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# PC WORLD

The Comprehensive Guide to IBM Personal Computers and Compatibles  
April 1986



## Up and Running

This month we depart from our usual format to offer a guided tour of five crucial work areas. In each section the sojourn begins with concepts (First Step), moves to implementation (Next Step), and concludes with evaluations of especially accessible packages (Review).

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# PC WORLD

April 1986  
Volume 4, Number 4

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PC World™ (ISSN 0737-8939) is published monthly at \$29.90 for one year (12 issues), \$53.90 for two years (24 issues), \$74.90 for three years (36 issues) by PC World Communications, Inc., 555 De Haro St., San Francisco, CA 94107. Foreign orders must be prepaid in U.S. funds with additional postage. Add \$12 per year for Canada and Mexico; add \$25 per year for surface mail or \$110 per year for airmail for all other countries. For subscriber service questions call toll-free 800/525-0643 (in Colorado 303/447-9330) or write: Subscriber Services, P.O. Box 55029, Boulder, CO 80322-5029. To place new orders call 800/628-2900 (in Nebraska 402/895-7284). Second-class postage paid at San Francisco. POSTMASTER: Send address changes to PC World, Subscription Dept., P.O. Box 55029, Boulder, CO 80323-5029. Editorial and business offices: 555 De Haro St., San Francisco, CA 94107, 415/861-3861. CompuServe 74055,412 The Source STE908

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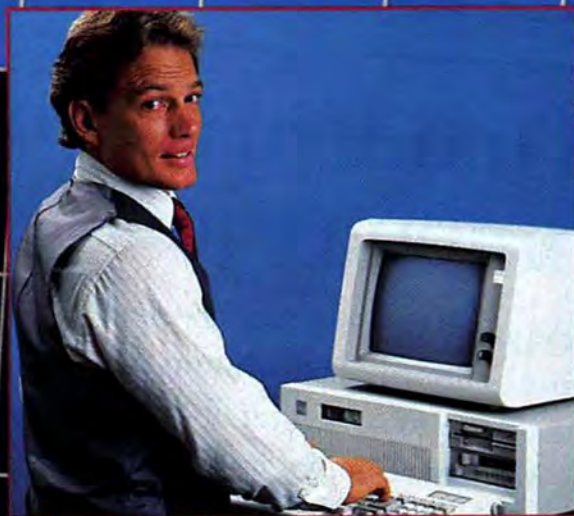
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# Meet our P

## Choosing a modem for your personal computer just got easier.

Modems are remarkable little gadgets. They can connect you and your PC to mountains of data and oceans of information. But up until now, deciding which modem to buy hasn't been easy. So to solve that little problem, IBM is offering two 1,200 bps PC modems. Modems that not only give you the best features currently available on PC modems, but also offer features usually found only on higher priced, higher speed modems.

### **First, a Brief Introduction to the IBM PC Modems:**

The IBM 5841 is a stand-alone modem capable of operating at 0-300, 600 and 1,200 bps in asynchronous mode, and 600 and 1,200 bps synchronous.

Our other modem is the IBM Personal Computer Modem—an internal, half-card modem that operates at 0-300, 600 and 1,200 bps asynchronous.

### **The Non-Identical Twins**

In some respects, these two modems are very similar. For example, they both have Automatic Adaptive Equalization—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 phone line conditions. This is one of those features more often found on faster, more expensive modems.

In addition to automatic answering, both modems offer Adaptive Dialing—which means that if you don't specify either tone or pulse dialing, the modems try tone dialing for one digit, and if that doesn't work,

they automatically switch to pulse dialing.

Both modems will automatically re-dial a number as many times as you tell them to. Or if you prefer, they can switch to an alternate number on a busy signal or a no answer. Once a connection is made, the modems automatically detect and adjust to the incoming transmission speed. They can also initiate an automatic log-on sequence including control characters, ID number and password.

And both modems have extensive "Help" menus, a complete complement of built-in diagnostics, a programmable speaker, and two phone jacks on the back so both your phone and the modem can be connected to the same line at the same time. You can even switch between voice and data without interrupting the phone call.

### **A Modem with a Memory of Its Own**

The IBM 5841 stand-alone modem has some additional features you don't usually find on 1,200 bps modems. For example, the modem is switchable between asynchronous and synchronous modes and has a 20-entry Dialing Directory. Kept in non-volatile



# CModems

storage, the directory enables the modem to dial up and log on to systems automatically. This feature is most convenient when the 5841 is used with a fixed-function ASCII terminal such as the IBM 3161 or 3163.

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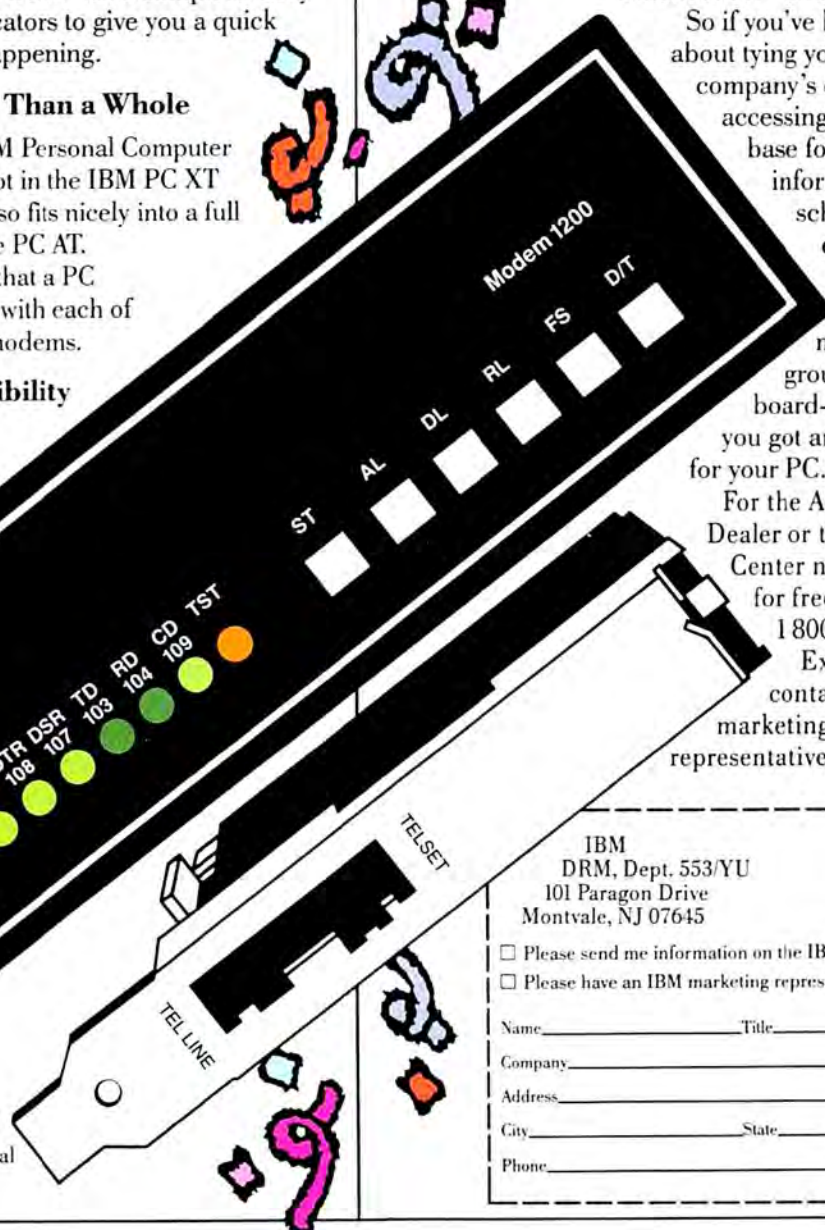
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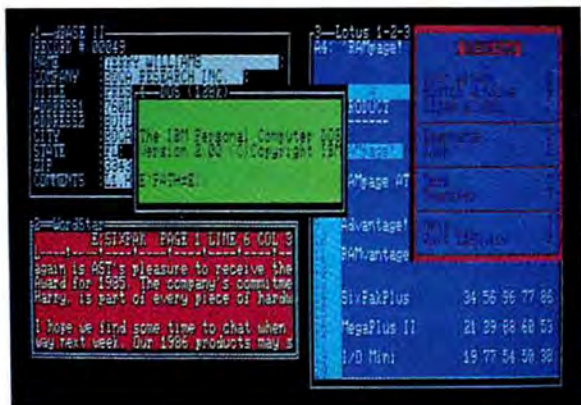
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# introduces the 640K barrier.

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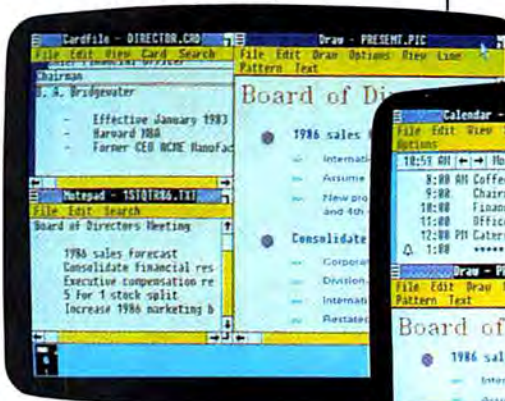
## Windows and "DRAW!" — a winning combination.

Missing some names? Remember, you're in the Microsoft Windows operating environment. Two more clicks and your list of corporate directors, stored in another file, appears in the corner of your screen. Now you can edit your presentation and refer to the list simultaneously.

That takes care of the text chart.

Now what about your ideas for the future?

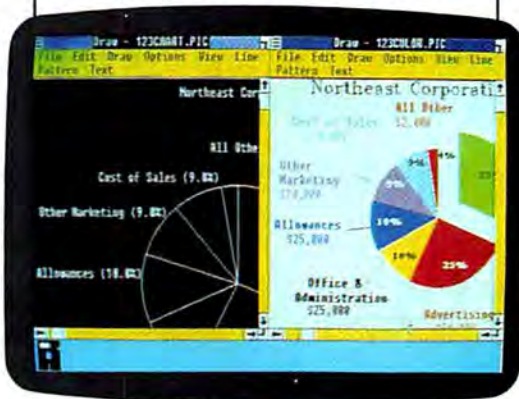
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David Bunnell

# The Battered PC User

Caution: Software documentation may be hazardous to your mental health

The way things are going with computers, perhaps it's not entirely inconceivable that one day in the future all software packages and hardware manuals will be required to carry blatant warnings to prospective customers.

"That would be lovely," says Jane Windes. She's the legislative consultant who is helping Assemblywoman Gloria Molina draft the language for Assembly Bill 1507, which comes before the California State Legislature in July or August. It's the controversial piece of legislation that seeks to hold software publishers, hardware manufacturers, and dealers accountable to consumers for their advertising.

According to this bill, any claims made by computer companies would be considered an express warranty.

That means if a software company touted its spreadsheet program as being "suitable for all your needs," any customer who happened to disagree would have the right to return it. Needless to say, dealers don't want to be held responsible for manufacturers'

claims. For that matter, they don't want to be accountable for their own claims.

"One thing manufacturers have done," Windes notes, "is to promote how easy a product is to use. The first-time user then finds out it takes four weeks of reading late at night to figure the program out. There's a discrepancy between advertising and reality."

One idea being kicked around in drafting the bill is licensing computer salespeople to make sure they are completely qualified to sell hardware and software. Now, I think that might be a little bit extreme. After all, the next step would be to accredit booksellers to sell books and to license shoe salespeople to sell shoes.

I think it's a good time right now to consider the basic issue of customer support. This is especially important when it comes to people who are new to PCs.

Seasoned PC users may already be used to navigating their way through the minefield of bugs and errors in a program that may have

*(continues)*



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been sold without having been tested. They can more or less fend for themselves. But novice users are the battered children of personal computing.

I believe that what we really need today is a new spirit of providing sound and adequate information to customers.

I recently had an experience that has shed a lot of light on the plight of the first-time user entering the real world of PCs.

I have a writer friend named James Armstrong. James has been writing books and articles for years. I finally convinced him to convert from his electronic typewriter ("a Swintec with a lavish 40K of memory," he says wistfully) to a personal computer. I gave him the usual litany of reasons for making the switch—ease of use, easier editing functions, speed, and so on. Everything except ice cream.

On my recommendation that it was a good computer for a good price, he bought a Tandy 1000 with 256K of memory. He also purchased a letter quality printer. I then suggested he try the *Volks-writer 3* word processing program. I had heard many positive things about this program, and it turned out that our editors were working on a review of it for a future issue. So I suggested that James write some notes about the experience of a beginner learning to use the program to accompany the magazine's review.

After about three weeks of James struggling to use the *Volks-writer 3* program, I realized how truly pathetic the support for new

(continues)



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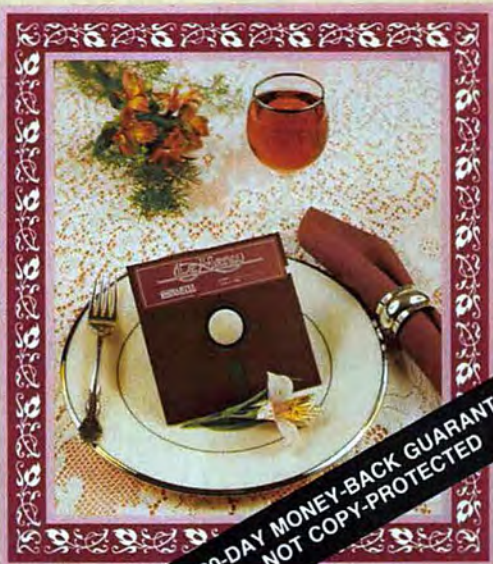
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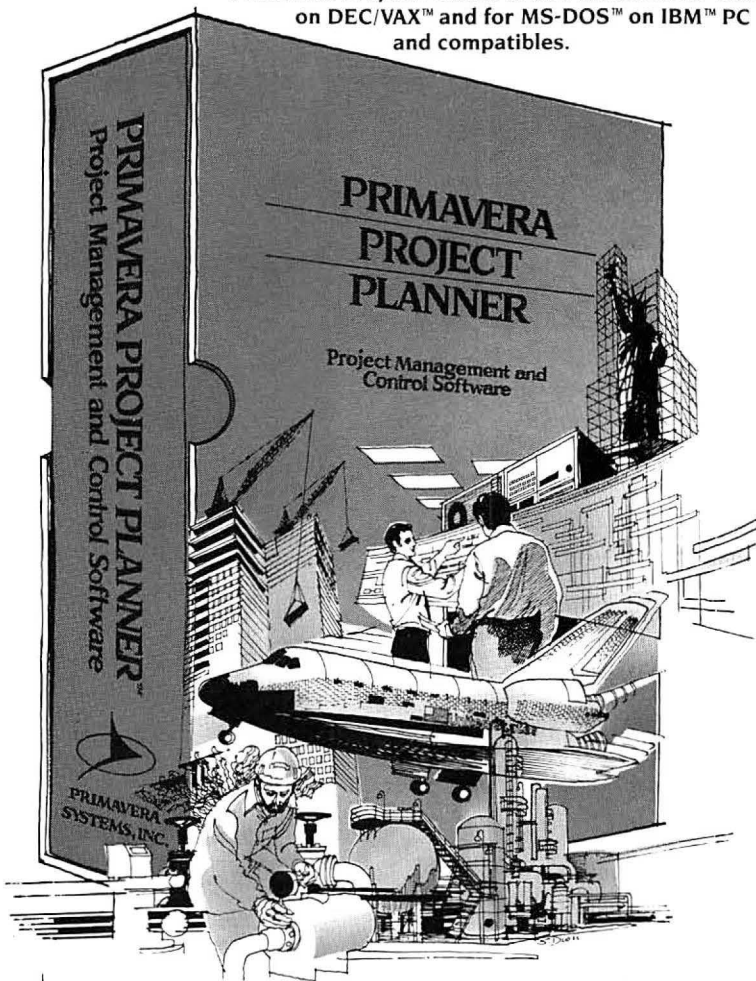
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users is—not only from the software publisher but also from the store where James bought his machine.

I almost developed welts on my hand from holding the telephone receiver during all the SOS calls he made to me from the first day. He couldn't get the program to load right. Nothing seemed to happen. He had read the manual very carefully, and he still couldn't figure out what was wrong.

It turned out that what was wrong was very simple. The write-protect tabs were on the disks, so they weren't functioning properly. When you first set up the program, it has to accept some data from you to be properly installed. So I asked James, "Is there a little piece of tape on the disk?"

He said, "Yes."

I then instructed him, "Remove that little piece of tape and try again." He did, and it worked. But this was after several hours of agony and trying to figure out what he was doing wrong. The publisher had never said anything about the write-protect tabs on the disk, assuming the customer would know about them.

A new computer user, of course, isn't going to be aware that write-protect tabs even exist, much less know what to do about them.

Well, that was just the beginning of James's troubles.

Over the next couple of weeks we went through every manner of torture and perplexity to make *Volkswriter 3* work on his machine. One thing we discovered was that the program was very

*(continues)*



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slow. After he had keyed in only four pages of text, he was typing ahead of it all the time. This didn't seem right.

We weren't able to find the solution to the program's sluggishness, so I called the manufacturer and explained that I was the publisher of *PC World*, that we had a neophyte reviewer using their program, and could they call him up and offer him some help.

What they told him was that *Volkswriter 3* was really designed to be run on a hard disk. But when you look at the software package, nowhere does it state that you need a hard disk to run the program. All it specifies is a requirement of 256K of memory and two double-sided floppy disk drives. After a consumer shells out \$295 for the program, I'd say that's an almost criminal omission of information.

Furthermore, we found that the spelling checker didn't work. "It would pass over obvious typos," James said, "like the word *speculation* with the numeral 3 in the middle of it by mistake. And it was not consistent when stopping at unknown words. I know perfectly well that nowhere in that dictionary could there be the city names of *West Covina* or *Gardena*, and yet it passed over them, too. I also doubt if *praetorian guard* is one of its entries, and it passed over that."

The real problem is that you couldn't figure out if something was wrong with the program, or if the trouble had something to do with the particular combination of the machine and the software. I

(continues)



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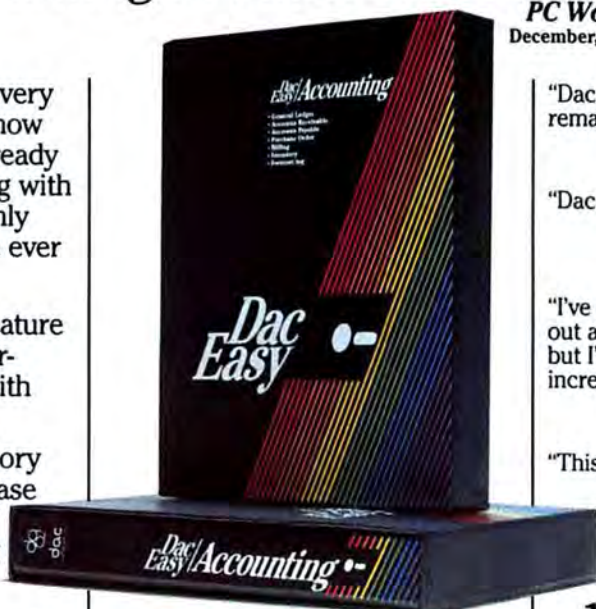
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might have been able to straighten out some of these dilemmas if I had been there, but James lives across the bay in Berkeley, and we were working over the phone.

After a couple of weeks of this PC purgatory, James reached a point with the program where it just hung up on him several times. Everything was stuck—“<F10> didn't answer, <Ctrl>-<Break> didn't answer, all the others didn't answer”—and he didn't want to turn it off because he would lose his file. But we finally gave up, and he began using *WordStar*, the old reliable standard.

But the next day (oops!) James called me to say, “I started playing with *WordStar* last night, and I've run into a dead end already!” Now his Radio Shack dealer is recommending that he take a class—“but he hasn't specified on what subject,” James sighs.

Rockabye Sweet Baby James! I'm thinking of getting an unlisted phone number.

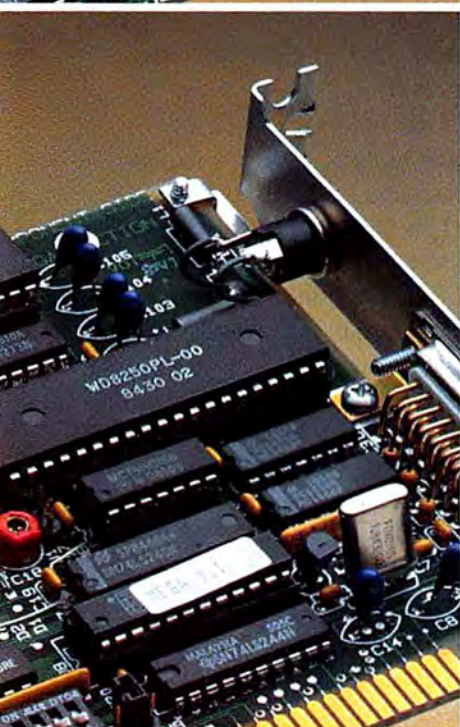
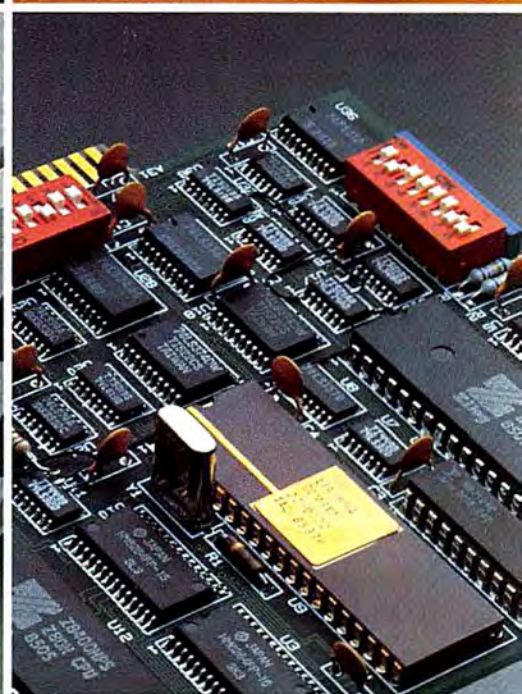
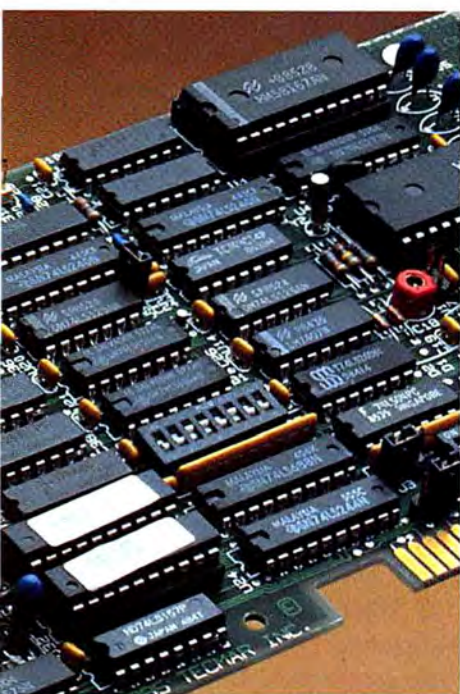
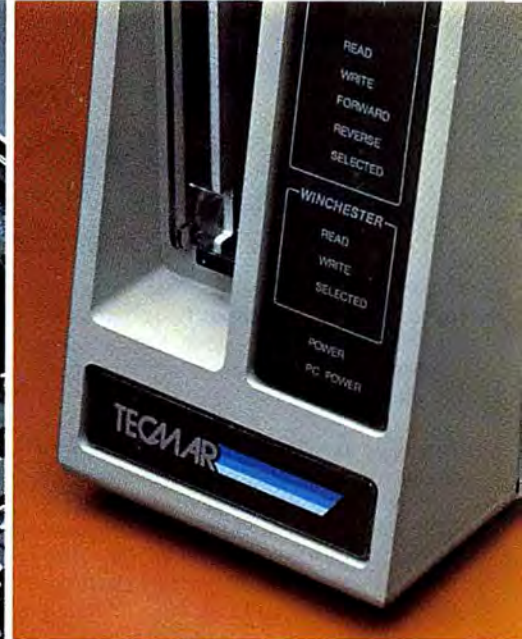
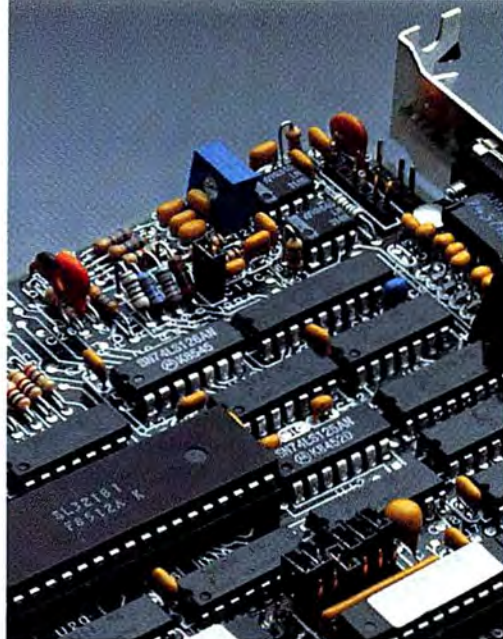
I really believe that computer companies just haven't learned how to communicate with new users. The first wave of users are doing fine. These are the technically innovative people, the technological “adapters,” so to speak, who already have a personal computer and have been using it for a long time. They are the ones who have the patience and the knack for understanding PCs as well as the patience for solving the problems themselves.

Meanwhile, it's a matter of reaching the people who aren't adapters. They have a great need for computers, too. Everyone

(continues)



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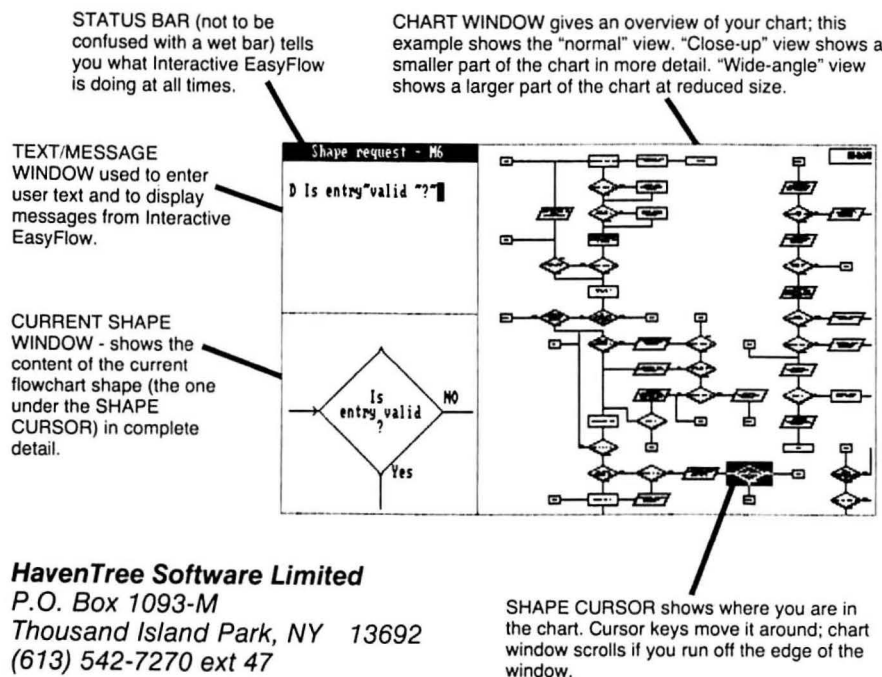
**Features:** • Text is automatically centered, character by character, within shapes as you type it • Text formatting controls allow you to over-ride the automatic formatting where desired • Lines are created by specifying the starting and ending points - the program automatically generates the route • Powerful editing facilities allow shapes and even entire rows and columns of shapes to be inserted or deleted; lines are automatically re-routed as necessary • Large chart size (up to 16 shapes wide by 16 shapes high) allows very large flowcharts and organization charts to be handled with ease • Charts can be larger than the screen - the window into the chart scrolls both horizontally and vertically as necessary • Flexible printer interface allows it to work with all

printers, not just dot matrix printers. Wide charts can be printed in strips Also works with Hewlett-Packard 7475A (and compatible) plotters • Twenty standard flowcharting shapes included • Common shapes supplied in three sizes • Extensive manual (125 pages) includes many examples • Context sensitive "help" facility provides immediate assistance at any time • Any number of titles can be placed on a chart • Commentary text blocks can be placed anywhere in the chart • Fast: written in 8088 assembler • Plus many more features than we can mention here.

Requires at least 256K memory, DOS-2 or higher and an IBM or Hercules compatible graphics card.

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The sample screen display shown below is typical of what you see while editing a chart. Other screen displays are provided for entering titles, changing options, getting "help" and so on.



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should be able to use a computer. People shouldn't be put in the position of having to dance across hot coals to find assistance.

So what should be done? First of all, I think there's a basic mind-set problem. All computer companies that are involved with customers—and this includes computer manufacturers, software publishers, stores, and mail-order suppliers—must realize that many have no prior computer experience, no background, and are not technological adapters who can readily use the products.

These companies have to change their way of thinking, quit making assumptions about people's abilities and skill levels, and really get back to basics. They must learn to teach people how to use computers and programs from the ground up.

In other words, the maxim "Physician, heal thyself" also applies to software manufacturers: Teacher, teach thyself.

*PC World* has a commitment to assisting new users and to helping people get involved with personal computers—while still serving the needs of our more experienced readers.

After all, today's new user is going to be tomorrow's experienced user and buyer.

This commitment is particularly illustrated in our regular "Getting Started" section, and even more so this month in the series of "First Step" articles.

I think that both hardware and software companies and computer stores need to foster this same attitude. If they continue to cater

(continues)



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Instead, Atari extended the ST concept to a new computer called the 1040ST<sup>TM</sup>.

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|--------------------------------------------|-------------------------------------------|-----------------------------------------------|----------------------------------------|-----------------------------------------------|-----------------------|
| Price                                      | \$999                                     | \$1795                                        | \$4675                                 | \$1995                                        | \$1295                |
| CPU                                        | 68000                                     | 68000                                         | 80286                                  | 68000                                         | 65C02                 |
| Speed MHz                                  | 8.0                                       | 7.16                                          | 6.0                                    | 7.83                                          | 1.0                   |
| Standard RAM                               | 1 MB                                      | 256K                                          | 256K                                   | 512K                                          | 128K                  |
| Standard ROM                               | 192K                                      | 192K                                          | 64K                                    | 64K                                           | 16K                   |
| Number of Keys                             | 95                                        | 89                                            | 95                                     | 59                                            | 63                    |
| Mouse                                      | Yes                                       | Yes                                           | No                                     | Yes                                           | Optional              |
| Screen Resolution<br>(Non-Interlaced Mode) |                                           |                                               |                                        |                                               |                       |
| Color                                      | 640 x 200                                 | 640 x 200***                                  | 640 x 200                              | None                                          | 560 x 192             |
| Monochrome                                 | 640 x 400                                 | 640 x 200***                                  | 720 x 350**                            | 512 x 342                                     | 560 x 192             |
| Color Output                               | Yes                                       | Yes                                           | Optional                               | None                                          | Yes                   |
| Number of Colors                           | 512                                       | 4096                                          | 16                                     | None                                          | 16                    |
| Disk Drive                                 | 3.5"                                      | 3.5"                                          | 5.25"                                  | 3.5"                                          | 5.25"                 |
| Built-in Hard Disk<br>(DMA) Port           | Yes                                       | No                                            | Yes                                    | No                                            | No                    |
| Midi Interface                             | Yes                                       | No                                            | No                                     | No                                            | No                    |
| # of Sound Voices                          | 3                                         | 4                                             | 1                                      | 4                                             | 1                     |

Atari 520ST with 512K RAM, \$799.

\*Connects to standard color TV. For RGB color monitor add \$200.

\*\*With optional monochrome board (non bit-mapped)

\*\*\*Interlace Mode - 640x400

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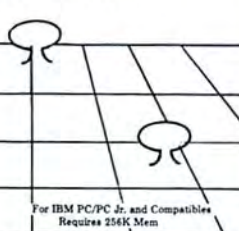
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only to experienced users, the world of personal computing will be unexciting and uninspired. The doors will be opened to products from Japan and other countries that will happily fill beginners' needs.

It's a very serious problem, which should be dealt with by all the players. Those who don't recognize this are creating an even bigger problem in the long run.

This is the main reason why bills like Assemblywoman Molina's are presented to the state legislature. People spend \$400 on a piece of software and find out only afterward that it doesn't perform very well unless it runs on a hard disk. Or they may discover other things that don't work properly.

This predicament is also another reason why people steal or copy software. Customers develop a bad attitude. They feel burned, and they don't want to be burned again. So they either steal software, or they want laws passed that will protect them from manufacturers' false claims.

Thus, software companies become their own worst enemy. The hardware industry isn't really that much better. Computer stores are also a joke. You can't really get any help from them. Everybody knows that. And customers aren't the only ones who complain about stores. Software publishers and hardware manufacturers also gripe about them.

A lot of companies offer "user support" on the phone. I wouldn't be surprised if 50 percent of the

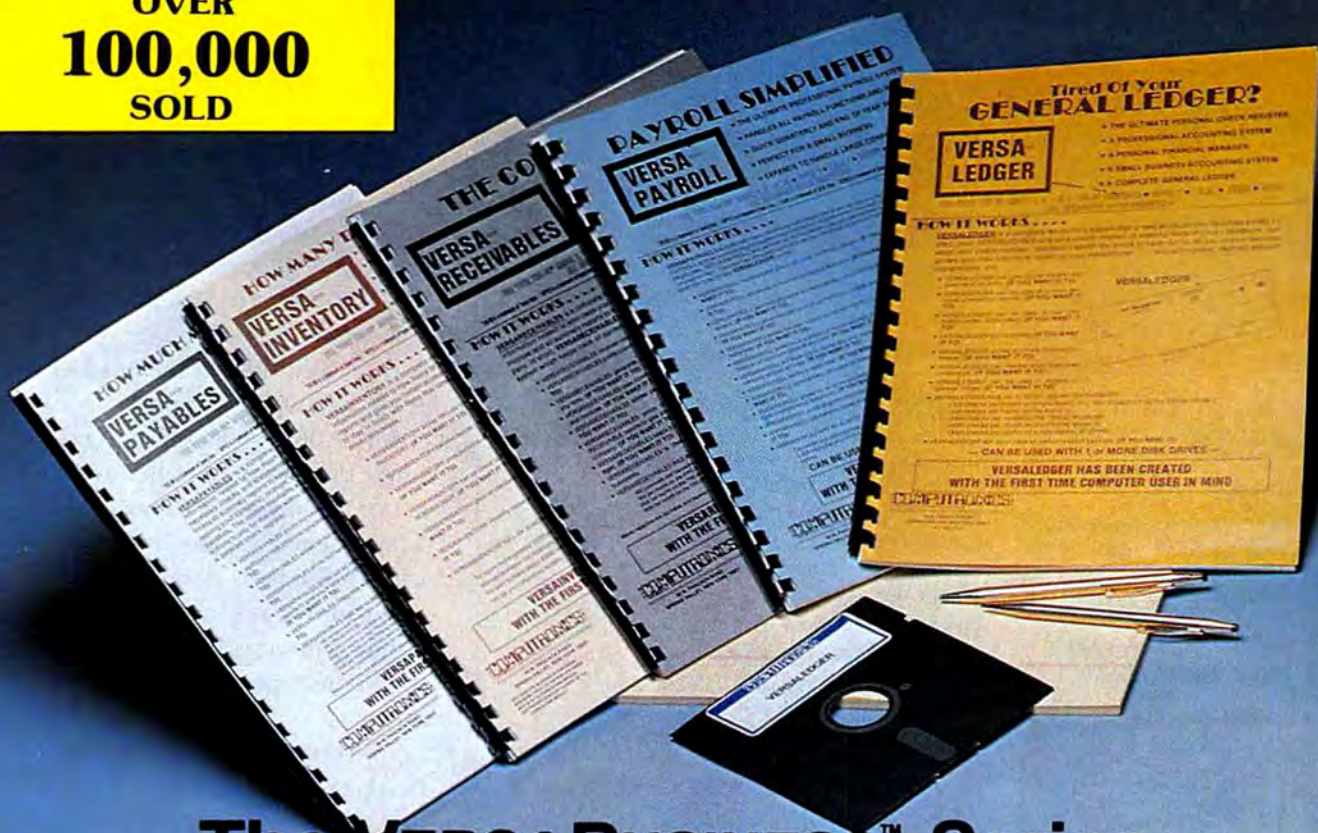
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TranSec UNlock is a unique software copying disk that removes copy protection, providing standard non-protected DOS copies. UNlock runs on IBM® PC, XT, AT, and compatibles with 256K or more, DOS 2.0 or higher.

**BACKUP COPIES.** UNlock safely and easily makes backup copies.

**RUN ON HARD DISK.** Programs load faster, use less disk space and work with any hard disk, including Bernoulli Boxes. No longer do you need the original in drive "A".

**RUN ON RAM DISK.** UNlock is the only software that can run copy protected software on a RAM disk or micro-floppy.

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## Your PC Market-Maximizer Account

The PC World Directory is a highly cost-effective way to enter the profitable IBM PC market—available in three- and six-month contracts. This comprehensive listing is your best bet for high returns with a minimal advertising investment. See this month's Directory for details.

callers hang up before they're assisted—because so many callers are ahead of them that they're put on hold for 15 to 20 minutes.

Of course, this in turn has created the book publishing business. Users will pay for popularly written, easy to understand manuals. Their only alternative would be to find some kind of Rosetta stone that would help them decipher the cryptic confusion of the product's original documentation.

Ironically, it seems that the lower the cost of the software, the easier the manual is to read. Maybe that's because if software costs \$600, then manufacturers can afford to rely on offering phone support, rather than putting more time into writing the manual.

Unfortunately, *ease of use* has become such a cliché in computer product advertising that it's lost its meaning. No one even wants to use the term *user-friendly* anymore. If some programming genius came along today with genuinely user-friendly software, no one would believe it. They wouldn't even look at it, because there are so many programs called user-friendly that clearly aren't.

We need fresh and innovative ideas on how to prevent PC-user abuse. Please let me hear your thoughts and suggestions. Perhaps we need an organization like Greenpeace or Amnesty International to monitor incidents of PC torture perpetrated on innocent PC users everywhere. ●



Introducing  
the most amazingly useful software  
for your IBM® PC or compatible.

# Ready!

The resident outline processor from the makers of ThinkTank™

## 1 READY! is resident.

The power of Ready! outline processing is available on demand, always one keystroke away from your favorite word processor, spreadsheet program, database, even other resident software.

## 2 READY! is an outline processor.

To the right is a sample Ready! outline. On paper, the outline just sits there. In action, Ready! animates your outlines. You'll actually have fun learning how to use Ready! Spend ten minutes learning the basics (really!), you'll continue to find new applications months later.

## 3 READY! can work inside your word processor.

Now you can outline while you write! Ever get an idea that belongs in paragraph 10 while you're writing paragraph 3? With Ready! in residence, you can record the idea, then get back to your writing—your hands never leave the keyboard. And outlines transfer into any popular word processor with two keystrokes! Finally, every word processor can have a built-in outline processor!

## 4 READY! can work inside your spreadsheet.

Document your spreadsheet work. Why is the ad budget so high in June? Drop a note in your Ready! outline so you won't forget... Use Ready! to design the "left edge" of your spreadsheet, then transfer it into any popular spreadsheet program without messy file conversions! Finally, every spreadsheet can have a built-in outline processor!

- + How I Use READY!, by Jack Larson, Anomolated Industries
  - + Action Items & Things to Do
    - people to tell about READY!
      - Jack Lombardi, my attorney
      - all my managers and staff
      - Steve Robertson, Chairman of the Board
      - the kids!
    - why I'm so excited about READY!
      - I consider more angles
      - I record ideas immediately!
      - I think and organize earlier in a project
      - READY! creates time!
    - more things I can do with READY!
      - design spreadsheets for the quarterly report
      - get a "mouse" so I can re-organize more easily
      - make "cheat sheets" of:
        - spreadsheet commands
        - database commands
        - word processing commands
      - keep a list of people I owe favors to!
      - develop itinerary for European tour in March
      - use READY! with a projector at board meeting!
- + Daily Appointment Calendar
  - + Wednesday January 8
    - + 08:00AM: phone calls
      - Marian Rogers: 415-902-0992, happy birthday!
      - she says I must call Uncle Rudy!
      - Jerry Grange: meet in Chicago on the 19th
    - + 09:30AM: Watch videotape of Annual Meeting
    - + 10:00AM: meeting with Bart Lewis
    - + directions
    - + agenda
    - + 02:00PM: staff meeting
  - + Thursday January 9
    - + 08:00AM: phone calls
    - + 11:30AM: lunch with Amy Wile
    - + Word Processing and Spreadsheet work
    - + transfer to word processor: letter to Mom
    - + chat-chat
      - the kids are back in school
      - I made \$1.3 million this year
      - I quit smoking, January 1, 1986; 09:00AM
    - + please don't sell your Anomolated stock
      - I'm having fun running the company
      - I hope I don't start smoking again!
    - + documentation for spreadsheet: ROLLOUT.WKS
      - cells F38, G38:
        - + increased ad budget for new product rollout
        - + ad budget back to normal levels in 90 days
      - cells G59, H59:
        - + major trade show in November
        - + send 15 employees: (expand for a list of names)
      - row 82:
        - + product turns profitable in December
  - + Christmas Present List
    - + name: Steve Robertson, chairman
    - + name: Grandma Larson
      - address: 92 Betty Loop
      - city, state & zip: Piedmont, CA 90254
      - amount to spend on present: \$99
    - Christmas present: READY! Outline Processor
    - buy at: Downtown Computer Center
    - + name: Jack Larson Jr

## 5 READY! is your appointment calendar.

What if a meeting moves from Wednesday to Thursday? That's where Ready! really shines... just grab the appointment by its "handle" and move it. All your notes move too!

## 6 READY! is incredibly flexible and adaptive.

Other resident programs lock you into four or five pre-defined structures such as a rolodex or appointment calendar. Only Ready! can create outline templates to maintain any kind of list... then add a new "record" by pressing a single function key!

## 7 READY! is your briefcase.

Carry all your plans, designs, projects, details, facts, lists, schedules, procedures, appointments, ideas and information with you. Dial a phone number from any headline, not just from a "rolodex." Take notes in your outline while you're on the phone. Time and date-stamp messages, keep your calendar. Ready! is perfect for portable "lap-top" computers.

## 8 READY! is compatible

with over 30 popular software products including ThinkTank™, the number one integrated outline processor/word processor.

**System requirements:** Ready! uses 128K RAM with a 32K outline (maximum size), runs on the IBM PC, PC XT, PC AT, or 100% compatible, requires one double-sided, double-density disk and DOS version 2.0 or higher. **Supported, but not required:** printer, Hayes Smartmodem™ or compatible, Mouse Systems™ or Microsoft® Mouse, Intel AboveBoard™ or compatible, ThinkTank version 2.0 or higher. **Trademarks:** Ready! and ThinkTank are trademarks of Living Videotext, Inc. The names of the products and companies appearing above may be trademarks or registered trademarks.

**Ready! is useful** because it organizes facts and ideas the way you do, as lists and lists-of-lists. **Ready! is amazing** because it's incredibly easy to work with—**anyone** can be up and running in ten minutes or less!

Add the power of resident technology and you have a fantastic system for organizing notes, ideas and facts, all **instantly accessible** from your favorite word processor or spreadsheet program. With Ready! in residence you'll never lose a good idea!

**Suggested Retail Price: \$99.95 Not Copy Protected**

**Call 1-800-822-3700 (in Calif. 1-800-443-4310) for nearest Ready! dealer**





# Say goodbye to Dot and Daisy.

Until now, if you wanted high speed printing, you got a dot matrix printer. If you wanted true letter quality, you got a daisy wheel. And if you wanted great graphics, you got a plotter.

The Desktop Printshop™ quietly replaces all that.

The Desktop Printshop prints with a whisper. Which means your printer can finally make friends with your office.

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The result? Communication that really communicates.

Reports, news-letters, proposals, forecasts, presentations, letters, even memos that look as if they were designed by a graphic artist.

But seeing is believing. For a hands on demonstration of the Desktop Printshop, call us Toll Free: (800) 621-6746, (in California: 805-495-5800), for the name of your nearest Cordata Dealer. Say hello to the Desktop Printshop...and it's, "Goodbye Dot and Daisy."



## The Desktop Printshop™

CORDATA, INC., 275 E. Hillcrest Drive, Thousand Oaks, CA 91360  
Telex: 650-2696270. In Europe: The Netherlands (032)40-18111



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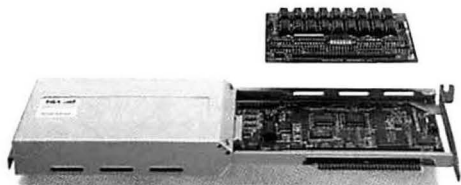
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Circle 346 on reader service card



*"The way our  
PCs are loaded, if we  
use anything but  
FileCard, we'll smoke  
the power supplies."*



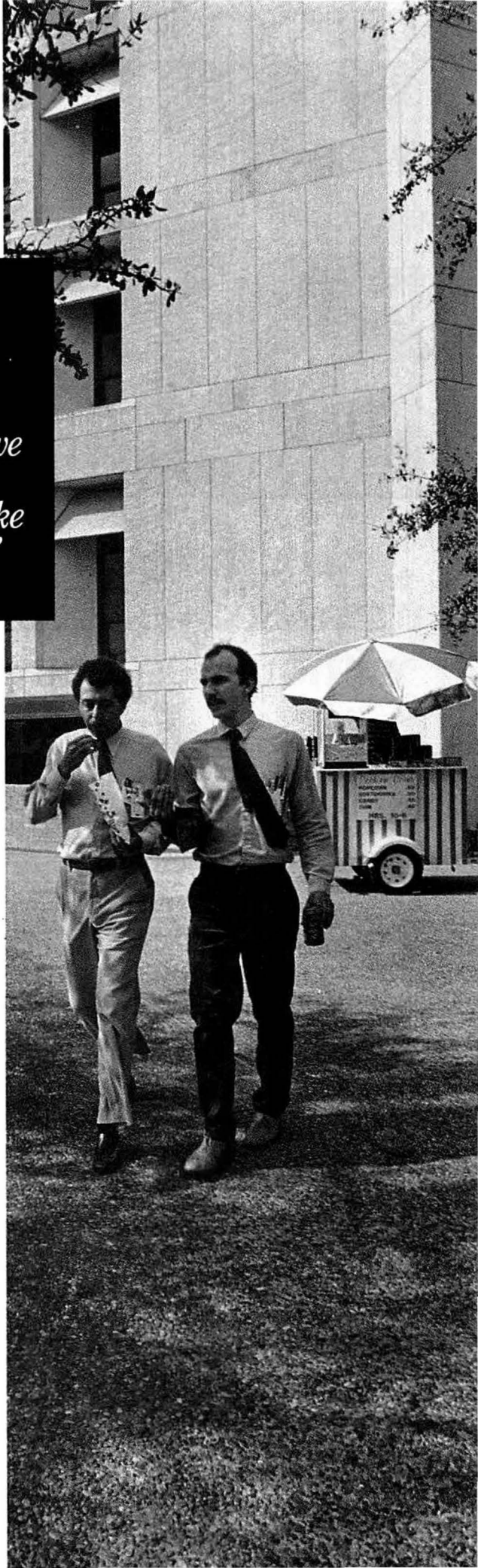
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# For thousands of years, man used personal computers without decent tape backup. Enough.

Personal computers have come a long way. Unfortunately, tape backup systems have not. Their functions are primitive, they're frightening to install and truculent to use.

Genoa's Galaxy™ Systems are more highly evolved. So not only do they outperform competitive systems, but using them is actually something that can be done by an ordinary human.

## The simpler. The better.

Our software is what makes the difference between our systems and everybody else's. And it's designed to help you use the system easily in either of two modes. Namely, menu-driven or batch file.

The menu mode operates true to its name, with menus showing all the commands you have to choose from. And there isn't a thing you can't do from the menu mode because it's comprehensive.

You'll want to use the batch mode for routine operations though, because it allows you to create a "file"

to contain those operations and run them automatically, just by hitting a few keys.

But probably the best example of just how downright civil the Galaxy systems can be is our auto backup. You just preset the time and the desired function, and the system does the rest. Automatically.

No other tape backup systems, by the way, operate this simply.

## The features all tape backups should have. But don't.

Before you make your first backup—which is the right time to do this—our installation software checks your disk configuration to make sure your tape drive will run at top speed. And it checks the entire system to guarantee it will perform as promised. No competitive system offers anything like it.

Another thing you can do is abort any command at any time. So you don't have to sit through a 20-minute

file-by-file restore just because you hit the wrong key.

You can also do a file-by-file restore from an image backup. So you can get back the one file you need rather than all the files you don't.

But whether it's a couple of files or a complete image, you'll be pleased to know you can restore to any storage device, thanks to Galaxy's interchangeability feature.

Multiple backups on the same tape—even from multiple sources like a floppy or another hard disk—aren't a problem either. The system simply starts recording where the last backup ended.

Or you can use multiple tapes to back up very large files. The system will just let you know when it needs a new tape.

We also perform crc error checking constantly. We can back up a 20 Mb disk in just over 4 minutes. And we're network compatible.

## What price progress?

Surprisingly, the Galaxies cost somewhat less than tape backup systems that offer less. Which includes all of them.

For the Genoa Galaxy dealer near you or complete specs, call 408-945-9720. Or write Genoa Systems Corporation, 73 E. Trimble Road, San Jose, CA 95131.

The Genoa Galaxy Systems. The most civilized tape backup in history.



*The IBM®-compatible Genoa Galaxies are available as internal or external versions of 1/4" streaming tape or cassette models. (External cassette not shown.)*

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FROM MICRO

TO MAINFRAME



## BARR/HASP: POWERFUL, VERSATILE, EASY TO USE for the IBM PC, XT, AT and compatibles includes software, synchronous adapter board and manual

The BARR/HASP Intelligent Communications package provides more than just a connection—it's powerful enough to drive multiple high-speed printers for volume printing, yet versatile enough to print checks and invoices on any size printer. With the menu-driven software, you can perform all program functions accurately, easily, and without lengthy training.

BARR/HASP emulates a full function IBM 3777-2 and HASP on the 360/20. Print speeds on single and multiple printers range from 30 cps to beyond 2,400 lpm (7,000 lpm on the PC AT). Line speeds range from 1,200 to 9,600 Baud on dial-up and to 19,200 Baud on a dedicated line. With the PCAT, you can achieve a new speed record for a micro-computer—56,000 Baud—and drive even the fastest laser printers at maximum efficiency.

All tasks—printing, plotting, sending jobs, and using the console—operate simultaneously from a single PC. Such high performance translates into instant savings. BARR/HASP now replaces expensive, cumbersome Remote Job Entry workstations—and does it for a fraction of the cost.

You'll find the BARR/HASP manual complete and refreshingly intelligible. But should you have a question, BARR's technical experts are just a toll-free phone call away.

### FREE 30-DAY TRIAL

See for yourself how the BARR/HASP Link can work for you. For a free 30-day trial, call

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(800-227-7797)

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|---------------|---------------------------|---------|----------|
| Host Systems: | MVS/JES2                  | VM/RSCS | NOS/RBF  |
|               | MVS/JES3                  | VS1/RES | MVT/HASP |
| Requires:     | 128K<br>synchronous modem |         |          |



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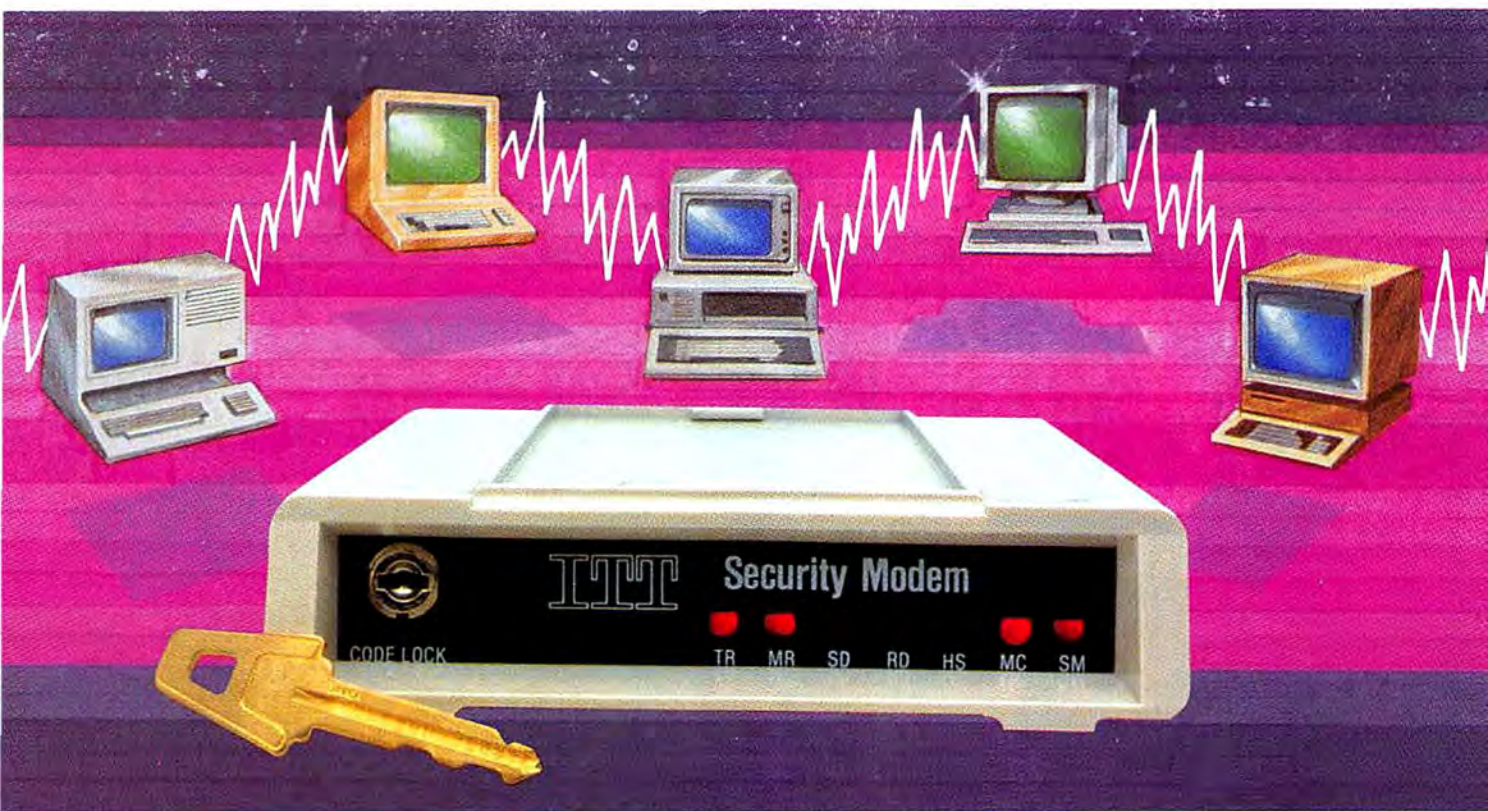
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# SMARTER THAN SMART



## ITT SECURITY MODEM

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The ITT SECURITY MODEM locks a foolproof barrier around your sensitive data that can be passed only by the callers you authorize. Besides operating as an open modem, it lets you set up three graduated levels of security...tight, tighter, tightest!

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- CALL PROGRESS MONITORING BY TONE OR CRT DISPLAY
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Operating at 110, 300 or 1200 bps, the ITT SECURITY MODEM can function in full or half duplex and is compatible with PC's by IBM, ITT, Panasonic, Compaq, ATT and others like them.

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# COMPUTE WHILE YOU PRINT!

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*Imagine a program that prints up to 10,000 pages while you run applications.*

Print Q does that. Plus prints multiple copies. Re-starts on any page after form jams. And more. All while you keep on working.

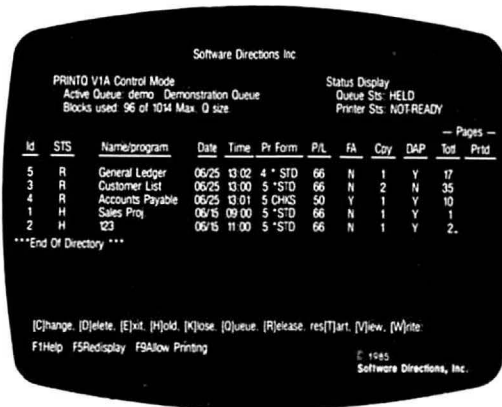
*It's the first really complete print spooling subsystem for your IBM PC. And your biggest time saver ever!*

### HOW PRINT Q WORKS

Load Print Q once with your program disk and it remains resident, assuming complete independent control of your printer.

You run applications as usual, but instead of stopping after the print command, keep right on computing! Print Q intercepts the documents bound for the printer, spools them to disk, then prints them according to your commands. With Print Q you can:

- Print up to 255 copies automatically.
- View documents without printing.



Convenient status display lets you monitor and control print commands at any time.

- Print documents in order of priority regardless of order on disk.
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# PrintQ™

For users of IBM, PC, AT, XT, PCjr and most IBM compatibles.

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## VS

# STATE OF THE SMART

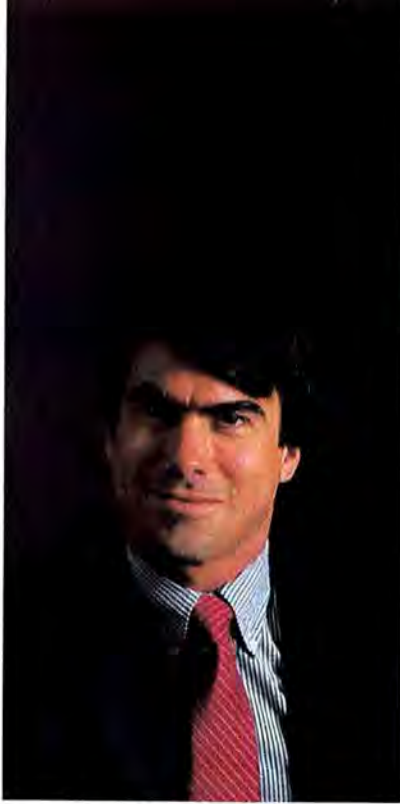


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Circle 142 on reader service card

# **persoft**





Kevin Strehlo

# Mail-Order Showdown

A group of CompuServe SIG regulars takes the bull by the horns and shows one of the biggest mail-order houses how to treat a customer.

When you have a problem with an IBM PC, try the IBM Special Interest Group (SIG) on CompuServe. Reaching the SIG is easy—type PCS131 from the command prompt—and getting a response is easier still. Just post a question on the board, and the regulars will pounce on you with answers.

Chances are Joan Friedman will pounce first. She's quicker with a computer than you might expect a rare books librarian to be. On one recent day, she posted 45 messages to the SIG, many of them thoughtful answers to tough questions. One participant was interested in a program that estimated the amount of money spent on CompuServe sessions; another was looking for a word processing configuration that could handle the Russian alphabet. Joan knew more about estimating CompuServe charges than about Russian word processing, but she had good answers for each.

As you might expect, 45 messages in one day is high, even for Joan. That's primarily because she herself had a problem worthy of correspondence. It was a hard disk problem, and it wasn't her first.

The SIG regulars knew all about her previous troubles with the hard disks she had purchased from PCs Limited, one of the biggest mail-order firms around.

Many of those regulars showed up in Austin, Texas, recently for a SIG get-together prompted by Joan's visit to that city for an archivists' convention. Some traveled hundreds of miles for the dinner—a measure of the high esteem that Joan inspires among SIG diehards.

Austin happens to be the home of PCs Limited, so it was natural for Joan and her cohorts to drop by the firm's showroom to try to resolve her problems. The encounter—which has come to be known as the Great SIG Showdown—turned into a textbook illustration of the kind of customer service problems that often afflict fast-growing fledgling companies. In the end, it also provided a useful lesson in the power of SIGs to get satisfaction where a lone individual might be left sputtering in the breeze.

