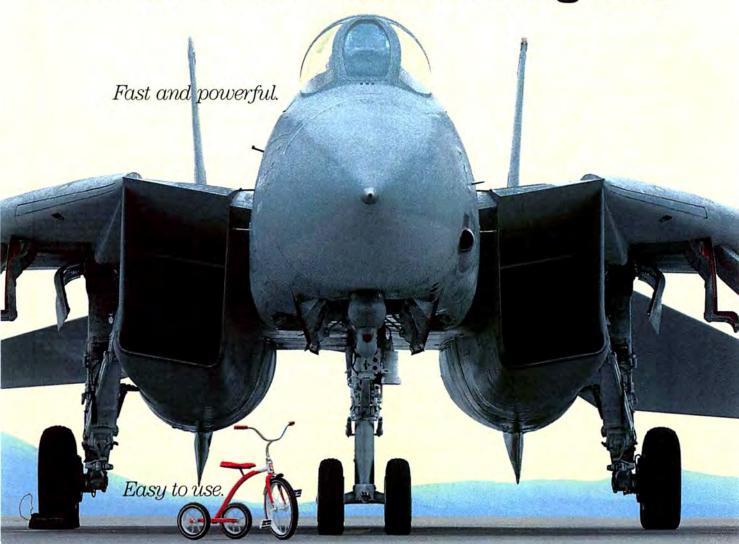
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# Until now, all word processing software fell into one of these two categories.



because, as Sedgewick states in his paper, "Empirical and analytical studies show that Quicksort can be expected to be up to twice as fast as its nearest competitors" ("Implementing Quicksort Programs," Communications of the ACM, Association for Computing Machinery, New York, October 1978, p. 847). After reading this I concluded that a more efficient implementation of Sedgewick's al-

gorithm must be possible, so I de-

veloped a Quicksort algorithm

that is faster and more efficient

than SHELL.BAS.

However, Sedgewick also states that his second sorting algorithm must be implemented in machine language to be efficient, so I also wrote the machine language subroutines CMPSTR and MAN-STACK. There are two versions of both of these subroutines. Those ending with the letter *C* are designed for use with the BASIC compiler; those ending with the letter *I* are for use with interpreted BASIC.

The program QUICKC.BAS (shown in Listing 3) is provided for conducting benchmarks of CMPSTR.OBJ and MANSTACK.OBJ, the two-part assembly language Quicksort subroutine for compiled BASIC. (CMPSTR.OBJ and MANSTACK.OBJ are created from Listings 4 and 5, CMPSTRC.DAT and MANSTCKC.DAT.) QUICKI.BAS

```
10100 'QUICKC.BAS
10110
10120 DEFINT A-Z
10130 DIM A$ (6000)
10140 DIM STACK (30)
10150 FALSE=0:TRUE=NOT FALSE
10160
10170 CLS : INPUT "How many":K
10180 FOR I=1 TO K
10190 A$(I)=CHR$(RND*25+65.5)
10200 A$(I)=A$(I)+CHR$(RND*25+65.5)
10210 A$(I)=A$(I)+CHR$(RND*25+65.5)
10220 NEXT I
10230
10240 '
        Initialization required before calling subroutine:
10250
                = Top of stack pointer
        TOS
10260
        FIRST
                = pointer to first string of interval
10270
        LAST
                = pointer to last string of interval
10280 '
                = sort completion flag
10290 '
        A$(K+1) = sentinel string. Must be greater than any other element
10300 '
10310 TOS=1
10320 FIRST=1
10330 LAST=K
10340 DONE=FALSE
10350 A$(K+1)=CHR$(255)+CHR$(255)+CHR$(255)
10360
10370 START!=TIMER
10380 GOSUB 10580
                         'perform quicksort
10390 ELAPSED!=TIMER-START!
10400 PRINT USING "####.### seconds elapsed."; ELAPSED!
10410
10420 ' test array order
10430 '
10440 CORRECT=TRUE
10450 FOR INDEX=1 TO K-1
10460 IF A$(INDEX)>A$(INDEX+1) THEN CORRECT=FALSE
10470 NEXT INDEX
10480 PRINT "List was sorted ";
10490 IF NOT CORRECT THEN PRINT "incorrectly." ELSE PRINT "correctly."
10500 END
10510
10520 '
        Quicksort subroutine
10530 ' Note: 10710 is optional. It protects against the worst case
10540
              sort (an already ordered array) but increases execution
10550 '
               time from 4 to 16%, depending on the number of strings
10560 '
              being sorted.
10570 '
10580 I=FIRST
10590 J=LAST+1
10600 SWAP AS(FIRST), AS((FIRST+LAST)\2)
10610 V$=A$(I)
10620
10630 '
        Partition the interval (FIRST, LAST) into two subintervals
10640 '(FIRST,J-1) and (I,LAST) such that every element in (FIRST,J-1) 10650 'is <= A$(J) and every element in (I,LAST) is >= A$(J)
10660 '
10670 CALL CMPSTR(A$(1), V$, A$(1), A$(J), I, J)
10680 IF J>I THEN SWAP A$(I), A$(J) : GOTO 10670
10690 SWAP AS(FIRST) AS(J)
10700
10710 '
        Save the larger interval on the stack for later processing.
10720 '
        process the smaller interval if it's non-trivial, otherwise
10730 '
        get the next interval from the stack until a non-trivial
10740 ' interval is found or the stack is empty (which means we're done).
10750
10760
10770 CALL MANSTACK(FIRST, LAST, I, J, STACK(TOS), TOS, STACK(1), DONE)
10780 IF NOT DONE THEN 10580
```

Listing 3: Compile QUICKC.BAS and link to CMPSTR.OBJ and MANSTACK.OBJ to demonstrate Quicksort.

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1231 California Circle Milpitas, CA 95035 (408) 263-1200 (shown in Listing 6) conducts benchmarks of CMPSTRI.BLD and MANSTACK.BLD, the two-part machine language subroutine for interpreted BASIC. (CMPSTRI.BLD and MAN-STACK.BLD are created from Listings 7 and 8, CMPSTRI.DAT and MANSTCKI.DAT.)

My tests show that these routines are two to five times faster than the SHELL.BAS program. In addition, you can remove the comments from the programs to save transcription time. The TIMER function is not a feature of BASIC versions prior to version 2.00 nor of BASCOM version 1.0. I use it for accurate timing results, but it may be omitted if necessary and is not coded to measure timings past midnight.