*(continues)*



# Princeton Gra

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The superior choice for use with IBM's Enhanced Graphics Adapter.\*



| <b>COMPARE:</b>                                    | <b>Princeton SR-12P</b> | <b>IBM 5175</b> |
|----------------------------------------------------|-------------------------|-----------------|
| Dot Pitch<br>(The lower, the better.)              | .26 mm                  | .31 mm          |
| Sugg. Retail Price<br>(The lower, the better too!) | \$999                   | \$1295          |
| Warranty                                           | 1 Year                  | 90 Days         |

Designed for demanding professionals who won't settle for anything less than the finest color graphic capabilities. Displays more than 4,000 brilliant colors... features an anti-reflective coated black matrix tube for less fatigue and eye strain. You get the sharpest graphics and text... at a substantial savings!

| <b>COMPARE:</b>          | <b>Princeton HX-12E</b> | <b>IBM 5154</b> |
|--------------------------|-------------------------|-----------------|
| Dot Pitch                | .28 mm                  | .31 mm          |
| Sugg. Retail Price       | \$785                   | \$849           |
| Tinted Black Matrix Tube | Yes                     | No              |
| Warranty                 | 1 Year                  | 90 Days         |

Ideal for most computing applications, the HX-12E offers 64 high-resolution colors and easy-to-read text. It gives you sharp colors, crisp characters... for less eye strain and easier viewing, hour after hour. Built-in versatility also allows you to display 16 colors with the IBM Color Graphics Adapter\* automatically.





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Princeton HX-12



IBM 5153

| <b>COMPARE:</b> | <b>Princeton HX-12</b> | <b>IBM 5153</b> |
|-----------------|------------------------|-----------------|
| Dot Pitch       | .31 mm                 | .43 mm          |
| Nonglare Screen | Yes                    | No              |
| Warranty        | 1 Year                 | 90 Days         |

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\*\* When used with IBM Color Graphics Adapter or equivalent.

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Joan began by explaining the story from the beginning: how she had ordered from PCs Limited two half-height, 20MB hard disks, two half-height floppy drives, a power supply, mounting hardware, and a Xebec combination hard and floppy disk controller. A crucial mounting bracket was missing from the first shipment, she said, and was likewise absent from a subsequent replacement shipment when one of the hard disks failed. After more than three months and a third shipment, everything finally seemed to be fine—until she tried to format a floppy disk and couldn't. With SIG regulars offering advice at every step, she said, she had swapped the cables, then the floppy drives, and finally the controller, before isolating the problem. It *had* to be the controller.

The PCs Limited technician was willing to exchange it, and Joan told him to test the new one and she'd be on her way.

That was the beginning of the real drama, when the technician balked at testing the new controller and Joan balked back. She wasn't about to take another ride on the mail-order merry-go-round.

"Look, I called and they told me testing it would be no problem," Joan said. "I came all the way from Connecticut, and I don't intend to leave Texas without a controller that works."

The technician eventually capitulated, agreeing to test the controller on a Turbo PC, PCs Limited's heavily promoted PC clone. With Joan's SIG friends clustered around, the technician installed a

new Xebec 1220 controller board and they all watched as DOS failed to boot.

The tech moved a second Turbo PC over to his workbench and re-installed the board. This time DOS booted, but the screen filled with a strange array of smiling faces and blinking ampersands.

The SIG folks exchanged knowing glances. Besides the thread that followed Joan's hard disk problems, there had been traffic on the SIG about problems with the Turbo PC. One Turbo PC owner had complained about the machine's PC compatibility claims, lack of knowledge among the company's support people, and difficulty in procuring a return authorization (even after he begrudgingly agreed to forfeit the 10 percent fee the company subtracted from refunds, even for defective merchandise). During the SIG discussion of Joan's hard disk problems, someone had picked up the theme by joking that it took four weeks for the Texas mail-order firm to process Joan's returns and ship replacements because PCs Limited was trying to run its order-tracking software on a Turbo PC.

SIG member Connie Kageyama suggested that the technician try the controller in one of the Turbo PCs running on the showroom floor. "At least you know they work," he said.

"No, I'm afraid we can't do that," the technician said. "Let me get Davis."

*(continues)*



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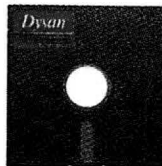
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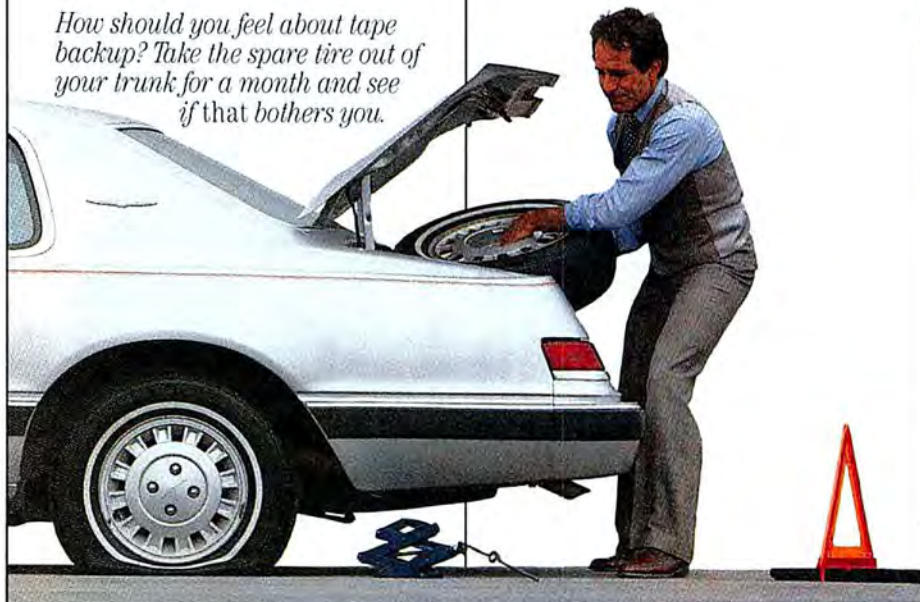
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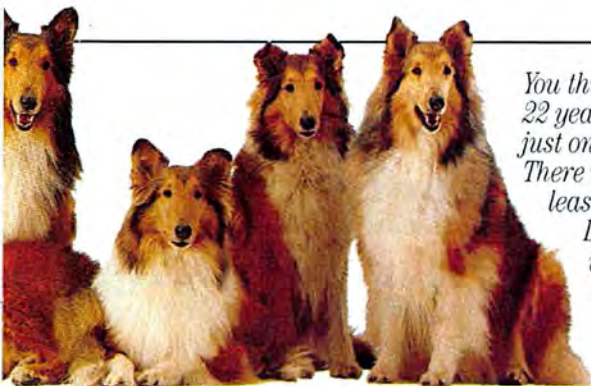
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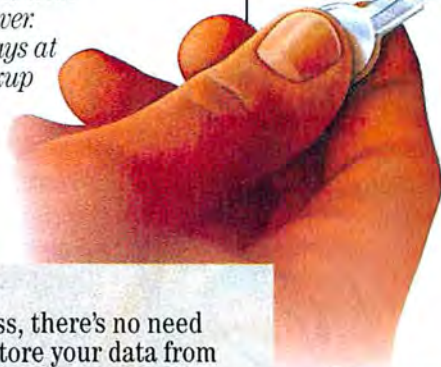
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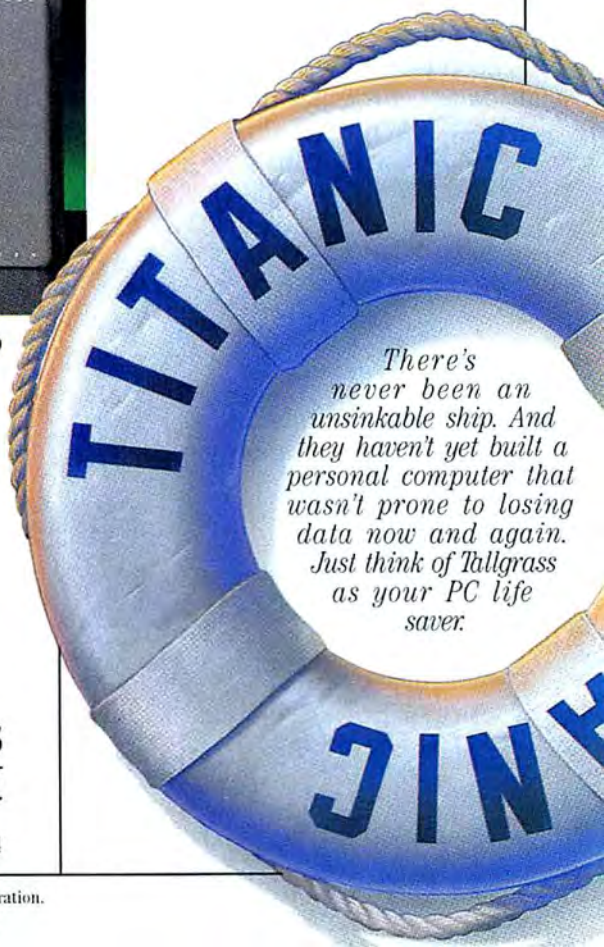
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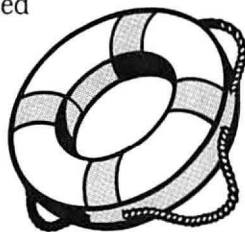


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Kevin Strehlo

He was back in an instant with head technician Davis Chalmers, who asked Joan to describe her problem. She explained that the controller she was exchanging would not format floppy disks and that she just wanted to verify the working condition of the controller she was getting in exchange. Davis installed Joan's old controller into his own machine, an IBM PC, and issued the command to format a floppy. It worked perfectly.

"What kind of floppy drives do you have in your system?" Davis asked. He was formatting a second disk.

"I'm not sure," Joan said. "Mitsubishi, I think. Something Japanese, anyway. But I know the problem isn't my floppies. Besides, you sold them to me."

"What kind of power supply do you have?" Davis asked.

"I don't know, whatever kind you sell."

Davis, now with three successfully formatted disks to his credit on Joan's controller, was busy adding components to his PC and didn't seem to be listening.

"Look, I'm the assistant SYSOP on the IBM SIG on CompuServe, and the SIG helped her troubleshoot this," Connie said. "She knows what she's talking about."

Davis looked up, his eyes widening at the mention of CompuServe. He nodded, flipped his PC back on, and successfully formatted a fourth disk.

"Look," Davis said slowly, "I'm not sure what I'm supposed to do. You say it won't format disks, but

(continues)



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it just formatted disks. How can I fix something that isn't broken?"

Connie and Joan conferred and came up with the suggestion that she take the hard-disk-only controller instead of the combo, because her old floppy controller still worked. But Davis wasn't sure if he could refund the \$70 difference. He continued trying to induce the controller to fail by duplicating Joan's configuration, but without success. He needed more time.

"Listen, we're just fixing to close. Can you all come back tomorrow?"

In quick succession Joan rattled off that she didn't have a car, she was here for only a few days from

Connecticut, she would be in meetings all day, and...

"Oops, hold it," Davis interrupted. "You all are absolutely right. The controller just failed."

In retrospect, Davis Chalmers said he'd never been happier to see a piece of PCs Limited equipment fail. Everyone there remembers how cheerful he became and the skill with which he tested Joan's new controller to make sure it worked. He also gave Joan his private phone number in case she had future problems. It was a good thing, too, because he forgot to reset the controller's DIP switches for Joan's configuration, which prevented the board from working when she got home and fired up her PC.

It is possible that the efforts of Joan Friedman and the other regulars on the SIG helped prompt PCs Limited to clean up its act. Certainly, concern for the quality of after-sale service has become a more important part of PCs Limited's business. It hadn't been crucial in the beginning, when 19-year-old Michael Dell and a buddy started selling PC gear out of their condo near the University of Texas. Nor was it the firm's first priority as the company's sales volume skyrocketed from pocket money to several million dollars a month. Just growing

(continues)

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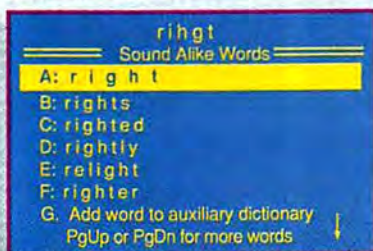
What we've done has been called "Artificial Intelligence," we simply call it "Turbo Lightning." This information revolution — driven by *Turbo Lightning* — means that the way you look things up is definitely looking up.

## No matter what program you're running, Turbo Lightning instantly checks your spelling as you type.

You could be running WordStar®, MultiMate™, SideKick®, Microsoft® Word, MCI Mail®, CompuServe®, or whatever, because as you work, as you write, *Turbo Lightning* is waiting in the wings, watching how you spell every word, but not getting in the way of what you're doing.

So how does it work? Let's say the word you meant to type was "RIGHT," but you accidentally typed "RIHGT," which is wrong. What happens then?

You immediately hear a 'beep,' so you know there was a boo-boo. You instantly see a window, that doesn't list "RIHGT" but it does list "RIGHT" and its sound-alike words. So your screen looks like this:



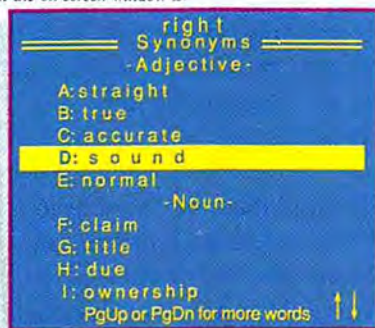
So you move your cursor to "A," which is the right "right," hit Return and the spelling mistake is instantly fixed. And the program you were working on has continued to run while you did a little spelling sidetrip with *Turbo Lightning*. (If you'd rather not remember your Spelling grades in school, the beep might make you nuts, but you can choose the "whole page" option. Which means that when you finish writing the entire page, any spelling mistakes will be highlighted. You go in and straighten things out straight away.)

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## Turbo Lightning does a lot more than spell "right" right, it also gives you instant synonyms.

Because you also have *Turbo Lightning*'s Random House Thesaurus at your fingertips, you can really get to know your 'rights.' So back to the word "Right," but this time in the thesaurus. Type in "Right" and what you see in the on-screen window is:



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Circle 134 on reader service card



fast enough to keep up with demand was a tall order, and servicing past customers invariably took a lower priority.

In any case, changes have been made at PCs Limited. The company installed an IBM System/36 to track orders more efficiently and hired some new people. And after being presented with print-outs of irate SIG exchanges on PCs Limited's comportment, Dell himself signed onto CompuServe to say the company had its growth problems licked and was striving to be more responsive. He said he would make himself available to clear up any problems and answer any questions SIG members might have.

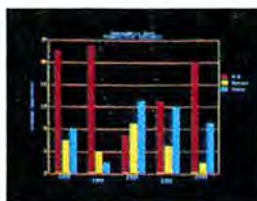
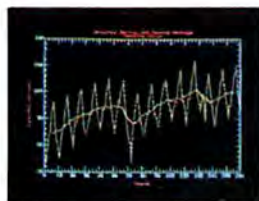
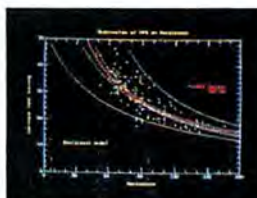
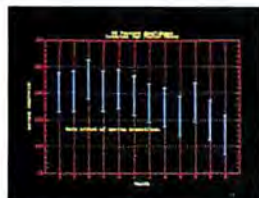
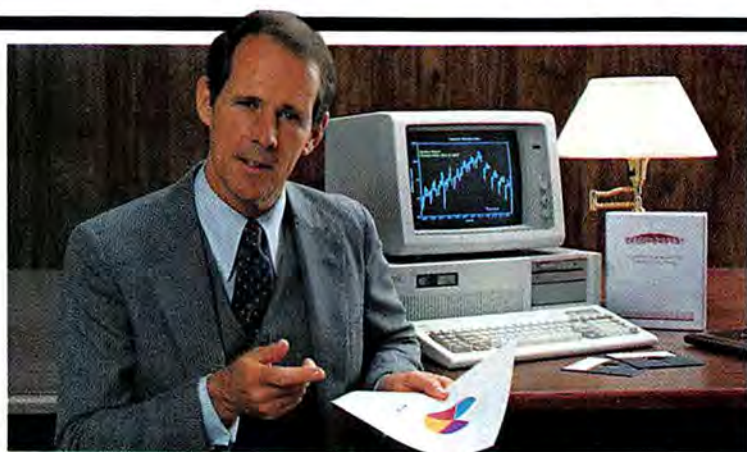
One of the first questions put to him was whether PCs Limited would halt the practice of charging customers when an order is taken, instead of when it is shipped. Unfortunately, the question scrolled off the board unanswered. If Dell has been back on the SIG since he made the offer to personally take care of SIG members, he's been "lurking," as they say, not participating.

In Joan's case, at least, the power of the SIG still holds sway. Recently, when she called head technician Davis Chalmers and told him she had received error message 1701 when she was cold booting her computer, he didn't doubt her for a minute. People who have dealt with PCs Limited

on their own may find it hard to believe that Chalmers agreed to swap Joan's old CMI drives and Xebec controller for Seagate drives and a Western Digital controller, via courier and without charge or complaint. But not the regulars on the SIG who were there for the Austin showdown.

What they have trouble imagining is how Joan Friedman will get along while her controller and hard drives are away. ●

*Kevin Strehlo is a freelance writer and PC World columnist who hunts for PC tales from an office overlooking Silicon Valley.*



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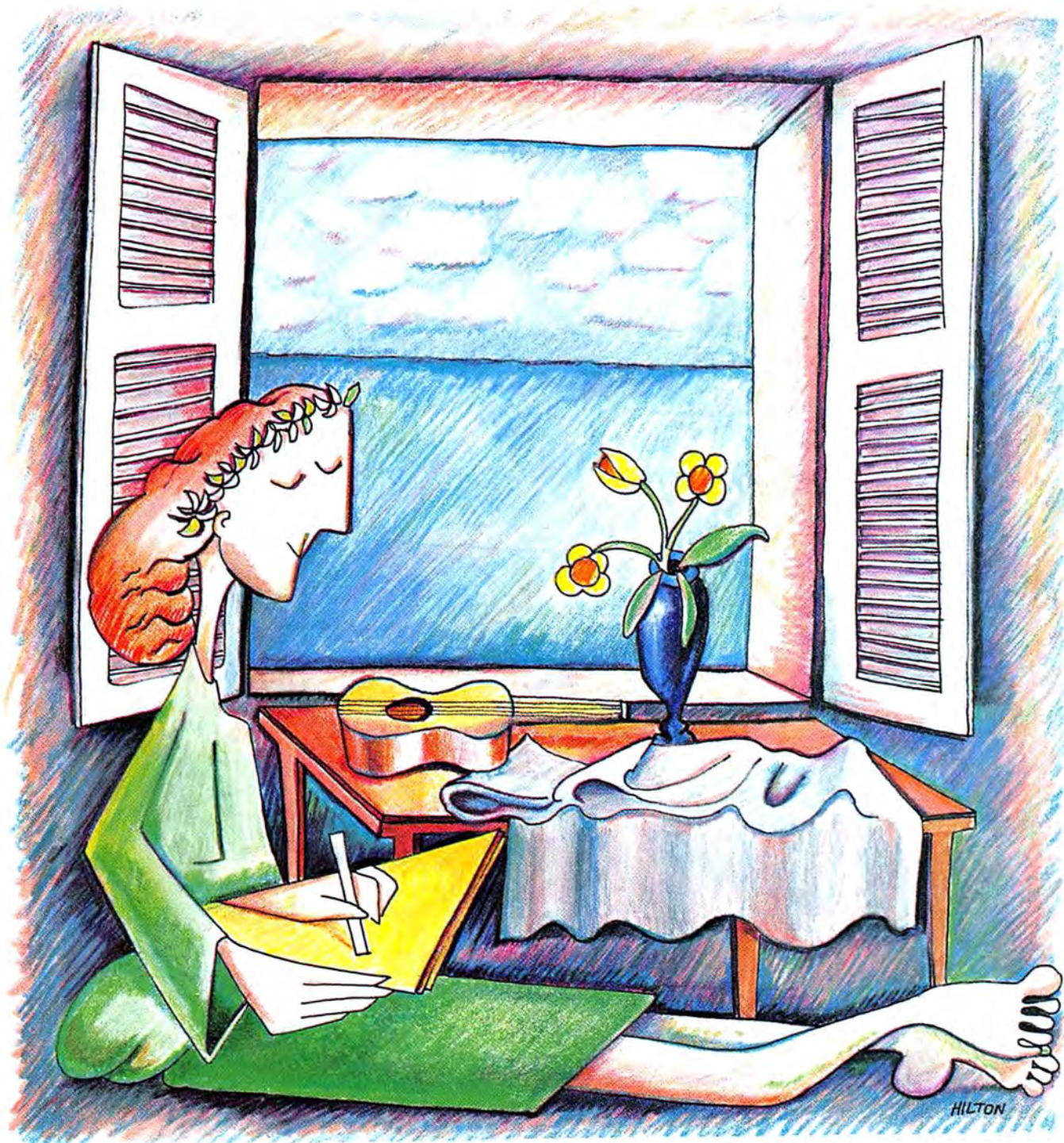
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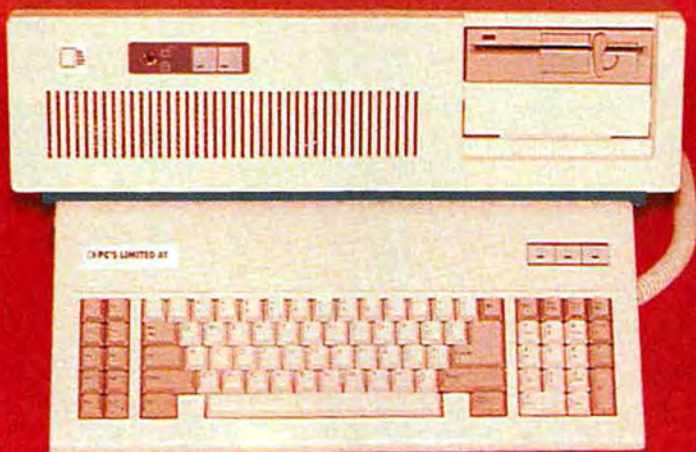
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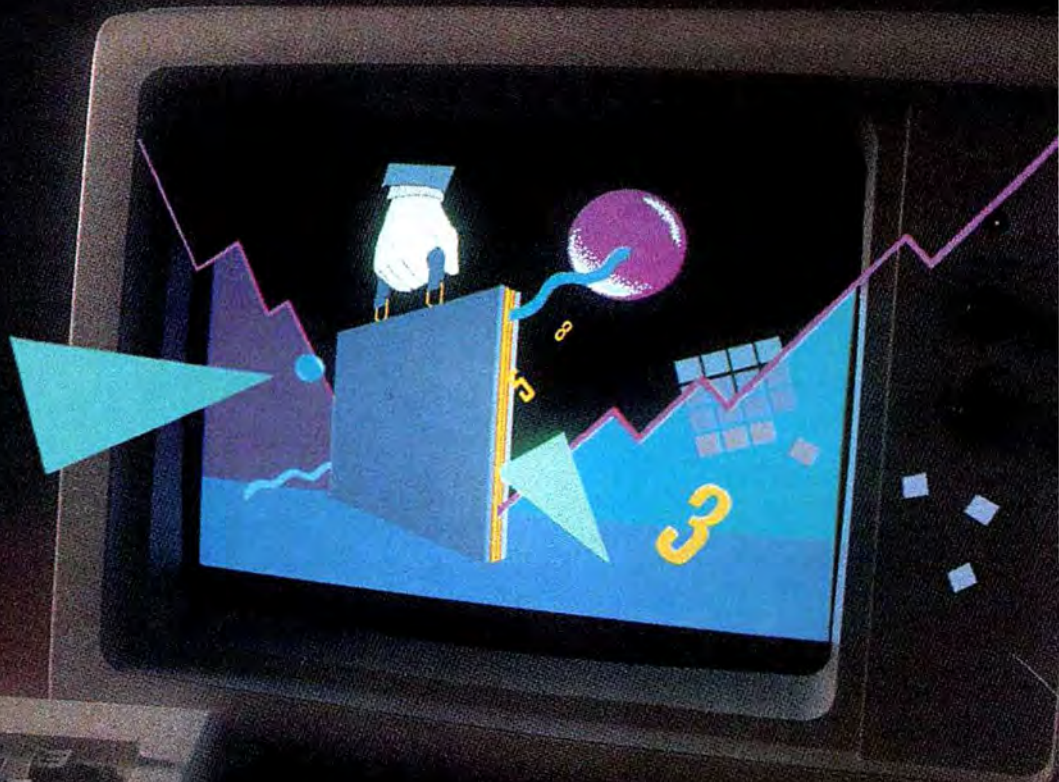
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|-------|-------|----|------|---|-----|----|---|-------|
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Hal Glatzer

# Paul Allen: Beyond Microsoft

The low-profile cofounder of Microsoft is blazing new software trails with his own applications-oriented venture, Asymetrix.

Ten years ago Paul Allen was a college dropout working for a big computer company. He and a younger friend, who'd been his classmate at prep school, had a wild idea: to write a version of BASIC that would run on the new 8-bit microcomputers. They sold enough punched-paper tapes of the language to start a small business in the Southwest, but in 1979 they moved it to the suburbs of Seattle, where they had grown up. Today Microsoft is a \$140-million-a-year company, but the person most often identified with it is Allen's cofounder, Bill Gates. And Allen himself has left Microsoft and formed his own company, Asymetrix, to create original application programs.

Allen always preferred the quiet side—the programming side—of Microsoft, away from the public eye. “Bill did a great job communicating Microsoft’s position to the public and focusing on the external aspects of the business,” says Allen.

Gates ran Microsoft, but Allen ran the programmers. As executive vice president for research and

development, he acquired the hastily written QDOS (“quick-and-dirty operating system”) from Seattle Computer Products, and turned it into MS-DOS and PC-DOS. He ran the Language group, the Compiler group, the DOS group, the Xenix group, and the Applications group.

“About 70 people worked under me,” he recalls. “Between 1980 and 1983, there was a lot of growth at Microsoft. We were staffing up to enhance DOS to 2.00, developing *Word* and *File*, enhancing our languages. Managing that growth was challenging, especially DOS 2.00, with its new tree-structured directories and installable device drivers. We were working directly with IBM.

“I always focused my attention on the groups that were working for me. As Microsoft grew beyond 200 employees, I couldn’t have close relationships with everybody. One of the main challenges when you’re a growing company is to find good people. We did a good

*(continues)*



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| Choice Key & Category Name    | Nickname         | Reser<br>voir | Dis<br>burse<br>ment |
|-------------------------------|------------------|---------------|----------------------|
| [A] Assets                    |                  |               |                      |
| [C] Cash                      |                  |               |                      |
| [P] Pocket Money              | Pocket Money     | Reser         | Disbur               |
| [C] Checking Account          | Checking Account | Reser         | Disbur               |
| [M] Money Market Account      | Money Market Acc | Reser         |                      |
| [R] Receivables               |                  |               |                      |
| [L] Loan to Sarah             | Loan to Sarah    |               |                      |
| [C] Cable TV Deposit          | Cable TV Deposit |               |                      |
| [M] Mortgage Escrow Account   | Mortgage Escrow  |               |                      |
| [L] Life Insurance Cash Value | Life Ins Value   |               |                      |
| [I] IRA                       | IRA              |               |                      |
| [A] Annuities Cash Value      | Annuities Value  |               |                      |
| [S] Securities                |                  |               |                      |
| [S] Stocks                    |                  |               |                      |
| [G] General Motors            | General Motors   |               |                      |
| [I] IBM                       | IBM              |               |                      |
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Microsoft cofounder Paul Allen calls his new software company Asymetrix because it's taking "a different approach from other companies."

job using our contacts with universities and industry to staff up. I was involved in bringing in [programmers] Charles Simonyi, Gordon Letwin, Greg Whitten. I did a lot of recruiting at MIT and Harvard."

Allen left the company at the height of his success in 1985. Far from being dissatisfied with Microsoft, he remains one of its largest shareholders and a staunch supporter of its products. He left for intensely personal reasons: Three years ago, Allen had to face his own mortality, and the confrontation changed his life.

"In October 1982 I was on a business trip, giving a speech at a Microsoft seminar in Paris, and I felt really under the weather," he recalls. "I flew back to Seattle and had tests. They showed I had

Hodgkin's disease [cancer of the lymph nodes]. I underwent three months of radiation therapy—a program that had been developed at Stanford—and the disease has been in remission ever since. I'm considered cured. I owe my life to that kind of scientific progress.

"After my treatments were over, I felt it was time to think about the kinds of things I wanted to do—things I didn't have time to do before. I did a lot of traveling in Europe. I helped out Microsoft on some projects. But after a lot of brainstorming, I decided I wanted to start my own company. In December of 1984, I put my initial team together, and in January 1985, Asymetrix opened its doors. We came up to full speed in June."

Allen says he could have created a new group at Microsoft, but, "I wanted to start with a blank piece of paper and design a new application. I felt the best way to do that was to be in a situation where I was managing my own company, focusing on that one application. Microsoft is a great company, but this was the best way for me to develop the product."

He did not raid Microsoft for talent. "Two of our people have worked for Microsoft, but they have also done other things since then. We used our industry contacts and some headhunters. We have some people here from the Boeing AI [artificial intelligence] group, and one guy from Bell Labs. We have a broad range of skills represented."

*(continues)*

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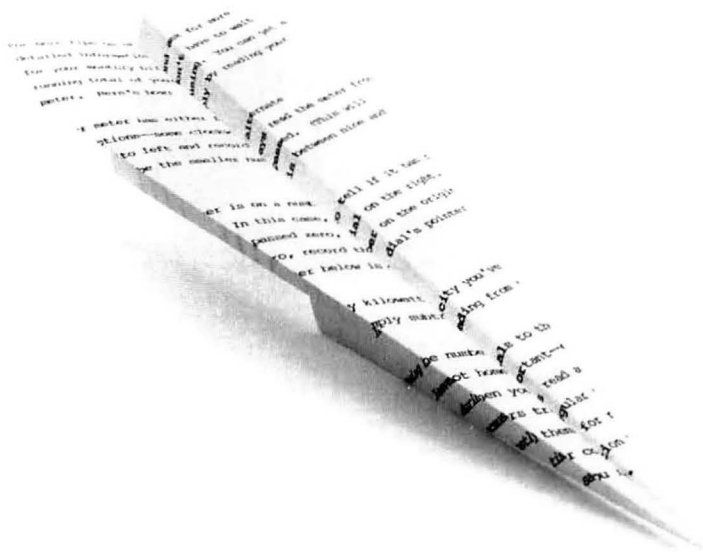
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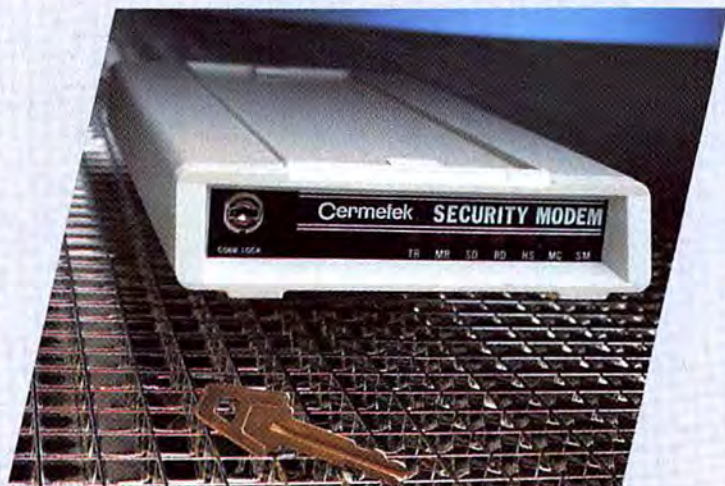
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Asymetrix is just a few miles away from Microsoft, in Bellevue, Washington, and its motto is "Software Redefined." Its products are kept tightly under wraps, but there are some clues to be found. There's an IBM PC AT on every desk; a Novell network links them together. "The name," explains Allen, "connotes asymmetry, a different approach from other companies."

"I see a spectrum running between today's products and true AI—which won't exist for a few years," he says. "There's a need for programs that can truly model the problem you want to solve. We want to build a program that is further along that spectrum than any existing product: software that is much more tightly coupled to the user's model of a problem than is any existing software; software that approximates the same framework as the user's own approach. It'll be a single product that can be extended."

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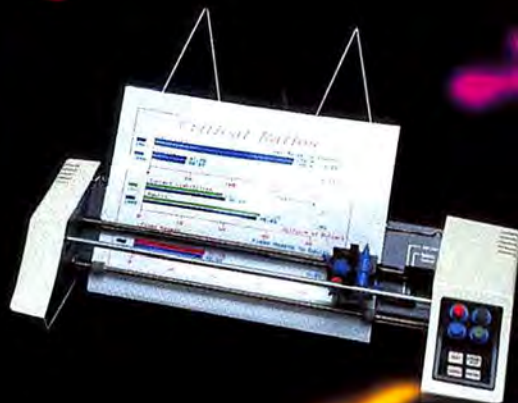
The money to start Asymetrix, like the incentive, came from Allen himself. "Venture capital was never crucial to the success of Microsoft," he recalls. "Microsoft was always able to finance its expansion from its profits."

Allen also learned from Microsoft's experience not to ignore

(continues)



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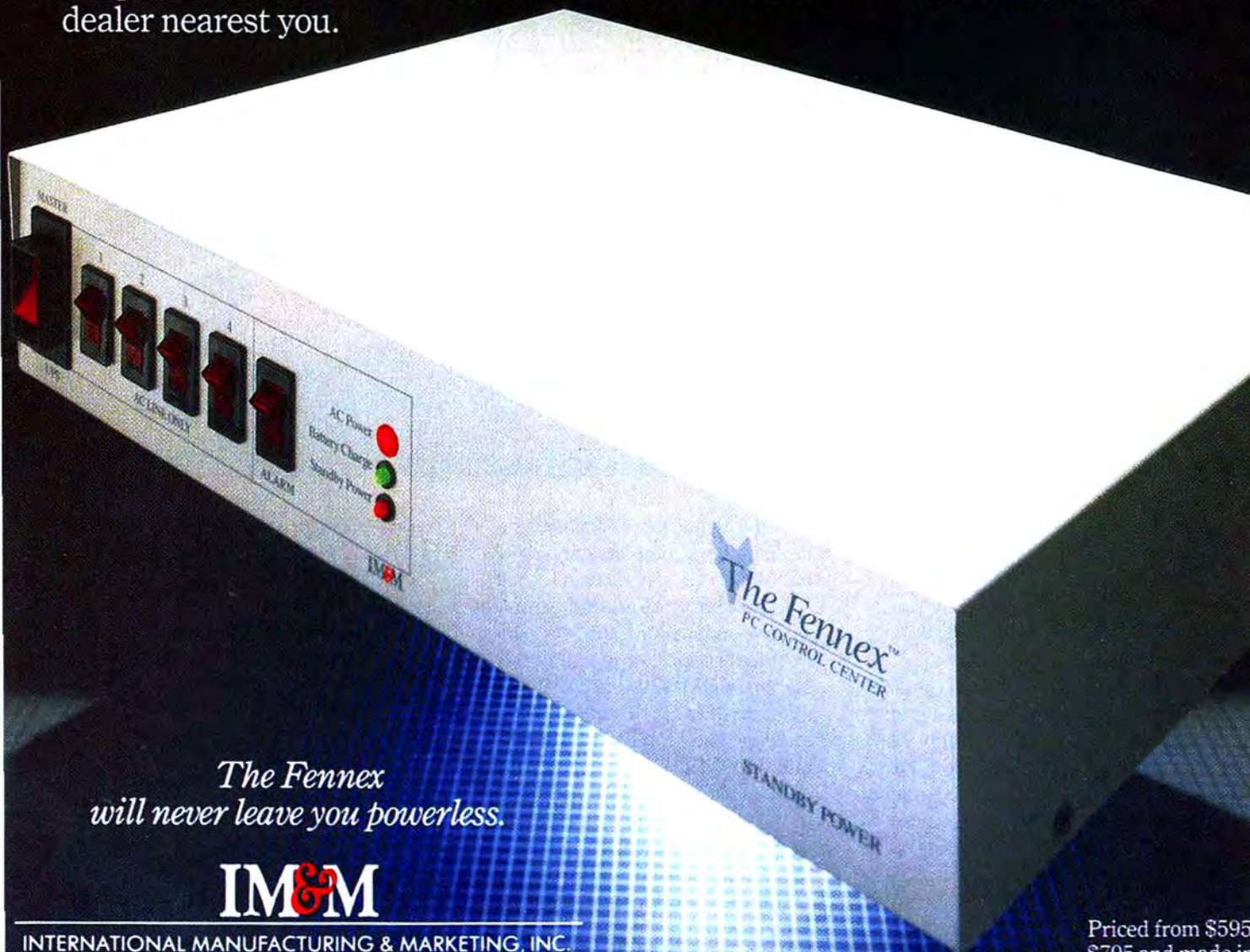


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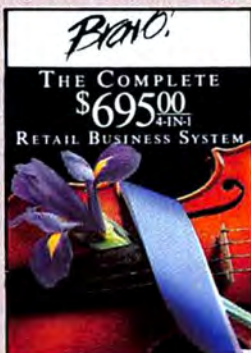
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Hal Glatzer

feedback from users. "A lot of discipline goes into a product, in developing a concept, implementing marketing goals, and bringing in a design. Microsoft is more market-driven now than it was in the early days. When Bill and I sat down ten years ago, we said, 'Hey, people want to have BASIC on their micros.' But now, at Microsoft—and at Asymetrix—you first study people's needs carefully and how you're going to market the product, and those things go into the product design from day one. We're working closely with people outside Asymetrix, with potential users, to help us design our products. We have a close-knit team."

Allen is single, and—unlike many computer wizards—has a full life away from work. "I'm a voracious reader. I subscribe to 20 or 30 journals and read them every week—two-thirds are technical, and a third are general interest. I play guitar and get together with some people every week. We play jazz and some rock and blues. I play electric and acoustic guitar—electric with the group. We even play at parties occasionally. I think music is a great way to relax. I sail a 25-foot cruiser around Lake Washington. I play chess. I have a pretty good size record collection. And I'm a rabid Sonics fan [Seattle Supersonics basketball team]. I have season tickets—courtside seats."

Allen talks to Gates often, but he smiles when he contemplates Gates's visibility in *Time*, *People*, and *Esquire* magazines. "I've avoided that, so far. Bill hasn't

(continues)



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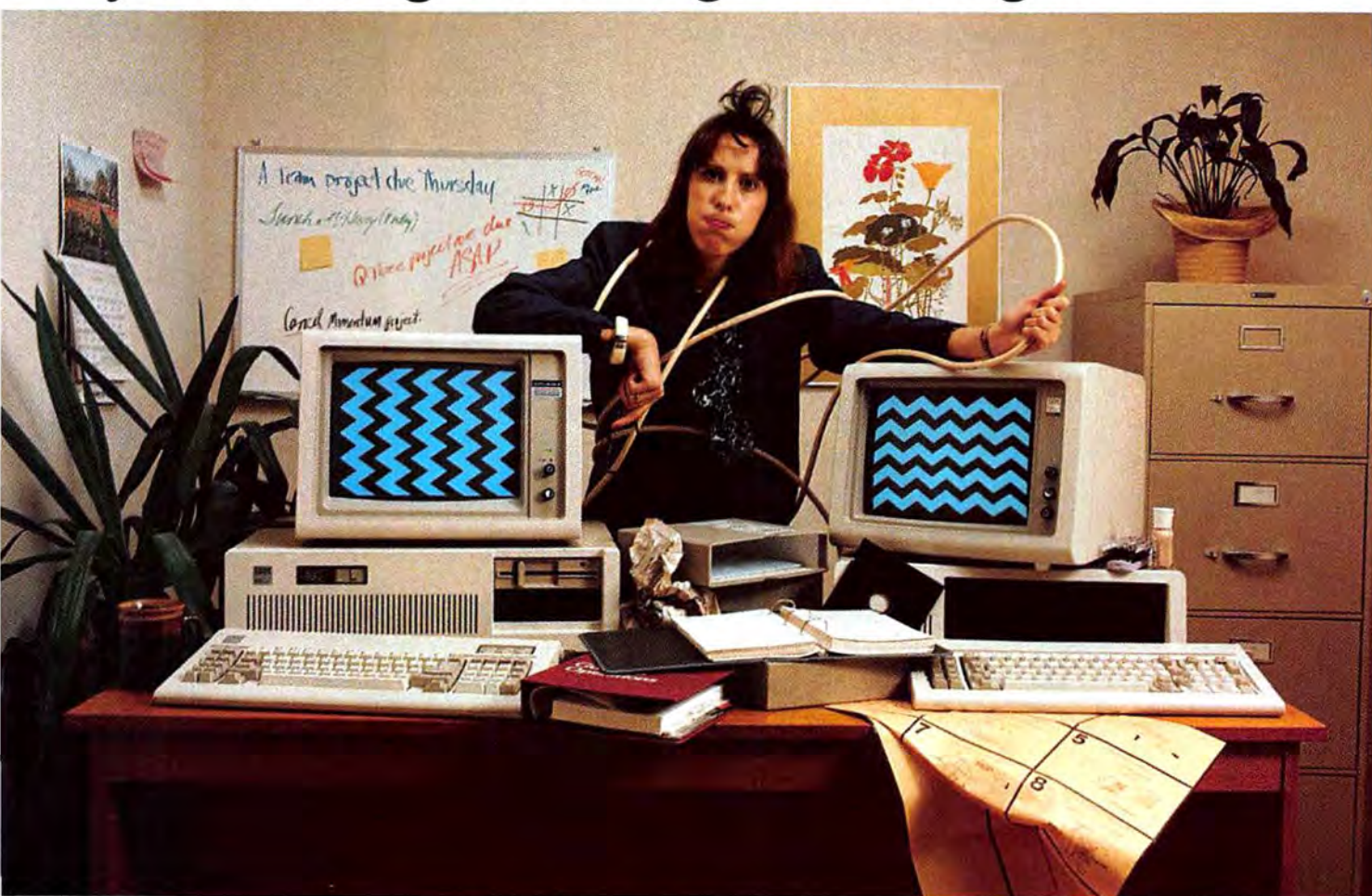
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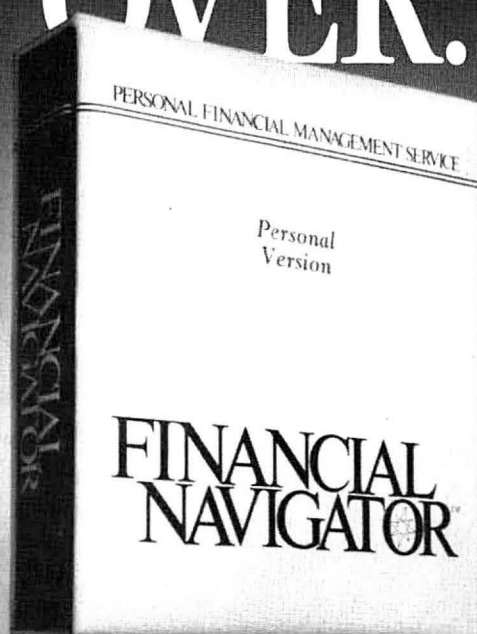


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been quite so fortunate. As for fame, I'm not adverse to it, but I was always more interested in the technical aspects and let Bill focus on the external aspects. I didn't feel left out. I had my picture in *Time*, too, when Bill was on the cover."

Of their success, he says simply, "We were in the right place with the right idea at the right time. Looking back, it's easy to see how our exposure to software technology in high school and the fact that we built a microcomputer right away [in 1975] were key elements in our deciding to use BASIC. It seems obvious now, but nobody else went out and did it. I think it's still true that if you have a good hardware or software idea, you can start a company and be successful. And there are plenty of stories like that today. Lotus, AST, Borland. Look at Philippe Kahn [of Borland]. It can still be done." ●

*Hal Glatzer is the West Coast correspondent for Software News. His computer thriller, The Trapdoor, will be published by Paperjacks in 1986.*

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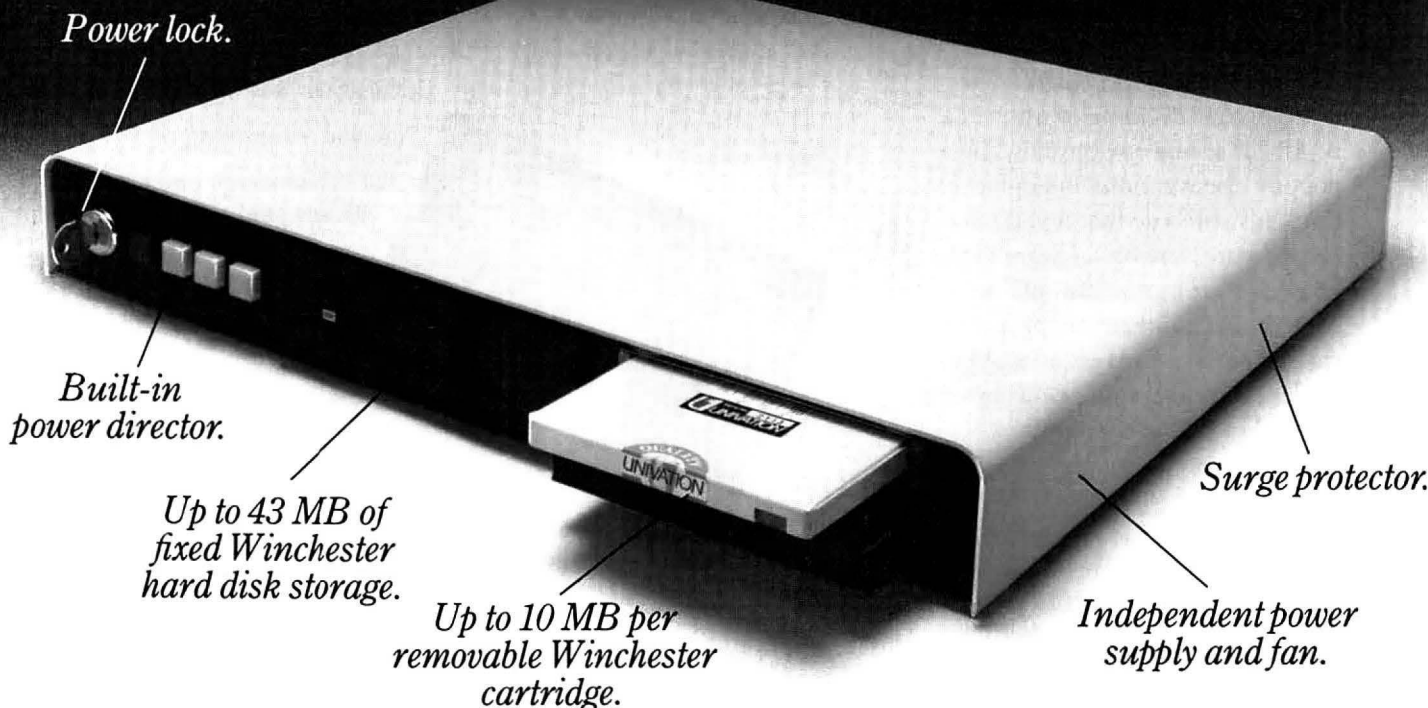
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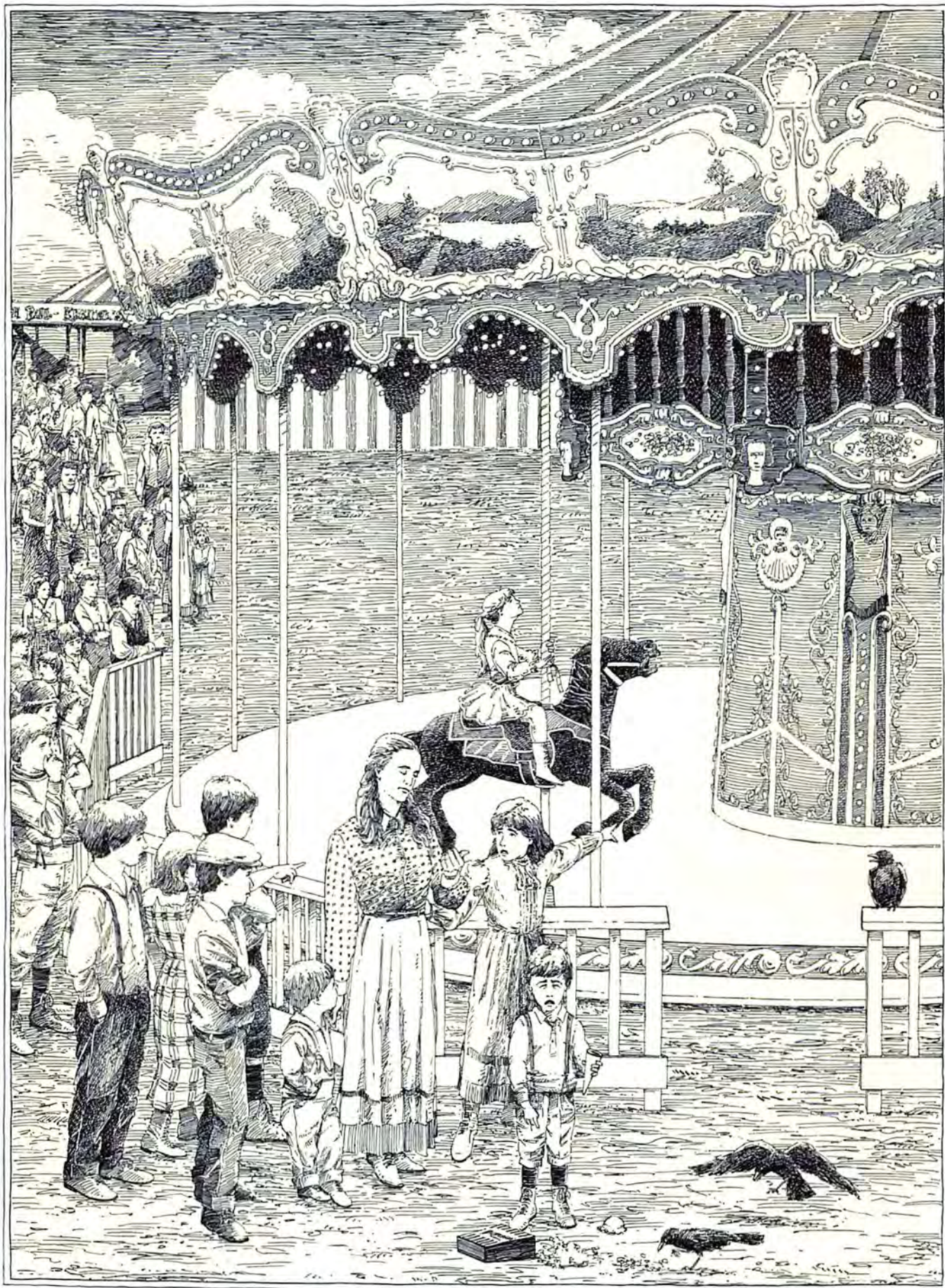
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# Letters

## *Reactions and responses from the PC World community*



### **Knee-Deep in Hoopla**

I disagree with Adam Osborne and Brian Jeffery when they say that industry standards in the marketplace inhibit innovation ["PC World Forum," *PCW*, December 1985]. Quite the contrary—in the long run it's standards that assure innovations will be made. Innovation is always risky because it must create a market; if it fails to set a standard, its fate is sealed. As a case in point, look at the Mac, the Amiga, and the Atari ST520. Apple's adoption of a closed architecture for the Mac was the biggest blunder since Watergate. Had Apple set a standard for 68000 machines and opened up to innovators like Atari and Commodore, serious computer users would now have a choice other than the IBM PC or one of its clones.

As for the ridiculously high price of software, I must also challenge Ed Esber's justifications. As a programmer, I admit there's no way I could write a single marketable program for \$500, but given the economies of scale, can a package cost more than \$5 or \$10 per unit to produce en masse? How much profit margin do you need?

I strongly suggest that these gentlemen get out of the office and spend some time at computer stores to see what's really going on. A few days spent relearning some basic problem-solving methods wouldn't hurt either.

*Mark West*

*Salt Lake City, Utah*

### **X-Ray Ayes**

The greatest potential hazard from VDTs is dropping one on your foot. Your extensive report on VDT hazards ["The Glaring Feud

Over VDTs," *PC World View*, *PCW*, December 1985] fails to mention that measurements of VDT X-ray emissions by the U.S. Bureau of Radiological Health and other organizations have firmly established that hazardous radiation levels do not exist. So-called protective proposals serve the same purpose as wearing a sprig of garlic around your neck—in the presence of ungrounded fears, do something, no matter how outrageous.

*Lester A. Slaback*

*Gaithersburg, Maryland*

### **Standards Standoff**

I read with interest "Fast Is Not Enough" in the December 1985 issue, but I question the authors' statement that X.PC appears to be winning the communications standards battle.

Although it is true that Hayes, Microsoft, and MCI have endorsed Tymnet's protocol, only Microsoft (with *Access*) appears to be doing anything with it. Consider also the few cities that Tymnet actually has up and running with X.PC, and there's not really a lot to talk about.

Endorsements merely signify someone's willingness to raise an approving hand. If Microcom were to play that game, it could count Apple, Lotus, Dow Jones, and MCI Mail among the supporters of its MNP networking protocol. But like those on the X.PC endorsement list, these companies have yet to actually implement MNP in their products or services. The more telling measure of a product's acceptance as a standard is its actual use in the

*(continues)*



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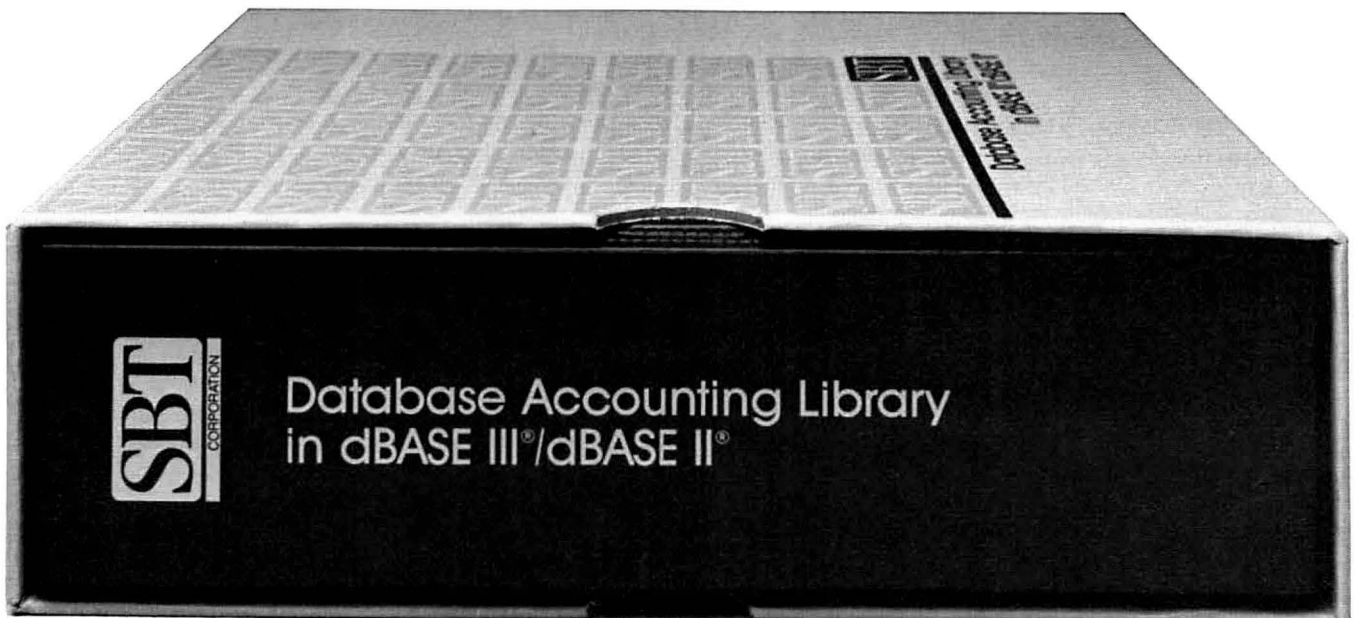
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community. There MNP separates itself from would-be communications standards.

First, every major value-added network has MNP up and running throughout the country. This includes Uninet, Telenet, and GEISCO. The IBM Information Network also utilizes MNP. This boils down to widespread availability and error-free access to all the subscription data bases these networks serve. X.PC, on the other hand, is limited to Tymnet's network.

Second, major modem manufacturers not only support MNP, they build MNP into their products. This list includes Racal-Vadic, Concord Data Systems, Codex, Micom, Novation, Multi-Tech, Cermetek, and Anchor Automation. Add these products to the 50,000 modems Microcom has shipped, and you have plenty of MNP devices with which to communicate.

In summary, MNP is not only "endorsed" by industry leaders, it's in place with a strength that X.PC can only hope to achieve in many more years.

Douglas A. Landfield  
Product Marketing Manager  
Microcom  
Norwood, Massachusetts

*Thank you for pointing out our generalization that X.PC appears to be winning the standards competition. Doubtless, a clear winner will not be evident for several years, if ever. Currently, neither the X.PC nor MNP session-level protocol can call itself the most popular, since that laurel rests with the lowly but dependable file transfer protocol, XMODEM.*

*However, we think it's safe to say that between the two leading session level protocols, X.PC has gained the most momentum during 1985. Clearly, Microcom's MNP arrived first on the scene and is a well-established competitor, but X.PC's low overhead, low cost, and support of concurrent communications have already made it a formidable contender with a bright future. —Jeremy Joan Hewes and Eric Brown*

## Knight of the Networks

David Bunnell made several very good points in his editorial "A Case for Stand-Alone Computing" [PCW, November 1985]. As a network consultant, I have to agree that most network software stinks and that per-station costs are too high.

For your readers currently pondering a network solution, I would like to offer my list of questions to make network companies squirm.

Can I use any hard disk as the file server? Can I use any expansion boards I want? Can I use different versions of MS-DOS on the same network? Can IBM and other record locks be used on the network concurrently? Will my old versions of application software be compatible with the new network version? Will the network software slow down the workstations? How fast is the print spooler, and will it work with graphics? How much memory is needed per station?

(continues)



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| CONTROLLER      | XT compatible                                             | NA     | NA         | NA                      | NA         | Internal \$ 350                                       |

\*Cassette \*\*Cartridge

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These questions should be enough to make any second-rate network salesperson go back into the appliance business.

*Philip Yanni  
Philadelphia, Pennsylvania*

#### Modem Vivendi

PC World's article about legal on-line data bases ["Lawyers On Line," October 1985] does an admirable job of providing an overview of the two major services, but two points should be clarified.

Many other significant data bases are available exclusively on Westlaw, including Public Utilities Reports, the Directory of On Line

Databases, and OSHA review commission decisions. The article also fails to point out that storing Westlaw information to disk is allowable only by special contract.

*Dorothy Molstad  
Public Relations Coordinator  
West Publishing Company  
St. Paul, Minnesota*

*West's policy regarding saving on-line data to disk is unclear. According to official doctrine, downloading data is both a violation of West Publishing's standard contract and a copyright infringement (although West does not explain why printing out on-line data is not). In practice, however, West's service representatives suggest downloading as a cost-saving*

*practice. Communications programs that West tacitly endorses, such as Law Search, include a downloading feature; indeed, the next release of West's own communications package, Westmate, will include a download utility and a limited license to download data and store it for up to 30 days. No explanation for the 30-day limitation was given. Those using other communications packages should consider asking West for a written downloading license. —Jordan Breslow*

*(continues)*



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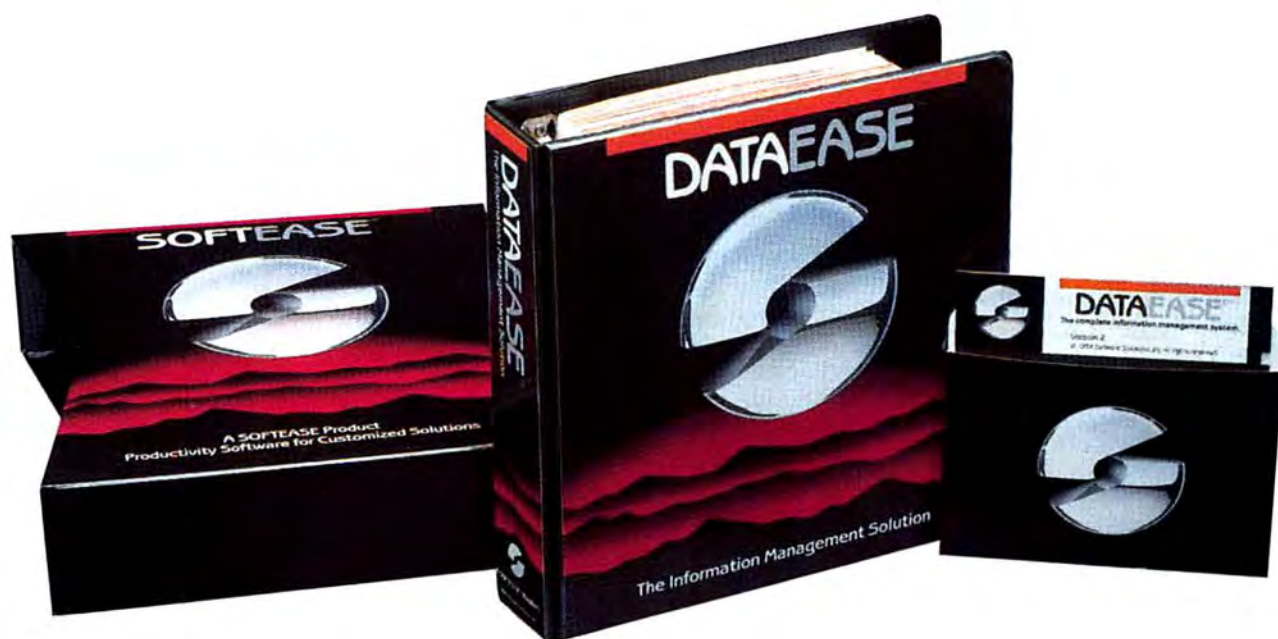
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### Star-Dot-Star Search

Several months ago there was a notice in *Letters that Hands On: Practical Tips and Useful Programs for IBM Personal Computers From the Pages of PC World*, a book containing items from the \*.\* column, would be released in July 1985. I have driven the local library's reference department to distraction, but they can't find mention of the book anywhere. Has it been, will it be, released?