Andrew J. Thorson Irvine, California

Editor's note: To create the CMPSTR and MANSTACK assembly language subroutines, load BASIC, type in the lines shown in Listing 9 (X-MAKER.BAS), and save the program with the command SAVE"X-MAKER" < Enter > . Then type in the lines shown in Listing 4, type RUN, and press < Enter > . After CMPSTR.OBI has been created, type NEW < Enter > , reload X-MAKER with LOAD"X-MAKER" < Enter > , and add the lines shown in Listing 5. Run X-MAKER again to create MAN-STACK.OBJ, and then repeat the procedure for Listings 7 and 8 to create CMPSTR.BLD and MAN-STACK.BLD. Next, type in the

```
1000 DATA "CMPSTR.OBJ"
1010 DATA 1,80,03,00,01,41,3b,96,21,00,00,04,43,4f,44,45,07,-1,50
1020 DATA 2,43,4f,44,45,53,45,47,05,43,4f,4e,53,54,04,44,41,-1,0d
1030 DATA 3,54,41,06,44,47,52,4f,55,50,a8,98,07,00,28,61,00,-1,60
1040 DATA 4,03,02,01,d2,98,07,00,48,00,00,04,04,01,10,98,07,-1,73
1050 DATA 5,00,48,00,00,05,05,01,0e,9a,06,00,06,ff,03,ff,02,-1,37
1060 DATA 6,57,a0,65,00,01,00,00,55,06,1e,07,fc,8b,ec,8b,7e,-1,7d
1070 DATA 7,10,8b,76,0e,8b,5e,0c,83,c6,04,e8,00,00,72,f8,87,-1,a1
1080 DATA 8,f3,83,ee,04,e8,00,00,77,f8,8b,46,12,2b,d8,b1,02,-1,46
1090 DATA 9,d3,eb,43,8b,7e,0a,89,1d,2b,f0,b1,02,d3,ee,46,8b,-1,d9
1100 DATA 10,7e,08,89,35,07,5d,ca,0c,00,56,57,8b,04,8b,15,8b,-1,a4
1110 DATA 11,c8,3b,ca,72,02,8b,ca,8b,74,02,8b,7d,02,f3,a6,74,-1,71
1120 DATA 12,03,5f,5e,c3,3b,c2,eb,f9,5b,9c,0f,00,84,14,00,01,-1,88
1130 DATA 13,01,42,00,84,1e,00,01,01,42,00,93,90,00,00,74,-1,61,-1
```

Listing 4: CMPSTRC.DAT. Add these lines to X-MAKER.BAS to create CMPSTRC.OBJ, part one of a sort routine for use with a BASIC compiler.

```
1000 DATA "MANSTACK.0BJ"

1010 DATA 1,80,03,00,01,41,36,96,21,00,00,04,43,4f,44,45,07,-1,50

1020 DATA 2,43,4f,44,45,53,45,47,05,43,4f,4e,53,54,04,44,41,-1,0d

1030 DATA 3,54,41,06,44,47,52,4f,55,50,a8,98,07,00,28,74,00,-1,ac

1040 DATA 4,03,02,01,bf,98,07,00,48,00,00,04,04,01,10,98,07,-1,11

1050 DATA 5,00,48,00,00,05,05,01,0e,9a,06,00,06,ff,03,ff,02,-1,37

1060 DATA 6,57,a0,78,00,01,00,00,55,06,1e,07,8b,ec,8b,5e,12,-1,91

1070 DATA 7,8b,0f,8b,5e,10,8b,17,8b,76,16,8b,7e,14,8h,da,2b,-1,26

1080 DATA 8,1c,8b,05,2b,c1,40,3b,c3,8b,5e,0e,8b,04,77,0f,89,-1,16

1090 DATA 9,07,4a,89,57,02,89,0c,8b,c1,8b,0d,eb,0d,90,89,0f,-1,0f

1100 DATA 10,8b,0d,89,4f,02,4a,89,15,8b,ca,83,c3,04,3b,c8,77,-1,97

1110 DATA 12,89,04,eb,e9,8b,76,08,70,04,ff,1f,2b,5e,0a,d1,eb,-1,9e

1130 DATA 13,43,8b,76,0e,89,1c,07,5d,ca,10,00,e8,90,0f,00,00,-1,e9

1140 DATA 14,01,08,4d,41,4e,53,54,41,43,4b,00,00,00,06,8a,02,-1,1b

1150 DATA 15,00,00,74,-1,e8,-1
```

Listing 5: MANSTCKC.DAT. Add these lines to X-MAKER.BAS to create MANSTACK.OBJ, part two of a sort routine for use with a BASIC compiler.

```
10100 'QUICKI.BAS
10110 '
10120 CLEAR ,63700! 'reserve space for subroutine
10130 DEFINT A-Z
10140 DIM A$(6000)
10150 DIM STACK(30)
10160 FALSE=0:TRUE=NOT FALSE
10170 CMPSTRI!=63700! ' Location of subroutine
10180 BLOAD "CMPSTRI.BLO", CMPSTRI!
10190 MANSTACK!=63811!

(continues)
```

Listing 6: QUICKI.BAS. This program demonstrates the two-part assembly language Quicksort routine (CMPSTR.BLD and MANSTACK.BLD) for interpreted BASIC.