Neal F. Wright  
Sunnyvale, California

*The book did indeed hit the shelves in July 1985. \*.\* stalwarts can order it from Simon & Schuster Computer Software, 1230 Avenue of the Americas, New*

*York, NY 10020 for \$16.95 plus sales tax (if applicable) and \$2 postage and handling. —Ed.*

### We Can't Always Be Right

Broderbund Software is a company striving to keep its prices as low as possible, but there are limits. In the December 1985 issue of *PC World*, the price of *Bank Street Writer* was inadvertently listed as \$19.95. Bargain hunters should be aware that the word processing program actually retails for \$69.95.

The Women's Computer Literacy Project ("Our Computers, Ourselves," *PC World View*, PCW, November 1985) is now known as

the Women's Computer Learning Center and is located at 1195 Valencia St., San Francisco, CA 94110.

Finally, Concentric Data Systems deserves credit as author of *1-2-3 Report Writer* ("More Power to You," PCW, January 1986).

*Letters should be mailed to Letters, PC World, 555 De Haro St., San Francisco, CA 94107, or sent electronically to MCI Mail PCWORLD, CompuServe 74055,412, The Source STE908, or Direct-Net 500. We reserve the right to edit letters. All letters must include the writer's name, city, and state before being considered for publication and should not exceed 300 words. ●*

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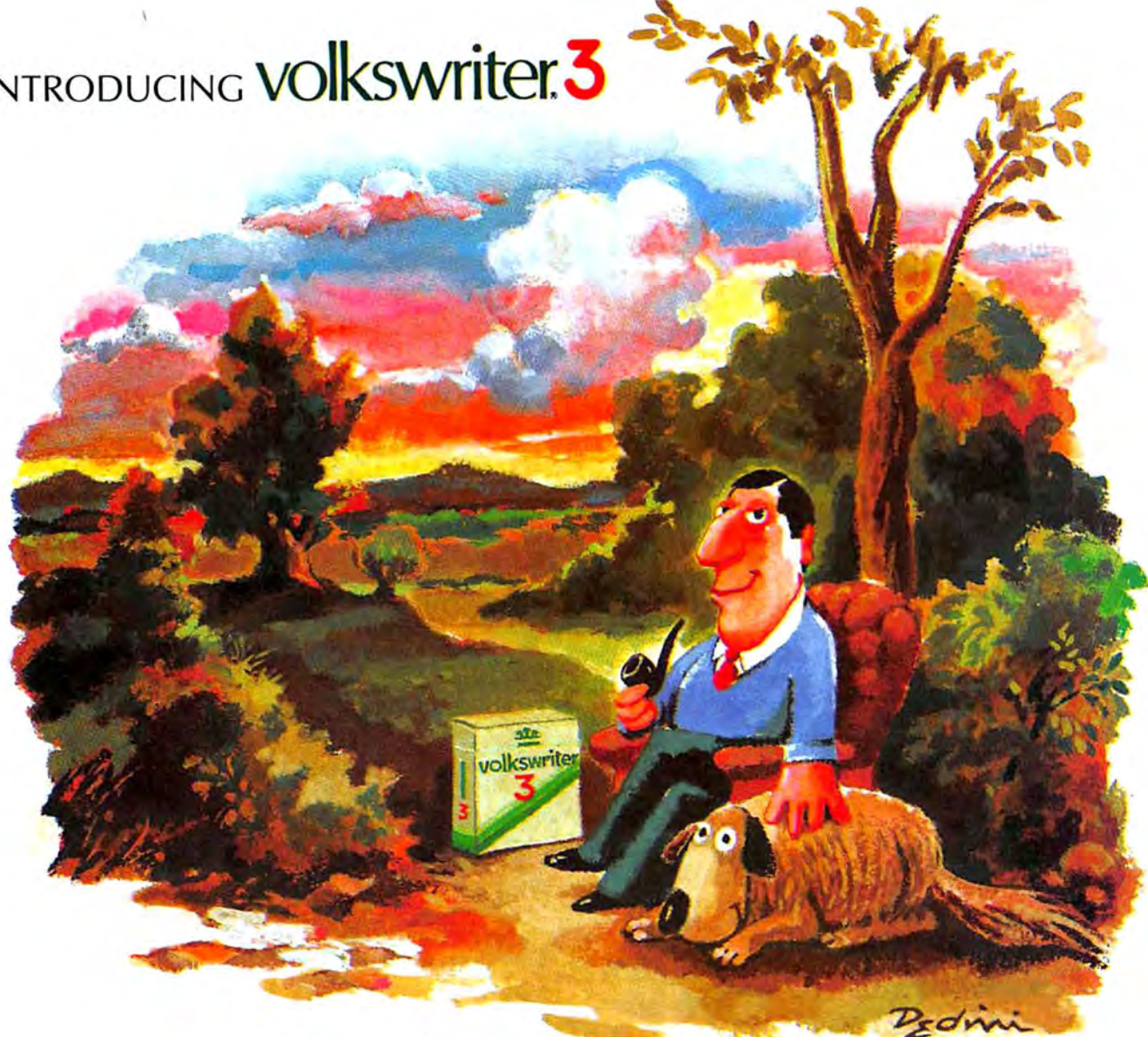
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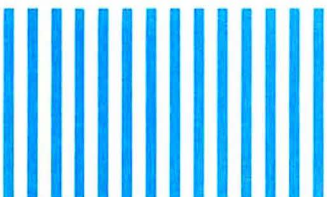
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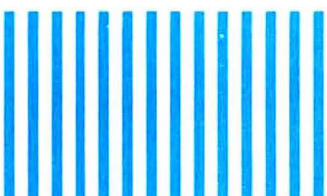
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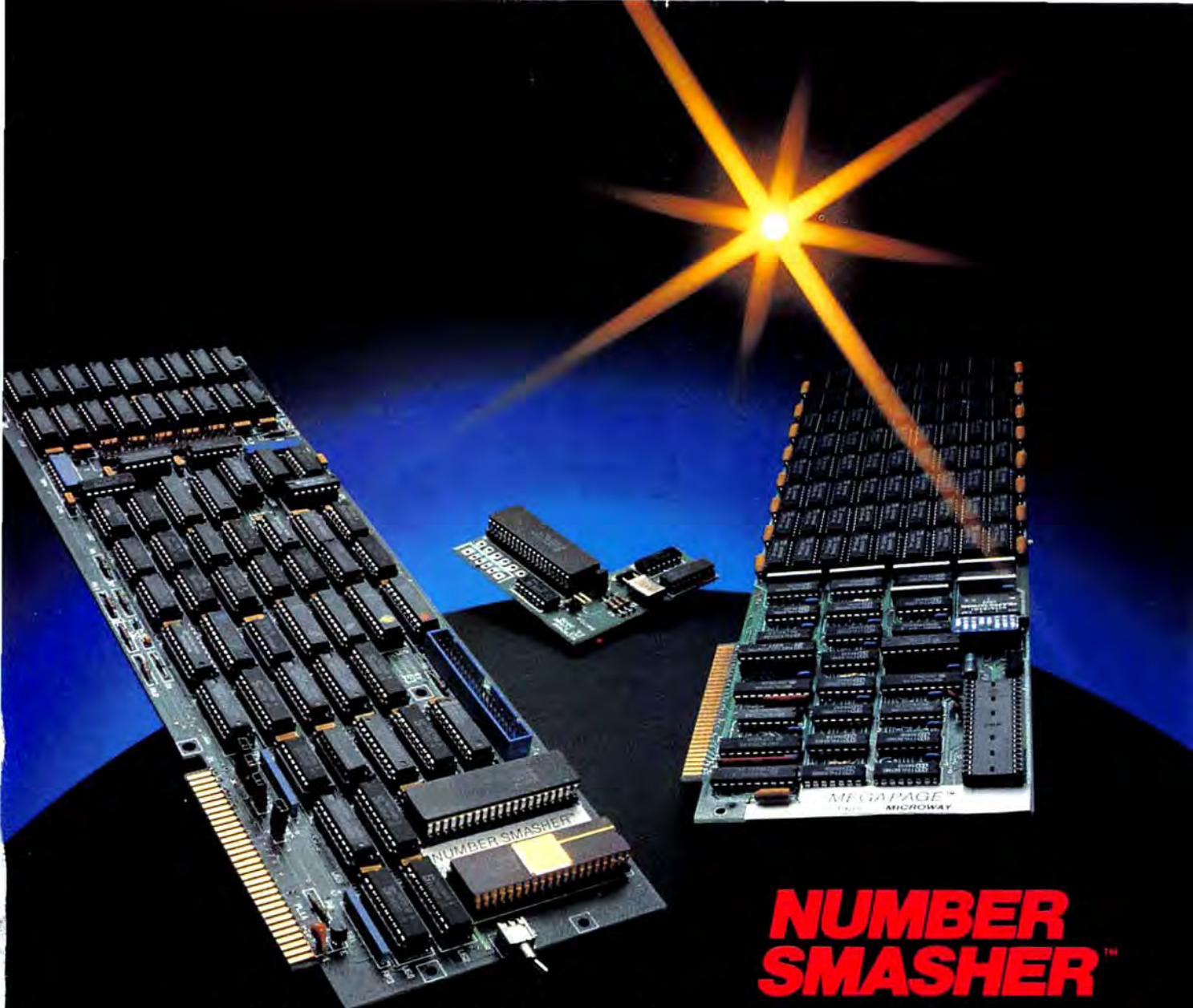
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## White-Collar Cartography

*Software measures everything from the health of your business to the business of your health. Why not worker productivity?*

For corporate management, the search for an effective way to gauge white-collar productivity is akin to the quest for the Holy Grail: Everyone covets it, but no one knows quite how to find it.

Michael Hierl, president of Pacesetter Software, believes his *Productivity Map*, a management

ideal committed to a PC program, ends the hunt. "How do you measure the output of systems analysts, engineers, marketing reps, research and design scientists, or even reporters?" he poses. "The usual means of determining productivity, like time/motion studies or quantity of output measurements, come straight from the factory floor and just don't work in the office."

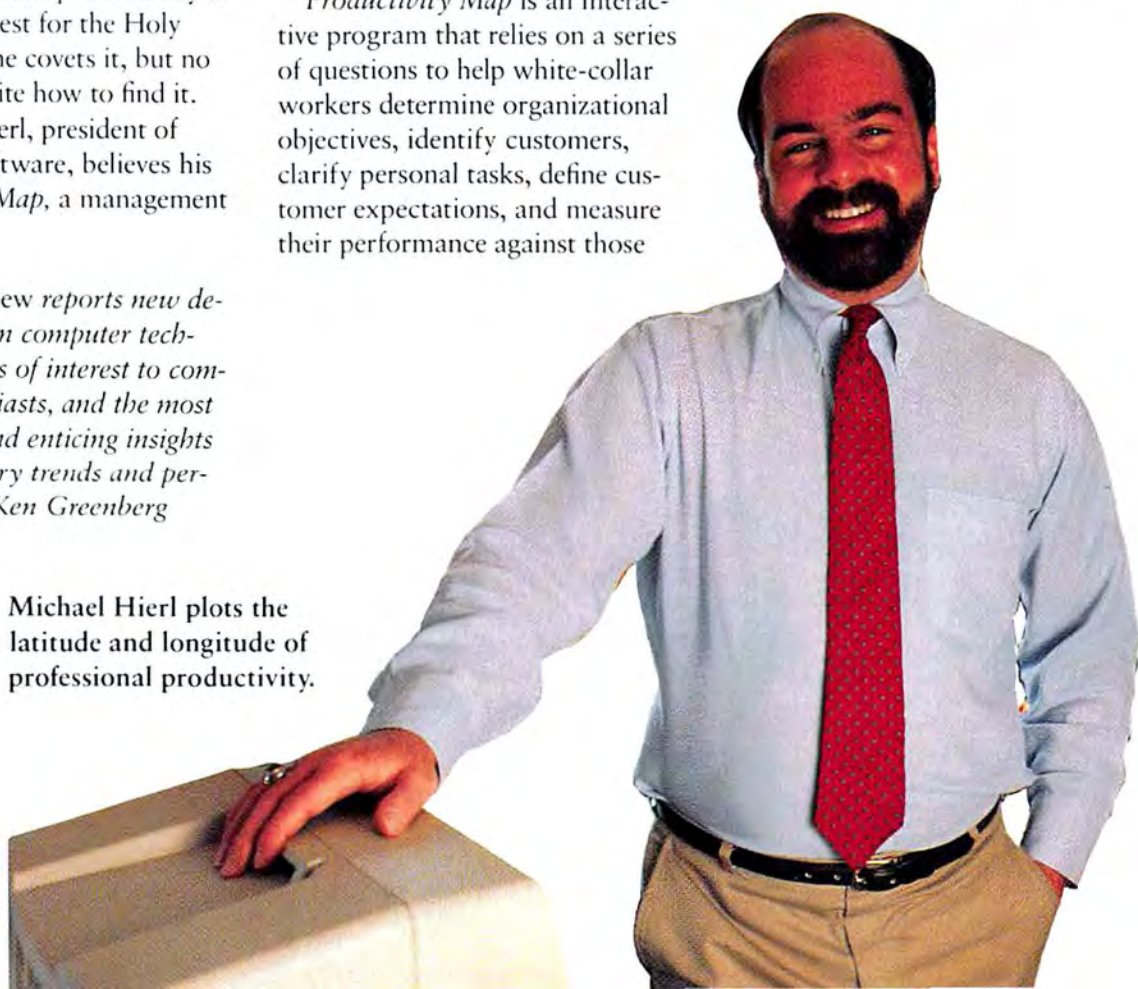
*Productivity Map* is an interactive program that relies on a series of questions to help white-collar workers determine organizational objectives, identify customers, clarify personal tasks, define customer expectations, and measure their performance against those

expectations. With this individual assessment entered, the program creates a printed report called a script that is designed to obtain feedback from co-workers. A worker can then use *Productivity Map*'s data management and graphics features to create charts and graphs that help track progress toward mutual goals.

*Productivity Map*, released in March, is built around a meth-

PC World View reports new developments in computer technology, items of interest to computer enthusiasts, and the most significant and enticing insights about industry trends and personalities. —Ken Greenberg

Michael Hierl plots the latitude and longitude of professional productivity.





# View

News and notes for the computing community

odology Hierl describes as "customer-driven." A customer in this case is anyone who receives output from a white-collar worker. For example, for a manager who assigns tasks within a department, the staff constitutes customers. For a controller who generates financial reports, line accountants are customers, and so on.

"We're just taking a marketing orientation that is most commonly identified with sales groups," Hierl says. "For white-collar workers, the biggest conceptual leap is to realize that their work affects that of their associates."

Hierl isn't talking through his hat. Pacesetter organized its own version of the Business Roundtable to create *Productivity Map*. The roster of interested parties spans government and industry—the congressional General Accounting Office, Westinghouse, 3M, GTE, Northern Telecom, Nabisco, Chrysler, Northeast Utilities, and the Bank of Oklahoma. All dispatched top productivity managers to a series of meetings during 1985 and through the first quarter of this year. Participants are providing Pacesetter's product development team with vital technical assistance.

This faith in the program's potential to improve white-collar

productivity is underscored by each company's \$12,500 contribution to Pacesetter—in effect, a dues payment entitling the firm to participate in the consortium. The fee covers an organization-wide license to use *Productivity Map* and qualifies each company as a beta test site.

Greg Whitney, manager of organization analysis at 3M, is

guarded in his support for Pacesetter's work. "Of course we're interested in improving productivity, but the program will have to sell itself," he says. "If it has merit, we'll use it."

Hierl is confident *Productivity Map* will meet the test and is hopeful his productivity crusaders will move on to new challenges. "The consortium," he declares, "will live on." —Wes Nihei

## The Price of the Paperless Office

You say the world—or at least your desk—isn't big enough for you and all those floppies? Even with your 78MB hard disk and a dozen Flip 'n Files, you can scarcely find room to park a pencil? Commiserate, then, with the captains of industry who must stash priceless, ever-proliferating corporate data—and be able to retrieve it, if need be. Why, you could probably fill the World Trade Center in lower Manhattan with the precious effluvia of Wall Street.

Precisely. Enter New York entrepreneur Paul Catalano, who is about to spend \$3 million creating an information warehouse called

Dataport in the catacombs of Battery Park, directly *under* the World Trade Center. The 1-million-cubic-foot cavity, which may be the world's largest man-made vault, once served as the end of the line for a subway tube running under the Hudson River. Disks and documents will be insulated from the cold, cruel world—to say nothing of radioactivity and magnetic fields—by walls and ceilings 30 feet thick. Catalano intends to feed the vault physically while Merrill Lynch and the New York Port Authority pursue development of a fiber optic network for delivery and remote retrieval.

Sort of puts your desk in perspective.



# Motoring at 6MHz

*For Detroit, smaller is better if it's under the hood. Way under.*

PC buffs who can't get enough no longer need to leave the technology behind when they take the wheel. The 1986 Buick Riviera is the first car to include as standard equipment a video display screen and control panel, which access and monitor some 100 automotive operations as you motor along.

Not only can this bionic Buick tell you when something goes awry, its on-board diagnostics just might knock some ethics into unsavory mechanics. Underneath the instrument panel of every '86 Riviera is an interface that connects to a souped-up AT at Buick service departments.

Developed jointly by IBM, Buick, and GM's Electronic Data Systems subsidiary, Buick's computerized automotive maintenance system (CAMS) tells service technicians at dealerships how to diagnose and cure whatever ails the car's electrical components. The touch-sensitive CAMS terminal displays a schematic of the circuit needing attention, a description of the problem, and step-by-step procedures for completing the repair.

**Top:** Don't touch that dial—to change radio stations, just point. **Middle:** No need to put this Buick on a hoist to determine what's ailing her. **Bottom:** The Riviera's digital tachometer gives new meaning to the term "redline."

Driving a car with a PC-style display screen can be distracting. You often want to sneak a peek at the screen, check your current fuel consumption rate (in mpg), or punch up a display of the car's diagnostic systems.

The Buick's 5-inch touch-sensitive CRT, called the Graphic Control Center (GCC), includes a mylar switch panel with ultrathin wires that send signals to the control circuitry. The GCC, which replaces 91 separate controls in a conventional, low-tech car, is activated when the driver grips the door handle. It then quickly performs a diagnostic check of all systems and displays a summary "page."

The GCC includes 6 basic screens—climate, summary, radio, gauges, diagnostic, and trip monitor. Secondary selections extend the number of screens to 35. Pressing any of the six "hard" keys displayed around the perimeter of the CRT lights a small indicator, sounds an alert, and flips to the appropriate page. Pressing the climate key, for example, brings up that page and the full set of 12 "soft" keys used to control the car's heater and air conditioning.

The trip monitor page is the most dynamic of the lot, with displays that change constantly as the on-board CPUs update their calculations. This page provides an instantaneous reading of fuel





economy in miles per gallon, average mpg for the current trip, and the distance the existing fuel supply will take you at your current rate. Subsequent screens enable you to key in your travel distance and have the CRT display an estimated time of arrival based on the average speed during the last 10 miles driven. A final subpage displays fuel consumption, average mpg, average speed, and time elapsed since the reset button was last pressed.

The basic Riviera brandishes a sticker price of \$19,831, but Buick declines to say whether throwing in all the electronics as standard equipment represents a savings in

manufacturing, what with the elimination of so many switches and knobs of yesteryear.

Buick, nonetheless, is touting its silicon sedans as a tonic for motorists weary of trips to Ralph's Garage. "These electronic devices are far more reliable than their mechanical counterparts and will save customers money in the long run by lowering service costs," says a company spokesperson. Buick hopes to sell 47,000 Rivas during the current model year. All of which may give the term *portable computer* an entirely new meaning. —*John Eckhouse*

## Reviving the China Trade

Seems there's a profound shortage of trained PC techies in China, which may be the reason the bloom is slightly off the computing rose in the world's largest potential market. Although Chinese enterprises have indulged in a computer-importing frenzy during the past few years, an estimated 80 percent of Beijing's PCs are closet-bound. Observers blame a paucity of hackers and technicians skilled in the care and feeding of machines.

Despite—or perhaps due to—that turn of events, China is in the midst of a concerted effort to build its own PC industry. The nation's factories cranked out 32,000 units during 1985—a fivefold increase in production. Mindful of these strides in manufacturing and distribution, Lu Shouqun, head of the People's Office of Electronic Development, is recommending that energies now be channeled into learning to fix the machines that Chinese industry is so adept at making. PC gurus with wanderlust, take note. —*Robert Horton*

## Tandon's New Drive

The struggle for market share in the personal computer business isn't over till it's over.

Sirjang Lal ("Jugi") Tandon evidently hasn't heard that the game belongs to IBM, Compaq, Apple, and AT&T. Like a high-tech Steinbrenner, Tandon has been scooping up major talent—part of a concerted effort to shift from the volatile storage business to the only slightly less volatile systems business.

Tandon recently engineered a savvy triple play, bringing in Dan Wilkie from IBM, H. L. Sparks from Compaq, and ex-Victor Technologies chairman Chuck Peddle. Wilkie, now Tandon president and chief operating officer, headed Big Blue's manufacturing operations in Boca Raton since the PC's inception. Sparks created IBM's initial marketing plan for the PC, then mapped out Compaq's sales strategy; he'll now do the same for Tandon. Peddle will reportedly bolster the company's presence in Europe.

Given that lineup, the only surprise would be if Tandon declined to market a line of machines under its own name. The company already manufactures the Tandy 1200HD, a moderately priced (and reportedly flawless) XT compatible.



## Silicon Tundra

Alaska: a frosty preserve for bears, naturalists, oil industry wildcatters, and other fauna. But techies and power users? Absolutely; computers truly are ubiquitous, and Alaska is no exception.

Alaska's image also smacks of "outpost." The state is a haven for branch offices of corporate America, with operations directed from the lower 48. Nerco Minerals manages to flip that stereotype around.

All the company's mines are "Outside," as Alaskans refer to the rest of the country, but Nerco Minerals calls Fairbanks home. Nerco has assets exceeding \$150 million, manages several million acres of mining claims and mineral exploration leases, and is among the nation's top ten producers of both gold and silver, with open pit mines in Idaho, Nevada, and Colorado.

"We're unique, the only U.S. company of our size with headquarters this far north," says John Cummings, manager of government and public affairs. "Other companies must be frightened by the cost of doing business here." Nerco is able to pull off this role reversal—and keep costs down—via computer and communications sophistication.

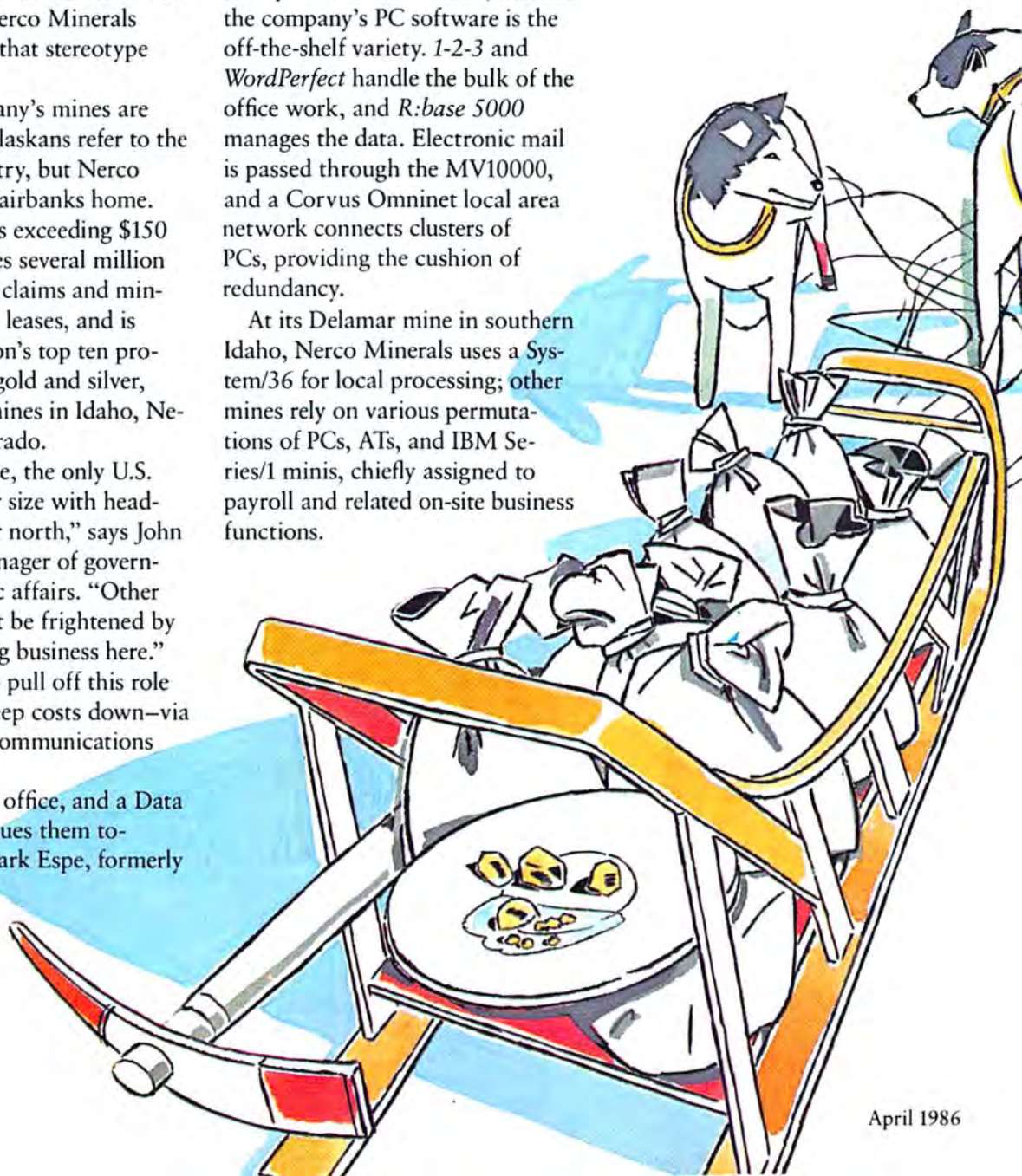
"PCs run the office, and a Data General mini glues them together," says Mark Espe, formerly

Nerco's director of communications and networking and now an independent consultant. Tethered to an Eclipse MV10000, Data General's top-of-the-line mini, are 20 PCs serving as intelligent workstations—links made possible by an internally developed terminal emulation program.

While that kind of self-sufficiency is the rule at Nerco, most of the company's PC software is the off-the-shelf variety. *1-2-3* and *WordPerfect* handle the bulk of the office work, and *R:base 5000* manages the data. Electronic mail is passed through the MV10000, and a Corvus Omninet local area network connects clusters of PCs, providing the cushion of redundancy.

At its Delamar mine in southern Idaho, Nerco Minerals uses a System/36 for local processing; other mines rely on various permutations of PCs, ATs, and IBM Series/1 minis, chiefly assigned to payroll and related on-site business functions.

Nerco's computing regimen goes well beyond corporate housekeeping. Company officials monitor the commodities markets vigilantly for news on the price of precious metals. Using *Interday Analyst*, a PC package, they assay data on gold and silver from Dow Jones, The Source, and Reuters.







Nerco's engineers have also gotten into the act, performing essential mine planning on PCs running *GeoStat*, a mainframe program shrunk for micros. *GeoStat* drives a plotter that creates a contour map of the prospective mining area; levels are scaled according to the cost of extracting the ore. Plotted output makes short work of pinpointing lodes where gold can be mined for \$200 or \$300 an ounce—and determining when mining simply doesn't make economic sense.

Life inflicts one minor misery on Nerco Minerals employees who go on line to monitor the precious metals scene. In Alaska—the westernmost as well as the northernmost state—keeping tabs on commodities means logging on at 5 a.m., just in time for market openings in Chicago, four time zones to the east. Outside, indeed.

—Richard Anderson

## Getting Them While They're Young

Once, student savings plans were as common in grade schools as primers about the Pilgrims. Kids handed pennies to a bank officer who scribbled figures in their passbooks. In a nod to discipline (and fiscal unreality), withdrawals were forbidden. Bank of America (BoFA) ran one such program for 50 years, at one point counting as many as 1.5 million customers, but in 1964 deemed the practice unprofitable and retired it. Now, however, with PCs in tow, BoFA is reviving StudentBanking.

On a weekly "bank day" in 130 California schools, students in grades K through 9 enter their



For these first, second, and third graders at Kensington School near Berkeley, California, the bank is just a keystroke away.

transactions on a Compaq portable or PCjr that BoFA supplies free of charge. (As a significant dividend, the computer remains on site throughout the year, available for any task the school considers appropriate.) A parent volunteer

handles the cash, accepting deposits, dispensing withdrawals, and turning in the excess to the participating BoFA branch that afternoon. Students choose from two interest-earning savings plans, both permitting withdrawals of up to \$10 per student per day. The

(continues)





## Winging It

If you can't beat 'em, leave.

While that homily may not precisely mirror the thinking of the top brass at Eagle Computer, erstwhile PC compatibles manufacturer, it looks very much like their strategy. Eagle is back, after a fashion—it's merely flown over to minicomputer land.

Eagle has formally unveiled the Concorde, which company CEO

Gary Kappenman dubs "the world's first open architecture minicomputer." With a triple bus design that incorporates the AT's 16-bit bus, the VME 32-bit bus, and a proprietary bus, the Concorde features something for everyone. The system supports multiple processors running in parallel, up to 24 expansion boards per box (including 12 AT-style boards), a 1250-watt power supply, a 140MB hard disk, a

60MB tape, and 16 serial ports. It can even accommodate 8-inch floppy disks.

Its machines may be gaining in bulk, but the company continues to contract. Last we heard, Eagle had pared its staff by 23, announced a quarterly loss of \$1.9 million, and remained more than \$7 million in debt.

## While They're Young ... (continued)

average student balance is \$50.

"Kids love it," says Michael Leonardich, BofA senior consultant. "They're very interested in saving and in seeing their money

grow. They have control over the funds—it's not mom's or dad's account. In this way, they're learning how to manage money."

All told, the bank has 110 Compaqs and 20 PCs on loan. Each machine is accompanied by home-grown (that is, bank-written) software. "We wrote a very friendly package, with a simple interface. Seven-year-olds can use it without difficulty," says Leonardich. Each student is assigned a password, and all take delight in keeping them secret.

Leonardich was part of an "intrapreneurial" team of BofA employees who treated the project like an independent business. He and manager Rick Carraher drew on their PC expertise to put the program together. "No corporate marketing people were involved," says Leonardich. "This was a grass-roots idea from the begin-

ning. It's outside the mainstream for the bank, but it's brought us public relations and financial benefits." Developing materials and software took six months and required jumping through a few regulatory hoops.

Parent volunteers are essential to the project because, as Leonardich puts it, "[The old] student banking had the same problem that plagues home banking [by PC]—it's impossible to transmit cash. We've given a lot of moms and dads with time on their hands something to do."

Leonardich says the program continually enlightens the bank on people's attitudes toward money: "Kids have a sincere desire to save. Many of their parents now regret that they didn't learn to save earlier in life." —Hal Glatzer



A new way to save



## What Hath Borland Wrought?

It's not that the computer business lacks vibrant marketing ideas these days, it's just that most of them seem to be emanating from Scotts Valley, California. Scotts Valley is, of course, the pitcher's mound from which Borland International president Philippe Kahn continues to hurl curveballs (some might even say screwballs) at industry sacred cows.

Consider Atlanta-based *Crosstalk* publisher Microstuf, which is now swinging at those same untouchable bovines in quest of a Borland-size hit. The firm recently withdrew *Infoscope*, its RAM-based file management package, from retail channels, then slashed the program's list price from \$225 to \$79. Microstuf will sell you *Infoscope* directly, in what the company claims is a bid to get the program's power "to the people" (see "Tunnel Vision," *PCW*, April 1985).

Mail-order sales and "bargain" prices put Scotts Valley on the map, but Microstuf's midcourse correction may also be aimed at *Reflex*, Borland's chart-busting

RAM-based analytic data manager. Sales of that program were lethargic until Borland acquired Analytica, creator of *Reflex*, and shaved about \$400 off the price.

While we're on the subject, you might well imagine Borland to be the fastest-growing software firm in the land ... but you'd be wrong. It's not Ansa or Symantec or Javelin Software, either. According to *Inc.* magazine's latest tally of the nation's 500 hottest privately held concerns, Broderbund Software ranks 12th among all companies, period. *Print Shop*, *Lode Runner*, *Fantavision*, and *Bank Street Writer* have been very good to Broderbund; Fiscal 1985 sales topped \$20 million, a 100 percent improvement on 1984—a refrain the firm has sung for the fifth consecutive year.

## It Had to Happen Dept.

Around Mesquite, Texas, power users have no truck with wimps packing just 128K, as Texas-based Storey Systems knows full well. Storey has unleashed RAMBOard .256, a high-caliber half-card memory expansion board with a truly regrettable name. It's enough to make you misty-eyed for the 64K Z-80.

## Into Thin Err

Kudos to the copy editors, proofreaders, and/or typesetters at *PC Week*, for their wry sense of humor. A recent overview of personal publishing systems contained this winner: "In 1984, about 4,120 software packages for PC-based typesetting were shipped in the United States, according to Frank Romano, associate editor of *Typoworld*, a newspaper for the typesetting industry."

It *was* a joke, wasn't it?

*Richard Anderson writes on technology from Oakland, California; John Eckhouse is a business reporter for the San Francisco Chronicle; Hal Glatzer writes about computers from Seattle; Robert Horton is a historian and lecturer in Troy, New York; and Wes Nihei is Editorial Assistant for PC World.* ●





# Your first color good enough

**NEC** introduces the only color monitor you need. Superb resolution plus MultiSync for across-the-board compatibility with all three PC graphics boards made by IBM® for business graphics, CAD/CAM, computer art, and text.



Now there's one high resolution color monitor that does things your way. The MultiSync™ monitor from NEC.

It gives you the best color resolution available at the price.

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Compatibility with the IBM® Enhanced Graphics Adapter Board

- MultiSync, the NEC feature that automatically adjusts to color adapter board scanning frequencies from 15.75 KHz to 35 KHz—suggesting the possibility that the MultiSync monitor might be compatible with all color graphics boards that are fully compatible with the IBM PC, PC/XT, and PC/AT, now and in the future.

- Full implementation of high resolution graphics software for business and other applications, now and in the future.

- And color capability limited only by the board being used.



## See Things Our Way

Until now, you had to choose different color monitors for compatibility with all three PC color graphics boards made by IBM. With so many board and monitor configurations, folks

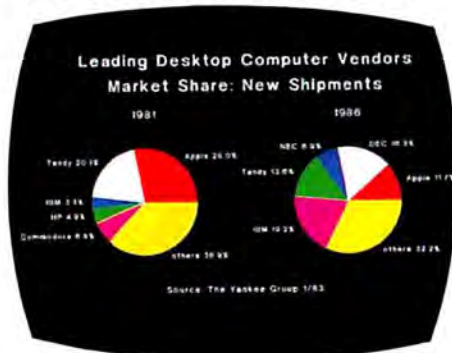


Compatibility with the IBM® Professional Graphics Adapter Board

didn't know which way to look.

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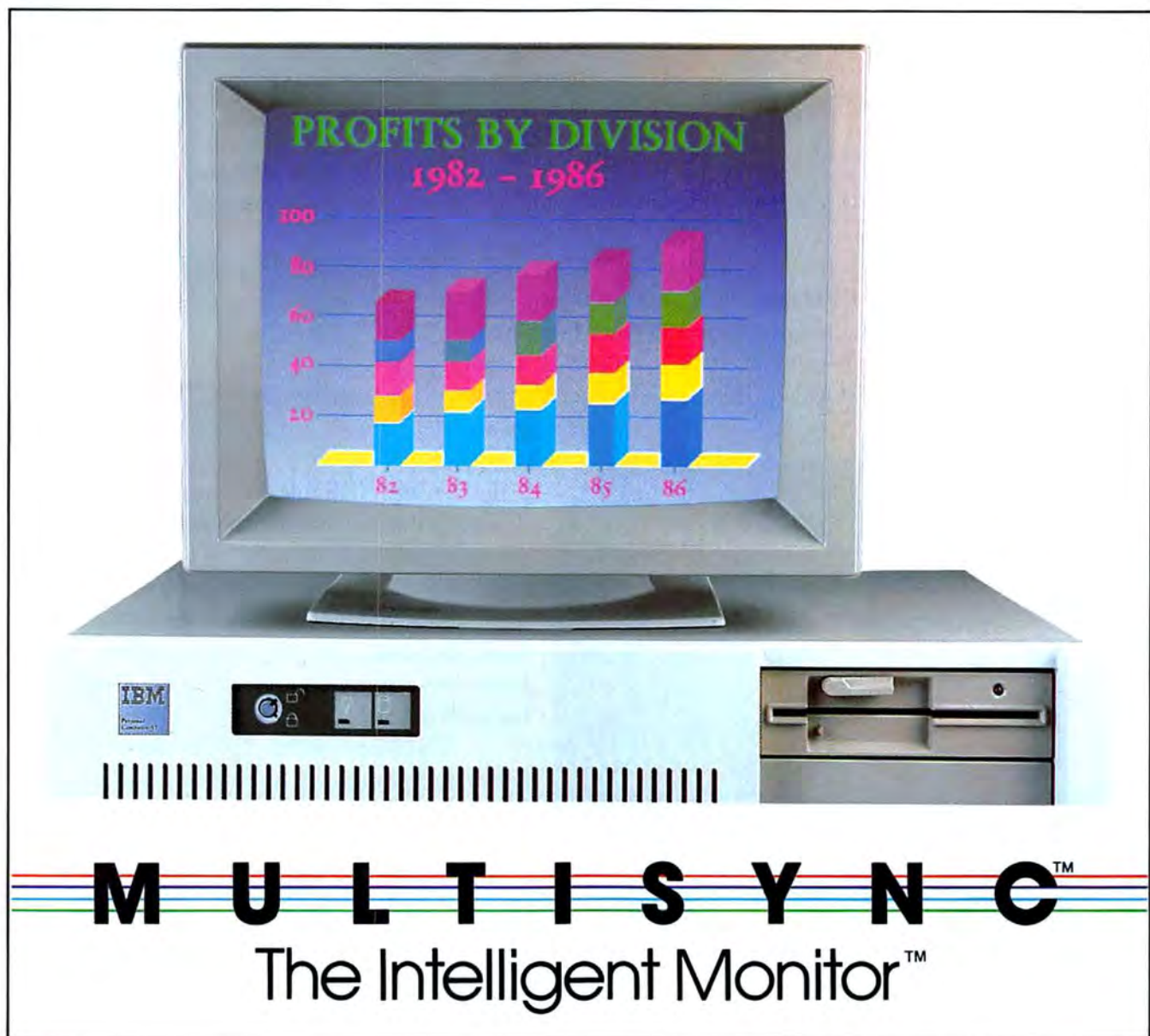
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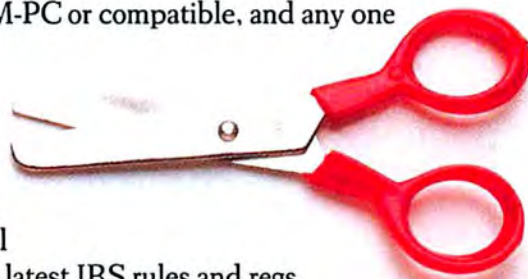
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## IBM HARDWARE

| AST                         | List  | Our   |
|-----------------------------|-------|-------|
| SixPak Plus 64K             | \$395 | \$239 |
| SixPak Plus, 384K, S/P/CC   | \$895 | \$269 |
| Advantage MultiP Brd for AT | \$595 | \$425 |
| Rampage 256K for PC         | \$495 | \$395 |
| Rampage 128K for AT         | \$745 | \$495 |

## CENTRAL POINT

|                 |       |       |
|-----------------|-------|-------|
| PC Option Board | \$ 95 | \$ 81 |
|-----------------|-------|-------|

## COMX

|                       |       |       |
|-----------------------|-------|-------|
| 130 Watt Power Supply | \$179 | \$ 93 |
|-----------------------|-------|-------|

## CORE Hard Disks for AT

|                      |        |        |
|----------------------|--------|--------|
| ATplus 20 meg for AT | \$1595 | \$1355 |
| ATplus 30 meg for AT | \$1995 | \$1695 |
| ATplus 56 meg for AT | \$3595 | \$3195 |

## HAUPPAGE (HCW)

|                   |       |       |
|-------------------|-------|-------|
| 8087 Chip         | \$175 | \$119 |
| 8087-2 Chip       | \$225 | \$175 |
| 80287 Fast-5 Chip | \$295 | \$229 |

## HERCULES

|                               |       |       |
|-------------------------------|-------|-------|
| Color Card with Parallel Port | \$245 | \$165 |
| Mono Graphics Card            | \$499 | \$319 |

## INTEL

|                         |       |       |
|-------------------------|-------|-------|
| Above Board 64K for PC  | \$395 | \$299 |
| Above Board 128K for AT | \$595 | \$449 |

## KENSINGTON

|                  |       |       |
|------------------|-------|-------|
| Masterpiece Plus | \$180 | \$129 |
|------------------|-------|-------|

## KEYTRONIC Keyboards

|                      |       |       |
|----------------------|-------|-------|
| KB5151 or KB5151 Jr. | \$255 | \$189 |
|----------------------|-------|-------|

## MICROSOFT

|       |       |       |
|-------|-------|-------|
| Mouse | \$195 | \$125 |
|-------|-------|-------|

## MOUNTAIN

|                  |        |       |
|------------------|--------|-------|
| 20 meg DriveCard | \$1195 | \$945 |
|------------------|--------|-------|

## MOUSE SYSTEMS

|                          |       |       |
|--------------------------|-------|-------|
| PC Mouse with Paint      | \$220 | \$145 |
| Mouse with Software (Jr) | \$220 | \$138 |

## PERSYST

|                          |       |       |
|--------------------------|-------|-------|
| PC Mono Board w/Par Port | \$250 | \$159 |
| Color Board              | \$210 | \$139 |

## QUADRAM

|                          |       |       |
|--------------------------|-------|-------|
| Quadboard no RAM to 384K | \$295 | \$189 |
| Quadboard 384K S/P/CC/G  | \$795 | \$239 |
| EGA+ Board               | \$595 | \$425 |

## RACORE

|                             |       |       |
|-----------------------------|-------|-------|
| Expansion Chassis Plus (Jr) | \$675 | \$459 |
| 256K Expansion Board (Jr)   | \$275 | \$179 |

## TALLTREE

|                     |       |       |
|---------------------|-------|-------|
| JRAM II board       | \$219 | \$159 |
| JRAM III 256K Board | \$399 | \$249 |

## TITAN

|                     |       |       |
|---------------------|-------|-------|
| PC Accelerator 128K | \$795 | \$595 |
|---------------------|-------|-------|

## VIDEO 7

|                          |       |       |
|--------------------------|-------|-------|
| Mono Graphics Card       | \$250 | \$139 |
| MGC with Parallel Port   | \$300 | \$169 |
| VEGA Board IBM EGA Comp. | \$599 | \$429 |

## WESTERN DIGITAL

|                           |       |       |
|---------------------------|-------|-------|
| 10 meg Filecard Hard Disk | \$895 | \$695 |
|---------------------------|-------|-------|

## PRINTERS

|                 |       |      |
|-----------------|-------|------|
| BROTHER         |       |      |
| HR25 Daisywheel | \$695 | CALL |

## EPSON

|                            |        |       |
|----------------------------|--------|-------|
| LX80 100 cps, 16 cps NLQ   | \$299  | \$249 |
| FX286 200 cps, 40 NLQ      | \$749  | \$609 |
| LQ800 180 cps, 60 LQ       | \$799  | \$649 |
| LQ1000 180 cps, 60 LQ, 15" | \$995  | \$795 |
| LQ1500 200 cps, 67 LQ, 15" | \$1295 | \$995 |

## DISKETTES

|                              |           |  |
|------------------------------|-----------|--|
| CONROY-LAPOINTE DISKETTES    |           |  |
| 10 ea DS/DD 40 trk (IBM)     | \$ 16     |  |
| 100/1000 ea DS/DD 40 trk     | \$119/799 |  |
| 10 ea DS/HD 96 TPI (IBM-AT)  | \$ 29     |  |
| 100 ea DS/HD 96 TPI (IBM-AT) | \$269     |  |

## GENERIC

|                           |           |  |
|---------------------------|-----------|--|
| 10/100 DS/DD 40 trk (IBM) | \$ 10/ 79 |  |
| 10/100 DS/HD 96 TPI (AT)  | \$ 27/249 |  |

## IBM SOFTWARE

| ASHTON-TATE                   | List  | Our   |
|-------------------------------|-------|-------|
| Framework II                  | \$695 | \$415 |
| dBase III+                    | \$695 | \$395 |
| dBase II (req. PC DOS & 128K) | \$495 | \$305 |

## BORLAND

|                             |       |       |
|-----------------------------|-------|-------|
| Traveling Sidekick          | \$ 70 | \$ 39 |
| Editor Toolbox or GameWorks | \$ 65 | \$ 40 |
| Turbo New Pack              | \$ 95 | \$ 50 |
| Reflex: The Analyst         | \$ 99 | \$ 59 |
| Traveling Combo             | \$125 | \$ 65 |
| Turbo Holiday Pack          | \$125 | \$ 69 |
| Superkey/Sidekick Package   | \$125 | \$ 75 |
| Turbo Jumbo Pack            | \$245 | \$130 |

## BOURBAKI

|       |       |       |
|-------|-------|-------|
| 1 dir | \$ 95 | \$ 62 |
|-------|-------|-------|

## CENTRAL POINT

|                        |       |       |
|------------------------|-------|-------|
| Copy II PC or PC Tools | \$ 40 | \$ 22 |
|------------------------|-------|-------|

## CHIP SOFT

|           |       |       |
|-----------|-------|-------|
| Turbo Tax | \$ 65 | \$ 45 |
|-----------|-------|-------|

## CYGNET

|                       |       |       |
|-----------------------|-------|-------|
| The Little Black Book | \$ 50 | \$ 39 |
|-----------------------|-------|-------|

## DAC

|                 |       |       |
|-----------------|-------|-------|
| Easy Accounting | \$ 70 | \$ 55 |
|-----------------|-------|-------|

## FIFTH GENERATION

|          |       |       |
|----------|-------|-------|
| Fastback | \$179 | \$109 |
|----------|-------|-------|

## FUNK SOFTWARE

|                       |       |       |
|-----------------------|-------|-------|
| Sideways NEW VERSION! | \$ 60 | \$ 39 |
|-----------------------|-------|-------|

## HOWARD SOFT

|                   |       |       |
|-------------------|-------|-------|
| 1986 Tax Preparer | \$295 | \$199 |
|-------------------|-------|-------|

## HUMAN EDGE

|             |       |       |
|-------------|-------|-------|
| Mind Prober | \$ 50 | \$ 29 |
|-------------|-------|-------|

## LIVING VIDEOTEXT

|            |       |       |
|------------|-------|-------|
| Think Tank | \$195 | \$109 |
|------------|-------|-------|

## LOTUS

|                   |       |       |
|-------------------|-------|-------|
| 1-2-3 NEW VERSION | \$495 | \$329 |
| Symphony          | \$695 | \$449 |

## MICROPRO

|                    |       |       |
|--------------------|-------|-------|
| Easy               | \$150 | \$ 99 |
| WordStar           | \$350 | \$189 |
| WordStar 2000 Plus | \$595 | \$295 |

## MICRORIM

|                        |       |       |
|------------------------|-------|-------|
| R:Base 5000            | \$695 | \$385 |
| Extended Report Writer | \$150 | \$ 92 |
| R:Base Cloud           | \$249 | \$133 |
| Program Interface      | \$395 | \$225 |

## MICROSOFT

|                  |       |       |
|------------------|-------|-------|
| Flight Simulator | \$ 50 | \$ 33 |
| Windows          | \$ 95 | \$ 63 |
| QuickBASIC       | \$ 99 | \$ 69 |
| Macro Assembler  | \$150 | \$ 99 |
| Multiplan        | \$195 | \$124 |
| Access           | \$250 | \$169 |
| Word             | \$375 | \$239 |

## MICROSTUF

|               |       |       |
|---------------|-------|-------|
| Crosstalk XVI | \$190 | \$110 |
| Remote        | \$195 | \$110 |

## MULTIMATE

|                         |       |       |
|-------------------------|-------|-------|
| Multimate               | \$495 | \$229 |
| Advantage requires 384K | \$595 | \$295 |

## PAPERBACK

|            |       |       |
|------------|-------|-------|
| VP Planner | \$100 | \$ 65 |
|------------|-------|-------|

## PETER NORTON

|                  |       |       |
|------------------|-------|-------|
| Norton Utilities | \$100 | \$ 56 |
|------------------|-------|-------|

## POLYTRON

|                        |       |       |
|------------------------|-------|-------|
| Polywindows (copiable) | \$ 85 | \$ 45 |
|------------------------|-------|-------|

## ROSESOFT

|        |       |       |
|--------|-------|-------|
| Prokey | \$130 | \$ 80 |
|--------|-------|-------|

## SATELLITE (SSI)

|                          |       |       |
|--------------------------|-------|-------|
| WordPerfect NEW VERSION! | \$495 | \$229 |
|--------------------------|-------|-------|

## SOFTWARE PUBLISHING

|                           |       |       |
|---------------------------|-------|-------|
| PFS: Write, File or Graph | \$140 | \$ 84 |
|---------------------------|-------|-------|

## SYMATEC

|       |       |       |
|-------|-------|-------|
| Q & A | \$299 | \$219 |
|-------|-------|-------|

## Internal Hard Drives

|        |            |       |
|--------|------------|-------|
| 10 meg | List \$745 | \$389 |
|--------|------------|-------|

|        |            |       |
|--------|------------|-------|
| 20 meg | List \$895 | \$489 |
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## CHIP KITS

|     |      |
|-----|------|
| 64K | \$ 9 |
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|                |           |
|----------------|-----------|
| 1-99 sets \$11 | 100+ sets |
|----------------|-----------|

|      |      |
|------|------|
| 256K | \$32 |
|------|------|

|                |           |
|----------------|-----------|
| 1-99 sets \$32 | 100+ sets |
|----------------|-----------|

|      |      |
|------|------|
| 128K | \$37 |
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|                |           |
|----------------|-----------|
| 1-99 sets \$39 | 100+ sets |
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## COMX/IRWIN

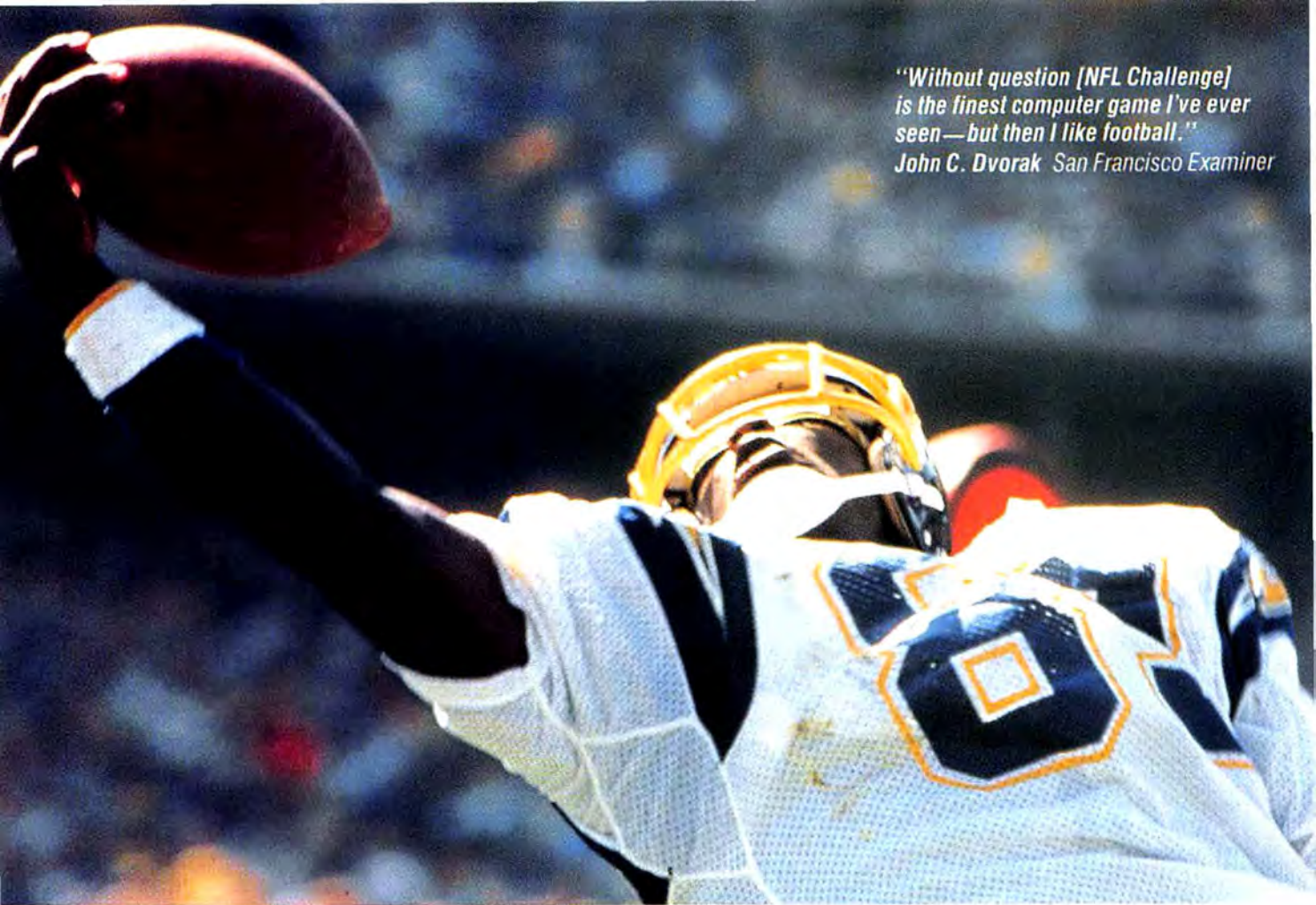
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10 meg List \$795 \$495

90 day limited warranty.

90 day limited warranty.





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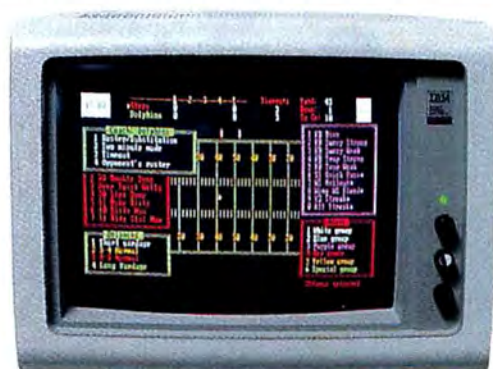
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Circle 764 on reader service card



# The Help Screen

*PC World offers answers and advice at every level*

This month: Making the grade with 1-2-3 cell values, defining BASIC string functions, redirection with the DOS command FOR, plus a look at how BASIC stores numeric values

Karl Koessel

## A 1-2-3 Label Conversion Quiz

*Q. As a classroom teacher, I use 1-2-3 to record student test scores and calculate final grades. I'm able to compute the final grade as a percentage, but I can't convert it to a letter grade. I've heard that such a conversion can be done, but no one seems to know how.*

*What's the answer?*

*Richard Gee*

*Kelowna, British Columbia*

**A.** Converting a value to a "label" with 1-2-3 release 1 or 1A is an almost impossible task. Neither version can adequately handle character strings. 1-2-3 release 2, however, deals with character strings easily. This latest version incorporates several new string functions and adds string capabilities to several existing functions.

With 1-2-3 release 2 you can build a grade table as shown in Screen 1. The table may, of course, be placed anywhere on the worksheet, but entries in the first column—a list of the minimum grade points that the adjacent letter grade requires—must be arranged in ascending order. When you've finished, use /Range Name Create to name the grade table's range Grade Table. Then move the cell pointer to the cell in which you want the first student's letter grade displayed and type @VLOOKUP( but don't press <Enter>. Follow that with the name of the cell containing that student's final grade point (B4 in the Screen 1 example) and ,SGRADE TABLE,1) (don't forget the \$ before the range name). Press <Enter> to finish the function, and that student's letter grade will appear. To obtain letter grades for the remainder of the class, copy this function to the range D5..D17.

## All FOR DOS Redirection

*Q. I've encountered a problem while trying to execute the DOS command FOR with a utility that requires redirection of standard input and output.*

The utility, STRIP.COM [\*.\*, PCW, March 1985], is used to convert WordStar files into ASCII files. Its command syntax is STRIP <infile> <outfile> where infile is the name of the WordStar file to be converted, and outfile is the name of the ASCII output file. The command FOR %Z IN (\*.\*) DO command will execute whatever DOS command replaces command for each of the file names listed between the parentheses.

I'm attempting to use the FOR command to execute STRIP repeatedly for each of my WordStar files (none of which has a file name extension), thereby creating ASCII files with the same name plus the extension .ASC. However, when I issue the command

```
FOR %Z IN (*.*) DO STRIP  
    <%Z>%Z.ASC
```

I receive a 'File not found' error message. Which file is the command unable to find? Based on my experience with a variety of systems, my suspicion is that the problem is with DOS itself. How do you assess it?

*James S. Bertram*

*Vancouver, British Columbia*

**A.** When present in a DOS command, the redirection symbol < enables the command to receive its input from the file (or device) specified after the symbol instead

(continues)



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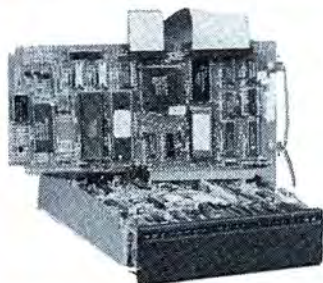
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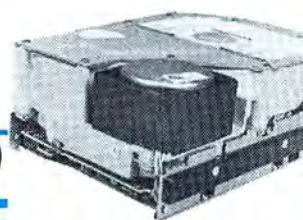
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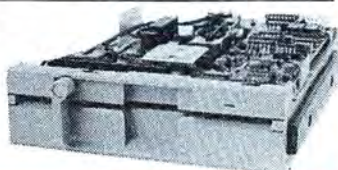


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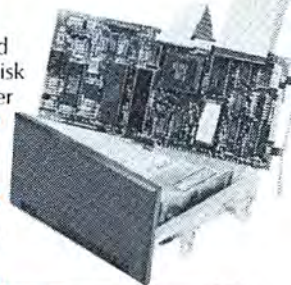
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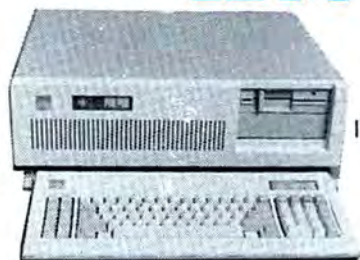
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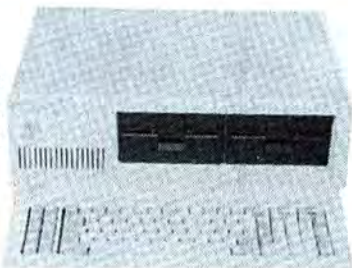


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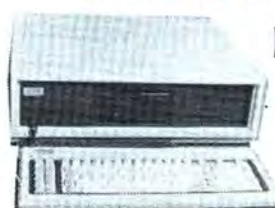
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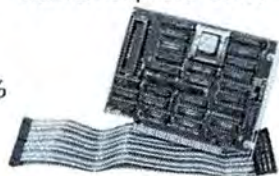
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of from the keyboard. In such instances, DOS verifies that the specified file exists before executing the command. For example, try the command **DIR <%Z>**.

**%Z** is the name of the file that DOS could not find when you invoked the FOR command. Because the FOR command is not executed until DOS has completed its search for the input file, **%Z** is not interpreted as a DOS variable but rather as literal characters of a file name. In other words, the redirection symbols in your command are part of the FOR command, not the STRIP command.

To solve the problem, first create a batch file by typing **COPY CON STRIPBAT <Enter>**  
**STRIP <%1 > %1.ASC**

and pressing function key **<F6>** and finally **<Enter>**. Substituting **STRIP.BAT %Z** in place of **STRIP <%Z > %Z.ASC** in your original FOR command works almost as intended—except that conversion will work only on the first matching file before the DOS prompt reappears.

We've got a new problem on our hands. DOS doesn't permit a batch file to be nested within a FOR command (or inside another batch file). As the results of our last attempt demonstrate, control is not returned to the FOR command after the nested batch file has been executed. We can, how-

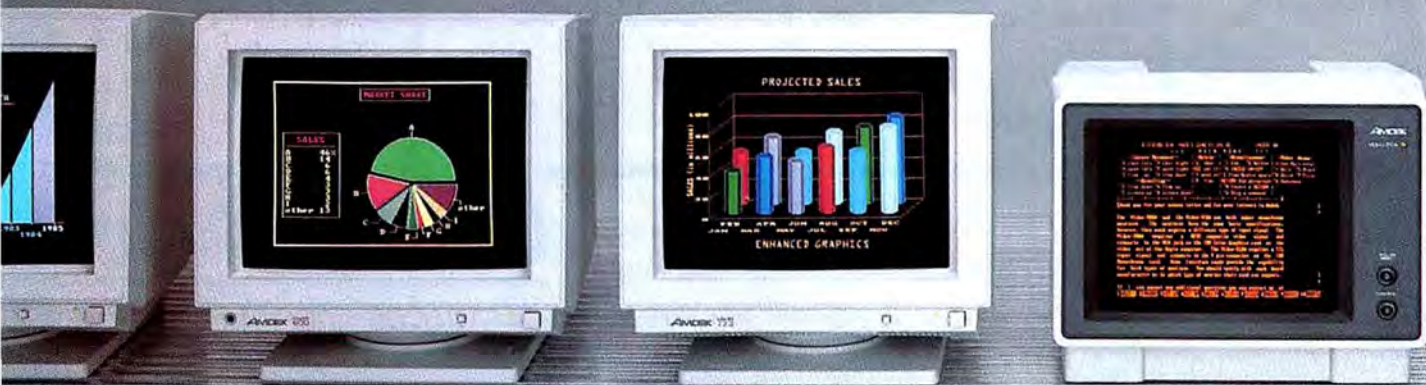
ever, nest a call for another command processor (see "The Fully Powered PC," *PCW*, July 1985). When the second command processor has completed its function, control is passed back to the initial command processor, which then resumes its current task.

Having created **STRIP.BAT**, therefore, you can type **FOR %Z IN (\*.\*) DO \COMMAND /C STRIP.BAT %Z** and press **<Enter>** to convert your files. Better yet, place that command in a batch file, which you may want to call **BULKSTRP.BAT**. And don't forget that the variables of a FOR command in a batch file must be preceded by double **%** signs.

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### **BASIC Values**

*Q. I do extensive programming on IBM PCs. I've long been aware of certain rounding errors in IBM BASIC, but I have only recently realized the magnitude of that problem. For example, if you type PRINT 9.4, BASIC prints 9.399999. It performs similar transformations on hundreds of numbers (8.4, 8.86, 9.02, 9.1, and 9.31, to list a few). Most of the programs I write are used to track money, and I'm naturally very concerned about the accuracy of my calculations. What's behind this imprecision? Are you aware of any methods to overcome this ten-*

*dency other than using double-precision numbers?*

*Stephen E. Roesch  
Baltimore, Maryland*

**A.** While we generally think of numbers as decimals—that is, values in base 10—versions of BASIC that run on most computers store numbers as binaries—values in base 2. When a numeric variable is assigned a number as in `A = 10`, BASIC converts the ASCII character string 10 into a binary value, then stores that value in memory as a string of on and off bits representing 1s and 0s. When the value of a numeric variable is printed, BASIC converts the stored binary value into a string of decimal digits. For whole numbers,

this presents no problem; every whole decimal number can be converted to a unique binary number consisting of a finite number of binary digits, and vice versa.

For fractions, however, this translation is problematic. Take, for example, the value .1 in base 3. This value cannot be represented with a finite number of base 10 digits and is thus written as an approximation: .33 or .33333 or .3333333, etc., depending on the number of digits allowed.

This idiosyncrasy persists with double-precision numbers, but because they are stored with a greater number of binary digits,

*(continues)*

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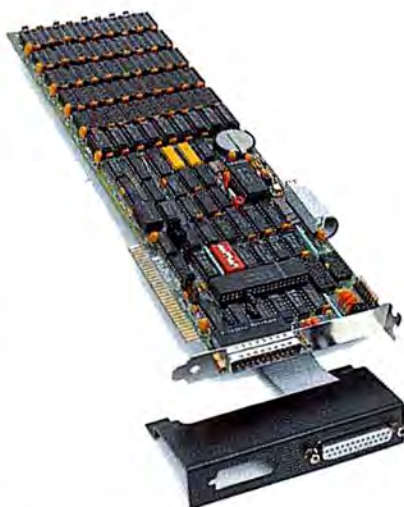
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conversion errors are less critical, particularly in money matters. Your desire to avoid double-precision numbers is understandable, given that they take longer to calculate and consume twice the RAM and disk space. Even double-precision numbers can ruin a programmer's day: Imagine your check-balancing program warning that your checkbook is out of whack when the program finds that the last balance plus the total value of deposits (say \$9.40) doesn't equal the remaining balance plus the total value of withdrawals (say \$9.399999).

Programs that demand decimal accuracy rely on another method of numeric storage. That technique is called binary coded decimal, or BCD; with it, every digit of a decimal number (or, in an alternate form of BCD, every two digits) is stored in a single byte. The BCD approach avoids both errors and approximations, but like double-precision numbers in BASIC, calculations slow and storage requirements increase.

You can use single-precision values for monetary dealings if you're willing to keep your sums below \$100,000.00 (or \$10,000,000 if you can manage to skip the pennies). Just work in whole values and use PRINT USING "SS#####.##"; x/100 (or use PRINT USING "SS#####"; x) when you need to print.

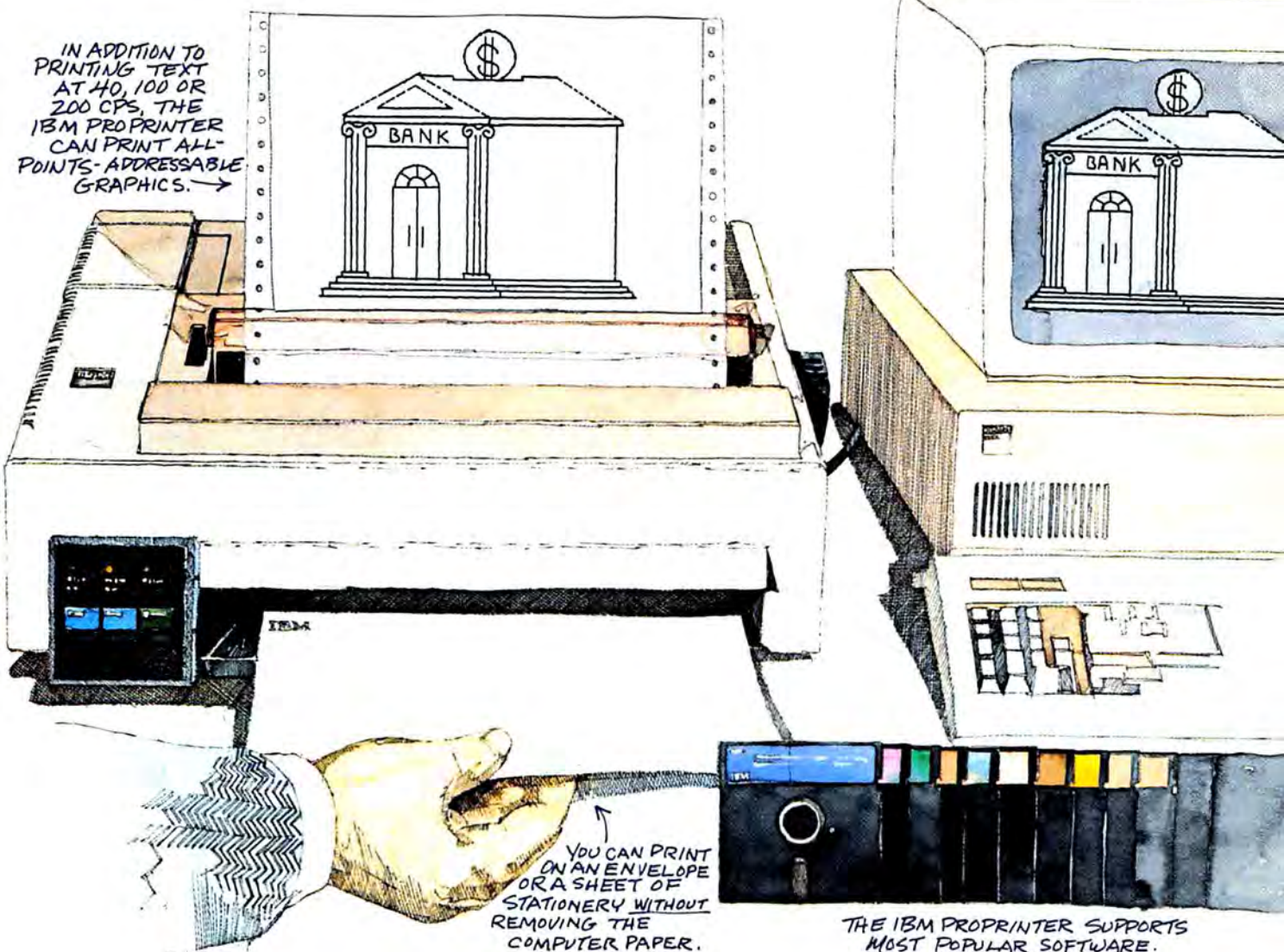
### Matching BASIC Functions

Q. When I write the following BASIC code, the PC executes it flawlessly:

(continues)



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|--------------------------|---------------------------------|--------------------------------|------------------------------|-------------------------------------|----------------------------------|
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| Documentation            | 1                               | 2                              | 2                            | 2                                   | 3                                |
| Ease of Learning         | 1                               | 2                              | 3                            | 1                                   | 4                                |
| Functionality            | 1                               | 2                              | 2                            | 3                                   | 2                                |
| Performance              | 2                               | 2                              | 1                            | 3                                   | 1                                |
| Document Control         | 1                               | 3                              | 2                            | 4                                   | 2                                |
| Text Control             | 1                               | 3                              | 2                            | 4                                   | 2                                |
| Page Control             | 2                               | 1                              | 3                            | 2                                   | 3                                |
| Micro Editing            | 2                               | 1                              | 2                            | 3                                   | 3                                |
| Global Control           | 1                               | 2                              | 1                            | 3                                   | 3                                |
| Page Layout              | 2                               | 3                              | 2                            | 2                                   | 1                                |
| Printing                 | 3                               | 1                              | 3                            | 3                                   | 4                                |
| Advanced Features        | 1                               | 2                              | 1                            | 2                                   | 3                                |
| Writing Aids             | 3                               | 3                              | 2                            | 4                                   | 3                                |
| Printers/Fonts Supported | 1                               | 3                              | 3                            | 3                                   | 4                                |
| Connectability           | 1                               | 4                              | 3                            | 5                                   | 2                                |

Note: The comparison numbers represent the relative ranking of each package compared to the others. The package with the highest ranking is given a 1. If packages rank equally, they are assigned the same ranking number.

Source: InfoCorp



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```
10 INPUT AS
20 AS = CHR$(ASC(AS)-32)
30 PRINT AS
```

Assuming I enter a lowercase character, the respective uppercase character is printed. I've also entered identical coding for line 20 into a define function (DEF FN) statement as follows:

```
10 DEF FNupper(LOWS) =
  CHR$(ASC(LOWS)-32)
20 INPUT AS
30 AS = FNupper(AS)
40 PRINT AS
```

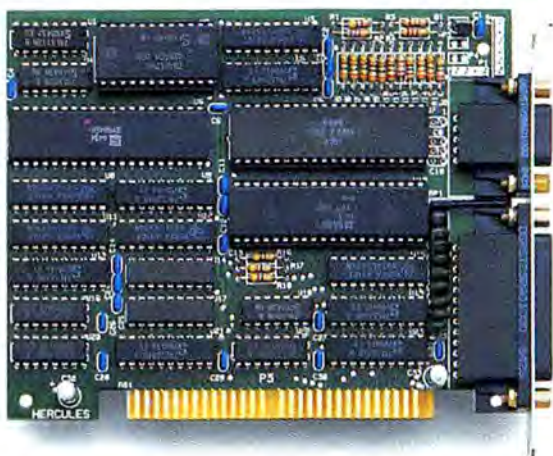
In such instances, however, the PC returns a 'Type mismatch in 30' error message. I can't determine what's wrong with the syntax and neither can any of my BASIC instructors. What am I doing wrong?

Bryan Nahrwold  
Pocatello, Idaho

A. The string variable `AS` and the (incorrect) numeric variable `FNupper` are the mismatched types in your current code. Change line 10 to **DEF FNupper\$(LOWS) = CHR\$(ASC(LOWS)-32)** and line 30 to **AS = FNupper\$(AS)**. These differ from your original lines only in that the dollar signs are inserted directly after the name of the *string* function and before the opening parenthesis.

Do you have any questions concerning the IBM PC or compatibles? Send them to The Help Screen, PC World, 555 De Haro St., San Francisco, CA 94107, or electronically to CompuServe 74055,412 or The Source STE908. ●





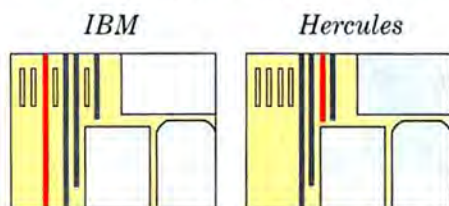
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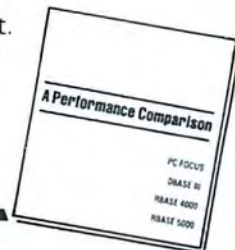
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Circle 331 on reader service card



# A Beginner's Tale: The Long Green Path

*Kevin Strehlo*





## Chapter 1: An Evil Signature in the Azure Sky

I was in a deep trance, alone aboard my houseboat, alone in front of my PC, alone in some unknown place of utter blackness. I could see nothing, feel nothing, hear nothing, taste nothing, smell nothing. Then I detected a faint sound, a beep. It beeped again. It must be Ford Prefect, I thought, trying to signal me with the sub-Etha signaling device. With the third beep I came bursting up out of my trance. It was the deck alarm I had rigged up to my PC's cassette port; someone had stepped aboard *The Crashed Disk*.

The intruder could have been anyone: my friend Heyer wanting to borrow my 2400-bps modem, a marina neighbor looking for help on a

1-2-3 macro, or a neighborhood kid eager to play a hair-raising game of *Lode Runner* on my AT. Or real trouble: someone with a buggy *dBASE* program. As the local PC guru, I get all kinds.

I walked past the galley and the starboard laser printer, then through the lounge to the doorway that opens onto the sheltered deck aft. She squinted down at me out of the bright Caribbean sun. The gray-striped business suit she wore was conservatively cut, but it couldn't conceal the kind of figure we used to make printouts of in college. That was when I was a foolish young hacker, before bit mapping, back when graphics were done with X's and O's.

She looked at me uncertainly. "You must be Travis McByte," she said. I nodded. "Heyer said you might

(continues)





be able to help. I manage a quick-print shop called Printorama, one of a chain of two. We decided to look into buying a PC, so I went to this computer store and ... I ... it was just so ... that is ...” She tortured her lower lip with glistening teeth and said nothing.

She didn't have to. I'd seen this kind of action too many times to count, and I could see it now: The blow-dried salesman swoops down on her across the static-free carpet, claws extended. At the mention of the word *business*, he starts talking about 20 mega-this and 4.77 mega-that. Then he shows her *Symphony*. Her eyes glaze. She asks what kind of software would be good for a growing printing business. *His* eyes glaze. It wasn't a pretty picture.

“You don't have to tell me about that,” I said. “It must have been traumatic, Miss, uh ...”

“Mrs. Disque.” I shrugged philosophically. “But you can call me Rama,” she continued. I pulled two Classic Cokes from the fridge and motioned for her to take one of the Scandinavian chairs on the deck. She watched me strangely as I sat on my knees, then shrugged and followed suit.

I lit my pipe. “Okay, tell me about it from the beginning ... slowly ... and don't leave anything out.”

She paused, breathed deeply, and began. “Well, there are a lot of things in a small family-owned business that just don't get done, so we decided it was time to computerize.” I nodded

pleasantly, but I didn't like the sound of things. Just what I needed—another novice who thinks a computer will completely turn the business around. “The company is at the point where we either have to stay mom-and-pop or do some organizing. But my poor husband, Virgil, is so busy running the main shop he doesn't have time to do anything else. And then last week one of our salespeople landed a big new job ... a four-color catalog, four times a year. Virgil tried to talk us out of it, said we were in over our heads. So we had this silly fight ...”

“Uh huh.” Hmm, marital troubles, I thought, but then checked myself: Stay away from it, McByte. The last time you messed around with a married woman, you ended up sneaking home barefoot over sharp coral. But that's another story (*The Cuckold Broods Violet*).

“Well, Virgil finally agreed, but I could see his point. We just aren't prepared for this kind of thing ...” My mind drifted as I watched some thunderheads roll in from Cuba, but Rama was still rattling off her litany of problems. “You see, we've never done four-color work or 11-by-17 sheet feed, so we have to buy a new press, and there's no room for it in the shop, so we have to knock down a wall—if the suite next door isn't leased before we can make the arrangements. And it means buying a couple



of new fonts for the photocomposition machine, and finding a company that does good, cheap color separations . . . " I nodded and smiled nonchalantly, as if getting the pieces of a complex project to come together on time was nothing tough. "Of course, it will all be up to Virgil to get it done, and the first catalog is due the first of September."

I had heard enough. "Then I better get him started right away," I said. "Where is your husband now?"

"Shooting the plates and running the press. I don't know where he's going to find the time to learn how to use a PC." Rama started pacing the deck disconcertedly. I'd seen nervous clients before, but this babe took the cake. She was scared of something. "Oh please, Mr. McByte, can't you just decide what he needs and set it up for him?"

"It's not that easy, I'm afraid," I cautioned. "If you let me do all the work, then I'll become indispensable to you, and I don't think you'd be able to afford it. Didn't Heyer tell you my rates?"

"He told me," she said, still pacing, "but I don't think we have any choice. I'll level with you, Mr. McByte. Quick and Dirty Printing just opened an outlet in town, and we can't compete with a big national chain the way we run things now."

Rama sunk into one of the chairs and buried her face in her hands. "Hey look," I said, uncertain of what to do. "It can't be all that bad. These

chain operations aren't always what they're cracked up to be."

"You don't understand, Mr. McByte," she said sharply. "Last night I got a very frightening phone call. Maybe it was a prank, but they said unless we sold our business to Quick and Dirty, we'd pay for it. When I asked who was calling, all they said was 'South,' and hung up."

It was my turn to stand up and start pacing. This was turning out to be some case.

"We've heard how Quick and Dirty operates," she continued. "They'll offer cut-rate prices, low enough to drive us to the edge of bankruptcy. Our only chance is to expand so we can achieve some economies of scale. But Virgil's dead set against it. Sometimes I think he's ready to give in before the fighting's begun. We need help. Please—help us, Mr. McByte."

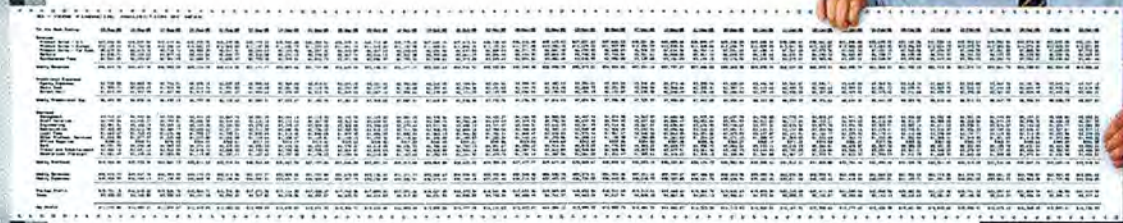
I sized her up for a moment. Desperation meant big bucks, but for how long? Especially with her husband against me. I knew from experience that in a bankruptcy, the consultant is always the last one to get paid. It didn't seem promising, but I needed the work and she was awfully easy on the eyes.

"Look, your first step is project management, but it's just a tool—not magic. And if your husband can't find

*(continues)*



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the time to set it up, maybe you should give it a whirl yourself." I paused and gave her the famous McByte smile. "In which case I could arrange for some private lessons, starting, say, this afternoon?"

Rama looked startled. "I don't know, Mr. McByte. I'm a graphic artist, not . . ."

"It's really not that bad once you get your fingers on the keyboard," I said, turning the irresistible McByte smile all the way up. Mrs. Rama Disque looked at me with an expression between disgust and distrust. I'd seen it before—disgrust.

"Okay, Mr. McByte, I'll do it, but let's get one thing straight. If I'm going to pay you by the hour, I want to learn computers and just computers. No funny stuff. And stop smiling like that—it drives me crazy."

The skywriting biplane that droned down the coast every afternoon had begun to puff out the name of whatever suntan lotion company had hired it for the day.

"Look at that," she said, pointing skyward. I'd seen it before, so I didn't. Besides, I couldn't tear my eyes off Rama. "Have you heard that joke about being a proofreader for a skywriting company?" she asked. "Looks like these pilots could use one. Can you believe it? They're putting two o's in *Copperto* . . ." Her brow wrinkled, and her voice trailed off. She continued to stare at the sky.

"Are you all right?"

She pointed dumbly upward, and I forced myself to look. The words *Cooperate, Rama* were just beginning to dissipate, and the plane had circled back to spell out a second line: *Sell out or Virgil gets it*. It came back for a third pass and left an evil signature in the azure sky: *Quick and Dirty*. Then it disappeared to the south.

"How did they know you were here?"

She shrugged. "I have no idea. I don't think anyone knew I was coming here except my husband."

My mind started to click into detective mode. After all, PC consulting and gumshoeing weren't all that different. It was only a matter of scale. So her husband was the only one who knew. Was the threat for real, or was Virgil in cahoots with Quick and Dirty?

"I've got to warn Virgil," she said, backing away.

"I don't think that's such a good idea," I told her. "Look, they may play hardball, but they're not going to kill anyone. Besides, you've got a witness now, if they try."

"So what *am* I supposed to do?"

I pointed toward the dark cabin of *The Crashed Disk*. "It's time for your first lesson. I'd like to introduce you to a good friend of mine called DOS."

(continues on page 149)



# Seeing the Project Through

Whether you're building a garage or implementing a new sales strategy, the principles of project management—enhanced in a variety of PC software programs—can help guide you down the critical path to success.

*Harvey A. Levine*



John A. works for a Fortune 500 engineering firm and is overseeing construction of a nuclear power plant in Brazil. John B. works for a midsize marketing firm and has been assigned the job of enhancing the public image of a Silicon Valley electronics company. John C. runs his own small typesetting and design business and must relocate the five-person firm to a new building by the end of the month without interrupting business-as-usual. And John D. is a freelance photographer who plans to convert his garage into a studio and darkroom.

What do the four Johns have in common, aside from their first name? Although the latter two may not realize it, they are all project managers so far as the work at hand is concerned. Each is responsible for achieving a specific objective within certain time and cost limitations—from building a power plant to converting a garage. And though the projects themselves may have little in common, the procedures for planning, controlling, and implementing them share many characteristics—the grist of project management.

Thanks to the availability of a plethora of project management software (more than 100 packages are on the market), many people with no claim to expertise in the discipline are finding that their PCs can

**BASELINE PLAN**





Critical Path

Project  
define:

tasks  
objectives



TRACKING

g Phase

ntation

ontrol Elements

Work Breakdown  
Structure

Network Analysis

Work Packages

Program Evaluation  
Review Technique

Resource Aggregation

Optimization

Variance

Complete

Milestone

Schedule

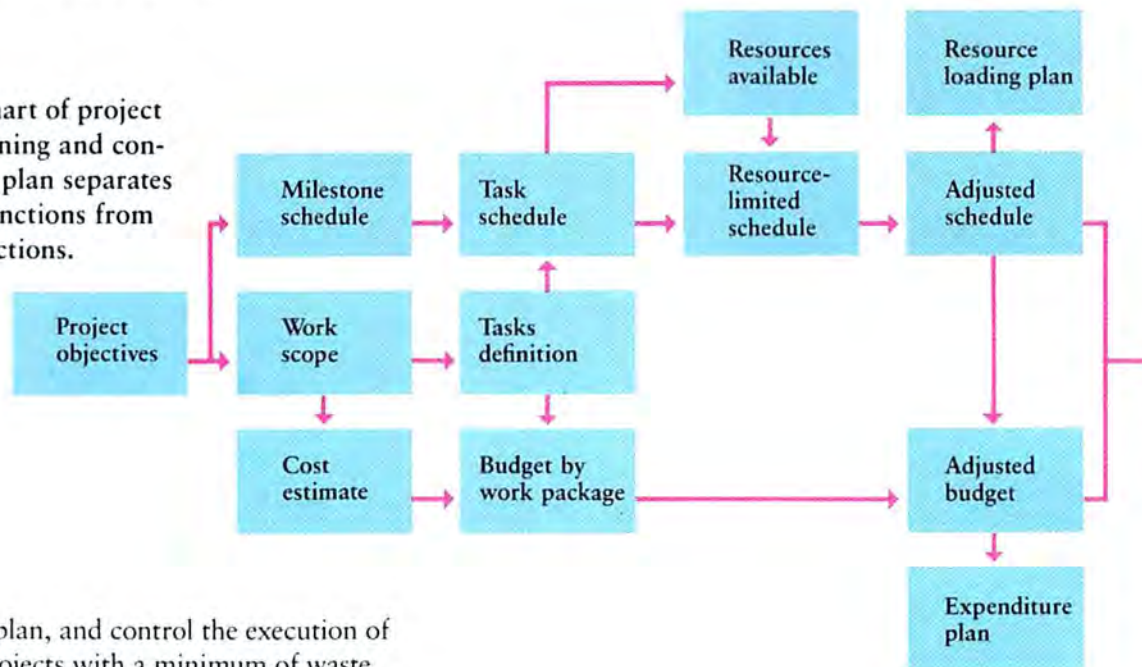
Hierarchical Planning

Scheduling

Mayzetta '86



Figure 1: A flowchart of project management planning and control. The baseline plan separates planning phase functions from control phase functions.



help them define, plan, and control the execution of major or minor projects with a minimum of waste and a maximum of efficiency. However, even a cursory understanding of the basic principles of project management will go a long way toward easing the task of selecting the appropriate software and putting it to its best use.

### What Gets Managed

From the perspective of project management, a project is a group of tasks to be performed in a limited time period to meet a specific set of objectives. A project is likely to be a unique, one-time operation with a limited life cycle; it will have a work scope, or framework, that can be broken down into definable tasks; it will have a budget for its execution; it may require the utilization of multiple resources, many of which may be in short supply and have to be shared with other projects; and it may require the establishment of a special organization.

Obviously, the management of projects requires a very different approach than a continuing, open-ended operation. General business management concentrates on productivity-oriented, time-phased measurements: How many widgets did we manufacture this week? How does that compare to last week? How does it compare to the same week last year? What were our applied person-hours for this week versus last?

Quality and human resource factors, of course, are also measured in general management: What is our reject trend? Has our employee satisfaction index improved? What is the trend in customer satisfaction?

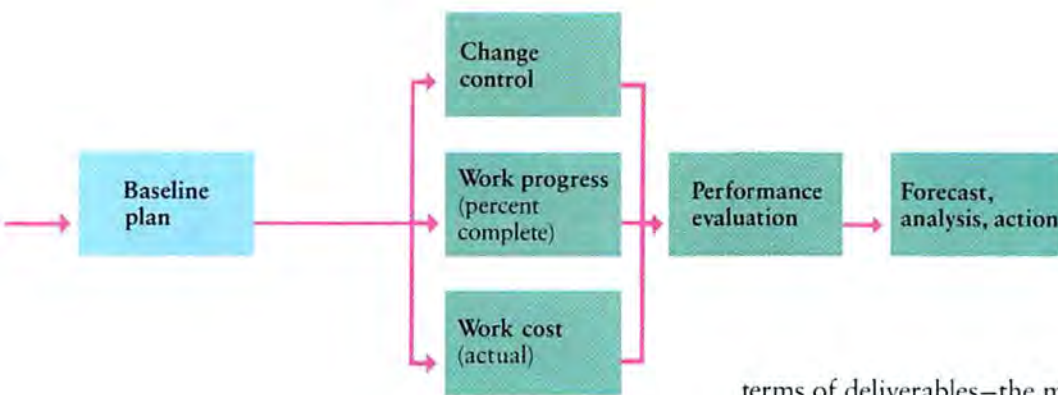
However, a project manager faces other concerns. Traditionally, he or she is not directly responsible for staffing and must use and direct resources from other divisions or companies. Also, the project manager must base budgetary control and labor primarily on the accomplishment of the defined work rather than on periodic time frames, such as quarters. The project manager may also categorize reporting and measuring by the various sections of the work (by work breakdown structure, deliverables, physical regions, cost accounts, resources, and the like), as well as by the traditional functional divisions, such as the progress of construction, engineering, and graphic design.

Project management software supports the planning and control of such elements as the work scope, or contents, of a project; the time frame; human and other resources; cost; quality; and communications. Each of these elements requires a plan, which becomes the basis for control.

### Planned Projecthood

Project management can be broken down into two phases: the planning of the project, and its implementation and control. The planning phase begins with the establishment of the project objectives and a clear definition of the tasks required to achieve those





objectives. The timing of the various tasks may then be determined, taking into account the required and available resources (such as labor, equipment, and materials) and their cost. These factors should lead to the establishment of a cost baseline, or target, which should be carefully evaluated, optimized where possible, and then frozen as your baseline plan.

All the steps following the baseline plan are parts of project management's implementation and control phase. Once work is begun on the first tasks, the manager should periodically track actual progress and costs, comparing those measurements to the corresponding targets in the baseline plan. The plan provides a basis for evaluating actual project performance, forecasting future performance, and developing corrective actions where necessary.

### One Step at a Time

Using the flowchart in Figure 1 as a reference, you should be able to plan any type of project, major or minor, and track your performance against your plan by following some time-tested procedures.

*Establish the project objectives.* This first item is often missing from discussions of project planning and control. But obviously a plan is developed to support a set of objectives, and these objectives should be defined in the general terms of duration, budget, and so on. More important, they should be defined in

terms of deliverables—the major components of the project. For instance, for the introduction of a new product, the deliverables could be the packaging, advertising, test marketing, and of course the product itself.

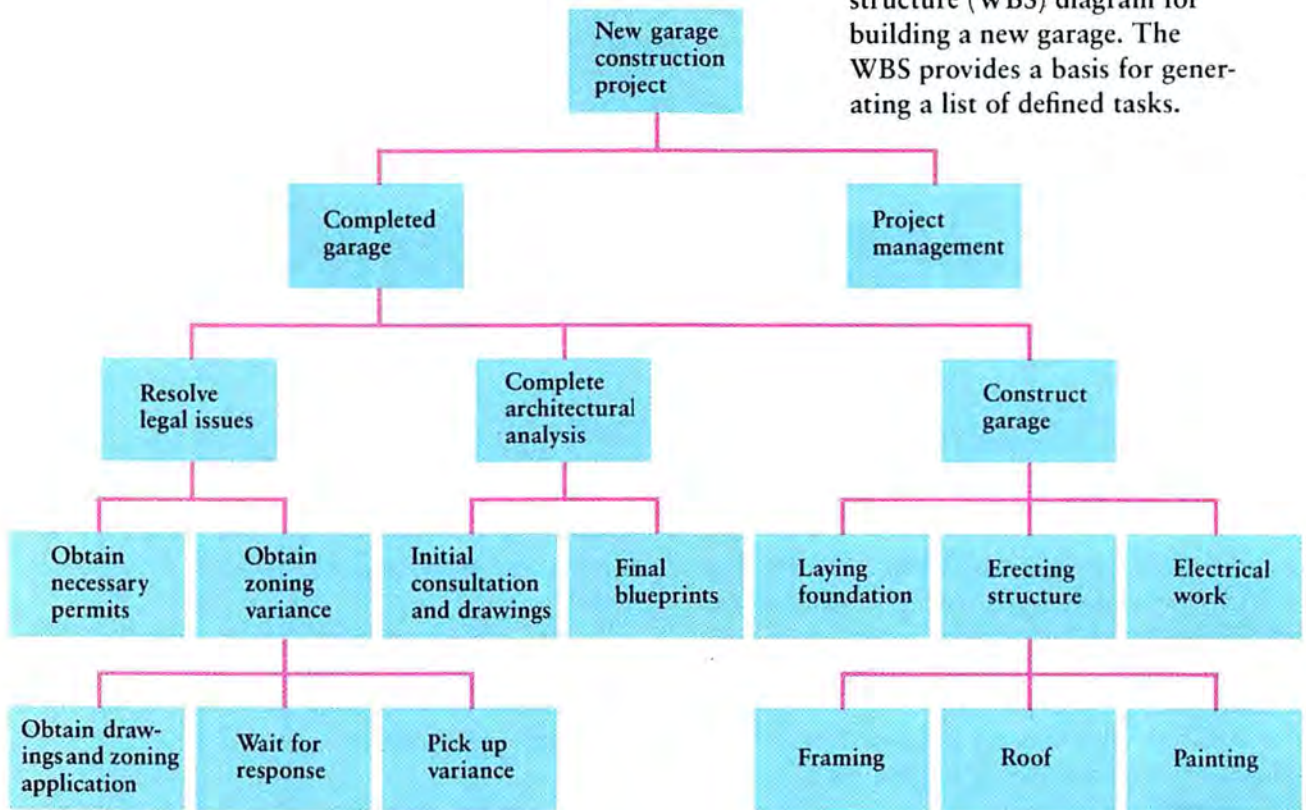
*Define the work.* After defining your objectives, you will move toward the final baseline plan along three parallel paths—defining the work to be done, the resources and budget for that work, and the timing.

A popular and useful approach toward defining the work scope is called the work breakdown structure (WBS) (see Figure 2). In this approach, also known as a hierarchical planning system, the project objectives are placed at the top of a diagram as deliverable end items. Each top-level segment of the project is then subdivided into smaller groups in a manner similar to that of typical organization charts. The work breakdown continues until you have groups of tasks that would constitute a natural set of events. These smallest groups are often called work packages. A hierarchical numbering system is generally used to facilitate the summarization, or rolling-up, of the quantitative data (costs and person-hours) through the various levels of the WBS. A multipart numbering system can be used to include codes for roll-up in other categories, such as department codes.

Those responsible for accomplishing the work review each work package in order to establish a set of task definitions. There are many ways to arrive at this necessary list of individual tasks. The WBS approach has many advantages, including better organization of the work, eliminating reinvention of the wheel, and use of the WBS as a checklist. A list of the tasks is then used as a basis for scheduling, resource planning, and budgeting. This portion of the project planning process can easily be done with pencil and paper and does not require a computer.



Figure 2: A work breakdown structure (WBS) diagram for building a new garage. The WBS provides a basis for generating a list of defined tasks.



Source: Microsoft Corp.

*Define the project schedule.* Target dates and timing objectives should be processed into a project milestone schedule (see Screen 1). This should be a clearly readable one-page document that presents the major milestones in the project schedule, such as “completion of foundation” in a construction project, or “completion of packaging design” for a new product. The level of detail should be one step greater than the schedule of deliverable end items but usually not more than about 40 line items.

Now, with the milestone schedule and the list of tasks generated by the WBS in hand, you can take a first cut at developing a detailed schedule of the tasks needed to complete the project. This schedule can be based on either time factors or resources. The more common basis is time—the duration-driven approach. Working with your list of tasks, you will add the expected duration for the execution of each task, such as “purchase mailing lists” in a direct mail project.

Next, you’ll identify the relationship of each task to every other task on the basis of precedence—which tasks must be completed before others can

begin. Methods of doing this are numerous, although they all aim at the same objective: to enable the computation of the earliest start and finish times for each task based on the task’s duration and its logical relationship to other tasks. This computation is usually performed by the computer and is referred to as the network analysis: literally, an analysis of the interrelated network of tasks showing their time-phased logic and the critical path—the set of activities leading directly to the earliest project completion date.

The network analysis should show three sets of date and time computations. The computer program first makes a forward pass, tracing the tasks through the defined precedence logic, counting the durations, and calculating the earliest start and finish dates for each activity. It then calculates back from the last task identified by the network analysis to determine the latest that each activity can start and finish without delaying the overall project. Finally, it should compute the difference between the calculated early



## Chapter 2: The Project Turns Gold

That afternoon I subjected Rama to baptism by fire with my favorite project management program, but by the time I got around to explaining the difference between a PERT chart and a Gantt chart, I knew I was losing her.

"But what does this have to do with my project?" she asked impatiently. "I just want to know where to start."

There wasn't anything to do but load up my trusty old outlining program. It had gotten me out of more jams than I could remember. "Here," I said, "just type in everything you need to do. Then you can rearrange it later."

Rama immediately grasped the familiar form of the outline, and soon she was typing away, stopping every now and then to add a subheading somewhere or rearrange the order of the tasks she needed to handle the job. When we reached the point where she was ready to enter the elements of the outline into the project manager and start generating a resource table and a Gantt chart, I decided we should stop for the day. If she studied the manual overnight, the concepts would be easier for her to handle. Besides, I still needed to toughen her up for facing that PC salesman.

We retired to beanbag chairs and cocktails on the upper deck, and I filled her in on some of the buzzwords he would throw at her the next day. I finished up with my standard pre-purchase lecture. "Just make sure you ask him to show you everything," I concluded, peering intently at her over the top of my sunglasses. "Don't count on his word for anything."

As we finished our drinks and watched the crimson sunset, Rama confessed that she had a case of the jitters. The phone call and the sky-writing episode had shaken her. "Maybe I should turn this whole PC business over to our new apprentice, Richard Dixie?"

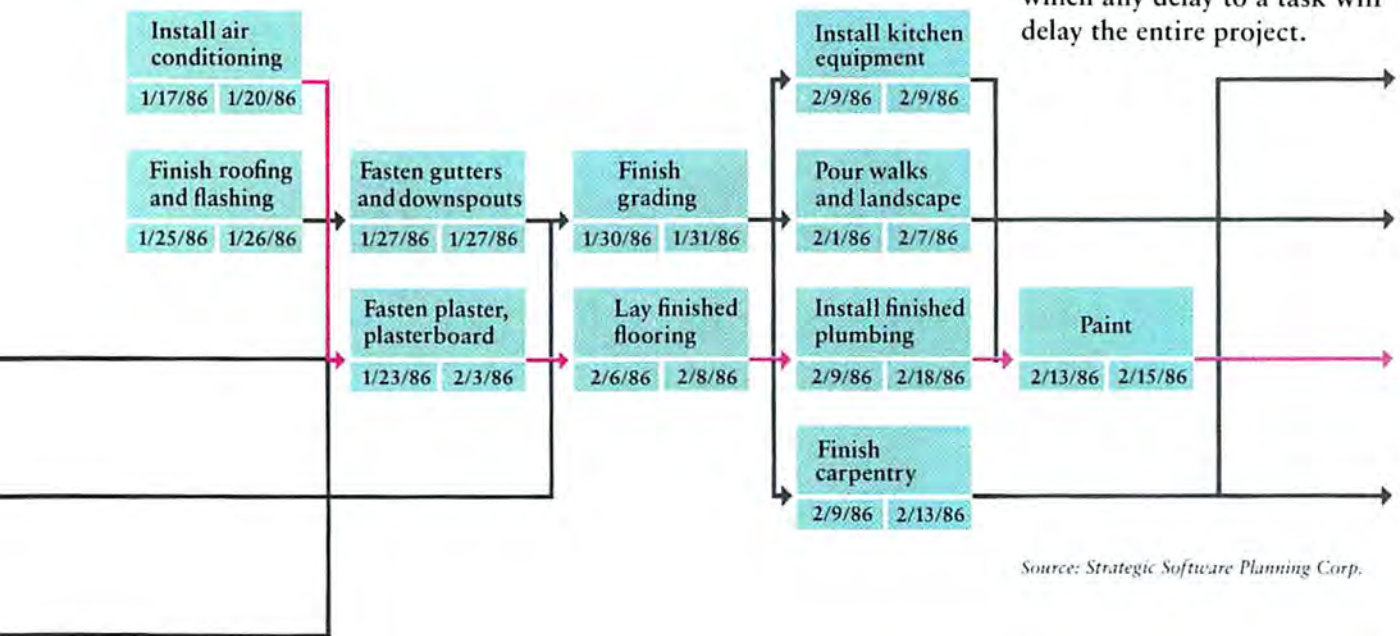
"Dixie?" I said. "You never said anything about an apprentice."

"We just hired him last week," she told me. "He says he knows computers, and yesterday when we decided to buy the PC, he volunteered to take the whole business off my hands."

I didn't like the sound of that. I told myself it wasn't just because I liked staring into Rama's brown eyes

*(continues)*





Source: Strategic Software Planning Corp.

dates and the calculated late dates to determine the float (or slack) time for each activity—that is, how much time flexibility exists for each task. Obviously, the less the float time on any activity, the more critical that activity is to the timely completion of the project.

The task schedule can be displayed in three typical formats: a tabular listing; a bar (Gantt) chart, which shows a graphic representation of work timing; and a network diagram—a graphic presentation of the work relationships (see Figure 3).

If you use a resource-driven task schedule instead of the duration-driven schedule, the precedence relationships are still required. But instead of identifying single-task durations, you identify the labor resources required to perform each task. This entails the quantification of the total person-hours required for each resource to do the task, and the allowable crew sizes. The computer can then determine task durations. The overall result is the same as with the duration-driven schedule. It is a common practice to

create a duration-driven schedule first to get an idea of the best schedule attainable without resource limit considerations.

*Establish the resource availability and requirements.* Again, working with the list of tasks, itemize the resources (labor, materials, services, and so on) required for each task. If you have developed a schedule for these tasks, you can now get an indication of the total resources required to execute the job on a period-by-period basis. It should be a simple matter for the project management software to produce resource histograms, or bar graphs, as in Figures 4 and 5. If you can define the resource availability, such a graph will note when the required resources exceed these limits. This function is called resource aggregation or resource indication.

*Establish a cost baseline.* To control costs, you will want to establish a budget for each task or group of tasks (work package). Again, this means going back to the WBS (for work packages) or the task definition list (for individual tasks). At the task level, the budget can be established by determining the resources for each task, the cost rate for each resource, the duration of each task, and the fixed costs.



*Evaluate the baseline plan.* Chances are good that your baseline plan will require some adjustment in order to meet the project time, cost, and resource objectives. The major adjustment area will be resources. It is very likely that your first cut of the schedule will produce a resource utilization profile having significant peaks and valleys, as shown in Figure 4. This is an inefficient and costly condition and may not be supportable by your labor sources. You will want to smooth out the resource profiles, which means rescheduling activities that can be moved without creating delays to the overall project milestones. You may need additional resources, more work hours per week, or adjusted relationships in order to meet the overall timing objectives.

*Optimize the baseline plan.* To accomplish this, you may need to engage in some "what if" processing, especially in juggling the schedule of those activities with float. If the schedule is tight or indicates late completion, the resources, workweek, and relationships of the most critical activities should be examined for potential adjustment or expediting.

If you have resource peaks and valleys, the program may be able to level the resources by moving the more highly loaded tasks that have positive float to periods of lesser demand for that resource (see Figure 5). You may also wish to set a utilization limit on certain resources so that the program can calculate a revised schedule and project completion date.



Screen 1: A milestone schedule for a major manufacturing project produced using SuperProject Plus from Computer Associates. Red indicates critical milestones, and blue indicates noncritical milestones. Other colors and symbols show float and delays.

as she looked at the computer screen. "What do you think the 'personal' in PC is all about?" I asked her. "It just doesn't make sense to be dependent on some kid to run your computer. What if he decides to leave? What if he isn't trustworthy?"

"Oh, no, Richard's as honest and hardworking as they come. He's always taking notes about the business, peering over my shoulder as I work, trying to learn everything he can. You know, it's funny, it's almost like he already knows the printing business, but that's silly. If he knew the business, why would he want to become an apprentice?"

"Maybe he's on the lam, just needs to pick up a few bucks," I suggested, half facetiously. "You know as well as I do how many shady characters pass through Key West."

"That's ridiculous," Rama laughed. "But maybe you're right. Maybe I should handle this thing myself. I could use the challenge."

"Don't worry," I told her. "You'll get it."

"We better get Virgil down here for a few lessons too," she said.

"Great," I said. Just what I need, I thought, as I walked her out to her car. Oh well, a buck's a buck. I just hoped I'd be alive to spend it.

(continues on page 177)



Optimization is an iterative process. It's aimed at balancing the various means at hand to come as close as possible to a baseline plan that meets the project's overall objectives and is acceptable to the project team.

*Freeze the baseline plan.* If you are going to exercise project control, you must be able to compare the project progress to the plan. Therefore, once you have developed an acceptable project plan you will want to save it for further reference. Some programs allow you to label one or more "target" schedules. Otherwise, you will want to save the baseline plan and do your updates on a copy of that plan.

*Track the work progress.* Tracking the project in the execution phase entails recording how much work has been done, what resources were utilized, and what costs were incurred. You should note when each task starts and finishes. In addition, you will periodically need to record the current status of in-progress activities in terms of remaining duration, expected completion, or percent complete. Tracking the work progress also entails amending the network plan and budgets to account for any changes in the work scope.

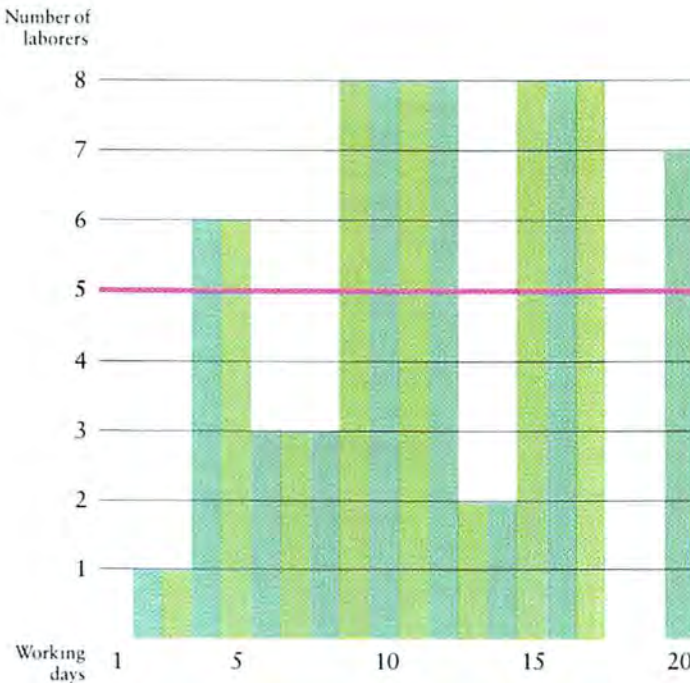


Figure 4: This resource histogram shows an unlevelled allocation of workers over the course of the project.

*Track actual costs.* Once the work is initiated, you will need to track the actual costs incurred. Ledgers should be set up for tracking cost commitments (as in purchase orders or labor contracts) and for recording actual (invoiced) costs. Tracking committed costs against the budget provides an early warning system for cost overruns. Some systems track only actual costs, which may produce cost performance data too late for corrective action.

*Compare progress and costs to the baseline plan.* Tracking progress and costs does not constitute control. Project control involves many steps, leading to corrective action directed at achieving the project objectives. In this progressive action, the first step after collecting progress data is to measure that progress against the target schedule. Two measurements should be monitored. The most obvious is the project end date calculated by the network critical path. Any delays to activities on or near the critical path could result in a schedule delay. You should also observe the general progress of the noncritical activities. If enough of these fall behind, you can assume that the lower production rate will eventually affect the critical schedule dates. Project control systems that measure production rates and earned value will facilitate this appraisal of schedule variance.

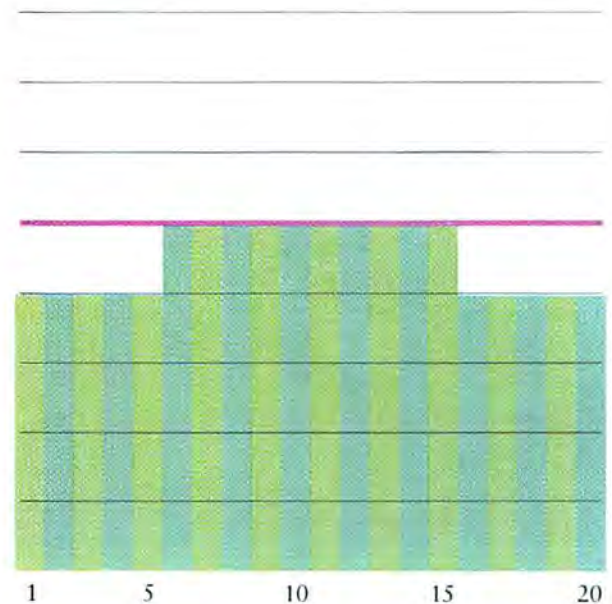


Figure 5: In this resource histogram the labor force has been leveled to smooth out, or stabilize, crew sizes and limited to a maximum of five persons.



In the case of completed activities, comparison of actual cost to budget for each activity is sufficient. However, for in-progress tasks, effective measurement of actual costs and comparison to the budget must be based on the earned value principle. The earned value for any activity is simply the activity budget times the activity percent complete. The biggest advantage of the earned value method is that it reduces all data to a common denominator of dollars. This makes it easy to summarize performance data at any level and by any coded grouping.

*Evaluate performance.* People whose careers may depend on the success of a project keep a sharp eye on two primary measurements. One, of course, is the project completion date. The other is the project profit margin. These measurements are a composite of individual task measurements. While performance is measured by specific period data, trends uncovered by tracking performance over several periods will be the most revealing. A dip in production rate or a spike in costs for a particular period may only be a matter of measurement fidelity or timing and should not be cause for alarm. But to ignore such perturbations over an extended period is to court disaster.

The most important condition for performance evaluation and trend analysis is consistency. Again, the computer is a major aid to that end.

*Forecast, analyze, and recommend corrective action.* Forecasting is merely an extrapolation of past performance tempered with the latest knowledge and judgment. There are, however, several approaches to this computation. The cost forecast is generally expressed as the "forecast to complete" (FTC), or the "forecast at completion" (FAC), which is the FTC plus actual incurred costs. A good summary of the FAC is most important, as top management watches this piece of project performance data more than any other.

All these functions are of little value unless they contribute to the attainment of the project objectives.

A good plan coupled with accurate, dependable progress tracking and followed by objective forecasting and analysis is the necessary recipe for a successfully managed project. Being able to develop alternatives for corrective action and to back up any recommendations with a presentable project story are equally essential.

## Choosing a Program

Selecting appropriate project management software from the scores of available programs begins with understanding your needs. If you only need to prepare proposals or baseline plans, then you can use programs that do only planning. But if you need to control a project, you need a system that provides for progress tracking and comparison to the plan.

To support project management's control function, a program should be able to save a version of your project (the time frames, resources, costs) as a baseline or target plan, or be able to freeze the target plan for comparison to current status and actual expenditures. A means of comparing the current performance to a benchmark is especially important.

The program should allow you to enter actual dates without overriding the target dates. Likewise, it should enable you to revise task durations or remaining durations without those entries overriding the target dates.

The ability to record actual costs and resource utilization periodically for comparison to the plan is also critical to controlling projects.

Good, hard-copy tabular and graphic reports of the project plan and progress may be important to many project managers, especially for reporting to upper management and to clients. Plotter capability, for Gantt charts, network diagrams, and resource/cost histograms, can be a considerable asset.

Finally, available project management software varies greatly in the number of functions provided and the user expertise assumed. Some programs are best suited to the novice planner, while others offer sophisticated planning and control functions that demand more than a passing knowledge of the subject. Choosing the right program for the project at hand—and for the manager in whose hands it will be planned and executed—is the first critical step on the path to successful project management. ●

*Harvey A. Levine is a senior project control specialist for the General Electric Company and chairman of the board of the Project Management Institute. He is the author of A Guide to Project Management Using Microcomputers, due from Osborne/McGraw-Hill in May 1986.*



# Project Planning on a Human Scale

You don't need to be the designer of the Trident sub to benefit from a project manager. Poor planning on any project can result in high employee turnover, inferior workmanship, and ultimately the failure of the project or your business. Here, SuperProject Plus takes on the work flow at an ad agency.

*Cindy Hamburger*

**|||||** In the 14th-floor offices of Adman Ad Agency, a group of graphic artists and copywriters sit idly sipping coffee and chatting. As the project manager in charge of Creative, you walk by and can't help but eavesdrop.

"We could either design Janice's wedding invitations or go shopping," says one of the graphic artists.







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FRI  
6



"I heard there's a sale at Macy's," a copywriter suggests.

"This is getting a bit absurd," says another. "Our fourth day without work. I thought we were the top-selling display agency on the coast. Last week they had us working 10-hour days for seven days straight, and this week, zilch. Can't they plan these things better?"

"Yeah," says another. "I've missed 'Dynasty' four weeks in a row."

Morale is getting pretty bad. You go back to your office to contemplate your employees' dilemma. You recall another conversation you overheard between a few account executives who were boasting about the huge designer jeans promotion contract they expected to land next week. Why not plan for it now, you say to yourself. If the contract comes through you'll be ahead of the game, and if it doesn't, little will have been lost. Besides, it would give you a chance to use that new project management program you ordered. Bravely, you clear your desk of crossword puzzles and tear the cellophane wrapper from your new copy of *SuperProject Plus*.

### ■ A New Regime

Projects can be designed and implemented on one of the many project management programs available for the PC, such as Project Software & Development's *Qwiknet*, Microsoft Project, and Breakthrough Software's *Time-Line*. These programs, spin-offs of earlier mainframe programs pioneered by big defense contractors, stress traditional, task-oriented project management.

They are aimed at the expert project manager who needs to schedule thousands of interrelated tasks. But the complexity of these programs leaves the manager of smaller projects, made up of relatively few tasks, out in the cold.

Until recently no software was available for managing a small project or a small staff. But now a second level of project management program has been created for the small business manager who organizes the day-to-day activities of a small staff. For the first time software is being developed that recognizes people as the primary resource of a project. Resource-oriented project management concentrates on the dependent relationships between people and the tasks they perform, and it excels in demonstrating how to manage both effectively – a process particularly well suited to small, labor-intensive businesses.

*SuperProject Plus*, a project management program distributed by Computer Associates International, is a prime example of the new wave of scaled-down project managers. Although the program is RAM resident and has the capacity for handling an unlimited number of tasks and resources, *SuperProject Plus* remains a simple and practical management tool for even the smallest projects.

### ■ Defining the Project

Like most project management programs, *SuperProject Plus* is based on the critical path method (CPM). A critical path is the sequence of dependent activities or tasks in a project from beginning to completion. The path of tasks is literally critical because any delay in the sequence will delay the whole project. The

common goal of all projects is to complete the job with the least expenditure of time, resources, and money and to yield maximum return. If time schedules fall apart, expenses mount and profits vanish.

The first rule of project management is that a project must be time limited. As the project manager, you will first need to estimate when you can start work on the project and then how long the project should take. You know from experience that creating an ad campaign like the one you'll do for the designer jeans contract takes approximately two weeks from conception to presentation. Therefore, two weeks, beginning on the day you get the account, is the estimated life cycle of the project.

Although implementing a project takes the bulk of the time, the planning stage is the most critical and results in the biggest payoff. You have already begun the planning process by determining the project's life cycle, but a few more elements must be considered before you can begin using your project management program.

Every project has one or more tasks (perhaps thousands) that must be completed to reach the goal. The best way to organize these tasks is to sit down with pencil and paper, a word processor, or an outlining program and dissect the project into small, chewable tasks. Screen 1 shows the initial breakdown of tasks for the Adman Agency project using the *MaxThink* outlining program.



Next you will need to estimate how long each job will take, how many people the job will require, and, if applicable, the costs. Screen 1 shows the time allotted for each task in hours and days and the resource allocated to each task. One major advantage that project management software has over planning on paper is the ability to compute subordinate details such as vacations, partial work-days, and half-time workers into the work schedule. Once you have collected this information, print out your outline for reference and load *SuperProject Plus*.

### Persevering With PERT

To begin using *SuperProject Plus*, set the system clock with the DOS Date command using April 1, 1986, as the project's start date. Type **SPJ** to load *SuperProject Plus*. The program starts in Beginner's mode, but you can change to Expert mode once you become more skilled. Move the cursor with the <Space> bar so that the PERT Chart option is highlighted.

The PERT (program evaluation and review technique) chart, alternatively called a network chart, an activity chart, or a critical path chart, is the easiest method for entering data. When you create your project on the PERT chart, each task appears as a task box that contains details of the project. The task boxes are linked to one another, indicating their relationships (see Screen 2). When you are finished, you will have a graphic representation of all the tasks necessary to complete the project and the logical sequence of execution.

To begin entering data, press <F3> (Create a Task) and trans-

fer the information from Screen 1 into the task boxes. *SuperProject Plus* automatically assigns each task a name (Task 1) and a number (001). Although you cannot change the task number, you can change the name. Type **Concept**, the name of the first job from Screen 1, into this field. If, against all recommendations, you prefer not to title the task, press <Enter> to move to the next field.

The next field applies to the assignment of resources to each task. You can leave this field blank by pressing <Enter> if you are not tracking resources, or you can add resources later. Type **Resc-1** to indicate that one employee is to be associated with the task of conceptualizing the ad. You have estimated that devising a reasonably sound concept should take 10 hours, so type **10H** in the next field. Repeat this procedure, selecting <F3> (Create a Task) for the remaining six tasks.

### Linking Tasks

The next step is to link the task boxes to determine the order in which they must be started and/or completed. Look at Screen 1 again. Some tasks must be started or finished before others can begin—for example, text cannot be typeset before it has been written and edited—whereas other tasks can be performed in tandem with one other; for example, an artist can design while the copy is edited.

To establish the order of (or link) the first two tasks, press <F4>. When you see the prompt on the bottom right of your screen 'Link from ... to ...', type **1** (Concept), press <Enter>, and type **3** (Write/Edit Copy). Continue this pattern and link the remaining tasks in the order listed: Link 2 (Design) to 5 (Create Art), 3

```

Uses of MaxThink*
→ 1 Concept*
    Resource 1, 10 hours*
  2 Design*
    Resource 4, 5 hours*
  3 Write/Edit Copy*
    Resource 2, 3 days*
  4 Typeset Copy*
    Resource 3, 2 days*
  5 Create Art*
    Resource 4, 2 days*
  6 Layout/Paste-Up*
    Resource 4, 2 days*
  7 Presentation*
    Resource 1, 5 hours*