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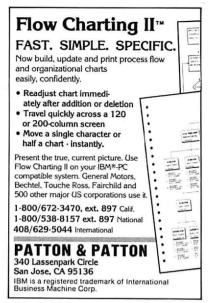
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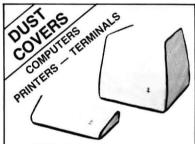
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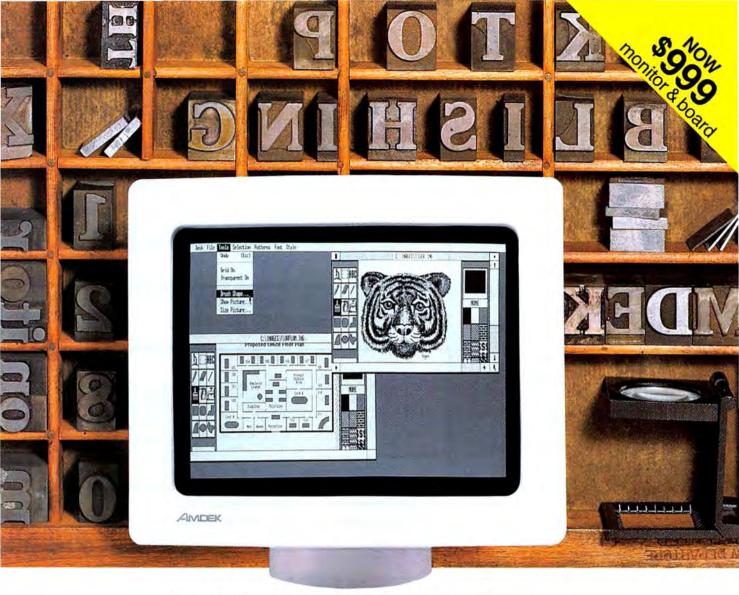
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```
10200 BLOAD "MANSTACK.BLD", MANSTACK!
10210 '
10220 CLS : INPUT "How many";K
10230 FOR I=1 TO K
10240 A$(I)=CHR$(RND*25+65.5)
10250 A$(I)=A$(I)+CHR$(RND*25+65.5)
10260 A$(I)=A$(I)+CHR$(RND*25+65.5)
10270 NEXT I
10280 '
10290 ' Initialization required before calling subroutine:
10300 ' TOS
                = Top of stack pointer
10310 '
       FIRST
                = pointer to first string of interval
10320 '
       LAST
                = pointer to last string of interval
                = sort completion flag
10330
       DONE
        A$(K+1) = sentinel string. Must be greater than any other element
10340
10350 '
10360 TOS=1
10370 FIRST=1
10380 LAST=K
10390 DONE=FALSE
10400 A$(K+1)=CHR$(255)+CHR$(255)+CHR$(255)
10410
10420 START!=TIMER.
10430 GOSUB 10630
                         'perform quicksort
10440 ELAPSED!=TIMER-START!
10450 PRINT USING "####.### seconds elapsed."; ELAPSED!
10460
10470 ' test array order
10480 '
10490 CORRECT=TRUE
10500 FOR INDEX=1 TO K-1
10510 IF A$(INDEX)>A$(INDEX+1) THEN CORRECT=FALSE
10520 NEXT INDEX
10530 PRINT "List was sorted ";
10540 IF NOT CORRECT THEN PRINT "incorrectly." ELSE PRINT "correctly."
10550 END
10560 '
10570 '
       Quicksort subroutine
10580 '
        Note: 10710 is optional. It protects against the worst case
10590
              sort (an already ordered array) but increases execution
10600
              time from 4 to 16%, depending on the number of strings
10610
              being sorted.
10620 '
10630 I=FIRST
10640 J=LAST+1
10650 SWAP AS(FIRST), AS((FIRST+LAST)\2)
10660 V$=A$(I)
10670 '
10680 '
       Partition the interval (FIRST, LAST) into two subintervals
10690 '
        (FIRST, J-1) and (I, LAST) such that every element in (FIRST, J-1)
10700 ' is <= A$(J) and every element in (I,LAST) is >= A$(J)
10710 '
10720 CALL CMPSTRI!(A$(1),V$,A$(I),A$(J),I,J)
10730 IF J>I THEN SWAP A$(I),A$(J) : GOTO 10720
10740 SWAP AS(FIRST), AS(J)
10750
10760 '
       Save the larger interval on the stack for later processing. process the smaller interval if it's non-trivial, otherwise
10770
10780
        get the next interval from the stack until a non-trivial
        interval is found or the stack is empty (which means we're done).
10790 '
10810
10820 CALL MANSTACK!(FIRST, LAST, I, J, STACK(TOS), TOS, STACK(1), DONE)
10830 IF NOT DONE THEN 10630
10840 RETURN
```

### Listing 6 (continued)



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lines for QUICKI.BAS (Listing 6) to perform your own timing comparisons in interpreted BASIC. To compare the timing in compiled BASIC, type in the lines for QUICKC.BAS and save it as an ASCII file they countile

ASCII file; then compile QUICKC.BAS and link the resultant object file to CMPSTR.OBJ and MANSTACK.OBJ.

### Trouble in Texas

I enjoyed reading the suggestion from Michael Weiss on how to configure the DOS prompt to display the Texas state flag (\*.\*, PCW, September 1986). Being a native Texan, I found that the prompt had just the right touch of obnoxious charm to make it a hit with every true Texan.

When I typed in the prompt commands, however, I noticed that the flag had a red field behind its star—definitely not the Texas flag. In the course of correcting that problem, I also fixed the prompt to make it scroll properly when displayed at the bottom of the screen.

The result is TEXFLAG2.BAT (shown in Listing 10). When typing in the prompt command, remember to replace each caret (^) with a space, each exclamation point (!) with <Alt>-223, and each question mark (?) with <Alt>-219. The flag on this prompt is drawn in bright white to better match the intensity of the red and blue stripes.

```
1000 DATA "CMPSTRI.BLD"
1010 DATA 1,fd,00,b0,00,00,6f,00,55,06,1e,07,fc,8b,ec,8b,7e,-1,12
1020 DATA 2,10,8b,76,0e,8b,5e,0c,83,c6,03,e8,38,00,72,f8,87,-1,28
1030 DATA 3,f3,83,ee,03,e8,2e,00,77,f8,ba,00,00,8b,c3,8b,5e,-1,08
1040 DATA 4,12,2b,c3,b9,03,00,f7,f1,40,8b,7e,0a,89,05,ba,00,-1,56
1050 DATA 5,00,8b,c6,2b,c3,b9,03,00,f7,f1,40,8b,7e,08,89,05,ba,00,-1,bd
1060 DATA 6,07,5d,ca,0c,00,56,57,8a,04,8a,15,b5,00,8a,c8,3a,-1,40
1070 DATA 7,ca,72,02,8a,ca,8b,74,01,8b,7d,01,f3,a6,74,03,5f,-1,94
1080 DATA 8,5e,c3,3a,c2,eb,f9,-1,6d,-1
```

Listing 7: CMPSTRI.DAT. Add these lines to X-MAKER.BAS to create CMPSTRI.BLD.

```
1000 DATA "MANSTACK.BLD"

1010 DATA 1,fd,00,b0,00,00,74,00,55,06,1e,07,8b,ec,8b,5e,12,-1,89

1020 DATA 2,8b,0f,8b,5e,10,8b,17,8b,76,16,8b,7e,14,8b,da,2b,-1,26

1030 DATA 3,1c,8b,05,2b,c1,40,3b,c3,8b,5e,0e,8b,04,77,0f,89,-1,16

1040 DATA 4,07,4a,89,57,02,89,0c,8b,c1,8b,0d,eb,0d,90,89,0f,-1,0f

1050 DATA 5,3b,0d,89,4f,02,4a,89,15,8b,ca,83,c3,04,3b,88,77,-1,97

1060 DATA 6,1a,3b,5e,0a,74,0e,83,eb,04,8b,4f,02,89,0d,8b,07,-1,49

1070 DATA 7,89,04,eb,e9,8b,76,08,c7,04,ff,ff,2b,5e,0a,d1,eb,-1,9e

1080 DATA 8,43,8b,76,0c,89,1c,07,5d,ca,10,00,-1,5a,-1
```

Listing 8: MANSTCKI.DAT. Add these lines to X-MAKER.BAS to create MANSTACK.BLD.

```
10 DEFINT A-Z : KEY OFF : DEF FNHEX(X$)=VAL("&h"+X$)
20 MSG$="Now testing for data errors...please wait" : GOSUB 190
30 SUM=0 : READ LN : IF LN<0 THEN 80
40 READ H$ : IF VAL(H$)<0 THEN 70
50 IF LEFT$(H$,1)="*" THEN GOSUB 210 : GOTO 40
60 SUM=(SUM+FNHEX(H$))*2 : SUM=(SUM\256)+(SUM MOD 256) : GOTO 40
70 READ CKSUM$ : IF SUM=FNHEX(CKSUM$) THEN 30 ELSE GOTO 170
80 MSG$="Press any key except ESC to create "#F$**":
90 GOSUB 190 : A$=INPUT$(1) : PRINT : IF A$=CHR$(27) THEN END
100 LOCATE 6,1 : PRINT "Working...";
110 OPEN F$ A$ #1 LEN=1 : FIELD #1,1 A$ BX$
120 READ LN : IF LN<0 THEN 160
130 READ H$ : IF VAL(H$)<0 THEN READ CKSUM$ : GOTO 120
140 IF LEFT$(H$,1)="*" THEN GOSUB 240 : GOTO 130
150 LSET BX$=CHR$(FNHEX(H$)) : PUT #1 : GOTO 130
160 CLOSE : PRINT : PRINT F$;" has now been created." : END
170 PRINT : PRINT "Error in DATA Line";$TR$(LN);" :"
180 PRINT "Check your work." : BEEP : END
190 CLS : LOCATE 3,1 : PRINT "X-Maker II" : RESTORE : READ F$
200 LOCATE 5,1,1 : PRINT MSG$; : RETURN
210 ZZ=VAL(MID$(H$,2)) : FOR I=1 TO ZZ
220 SUM=SUM*2 : SUM=(SUM\256)+(SUM MOD 256)
230 NEXT : RETURN
240 ZZ=VAL(MID$(H$,2)) : FOR I=1 TO ZZ
250 LSET BX$=CHR$(0) : PUT #1 : NEXT : RETURN
```

Listing 9: X-MAKER.BAS