EDIT: Jain      Annotate  Delete  Find  Get  Insert  Help
      Overtime   Put      Replace  Single_conn  Undo
Return to main-menu
                        PATH: 0.1                      323080 Bytes MAXTHINK: sample1
  
```

Screen 1: An outline of task details for Adman's designer jeans ad project created with MaxThink, an outline processor



(Write/Edit Copy) to 4 (Typeset Copy), 4 (Typeset Copy) to 6 (Layout/Paste-Up), 5 (Create Art) to 6 (Layout/Paste-Up), and 6 (Layout/Paste-Up) to 7 (Presentation).

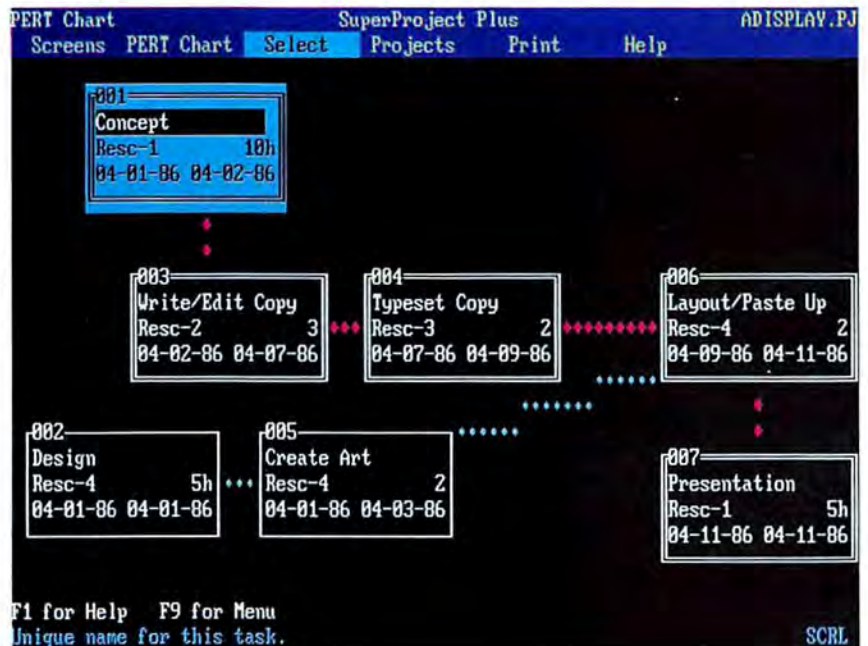
Notice that the start and finish dates for each task are calculated automatically as you enter their dependencies. *SuperProject Plus* calculates the earliest possible start and end dates based on the dependencies and estimated durations. Sometimes the start of one task depends on the start of another, or the finish of a task depends on the finish of a preceding task. The program lets you define these relationships in the Intermediate mode. If you make an error linking tasks, press <F9> from the PERT Chart main menu and select Unlink Tasks.

To print a copy of the chart, move the cursor to the Print option on the main menu. Select Screen to indicate that you want to print only what's on the screen, turn on the printer, and let it roll. Your printout should look like Screen 3.

### Dates, Deadlines, and Details

The next step is to calculate deadlines and customize employee work schedules. Look at the PERT Chart printout and analyze the cycle of the project. The longest path, from Task 1 to Task 7, determines the duration of the project; in this case, the jeans ad campaign project should take a total of 11 days. This is the critical path of the project, since any delay of a task on this path will delay the en-

Screen 2: The PERT Chart menu with pull-down options and a sample of two tasks linked by the critical path



Screen 3: The completed PERT Chart showing all tasks, resources, and durations of the original project plan



Press the <Space> bar to highlight Screens on the main menu. Press <F9> and select Project Details to view the calculated deadlines of the project. The first line of this menu shows the default title, 'Proj-1.pj'. Rename the project by typing **Adesign**, or choose a unique project name to your taste. (You cannot reload the project without renaming it.) Also, in the second field enter the drive or directory where you want the project stored. Notice that the start and finish dates on the Project Details screen shown in Screen 4 fall within the original two-week plan and need not be altered. So far so good.

To view the details of your employees' work schedules, highlight the Screens option, press **<F9>**, and select the Resource Details option. The Resource Details screen includes a list of all the tasks assigned to a particular resource for a single project, the start and finish dates of the tasks, and the costs (see Screen 5). Scroll through all the resources with the **<Tab>** key. To add other resources simply type a unique name in the first field. If you don't want to use the program's defaults, you can customize a number of options on the Resource Details screen. At Adman, for example, everyone but the CEO knows the employees work only 7 hours a day, excluding lunch. *SuperProject Plus's* default workday schedule lasts a full 9 hours, including lunch. You can alter this factor by entering 7, or 4 for half-time employees. A convenient cost feature lets you enter an employee's

| Project Details   |        |                       |     | SuperProject Plus          |   |          |   |         |    |       |   |           |   |      |   | ADESIGN.PJ |   |   |   |    |    |    |   |   |   |   |   |
|-------------------|--------|-----------------------|-----|----------------------------|---|----------|---|---------|----|-------|---|-----------|---|------|---|------------|---|---|---|----|----|----|---|---|---|---|---|
| Screens           |        | Details               |     | Select                     |   | Projects |   |         |    | Print |   |           |   | Help |   |            |   |   |   |    |    |    |   |   |   |   |   |
| Name: ADESIGN.PJ  |        |                       |     |                            |   |          |   |         |    |       |   |           |   |      |   |            |   |   |   |    |    |    |   |   |   |   |   |
| Directory: B:\    |        |                       |     |                            |   |          |   |         |    |       |   |           |   |      |   |            |   |   |   |    |    |    |   |   |   |   |   |
|                   |        |                       |     | Defaults                   |   |          |   |         |    |       |   |           |   |      |   | Totals     |   |   |   |    |    |    |   |   |   |   |   |
| Author:           |        | ID Code: P2           |     | Hours:                     |   |          |   | 0       |    |       |   | Var:      |   |      |   | 0.00       |   |   |   |    |    |    |   |   |   |   |   |
| Leader:           |        | UnLocked: ----        |     | Fixed:                     |   |          |   | 0.00    |    |       |   | Fixed:    |   |      |   | 0.00       |   |   |   |    |    |    |   |   |   |   |   |
| Created: 04-01-86 |        | Revised: 04-01-86 # 1 |     | Bill Rate:                 |   |          |   | 0.00    |    |       |   | Total:    |   |      |   | 0.00       |   |   |   |    |    |    |   |   |   |   |   |
| Start: 04-01-86+  |        |                       |     |                            |   |          |   |         |    |       |   | Actual:   |   |      |   | 0.00       |   |   |   |    |    |    |   |   |   |   |   |
| Finish: 04-11-86  |        | Dur: 8 7h             |     | Duration:                  |   |          |   | 5       |    |       |   | Hours: 92 |   |      |   | Ovr: 0     |   |   |   |    |    |    |   |   |   |   |   |
| Owner Project:    |        |                       |     | Alloc: 8x                  |   |          |   | Pri: 50 |    |       |   | Tasks: 7  |   |      |   | Resc: 4    |   |   |   |    |    |    |   |   |   |   |   |
| Workday           | Start  | Finish                | Hrs | 6a                         | 7 | 8        | 9 | 10      | 11 | 12    | 1 | 2         | 3 | 4    | 5 | 6p         | 7 | 8 | 9 | 10 | 11 | 12 | 1 | 2 | 3 | 4 | 5 |
| Sunday            | 12:00a | 12:00a                | 0   | .....                      |   |          |   |         |    |       |   |           |   |      |   |            |   |   |   |    |    |    |   |   |   |   |   |
| Monday            | 8:00a  | 4:00p                 | 8   | ...yyyyyyyyyyyyyyyyyy..... |   |          |   |         |    |       |   |           |   |      |   |            |   |   |   |    |    |    |   |   |   |   |   |
| Tuesday           | 8:00a  | 4:00p                 | 8   | ...yyyyyyyyyyyyyyyyyy..... |   |          |   |         |    |       |   |           |   |      |   |            |   |   |   |    |    |    |   |   |   |   |   |
| Wednesday         | 8:00a  | 4:00p                 | 8   | ...yyyyyyyyyyyyyyyyyy..... |   |          |   |         |    |       |   |           |   |      |   |            |   |   |   |    |    |    |   |   |   |   |   |
| Thursday          | 8:00a  | 4:00p                 | 8   | ...yyyyyyyyyyyyyyyyyy..... |   |          |   |         |    |       |   |           |   |      |   |            |   |   |   |    |    |    |   |   |   |   |   |
| Friday            | 8:00a  | 4:00p                 | 8   | ...yyyyyyyyyyyyyyyyyy..... |   |          |   |         |    |       |   |           |   |      |   |            |   |   |   |    |    |    |   |   |   |   |   |
| Saturday          | 12:00a | 12:00a                | 0   | .....                      |   |          |   |         |    |       |   |           |   |      |   |            |   |   |   |    |    |    |   |   |   |   |   |



hourly rate and have the program automatically calculate the rate per day or per week. The program then multiplies by the days or weeks scheduled and displays the variable cost of the job.

The applications are limitless. You can estimate the project's total cost by adding the variable costs of all resources; you can estimate the costs when employees work overtime; or you can clarify paycheck amounts based on the information in the Total column. In the fixed cost field you can track the one-time cost of a resource for the entire task, such as the flat fee demanded by a consultant.

The Resource Calendar provides another option for customizing work schedules. Press <F9> with the cursor on the Screens menu and select the Resource Calendar option. You can scroll through the calendar schedules of all the resources using the <Tab> key. Use the Resource Calendar (see Screen 6) to enter personnel details (such as a half day of work, lengthy scheduled meetings, or sick days). If an employee takes a vacation or is sick, the program recalculates the project's early and late finish dates and adjusts all subsequent tasks accordingly. You may also use the Project Calendar option to designate companywide nonworkdays and holidays.

### A Critical Illness

Both the Project and Resource Calendars have a predefined workweek of Monday through Friday, 8 a.m. to 5 p.m.; but in real life, complications inevitably arise. Fortunately, with *SuperProject Plus* you can make adjustments to work schedules on

either calendar and they will immediately update all other screens in the program.

At Adman such complications arise often. As it happened, the designer jeans contract *did* go through. As project manager, you were determined to stick with the *SuperProject Plus* plan to the end, but the next week nature threw a monkey wrench into your plans. One day during the Layout/Paste-Up task, Mary (Resc-4) went home sick. She worked 4 hours in the morning and, from the look of her green complexion, you estimated that she would not return the next day. Mary was the only person scheduled to do the layout for the ad, and without her the project would be delayed. What to do?

First, enter Mary's projected sick day and the half day already missed on the Resource Calendar under Resc-4 (see Screen 6). To estimate the effects of Mary's illness on project deadlines, view the PERT Chart screen again. The Presentation, your goal, has been delayed by two working days.

The alternatives are: Tell the client the display ad will be late; do Mary's job yourself; get someone else to do Mary's job; or try to reschedule the remaining tasks so that the Presentation is not delayed.

All these options are viable, and it is up to you to weigh the possibilities based on your most demanding priorities. A call to the client would eliminate all your problems, but it might also eliminate any future contracts, since it

would cause a delay in their marketing schedules. And, you have to admit, you're really not qualified to do the Layout/Paste-Up job yourself.

### Custom Perspective

*SuperProject Plus* can't solve the problem for you (no program can), but it can flag it, put it into perspective, and allow you to weigh the alternatives.

First, highlight Screens on the main menu. Press <F9> for the pull-down features and select Preferences. The Preferences screen lists all the system default settings (see Screen 7). Either Yes or No should be highlighted on each field. Using the <Enter> key to toggle back and forth, you can change the defaults to either show or hide a number of options. Screen 7 shows the Preferences as they exist in Beginner's mode. You can globally change the Preferences once you've become familiar with the program by moving the cursor to Preferences on the main menu and selecting Expert mode. But to resolve the conflict in the project schedule caused by Mary's illness, you will need to change only a few settings. Toggle the options to indicate Yes on the following settings: Enter Must Dates on PERT, Show Overtime, and Blinking Resource Conflict.

Next, highlight Screens on the main menu, press <F9>, and select Task Details. Any changes you make to the Task Details screen are reflected on all other screens in the program. You can now enter a must start or a must finish date to show mandatory deadlines on the project schedule. If you enter a must start date, the program will



automatically calculate the must finish date, and vice versa. Assuming that the project started on schedule, the date 4-1-86 as the early start date is correct. The most important date, you decide, is presenting the display ad on time. Use the <Tab> key to locate Task 7, Presentation, and type 4-11-86 in the must start date field.

Weighing the conflict of Mary's illness against the mandatory Presentation date you have just entered, *SuperProject Plus* calculates the time allotted for the project and finds a conflict.

### Warning Signals

A conflict arises when you change a date to make it earlier than the calculated start date of the task. The ID number of the conflicting task flashes, indicating that you have forced a delay in a task on the critical path. The flashing ID can also signal that a resource is scheduled for two or more concurrent tasks but can work on only one at a time, or that there are not enough hours to do all the tasks scheduled. The flashing ID number on Task 7, Presentation, indicates that Mary's task, Layout/Paste-Up, is causing the delay because it must be finished before the Presentation can begin. Should you consider asking Mary to work overtime when she returns? Or should you hire a replacement to work in her absence?

Although both options are feasible, hiring a replacement for Mary on Layout/Paste-Up will get the project out on time without subjecting any employees to overtime.

Use the <Tab> key to locate Task 6, Layout/Paste-Up, on the Task Details screen. Your screen

Screen 6: The Resource Calendar with a five-day workweek and a customized work schedule for Resource-4

Resource Calendar

SuperProject Plus

ADISPLAY.PJ

Screens

Calendar

Select

Projects

Print

Help

Calendar for: Resc-4

Number of units: 1

| 1986 | Sun 0   | Mon 7 | Tue 7 | Wed 7   | Thu 7 | Fri 7 | Sat 0   |
|------|---------|-------|-------|---------|-------|-------|---------|
| Mar  | 23 WKND | 24    | 25    | 26      | 27    | 28    | 29 WKND |
| Mar  | 30 WKND | 31    | 01    | 02      | 03    | 04    | 05 WKND |
| Apr  | 06 WKND | 07    | 08    | 09 sick | 10    | 11    | 12 WKND |
| Apr  | 13 WKND | 14    | 15    | 16      | 17    | 18    | 19 WKND |
| Apr  | 20 WKND | 21    | 22    | 23      | 24    | 25    | 26 WKND |

Holiday or exception to project workday.

Holiday or exception to project workday.

| Preferences         |  |                 |  | SuperProject Plus |  |                           |  | ADISPLAY.PJ              |  |      |  |     |  |    |  |
|---------------------|--|-----------------|--|-------------------|--|---------------------------|--|--------------------------|--|------|--|-----|--|----|--|
| Screens             |  | Preferences     |  | Select            |  | Projects                  |  | Print                    |  | Help |  |     |  |    |  |
| Edit Options        |  |                 |  |                   |  | Feature Options           |  |                          |  |      |  |     |  |    |  |
| Auto Recalculation: |  | Yes             |  | No                |  | Resource Leveling:        |  | Yes                      |  | No   |  |     |  |    |  |
| Confirm Quit:       |  | Yes             |  | No                |  | Feedback Actuals:         |  | Yes                      |  | No   |  |     |  |    |  |
| Confirm Delete:     |  | Yes             |  | No                |  | Level Using Priority 1st: |  | Yes                      |  | No   |  |     |  |    |  |
| Auto Putaway:       |  | Yes             |  | No                |  | Enter Link Type:          |  | Yes                      |  | No   |  |     |  |    |  |
| Auto Positioning:   |  | Yes             |  | No                |  | Enter Must Dates on PERT: |  | Yes                      |  | No   |  |     |  |    |  |
| Del Orphaned Rsrcs: |  | Yes             |  | No                |  | Enter Actual Dates/Hours: |  | Yes                      |  | No   |  |     |  |    |  |
| Sound:              |  | Yes             |  | No                |  | Enter Work Breakdown:     |  | Yes                      |  | No   |  |     |  |    |  |
| Format Options      |  |                 |  |                   |  | Show Float on Gantt:      |  |                          |  |      |  | Yes |  | No |  |
| Date Format:        |  | mm/dd/yy        |  | dd/mm/yy          |  | dyMon Yr                  |  | Show Delay on Gantt:     |  | Yes  |  | No  |  |    |  |
| Date Separator:     |  | /               |  | ,                 |  | - blank ;                 |  | Show Workday on Gantt:   |  | Yes  |  | No  |  |    |  |
| Time Format:        |  | 12hr            |  | 24hr              |  |                           |  | Show Hour of Day:        |  | Yes  |  | No  |  |    |  |
| Menukey:            |  | Holddown        |  | Toggle            |  |                           |  | Show Time of Day:        |  | Yes  |  | No  |  |    |  |
| 2nd Gantt Line:     |  | Actual          |  | Planned           |  | None                      |  | Show Costing:            |  | Yes  |  | No  |  |    |  |
| Screen:             |  | Monochrome      |  | Color             |  | BW graphic                |  | Show Overtime:           |  | Yes  |  | No  |  |    |  |
| Project Suffix:     |  | pj              |  | Gantt             |  | Hrs/Day: 9                |  | Show Help Message Line:  |  | Yes  |  | No  |  |    |  |
| Print Output:       |  | Print           |  | Spool             |  | File Graph SideWay        |  | Blink Resource Conflict: |  | Yes  |  | No  |  |    |  |
| Page Width: 80      |  | Page Height: 66 |  |                   |  |                           |  | Long Menus:              |  | Yes  |  | No  |  |    |  |
|                     |  |                 |  |                   |  |                           |  | Auto Create Resources:   |  | Yes  |  | No  |  |    |  |

Perform automatic recalculation.

Screen 7: The Preferences screen showing the options available in Beginner's mode



should look like the one in Screen 8. Type **Resc-5** in the Resource column at the bottom left of the screen. *SuperProject Plus* assigns a default schedule of 16 hours at 8 hours a day for every resource. You can change these hours by typing **14** hours under the heading Hrs and **7x** under the heading of Allc. (Allc stands for allocation type and determines how a resource's time is distributed over the job assignment.)

There are three ways of designating daily allocation: number of hours per day, percentage of the day, or entire workday. Typing **7x** in this field means that Resc-5 will work 7 hours per day. The Allocation option allows a resource to work on a task for less than the full duration of the project. However, the resource must start the assignment when the task begins.

Since Resc-5 will replace Mary on the Layout/Paste-Up task, you should remove Mary as a resource for this part of the project. Move the cursor so that it highlights the first resource, Resc-4, listed on the lower left of the Task Details screen (Screen 8). Select Details from the main menu, press < F9 >, and choose the option Remove Assignment. The program responds with 'Delete currently selected resource from the Task?' Answering yes to this prompt will delete the resource the cursor is on, Resc-4, and reschedule her replacement, Resc-5, for the assignment. When you view the PERT Chart, it will indicate that the scheduling conflict has been resolved.

Once you begin to use a project manager, you can continually add new projects using the original data and resources. As you build momentum you will be able to incorporate some of the advanced

Screen 8: The Task Details screen detailing all the items connected with Task 6, Layout/Paste-Up

| Task Details                    |  |         |      | SuperProject Plus |              |               |  | ADESIGN.PJ |            |              |  |  |
|---------------------------------|--|---------|------|-------------------|--------------|---------------|--|------------|------------|--------------|--|--|
| Screens                         |  | Details |      | Select            |              | Projects      |  | Print      |            | Help         |  |  |
| Task ID: 006                    |  |         |      |                   |              |               |  |            |            |              |  |  |
| Name:Layout/Paste Up            |  |         |      | Start             |              |               |  | Finish     |            | Totals       |  |  |
| Duration:                       |  | 2       |      | Erly:04-08-86     |              | 04-10-86      |  | Var:       |            | 0.00         |  |  |
| Delayed:                        |  | 0       |      | Finish Del: 2h    |              | Late:04-08-86 |  | 04-10-86   |            | Fix: 0.00    |  |  |
| Float:                          |  | 0       |      | Free Float: 0     |              |               |  | Tot:       |            | 0.00         |  |  |
| Connected:                      |  |         |      | Critical          |              | Schd:04-08-86 |  | 04-10-86   |            | Act: 0.00    |  |  |
| Task Scheduled                  |  |         |      | Plan:             |              |               |  | Hrs:       |            | 16           |  |  |
| Resource                        |  | Hrs     | Allc | Un                | Predecessors |               |  |            | Successors |              |  |  |
| Resc-4                          |  | 14      | 7x   | 1                 | 005          | Create Art    |  |            | 007        | Presentation |  |  |
|                                 |  |         |      |                   | 004          | Typeset Copy  |  |            |            |              |  |  |
| Resource assigned to this task. |  |         |      |                   |              |               |  |            |            |              |  |  |

Resource assigned to this task.

features of *SuperProject Plus*, such as tracking a single resource or a group of resources from project to project, leveling time schedules, and resolving work overloads.

With resource management, the resources, not the tasks, drive your schedules. Undoubtedly there will be other unexpected developments to watch for before the final presentation of the designer jeans ad draws to a close. Resource management should always look for and expect the unexpected. At Adman, resource management techniques helped get the project completed under deadline and helped put "Dynasty" back on the preferences list of the staff on the 14th floor. ●

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*MaxThink 3.2  
MaxThink, Inc.  
230 Crocker Ave.  
Piedmont, CA 94610  
800/227-1590, 800/642-2406  
California  
List price: \$89  
Requirements: 256K, DOS 2.00  
or later version  
Not copy protected*

*SuperProject Plus  
Computer Assoc.  
2195 Fortune Dr.  
San Jose, CA 95131  
408/942-1727  
List price: \$495  
Requirements: 320K, two disk  
drives, DOS 2.00 or later  
version*



# Modest Projections

Computer-based project management is no longer the private domain of specialists. A new generation of easy-to-use software, typified by Time Line and Advanced Pro-Path 6, is making projects manageable for just about any business.

*Gary Jackson*

■■■■ Project management is part of virtually everyone's work, even though the "project management" label is seldom applied. When you set your weekly schedule or decide how to divvy up your department's travel budget, you're managing a simple project.

Just as using a personal computer to balance your checkbook smacks of overkill, however, you probably wouldn't use project management software to keep

track of appointments or plan your vacation. But for more complicated projects, such as scheduling an international conference or moving into a new office, the talents of one of these programs could be invaluable.

The two packages evaluated here provide the ease of use, the flexibility, and the power required to handle relatively complex projects. The programs are *Advanced Pro-Path 6* and *Time Line*; both are good examples of moderately priced software that should appeal to mid-level managers and other businesspeople who have little or no project management experience.

■ **Advanced Pro-Path 6**  
*Advanced Pro-Path 6*, from SoftCorp, is a menu-driven program that can handle projects spanning several years and ranging in scope from a few tasks to more than 200.

Version 2.0 allows 250 tasks per project file; SoftCorp also sells less expensive versions with limits of 150 and 75 tasks. To track larger, more complex projects, the program permits linking of project files, so that an entire project (with its own set of tasks) can be integrated into another and defined as a single task. Yet despite this linking capability, *Advanced Pro-Path 6* is best suited for small and intermediate-size projects, such as running a sales convention or building a house. The program's rather rigid structure and numerous files make managing a large project, such as building a group of houses, cumbersome and potentially confusing.

Like most project management programs, this one uses pre-designed data entry forms. Unlike many of its competitors, however, *Advanced Pro-Path 6* always displays the main menu at program start-up and between data entry steps (see Screen 1). Although the sequence of menu items mirrors the sequence of steps in creating a



project schedule, the menu's utility is quickly outweighed by the tedium of returning to it constantly.

### ■ It's a Setup

Initial setup for *Advanced Pro-Path 6* consists of filling in a screen form. You define parameters that include the type of display adapter and monitor, the disk drive for storage of data files, whether a command summary is shown when the project schedule is displayed, and (in the program's scheduling component) which of three views of schedule data should be displayed first.

Default values are provided for each item on the installation form, so you needn't create a new set of options for the program. The only values you may want to change are the default disk drive (drive A:) and the monitor and adapter setting (monochrome is assumed).

You'll want to amend one final bit of information during setup, however. The program automatically displays your company's name on all menus, screens, and reports. The default data supplied with the program is "SoftCorp, Incorporated"—probably not the identifier you'd select. You must provide an alternative, or you can display no company name by using the <Space> bar to delete all characters from this category.

### ■ Backward Planning

Before you can begin to build the schedule by naming tasks, *Advanced Pro-Path 6* requires that you create separate calendar and resource files. Establishing the calendar parameters is an obvious early step in the management of any project, and the on-

screen form requires only that you designate days of the week as workdays, nonworkdays, or holidays.

Defining resources at this stage is a different matter, however. Before you determine the actual tasks to be executed, it's difficult to know what resources will be required or what their costs will be.

**Advanced Pro-Path 6 automatically calculates the end date, resource allocations, and costs (multiplying the number and rate of assigned resources by the duration of each task) and determines the project's critical path.**

Consequently, you may find it expedient to list only a few resources in this initial stage, then revise the list after defining project tasks.

To change the resource list after defining the project's tasks, you must leave the project scheduling component, return to the main menu, and once again select the Resource option. Each resource file can contain up to 30 resources, each with a cost, and a 4-character code that you enter when assigning resources to tasks in the scheduling module. If a resource is not listed in the resource file, it cannot be referenced to a task, so all too often you may find yourself shuttling between the task-definition file (in the scheduling module) and the resource file.

### ■ Tasks at Last

Defining the tasks in a project is also a multiple-step process in *Advanced Pro-Path 6*. After you name the project file, the Project Definition screen appears. You specify project name, leader, and starting date; name the requisite calendar and resource files; and designate the time scale, which

can be days, weeks, or months (see Screen 2). You can specify a Quick Print file, which must be a data format created from the program's separate report menu. This enables you to print a report while you are using the scheduling module, instead of having to quit that module and move through the main menu to the report submenu. During project definition, you can override the program's default for automatic calculation of the critical path as well.

Once task definition is complete, *Advanced Pro-Path 6* loads the scheduling module and the necessary data files, then presents a screen for entering the list of tasks. A status line at the top indicates the help status, the form of the schedule currently on the screen, the project file name, and the number of tasks still available.



The bottom third of the screen displays a summary of commands.

When you select Add, the command summary is replaced by a form to which you add specific information about the task. These details are the heart of a project's schedule: the duration (in days, weeks, or months, as specified in the calendar file); starting date; offset (which can advance or delay the start of the task); cost (a number of up to 7 digits, with or without a decimal point); dependencies (other projects that must be completed before this one); and the names and quantities of resources to be used for the task.

Once you have supplied this data, along with a short reference code and a lengthier task description, the task is posted at the top of the screen. Also displayed is a 16-day calendar indicating the project's start date and 15 successive workdays. The program uses definable symbols to identify the type or status of each task, such as critical tasks, dependent tasks, and completed tasks; if you have a color monitor and adapter, tasks are also differentiated by color.

The program automatically calculates the end date, resource allocations, and costs (multiplying the number and rate of assigned resources by the duration of each task) and determines the project's critical path. If you change resource allocations, task durations, or other project variables, the program revises the schedule immediately.

To review the details of all tasks, you can change the display to the Task mode. You can then edit, add, or delete tasks. To see how resources are allocated, you can switch to the Level mode,

12-15-1985 Jackson Associates ADVANCED PRO-JECT 6

MAIN MENU

- 1 Installation/Configuration
- 2 Calendar Definition
- 3 Resource Definition
- 4 Project Schedule
- 5 Project Reports
- 6 Utilities Menu

Enter Option: >

Enter The Option You Wish To Perform And Press The RETURN Key

Screen 1: The main menu of Advanced Pro-Path 6, which is displayed between major program operations. Note that the screen displays 'Advanced Pro-Ject 6', the program's name at the time of the evaluation. SoftCorp subsequently renamed the package.

12-15-1985 Jackson Associates ADVANCED PRO-JECT 6

PROJECT DEFINITION

File Name: B:SAM1

Name Of Project >SAMPLE PROJECT

Project Leader >G. Jackson

Project Start Date >010606

Calendar File Name >C

Resource File Name >RESOURCE

Time Scale Code >D D=Days, W=Weeks, M=Months

Compute Critical Path? (Y/N) >Y

Quick Print Report >

Enter Any Desired Changes And Press RETURN

ESC=RETURN F10=QUIT

Screen 2: Advanced Pro-Path 6's project definition form serves as the first step in adding tasks to a project.



which lists all the resource codes and produces a bar graph showing a specified resource's amounts and dates of use.

*Advanced Pro-Path 6's* ability to link projects is useful for handling related procedures. For example, relocating a company's office could involve separate plans for

Next you must create a Report Options file, which defines and configures the report's content; you fill in the blanks on two successive screens to accomplish this. You can then print the report, along with several others if you wish. If you merely want to reprint a previously defined report, you

program uses those same files.

The documentation covers commands, key assignments, error messages, program limits, sample reports, and data formats for export to other programs. The manual includes an index.

*Advanced Pro-Path 6* may be the answer to the needs of a small company interested in using the office PC for project planning, but the program isn't for everyone. Its major flaw lies in the endless file creation required to define and manage a project. Moreover, you must leave the program's scheduling module to change the data in the calendar or resource file or to print a report.

All this switching between modules and menus makes the program tedious and inefficient for projects with many tasks or resources. Thus, while it favors beginning users and it gets the job done, *Advanced Pro-Path 6* provides a rather inelegant solution to the problems of managing projects.

*Because its menu and command sequence are second nature to the huge population of 1-2-3 users, Time Line seems familiar even before you've entered your first project.*

finding the new space, taking inventory of all items before and after the move, and monitoring the transition's cost through the company's accounting system. Each of these procedures could be an individual project, and two or more compatible projects entities could then be linked.

### Menus Galore

Creating reports with *Advanced Pro-Path 6* involves another round of menus and steps. The Report menu includes four options, which in practice amount to three steps and a repeat print option. You first create yet another file, called an Output Profile, for each project. This file specifies the data format for the report and indicates whether it will be sent to a printer or a disk file. The program provides several standard disk-file options, so project reports can be read by *1-2-3*, *dBASE II*, *dBASE III*, *WordStar's MailMerge*, or Funk Software's *Sideways*, or they can simply exist as unadorned ASCII text.

can skip the foregoing three steps by choosing the Reprint option from the printing menu and providing the name or number of the desired report. Alternatively, you can use the Quick Print file you've already created. It will not, however, include revisions made since the project file was last saved. Consequently, you can't change variables and get a printed version of each new version of the schedule; "what if" analysis is limited to the screen.

One strike against *Advanced Pro-Path 6* is its on-screen method of report specification. Displaying the resulting reports on the screen before writing to disk or printer would make much more sense.

### Planning to Learn

The thorough documentation for *Advanced Pro-Path 6* includes two valuable overview chapters that explain the critical path method and introduce the program's major features. A detailed tutorial section provides a step-by-step guide to using the sample files included on the program disk; a self-running demo

### Time Line

Like *Advanced Pro-Path 6*, *Time Line*, from Breakthrough Software, is both menu-driven and keyed to neophytes, but the latter program's design is so appealing that it makes computer use a genuine pleasure. The program was written in Modula 2, a relatively new language created by Niklaus Wirth, who also developed Pascal. As a result, *Time Line* is quick and extremely efficient.

*Time Line* is not copy protected and is easily installed on a hard disk. Setting up the program involves identifying your computer's



monitor, adapter, and printer and then saving these choices. If you want to create disk files compatible with any of several word processing programs or if you want to configure the program's reports for *Sideways*, you can select from the custom options when configuring the printer setting.

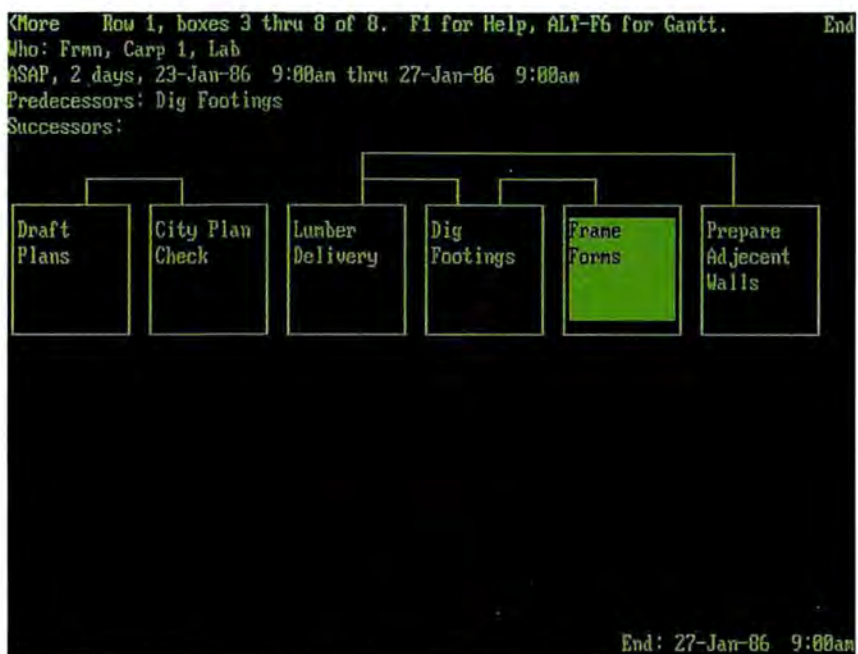
### Screen Talents

Even though *Time Line* is menu-driven, the program's central metaphor is a Gantt chart, not a menu. To access the menu and select its options, you either press the slash key, followed by the first letter of the option desired, or highlight the selection by placing the cursor on the appropriate word. Because its menu and command sequence are second nature to the huge population of 1-2-3 users, *Time Line* seems familiar even before you've entered your first project.

The program makes it possible to enter tasks without a resource file or a project-specific calendar file. You can thus define the tasks first, usually the most logical way to set up a project schedule.

You enter the details of project definition, resource allocation, cost, duration, and calendar specifications on several predesigned forms. You can retrieve forms with function key commands; when data entry is complete, the display returns to the Gantt chart.

At any time in the scheduling process, you can view your project as a PERT chart (see Screen 3) rather than as the conventional Gantt chart. A PERT chart is useful for viewing the interrelation of tasks and dependencies. This type of chart does not show a time line, although it does display tasks in order of precedence.



Screen 3: A Time Line PERT chart. Dependencies are indicated by the lines that join task boxes.

(F2) to edit, (Ins) to add, (Del) to delete, (Esc) to exit, (Enter) to Select.

| Who    | Status             | Amount |
|--------|--------------------|--------|
| Carp 1 | R Carpenter 1      |        |
| City   | FC City Plan Check |        |
| Dfts   | R Draftsman        |        |
| Frmn   | R Foreman          |        |
| Lab    | R Laborer          |        |
| Yard   | UC Lumber Yard     |        |

Name: [Frame Fo] Dfts R Draftsman (ALAP, Span)

Start: [23-Jan-8] Frmn R Foreman (ks, Months)

End: [27-Jan-8] Lab R Laborer (rted, Done)

Time to Complete Yard UC Lumber Yard

Notes: 1 [ ]

2 [ ]

Priority: [2] [ ]

Who/Cost Amount

[Frmn] [1.0] [ ]

[Carp 1] [13.0] [ ]

[Lab] [13.0] [ ]

[ ] [ ] [ ]

Resource/Cost List

Task Form

End: 27-Jan-86 9:00am

Screen 4: The resource/cost form in Time Line enables you to revise or add resources. Note that this form is a window on the task form, which overlaps the Gantt chart.



### Telling Time

Supplying calendar data in *Time Line* is a simple three-step process. The program's resident calendar covers 25 years; most standard holidays are built in. The first screen display is a one-month calendar that enables you to move from day to day or month to month. To eliminate a day from the workday schedule, type *No work* in the appropriate calendar square, and the day is excluded from the schedule.

That screen is followed by a form for designating hours of the day as work time. The third form specifies the number of hours per day and days per week that the program uses to calculate the time and cost for each task. This form also lets you specify the precise unit of time that the program will calculate; your choices range from 1 hour to 1 minute. The program rounds to the nearest unit when a duration is expressed in partial units.

### Resource Management

Resources consist of people (individuals or teams), materials, and equipment. *Time Line* gives you the tools to manage all these elements prudently and in a timely manner.

The program helps you balance the project's resources with a graph called a histogram, which shows when and how such entities are scheduled. *Time Line* continually monitors the assignment of resources and alerts you when they have been overscheduled. The program's resource-leveling feature then reschedules tasks to avoid conflicts; this usually involves adding time to the project

schedule. If the program's suggested rescheduling is unacceptable, you can easily reassign resources so the schedule won't be changed (see Screen 4).

*Time Line* flags resource conflicts by placing a thin line to the

add resource and cost information in the bottom portion of this form.

*Time Line*'s editing commands permit tasks to be revised, joined, copied, deleted, or split in two. The Split command is especially

*Time Line continually monitors the assignment of resources and alerts you when they have been overscheduled.*

left of the task bar, showing when the task could have begun had resources been available. The program marks conflicting tasks with a 'C' in the Gantt chart's status column.

You can include a pay rate or unit cost for each resource, and the program will compute the costs associated with each resource assignment. Cost can be fixed, unit, or variable. Materials can be assigned unit costs and then computed according to the number of units required for a task. You can assign a percentage of a cost to several tasks. In addition to a histogram, *Time Line* produces several open-ended resource reports.

### Multi-Tasking

Tasks are defined on one of the simple, self-explanatory forms that typify the program. Here you specify a name; task type (which determines how the program calculates the schedule); a starting and ending date and time (for fixed tasks only); task duration and current status; and optional notes, priority assignment (used with resource leveling), and summary (reference to a master schedule of several projects). You can

useful for redistributing the workload in order to equalize resources or for moving one portion of a task to a different point in the schedule. The Undo command reverses the most recent change made in a task or dependency.

Once task data has been entered, *Time Line* posts it on the Gantt chart. As each new task is posted, you indicate whether it is dependent on the task preceding it. You can also specify a dependency or partial dependency between tasks at a later time by editing one or more task forms. A task may have as many dependencies as needed for the project.

### You're in Control

To prepare the schedule, the program combines the data for dependencies, task types, task durations, resource allocations, and costs. You can easily adjust any of these variables from the Gantt chart by retrieving and editing the appropriate form.

You can also assign fixed dates to tasks, barring the program from changing those dates even if resource leveling would otherwise



do so. By designating a project's end date as fixed, for example, you can in effect schedule in reverse, determining where and how to compress the duration of tasks or allocation of resources to meet a fixed deadline.

*Time Line* also enables you to control the degree of automation used to create the schedule. Options include toggling automatic recalculation and resource leveling on and off, as well as sorting tasks by date, name, or notes, and issuing an audio alert as a reminder to update the schedule.

The Display command is yet another useful feature that can help you manage your project. This command permits "filtering"—that is, the ability to highlight (in color or inverse video) or hide specified tasks. You can also specify a display showing the project a day or a week at a time. A printed version of any of these displays is available.

A separate utility program, provided when you register your purchase, can transfer *Time Line* schedules to 1-2-3, *Symphony*, *SuperCalc 3*, *Multiplan*, *dBASE II*, and *dBASE III*. You can also import certain types of files. These include schedules created with previous versions of the program, files from *Harvard Project Manager*, and files in which commas separate all variables.

### Rapid Reports

*Time Line* generates a variety of standard reports. The program's filtering capability lets you tailor reports to present only the information you want to emphasize.

In addition to Gantt and PERT charts, you can produce a status

report showing tasks scheduled for the current day and week; a task report listing selected data for all tasks or all relevant data for a single task; a resource summary; analysis of cost and task completion; and cost and worker-hour reports by task, resource, and specified time period. Finally, the program will produce an actual-versus-planned report, which identifies tasks whose duration or starting date deviated from what was planned.

### Learning Made Easy

*Time Line* comes with a concise, well-written manual that is easy to read and use. There are examples of screen displays that are printed in highlighted text, as are the useful notes and hints that appear in the margins.

The program comes with a separate disk tutorial, although the manual does not include a corresponding tutorial section. The short *Getting Started* booklet makes it easy for computer novices to start using the program or the tutorial.

Overall, *Time Line* is a flexible program that should satisfy both budding and veteran project managers. Its command structure, smooth operation, and pleasing use of screen graphics add to the program's substantial merits, and only its lack of plotter support keeps *Time Line* from competing with the more established, high-priced project management programs for the PC.

Although less flexible and more cumbersome in operation, *Advanced Pro-Path 6* provides adequate project management capabilities at a reasonable price. Yet the program's narrow choice of report formats and content, combined with its limited on-screen versatility, rank *Advanced Pro-Path 6* considerably below *Time Line* in power and dollar value. Nonetheless, the path to PC-based project management now seems unobstructed. ●

*Gary Jackson is a computer consultant specializing in operations and CAD systems for the construction, architectural, and engineering fields in the San Francisco area.*

*Advanced Pro-Path 6*  
SoftCorp, Inc.  
2340 State Rd. #244  
Clearwater, FL 33575  
813/799-3984

List price: 250-task version \$199,  
150-task version \$149, 75-task  
version \$99

Requirements: 160K, two floppy  
disk drives or one floppy disk  
drive and one hard disk, DOS  
2.00 or later version  
Not copy protected

*Time Line*  
Breakthrough Software  
505 San Marin Dr.  
Novato, CA 94947  
415/898-1919

List price: \$495  
Requirements: 256K, two disk  
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version  
Not copy protected



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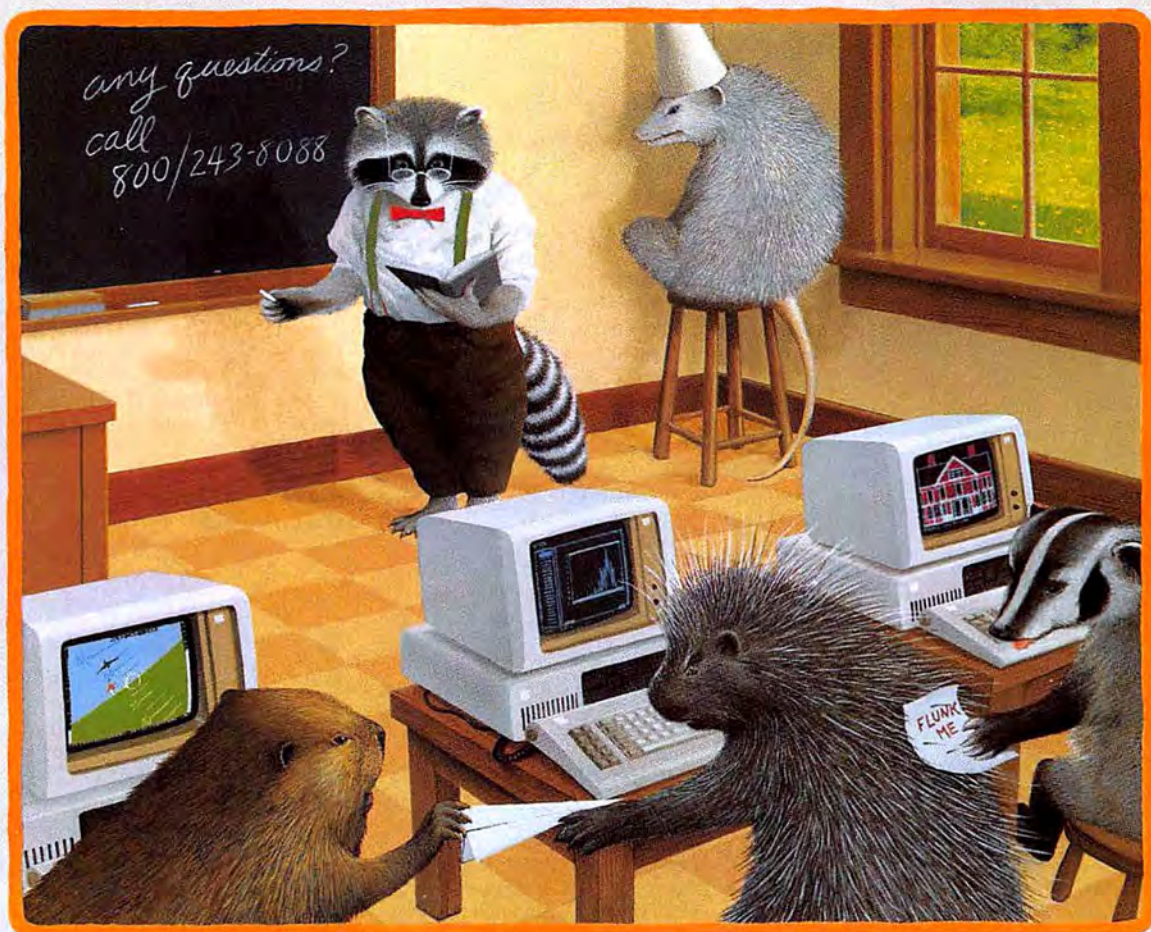
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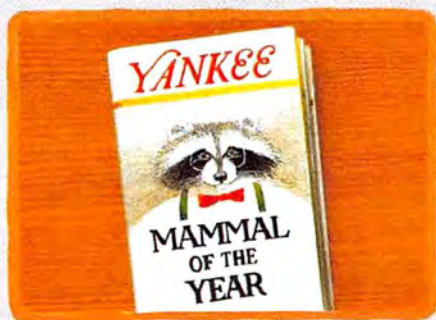
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|                                      |      |
|--------------------------------------|------|
| 5150 keyboard .....                  | 115. |
| 5151 keyboard (deluxe) .....         | 169. |
| 5153 keyboard (with touch pad) ..... | 289. |

## Kraft

|                                             |     |
|---------------------------------------------|-----|
| Joystick .....                              | 29. |
| Executive Cursor Control (w/Joystick) ..... | 47. |

## Mouse Systems

|                                      |      |
|--------------------------------------|------|
| PC Mouse with PC Paint+ .....        | 139. |
| PC Mouse w/Ready .....               | 139. |
| PC Mouse w/Ready and PC Paint+ ..... | 159. |

## Orchid Technologies

|                                                                                                      |      |
|------------------------------------------------------------------------------------------------------|------|
| Conquest Multifunction Board 0k fully supports LOTUS/INTEL expanded memory specification (EMS) ..... | 264. |
| PC Turbo 186 w/256k and Daughter Board expandable to 640k .....                                      | 599. |

## Eccell Multifunction Board for the AT

|                                                                                                                                                                     |      |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|
| 0k upgradeable to 1 Meg, fully supports LOTUS/INTEL expanded memory specification (EMS) and Error Correction Code (ECC), (serial and parallel ports optional) ..... | 399. |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|

## Paradise Systems

|                             |      |
|-----------------------------|------|
| Color/Mono Card .....       | 149. |
| Modular Graphics Card ..... | 275. |
| Five Pack w/384k .....      | 169. |

## PC Designs

|                                                                                                                                   |      |
|-----------------------------------------------------------------------------------------------------------------------------------|------|
| FD 1000 Computer .....                                                                                                            | 789. |
| PC Magazine called it "a top performance bargain" (Oct. 15). PC Week called it "a terrific machine at a terrific price" (May 10). |      |

Please call for more information about this computer.

## Princeton Graphics

|                                           |        |
|-------------------------------------------|--------|
| HX-12 RGB monitor (690 x 240) .....       | \$449. |
| HX-12E RGB monitor (EGA compatible) ..... | 589.   |
| MAX-12E Amber monochrome monitor .....    | 179.   |

## Quadram

|                                                                                                             |      |
|-------------------------------------------------------------------------------------------------------------|------|
| Expanded Quadboard with clock calendar, parallel, serial & game port, I/O bracket, and Quadmaster software. |      |
| 384k (fully populated) .....                                                                                | 249. |
| 0k (upgradeable to 384k) .....                                                                              | 189. |
| Gold Quadboard 0k .....                                                                                     | 387. |
| Silver Quadboard 0k .....                                                                                   | 249. |
| Quad Sprint w/8086 processor .....                                                                          | 479. |

|                                                                                   |      |
|-----------------------------------------------------------------------------------|------|
| Microfazer Printer Buffer (parallel) w/copy MP 64 (64k) upgradeable to 512k ..... | 159. |
|-----------------------------------------------------------------------------------|------|

## QuadEGA+

special

## SMART

PC-Document Keyboard Templates

available for:

DOS/Basic 2.0-2.1 dBase III

## OUR POLICY

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- UPS Next-Day-Air available.
- COD max. \$1000. Cash or certified check.
- 120 day limited guarantee on all products.\*
- To order, call us anytime Monday thru Friday 9:00 to 9:00, or Saturday 9:00 to 5:30. You can call our business offices at 603/446-3383 Monday thru Friday 9:00 to 5:30.

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230W

|                   |               |
|-------------------|---------------|
| DOS/Basic 3.0-3.1 | Wordstar      |
| Lotus 1-2-3       | Wordstar 2000 |
| Symphony          | Turbo Pascal  |
| Framework         | WordPerfect   |
| Multimate .....   | each \$12.    |

## Titan Technologies

Accelerator PC 256k .....

## Toshiba

All floppy drives are completely pre-tested and are supplied with a printout of the test results. They are shipped with complete step-by-step installation instructions. Drives are 320k/360k.

|                                          |       |
|------------------------------------------|-------|
| P1340 printer (80 column) .....          | 439.  |
| P341 parallel printer (136 column) ..... | 749.  |
| P351 parallel printer (136 column) ..... | 1089. |

## DRIVES

All floppy drives are completely pre-tested and are supplied with a printout of the test results. They are shipped with complete step-by-step installation instructions. Drives are 320k/360k.

## Control Data (CDC)

(5 1/4") half-height drive (DS,DD) .....

## IOMEGA

|                                       |       |
|---------------------------------------|-------|
| Bernoulli Box 20 Meg w/PC2 card ..... | 2349. |
| 10 Meg cartridge .....                | 48.   |
| Bernoulli Box 40 Meg w/PC2 card ..... | call  |
| 20 Meg cartridge .....                | 67.   |

We are an authorized IOMEGA service center.

## Mountain Computers

|                                                         |      |
|---------------------------------------------------------|------|
| Drive Card 20 Meg .....                                 | call |
| Seagate                                                 |      |
| 20 Meg Internal Hard Drive (w/controller, cables) ..... | 469. |
| 20 Meg Internal Hard Drive for the AT .....             | 569. |

## Toshiba

AT 360k Drive (5 1/4") half-height drive .....

## MEMORY

|                                                                                |     |
|--------------------------------------------------------------------------------|-----|
| 64k Memory Upgrade Set for IBM-PC or XT system board or any memory board       |     |
| 150 nanosecond (set of 9) .....                                                | 15. |
| 200 nanosecond (set of 9) .....                                                | 12. |
| Install memory upgrades & run diagnostics at time of board purchase only ..... | 10. |
| 256k Memory Upgrade Set for any IBM-AT memory board (9 chips) .....            | 39. |

## DISKS

|                                                         |     |
|---------------------------------------------------------|-----|
| DS/DD Disks for the PC & XT (40 TPI). 10 disks per box. |     |
| Maxell MD-2 .....                                       | 19. |
| Verbatim Datatype .....                                 | 19. |

**DS/High Density Disks for the AT (96 TPI). 10 disks per box.**

|                                  |     |
|----------------------------------|-----|
| Fuji .....                       | 35. |
| Maxell .....                     | 39. |
| Verbatim .....                   | 45. |
| Flip Sort (holds 75 disks) ..... | 15. |

## INFORMATION SERVICES

|                                                                                                                     |     |
|---------------------------------------------------------------------------------------------------------------------|-----|
| Compuserve                                                                                                          |     |
| Compuserve Information Service (includes subscription, manual, 5 hours of connect time, monthly publications) ..... | 27. |
| Dow Jones                                                                                                           |     |
| Membership Kit .....                                                                                                | 19. |

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

# PC CONNECTION®



# hints halt hardv

|                                        |       |
|----------------------------------------|-------|
| ✓Professor DOS .....                   | \$47. |
| ✓Tutorial Set (both items above) ..... | 75.   |
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| ✓Training for Lotus 1-2-3 .....        | 49.   |
| ✓Training for dBase III .....          | 49.   |
| <b>Scarborough Systems</b>             |       |
| MasterType .....                       | 26.   |
| <b>Simon &amp; Schuster</b>            |       |
| ✓Typing Tutor III .....                | 33.   |

## EDUCATIONAL

|                                                                          |     |
|--------------------------------------------------------------------------|-----|
| <b>Barron's</b>                                                          |     |
| Computer SAT .....                                                       | 59. |
| <b>Designware</b>                                                        |     |
| Spellcopter (ages 6 to adult) .....                                      | 25. |
| Grammar Examiner (ages 9 to adult) .....                                 | 27. |
| <b>Eduware</b>                                                           |     |
| Algebra 1, 2 or 3 .....                                                  | 22. |
| <b>Harcourt Brace Jovanovich</b>                                         |     |
| ✓Computer SAT .....                                                      | 49. |
| ✓Computer GRE .....                                                      | 57. |
| <b>Spinnaker</b>                                                         |     |
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| ✓Face Maker (ages 3 to 8) .....                                          | 18. |
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| ✓Fraction Fever (ages 7 to adult) .....                                  | 18. |
| ✓Kinder Comp (ages 3 to 8) .....                                         | 18. |
| ✓Alphabet Zoo (ages 3 to 8) .....                                        | 20. |
| ✓Trains (ages 10 to adult) .....                                         | 20. |
| ✓Delta Drawing (ages 4 to adult) .....                                   | 27. |
| <b>Stone</b> (requires graphics board)                                   |     |
| ✓My Letters, Numbers, Words (ages 1 to 5) .....                          | 29. |
| ✓Kids Stuff (ages 3 to 8) .....                                          | 29. |
| <b>The Learning Company</b>                                              |     |
| ✓Reader Rabbit (ages 5 to 7) .....                                       | 26. |
| ✓Rocky's Boots (ages 9 and up) .....                                     | 32. |

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|----------------------------------------------------------|--------------|
| <b>Blue Chip</b>                                         |              |
| High finance simulations.                                |              |
| ✓Baron .....                                             | 32.          |
| ✓Millionaire .....                                       | 32.          |
| ✓Squire .....                                            | 32.          |
| <b>Electronic Arts</b>                                   |              |
| ✓Pinball Construction Set .....                          | 25.          |
| ✓Dr. J/Larry Bird One-on-One .....                       | 28.          |
| ✓Music Construction Set .....                            | 28.          |
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| ✓PC Arcade .....                                         | 35.          |
| <b>Hayden Software</b>                                   |              |
| ✓Sargon III (highest rated Chess program) .....          | 35.          |
| <b>Infocom</b> Difficulty levels shown in <i>italics</i> |              |
| <b>JUNIOR</b>                                            |              |
| ✓Seastalker .....                                        | 25.          |
| <b>STANDARD</b>                                          |              |
| ✓Enchanter .....                                         | the Witness  |
| ✓Cutthroat .....                                         | ✓Wishbringer |
| ✓Hitchhiker's Guide .....                                | each 25.     |
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| ✓Zork II .....                                           | ✓Zork III    |
| ✓A Mind Forever Voyaging .....                           | each 29.     |
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## PC Connection Hardware Special

through April 30, 1986

### QUADRAM

#### ✓QuadEGA +

- Combines four major video-display standards into one board:
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  2. Monochrome Graphics—720 x 384
  3. Color Graphics—
    - 320 x 200 Medium
    - 640 x 200 High
    - with 16 colors out of 16
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- Complete with 256k of video memory
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For IBM-PC, XT & AT.....\$369.

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each 31.

*Invisicues (hint booklets) are available for most Infocom games. Specify game..* 6.

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- ✓Microleague Baseball .....

25.

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22.

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32.

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- ✓Golf's Best (Pinehurst) .....

32.

- ✓Golf's Best (St. Andrew's) .....

32.

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- ✓Bridge Parlor (best Bridge simulation) ..

49.

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- ✓Championship Blackjack .....

23.

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- ✓GATO .....

27.

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32.

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29.

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All AST Boards come with a full one year warranty.

SixPakPlus 64k includes Sidekick version 1.5

non-copy protected, & DesqVIEW .....

384k (fully populated).....

279.

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249.

I/O Plus II .....

125.

Parallel, game, or second serial port

for any AST board (specify board) .....

35.

✓AST-5251-11 .....

579.

✓Reach Modem half card 300/1200 baud

internal modem includes Crosstalk XVI

349.

✓Advantage 128k upgradeable to 1.5 Meg

includes Sidekick version 1.5 non-copy

protected .....

379.

RAMpage! upgradeable to 2Mb, fully

supports LOTUS/INTEL expanded memory

specification (EMS) .....

call

✓AT RAMpage! upgradeable to 2Mb .....

call

**Amdel**

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✓Video 310A mono monitor (amber) ....

169.

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**Compucable**

Plastic Keyboard & Drive Cover Set ....

17.

✓IBM Mono Screen Enhancement .....

17.

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Uninterruptable power backup units

✓Datasaver 400 WATT .....

call

**Curtis**

**ACCESSORIES**

✓PC Pedestal (for IBM Mono or Color) ...

37.

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47.

✓System Stand .....

19.

✓Universal System Stand .....

23.

✓Low Profile Tilt and Swivel Pedestal ....

37.

✓Crystal 300-watt (line conditioner) ....

159.

**CABLES**

✓Smartmodem to IBM Cable .....

17.

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✓Extension Cables for IBM Mono Display 33.

✓Color and Monochrome Extension cables 39.

✓Printer-to-IBM cable .....

17.

**SURGE SUPPRESSORS**

✓Safestrip .....

21.

✓Diamond (6 outlets) .....

29.

✓Emerald (6 outlets; 6 ft cord) .....

36.

✓Sapphire (3 outlets; EMI/RFI filtered) ....

47.

✓Ruby (6 outlets; EMI/RFI filtered; 6 ft cord) 55.

✓Command Center .....

123.

**Epson**

✓DX-20 (letter quality) .....

call

✓FX-85 (80 column) .....

call

✓FX-286 (replaces FX-185, 136 column) call

✓LX-80 printer (80 column) .....

call

✓LX-90 printer (80 column) .....

call

✓LQ-1000 (letter quality dot matrix) ....

call

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

**PC CONNECTION®**



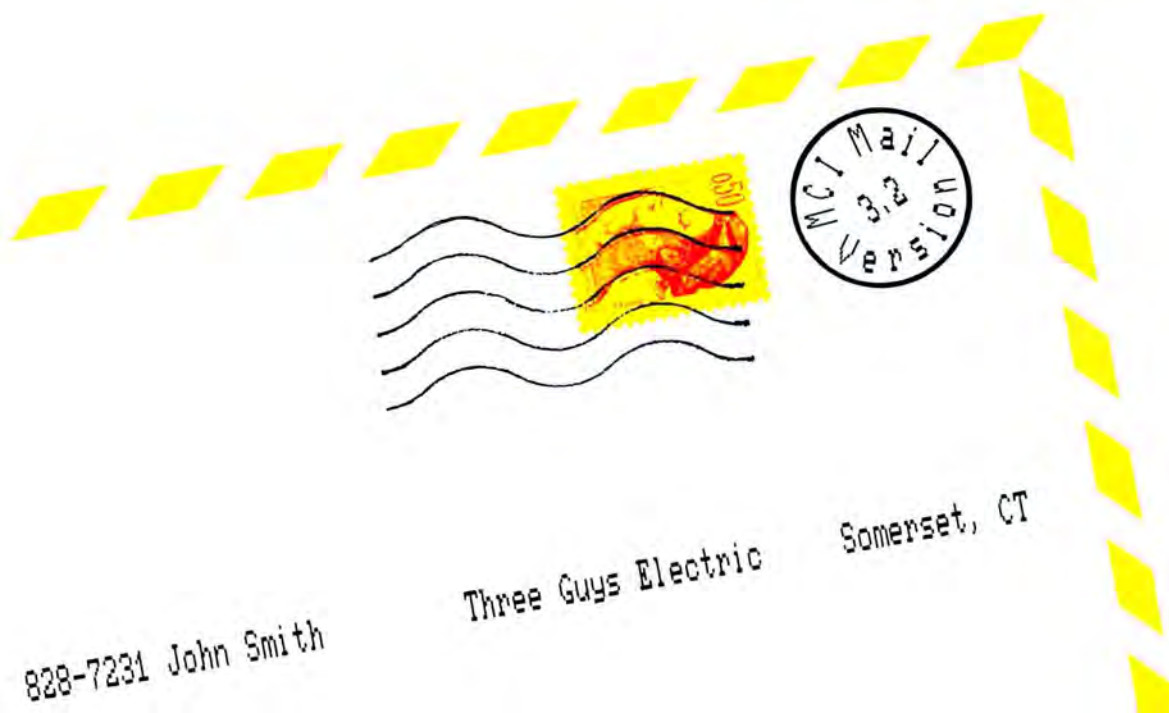
# Communications Post Haste

"It's in the mail" takes on new meaning as electronic mail gains in popularity. Latch on to MCI Mail to reduce in-box clutter and trim the phone bill.

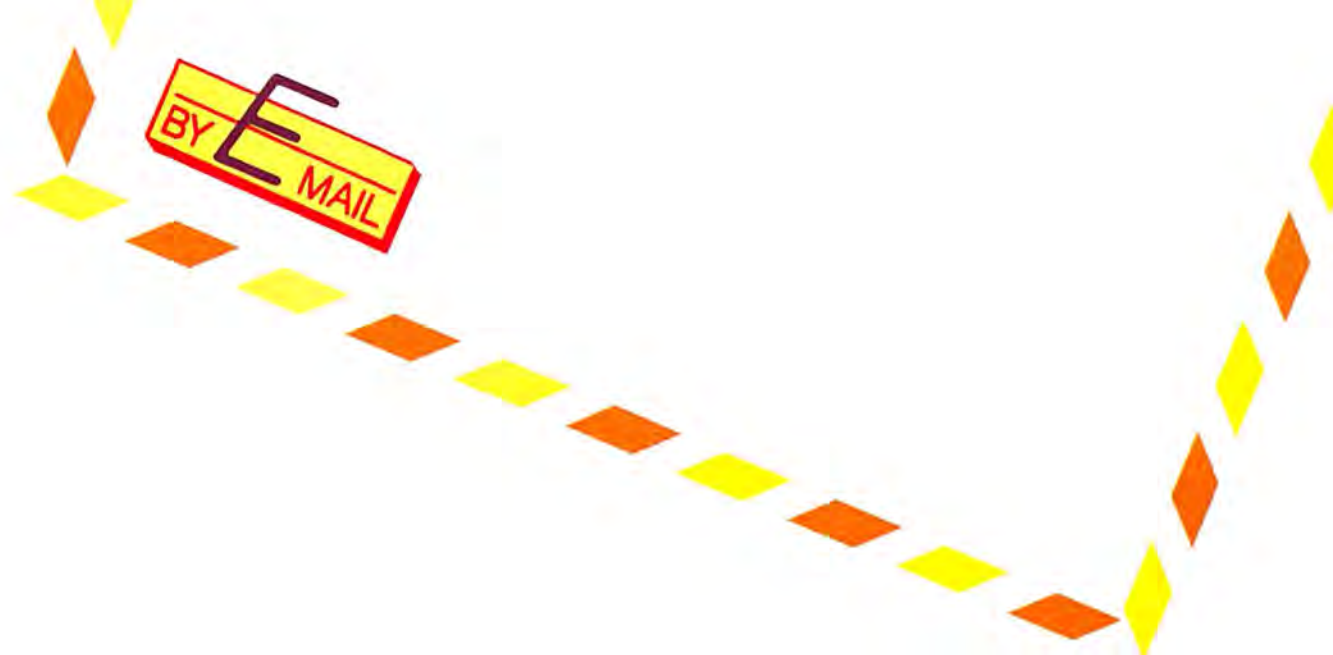
*Chris Yalonis*

|||| It's an idea whose time has come. Instead of playing telephone tag, suffering answering machines and busy signals, or waiting days for the U.S. Postal Service to deliver a letter, you simply push a few keys on your PC, and almost instantaneously your message appears on another computer down the block, across the country, or both. When you use electronic mail, the postman may never ring at all.

Broadly defined, electronic mail (or E-mail) is a \$1.5 billion industry that includes Telex, facsimile and modem communications, and any other communications method that can transmit text or photocopies of documents electronically. More specifically, E-mail is







an electronic message delivery system that enables you to log on to a computer system, compose a message at a terminal, and send it to an electronic "Mailbox" storage area on the same system, where the recipient can retrieve it at his or her terminal.

Currently, electronic mail carries some 2 million messages a day, 35 percent more than a year ago, according to International Resource Development (IRD), a Norwalk, Connecticut, market research firm. But IRD projects that electronic mail, still in its infancy, will be a multibillion-dollar business transmitting 18 billion messages a year by 1990.

Enter MCI Communications. Best known for knocking heads with telecommunications giants on their own turf, MCI burst on the E-mail market in September 1983 with MCI Mail. The company spent \$100 million to develop the service and at the outset offered free MCI Mail service to customers of Dow Jones News/Retrieval—an on-line business and financial data base. MCI Mail currently boasts 200,000 subscribers, with an additional 65,000 occasional users tapping into it through Dow Jones News/Retrieval and the Bibliographic Retrieval Service (BRS), an on-line educational data base of industry-specific journal abstracts.

Somewhere in metropolitan Chicago (for security reasons MCI refuses to disclose the exact location) lies the heart of MCI Mail—a packet-switching network controlled by a mainframe computer. There MCI receives and transmits documents in three forms. An electronic message called an instant letter is stored in a recipient's electronic Mailbox and retrieved through a PC. Paper mail is sent to the MCI print center closest to the destination and delivered to the recipient either through the U.S. mail or via Purolator Courier. Telex messages are transmitted electronically and printed on the recipient's Telex terminal.

While electronic mail devotees promise a paperless office someday, it's hard copy handling that makes MCI a standout among E-mail subscriber services. While offering all the advantages of E-mail, MCI Mail isn't network bound. People who don't subscribe or who don't own PCs can still receive messages through MCI. The system stores letterheads



and can add a copy of your signature to correspondence. Each print center is also set up to do bulk mailing and bundle special mailers.

Print centers are located across the United States and in Brussels, Belgium, for paper mail sent to European addresses. Plans are in the works for a similar center in Asia. For the letter that absolutely has to

*MCI Mail currently boasts 200,000 subscribers, with an additional 65,000 occasional users tapping into it through Dow Jones News/Retrieval and BRS.*

be there on time, MCI in conjunction with Purolator also offers two quick-delivery services that handle overnight (Onite) and 4-hour (4Hour) delivery. Four-hour service, however, is available only in New York, Philadelphia, Washington, D.C., Chicago, Los Angeles, and Indianapolis and operates only during working hours at the city of destination.

### Stepping Into MCI Mail

MCI Mail is one of the easiest computer applications to learn, and it won't clean out your wallet. MCI charges an annual \$18 fee with no connect time charges or minimum usage requirements. The fee includes a free subscription to Dow Jones News/Retrieval Service. You aren't exempt from Dow Jones connect charges, but as an MCI member you save the one-time subscription fee.

Sending an instant letter up to 500 characters (about 80 words) costs 45 cents. Letters between 500 and 7500 characters (1200 words) long cost \$1 apiece, with each additional 7500 characters costing \$1. For paper mail, an MCI instant letter up to 3 pages long costs \$2. Overnight letters of up to 6

pages are \$8, and 4-hour letters of up to 6 pages, \$30. Letterhead registration costs \$20 per letterhead.

A week or two after you've signed up, you'll receive an MCI Mail starter kit with your user ID, a password, a disk-based tutorial, a getting started manual, a quick reference guide, price information, and a directory of local access numbers. All you need is a modem, a telephone line, and any device capable of asynchronous communication. A personal computer, a Telex terminal, a word processor, or even an electronic typewriter will do. For a personal computer you'll also need communications software. Having a program with automatic logon is handy so you don't have to type in your user name and password every time you use the service.

The easiest way to connect to MCI Mail is to dial one of the local access numbers, available at no charge in 65 cities across the country. MCI Mail is also accessible through Tymnet, WATS, Dow Jones News/Retrieval Service, and BRS. An option called MailLink connects in-house electronic messaging systems to MCI Mail.

It's a good idea to go through the practice session on the tutorial disk before you use the system to send mail. After making the connection, type your user name and password at the prompts, and MCI's main menu appears (see Screen 1). When you enter the password, be precise. For security reasons, it doesn't display on the screen. Three mistakes and you're automatically disconnected from MCI Mail.

### The Envelope, Please

Once you connect to MCI Mail you basically have two options—to create and send messages and to read messages in your Mailbox. MCI tells you at the outset whether or not mail is waiting. You can read your mail immediately or wait till after you've sent a letter. Sending letters through MCI Mail is much the same as handling regular paper correspondence: You address an envelope, write text, and send the letter. The Create command encompasses all these functions.

Type Create at the main menu command prompt. At the 'To:' prompt type the addressee's name. Following that add the means of delivery in parentheses: Instant for instant letters transmitted directly to another MCI subscriber's Mailbox, Paper



## Chapter 3: Beneath the Aqua ASCII

The skywriting incident was soon forgotten in the crush of project management and word processing lessons. By the time Rama Disque was able to walk down the critical path of her project solo, I was ready for a vacation.

Whenever I need to get away for a few days, Heyer joins me for a cruise in *The Crashed Disk*. Nothing like it. From a few leagues out, you can't see the smog settling over the Florida Keys.

"So how's the print shop job coming?" asked Heyer as he set down the galley proofs of his latest book. "I saw your client leave the boat a little late last night. Have you succumbed to temptation yet?"

That's Heyer for you, I thought. Good old Heyer, world-famous cognitive scientist and beach bum, and my best buddy. He also had one of the filthiest minds in the Keys.

"Forget it, Heyer, she's married, and very much in love. It's all strictly aboveboard."

"Sounds more like a RAMpage," said Heyer.

I explained to Heyer how Rama had mastered project management in nothing flat, and that things were looking up as far as avoiding a takeover by Quick and Dirty. Now that she had bought a PC, Rama was well on her way to taking Printorama from a quick-print hole-in-the-wall to a first-class four-color shop with float time to spare.

When Rama called me in to Printorama #2 a few weeks later, I was surprised at how much business had picked up. I threaded my way through copying machines and harried print operators to the cluttered back office, where I found Rama staring intently into her PC.

She dispensed with idle chitchat and got right down to business. "The problem is communications," she said flatly. "Our main shop is doing most of the production for this shop now, so I might call over there to check if a customer can get a four-color job back a day early. Only Virgil is away or too busy to come to the phone. All this time the customer is on hold or waiting at the counter. I leave a message to have Virgil call back, and ... well, it's just so inefficient."

I nodded. I knew about inefficient. I had once written a program using the p-System. But that's another story (*The Long Pastel Wait*, now in paperback).

"Maybe you need electronic mail," I suggested.

Rama smiled sagely. "Exactly what I had in mind, especially since

(continues)





```

MCI = MENU      Connected to MCI MAIL      FID = HELP
Against Libya, Officials Say

Type //NEWS on Dow Jones for Details.