```
PROMPT $ $ $ Se[22;3H$e[1m$e[44m^^^$e[47m?????$e[23;3H$e[44m^*^
$e[47;41m!!!!!$e[24;3H$e[44m^^^$e[41m^^^^$e[40m^^$p$g$e[0m$e[20
```

Listing 10: TEXFLAG2.BAT

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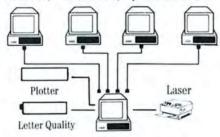
EasyPRINT's printer configuration program provides a menu driven installation program that will guide you step-by-step through the software installation process and lets you redefine your network as your printing requirements change.



after

### DESKTOP PUBLISHING

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EasyPRINT—Printer Sharing System

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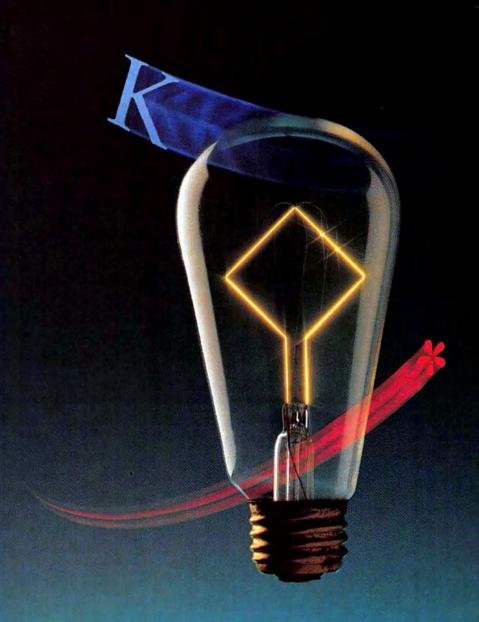
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Now all we need is a program to play "The Eyes of Texas." Thomas Pesek Sugar Land, Texas

Editor's note: The suggestion from Mr. Weiss generated a great deal of mail from sentimental Texans. I hope this information will set everyone to rest. Note also that you might get an 'Out of environment space' message if you load any memory-resident programs before changing the prompt.

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### Correction

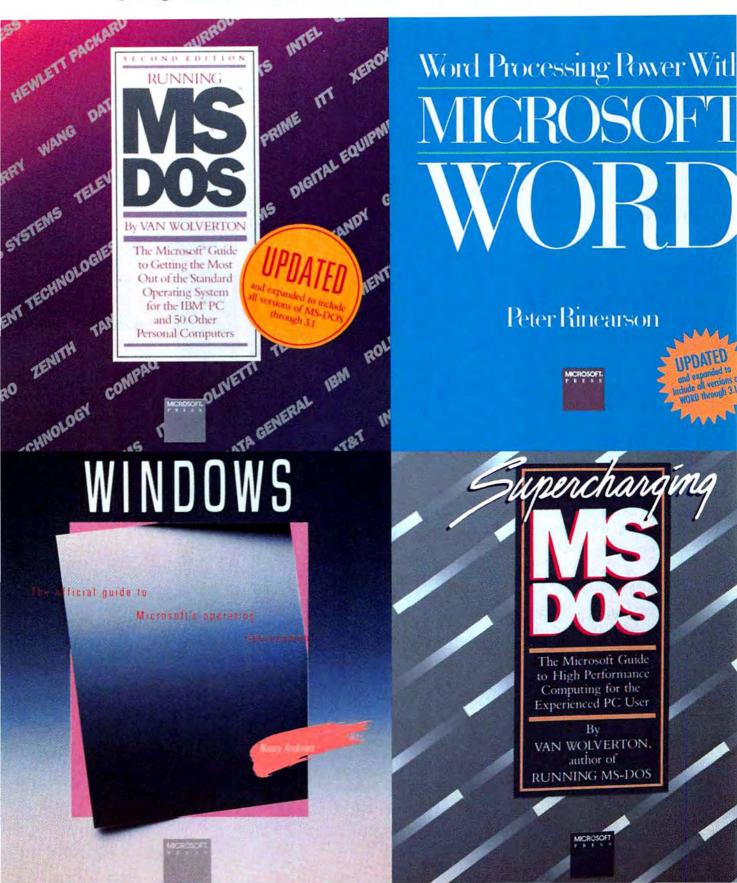
The five Softstrips on page 333 contain \*.\*'s December 1986 program listings. *PC World* apologizes for any inconvenience caused by the production error of December's Softstrips.

3

These Softstrips contain \*.\*'s January program listings.

2

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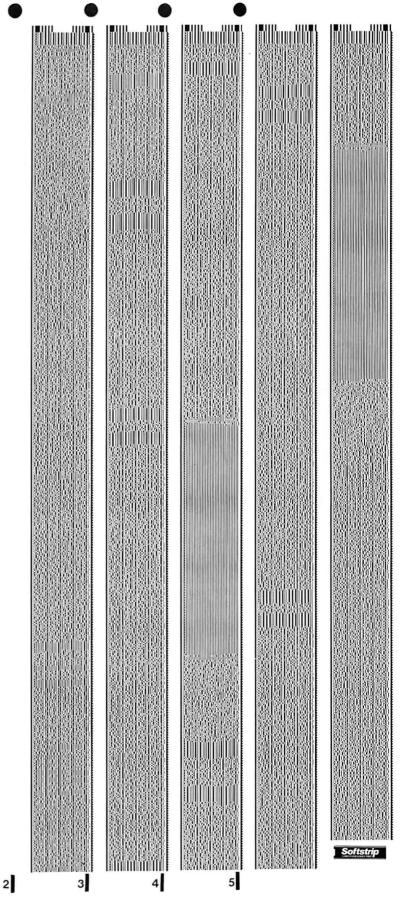
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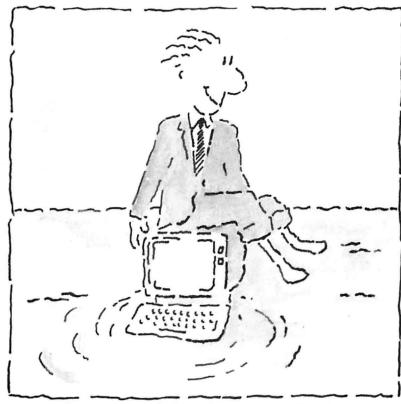
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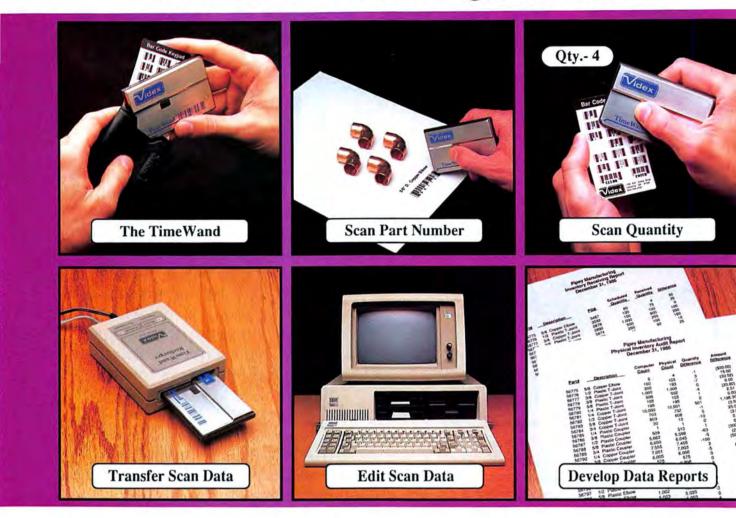
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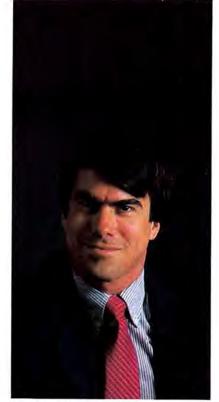
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Kevin Strehlo

Despite the warnings of industry alarmists, the IBM PC standard won't go away; it will just break in two.

### Standard Solutions

he era of the IBM standard for desktop personal computing is ending." This dire prediction from the *San Francisco Examiner*, and other similar comments in the general press, followed last fall's announcement that IBM and Intel were sharing custom chip technology.

Never mind that such technology has been on the market for several years and that Intel is a late entry in the application-specific integrated circuit (ASIC) game. With IBM's sudden ability to build personal computers based on custom chips, press reports warned, we'll soon see a new generation of IBM desktop machines that are hideously difficult for the competition to clone.

But will the IBM standard vanish? Nonsense.

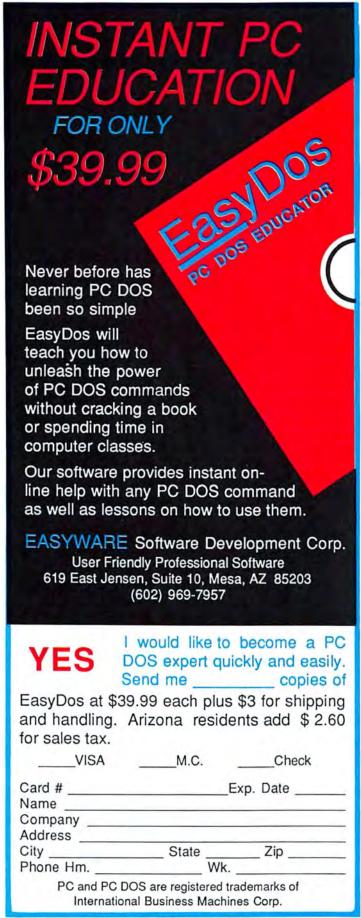
To understand why, let's take an example of real innovation from IBM—the Enhanced Graphics Adapter (EGA). Although the EGA didn't contain a great deal of custom circuitry, it couldn't be duplicated with off-the-shelf integrated circuits.

However, other vendors had no trouble keeping up with IBM. In fact, the advance was quickly topped by one of the most complex sets of custom circuitry ever to hit the street—the EGA custom-chip set from Chips and Technologies.

So IBM produced a piece of innovative hardware, a start-up looked at it and reverse-engineered it in a few months, and the race was on.

True, IBM's EGA didn't share the stage with any clones for months. It took time for Chips and Technologies to analyze and replicate the circuitry, work out kinks in the design, and get the chips into production. It took even more time for the board manufacturers to create their EGA products.

But the EGA clones still hit retail shelves before significant numbers of EGA-compatible programs appeared. Indeed, it was only



Circle 920 on reader service card

when a baker's dozen of clones materialized that software designers began to get excited about EGA compatibility.

What about price advantage? IBM can amortize the cost of custom-chip development over a much larger number of machines than any of its competitors can. But if specialists like Chips and Technologies get business from all of IBM's competitors, the economies of scale begin to look similar.

And although the EGA example is somewhat misleading on the matter of pricing, because IBM did not go all the way with custom chips, it's worth noting that IBM took a beating on price in the retail market.

Competing board suppliers gained a market advantage by outengineering IBM—not that hard to do, despite IBM's vaunted R&D budgets and capabilities. You simply let IBM take the gut-busting leap forward and then reversengineer and refine the work. The EGA clones, for example, can emulate the older display modes better than the original.

One final point regarding the EGA: IBM built in a level of compatibility with previous display adapters because it had no choice. No one would want a display board that couldn't run any existing software. And the same will be true of any PC designed around custom chips. That means the PC standard won't be blown away.

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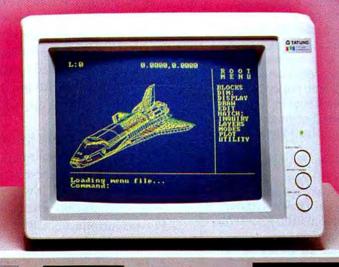


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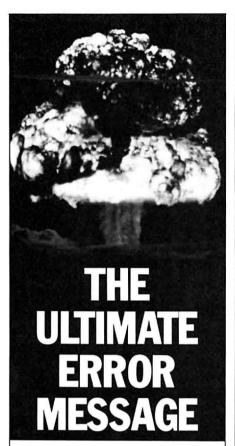