MCI Mail Version 3.2

Your INBOX has 1 message

Press <RETURN> to continue

You may enter:

SCAN      for a summary of your mail
READ      to READ messages or LISTS
PRINT     to display messages nonstop
CREATE     to write an MCI Letter
CREATE LIST to make a distribution list
DOWJONES  to Dow Jones News/Retrieval
ACCOUNT   to adjust terminal display
HELP      for assistance

Command (or MENU or EXIT):
01 07/86 16:35:09      Line 24 Column 28

```

Screen 1: The Basic menu shows all the commands you need to use MCI.

```

MCI = MENU      Connected to MCI MAIL      FID = HELP
TO: John Smith

There is more than one:

No.      MCI ID Name      Organization      Location
0 NOT LISTED BELOW, DELETE.
1 NOT LISTED BELOW, ENTER AN ADDRESS.
2 999-9876 John Smith      La Folette, LA
3 998-7654 John Smith      Gladwyne, AL
4 999-5432 John Smith      Smith, Smith & Smythe California, PA
5 887-1234 John Smith      Sleepy, NY
6 998-3343 John Smith      Bakersfield, CA
7 997-4352 John Smith      Soma, OR
8 828-7231 John Smith      Three Guys Electric Somerset, CT
9 879-2211 John Smith      Bowie, TX
10 888-3321 John Smith      Smallville, KS
11 999-6644 John A. Smith      San Francisco, CA
12 989-8365 John A. Smith      Troy, MI
13 887-4921 John A. Smith      Running Dog Shoes Berkeley, CA
14 987-6288 John A. Smith      Chicago, IL
15 899-5960 John A. Smith      Provo, UT
16 898-7043 John A. Smith      New York, NY

01 08/86 11:54:19      Line 24 Column 01

```

Screen 2: MCI address listings display every subscriber with an identical or similar name.

for paper hard copy delivered via regular mail or courier, or Telex. If you don't indicate a means of delivery, MCI assumes instant delivery.

MCI Mail searches for the recipient's name among its subscribers and displays a numbered listing of all identical and similar names and each person's registered organization, city, and state (see Screen 2). Looking for a John Smith or a John Wong may entail a lengthy scroll through the list to find the one you want. If the recipient is not an MCI Mail subscriber, you supply an address for paper delivery.

MCI then displays another 'To:' prompt. You can send a letter to as many people as you want this way. Pressing <Enter> at 'To:' brings up a 'CC:' prompt, for courtesy copies.

You can also send letters to a mailing list. The Create List command enables you to write a distribution list for your letters, label it, and store it on MCI. At any command prompt, type Create List and fill in your address information at the prompts. Whenever you want to use that list to send mail, you enter the label at the 'To:' prompt, and MCI distributes your letter. For bulk mailings MCI has a volume mail service (see "Scenes From an On-Line Sales Campaign" in this issue).

### Take a Letter

After you've addressed the envelope, MCI Mail displays the 'Text:' prompt. You can either type a message directly with the on-line editor or upload a file created with a word processing program. Communications programs generally provide a send function to transmit files.

Because MCI Mail transmits in the lowest common denominator file format, ASCII text, it's simple for a wide variety of computers to communicate through the system. For example, you can send a letter composed on the office IBM PC to your MCI Mailbox, retrieve it at home with a Commodore computer, revise it, and funnel the draft back through MCI to a Telex machine on the other side of the country.

When using a word processing program, you'll find that MCI Mail does not accept high-bit ASCII characters gracefully. For example, codes for formatting commands like underline or boldface are generally displayed as strange characters. If you intend to



we're planning on buying a third shop next month."

"That'll show those Quick and Dirty folks," I said, truly impressed. She must have been reading those computer magazines I gave her. It was encouraging to see a novice take charge like this, but it kind of got on my nerves. If she kept this up, I'd be out of a job.

"You see, if Virgil could just send us the production schedule each morning and afternoon, I wouldn't have to play phone tag with him," Rama continued. "And I could put in E-mail requests for paper stock transfers, things like that."

I worked closely with Rama on the problem, buying another PC for the main office, purchasing modems and software, and choosing the appropriate electronic mail service. The hard part was teaching Virgil. It was clear that he had no interest in using the system. Only when their apprentice, Dixie, volunteered to handle the job did Virgil agree to try it himself. I guess it was bad enough that his wife was showing him up, but he'd be damned if he'd let that snot-nosed Dixie kid outsmart him.

It was like dragging a dog into a bathtub, but I managed to teach Virgil electronic mail. True, Virgil never fully understood that sometimes he was sending commands to the program in the PC, other times to the communications network, and still other times to the electronic mail service, but his gift for memorization pulled him through.

While Virgil was a memorizer, Rama was an explorer. At night, while Virgil was tearing the tops off a few beers at the local tavern (and sometimes cutting his hand on the jagged edges), Rama was getting bleary-eyed in front of the PC, navigating strange new menus, gathering news, taking a look at their stocks, even searching for bargains in the electronic malls.

One evening I dropped by to see how she was coming along. Rama was so engrossed, she barely looked away from the screen. It made me proud to see my student so committed to computing, but I was beginning to get a little worried about her. Her beautiful brown eyes were streaked with red, and she seemed to be losing weight. I'd been there myself once, so I understood, but she was swimming in dangerous waters. Even an experienced hacker knows to take a break every now and then.

"Hey, what do you say we take a breather," I suggested innocently. "Maybe go for a little midnight cruise."

She pressed a few keys without looking up. "Oh, thanks, Travis, but the on-line conference starts any minute now. We're going to be talking about extended memory."

I shrugged. "Suit yourself, Rama." But as I walked out the door I wondered if this Frankenstein might have created a PC-compatible monster.

*(continues on page 205)*



transfer files that include format commands generated by programs like *WordStar*, *Volkswriter*, or *1-2-3*, which use nonstandard characters, you must first convert them to ASCII.

If your message is meant only to be read—not edited—end each line with a carriage return. If you don't insert carriage returns, MCI Mail will do it for you, and your text may come out looking like a jigsaw puzzle. However, if the file will be edited at its destination, you should avoid adding carriage returns except to separate paragraphs.

The MCI Mail editor is tough to work with. Because of the lack of standards in word processing and electronic mail, MCI Mail offers a bare bones, line-oriented editor designed to be compatible with a multitude of existing word processing programs. You

*Because MCI Mail transmits in the lowest common denominator file format, ASCII text, it's simple for a wide variety of computers to communicate through the system.*

can erase words easily by backspacing, but moving around the body of the text is a chore. To edit a letter, you must designate which lines of the draft you want changed and then retype them. In general, short messages are easily created on line with the editor, but correspondence of more than one page should be written with a word processor.

Before incurring delivery charges, it's a good idea to practice creating and sending messages. Write a short note and a long letter using the on-line editor and a word processing program. Send these either to your own MCI Mailbox or to another subscriber who can tell you how they look when received.

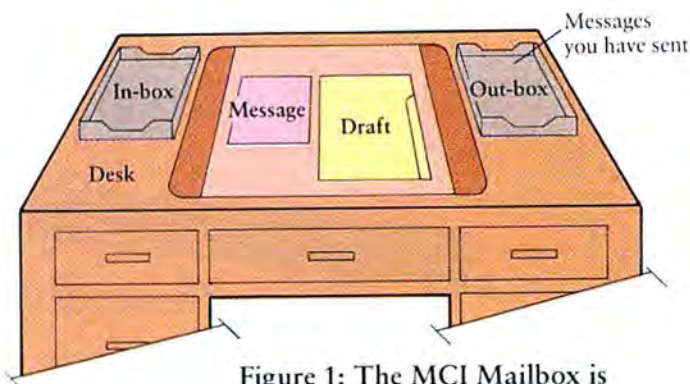


Figure 1: The MCI Mailbox is modeled after a typical desk.

### It's in the Mail

Typing a slash (/) on a line by itself after you've created a message indicates the end of the message and brings up the 'Handling?' prompt, where you indicate how the letter should be sent: Instant, Paper, Onite, or 4Hour. Just press <Enter> to send a letter as instant mail or regular paper mail. Typing Onite or 4Hour at this prompt delivers paper mail by courier. You can also give priority to instant letters by labeling them Onite or 4Hour, which places them ahead of other messages in the recipient's Inbox.

The MCI Mailbox resembles the typical office workspace, with Inbox, Outbox, Desk, and Draft sections (see Figure 1). The Inbox stores electronic mail until it's read; after that, it is automatically transferred to the Desk. You can store a letter you've created but haven't sent in the Draft section so you can retrieve and complete it later, and the Outbox saves a copy of each outgoing message. The Desk, Draft, and Outbox sections all delete messages after holding them for 24 hours.

With the Scan command you can quickly see what's in each section of the Mailbox. Scan displays a brief message summary that includes dates, recipient or sender name, and subject. Type Scan Inbox, for instance, to display a list of all mail waiting to be read.

When you want to read mail, first activate the download, or receive, feature on your communications program, then issue the Read command. MCI periodically stops transmission of the letter to ask if you want to see more. You must press <Enter> to continue. This allows you to read your mail while you're downloading it but can be a nuisance if you're trying to save a long document. If you're sure you want to save something, using the Print command in place of Read saves a lot of time by downloading the message nonstop.



## Helping Out

If you get lost in the shuffle, MCI is always there to help you sort things out. You can type Help followed by any function name at the command prompt for information. For instance, Help Edit explains what the text editor does and how you use it. If you don't enter anything at a command prompt, after 5 minutes MCI automatically kicks you out of the system, but don't worry—if you get stuck or distracted, MCI warns you when you're about to be cast out. When you're really stumped you can call a toll-free number for technical assistance.

The features described in this article represent MCI's Basic Service. An extra \$10 per month buys the Advanced Service, which forgoes menus. It is instead command-driven and allows you to chain commands for faster processing. Messages in the Outbox, the Inbox, the Draft section, or the Desk are saved for 5 days instead of 24 hours before being deleted. You can store more than one draft, register 15 letterheads or graphics for printing of paper correspondence, and forward messages from your Mailbox to another location.

## No Track Record, Yet

Although about a dozen major services compete in the E-mail game, even the biggest companies, including MCI, have yet to show a profit for their electronic mail services. The U.S. Postal Service gave up trying to sell its E-COM electronic mail service in the fall of 1985.

IBM bought 16 percent of MCI in 1985. How Big Blue will capitalize on this relationship remains to be seen. It's safe to assume, however, that new products, features, and services from MCI are on the horizon. E-mail is here to stay. ●

*Chris Yalonis is president of The Jupiter Group, a Sausalito, California, a management consulting firm in the microcomputer industry. He is the author of eight books and numerous articles on the computer industry.*

### MCI Mail

1900 M St. NW #1001  
Washington, DC 20036  
800/624-2255

*Cost: \$18/year, varying charges depending on method of delivery*

*Requirements: one disk drive, communications software, modem, standard telephone line*

Command (or MENU or EXIT):

01/07/86 16:35:09



# Scenes From an On-Line Sales Campaign

Or, how the Lone Wolf Scientific sales department used the latest version of Crosstalk XVI to automate sending sales orders, access the company data base, keep in touch with customers via MCI Mail, and perform other amazing feats.

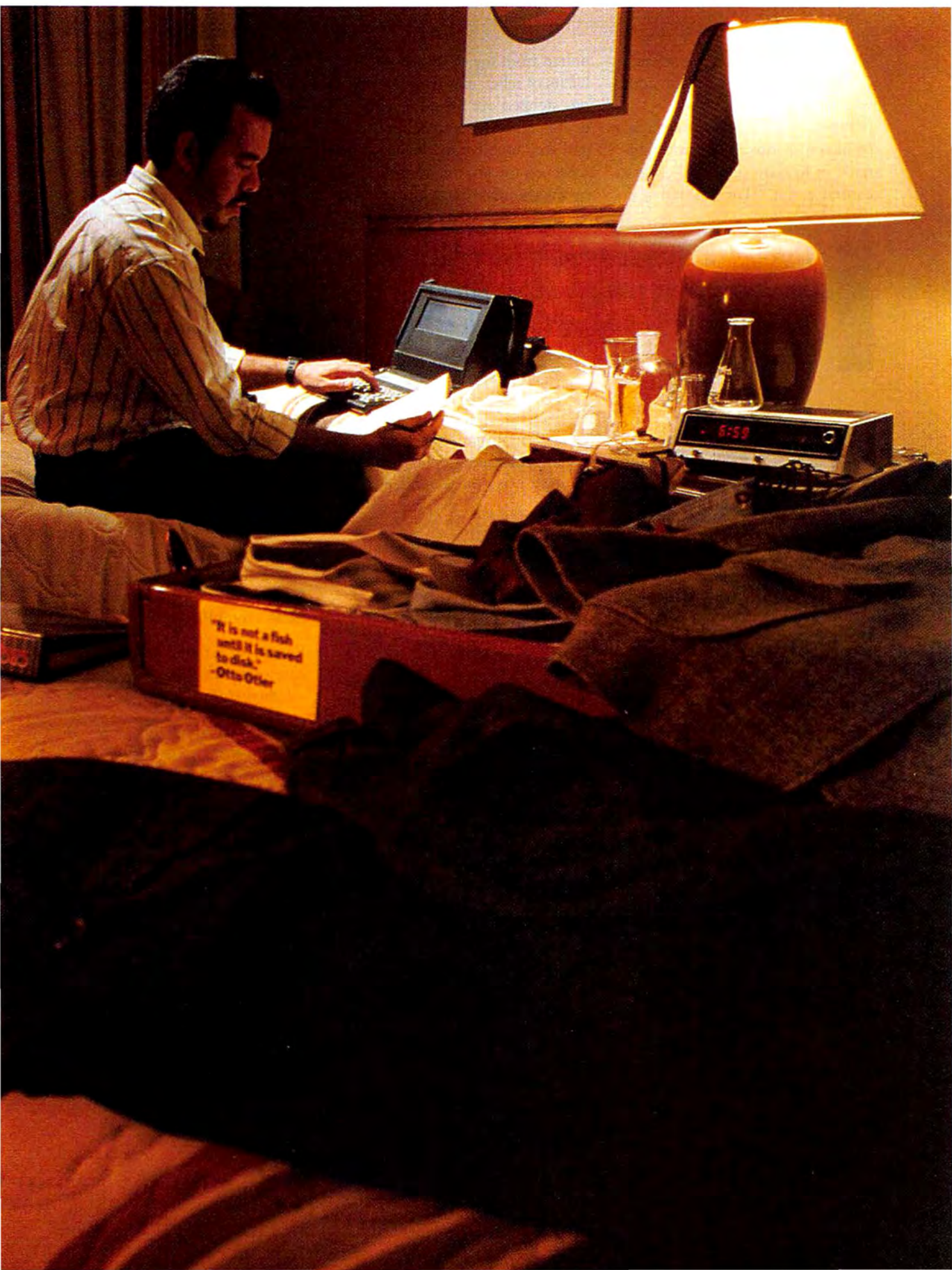
*Judy Getts*

||||| "Better to telecommunicate in remote places than burn incense at home." That's what my boss Otto says. He loves to make up proverbs like that, especially if they are applicable to our new on-line sales campaign. Here's another of his favorites: "He who hunts two hares and forgets to take along his MCI Mail password is as good as a rooster who thinks he's a bullterrier." A regular Kahlil Gibran of teleconferencing, Otto is.

Strange, but that's how I felt, sitting there on the floor of the broken hotel elevator, somewhere in Boise, with a dozen unfilled purchase orders in my briefcase. My Morrow Pivot portable computer sat by my side, and my sample cases full of glass beakers, Erlenmeyer flasks, Bunsen burners, surgical scissors, and rubber hoses were spread around me in defensive formation. I was itching to auto-dial, but there was no way to connect. I was aching to go









asynchronous, but no phone jack was in reach. Maybe cellular radio was the way to go after all.

Beside me, a man in an overcoat so heavy he looked like he'd wintered in Krakow appeared close to cardiac arrest. "The hospitality

bolted from the elevator with bleats of relief, and the centered one stepped out the door with unconcerned ease. Quickly I gathered together my luggage and hastened toward the door, buoyed by the thought that within mo-

*Through a slick combination of MCI Mail, direct connections to the company's mainframe, and frequent Kermit transfers, life is sweeter.*

suite!" he shrieked. "I was supposed to be in the hospitality suite an hour ago." The man next to him, his beatific smile implying sight into some higher realm, balanced a sample case not unlike my own on his knees. He kept repeating, "You know, this happened to me once in Hackensack, New Jersey."

So you can understand why a two-wire connection was my keenest desire. To pass the time I read my *Crosstalk XVI* manual, took notes, wrote script files, and fantasized about carrier detect signals.

As we neared the hour mark, the man in the overcoat screamed, "We're going to run out of oxygen!" and flung himself against the doors like a human sacrifice.

"It didn't happen in Hackensack," remarked the other, his serenity seemingly undiminished.

When the vinyl-padded doors finally creaked open, Mr. Krakow

ments long-distance access would no longer be a theoretical state of mind. It was time to modem home.

#### ■ Crosstalk to Pocatello

*When the cobra bites, you know you just gotta go 1200 baud.*

—Otto Otlar

Otto may be strange, but he's also the driving force who got our sales force on line. Thirteen of us work the upper northwest territory, driving from one jerkwater town to another. Sometimes we're on the road for weeks hawking centrifugal pumps, petri dishes, lab carts, and little rubber stoppers to hospitals, government labs, and private research facilities.

Coordinating everyone used to be a nightmare, what with 18 reps dialing the home office half a dozen times a day to dictate sales orders and keep Otto at bay with fastidiously detailed customer updates. Now, through a slick combination of MCI Mail, direct connections to the company's mainframe, and frequent Kermit transfers to the regional office in

Pocatello, Idaho, life is sweeter.

The cornerstone of this setup is the latest version of Microstuf's *Crosstalk XVI*—version 3.6. *Crosstalk* now provides Kermit error checking for swapping files and enhanced terminal emulation for playing dumb. The new version also flaunts a few minor script language improvements, automatic modem speed settings, *TopView* support, and a new XMODEM, which Microstuf maintains will cooperate with "every flavor of checksum XMODEM we could find to test it against."

A number of bugs have been fixed in version 3.6, and its loading time is much faster. Microstuf also claims its program now supports modem speeds up to 115,200 bps.

#### ■ Another Lonely Hotel Room

*Beware of programmers who carry screwdrivers.*

—Leonard Brandwein

*Somewhere, something incredible is waiting to be known.*

—Carl Sagan

(Both quotes taken from *Crosstalk's* introductory screens)

Once I'd established myself in the hotel room, I set up my trusty Pivot. The phone cord from its internal modem wound its way down the tacky chenille bedspread and into the wall jack. After kicking off my loafers and flinging my tie over the lampshade, I loaded *Crosstalk* plus the command and script files to dial up Effie's AT by typing `xtalk effie`.



*Crosstalk* has two main genres of files: script files and command files. A command file contains settings for such variables as the phone number, the modem's dialing string, the bps rate, the number of stop bits, and other communications parameters--in short, the information *Crosstalk* needs for dialing out and communicating. STD.XTK operates as the default command file, but with the aid of prompts in the NEWUSER file, other command files can be set up to dial various on-line services. You can also customize command files by adjusting the settings displayed on the main menu. You enter commands on the command line, then type **STD.XTK** to view a listing of the "unseen" default settings. Finally, you type **save filename** and press **<Enter>**. Or you could copy STD.XTK, rename it, and then pull up the DOS editor and adjust the settings.

Command files may be run either solo or in tandem with script files--short programs that take over once you're on line. You can use scripts for automating logons, even entire sessions.

My script for sending sales orders to Effie is called EFFIE.XTS (see Listing 1). The command file it interacts with is EFFIE.XTK. To load them together along with *Crosstalk*, I just enter **xtalk effie** at the DOS prompt. My script dials her number, initializes the connection, enters my password when

her system requests it, and enters **<Ctrl> -C** so that her copy of *Crosstalk* responds to my commands.

At the command prompt from her system, my script sends the command **RKermit** to set up her AT to receive my files via the Kermit protocol. It proceeds to transmit my fresh batch of sales orders, then logs off. Effie doesn't have to be at her AT while I'm sending, and all I have to do is watch. In fact, I don't even have to do that.

The script's helpmate, the command file EFFIE.XTK, was set up by adjusting the default communications settings and assigning macros to the function keys. To assign the logon to a function key, I typed **fk c9 password |**. (C9 is the abbreviation for **<Ctrl>-<F9>**, and the **|** represents *Crosstalk*'s carriage return [see Screen 1].) **<Ctrl>-<F1>** (abbreviated as **C1**) holds the **<Ctrl>-C**

```
; Script to log in to Effie's system and
transmit
; Wait for log on prompt
WAit Char ":"
WAit Delay 5
; Send my password, plus a carriage return (|)
from <Ctrl>F9 function key
REply @C9
CLear
MMessage

You're now logged in.

ALarm 3 Now
WAit Delay 5
; Send <Ctrl>C (contained in function key
Ctrl-F1) to set the command mode on
Effie's system
REply @C1
; Send "RKermit" command, plus a carriage
return (contained in function key <Ctrl>F2)
to receive files via Kermit on Effie's system
REply @C2
; Tell my system to send all files
with extension ".XXX"
XKermit B:*.XXX
REply |
; Set command mode on Effie's system
REply @C1
; Send "BYE" command, plus a carriage
return (contained in function key <Ctrl>F2)
to log off
REply @C3
```

Listing 1: EFFIE.XTS, a sample script on *Crosstalk* XVI 3.6 (comments are preceded by semicolons)



command that sets Effie's system to respond to commands from mine (<Ctrl>-C is displayed as ^C when you set the function key). <Ctrl>-<F2> readies Effie's system to receive a Kermit transfer; and <Ctrl>-<F3> stores the command to log off (see Screen 2). Finally, I typed **save filename** to store the function key assignments.

You can assign both character strings and *Crosstalk* commands to function keys. Script files, on

the other hand, can hold only *Crosstalk* commands. I assigned most of the *Crosstalk* commands to function keys, but I could just as well have embedded the commands in script files.

Say, for instance, I don't want to automatically log on and transmit files to Effie's system, but I still don't want to have to tap out long password commands. I simply assign the same function key settings in EFFIE.XTK to the default command file STD.XTK. With STD.XTK loaded, I'll be able to automatically transmit files at the flick of a key.

| CROSSTALK - XVI Status Screen |          |                  |      |            |                       |          |     |          |     | Off line |
|-------------------------------|----------|------------------|------|------------|-----------------------|----------|-----|----------|-----|----------|
| Name Effie                    |          |                  |      |            | Loaded A:EFFIE.XTK    |          |     |          |     |          |
| Number 800-247-5470           |          |                  |      |            | Capture Off           |          |     |          |     |          |
| Communications parameters     |          |                  |      |            | Filter settings       |          |     |          |     |          |
| SPeed                         | 1200     | PARity           | None | DUPlex     | Full                  | DEbug    | Off | LFauto   | Off |          |
| DATA                          | 8        | STop             | 1    | EMulate    | None                  | TABex    | Off | BLankex  | Off |          |
| Port                          | 1        |                  |      | Mode       | Call                  | INfilter | On  | OUTfiltr | On  |          |
| Key settings                  |          |                  |      |            | SEnd control settings |          |     |          |     |          |
| ATten                         | Esc      | COmmand ETX (^C) |      |            | CWait                 | None     |     |          |     |          |
| SWitch                        | STX (^B) | BReak End        |      |            | LWait                 | None     |     |          |     |          |
| Available command files       |          |                  |      |            |                       |          |     |          |     |          |
| 1) EFFIE                      |          | 2) MCMAIL        |      | 3) NEWUSER |                       | 4) SETUP |     | 5) STD   |     |          |

Command? fk c\_

Screen 1: Assigning macros to function keys on Crosstalk XVI. The command **fk c** displays a listing of current <Ctrl>-function-key settings.

## Kermit Meets Herbie

*Better a handful of dry dates and a fuzzy phone connection than have none at all and be kicked in the eye by a brooding camel.*

—Otto Otler

The Kermit error-checking protocol is quite convenient because it works on computers from micros to mainframes. Effie uses it all the time for exchanging files with the company's DEC VAX minicomputer, "Herbie."

Kermit is one of the more sophisticated protocols available on the PC, giving users a high degree of control over parameters and the level of error checking. Plus, it operates in two different modes—server and nonserver. Server mode allows your Kermit to "talk" to another computer operating in the same mode, thus automating file transfers. However, *Crosstalk's* Kermit, like most PC versions of Kermit, is limited to operating in nonserver mode.

Once Effie receives my sales orders via Kermit, she extracts the data she needs for Otto, then whisks them along to Herbie's data base via a hard-wired connection. For this she relies on *Crosstalk's* DEC VT 100 terminal emulation function, which she loads by typing EM VT at the main menu. Version 3.6 adds a few embellishments to VT 100 emulation, such as the abilities to program the <Backspace> key and to send formfeed characters to a printer.

I use VT emulation when I'm on the road and want to dial up Herbie's customer data base to track



inventory or extract information on past purchases, account balances, and delivery information. Emulation mode allows my diminutive Pivot to masquerade as a DEC VT 100 terminal in the presence of Herbie, converting its escape sequences for such activities as cursor positioning into something intelligible to my Pivot. Almost everything works the same, although you lose control of function keys <F1> through <F4>.

Granted, Herbie misses the VT 100's 132-character screen onto which he usually projects his ego, but now his data management software can be designed and maintained without the need to support a Mardi Gras of different computers and terminals.

## MCI Mobility

*Slicing bread is easy, but learning how simple it is to use MCI Mail is like ripping the shrink-wrapped cellophane off a unicycle.*

—Otto Otlar

A terrible fear struck our sales department not long ago. Its outbreak coincided with Otto's announcement that we were all going to start telecommunicating on MCI Mail, no ifs, ands, or buts about it.

It was pandemonium the first week. One rep, as soon as he received his MCI Mail starter kit, started hyperventilating. Another fed his floppy disk containing the MCI tutorial to the guppies. A

third acquired the habit of, whenever he heard the phone ring, maniacally flipping through his MCI quick-reference guide and looking around the room for help.

As for myself, I responded as I do to all such stressful situations: For days I was haunted by an overwhelming compulsion to watch TV. To my surprise, however, I found MCI Mail was kind of fun once I got the hang of it. In fact, learning how to use it takes less time than a drive to the post office. You can use MCI Mail to not only send and receive messages but dispatch telexes, send out overnight hard copy letters on your own company stationery, even create and maintain mailing lists.

We have one corporate MCI account for our entire office, so our in-boxes and out-boxes get rather crowded. Our daily call-in reports to Otto are sent to the Inbox, and

Effie downloads and saves them to disk with *Crosstalk's* capture function. Otto also keeps in touch with us individually, relaying new customer leads, advising us on particular clients, and mass-mailing us memos on the latest incentive program. In addition, we keep in touch with each other, and Effie keeps tabs on us, sending us notes through the Inbox with updates on hotel reservations, calls we received at the office, even orders that were placed by customers.

It may sound complicated, all this "networking," but it's really not. Once you log on to MCI, you can perform two main tasks: read messages and create them. (See "Communications Post Haste" in this issue for a tutorial on MCI Mail.)

*Crosstalk* provides a ready-made script file for automating

```

CROSSTALK - XVI Status Screen                               Off line
Name Effie                                                    Loaded A:EFFIE.XTK
Number 880-247-5470                                           Capture Off

----- Communications parameters -----
Speed 1200 Parity None Duplex Full
Data 8 Stop 1 EMulate None
Port 1 Mode Call

----- Filter settings -----
DEbug Off LFauto Off
TABex Off BLankex Off
INfilter On Outfilter On

----- Key settings -----
ATten Esc Command ETX (^C)
Switch STX (^B) BReak End

----- SEnd control settings -----
CWait None
LWait None

----- CTRL - function key definitions -----
F1 = ^C F2 = RKernit!
F3 = BYE! F4 =
F5 = F6 =
F7 = F8 =
F9 = F10= Bdo hangup!

Command? fk c9 shiptoshore85!_

```

Screen 2: To set up a macro for automatically logging on to a system, assign the password plus a carriage return to <Ctrl>-<F9>, by typing `fk c9` and then the password.



logon to MCI Mail, but it has a few problems. It can't be used to log you on to MCI Mail automatically if you're dialing through Tymnet; the prompts and timing are slightly different, so I wrote my own script (see Listing 2).

The 'C8' in Listing 2 is the function key for your account name; 'C9' is your password. This logon should work for most Tymnet numbers, but don't be surprised if you experience occasional peculiarities. Tymnet has a temperamental nature.

As for the *Crosstalk*-supplied script file for automating logon to MCI Mail through a direct line—MCIMAIL.XTS—the timing is off.

The easiest fix for this is to call up your editor, display the file, and delete the fifth line, which reads: 'WAit String "port:"'. That done, the script will automatically respond to MCI Mail prompts with your user name and password.

You can write addenda for either of the two *Crosstalk* MCI mail logon scripts so that *Crosstalk* will not only log you on automatically but enter the Read Inbox command to fetch your waiting mail, capture the mail to memory, log off, and then write it to disk for later perusal. Unfortunately, I have to perform these chores manually. Because we have only one department account, I need to first Scan the Inbox to

pick out which mail is mine. I can however, use *Crosstalk* to assign commands like Scan Inbox to function keys.

## Mailing List Management on MCI

*It is not a fish until it is saved to disk.*

—Otto Otter

The MCI feature I find most useful is the one that allows you to create and maintain mailing lists. As in creating an envelope, you type **Create List** at the 'Command?' prompt. MCI Mail asks for a name for your list, and you can enter something like Most Esteemed Customers. After that, enter your addresses along with delivery instructions at the 'To:' prompts. By this method you can send some people on the list electronic mail, some hard copy, others telexes.

Far easier than plowing through all the prompts and queries, though, is uploading a mailing list. At the 'To:' prompt enter **/Upload On** and then instruct *Crosstalk* to send your mailing list. Next, enter **/Upload Off** and you're ready to go. The list can be edited with MCI's line editor, accessed by the Edit List command, and displayed by the Read command. It can be updated at any time. A directory of all the lists maintained in your account can be viewed by typing **Scan List**.

You can later send personalized mail to all those on a particular mailing list by merely entering the list name at the 'To:' prompt. For a fee, MCI print centers will even

```
;TYMNET login script file
WAit Delay 30
REply "a"
WAit String "please log in:"
REply "MCIMAIL"
REply |
WAit Char ":"
REply @C8
REply |
WAit Char ":"
REply @C9
REply |
WAit String "opened."
CLear
MMessage

You're now logged in to MCI MAIL.
.

Alarm 3 Now
```

Listing 2: *Crosstalk* script to log on to MCI Mail through Tymnet



prepare special mass mailings for you with extra touches such as inserts and odd-size envelopes.

Lone Wolf Scientific maintains a number of lists—one for general mass mailings, containing the names and addresses of all our customers, plus numerous special-interest lists for targeted promotions. Those lists might contain the names of customers who are interested in specific large price tag items, such as our \$150,000 plush and forested marsupial habitat, or have a more general interest in one of our product lines, such as our utensils for maintaining botanical gardens.

**F**or a fee MCI print centers will even prepare special mass mailings for you with extra touches such as inserts and odd-size envelopes.

Along with these company lists, each salesperson maintains an individual list of assigned customers. Not only that, but we can share mailing lists maintained by other departments in their individual MCI accounts, thus tapping into the advertising department's list of scientific journals in which our ads regularly appear or the promotion department's invitation list for the forthcoming Lone Wolf Scientific Spring Instrumentation-fest. That's going to be one heck of a party.

## Horseshoes and Hyacinths

*A traveling salesman without a modular jack is like the Gate of Peacocks without special hours for tourists.*

—Otto Otler

After I logged off MCI Mail, excited *Crosstalk*, and shut down my Pivot for the night, I contemplated how our lives at Lone Wolf Scientific had changed since we went on line. No longer do I have to scramble to customers with apologies when they receive 8000 petri dishes rather than an 8-gallon aquarium because my verbal sales

order was misunderstood. More important, no longer do I have to suffer the high-decibel range of Otto's carnival-barker voice as I give him his customer updates over the phone and he shouts his replies.

Otto has other things planned for us: teleconferencing, fiber optic connections, T1 carriers. I don't even know what a T1 carrier is, but then again, I didn't know what MCI Mail was just six months ago. I'm glad I do now. As Otto himself likes to say, "People may think you shoe horses, but once you're on MCI Mail everyone gets hyacinths." Frankly, I think Otto's been to one motivation seminar too many, but you can't argue with success.... ●

*Judy Getts is a freelance science writer. Technical assistance was provided by Steve Montgomery, a computer consultant in Milwaukee and author of the book Profitable Pricing Strategies, forthcoming from McGraw-Hill.*

*Crosstalk XVI version 3.6  
Microstuf, Inc.  
1000 Holcomb Woods Pkwy.  
#440  
Roswell, GA 30076  
404/999-3998  
List price: \$195 (no charge to upgrade from 3.5)  
Requirements: 96K, one disk drive, serial port, modem*

*MCI Mail  
1900 M Street NW #1001  
Washington, DC 20036  
800/624-2255  
Cost: \$18/year, varying charges depending on method of delivery  
Requirements: one disk drive, communications software, modem, standard telephone line*

*Pivot  
Morrow Designs Inc.  
600 McCormick St.  
San Leandro, CA 94577  
415/430-1970  
List price: 256K, one disk drive \$1995; 256K, two drives \$2995; 640K, two drives \$3795*



# Relay Strikes Gold

Relay Gold is more than just an update of the popular Relay communications program. A powerful new script language, limited multitasking, and the addition of Kermit error checking add up to powerhouse telecommunications for the PC.

*Aubrey Pilgrim*

||||| As PC users grow increasingly dependent on electronic mail, on-line services, and micro-to-mainframe links, the medium of communications grows in importance. A new generation of powerful communications packages strives to keep up with the rising expectations of telecommunications by providing advanced features that can handle a variety of on-line situations. Last year Microsoft came out with the overwhelmingly thorough *Access*. Soon afterward, VM Personal Computing delivered *Relay Gold*,







```

RELAY Gold 1.0      (c) Copyright 1985 VM Personal Computing      Modem

Please indicate the type of modem you have connected to your computer and
press ENTER (↵) to proceed.

T = AT&T AutoCall 2224      P = Popcon X100 or C100
H = Hayes Smartmodem 300, 1200, U = Racal-Vadic VA212
    1200B, or compatible    W = Racal-Vadic 2400PA
S = Hayes Smartmodem 2400    X = Racal-Vadic Maxwell
    or compatible          1200V or 2400V
C = Penril Pacer 2400      R = Rixon PC212A or R212
    or Auto Data 300/1200  E = Telenetics ExpressData

O = Other "AT" autodial modem, not listed above
I = Other intelligent modem (user programmed)
M = Manually operated ("dumb") modem
A = Manual modem with autoanswer capability
D = No modem used (or direct connection)

Your Modem Code is: D

Press F10 for HELP
CAPS      12/29/85 19:36:57      Line 21 Column 50
    
```

Screen 1: Relay Gold installation screen. The program supports a number of popular modems, including those operating at 2400 bps.

```

RELAY Gold 1.0      (c) Copyright 1985 VM Personal Computing      OFFLINE

Your PC ID is: AUBREY PILGRIM

F1 = Call JOHN
F2 = Answer a Call From A PC
F3 = Review the Directory of Computers
F4 = Set Personal Computer Options
F6 = Edit a File
F7 = Print Files
F8 = Run a Program
F9 = Stop Printing

This is a demonstration copy. Please do not copy or resell.

Esc = Exit      F10 = HELP
CAPS      12/29/85 19:37:54      Line 06 Column 38
    
```

Screen 2: Relay Gold's main Offline menu. Menus are essentially unchanged from the earlier Relay, and you can modify the color scheme to your preferences.

which takes the familiar menu-driven shell of *Relay* and turns it into a competitive, high-end performer. VM still supports the old *Relay*, but registered users can upgrade to the new *Relay Gold* for \$75.

Like *Access*, *Relay Gold* contains the two major features that will be commonplace in future communications packages: a powerful script language for customizing on-line sessions, and concurrent communications (see "Equal Access," *PCW*, January 1986, for a review of *Access*). *Relay Gold*'s script language can automate complex conditional situations for unattended communications.

If the prospect of learning a programming language in order to telecommunicate is intimidating, don't worry. Although it seems to be adding unnecessary complexity, a script language is intended to make communications easier. Communications companies are counting on every office having at least one guru who can set up automated script routines for others. This ability to streamline tedious transfer sessions is especially helpful when communicating with demanding, security-conscious mainframes.

The second prerequisite—concurrency—is a somewhat vague buzzword that has already been used and abused to the point of incomprehensibility. *Access* claims concurrency by supporting Tymnet's X.PC error-checking protocol. When using the Tymnet communications network or communicating with another X.PC-equipped system, you can run up



to eight sessions simultaneously, display them in different windows, and cut and paste between them. In *Relay Gold*, VM Personal Computing defines the concept a little differently. As in *Relay*, if the remote system you are communicating with also uses a *Relay* product, you can send and receive files simultaneously and chat with the remote user at the same time.

Another handy feature lumped under the concurrency label as well as under the category of *multitasking* is the ability to transmit files in the background while running another application, such as a word processing or spreadsheet program. While the term *concurrency* may be more appropriately applied to *Access's* X.PC features than to *Relay Gold*, the latter's interpretation may provide more advantages to the user.

### ■ Relying on Relay

Aside from concurrency and script programming, *Relay Gold* is quite similar to its venerable sire, *Relay*, now all of 3 years old. The menus look about the same, and you get the same high-speed performance when communicating in VM's proprietary *Relay* error-checking mode. Other important functions that have been retained include macros, a full-screen editor, password encryption, and unattended and remote operation.

The changes from *Relay* have been few, but significant. Although the old *Relay* contained a script language, *Relay Gold's* is much more versatile and powerful.

With the addition of a Learn mode, which makes a copy of an on-line session for future use as a script, the script language is also easier to learn and use.

A *Relay Gold* function not found in the old *Relay* is the

Along with VM Personal Computing's friendly phone support, the company maintains a bulletin board system (BBS) with all the latest changes and improvements to the program. To receive an update, simply call the BBS, give the

*If the remote system you are communicating with also uses a Relay product, you can send and receive files simultaneously and chat with the remote user at the same time.*

Scrollbar buffer, which automatically saves the last 32 screens of your on-line sessions. This feature is helpful when screens of data roll past before you remember to start capturing data. *Relay Gold* has also added support of the Kermit error-checking protocol, which was tacked on to the latest update of *Crosstalk XVI* as well. (See "Scenes From an On-Line Sales Campaign" in this issue for more on the Kermit protocol and *Crosstalk XVI* 3.6.)

### ■ Digging for Gold

*Relay Gold's* new disk-based tutorial takes less than an hour but is comprehensive enough to have you using *Relay Gold* right away. Inside the main program, context-sensitive on-screen help is available by pressing <F10>, bucking the industry standard of using <F1> for help.

*Relay Gold's* reference manual contains plenty of sample screens, commands, and script files. Despite the wealth of examples, the manual's organization is mediocre. Although the documentation manages to convey the bulk of necessary information, it omits a few key points along the way.

password that comes with your copy of the program, and you can download all of the latest improvements. A *Relay Gold* utility program takes these changes and automatically inserts them into the proper program files.

Because *Relay Gold* is not copy protected, making backup copies or installing the program on a hard disk is easy. However, when you are connected to another PC using *Relay Gold*, the programs exchange serial numbers and compare them. If the two numbers are identical, both programs terminate the session.

When you load *Relay Gold* for the first time, an introductory screen appears, asking you to type in a user ID. It then displays a list of popular modems, including the newer 2400-bps variety (see Screen 1). Although not listed, *Relay Gold* also supports the 10,000-bps Fastlink/Trailblazer modem.



## The Offline Menu

Once the installation screens are completed, the main Offline menu appears (see Screen 2). As in the rest of the program, commands are executed via the function keys. If your modem is tied to COM1: (the default), then your configurations should be complete. Selecting <F4> (Personal Computer Options) from the main menu provides an option to redirect the program to use COM2:.

One of the options on the <F4> screen asks, 'Should the new user screen be displayed at startup?' One thing the manual fails to mention is that if you answer yes, the COM port settings and any other changes you have made revert to the defaults the next time you load *Relay Gold*.

Worse, turning off the introductory screens isn't enough to restore

3). Pressing <F4> displays the Connect Options menu, showing the configurations for the currently selected entry (see Screen 4). Here, you can set the COM port, as well as parity, protocol, and other parameters. Once on line, you can't change the error-checking protocol except to switch to a straight ASCII non-error-checking transmission.

The program offers Relay, XMODEM, and Kermit protocols. If the remote system is running with *Relay Gold*, *Relay*, or any of the mainframe *Relay* products, such as *Relay/3270*, *Relay/VM*, and *Relay/TSO*, choose the Relay option. This proprietary protocol provides the fastest error-free transmission of any protocol supplied. Because all the *Relay* products share the Relay error-checking protocol, and *Relay Gold* also

option. Unfortunately, nowhere in the documentation or the help screens is the difference between the two versions explained.

Quite logically, <Esc> brings you back to the previous menu, in this case the dialing directory. To add a phone number to the directory, begin by choosing a model that is similar to the system you will be communicating with. According to VM Personal Computing, there are only two types of communications users: those using a *Relay* product on a PC (choose the 'A PC' entry) and all others (choose 'A HOST', even if you're communicating with another PC). This xenophobic viewpoint seems a bit odd at first, but you soon get used to it.

Next, place the cursor at the model entry and press <F3>. A new name field pops up, indicating that a copy of the model has been created, along with a new Connect Options menu. Type in the name and number and change the transmission speed if it's other than 1200 bps.

To initiate a call from the directory, place the cursor at the desired entry and press <F1>. You can also dial from the main menu by typing the name of a directory entry in the block at <F1> and pressing <Enter>. To answer a call from another computer, press <F2> at the main menu. If the caller is listed in your directory, type in the name of the remote entry before pressing <F2>. If the caller is using a *Relay* product on a PC and is not in the directory, type in A PC. For any other caller not in your directory, type in A HOST.

*Aside from concurrency and script programming, Relay Gold is quite similar to its venerable sire, Relay.*

the COM port settings. You must individually assign COM2: to each phone number on the dialing directory (see Screen 3). *Relay Gold* makes having both a modem and a serial printer a difficult burden.

The manual is less than lucid on the required procedure. From the main menu you press <F3> for the dialing directory, which lists 20 types of computers and services such as Dow Jones, CompuServe, and EasyLink (see Screen

emulates VT 100, VT 52, and VT PCI terminals, the program is a good choice for micro-to-mainframe applications.

Two versions of XMODEM are listed on the Connect Options menu: C for the XMODEM Checksum protocol and X for the XMODEM CRC method. They differ substantially. The older Checksum version, or the C option, is most common on BBSs. The CRC form of XMODEM, or the X option, is a newer, improved protocol, but most BBSs don't carry it, and many communications programs don't offer it as an



The line at the top of the screen tells you what system you are connected to. The status line at the bottom displays a <CapsLock> indicator and the number of characters sent or received as they are transmitted.

## Split Screens and Concurrency

Once you are connected to another computer, the directory disappears. If you are communicating with another system using *Relay Gold*, a split screen appears, producing a clutter-free chat space. The top half displays the messages from the other system, while your messages appear on the bottom half. Files can be transmitted in both directions simultaneously even as a dialogue is in progress.

Pressing <Esc> brings up the Online menu; like the Offline menu, its options are each tied to a function key (see Screen 5). If you press <F3> to send a file to another computer, a new screen appears, indicating the protocol you are using and asking for the name of the file to be sent. The screen also displays a listing of the files on your current directory or drive. Several files can be queued up to be sent sequentially by pressing <Ctrl>-<Enter> after each file name and <Enter> after the last name. *Relay Gold* follows the DOS convention of using asterisks and question marks as wild-card characters.

To receive, or download, a file, press <F4>, and another screen appears, asking you to name the file that will be received. If the file name is the same as one already in your disk directory, the program renames the existing file with a .BAK extension. One excellent feature is that before the transfer begins, *Relay Gold* automatically

| Directory of Computers |                  |       |      |                             |
|------------------------|------------------|-------|------|-----------------------------|
| Name                   | Telephone Number | Speed | Type | Notes and Comments          |
| A HOST                 |                  | 1200  | Host | MODEL: Full duplex host     |
| A PC                   |                  | 1200  | PC   | MODEL: A PC Using RELAY     |
| COMPSERV               |                  | 1200  | Host | MODEL: CompuServe Access    |
| DOWJONES               |                  | 1200  | Host | MODEL: Dow Jones News       |
| EASYLINK               |                  | 1200  | Host | MODEL: EASYLINK             |
| GOLD                   | 12037979323      | 1200  | PC   | ON PC SUPPORT Danbury       |
| MODEM                  | MODEM            | 1200  | Host | Type directly to your MODEM |
| NEWSNET                |                  | 1200  | Host | MODEL: NEWSNET              |
| NSJDIR                 | 4089458358       | 1200  | Host | MODEL: Full duplex host     |
| PDES                   | 4087357198       | 1200  | Host | MODEL: Full duplex host     |

Use PgDn and PgUp to scroll the Directory. Press ENTER when finished.

F1 = Call Name at Cursor      F2 = Answer Name at Cursor

F3 = Add a New Name in Directory By Copying Entry at Cursor      F4 = Review Connect Options for Name at Cursor

Esc = Quit      F10 = HELP

CAPS      12/29/85 19:47:38      Line 10 Column 10

Screen 3: The first screen of the Directory of Computers. *Relay Gold* comes with sample entries for the most popular computers and allows you to create your own.

| Review Connect Options for Computer Named: - NEW - |                     |                          |             |
|----------------------------------------------------|---------------------|--------------------------|-------------|
| Parity Code?                                       | 1 (I,N,E,O,M,S,7,8) | Logon Script Filename?   |             |
| Local Echo?                                        | Y (Y,N)             | Full or Half Duplex?     | F (F,H)     |
| Auto Linefeed?                                     | Y (Y,N,X)           | Flow Control (XON/XOFF)? | F (Y,N,R,X) |
| COM1 or COM2?                                      | 1 (1,2)             | Turnaround Character?    | 14 (00-FF)  |
| Stop Bits?                                         | 1 (1,2)             | Show Control Characters? | N (Y,N)     |
| File Protocol?                                     | R (R,N,K,X,C,E)     | Delay After Each Line?   | 3 (0-99)    |
| TTY Cursor Ctl?                                    | D (L,H,D,U)         | Translation Filename?    |             |
| Answerback Char?                                   | 30 (00-FF)          | Script Control Char?     | 30 (00-FF)  |
| Send LF with CR?                                   | Y (Y,N)             | Function Key Filename?   |             |

Esc = Quit      F10 = HELP

Screen 4: The Connect Options menu. Each directory entry can be set up with a variety of configurations, including Relay, XMODEM, and Kermit error checking.



```

RELAY Gold                               Your PC ID is: eric                               ONLINE

      F1 = Return to Terminal Screen

Alt F1 = Redial or Reanswer the Telephone

Alt F2 = Hang up and Return to Main Offline Menu

      F3 = Send Files to Another Computer

      F4 = Receive Files to Your PC

      F5 = Set Current Connect Options

      F6 = Edit a File

      F7 = Print Files

      F8 = Run a Program

      F9 = Stop Printer, File Transfer, or Script

      F10 = HELP

01/23/86 12:06:25                               Line 01 Column 01
  
```

Screen 5: The Online menu. While on line, you can use the editor, print out files, and telecommunicate in the background while running another program.

checks your disk to see if it has enough room.

Other Online menu choices allow you to change connect options and print a file to the printer or to disk. The most interesting choice, <F8>, allows you to run another program concurrently from DOS while sending or receiving a file. Sounds too good to be true? Perhaps: The concurrent program must be a .COM or .EXE file, it must not address a serial port while you're on line, it cannot address files that *Relay Gold* is printing, sending, or receiving, and the program must fit in memory along with *Relay Gold*.

However, if your concurrent program fits the bill (and most do)

and you have sufficient memory, this feature can be a real time-saver. If you regularly send and receive long files, and the novelty of watching your text scroll by has worn off, *Relay Gold*'s version of concurrent multitasking can save you a lot of time without significantly impairing performance in either program. Although my application slowed down considerably a couple of times, during the vast majority of attempts the performance deficit was negligible.

### Full-Screen Editing

Off line or on line, you can create new files or edit files created by other programs by pressing <F6>. *Relay Gold*'s full-screen editor, which resembles XEDIT, the editor used by IBM mainframe VM/CMS systems, is more powerful than most editors found in

communications programs, yet it is quite easy to use.

As in *Relay*, the *Relay Gold* editor can be used with the script language to assign various functions and text strings to keys. By using <Shift>, <Ctrl>, and <Alt> in combination with other keys, you can program hundreds of macro functions.

### Scripts and Unattended Operation

The major improvement over the original *Relay* is the addition of an entirely new script language. This language, like the editor, is very similar to the one used by VM/CMS systems on IBM mainframes. A few sample script files are included on disk so that you can log on to some major services with only slight modifications. More sample script files are in the reference manual (see Listing 1 for a sample script).

If that's not enough to get you going, you can take advantage of *Relay Gold*'s Learn mode. If you press <Alt>-L before you type in your logon procedure, the program records the entire session. The next time you want to log on to that host, all you need do is point the cursor to the appropriate directory entry, press <F1>, and the logon will be done for you. By using the Learn mode and the script examples, you should be able to create your own custom programs without much knowledge of programming.

*Relay Gold*'s scripts can accomplish far more than duplicating logon procedures. For example, if



```

*
*      RELAY Gold - Sample CALL script for Hayes Smartmodem
*
*      (c) Copyright 1985 by VM Personal Computing, Inc.
*      All rights reserved
*
*      This script demonstrates RELAY's support for general
*      "intelligent" modems by calling via a Hayes Smartmodem.
*      Of course, RELAY's native Smartmodem support is more
*      advanced; you should use this script only as a sample.
*
*
*      STEP 1) Display a message to the user
*
*      MSG IDialing the telephone ... Please stand by.
*
*      STEP 2) Prepare the modem
*
*      SEND "ATEOV1Q0"
*      WAIT 3 "OK"
*      IF TIMEOUT STOP ERROR EYour modem is not responding!
*
*      STEP 3) Send the ATDT command
*
*      WAIT 0.5
*      SEND "ATDT&TELEPHONE"
*
*      STEP 4) Wait for the result line
*
*      WAIT 60 RLINE
*      IF NOT "CONNECT" STOP ERROR EThe other Computer does not answer!
*
*      STEP 5) The connection is now complete
*
*      STOP

```

Listing 1: A sample Relay Gold script program

you don't like menus or function keys, you can copy a script from the manual to make the program command-driven. Yet the real power of the language comes into play during unattended operation. The script language is a complete programming language that allows you to program your computer to log on, ask questions, wait for answers, send and receive files, leave messages, and log off.

You can also set up *Relay Gold* for remote-control operation, so that you or someone else can call in while you're away from your PC. Go to the directory and press <F3> to make a copy of the Unattend model and give it a new file name. Then return to DOS and type *Relay filename /U*. You can

leave your PC, knowing *Relay Gold* will be there, ready to field all calls.

You can restrict callers to a specified disk drive or file and invoke several layers of password protection. By using a script program similar to the example listed in the manual, you can set up an unattended PC to send or receive files at any time of the day or night, thereby saving on phone costs. You could also use this feature to send a file from your PC at work to your unattended computer at home.

## The Price of Gold

Whether or not you decide to buy *Relay Gold* depends on several factors. If you're a satisfied *Relay* user but want more features, don't hesitate—send in your \$75—you're getting a lot more for your money here than with most so-called updates. If you're looking at the world of *Relay* for the first time, take a closer look, first of all at the price. VM has priced *Relay Gold* \$75 above *Relay*. If you don't need *Relay Gold*'s advanced features such as scripts, concurrency, and unattended communications, you may want to investigate simpler file-transfer programs available for a fraction of *Relay Gold*'s price.

However, if you like menus and function key-driven programs, communicate with other systems that use *Relay* products, or telecommunicate frequently, *Relay Gold* won't let you down. VM Personal Computing has taken a fast, clean program and made it better. ●

*Aubrey Pilgrim is a freelance writer and a quality engineer in San Jose.*

*Relay Gold*  
 VM Personal Computing  
 41 Kenosia Ave.  
 Danbury, CT 06810  
 203/798-3800  
 List price: \$225, for registered  
 Relay users \$75  
 Requirements: 128K, one disk  
 drive, modem, serial port



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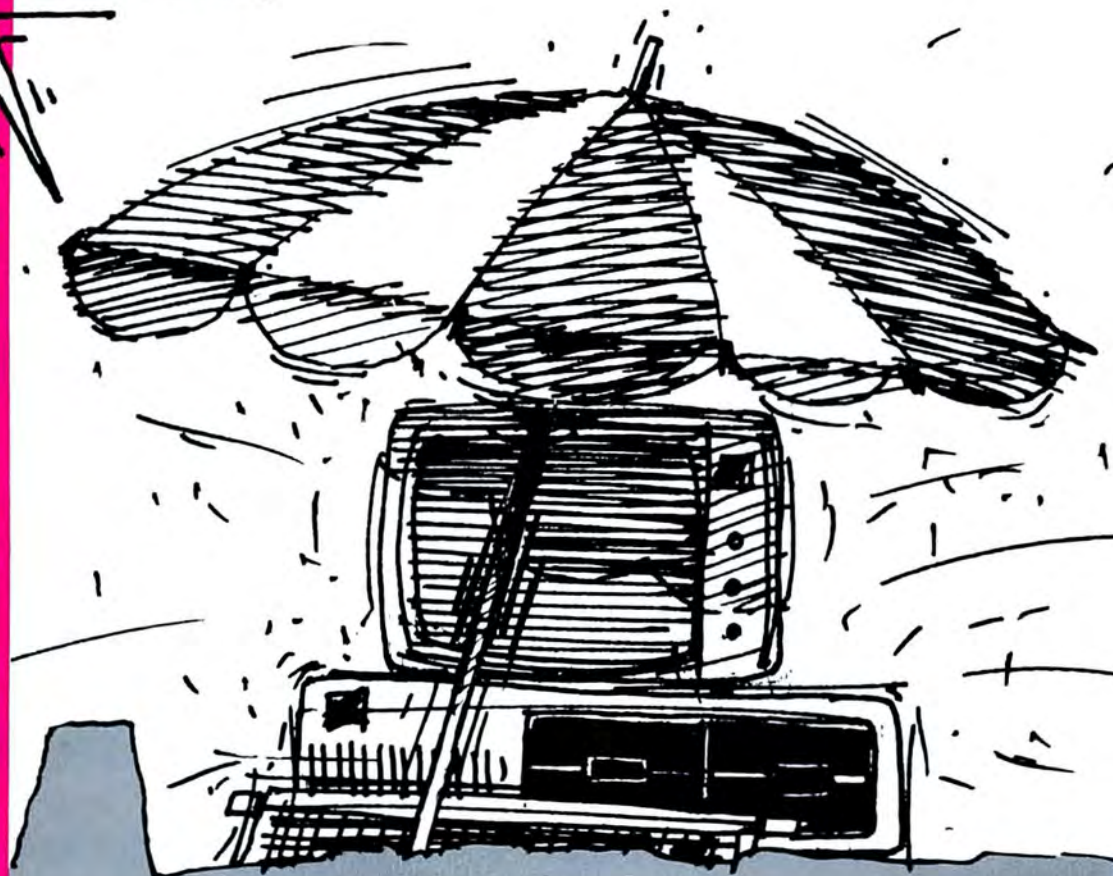


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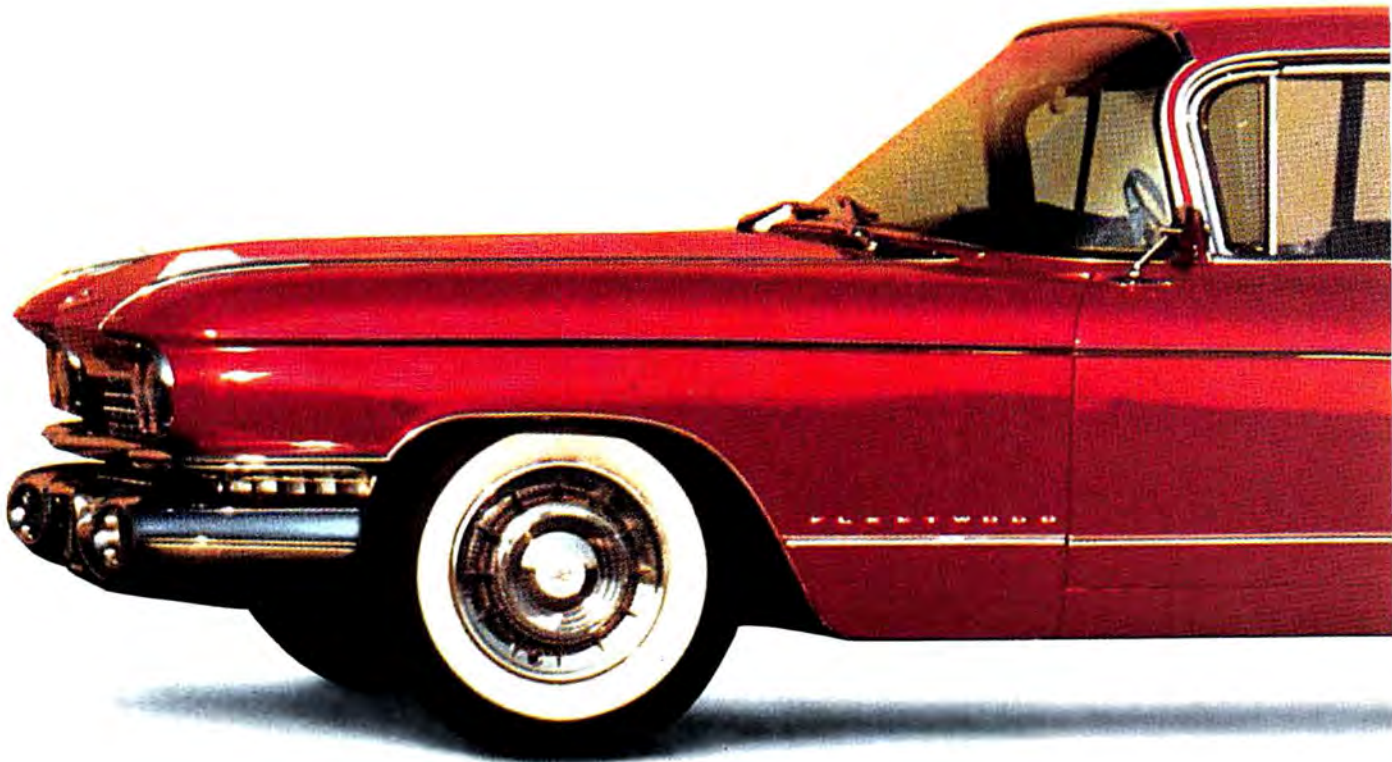
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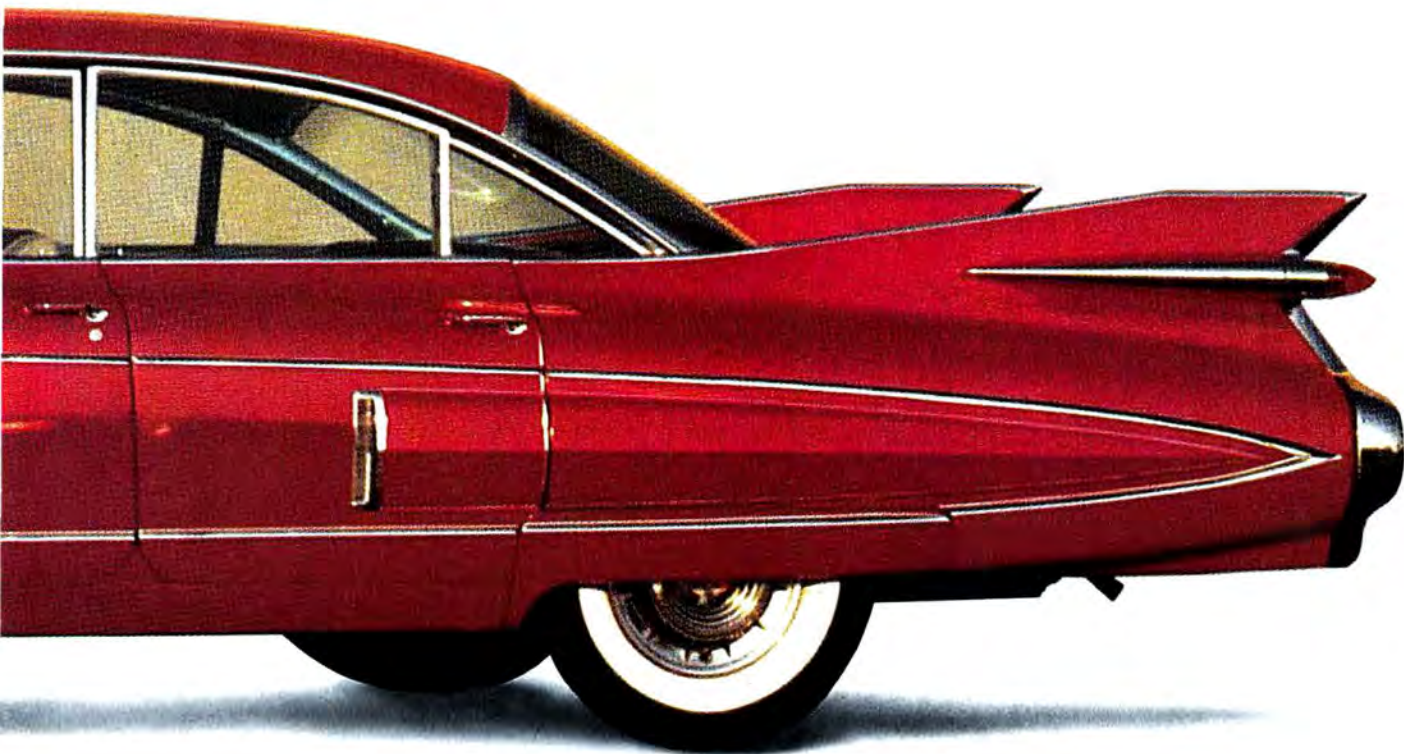
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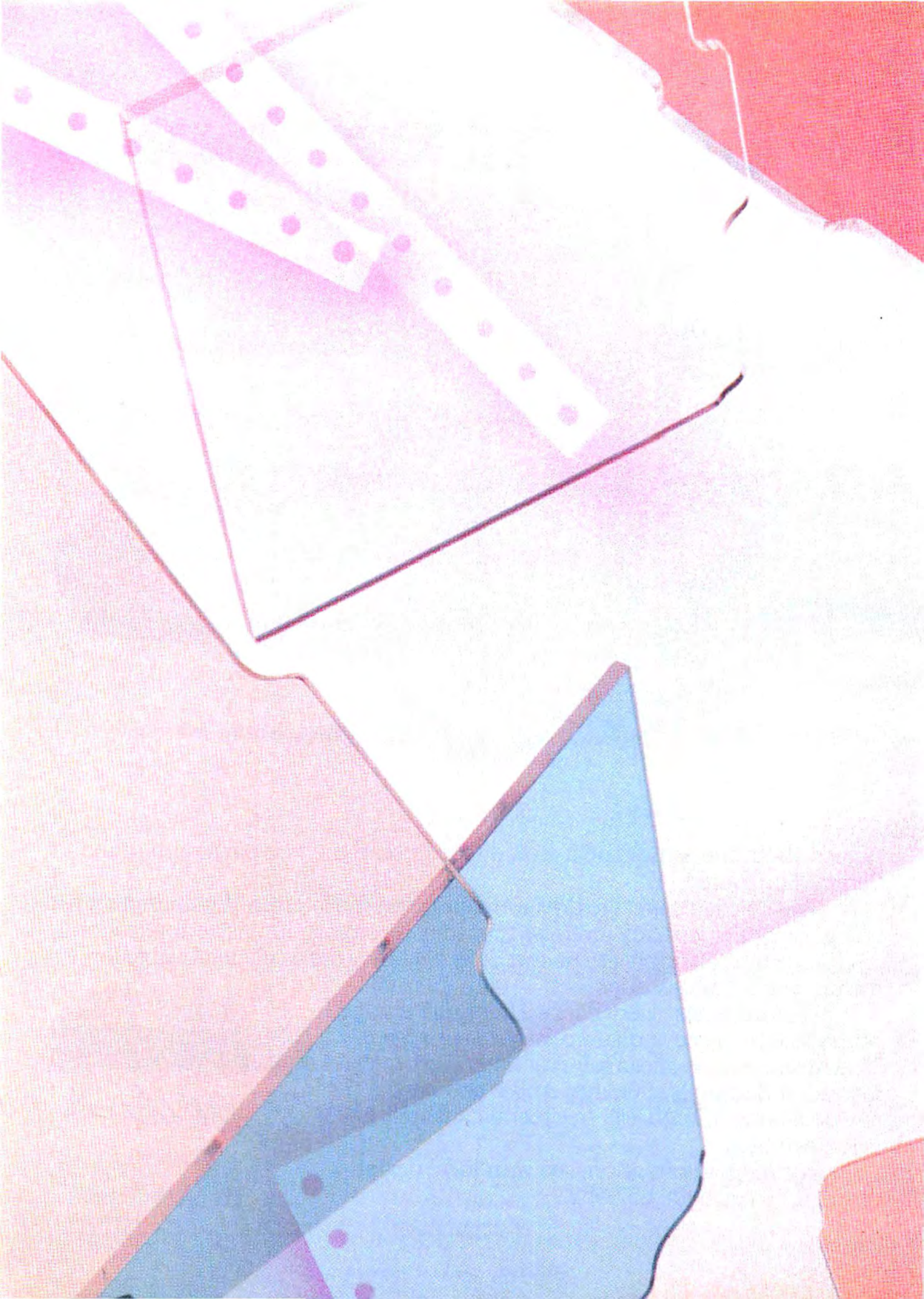
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# Data Base by Design

A few commonsense guidelines can show you how to create an efficient data base and derive the reports you need.

*Judd Robbins and Ken Braly*

Some data base tasks are child's play. If you're setting up a mailing list, for example, you need to create only a single file. Give each record a name, street address, city, state, zip code, and perhaps a few other fields, and the job is done.

But most applications aren't so simple. If you want to keep track of product orders, for instance, you'll need to establish relationships between products, orders, customers, and vendors. Should you keep all this information in a single file? Two? Three? More?

The way you structure your data base determines the efficiency with which you'll be able to retrieve information. The critical design stage involves dividing your data into logical groups, or files. Then, once you've established what data goes into which file, you must implement the structure within the context of the program you're using.

The rules that govern sound data base design apply to virtually any data management software. To link theory with practice, however, the latter part of this article provides specific *dBASE* commands for users of *dBASE II* and *III*. Throughout, file and field names will conform to *dBASE*'s character limit.



**What Goes In**

To decide what information to store in your data base, begin by considering the output you want from your system. Think carefully about the kind of data you'll need on reports, and make sure you incorporate it all in the data base design.

Next, look at the input documents. Most but not all of the data you enter will appear on output reports. If you're a retailer, for example, customer purchase orders and your own advertisements may provide valuable data that you'll want access to. Knowing which salesperson closed a deal with a certain customer may be unimportant now, but you might need that information in the future. Entering the salesperson's name when you first create the data base may mean more data entry work, but it's easier than trying to add the data later.

Take the Ajax Seminar Company as a case in point. Ajax conducts training seminars around the country on various microcomputer subjects. It mails thousands of brochures, maintains a roster of reputable instructors, and enrolls students from many companies. What kind of data should Ajax store in its data base?

First, Ajax needs a report that lists the attendees for each class. Because many classes may offer the same seminar, an enrollment summary showing the overall number of people signed up for each seminar would also be valuable. Another key report is a mailing list to keep alumni informed of upcoming seminars. And last, the company needs invoices for billing students.

Input documents include the seminar brochure, which lists information about classes; the enrollment form, which contains data on the students; contracts

detailing the arrangements between the company and the instructors; and purchase orders and checks, which contain payment information. Figure 1 consolidates the data elements from the input and output documents into four logical groups.

**Data Relationships**

Your data base must accomplish two goals: It must store all relevant data, and it must be able to connect that data logically, both within a file and in different files.

A typical way of handling the four data groups in Figure 1 would be to store each group in a separate file, giving the files the names STUDENT, SEMINAR, TEACHER, and CLASS. The data elements within each file are closely related. For example, there's only one address for every student name, and only one name for every address. This type of correlation is referred to as a *one-to-one relationship*.

A second type of correlation is a *one-to-many relationship*. For example, a seminar is held many times in many different cities, and each of these offerings is considered a separate class. Consequently, a one-to-many relationship exists between seminar and class.

Relationships are seldom one-sided, even with data. The relationship between seminar and class may be one-to-many, but what about the relationship

**Figure 1: The raw data for the Ajax Seminar Company's data base can be divided into four logical groups.**

|                                                       |              |                 |
|-------------------------------------------------------|--------------|-----------------|
|                                                       |              | Instructor name |
|                                                       |              | Address         |
| Student name<br>Address<br>Company<br>Fee balance due | Seminar name | Class           |
|                                                       | Length       | Date            |
|                                                       | Fee          | City            |
|                                                       |              | Hotel           |



## Chapter 4: A Purple Rage

I had a feeling Virgil was upset about something when he showed up late one night aboard *The Crashed Disk*. No sooner had my alarm gone off than there he was, 260 pounds of muscle looming over me in the semidarkness. As he talked, he kept hitting his palm with a rolled up copy of *PC World*. It had the circumference of a baseball bat, and a sample disk stuck out of one end, mangled beyond hope. Not even Norton could save it. Heck. Not even I could save it. More important, I began to wonder if anybody could save me.

I looked around for protection, but the only thing in reach was a slim copy of *Dr. Dobb's Journal*. No contest. Let this be a lesson to you, McByte: No more playing footsie with other men's wives.

"I want to set up a data base to track my two salespeople ... and my wife," Virgil blurted out, his voice a bit strangled on the last two words. "I figure if I know how she uses her time ... " His voice trailed off again, and he closed his eyes, his face turning slightly purple.

So that was the name of his game: data management. If so, it didn't look good. Data management and jealousy could be a pretty ugly mix.

"I want the salespeople to keep track of their accounts," Virgil continued, after regaining his composure. "I can use the form we use to write up jobs as a model for their data en-

try form. But some of it seems pretty tough, McByte." He glared down at me threateningly. I nodded, slowly inching my chair out of striking range. Tough was right.

"Not that tough," I croaked in an attempt at macho devil-may-care. "Fortunately, you've come to the right guy."

"Have you read this article about data base design?" he asked, tapping his palm with the magazine for emphasis. "I get the feeling I must be missing something. What's all this stuff about a one-to-many relationship? Why is the 'one' side a 'key'?"

The hidden meaning of his words seemed all too clear. Teaching your pupil data base design wasn't easy when he thought you had something going with his wife. And it was even tougher if he looked like he was being tortured with electrodes when he had to type a simple directory command.

"I thought you said applications got easier as you went along," Virgil said ominously. My grin flattened. In the ensuing silence you could hear the creak of the boat against the sidings as the wind stirred up. The storm would hit soon.

(continues)





between class and seminar? Because each class is associated with only one seminar, the relationship between class and seminar is one-to-one.

In either one-to-one or one-to-many relationships, the “one” side is referred to as a *key*. A key is a data element that defines the other elements with which it’s associated. Within an individual data base record, the field that holds this critical data element is called the *key field*.

The third type of association between data elements is a *many-to-many relationship*. An example is the relationship between student and class. A student can enroll in several classes, and a single class may have many students.

One-to-one, one-to-many, and many-to-many relationships must all be incorporated into the data base you design. Drawing a bubble chart is an often-used method to help conceptualize data base structure. Figure 2 shows the three types of relationships in bubble-chart form. Single arrows indicate the “one” side of a relationship, while double arrows represent the “many” side.

One-to-one relationship



One-to-many relationship



Many-to-many relationship



Figure 2: The three types of data relationships depicted in a bubble chart

## Design Rules

Once you’ve classified the relationships between the various types of data you’re dealing with, it’s time to establish them in the data base. Several rules of thumb should help you accomplish this task.

**Rule 1:** *Assign a unique ID number to every key.* By using an ID number instead of a student name as the key, for example, you eliminate the risk of confusing two students who have the same name. When you assign ID numbers, however, don’t try to encode them with meaning, such as a student’s company or a seminar’s subject. This encoded information may change, and you should avoid changing an ID number whenever possible.

**Rule 2:** *If two elements are related one-to-one, put them in the same file.* For example, the data elements associated with a seminar name are all related one-to-one with the Seminar ID. Thus, the SEMINAR file will contain four fields: *Seminar ID*, Seminar Name, Length, and Fee. (The first field is italicized to indicate that it’s the key field.) Similarly, the TEACHER file will include the fields *Instructor ID*, Instructor Name, and Address.

**Rule 3:** *If two elements are related one-to-many, build a file around each and put the key field of the “one” in the file of the “many.”* For example, seminar and class are related one-to-many (many classes for a given seminar). Rule 2 legislates that these fields are in the two files SEMINAR (*Seminar ID*, Seminar Name, Length, Fee) and CLASS (*Class ID*, Date, City, Hotel). In addition, Rule 3 requires that the CLASS file must also contain the key field of the SEMINAR file. In the SEMINAR file you now have *Seminar ID*, Seminar Name, Length, and Fee; the CLASS file contains *Class ID*, *Seminar ID*, Date, City, and Hotel.

Every record in the CLASS file contains the ID of the seminar with which the class is associated. When you look up a particular class record, you can use the Seminar ID to find data on that seminar from the SEMINAR file. If a particular seminar has seven classes scheduled, seven records in the CLASS file will have the ID of that seminar. This is how one-to-many relationships are manifested in a relational file design.

**Rule 4:** *If two elements are related many-to-many, build a file around each and then create a third file containing the key fields of each of the other two.* For example, student and class are related many-to-many (many students per class, possibly many classes



per student). Rule 1 says that these fields are in the two files STUDENT (*Student ID*, Student Name, Address, Company ID) and CLASS (*Class ID*, Seminar ID, Date, City, Hotel).

Ignore the relationship between classes and seminars for the moment. Now, you could show that a class had many students by using Rule 3 and including a Class ID in each STUDENT record. But how could you show that a student had more than one class? You can't put a Student ID in the CLASS file, because you wouldn't know which Student ID to use. Rule 4 solves the dilemma by having you create a new, third file, which has a key made up of the key fields of the other two: *Student ID* and *Class ID*.

The two-part key in this new file is known as a *concatenated key*. Because this key appears in every record within the new file, the very existence of a record establishes a link between a student and a class. If a certain class has 17 students in it, for example, there will be 17 records in the new file with the relevant Class ID. If a student has signed up for three classes, there will be three records in the new file with the appropriate Student ID.

What should you call this third file? Anything you want, of course, but using a logical name is easiest. Because each record indicates enrollment of a student in a class, you can call the file ENROLL.

At the moment, ENROLL contains nothing but the concatenated key. You could stop there; the only purpose of the new file is to act as a link, and the keys are all you need. But sometimes this new file will have data in it as well, data elements that depend on the concatenated key.

In the ENROLL file, the link between student and class provides a perfect opportunity to add an important piece of data: the fee balance due. Employing Rule 4 thus yields these three files: STUDENT (*Student ID*, Student Name, Address, Company ID); CLASS (*Class ID*, Seminar ID, Date, City, Hotel); and ENROLL (*Student ID*, *Class ID*, Fee Balance Due). Figure 3 shows the result of applying all four rules to the Ajax Seminar Company's data.

Pretending nonchalance, I got up to pour a cup of coffee. "It does get easier, Virgil," I said at last. "Trouble is, some data base work isn't so much running an application as it is writing a program. That's why so many guys can make their livings as PC gurus. You've read the article. You know what's involved. Do you want to spend your time learning how to write custom applications, or do you want to spend it expanding Printorama?" I looked at Virgil suspiciously. "You do want to expand Printorama, don't you?"

A clap of thunder shook the boat, and rain began to pelt the deck outside. He nodded. "McByte, we're going to write this application together. We'll start tomorrow. I want to keep my eyes on you." Virgil stomped off the boat into the pouring rain.

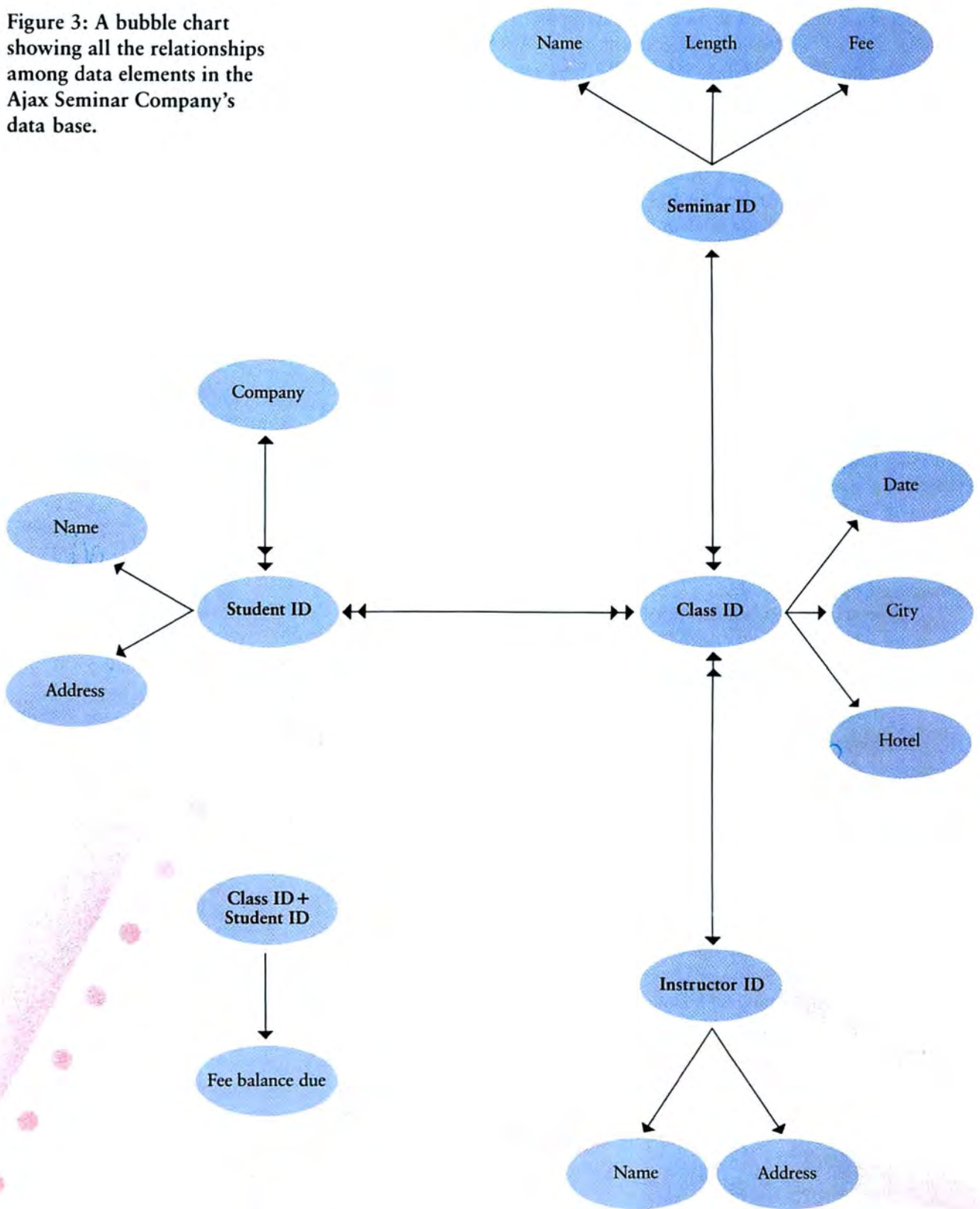
So that was it. He didn't like me hanging around his wife so he decided to monopolize my time. Maybe this jealousy thing was all a ruse to keep me on the defensive. Yeah, he sends me on a wild-goose data base project while the business goes down the drain and he can sell it to Quick and Dirty.

It was times like these that I thought I should go into another line of work, something easier... like leading an antiterrorist rescue squad.

(continues on page 237)



Figure 3: A bubble chart showing all the relationships among data elements in the Ajax Seminar Company's data base.





## More Data Base Design Principles

The next three principles test the soundness of your data base design. If you followed the four previous rules faithfully, your design should pass muster.

*Principle 1: Don't repeat a data element type within a file.* This is a common trap that many beginning data base designers fall into. For instance, suppose you're building a data base to track your company's salespeople and how much they sell each month. The most obvious way to do this is to construct a SALES file containing *Salesperson*, January Sales, February Sales, March Sales, and so on.

This file has 13 fields: a name field and 12 monthly sales fields. If you implement this file in *dBASE*, and you want to find the March sales total for John Jones, you merely give the commands

```
USE SALES
```

```
LOCATE FOR NAME = 'JOHN JONES'
```

```
? MAR_SALES
```

All well and good—but there are some potential problems. What do you do next year, when you have 12 more months of sales figures to store? You could add 12 more fields to the data base, but this might get rather tedious. Also, if you're using *dBASE II*, you'll run out of fields after 32.

Another problem arises when you ask a typical sales management question like "Who has sales of more than \$10,000 in any month this year?" Because you don't know which fields have a value greater than 10,000, you must use the cumbersome *dBASE* commands

```
USE SALES
```

```
LIST NAME FOR JAN_SALES > 10000 ;
```

```
.OR. FEB_SALES > 10000 ;
```

```
.OR. MAR_SALES > 10000 ;
```

```
.OR. APR_SALES > 10000
```

These problems arise because the fields Jan\_Sales, Feb\_Sales, and so on are really separate instances of a single data element type: monthly sales. What you really have is a one-to-many relationship between a salesperson and his or her monthly sales.

Rule 2 dictates that you must construct two files: SALESPRS (*Salesperson Number*, *Name*) and MNTHSALE (*Year*, *Month*, *Salesperson Number*, *Amount*). Then, at the end of a given month, you

store the sales total for each person by adding a record to the MNTHSALE file, rather than filling in a new field in the SALESPRS file. In *dBASE III*, you'd link the two data bases together:

```
SELECT 2
```

```
USE SALESPRS INDEX SALESID
```

```
SELECT 1
```

```
USE MNTHSALES
```

```
SET RELATION TO SALESID INTO SALESPRS
```

Then you could answer the request for John Jones' March sales total with

```
LOCATE FOR YEAR = 85 .AND. MONTH = 3 ;
```

```
.AND. SALESPRS->NAME = 'JOHN JONES'
```

```
? AMOUNT
```

You could find out who's sold more than \$10,000 for any month with