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hat we're saying, then, is that IBM no longer controls the IBM standard. Instead, it's in the hands of millions of people who work on machines that run software designed by a slew of independent companies. The day is coming when we won't be limited to a single body of software that every PC can run.

Microsoft's plans for Advanced DOS (ADOS) will soon split the PC world into haves and havenots. Machines based on the 80286 and the 80386 will be able to run multiple tasks simultaneously, and they will be able to access memory beyond today's 640K limit without the encumbrance of kludges.

If brochures released by Microsoft in Europe prove accurate, ADOS will give the poor 80286 machines only 1MB per task, while the 80386-based systems will enjoy a full 16MB per task. So the 386 becomes the ticket to the future.

It's hard to imagine how the face of desktop computing will change in the brave new world of ADOS and the 386. It was just as tough back in 1981 when the IBM PC was introduced. CP/M's 64K wall was suddenly pushed back by a factor of ten. If anyone had foreseen hitting the 640K barrier, they kept it to themselves.

Given this new freedom, software developers made great leaps forward: from *VisiCalc* to 1-2-3, from *WordStar* to *WordPerfect*—or pick your own favorite example. Given more memory and the genius to use it well, software developers worked wonders. We can expect more of the same from the latest jump in addressable memory.

And although the payoffs of multitasking aren't yet clear, they will be significant. Many of us are already starting to taste the benefits.

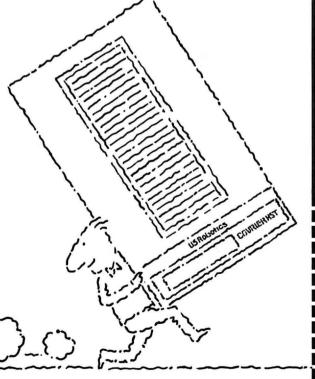
Users of resident software like *SideKick* know how helpful it is to switch instantly to a function unrelated to the work you're doing—to leave the spreadsheet effortlessly, look up a phone number, dial it automatically, and then check your calendar before returning to the unchanged spreadsheet.

Beyond this, the benefits come in spades for those who have purchased enhanced expanded memory specification boards and mastered *Desquiew*. Those select few are already circumventing the 640K barrier to run a number of full-blown programs at once.

But more important will be multitasking setups in which several tasks together help you get one job done. Borland's *Turbo Lightning*, a resident guardian angel that looks over your shoulder as you type and aids spelling when you need it, points in this direction.

You'll see many more of these guardian angels with the ability to look over your shoulder when more memory is available to prevent the angels from bumping

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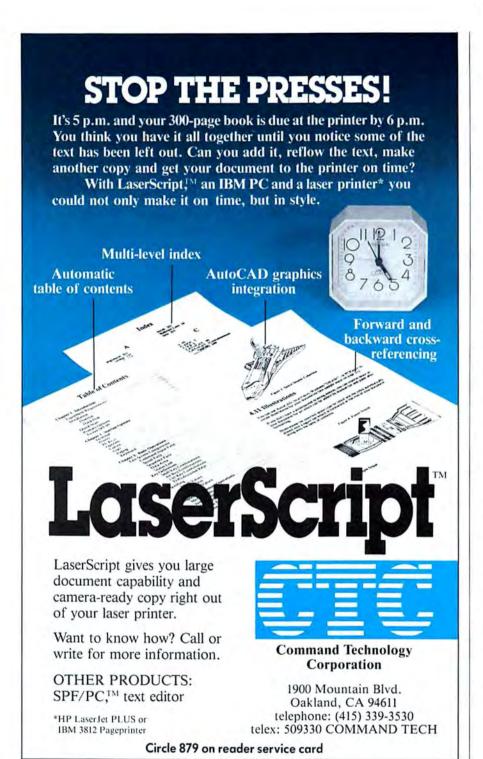
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wings. One of these angels might be an automatic spreadsheet auditor that warns you the instant you make a circular reference or overwrite a formula with data.

Or imagine Gary Kildall's brainchild: a "librarian" task that runs in the background as you use your word processor. Connected to a CD ROM full of information on whatever subject you're writing about, the librarian watches as you write and pops up messages that say, "I have interesting stuff on this topic—would you like to see it?"

And what about page-layout programs, which may inundate us with painful evidence that most of us know nothing about graphic design? What could be better than a built-in angel that upholds the golden rules of design—preventing the unbalanced page, the gray page with nothing to break up the type, or the page with 12 clashing typefaces?

Or how about a separate task that asks what stories and pictures you plan to lay out and shows you several alternative solutions? Each will be more attractive and readable than what you're likely to turn out, because enough memory will be available to apply the captured knowledge of a layout expert directly to the task.

Indeed, it will be a brave new world—if there's a large, stable environment of 386-class machines that can run this new generation of software.

Of course, the millions of 8088based PCs locked into today's IBM standard won't vanish.

(continues)

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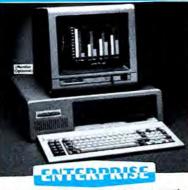
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Which brings us back to the original point. The PC standard won't go away; it will just break in two.

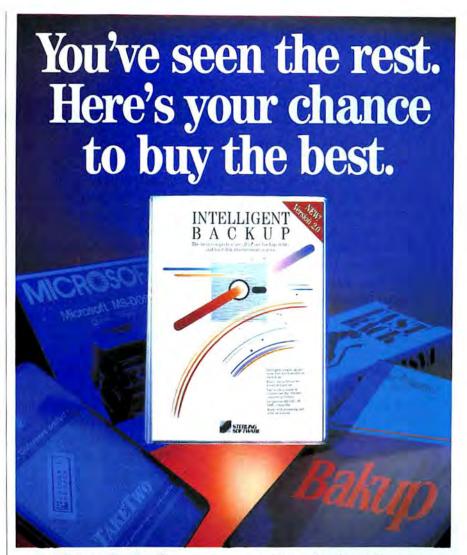
or custom chips to fully realize their promise in useful hardware innovations, the software must keep pace with the changes. Years ago, advanced computer graphics equipment faced the same problem, and developers came up with a logical solution—device independence.

Back to the future: If IBM tries to beat off the PC clone makers with innovative hardware designs, it needs a software environment that enables developers to take advantage of such advances without having to rewrite applications from scratch. Currently, the only such device-independent environment in a position to take advantage of the increased memory and multitasking capabilities of Advanced DOS is Microsoft Windows.

Windows is slow and clumsy in today's 640K DOS on an 8088-based PC. But the next generation of desktop machines will take care of those problems.

More importantly, by isolating application programs from the nitty-gritty of hardware, Windows promises to dissolve the lock that today's standard has on hardware innovation. Windows can give Big Blue a chance to shake the clone makers, or at least keep them hopping, by constantly striding ahead with hardware advances in graphics, sound, and input.

(continues)



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Naturally, the same device independence that lets IBM make technological leaps will also free IBM's competitors. Suddenly, a company can compete by building a machine that's better than IBM's box, not simply cheaper or more like IBM's machines than any other clone. User needs, not IBM interests, will dictate hardware advances.

As we stand on the edge of personal computing's brave new world, the biggest worry is that IBM has an alternative to *Windows* up one of its many R&D sleeves. If IBM is busily creating a virtual environment—in which to-

day's DOS software, tomorrow's ADOS software (including *Windows*), and software based on a proprietary operating system can all run—will the giant reclaim dominance?

Actually, IBM already owns such software—and it doesn't matter.

In its mainframe form it's called VM (for Virtual Machine), and 80386-based machines will offer enough horsepower and memory to run it or a similar offering built around IBM's *TopView* environment. But VM or something like it gives IBM an edge only if the application software environment it creates is better than what's available elsewhere.

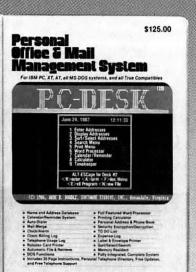
And a futile scan of the software best-seller charts for *Top-View*—or any software developed by IBM, for that matter—indicates that IBM's in-house software is rarely a threat.

So what does this mean to PC users now? To be fair to the Examiner, we can agree with its story's conclusion. The pace of innovation will pick up, and the game will change—from choosing boxes by brand reputation and price to picking among computers that offer significantly different capabilities.

Kevin Strehlo hunts for PC tales from an office overlooking Silicon Valley.

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	Color Correction	Oct.	398	Correction to "Colors with 1-2-3 release 2" (*.*, July 1986)
	Prime Correction	Nov.	420	Fixes timing problem of "Turbo Primes" (*.*, August 1986)
dBASE	More on dBASE III Function Keys	Feb.	335	Trapping function keys with and without the CASE statement
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DOS	More and Better	Jan.	311	A program that replaces the DOS MORE command and strips high bits, too
	For Environmentalists	April	344	An undocumented feature reserved by DOS to increase en- vironment parameter space
	At Your Command	July	340	Execute multiple DOS commands from within programs that can execute only one
	Alternate Configurations	Aug.	306	A batch file to temporarily disable ANSLSYS and other device drivers from CONFIG.SYS
	Quick Copy Lone Star Look	Sept. Sept.	326 334	A quick method for copying files between subdirectories Replace the DOS prompt with the flag of Texas
Display	Video Extension EGA at Length		330 315	Where to buy a long extension cable Modify ANSLSYS and COMMAND.COM to use the EGA's 43-line mode
Graphics	Turbo Color	Mar.	305	Some unusual low-resolution color graphics routines
	Upping the Ante	Mar.	305	A low-resolution color generation program
	Window Wonder Graphics to Go	Mar. June	312 358	Use BASIC to print upside down Programs to print high-resolution graphics screens
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Miscellaneous	Troubleshooting Tip	July	340	General tips for troubleshooting computer system problems
	Introduction to Softstrip	Oct.	381	PC World inaugurates *.* program listings in Softstrip form
Pascal	Talking to Turbo	Jan.	314	Retrieving the command line with Turbo Pascal
	Turbo Circles	May	350	A Turbo Pascal routine to draw circles
	Turbo Disk Directories	May	356	A Turbo Pascal routine to display a disk directory
	Turbo Disk Data	Oct.	392	A Turbo Pascal routine that returns the amount of available
	One Library Serves All	Oct.	392	disk space A Turbo Pascal program to execute .CHN files and save disk
	Where Am I?	Oct.	396	space A Turbo Pascal routine to call DOS 3.xx's program-location feature
	Turbo Joystick	Dec.	378	A Turbo Pascal joystick interface routine
Printers	Data to Go	Mar.	307	Send OUTPUT.COM control characters to the printer
	LaserJet Flip Tip	April	360	A tray that collates documents and handles oversize paper
	Print Screen Perfected	May	343	Add a form feed to <shift>-<prtsc></prtsc></shift>
	Printer Enhancement	June	351	Double-time printing on the Epson MX-80 and IBM Graphics Printer
	Tandy Trouble	June	352	Override the Auto-LF setting to fix Tandy's double-spacing problem
	Turbo Asides	July	324	A sideways printing program written in Turbo Pascal
	Printer Control Via SideKick	Sept.	325	Using SideKick's Notepad to send control codes to the printer
	Printer Pointer	Nov.	418	Switching the upgraded Epson FX-80 between LQP and draft modes
Storage	Hard Disk Elbowroom	April	341	Reduce the number of sectors per cluster on a hard disk and increase storage space
	Security Leak	Dec.	382	Deleting unencrypted copies and temporary files does not actually erase the data
Utility	Get a Move On	Feb.	321	A program to move files from one directory to another and, optionally, rename them
	A Key Program	Feb.	330	BASIC program creates ANSI.SYS key reassignment .COM files
	CHMOD Revisited	Feb.	338	Enhanced CHMOD.COM reads as well as changes a file's attribute byte

Subject	Title	Issue	Page	Description
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Utility	Batch of Documentation	April	346	A tip for storing and retrieving documentation files on line
(continued)	Just Browsing	April	352	An alternative to the TYPE command for viewing the contents of files
	Cursor Control	May	343	A Turbo Pascal program that changes cursor size
	Cursor Correction	May	348	A BASIC program that restores the cursor to its normal size
	Perfect Typing	June	360	Display WordPerfect files on screen from DOS with control codes shown as asterisks
	CHMOD Comment	June	366	*.* utilities should have only one space before each parameter
	Colors With 1-2-3 Release 2	July	315	A patch for 123.SET to change the colors of 1-2-3 release 2; plus defaulting to ECHO OFF
	On the MOVE Again	Aug.	318	An enhanced version of "Get a MOVE On" (*.*, February 1986)
	Border Patrol	Oct.	386	A program that uses the graphics monitor's border to indicate the status of <capslock> and <numlock></numlock></capslock>
	X-MAKER Improved	Dec.	361	X-MAKER.BAS, *.*'s program-making program, improved
	Remote Control	Dec.	361	Echo keystrokes out the serial port of one PC and into the serial port of another
	Son of CLOCKTIC	Dec.	384	A clock program version that works on a Monochrome Dis- play

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Data Management	Jan.	239	Notebook II and Bibliography Organized note-taking plus an automated bibliography
	Feb.	278	SeekEasy Quick and simple information storage and retrieval
	Aug.	147	Legalex Calendar System version 1.04 A legal calendar program for appointments and deadlines
	Sept.	107	Quickreport version 1.5 A report generator for dBASE II and III
	Sept.	128	Scorecast A pro football data base and forecasting program
	Nov.	116	PC-File/R version 1.0 A menu-driven program for managing large data files
Finance	April	307	Winning Investor A stock portfolio analyzer
	Nov.	154	Vestor An on-line securities analysis program
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Games	Jan.	244	Speculator A commodities trading game
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Programming	Feb.	280	dBIII Compiler and Clipper Two dBASE III program compilers
	Aug.	132	ZBasic Interactive BASIC version 3.0 A fast BASIC compiler with the feel of an interpreter
	Nov.	169	Alice version 1.3 A Pascal interpreter and debugger
Project Managemer	nt Jan.	262	Life/Time Manager A personalized project management system for organizing your life
	Oct.	185	Individual Training for Project Management A generic project management tutorial
Publishing	July	90	Fontasy version 1.06 Desktop publishing with multiple fonts and formats
	July	98	The Print Shop An inexpensive program that generates simple graphics
	July	112	The Newsroom Bare-bones desktop publishing for newsletters
	July	122	FontGen A font and symbol generator for laser printing
	Oct.	174	The Printing Press A menu-driven clip art program
	Dec.	123	SCLaser Plus A code-oriented publishing program for the office
Spreadsheets	June	89	1-2-3 Report Writer A report generator for Lotus 1-2-3 worksheets
Tutorial	May	158	Teach Yourself Framework A Framework tutorial
Utility	Feb.	282	FANSI-Console version 1.11P A faster alternative to the DOS ANSI.SYS for screen and keyboard input and output
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	Mar.	276	Fancy Word Additional typefaces for use with <i>Microsoft Word</i> and HP's LaserJet printer
	April	311	Media Master Plus version 1.15 A data conversion tool
	May	143	Quickcode 123 A memory-resident macro and data base menu generator for 1-2-3 release 2
	June	124	DOS-Helper version 2.12A An on-line DOS 2.00–3.10 help manual
	Aug.	129	Ledger Domain version 2.1 A checking-account template for 1-2-3
	Aug.	144	PC Tools version 1.1 A low-cost alternative to The Norton Utilities
	Sept.	92	PopDrop 1.0 Remove memory-resident programs with a single command
	Oct.	147	Traveling Sidekick An appointment and calendar program and travelers' aid
	Oct.	158	SmartNotes 1.0 An electronic equivalent of gummed notes
	Oct.	166	MacroPIK'r version 1.3 Data conversion utility that converts mainframe files to PC
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	Nov.	147	Resident version 1.1 A program that lets WordStar, 1-2-3, and most other applications work like a memory-resident utility
	Dec.	162	Referee A program that keeps your memory-resident utilities in line
Word Processing	Feb.	275	WordFinder version 2.0 An electronic thesaurus
0	Mar.	269	Ready! A memory-resident outline processor
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	April	295	NewWord 3 A WordStar-like word processor
	June	113	MindReader A capable word processor and proofer for the hunt-and-peck typist
	July	128	WordStar 2000 release 2 An update of the word processing program
	Aug.	138	PC-Outline version 1.02 A multiwindow memory-resident outline processor
	Sept.	88	Microsoft Word version 3.0 Notable improvements and new features

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	May	122	The Modem Accelerator A communications device that uses data compression for fast file transfer	
	June	150	MegaFunction A multifunction board with its own AC power supply and 1.28MB RAM disk	
	July	137	JLaser and JRAM-3 A controller board that expands the memory of laser printers	
	July	151	PC MacBridge A board that enables the PC to send files to the Apple LaserWriter	
	July	160	SideDialer A tiny autodial board compatible with most directories	
	Aug.	100	PC/Audit Card A board that tracks PC usage	
	Sept.	168	MicroSpeed Fast88 A PC accelerator board that requires no expansion slot	
	Oct.	140	Ingram-Eve Short Stack A small, low-cost memory expansion board	
	Dec.	99	Paradise AutoSwitch EGA An EGA compatible with automatic mode switching plus	
	Dec.	77	CGA and HGC emulation	
Communications	May	134	Zoom/Modem PC 1200 XL A feature-laden 1200-bps modem for a low price	
Graphics	Jan.	278	Modular Graphics Card A graphics card that duplicates the IBM Color/Graphics Adapter	
	Aug.	118	Persyst Color Combo Card A multifunction board that emulates the IBM Color/ Graphics Adapter	
	Nov.	193	Graphics Solution A graphics board that emulates Hercules, CGA, and Plantronics graphics adapters	
Input Devices	Feb.	259	Omni-Reader A low-cost, low-performance optical character reader	
Memory	Dec.	100	NEC V20 and V30 Fast, cheap replacements for 8088 and 8086 CPUs	
Miscellaneous	Dec.	108	Watchman I Standby Power System A combination emergency power supply and surge protector	
Modem	Sept.	177	Ven-Tel 2400 Plus A Hayes-compatible 2400-bps modem	
Monitors	Feb.	258	<b>Limelight</b> A portable projection system capable of enlarging monochrome PC images up to 8 by 8 feet	
Output Devices	Oct.	122	Cauzin Softstrip System Reader laser-readable hard copy form	
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	Sept.	160	Mannesmann Tally MT-290 A full-featured 9-pin dot matrix printer with font car- tridges	
	Nov.	202	NL-10 A 9-pin Epson-compatible printer with near letter quality printing	

Subject	Issue	Page	Product and Description
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	Aug.	112	OnBoard 20 Hard Drive Card 20MB of hard disk storage on a board
	Oct.	134	Diskit 2 A mass storage device that uses removable high-density media
	Nov.	182	Portafile An external 20MB hard disk
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	Dec.	103	Excel Stream 60 A speedy tape drive for file-by-file backups and restores
Systems	Jan.	270	Executive Partner Panasonic's new portable PC with built-in thermal printer
	Jan.	271	HP Portable Plus Upgraded HP Portable Plus including removable ROM software and more RAM
	Jan.	286	Tandy 1000 An IBM PC-compatible system for under \$1000
	Mar.	230	NCR PC8 A high-speed clone of the IBM AT Model 99
	Mar.	237	TeleVideo AT A fast AT compatible from terminal-maker TeleVideo
	Mar.	244	ITT Xtra XP An XT compatible with AT processing power
	Mar.	254	Texas Instruments Business-Pro An AT compatible impersonates a small minicomputer
	Mar.	250	Compaq Deskpro 286 The original clone maker's first 80286 machine
	Mar.	260	Hewlett-Packard Vectra The Vectra, geared toward the engineering and scientific market, runs every IBM PC product
	April	321	Amqute Smaller, lighter, and cheaper than a Compaq portable
	April	328	Epson Equity I A reliable, affordable PC compatible
	May	108	Compaq Portable II Compaq's ultralight 80286-based portable
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	June	142	Leading Edge Model D A low-cost PC compatible
	June	143	Heath ZP-150 An 8-pound laptop
	July	144	Sanyo MBC-775e Portable Color Computer The first portable PC compatible to of- fer color
	July	156	FD-1000 Personal Computer A do-it-yourself, cut-rate XT clone
	Aug.	88	Data General/One Model 2 The laptop with the first readable LCD display
	Sept.	141	Sperry PC/IT An AT compatible with massive expandability
	Sept.	148	Toshiba T1100 Toshiba's lighter, smaller laptop
	Oct.	102	The PC+ A PC clone from Thompson, Harriman & Edwards Computer Products Company
	Oct.	108	Kimtron KT-7/PC A board, terminals, and software for turning an AT into a multiuser system
	Nov.	177	6300 Plus AT&T's system offers XT/AT compatibility and runs UNIX and DOS
	Dec.	90	Toshiba T3100 A 14-pound 80286 portable with a dazzling gas plasma display
	Dec.	91	NEC APC IV An AT compatible with a 40MB hard disk and an EGA display

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# February Preview Graphics

Graphics Industry Roundrable

Six industry luminaries shed

Six industry luminaries shed

some light on the crucial facing the light on the currently facing the graphics issues currently. Among the graphics issues community. Among the hot topics: standards, user the PC community and hard interfaces, displays, and hard interfaces, output.

ontput.

Copy output.

Plus, a graphics primer, written

Plus, a graphics graphics editor

by PC World's graphics standards,

covering all the modes, all the

covering all the monochrome

common graphics standards,

installation, and monochrome

installation, and and monochrome

and color capabilities.

R:base System V

An in-depth review of the latest

An in-depth review of R:base.

An in-depth review of R:base.

and greatest version of R:base.

and perfect version of R:base.

and perfect version of R:base.

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and has networking but can it and has networking beat dBASE at its own game?

beat dBASE at its own game.

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