```
LIST SALESPRS->NAME FOR YEAR = 85
```

```
.AND. AMOUNT > 10000
```

In this second instance, you might have some salespeople listed more than once, provided they had exceeded the \$10,000 mark more than one time that year. In *dBASE II*, working with the two files requires more effort, but the idea is the same.

*Principle 2: In a file that has a concatenated key, all additional fields must depend on the entire key.* Take the Ajax Seminar Company example: ENROLL (*Student ID*, *Class ID*, *Fee Balance Due*). *Fee Balance Due* is dependent on both the *Student ID* and the *Class ID*.

If you'd failed to recognize the need for a separate STUDENT file, you might have put the student information in ENROLL (*Student ID*, *Class ID*, *Student Name*, *Student Address*, *Fee Balance Due*). The *Student Name* and *Student Address* relate only to the *Student ID* portion. This means that if a given student had taken more than one class, his or her name would appear in the file more than once. It also means that when you purge old enrollment data for classes long past, you lose student names and addresses—which spells trouble for future mailings.

*Principle 3: Don't have any field in a file that is related to anything but the primary key.* For example, you shouldn't store all the information about a class instructor in the CLASS file, as in CLASS (*Class ID*, *Date*, *City*, *Hotel*, *Instructor Name*, *Instructor Address*). If an instructor teaches only one class, and that class is cancelled, then all information about the instructor disappears as well.



### Physical Data Base Design

You've thus far dealt with *logical* data base design, which looks only at the data elements and the relationships among them. Most of the design work you've done is independent of the data management package you're going to use. The rules and principles are simply for designing files that will be easy to work with.

Easy to work with, that is, in theory. Now you have to implement the data base design on a real computer, with real disk drives and real software. And real-life systems have certain limitations.

Sometimes these limitations involve speed. While they're improving constantly, microcomputer processors and disk drives are seldom as fast as you'd like. In other situations, the limitations depend on mass storage. If you don't have a hard disk, the

*Although you can work with more than two files in dBASE II, performance can suffer and programming can become awkward.*

amount of disk space may severely limit the operations you can perform and the data you can store.

Finally, you may be limited by the design of the software itself. For example, *dBASE II* allows only two files to be open at one time, and the Ajax Seminar Company system has six files. Although you can work with more than two files in *dBASE II*, performance can suffer and programming can become awkward.

Setting up your files on a real computer is called *physical* data base design. Here's where you'll look at the quirks of *dBASE* and consider how to refine your system to suit the software. Using the Ajax Seminar Company data base in Figure 3, observe how the following real-world problems are solved using *dBASE*.

Suppose you wanted to know the current enrollment for Class XYZ. This one's easy. If you identify classes by Class ID, then you know there's a record in the ENROLL file for each student enrolled. Therefore, you need the *dBASE* commands

**USE ENROLL**

**COUNT FOR CLASSID = XYZ**

But maybe it isn't so easy. The Count command reads sequentially through the file, adding up records whose Class ID field contains XYZ. If you're a small company, with 4 seminars, 15 classes, and 250 total enrollments at any one time, these commands will do just fine. But if you're a university with 1000 classes, reading a 30,000-record file sequentially could take hours.

Fortunately, there are several alternatives. For one thing, you can *Index* the ENROLL data base on the Class ID field, creating a separate class ID list. When the computer sorts through this list, it finds directions pinpointing the location of the appropriate records for each class ID within the physical data base itself. To implement this strategy in *dBASE*, give the commands

**USE ENROLL INDEX CLASSID**

**FIND XYZ**

**COUNT WHILE CLASSID = XYZ**

The Find command is very rapid, and the Count While command requires reading only as many records as there are enrollments for the class. In other words, performance improves dramatically. You may find that an Index on Class ID in the ENROLL file has many uses.

A second alternative involves modifying the data base design. What if you add a new field to the CLASS file called Total Enrollment, which contains the total number of students enrolled in the class? Finding the number of students enrolled in Class XYZ would be easy and quite fast:

**USE CLASS**

**LOCATE FOR CLASSID = XYZ**

**? TOTENROLL**

It would also be easy to create a report listing the total enrollment for all the classes, a job that would take a lot more work using an index.

The only problem with this method is that you now have a number in the CLASS file which is the same as the number of records in the ENROLL file



for that class. This is what is known as *redundant data*—data that exists in more than one place within the same data base. When a student enrolls in a class, and you add a record to the ENROLL file, you (or the system) must also update the appropriate Total Enrollment field in the CLASS file. The same is true when a student withdraws from a class. If you don't make both changes, you could run into the embarrassing situation of telling a student that a class is filled, when in fact a student has withdrawn and left an open slot. Having redundant data requires more effort on your part, but the performance gain is often worth the effort.

### Physical Performance

Physical data base design deals directly with program performance, and performance often involves trade-offs. The primary goal of a data base design is speed. You have two things to trade for greater speed: disk space and ease of programming. Generally, there are three approaches to the performance problem: indexing, adding files, and modifying the logical design.

*Indexes.* Creating indexes often has significant performance impact. When you avoid a sequential search of a large file, you can save a lot of time. But indexes use up disk space and maintaining them entails extra effort during the design process.

*Additional files.* Creating a new file can speed up an operation and simplify the programming task as well. Any new file uses more disk space, however, and may introduce redundant data or redundant links, which need careful upkeep.

*Modifying the logical data base design.* Adding new fields to the data base or otherwise modifying the logical data base design may improve performance and make programming easier. The Total Enrollment field in the CLASS file is a good example.

Certain cases call for deliberately violating a logical design rule. For instance, the SALES file discussed earlier (*Salesperson*, January Sales, February Sales, ...) was theoretically not the best design, due

to the repeating data element type, Monthly Sales. But if you know your SALES file will not extend beyond one year, and if sales management queries like "Who sold more than \$10,000 in any month this year?" are superfluous for your applications, go ahead and set up a SALES file the "wrong" way. You'll still be able to write a simple Report Form showing the annual sales performance of the staff, without setting up separate SALESPRS and MNTHSALE files.

Logical design rules and principles are not carved in stone. But as in most cases in life, if you want to break a rule, you should know exactly why you're doing so and what the consequences may be. Violating a data base design principle may make your current system perform better, but it may also make adapting to changing requirements difficult later.

So spend some time designing your data base, and consider all the contingencies thoroughly. If you're exacting and follow the design steps carefully, you'll enjoy high performance, simplified programming, and a data base that lasts a long time without modification. ●

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# Getting Personnel With Paradox

You've outgrown pfs:file, but you're not quite in the dBASE or R:base league. Follow this tutorial to find out how Paradox's relational power and query-by-example intuition can help solve your data management dilemma.

*Nicholas M. Baran*

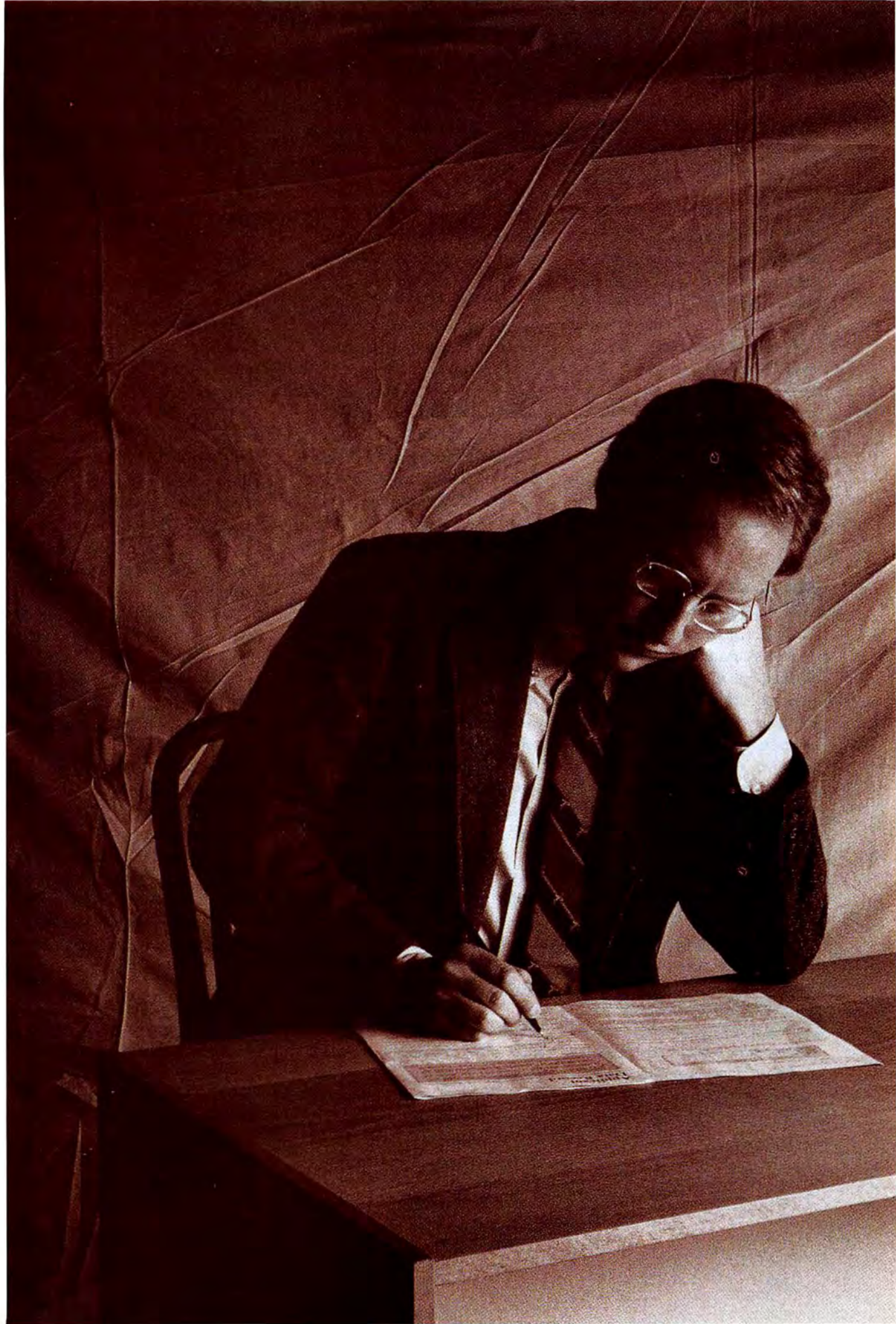
 You're tearing your hair out. As your company, UpScale, Inc., enjoys unforeseen growth, you can't keep up with the clamorings for more staff. With great urgency, each of UpScale's four department heads has been submitting to you, the personnel manager, mounds of requests for new hires. You aren't sure if the salary line in the company budget can survive the strain. Good fortune has been smiling on UpScale; you might see fit to revise the salary budget, but by how much? How soon? And what departments need it most?

If you were a whiz at monster data managers like dBASE or R:base, you could jimmy your data and come up with a report that summarizes your department salary budgets and requests for new hires. But UpScale has never needed anything more than a single file manager for its personnel and budget records, so you've never learned to use a relational program. Can you solve this pressing problem without surrendering

to the programming intricacies of dBASE? You bet.

With its powerful relational and reporting capabilities, *Paradox* from Ansa Software is well suited to demanding data management assignments. The program can tackle the same tasks as data management stalwarts dBASE and R:base. But *Paradox* has an added dimension that makes it more attractive to the data management novice than other relational data managers: a "query-by-example" feature that makes data retrieval almost as simple as saying please. You select the Query function from *Paradox*'s main menu, enter a few keystrokes in a mock data entry form, and *Paradox* retrieves the data. No need to write an arcane program as you would in dBASE or R:base 5000. *Paradox* offers a powerful programming language (PAL), which was originally intended to be a developer's tool. Most users will get along nicely with *Paradox*'s basic fea-







tures, which include report generation and macros (see “A Most Ingenious Paradox,” *PCW*, March 1986).

### A Guided Tour

As personnel manager of a growing company, you need relational capabilities to help you generate reports based on information from several data tables. Here's where *Paradox*'s query-by-example shines. When you retrieve data from the program's 1-2-3-like tables, *Paradox* distills it into an Answer table—the answer to your question, or query, about the data base. You base your report on the data in the Answer table (see Figure 1).

### First Things First

Before you get to that point, however, you'll need to establish the necessary data tables. For this tutorial, you'll create a Department table that details operating and salary budgets and expense forecasts for each department; an Employee table that lists each employee by name, address, social security number, length of stay with the company, position, and salary; and a Requests table to organize requests for new employees and balance them against the company's salary budgets.

Next, you'll design a data entry form complete with validation codes for particular tables, use your form to enter data, use *Paradox*'s query-by-example feature to gather data for the report, and record your query using *Paradox*'s macros, or “scripts,” as the program's macro feature is called.

### Starting Up

Select the Create option from the *Paradox* main menu. Following the example in Figure 2, name the tables Employee, Requests, and Deptmnt. *Paradox* will prompt you to enter the appropriate field name (up to 25 characters) and code to signify the type of data—dollar, date, alphanumeric, or numeric. You enter these specifications by moving the cursor to the appropriate field, filling in the blank, and pressing <Enter>. When you have completed a table, save it by pressing *Paradox*'s Do-It key, <F2>. Saving the table returns you to the main menu. Select the Create option again, and begin the next table.

Each table you create must have a corresponding data entry form, and each data entry form must be assigned to a specific table (tables do not share forms in *Paradox*).

For the data entry form, you can use the default design that *Paradox* provides when you press <F7>, or you can design your own custom form. To design a new form, select the Forms option and specify Design. Select Requests as the table; *Paradox* will prompt you to enter a description of the form you want to design. Type **Request for Personnel Form** and press <Enter>.

You now have a blank screen on which to design your form. Pressing <F10> displays *Paradox*'s submenu of design tools; among them is the Put selection, which you use to arrange fields on the form. When you select Put and specify Regular fields, *Paradox* displays in the command line all the field names entered in your data table (Regular is *Paradox*'s way of describing standard data fields and does not apply to calcu-

lated or page number fields). Use the Put option to place field names anywhere on the form. Moving the cursor to the desired location, press <Enter>, and select the field name that you want to appear.

You can also use the Put option to assign special qualities to fields. For example, you can create a field to indicate which record of a multiple-record table you are viewing using the #Record option, calculate a new field from existing fields, and create a DisplayOnly field (a data field from the first page of a multiple-page form that appears on subsequent pages to identify the record you are viewing). Other design tools enable you to put borders around your form, rearrange areas, erase fields and borders, and change the video attributes to high intensity, blinking, and inverse video. Design your own form by selecting these tools from the Forms menu and entering the information as shown in Screen 1.

When you are satisfied with your form, save it by pressing <F2>. Designate the form as the standard design for the Requests table by selecting Image, specifying Pickform from the main menu, and pressing <F7>. Your custom form will be displayed automatically when you view or edit the appropriate table.

### Reality Check

You can assign validity checks to specific fields in your form using *Paradox*'s ValCheck option. The Dept-Num field is a good candidate for the validity check. UpScale has four departments, numbered 1 through 4. By establishing a valid range of 1



---

Department Number: 1                      Salary Budget: 300,000.00

| Id-Num | Salary     |
|--------|------------|
| 001    | 25,000.00  |
| 002    | 30,000.00  |
| 004    | 100,000.00 |
| 009    | 45,000.00  |

|                                   |                  |
|-----------------------------------|------------------|
| Total Salary: 200,000.00          | Number of Active |
| Total Requested Salary: 65,000.00 | Requests: 2      |

---

Department Number: 2                      Salary Budget: 500,000.00

| Id-Num | Salary    |
|--------|-----------|
| 003    | 30,000.00 |
| 007    | 35,000.00 |
| 008    | 20,000.00 |
| 010    | 28,000.00 |

|                                   |                  |
|-----------------------------------|------------------|
| Total Salary: 113,000.00          | Number of Active |
| Total Requested Salary: 85,000.00 | Requests: 3      |

---

Department Number: 3                      Salary Budget: 150,000.00

| Id-Num | Salary    |
|--------|-----------|
| 006    | 40,000.00 |
| 011    | 22,000.00 |

|                                   |                  |
|-----------------------------------|------------------|
| Total Salary: 62,000.00           | Number of Active |
| Total Requested Salary: 60,000.00 | Requests: 1      |

---

Department Number: 4                      Salary Budget: 100,000.00

| Id-Num | Salary    |
|--------|-----------|
| 005    | 18,000.00 |
| 012    | 30,000.00 |

|                                   |                  |
|-----------------------------------|------------------|
| Total Salary: 48,000.00           | Number of Active |
| Total Requested Salary: 38,000.00 | Requests: 2      |

---

|                            |              |
|----------------------------|--------------|
| Total Number of Employees: | 12           |
| Total Company Salary:      | 423,000.00   |
| Total Salary Budget:       | 3,700,000.00 |

---

Figure 1: Before you generate this report, you'll create three data tables, design a data entry form, and query the data base using Paradox's query-by-example feature.



through 4, you can help prevent erroneous department entries.

Assign the validity check to the Requests table by selecting Modify from the main menu and specifying DataEntry and the Requests table. Press <F10> and select the ValCheck option from the sub-menu. Assign both high and low values using the HighValue and LowValue menu options, and preserve both validations by selecting Keep.

Finally, fill in your data base using all the data entry forms you created. Be sure to complete the forms, because you will use the data to generate a budget report later. Enter the employees' names, identification numbers, and department numbers shown in Figure 3. Also enter the appropriate salary budgets for each department and choose your own operating budgets. Enter several new

hire requests in your Requests table, being sure to include the number of the department originating the request; the numeric codes for accept, reject, or defer in the Action field (to signify whether the hire request has been accepted); and the proposed salaries in the Reqsal field.

### Getting Down to Essentials

The main menu's Ask option invokes the heart and soul of *Paradox*. This query-by-example ability lets you extract data by filling in the blanks in a mock data entry form. Select it and then specify the Employee table. Notice that a form showing the structure of the Employee table is displayed on the screen. Move the cursor to the next field using the <Tab> key; if you want a particular field listed in your query, press <F6> to insert a check mark in that field. Mark the Id-Num field and

move the cursor to the salary field. Check off the salary by pressing <F6>, and then type > 25000 next to it. This query will list the identification numbers of employees whose salaries exceed \$25,000. Press the Do-It key, <F2>, to execute the query.

The results are displayed in an Answer table. The Query and Answer tables can be cleared by pressing <F8>. Queries can include common mathematical operators such as MAX, MIN, and SUM, as well as logical operators and statistical functions.

While you've been engaged in this productive toil, the UpScale bigwigs have graciously rewarded their employees' hard work with a 10 percent across-the-board salary increase. Update the Employee table accordingly with a global change by selecting Ask and the Employee table. Move the cursor to the salary field. *Paradox*'s Changeto command handles such revisions, but you must tell the program what to change.

You want to alter the salary to Salary \* 1.1, so move the cursor to the Salary field, press <F5>, and type 99. The entry is displayed in inverse video to indicate an example of the data that will be changed. Type a comma and then Changeto followed by <F5> and 99. Press the <Space> bar, type \* 1.1, and press <F2>, and all Salary fields in the Employee table will be increased by 10 percent.

In response, *Paradox* displays a Changed table showing the values prior to the change. The original data table is automatically updated. If you accidentally change data, you can delete the original table and rename and save the

Requests Table Structure

| Field Name  | Field Type |
|-------------|------------|
| Dept-Num    | A2         |
| Submit-Date | D          |
| Grade       | A15        |
| Reqsal      | \$         |
| JobDescript | A25        |
| StartDate   | D          |
| Action      | A1         |

Deptmnt Table Structure

| Field Name | Field Type |
|------------|------------|
| DEPT-NUM   | A2*        |
| DEPT-NAME  | A25        |
| OPBUDGET   | \$         |
| SALBUDGET  | \$         |

Field Name Field Type

|            |     |
|------------|-----|
| Id-Num     | A4  |
| Last-Name  | A15 |
| First-Name | A10 |
| Mid-Init   | A1  |
| Street     | A20 |
| City       | A20 |
| State      | A2  |
| Zip        | A5  |
| Soc-Sec    | A11 |
| Dept-Num   | A2  |
| Grade      | A2  |
| Salary     | \$  |
| ExempNum   | N   |
| HomePhone  | A12 |

Employee Table Structure

Figure 2: *Paradox* prompts you to enter the appropriate field names and types into the data tables. You'll use this information later to create data entry forms.



Changed table, thereby restoring your original data. Keep in mind that the Answer and Changed tables are temporary unless you rename and store them. If you don't, they will be overwritten after every query or change operation.

**Paradox Has the Answer**  
Now that you've created accurate and updated data tables, you can use them to generate a report. You need to extract the salary budget for each department from the Department table, each department's new hire requests and salary proposals from the Requests table to weigh against the company's total and departmental salary budget, and current employee identification numbers, salaries, and department numbers from the Employee table (see Figure 1). *Paradox's* query-by-example process makes this chore straightforward. The Dept-Num field is a link, or common field, among the tables and is thus the example needed to aggregate the data according to department number. The example tells *Paradox* to check each table in the query and select the checkmarked fields from records that match the criteria in the example fields. Screen 2 shows the query that will assemble the desired data.

Start by pressing <Alt> - <F8> to clear the work space. Select Ask from the main menu and specify the Department table. Move the cursor to the Dept-Num field and press <F5>. Type 99 or XX (the example value is irrelevant as long as you use it consistently throughout the query). Move the cursor to the Salbudget field and check it off by pressing <F6>.

You have finished the Department table, so press <F10> and select Ask and the Requests table.

The Department table will remain on screen, and the Requests table will appear below it. Move the cursor to the Dept-Num field and type 99. Move to the Reqsal field. In this field, you will figure the total salaries of proposed new hires using SUM, and the number of new hire requests using the COUNT operator. Type **calc sum**, **calc count**. Move the cursor to the Action field and type **Not 2**. This ensures that the query will extract only those requests that have not been rejected by the company. Now bring up the Employee table, select Dept-Num as the example, and check it off by pressing <F6>. Do the same for the fields Salary and Id-Num. You will use this data in the report to illustrate how much of each department's salary budget current employees have already claimed.

Press <F2> and review your Answer table. Note the new

fields—Sum of Reqsal and Count of Reqsal. Both were created by including the *calc sum*, *calc count* operator in the query.

Pat yourself on the back for completing a complicated query the first time out, and then save the query as a script by selecting the Scripts option from the main menu and specifying QuerySave. Give your query a name and press <F2>. From now on you can invoke the script from the Scripts menu and press <F2> to execute the query. The saved script is stored as a file with the extension .SC and is listed in the Scripts menu.

*Paradox* returns to the main menu, where your Answer table is waiting. Because the Answer table is temporary and you need it for the report, use the Tools/Rename option to rename the Answer table. Call it Results.

Editing Requests table with form F: Record 1 of 1

=====

\*Request for Personnel Form\*

=====

Record Number: 1

Date Submitted: 1/12/86 4

Department Number: 1

Description of job requested: Secretary

Grade: 4 Desired Start Date: 3/81/86

Salary: 25,000.00

Action: 3

| Valid Grades |               |              | Valid Actions | Valid Dept. Numbers |
|--------------|---------------|--------------|---------------|---------------------|
| 1 = Clerk-1  | 5 = Line Sup. | 9 = Mngr-1   | 1 = Accept    | 1 = Admin           |
| 2 = Clerk-2  | 6 = Line Fmn. | 10 = Mngr-2  | 2 = Reject    | 2 = Manufacturing   |
| 3 = Line-1   | 7 = Admin-1   | 11 = UP      | 3 = Defer     | 3 = Marketing       |
| 4 = Line-2   | 8 = Admin-2   | 12 = Exec UP |               | 4 = Distribution    |

Screen 1: You can design a custom data entry form, as shown here, or use a standard form provided by *Paradox*.



## Banding Together

*Paradox* uses a unique metaphor for designing reports. Each element of the report, from page headers to data totals, is assigned to a specific "band." Bands appear on the screen as physical divisions of the report design specification; you select field names from the menu and insert them in the appropriate band. Each band serves a different formatting and printing purpose. The Report band, for example, is divided into upper and lower sections. Data entered into the upper Report band is printed once at the beginning of the report, and data entered in the lower section is printed once at the end. Thus, the Report band is appropriate for information that you want in the report header,

such as titles, authors, dates, introductory remarks, and in the report footer, such as grand totals or other summary results.

The Page band prints data that appears at the top or bottom of each page, such as page titles and footnotes; the Group band prints group headers and data summaries such as page subtotals; and the Table, or Form, band contains the body of the report. You arrange the groups of data in columns within the bands.

To design the report, select the Report option from the main menu and enter **Results** for the table. Select Design and then a Tabular format. Assign a simple description to it such as Departmental Salary Budget Report. The screen displays a design form listing the fields from the Results table, and the Report menu appears at the top of the screen.

Because you will be grouping the data by department number, the Table band will include only the Id-Num and the Salary fields. The easiest way to make this happen is to move the remaining fields in the group header and footer areas first. Select the Field option from the Report menu, and specify Erase. *Paradox* will then prompt you to indicate which fields you want to erase. Move the cursor to the field display column that appears on screen, and select and erase all fields except Id-Num and Salary. Press <F10> and select Tableband. Insert a blank column between the two fields and position them as shown in Figure 1.

Move the cursor to the group heading area and insert several blank lines for the report headings using the <Ins> and <Enter> keys, and then type the heading. Select Field and specify Place to locate the Dept-Num and Salary budget fields in the group header.

Move the cursor to the group footer area and type the titles. Locate the Sum of Reqsal and Count of Reqsal fields next to their descriptors using Field/Place. All you need now are fields to calculate total salary and the number of employees. Select Table and specify Place and then Summary as the field type. Select Id-Num as a Count field and Salary as a Sum field, and specify Group for summary fields. Place the fields in the group footer next to their descriptors.

Finally, move to the group footer area and specify Overall to create summary fields for the grand total of employees, salaries, and requested salaries.

Finish by selecting Setting/Format from the Report menu to

Figure 3: Follow this guide when filling out the UpScale, Inc., data entry forms.

### Department Information:

| Department | Salary budget |
|------------|---------------|
| 1          | \$300,000     |
| 2          | \$500,000     |
| 3          | \$150,000     |
| 4          | \$100,000     |

### Employee Information:

| Id-Num | Name                 | Address         | Salary    | Dept-Num |
|--------|----------------------|-----------------|-----------|----------|
| 001    | Anderson, Joseph T.  | 101 Cypress St. | \$25,000  | 1        |
| 002    | Williams, Sandra B.  | 400 Herbst St.  | \$30,000  | 1        |
| 003    | Ferguson, Wallace J. | 3000 Oak Ave.   | \$30,000  | 2        |
| 004    | Mathison, Martin M.  | 1 Mathison Pl.  | \$100,000 | 1        |
| 005    | Curtis, Sherry C.    | 897 Vernon Ave. | \$18,000  | 4        |
| 006    | Flynn, Finis F.      | 24 Scott Way    | \$40,000  | 3        |
| 007    | Hertzog, Daryl E.    | 9404 Dawn Cr.   | \$35,000  | 2        |
| 008    | Harris, Claire A.    | 151 Monty Ln.   | \$20,000  | 2        |
| 009    | Nolan, David W.      | 654 Ariel       | \$45,000  | 1        |
| 010    | McCall, Nicolette J. | 5050 Market St. | \$28,000  | 2        |
| 011    | Camarda, Kathy M.    | 100 Skipper St. | \$22,000  | 3        |
| 012    | Moreno, Michael J.   | 333 Zoe         | \$30,000  | 4        |



specify the format for Groups-of-Tables. This way, the table headings for Id-Num and Salary will appear within each group as in Figure 1.

Press <F10> and select Output and Screen to view your finished report.

### Temporary Beauty

Remember that you designed the report using the Results table, which you created by renaming and saving the Answer table generated from your query. Although your first inclination might be to use the name Results for subsequent Answer files generated by this query, remember that the report you just generated is inextricably linked to the original Results table; consequently it's also ephemeral. When you create a new Results table, *Paradox* will overwrite the original as well as your report.

Henceforth, consider the Results table a "dummy" table where you keep your report. In other words, don't mess with it. When you repeat the query, rename the Answer table using another name, such as Budget. Copy the report format from the Results table to the Budget table using Tools/Copy/JustFamily. Then select Report and specify Printer to print a hard copy. The report will contain the updated information retrieved from the second Answer, or Budget, table.

To automate this sequence, start at the main menu and select Instant Script Record by pressing <Alt> - <F3>. Then execute the query using the Scripts option

and the script you saved using QuerySave. Select Tools and specify Rename to rename the Answer table to Budget. Use Tools/Copy/JustFamily to copy the reports from the Results table to the Budget table. Finally, select Report, and then specify Output and Printer to print your report. End by pressing <Alt> - <F3> to save your new script as an Instant Script. Rename it Budgetrpt or something similar. You're done.

Although you have generated a complex report using a sophisticated program, you haven't created a single line of code. You've also delivered UpScale from confusion and can now shuttle off to the Bahamas for a lazy respite. Still, you have only scratched the surface of *Paradox*'s power. As UpScale continues to grow, merge, acquire, and conquer, you can grow into *Paradox*. ●

*Nicholas M. Baran, a San Francisco-based technical writer and consultant specializing in data management and communications, is the coauthor of Using R:base 5000 (Osborne/McGraw-Hill, Berkeley, California, 1985).*

### Paradox

Ansa Software

1301 Shoreway Rd. #221

Belmont, CA 94002

415/595-4469

List price: \$695

Requirements: 512K, two disk drives, DOS 2.00 or later version, hard disk recommended

J [F6] to include a field in the ANSWER; [F5] to give an Example Main -v

|          |           |          |           |
|----------|-----------|----------|-----------|
| DEPT-NUM | DEPT-NAME | OPBUDGET | SALBUDGET |
| 99       |           |          | 9         |

|          |             |       |                      |
|----------|-------------|-------|----------------------|
| Dept-Num | Submit-Date | Grade | Reqsal               |
| 99       |             |       | calc sum, calc count |

|          |       |        |          |
|----------|-------|--------|----------|
| Dept-Num | Grade | Salary | ExempNum |
| 99       |       | 9      | -        |

| EMPLOYEE | Id-Num | Last-Name | First-Name | Mid-Init | Street          |
|----------|--------|-----------|------------|----------|-----------------|
| 1        | 881    | Anderson  | Joseph     | T        | 181 Cypress St. |
| 2        | 882    | Williams  | Sandra     | B        | 488 Herbst St.  |
| 3        | 883    | Ferguson  | Wallace    | J        | 3888 Oak Ave.   |
| 4        | 884    | Mathison  | Martin     | M        | 1 Mathison Pl.  |

Screen 2: This query tells *Paradox* to search each table and extract data from the marked fields. The calculation phrase in the Reqsal field tells *Paradox* how to process the data it extracts from that field. When the query is completed, *Paradox* will display an Answer table containing the extracted data.



# Q&A: Smarter Searching

Symantec's Q&A, an impressive combination of word processor, data manager, and natural language, blends Software Publishing's ease-of-use methodology with features more common to heavyweight data managers.

*Jim Heid*

■■■■ Success breeds imitation. Symantec's Q&A is solid proof. The combination data manager and word processor mimics Software Publishing's popular *pfs:write*, *pfs:file*, and *pfs:report*—three packages that became models for low-end word processing and data management after more than a million users snapped them up from retail shelves. Software Publishing has been amazingly successful at finding a market that

data management behemoths like *dBASE* and *R:base* could not address: the price-conscious, inexperienced user. Symantec is one of several software companies riding Software Publishing's coattails into the low-end, low-price applications market.

But a closer look at Q&A reveals that the product is more than just a *pfs:* clone. Intended for those who want ease of use without sacrificing versatility, Q&A has the look and feel of the *pfs:* products but is easier to use than its *pfs:* counterparts and benefits greatly from a natural language interface.

That interface, called the Intelligent Assistant, is an artificial-intelligence-based front end that enables you to issue commands to the data manager in plain English phrases, called queries. Instead of using an arcane programming language to outline report specifications, sort levels, and searches, you tell Q&A, for example, *Show me a list of employees earning more*

*than \$30,000, sorted by department.* The Assistant generates the code required to locate and display the data.

Symantec also had the foresight to include a host of conveniences and shortcuts usually found only in more ambitious programs: a keyboard macro facility for storing and recalling frequently typed commands or phrases, plus utilities for importing and exporting data and copying, renaming, and deleting files. Q&A enables you to import existing files from *pfs:file*, *IBM Filing Assistant*, and *1-2-3*, as well as DIF or ASCII files.

You can create documents of up to 80 pages in Q&A's Write module and index as many as 115 fields in its File module. Q&A works with most printers, and excellent documentation and on-line help complete the package (see Table 1).

■ **A Voracious Appetite**  
While Q&A is a more powerful package than *pfs:file*, Symantec made a few trade-offs. Most significant is the sheer bulk of the program: Symantec recommends a minimum of 512K and



two floppy disk drives, but performance is greatly enhanced if you have 640K and a hard disk. Additionally, the current version of Q&A does not take advantage of the Lotus/Intel/Microsoft Expanded Memory Specification, an oversight that could be crippling for a program as hardware-intensive as Q&A.

The program and tutorial fill four disks; be prepared to do some disk-swapping if you don't have a hard disk. (Symantec has gone to great pains to minimize swapping; see the discussion under "Get Your Disks in a Row.")

The Intelligent Assistant is largely responsible for the program's voracious appetite for memory and will consume as much as 494K when you add synonyms and definitions to its dictionary. In any case, 640K is desirable; you'll be able to create larger word processing documents, because Q&A's Write module holds all data in RAM until you store it on your data disk. You'll also have room to add a background utility like *SideKick*.

### Moving In

Symantec deserves credit for virtually eliminating the installation process—Q&A comes ready to run. You insert the disk and type QA. If you have unusual video hardware, such as a composite monochrome monitor attached to an IBM Color/Graphics Adapter, you simply add a switch to the command: QA -scc for color monitor/color board, QA -smc for monochrome monitor/color board or QA -smm for monochrome monitor/monochrome board.

According to Symantec chairman Gordon Eubanks, novices—a good portion of Q&A's intended audience—prefer to start programs right out of the box rather than running installation programs

data disk that you keep in drive B:. The fourth disk modifies the program to run on hard disks, and the fifth is an on-line tutor. When using a hard disk, you must load the fourth disk last, or the hard

*Instead of using an arcane programming language to outline report specifications, sort levels, and searches, you tell*

**Q&A, Show me a list of employees earning more than \$30,000, sorted by department.**

first. The switch commands affect a small number of users, according to Eubanks, so the majority will be able to start Q&A without delving into installation peculiarities.

### Get Your Disks in a Row

Q&A is not copy protected, so you can get into the program immediately after making backup copies of the disks. To lessen the frustration of disk swapping, Symantec has organized the program with great care. You insert the Q&A start-up disk to load the main menu. When you make a selection, Q&A prompts you to insert the program disks: The second disk contains the word processor, filer, reporting module, and utilities; the Intelligent Assistant lives on a third disk. One swap lets you use all the applications, and another swap lets you use the Intelligent Assistant. All your data is stored on a separate

disk utilities contained on that disk will be overwritten, preventing the program from running.

While its menus often contain commands identical to those in *pfs*: programs, Q&A enables you to invoke commands in any of three ways. You can type the command's first letter, highlight a command with the <Tab> key or <Space> bar, or for even speedier access, type the number that corresponds to the entry.

### Heavyweight Flexibility

*pfs*: veterans can be up and running in short order with Q&A's single-file data manager. Further examination, however, reveals flexibility more akin to data management heavyweights *dBASE III* or *R:base 5000*.

Q&A's File module uses virtual memory—the number of records you can store is limited only by disk space. You create the data base using a data entry screen, just as you do in *pfs:file* (see Screen 1). You specify fields and design the screen by moving the cursor and



Table 1: Q&A and pfs: face off

|                          |                                               | Q&A        | pfs:write  |
|--------------------------|-----------------------------------------------|------------|------------|
| Word Processing Features | Maximum document size (pages) <sup>1</sup>    | 80         | 32         |
|                          | Maximum line width                            | 240        | 250        |
|                          | Maximum lines in headers/footers              | variable   | 2          |
|                          | Tabs                                          | yes        | yes        |
|                          | Decimal tabs                                  | yes        | yes        |
|                          | Selecting and scrolling shortcuts             | excellent  | good       |
|                          | Able to restore deleted text                  | yes        | yes        |
|                          | Box and line drawing                          | yes        | no         |
|                          | Support for italicized printing               | yes        | no         |
|                          | Keyboard macros                               | yes        | no         |
|                          | Copies blocks to disk                         | yes        | no         |
|                          | Prints blocks                                 | yes        | no         |
|                          | Accepts measurements in inches                | yes        | no         |
|                          | Supports subdirectories                       | yes        | yes        |
|                          | Converts WordStar files                       | yes        | no         |
|                          | Reads plain ASCII files                       | yes        | yes        |
|                          | Saves files in ASCII format                   | optionally | optionally |
|                          | Words in spelling dictionary                  | 60,000     | 75,000     |
|                          | Capacity of auxiliary dictionary <sup>2</sup> | disk       | 600        |
|                          | Able to produce form letters                  | yes        | yes        |

typing field names, which are identified by a colon after the name and accompanying descriptive text. *pfs:file* lets you have up to 32 screens, or “pages,” per record, while *Q&A* limits you to 10. Each *Q&A* page can hold 21 one-line, 80-character fields.

Unlike *pfs:file*, *Q&A* enables you to error-check your data. *pfs:file* treats all fields as text fields that can hold any type of character; the program does not allow you to designate fields as strictly numeric or alphabetical. Thus, you cannot prevent someone from entering *dismal* in a Salary field or *yes* in a field called Single or Married. *Q&A* provides field types for

text, numbers, currency values, dates, and yes/no values. When you’re filling in a field formatted to hold numbers, *Q&A* ignores nonnumeric keystrokes.

Strangely, *Q&A* is less strict about enforcing other field rules. If you type *maybe* in a Yes/No field, *Q&A* displays the message, ‘This doesn’t look like a yes/no value. Please verify.’ You can correct the error, or you can simply press <Tab> to move on to the next field, and *Q&A* will accept the incorrect value.

Otherwise, *Q&A*’s assortment of arithmetic operators, such as greater than, less than, and equals, restricts the values entered in a field—useful for ensuring, for example, that all Age values in a data base of teenagers are between

13 and 19. But these value-checking features don’t go far enough. If you enter a value that does not fall within an established range, *Q&A* scolds, ‘Value not in specified range. Please verify before continuing.’ One tap of the <Tab> key enters the uncorrected value in your data base.

On one hand, *Q&A*’s forgiving nature gives you the flexibility to bend your application’s rules and enter a value you didn’t anticipate when designing the data base. On the other hand, bending the rules in a data base can produce inaccurate results when searching or sorting.



Table 1 (continued)

|                                                     |                                                                            | Q&A File   | pfs:report        |
|-----------------------------------------------------|----------------------------------------------------------------------------|------------|-------------------|
| <b>Word Processing Performance<sup>3</sup></b>      | Changes line width from 70 to 40                                           | :04.5      | :12               |
|                                                     | Changes "the" to "a" throughout                                            | :36        | :36               |
|                                                     | Proofreads entire file                                                     | 5:30       | 2:04              |
| <b>Filing and Reporting Features</b>                | Maximum number of records                                                  | 16,000,000 | 2200 <sup>4</sup> |
|                                                     | Maximum field length                                                       | 1680       | 1679              |
|                                                     | Maximum number of fields                                                   | 2400       | 3200              |
|                                                     | Maximum number of screens in record                                        | 10         | 32                |
|                                                     | Maximum number of indexed fields                                           | 115        | 1                 |
|                                                     | Text fields                                                                | yes        | yes               |
|                                                     | Calculated fields                                                          | yes        | yes               |
|                                                     | Date fields                                                                | yes        | no                |
|                                                     | Yes/no fields                                                              | yes        | no                |
|                                                     | Keyword fields                                                             | yes        | no                |
|                                                     | Numeric fields                                                             | yes        | no                |
|                                                     | Currency and date format options                                           | yes        | no                |
|                                                     | Justification format options                                               | yes        | no                |
|                                                     | Box and line drawing on form design                                        | yes        | no                |
|                                                     | Changeable colors on form design                                           | yes        | no                |
|                                                     | Entry checking features                                                    | yes        | no                |
|                                                     | Customized help command                                                    | yes        | no                |
|                                                     | Form programming                                                           | yes        | no                |
|                                                     | Accepts measurements in inches                                             | yes        | no                |
|                                                     | Table view of data base records                                            | yes        | no                |
|                                                     | Number of saved reports per data base                                      | 100        | 8                 |
|                                                     | Number of sorting levels in reports                                        | 16         | 2                 |
|                                                     | Calculated columns in reports                                              | yes        | yes               |
| <b>Filing and Reporting Performance<sup>5</sup></b> | Searches for record on indexed field                                       | :06.9      | :12               |
|                                                     | Searches for record on nonindexed field                                    | :07.8      | :13.1             |
|                                                     | Sorts and prints records to screen                                         | :14.2      | :14.5             |
| <b>The Intelligent Assistant</b>                    | Sorts and prints records to screen using a floppy disk system <sup>6</sup> | :42        | N/A               |
|                                                     | Sorts and prints records to screen using a hard disk system                | :23        | N/A               |

<sup>1</sup> Longer documents can be produced by joining separate files at print time.<sup>2</sup> With Q&A, the number of words in the auxiliary dictionary is limited only by available disk space. Both Q&A and pfs:write permit numerous auxiliary dictionaries.<sup>3</sup> Tests conducted on a 640K, two-disk-drive system with a 1600-word file. When each program's spelling checker encountered an unknown word, it was instructed to skip the word. The Q&A spelling checker was in pre-release form; Symantec claims the final version will be at least as fast as pfs:write's. The remaining Q&A tests were performed on version 1.0, the product's first release. Times are in minutes:seconds.<sup>4</sup> On a hard disk, a pfs:file data base may be up to 4MB in size or contain 32,000 records, whichever comes first.<sup>5</sup> Tests conducted on a 640K, two-disk-drive system with a 50-record data base containing 11 fields. Times are in minutes:seconds.<sup>6</sup> This sort process was timed from the moment the Intelligent Assistant began parsing the query to the moment the results were displayed on screen. Times are in minutes:seconds.



Q&A lacks a programming language like those in *dBASE III* and *R:base 5000*. It does, however, offer limited programming functions for data manipulation, including more than a dozen programming words, including IF ... THEN, GOTO, and the logical operators AND, OR, and NOT, for programming cursor movements and field values. For example, you can program the cursor to skip blank fields, or you can program Q&A to calculate the values in fields. Thus, if you want to figure bonuses into your sales staff's income, for instance, you could tell Q&A to add a bonus rate of 15

You can also have calculated fields. In a data base of sales representatives, for example, you could instruct Q&A to add each sales representative's income to the values entered in a Commission field to produce a field called Total Salary.

#### Specify and Retrieve ...

Once you've entered data into your data base, you can retrieve it by filling out a search specification. As with *pfs:file*, you enter search criteria into a form that mimics your data entry layout. You can browse through your data base one record at a

ignating number (1 in this example) becomes the primary sort field. You can designate an unlimited number of secondary sort fields.

#### ... Or Just Ask

Some data base users prefer plain English queries to menus or commands. Among the few attempts to satisfy this preference, the best known is Microrim's *Clout*, a natural language front end to Microrim's *R:base* data manager and other programs (see "The R:base Express," *PCW*, November 1985). But most natural language products have severe shortcomings that cripple their utility. Q&A's Intelligent Assistant overcomes some of these shortcomings and, for the most part, lives up to Symantec's claims that Q&A's natural language interface performs reliably.

Like a new employee who has to learn the ropes, the Intelligent Assistant must be taught about your data base before you can start barking orders. The first time you use the Intelligent Assistant with your data base, the Assistant will automatically review the data and "teach" itself everything it needs to know by indexing fields and storing the information as a dictionary in a file on the data disk. It will also display a sentence for you to complete with up to 11 descriptive words or phrases, such as *clients*, *customer contacts*, or *class enrollments* (for example, 'Each form contains information about a particular client.').

*Once you've entered data into your data base, you can retrieve it by filling out a search specification. As with pfs:file, you enter search criteria into a form that mimics your data entry layout.*

percent to salary if the salesperson's sales exceed \$10,000 and his or her number of years with the company is five or more. Instead of using a text editor to type the programming statements, you program the data base by entering each statement in the field to which it applies—a much less intimidating approach (see Screen 2). Q&A also permits date and time arithmetic; a library's data base might use a field called Date Due for values obtained by adding a value for a predetermined number of days to values in a field called Date Borrowed.

time or call up a Table view to display up to 17 records simultaneously in row-and-column format (see Screen 3). To move to a particular record quickly, simply highlight it and press <F6>.

You sort data using a sort specification that again replicates your data entry layout. You designate the fields to be used in the sort and how you want Q&A to sort them. For example, for an alphabetical sort by last name, you type 1 in the Last Name field, followed by a comma and AS for ascending. If you also want the data sorted by zip code in descending order, you type 2,DS in the Zip field. The field with the lowest des-



The program will also ask you to define locations, proper names, and units of measure, as well as alternate or synonymous field names; you might want to refer to the data in the Supervisor field as *boss* or *manager*. Teach Q&A the alternate references for the Supervisor field and you can ask, *Show me Duncan's boss* or *Who is Duncan's manager?* and you'll get an accurate response.

Q&A applies the information you supply during the instruction process to assemble a dictionary of words and phrases that apply to your data base. The Intelligent Assistant uses this dictionary along with its own 400-word vocabulary to interpret your requests. While *Clout's* data base dictionary is limited to 500 words, Q&A's is restricted only by available disk space. This larger dictionary lets you give Q&A a more thorough understanding of your grammatical preferences as well as familiarity with your data base, and thus extract accurate results from your queries.

One of *Clout's* shortcomings is that it can only answer your queries; it cannot respond to a natural language command that asks it to modify the data base. Q&A's Assistant, on the other hand, can tap all the talents of the program's File and Report applications. You can make changes to data (*Make Dave's hobby bird watching* or *add records*) or print reports that you designed in the report application (*run monthly report*). Simply ask Q&A to *Show all forms*, and you can browse and alter the data base as if you were in

|                                                                                                                                                                                            |                                            |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------|
| Last name: Cleaver                                                                                                                                                                         | First name: Ward                           |
| Address: 15 Nirvana Street                                                                                                                                                                 |                                            |
| City: Sweetown                                                                                                                                                                             | State: NY Zip: 10023                       |
| Sex: MALE                                                                                                                                                                                  | Alma Mater: Midtown University, 1954       |
| Hobbies: playing ball; talking with Wally and The Beaver                                                                                                                                   |                                            |
| Hired date: Apr 21, 1956                                                                                                                                                                   | Department: Acctg Position: Representative |
| Classification: 3                                                                                                                                                                          | Manager: Lorne Brown                       |
| Review date: May 25, 1986                                                                                                                                                                  |                                            |
| Review comments: With son Wally free on bail, we hoped Ward's performance would improve. He still appears distraught; says "gee" a lot. Recommending dismissal and elimination of pension. |                                            |
| Evaluation: -                                                                                                                                                                              | Bonus factor: Eligible: Y                  |
| Salary: Bonus:                                                                                                                                                                             | Accrued Vacation:                          |
| Note:                                                                                                                                                                                      |                                            |

employee.dtf Form 1 Page 1 of 1

Esc-Exit F1-How to update F6-Table F7-Search F8-Calc F10-Continue

Screen 1: Q&A lets you embellish data entry screens with boxes and customized on-line help. You move from field to field by pressing <Tab>. Pressing <F5> copies into a field the value from the same field in the previous record.

|                                                                              |                            |
|------------------------------------------------------------------------------|----------------------------|
| Last name:                                                                   | First name:                |
| Address:                                                                     |                            |
| City:                                                                        | State: Zip:                |
| Sex:                                                                         | Alma Mater:                |
| Hobbies:                                                                     |                            |
| Hired date: #100                                                             | Department: Position:      |
| Classification: #20: IF                                                      | Manager:                   |
| Review date:                                                                 |                            |
| Review comments:                                                             |                            |
| Evaluation: #10                                                              | Bonus factor: #30: LOOKUP( |
| Salary: #30                                                                  | Bonus: #60 = #30 * #30/100 |
| Note: #300                                                                   | Accrued Vacation: #70: I   |
| Long value: (#40: IF @DATE - #100 < 180 THEN #40 = "N" ELSE #40 = "Y"; CNEXT |                            |
| employee.dtf                                                                 | Program Spec               |
| Page 1 of 1                                                                  |                            |
| Esc-Cancel F1-How to program F3-Clear Spec F6-Expand field F10-Continue      |                            |

Screen 2: You can program a Q&A data entry form by typing statements in a specification. Here, the statement corresponding to the field Eligible is shown. The statement determines if the current date minus the hired date (field #100) is less than 180. If so, N is entered in the Eligible field; otherwise, Y is entered. The less-than sign at the beginning of the statement tells Q&A to execute the statement when the cursor leaves the field.



| Last name      | First name   | Address          | City          | State |
|----------------|--------------|------------------|---------------|-------|
| Billingsgate   | Rudy         | 767 Turk St.     | San Francisco | CA    |
| Gyornfi        | Natalia      | 15 West St.      | San Francisco | CA    |
| Johnson        | Mildred      | 15 Broadway      | San Francisco | CA    |
| Jackson        | Will         | 420 Selby Lane   | Atherton      | CA    |
| Footbair       | Dorian       | 12567 High Stree | Revere        | PA    |
| Fays           | Martha       | 1256 East Stree  | Phoenix       | AZ    |
| Dean           | Sarah        | 1040 Chestnut S  | San Francisco | CA    |
| Kelly          | Colin        | 12 Ridgeway Ave  | Orlando       | FL    |
| Jeffers        | David        | 1532 Broadway    | Boston        | MA    |
| Scribblemonger | Throckmorton | 1 Nob Hill       | San Francisco | CA    |
| Gallway        | James        | 23 Embarcadero   | Daly City     | CA    |
| Abrams         | Judy         | 1550 Irving Roa  | Boston        | MA    |
| Jones          | Fred         | 1485 Benito Ave  | Ferriun City  | PA    |
| Johnson        | Fred         | 123 Ceballo      | Savannah      | GA    |
| Kelly          | Duncan       | 53 Lookout Hill  | Pittsburgh    | PA    |
| Norton         | Ed           | 328 Chauncy Str  | Brooklyn      | NY    |
| Cleaver        | Ward         | 15 Nirvana Stre  | Sweetown      | NY    |

employee.dtf      Form 38    of 38  
 Esc-Exit      { ↓ ↑ Home End PgUp PgDn }-Navigate      F10-Show form

Screen 3: Q&A's file application provides a Table view that lets you see numerous records at once. You can jump to a given record by highlighting it and pressing <F10>.

WHAT'S WARD CLEAVER'S ALMA MATER, AND WHAT ARE HIS HOBBIES?

Shall I do the following?  
 Create a report showing  
   the Full name and  
   the Department and  
   the Alma Mater and  
   the Hobbies  
 from the forms on which  
   the Full name is WARD CLEAVER.

Yes - Continue      No - Cancel request

employee.dtf  
 Esc-Cancel      ← Continue

Screen 4: The Intelligent Assistant always paraphrases your questions to avoid misunderstandings. The original question appears at the top of the screen, while Q&A's interpretation appears below.

the File application. This versatility is the result of tight integration between Q&A File and Report.

### ■ The Give and the Take

Clout has been known to give inaccurate answers if it misinterprets your question. Q&A works around that problem by paraphrasing your question, displaying its interpretation, and asking for verification (see Screen 4). If Q&A's paraphrase is inaccurate, you can cancel the request and rephrase the question. While this approach prevents misunderstandings, it also adds an extra step to every command you issue and slows the query process considerably (see Table 1). You do not have the option to bypass that step for straightforward requests like *Where does Smith live?* or *Show all forms*. Of course, deciding what constitutes a straightforward request would require formidable AI capabilities that are currently unavailable on the PC.

Despite Symantec's extra efforts, the Intelligent Assistant's interpretive reach is limited. Take the question *Who makes computers?* You'd interpret *who* as referring to a company and would answer with the appropriate company names. Q&A, however, regards *who* as a reference to people, and would display a report showing all the people-related records in a data base of computer manufacturers. Q&A's interpretation would be grammatically correct but does not necessarily supply the answers you want.

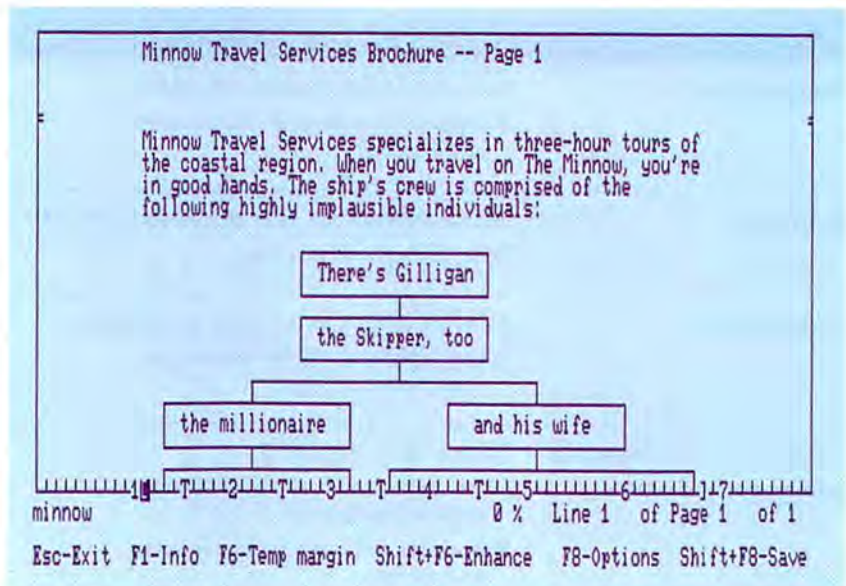
In the end, the Assistant's real strength is the ease with which it



lets you ask complex questions like *Show the electrical engineers with a salary between the average and the maximum* (see Figure 1). The Assistant will gather data on the salaries of all the electrical engineers in the data base, figure the average and the maximum, and report the results. You get three separate functions from one query, and you don't need to program the data base for the mathematical calculations. This is a notable achievement for a \$299 product.

### Reporting Your Data

Like *pfs:report*, *Q&A's* Report module lets you create tabular reports with totals, subtotals, and other calculations. Again, you select the records for printing by typing criteria into a search specification. Next, you fill out a column/sort specification that tells *Q&A* which fields you want printed in which columns and your sort preference. Finally, you specify whether you want to print the report on the printer, display it on screen, or save it in a disk file to use in a *Q&A* word processing document. Once you've designed a report, you can save its format on disk for future use. Like *pfs:report*, *Q&A* stores reports as part of the data base instead of as standard ASCII files. *pfs:report*, however, imposes a 10-character limit on report names and cannot save more than eight report designs. *Q&A* allows more descriptive report names of up to 20 characters and stores as many designs as will fit on disk.



Screen 5: *Q&A's* word processor lets you draw boxes and lines, a useful feature for creating organizational charts. A document's header is separated from the text by two small marks at the left and right margins. At the bottom, a status area shows margin and tab settings, as well as the document's name, memory usage, and other information.

### Worthy of Good Words

Smart Symantec. They've endowed *Q&A* with the features that made *pfs:write* popular (see Screen 5). *pfs:write* users will be comfortable with the organization of *Q&A's* word processor and will delight in discovering its additional features. For example, *Q&A* can copy or move text blocks to a new file. It also enables you to bypass the Print command and obtain quick hard copy by pressing <Ctrl>-<F2> and then using the cursor keys to select the text to print. You can send control codes to your printer to activate such print styles as expanded text, pull data from your *Q&A* data base to create a report, and use the cursor keys for a range of functions: drawing boxes and

lines in documents or specifying margins and page dimensions in inches as well as in characters or lines. *WordStar* diehards can use that program's <Ctrl>-key pattern for cursor movement and editing commands.

*Q&A* often improves markedly on ideas that were good in *pfs*:. To create headers and footers in *pfs:write*, for instance, you use the Define Page command to type up to two lines of header and footer text. In *Q&A's* Write module, when you choose to edit the header or footer, a small window appears, enabling you to type up to six lines (or more if you change the margin settings). *Q&A* also lets you see clearly how the header



|                                                  |                                                                                                                                       |
|--------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------|
| Simple reports                                   | Show me the departments and salaries.<br>What are the employees' departments and salaries?                                            |
| Restrictions                                     | Which company has sales greater than 100,000?<br>What is its phone number?                                                            |
| Sorted reports                                   | Show the employees sorted by increasing age.<br>Sorted alphabetically by department, show names and ages.                             |
| Totals, averages, maximums, minimums, and counts | What is the average age?<br>What are the total sales of companies in New Hampshire?<br>Show sales with maximum, minimum, and average. |
| Subtotals                                        | What is the total salary for each department?                                                                                         |
| Calculated fields                                | What is Duncan's salary minus taxes?                                                                                                  |
| Compare records                                  | Whose age is less than Fred's?                                                                                                        |
| Add new forms                                    | Create a new form.                                                                                                                    |
| Change existing forms                            | Change Duncan's marital status to "single".<br>Increase the salary of all female employees by 20%.                                    |
| Add synonyms                                     | Define "hot shot" as "manager with salary > 80000".                                                                                   |

**Figure 1: A sampling of questions that Q&A's Intelligent Assistant can understand**

and footer will look on the page. Like *pfs:write*, Q&A shows page breaks where they appear in the document.

Q&A incorporates clever shortcuts that enable you to select large blocks of text for copying, formatting, or deleting. You can use the cursor keys to highlight a character or a line at a time, as you can in most programs. But if you press a character key, Q&A auto-

matically highlights the text from the cursor's position to the next on-screen occurrence of the character. Or, if you repeatedly press the function key corresponding to the desired block command, such as <F3> for Delete, Q&A will select the text in increasingly larger chunks. Press it twice, and you select a word. Press it again, and the sentence is highlighted. A fourth press selects the paragraph, a fifth, the page, and the sixth, the entire document.

## Whose Questions Does It Answer?

Q&A is best suited to people with simple filing needs—mailing lists, personnel files, and client lists—who don't need a relational program but who want the error checking and field formatting features that full-function programs provide. Its imitation of the *pfs* approach should also make it appealing if you want more power but don't want to learn a new product from scratch.

And the Intelligent Assistant? Q&A is a good product without it. With it, Q&A lets you analyze data instead of just manage it. Separately, each Q&A application would be competitive with its *pfs* counterpart. Combined in Q&A with the Intelligent Assistant, they may spell trouble for Software Publishing's low-end monopoly. ●

*Jim Heid is a freelance writer, a contributing editor of Macworld, and coauthor of The Complete Guide to the Tandy 1000 (Ash-ton-Tate Publishing, Culver City, California, 1985).*

## Q&A

Symantec Corp.  
10201 Torre Ave.  
Cupertino, CA 95014  
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List price: \$299

Requirements: 512K, two disk drives (hard disk recommended), DOS 2.00 or later version



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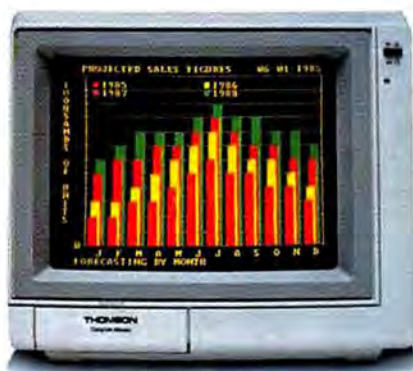
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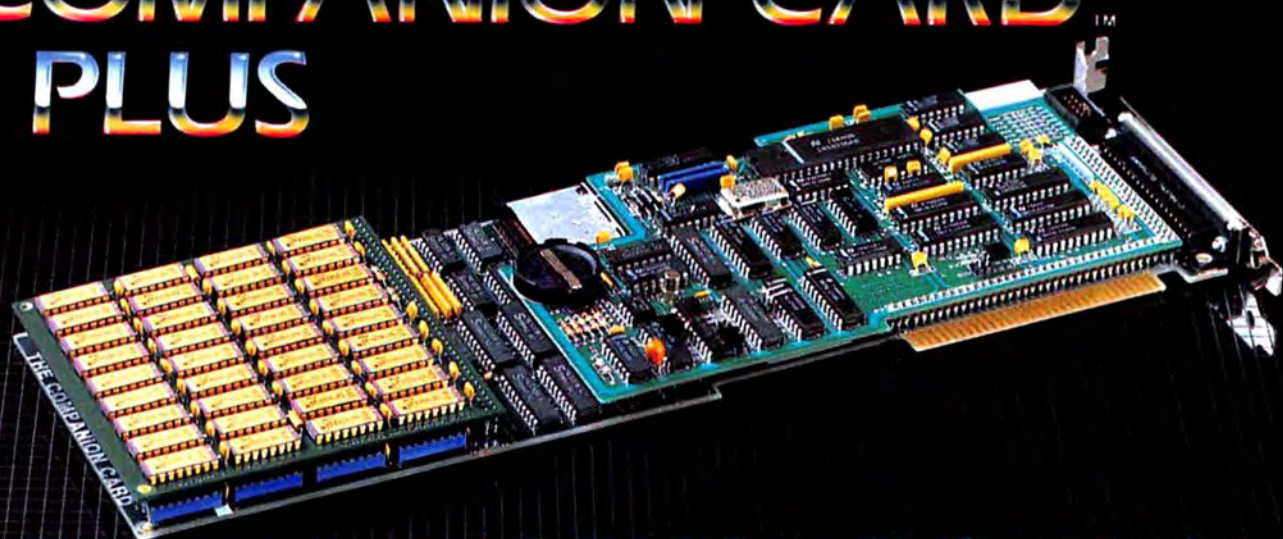




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Front view.



Back view.

Here's a puzzle for you, Watson! Look at this new MicroManager!

Can't say I see anything out of the ordinary, Holmes.

Think, Watson, not about what you see, but rather what you *don't* see.

But, Holmes, everything seems perfectly in order.

Precisely! When did you ever see a printer station that was perfectly in order, Watson?

Zounds, Holmes! Some rascal has stolen the cables!

So it seems, Watson, but observe carefully—there's more to this than meets the eye. The cables have been cleverly concealed right under our very noses! Notice how each cable disappears through a knock-out hole and enters a channel in the rear of the device. Remove these vertical panels and—voila!—we discover the cables passing from level to level through secret compartments.

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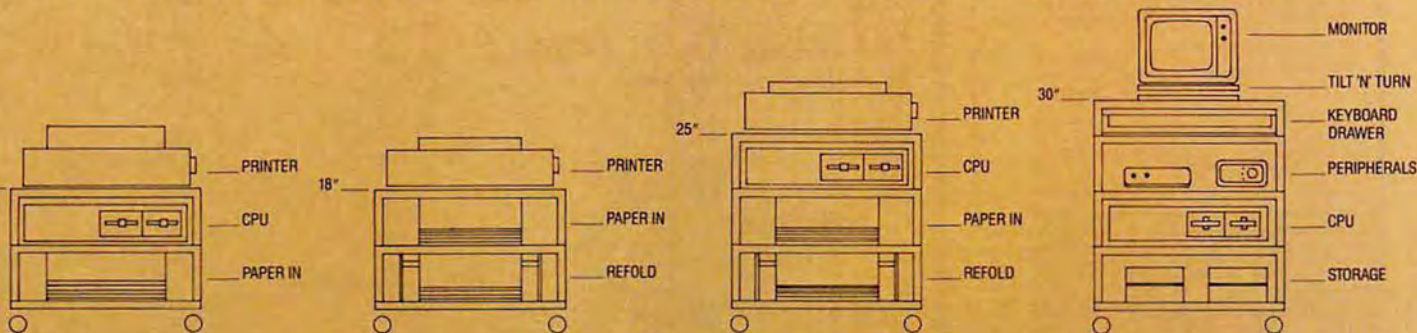
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| <b>SOFTWARE PRODUCTS</b>            |        | Microline 2410P                 | 1705.00 |
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| EXP 770P              | 669.00  | Maximizer w/64K                   | 169.00 |
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| SR-15 (200cps)        | 579.00  | Big Byte Memory Board w/64K       | 115.00 |
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| 1340 Par. or Ser.     | 391.00  | Rio Plus II w/64K                 | 274.00 |
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| AST-3780                           | 570.00 | Maximizer w/64K                   | 169.00 |
| AST-5251/11                        | 575.00 | Maximizer w/OK                    | 159.00 |
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| AST-Rampage for PC/XT/AT           | 325.00 | Grande Byte-AT w/128K             | 189.00 |
| AST-U/D Plus II                    | 124.00 | Quarter Byte w/256K               | 189.00 |
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| Copy II PC Option Board            | 74.00  | Rio Grande Multifunction 128K     | 269.00 |
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| & Hybrid)                          | 255.00 | Mono Plus with Parallel Port      | 139.00 |
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| to 576K)                           | 85.00  | Captain Multifunction w/64K       | 149.00 |
| <b>HERCULES</b>                    |        | Captain Multifunction w/384K      | 229.00 |
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| Monochrome Graphics Card           | 283.00 | Nastro Multifunction w/128K       | 345.00 |
| <b>INTEL</b>                       |        | Graphics Master                   | 430.00 |
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| Above Board AT w/128K              | 359.00 | Wave 64K                          | 175.00 |
| Above Board Piggyback AT           | CALL   | <b>TITAN</b>                      |        |
| MCI                                | CALL   | Accelerator PC w/128              | 445.00 |
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| <b>ORCHID</b>                      |        | Monochrome Graphics Adaptor       | 185.00 |
| PCnet Blossom 64K                  | 181.00 | Enhanced Graphics Adaptor         | 360.00 |
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| PC Turbo-186 w/8087                | 785.00 | BASF DS/DD                        | 12.90  |
| Daughterbord 256K                  | 785.00 | Elephant DS/DD                    | 16.50  |
| Conquest Multifunction w/OK        | 252.00 | Maxell DS/DD                      | 17.50  |
| Excel Multifunction AT w/OK        | 383.00 | Maxell DS/DD (for AT)             | 38.50  |
| MemCram Memory Card w/OK           | 252.00 | Verbatim SS/DD                    | 15.50  |
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| w/Software)                        | 725.00 | 3M DS/DD                          | 20.50  |
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| 5-Pack Multifunction Card w/OK     | 165.00 | <b>AMDEK</b>                      |        |
| Modular Graphics Card              | 235.00 | Video 310A Amber                  | 143.00 |
| Multi Display Card                 | 169.00 | Color 300 Composite               | 215.00 |
| Color/Mono Card                    | 125.00 | Color 600 Hi-Res RGB              | 375.00 |
| Parallel Printer Port Module A     | 64.00  | Color 710 Ultra Hi-Res RGB        | 425.00 |
| Serial Port Module A               | 64.00  | Color 722 RGB Enhanced Graphics   | 479.00 |
| Serial, Parallel & Clock w/OK      | 185.00 | Tilt & Swivel                     | 29.00  |
| Module C                           | 125.00 | <b>IBM</b>                        |        |
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| <b>PERSYST</b>                     |        | IBM Color Monitor                 | 525.00 |
| Mini Monochrome Board              | 139.00 | IBM Enhanced Color Monitor        | 655.00 |
| PCI Color Board RGB & Comp.        | 139.00 | <b>HX-9 Hi-Res RGB Color</b>      | 389.00 |
| Color Combo Card OK w/Clock        | 289.00 | HX-12 Hi-Res RGB Color            | 415.00 |
| Nono Combo Card OK w/Clock         | 289.00 | HX-12E Hi-Res RGB Color           | 485.00 |
| Short Port Color Graphics Card RGB | 129.00 | MAX-12E Hi-Res Amber              | 150.00 |
| Memory Board w/384K                | 189.00 | SR-12 Super Hi-Res Color          | 544.00 |
| Speed Memory Board w/OK            | 229.00 | <b>TAXAN</b>                      |        |
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| Expanded Quadboard w/384K          | 215.00 | 620 RGB Color 650x200 res.        | 369.00 |
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| Quadlink                           | 309.00 | <b>ANCHOR AUTOMATION</b>          |        |
| Quadmeg-AT w/128K                  | 295.00 | Signalman Express 1200            | 225.00 |
| Quadport-AT Starter Kit            | 98.00  | Signalman Lighting 2400           | 340.00 |
| Liberty AT w/64K                   | 255.00 | Volkswriter 1200                  | 166.00 |

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| <b>QUADCOLOR</b>                  |        | 60MB Cartridge Backup (Internal)  | 795.00  |
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| Quadwave Monochrome Card          | 225.00 | <b>CORE INTERNATIONAL</b>         |         |
| <b>SIGMA</b>                      |        | 20MB AT Plus                      | 1199.00 |
| Color 400 Card                    | 420.00 | 60MB Cartridge Backup (Internal)  | 1450.00 |
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| Quarter Byte w/256K               | 189.00 | 100MB Cartridge Backup (External) | 1025.00 |
| Big Byte Memory Board w/64K       | 115.00 | <b>IOmega</b>                     |         |
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| Rio Plus II w/64K                 | 274.00 | Bernaulli Box 10MB Plus w/Ctrl.   | 1865.00 |
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| Graphics Plus II                  | 209.00 | Bernaulli Box 2-20MB w/Ctrl.      | 3150.00 |

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| Captain Multifunction w/384K | 229.00 | 10MB Cartridge Backup (External)      | 675.00  |
| Nastro Multifunction w/OK    | 325.00 | 10MB Cartridge Backup (Internal AT)   | 595.00  |
| Nastro Multifunction w/128K  | 345.00 | 20MB Cartridge Backup (External AT)   | 805.00  |
| Graphics Master              | 430.00 | <b>MAXTOR</b>                         |         |
| Lab Master w/Options         | 675.00 | 140MB Hard Drive for PC AT (Internal) | 3500.00 |
| Wave 64K                     | 175.00 | <b>MOUNTAIN COMPUTER</b>              |         |
| <b>TITAN</b>                 |        | 10MB DriveCard                        | CALL    |
| Accelerator PC w/128         | 445.00 | 20MB DriveCard                        | CALL    |
| <b>VIDEO 7</b>               |        | <b>PRIMA</b>                          |         |
| Monochrome Graphics Adaptor  | 185.00 | 40MB for XT (Internal)                | 1395.00 |
| Enhanced Graphics Adaptor    | 360.00 | 60MB for XT (Internal)                | 1525.00 |

|                                 |        |                                    |         |
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| BASF DS/DD                      | 12.90  | 60MB for AT (Internal)             | 1395.00 |
| Elephant DS/DD                  | 16.50  | <b>RACORE</b>                      |         |
| Maxell DS/DD                    | 17.50  | Drive Two for PC Jr.               | 355.00  |
| Maxell DS/DD (for AT)           | 38.50  | Expansion Board for PC Jr. w/128K  | 145.00  |
| Verbatim SS/DD                  | 15.50  | <b>SEAGATE</b>                     |         |
| Verbatim DS/DD                  | 18.50  | 20MB Half Height for XT (Internal) | 469.00  |
| 3M DS/DD                        | 20.50  | 20MB Full Height for AT (Internal) | 575.00  |
| <b>MONITORS</b>                 |        | 30MB Full Height for AT (Internal) | 695.00  |
| <b>AMDEK</b>                    |        | 40MB Full Height for AT (Internal) | 825.00  |
| Video 310A Amber                | 143.00 | <b>SHUGART</b>                     |         |
| Color 300 Composite             | 215.00 | 10MB Half Height for XT (Internal) | 365.00  |
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| Color 710 Ultra Hi-Res RGB      | 425.00 | 360KB Full Height                  | CALL    |
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| Tilt & Swivel                   | 29.00  | 60MB Cartridge Backup (External)   | 1350.00 |
| <b>IBM</b>                      |        | Interface Card for TG 20/21/22     | 135.00  |
| IBM Monochrome Monitor          | 210.00 | <b>TECMAR</b>                      |         |
| IBM Color Monitor               | 525.00 | 60MB Cartridge Backup for AT       | 1160.00 |
| IBM Enhanced Color Monitor      | 655.00 | 60MB Cartridge Backup for PC/XT    | 1450.00 |
| <b>HX-9 Hi-Res RGB Color</b>    | 389.00 | <b>WANGTEK</b>                     |         |
| HX-12 Hi-Res RGB Color          | 415.00 | 60MB Cartridge Backup (Internal)   | 875.00  |
| HX-12E Hi-Res RGB Color         | 485.00 | <b>WESTERN DIGITAL</b>             |         |
| MAX-12E Hi-Res Amber            | 150.00 | 10MB File Card with Daughter       | 815.00  |
| SR-12 Super Hi-Res Color        | 544.00 | Board                              |         |

|                                        |        |                                        |        |
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| <b>ANCHOR AUTOMATION</b>               |        | <b>ANCHOR AUTOMATION</b>               |        |
| Signalman Express 1200                 | 225.00 | Signalman Express 1200                 | 225.00 |
| Signalman Lighting 2400                | 340.00 | Signalman Lighting 2400                | 340.00 |
| Volkswriter 1200                       | 166.00 | Volkswriter 1200                       | 166.00 |
| <b>AST</b>                             |        | <b>AST</b>                             |        |
| AST Reach Internal 1200                | 310.00 | AST Reach Internal 1200                | 310.00 |
| <b>HAYES</b>                           |        | <b>HAYES</b>                           |        |
| Smartcom II                            | 84.00  | Smartcom II                            | 84.00  |
| Smartmodem 300 (external)              | 127.00 | Smartmodem 300 (external)              | 127.00 |
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| Smartmodem 1200B (internal)            | 319.00 | Smartmodem 1200B (internal)            | 319.00 |
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| Smartmodem 2400 (external)             | 570.00 | Smartmodem 2400 (external)             | 570.00 |
| Smartmodem 2400B (internal)            | 535.00 | Smartmodem 2400B (internal)            | 535.00 |
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# Assume Nothing

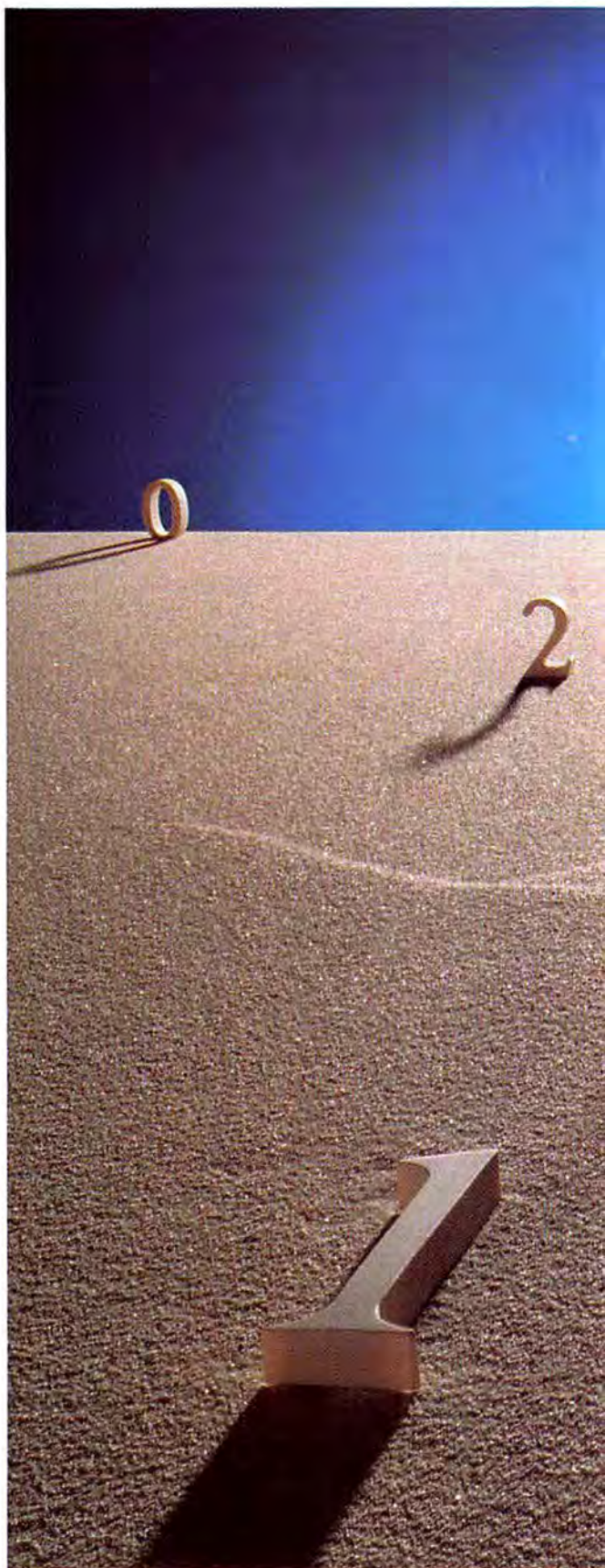
Need to explore a galaxy of numbers? Here's an introduction to data analysis along with a few strategies that promise added credibility for your "what ifs."

*Darien Fenn*

Trying to navigate your way through a minefield of raw data without having both a clear goal and a good conceptual road map is an invitation to disaster. As Murphy's fifth law of computing admonishes, "Computers do what you tell them to do, not what you want them to."

Fortunately, numerous ways exist to bridge the gap between what you need to do and what software can do for you—and let Murphy take the hindmost. You can start by stepping back before you plunge in. Realize that you need to match the results you're trying to achieve with the software tools appropriate to the task. That in turn requires an understanding of three key objectives: the answers you're seeking to pull from your data; the ways in which you intend to make the results of your analysis clear to yourself and to others; and the means you'll use to monitor the process by which you arrived at your conclusions.

Data analysis software was rocket fuel for personal computing during the early 1980s. A maturing software industry now offers products that extend well beyond *VisiCalc* and the other early entries in









this genre. With adjuncts the likes of *1-2-3 Report Writer*, *HAL*, and *Note-It*; integrated programs like *Symphony* and *Framework II*; and hybrids like *Javelin*, *VP-Planner*, and *Reflex*, it's clear that today's products strive to address every element in the data analysis equation. Beyond calculations and graphs, data analysis programs increasingly encourage you to carefully structure problems, dissect models and formulas, document assumptions, and generate sophisticated reports. These capabilities are apt to help you refine your approach to assessing and interpreting data—and ultimately to solving business problems. After all, programs only do the figuring; *you* do the analysis.

### ■ Wanted: Answers

In data analysis, as in household maintenance, it's good practice not to swat flies with dynamite. A great deal of information can be obtained via simple numeric operations. That's frequently the case when dealing with large data sets or when the most salient features of the data must be summarized. Such summary analyses usually fall into one or more of the following categories:

*Measures of central tendency* provide a single number that represents all the data. The most common of such measures are the mean (or average) and the median (the number in the middle).

*Measures of variation* describe the variability of the data or compare and contrast various data points. Typical measures include standard deviation and variance. Measuring variability is as important to understanding data as is determining central tendency.

Suppose, for example, that the average monthly sales for all the salespeople in a firm were \$10,000. If all the individual salespeople's totals were within \$100 of one another, the implications would be radically different from a situation in which several salespeople showed extremely high sales volumes while others had correspondingly low volumes. Both conditions however, produce an identical average.

*Measures of inference* come in handy when you want information about something but don't have all the necessary data. Consider quality control in a production setting or consumer buying preferences. While it's neither feasible nor desirable to poll every

consumer or check every part as it comes off an assembly line, you can estimate certain values by sampling the data and applying various analytic tests to those samples.

*Measures of prediction*, technically known as *measures of covariation*, reveal patterns and relationships among various parts of a data set. If you're interested in generating a trend line to accompany the ramp up of a new product, you may be a candidate for regression analysis, one method of prediction. Attempts to determine sales of a variety of products by each division are apt to involve cross-tabulations, another measure of prediction.

Regression analysis and cross-tabulation are suited to a varied population of specialists: research scientists, engineers dealing with system design and control, and businesspeople tracking personnel, production, sales, or market conditions.

The primary purpose of all these analytical approaches, simple as it sounds, cannot be over-emphasized: to reduce a large volume of data to a more manageable and meaningful form.

### ■ How Are We Related?

While spreadsheets and the like contain features that are regularly brought to bear on business problems in each of the four analysis areas described, there's a fifth major data analysis activity—one that's a virtual mainstay for many PC users. That activity is *modeling*, the analytic discipline most often allied with spreadsheets.

Spreadsheets specialize in displaying and enabling you to manipulate relationships between data variables. An entire pattern of such relationships can be assembled into a model that is in fact a simulation of a system. Models enable you to study variables' effects on each other and are typically used in financial applications, for both tracking current information and projecting future outcomes. Such applications range from standard accounting and financial record keeping, investment analysis, and sales forecasting, to growth and acquisition analysis, inventory control,



## Chapter 5: The Spreadsheet Bled Red

**A**fter I set up the data base with Virgil, I decided it was time for another vacation. It had been tense work, what with Virgil breathing down my neck every second. At least he was finally starting to trust me.

When Heyer and I returned from our cruise to the Bahamas, I knew I had to get to work. I'd lost a bundle in the Nassau casinos and barely had enough scratch to cover my dock fee. Fortunately, Rama gave me a jingle and asked me to give her a hand with her spreadsheet. It was an analysis gig; she wanted to know whether she should buy out Jumpin' Jack Flash Printing as her next acquisition. This little mom-and-pop operation was beginning to look more like a corporation all the time.

The joint was jumping when Rich Dixie met me at the door. The presses had been moved into a newly acquired back room, and desks adorned with PCs had taken their place.

"So how's Virgil coming with his data base?" I asked the well-scrubbed Dixie.

"Oh, I've taken that over now, Mr. McByte," Dixie smiled. "You know how busy Mr. Disque is."

"Yeah, sure," I said. Knowing Virgil, it figured. Still, there was something about Dixie that set off the alarm connected to my mental cassette port, but I couldn't quite put my finger on it.

The kid dropped me off at Rama's desk and departed with a brisk salute. Rama gave me a quick kiss on the cheek, the kind your sister gives you when she's trying to impress the grandparents. "Good to see you, Travis. What do you think of our new wunderkind?"

"You mean Dixie?" She nodded and I scratched my head. "I don't know, Rama. Something about him gives me the creeps. Are you sure you should be trusting him with your data management?"

"Oh, come on, Travis. Rich is an essential part of the business now," she said, and then gave me a sly smile. "You're just afraid that between the two of us we're not going to need you anymore. And when you see my spreadsheet model, you'll really be worried."

I smiled sheepishly and turned to her spreadsheet. "What's your assumption on the percentage of business you're going to lose by jacking up prices?" She showed me the formula. I whistled. "Jumpin' Jack must have been really lowballing it." Then she showed me a separate spreadsheet that costed out some of Jumpin' Jack's big jobs.

*(continues)*



break-even analysis, and literally dozens of other functions common to business planning. Spreadsheet models can of course be sculpted to any other application in which relationships between variables exist.

In some cases, once you have entered all the values for the independent variables in the model and all the formulas specifying the relationships between variables, your work is completed. In other instances, you'll want to know the impact one variable has on another variable or a set of variables. For example, how might increased interest rates affect overall profitability? How much growth will a given cash flow accommodate? How many cows can you afford to feed if the cost of hay rises to \$90 a ton?

Most spreadsheet programs—1-2-3, *SuperCalc* 3, *Multiplan*, and so on—instantly display the resulting changes in your model when you tinker with an input variable. Some programs enable you to generate tables showing various values of one or two input variables, and the effect that entering each input value into the model has on other variables. This type of evaluation is sometimes referred to as “what if” analysis (technically, sensitivity analysis). Aside from being a certain amount of fun, “what if” analyses are undeniably powerful: Literally thousands of calculations may occur between keyed-in variables and the output they affect, and obtaining answers is but a few keystrokes away.

### Computerized Chameleons

Off-the-shelf spreadsheet programs aren't statistical packages, but they can perform limited statistical operations. Built-in functions range from the basic (count, sum, average, minimum, maximum) to the sublime (variance, standard deviation, frequency distribution) to the financial (net present value, internal rate of return, various amortizations). As your need for more complex aggregations and operations grows, some programs can respond accordingly, providing program-specific command languages for model building and automating regularly executed processes with keyboard macros.

Technically, the spreadsheet is nothing less than an ultra-high-level programming language—or, at the very least, a highly capable environment for applications. Accordingly, spreadsheets now occupy a growing middle ground between ready-made application

programs and traditional computer languages. The spreadsheet is the engine behind the development and dissemination of scads of new, refined, and usable data analysis tools.

The commercial template is an instructive confirmation of the spreadsheet-as-environment. A template is nothing more than a spreadsheet with all the formulas filled in but the data cells left blank. Templates exist for a multitude of financial applications ranging from simple cash-flow analyses to complex accounting systems. If your application happens to fit a template, using one can obviously save substantial time and effort.

### Spreadsheets and Illusions

The spreadsheet creates a marvelous illusion, as any user can attest. Indeed, the illusion is so successful that few people initially realize that building a spreadsheet model is a form of computer programming. You lay out your problem visually on a video-based ledger. This grid is a natural and effective organizing concept for specifying data and relationships; its presentation enhances problem solving.

Perhaps 1-2-3, the proven leader in the field, best embodies this approach to organizing information. By presenting data in three ways—in a spreadsheet, displaying dynamic numeric relationships; in a data base, ordering information according to the attributes it possesses; and in graphs, visual analogs of numeric values—1-2-3 enables you to fit numbers into various conceptual metaphors.

Yet *data analysis* is no longer synonymous with *spreadsheet*; while programs like 1-2-3 and *SuperCalc* 3 have extended and refined the ledger metaphor with a broad array of features, hybrid products built around other metaphors offer alternative approaches



to similar tasks. *VP-Planner*, *Reflex*, and *Javelin*, for example, offer data base variations on the worksheet theme. Integrated programs the likes of *Symphony*, *Framework II*, and *Enable* augment spreadsheets with full-fledged data management, word processing, and communications modules.

Although spreadsheets, integrated packages, and the emerging new breed of data analysis tools considerably simplify the process of analyzing data, they don't do it all for you. You still need to learn the ropes, however tangled they may seem.

A trade-off accompanies all the power and sophistication these programs offer. In a nutshell, it's simply that the more the program does for you, the more specialized commands you'll need to learn, the less flexible the system is, and the more restrictions it imposes. With the ultra-high-level language of the spreadsheet, the number of specialized commands is staggering (you could tackle more than 600 in *Symphony* alone). Unlike BASIC or Pascal, spreadsheets don't quite present you with a blank sheet; you're still dealing with a product that is at least part application. Consequently, spreadsheets are a good deal more limited than lower-level languages—a situation that can both help and hinder your data analysis task.

### People Get Ready

Once you've selected the kind of analysis you need to perform, it's wise to construct a rough outline of the form in which you'd like to present the results. In rare instances, you may need to perform an analysis to learn a result you'll use and promptly discard. More often, you'll need to refer to your findings later or present them to someone else. The capabilities of different programs to display results exactly the way you want them vary widely and can be a major factor in selecting software—and how you use what you choose. Remember that you're trying to convey something about the data, not the data itself. The PC will perform the drudgeries of calculation, but your results are still subject to interpretation. The more clearly you can present the results (even for an audience of one), the more useful your work will be.

It's also essential to remember that trade-offs apply as much to the process of summarizing data as to analyzing it. As you continue to distill data for

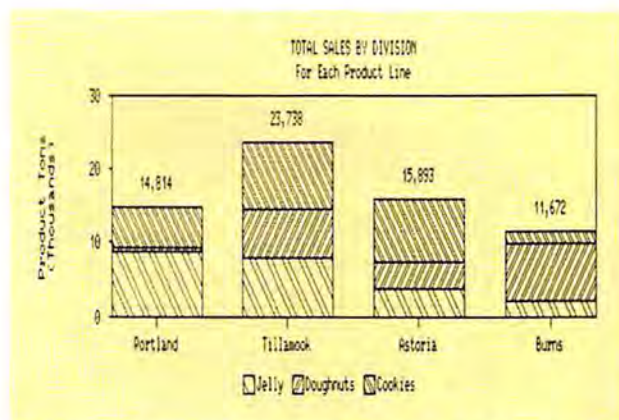
"It looks like he's making a small profit, but look at this cash-flow analysis," Rama said, and she scrolled to yet another part of the worksheet. "His clients hung him out to dry for 90 days before they paid him, but Jumpin' Jack didn't add finance charges. Pffft. There went his profit."

Rama's spreadsheet was sound, real sound, the straight scoop all the way. "And to think that we used to be worried about Quick and Dirty taking us over," Rama laughed as she printed out her spreadsheet. "Once we have our fourth shop, we won't have a thing to worry about."

Yeah, it sounded sweet, but I knew better. Something about living on a houseboat and being so susceptible to high winds and raging tides had tuned my ear to the quiets that come before storms. Call it a hunch, call it ESP, call it whatever, but I knew something was rotten in Key West. Still, there's a funny thing about smells—you can't always tell where they're coming from. Was it Virgil, Dixie... who knows... maybe even Rama. Whatever was threatening was going to come up quickly, do its dirty work, and then be gone before Printorama even knew what hit it.

(continues on page 267)





Screen 1: The essence of analysis is distillation and the ability to ascertain relationships among sets of data. This stacked bar graph quickly highlights divisional performance and product popularity.

| January   |  | Division |           |         |        |
|-----------|--|----------|-----------|---------|--------|
| Product   |  | Portland | Tillamook | Astoria | Burns  |
| Jelly     |  | 8,825    | 8,090     | 3,801   | 2,194  |
| Doughnuts |  | 536      | 6,564     | 3,647   | 7,705  |
| Cookies   |  | 5,453    | 9,084     | 8,445   | 1,773  |
|           |  | 14,814   | 23,738    | 15,893  | 11,672 |

Figure 1: A basic matrix consisting of data about products sold by division

| February  |  | Division |           |         |        |
|-----------|--|----------|-----------|---------|--------|
| Product   |  | Portland | Tillamook | Astoria | Burns  |
| Jelly     |  | 9,723    | 8,800     | 4,501   | 2,337  |
| Doughnuts |  | 1,049    | 7,410     | 3,789   | 7,773  |
| Cookies   |  | 6,325    | 9,732     | 8,948   | 2,665  |
|           |  | 17,097   | 25,942    | 17,238  | 12,775 |

| Increase in sales |  |     |     |     |     |
|-------------------|--|-----|-----|-----|-----|
| Tons              |  |     |     |     |     |
| Jelly             |  | 898 | 710 | 700 | 143 |
| Doughnuts         |  | 513 | 846 | 142 | 68  |
| Cookies           |  | 872 | 648 | 503 | 892 |
| Percent increase  |  |     |     |     |     |
| Jelly             |  | 9   | 8   | 16  | 6   |
| Doughnuts         |  | 49  | 11  | 4   | 1   |
| Cookies           |  | 14  | 7   | 6   | 33  |

Figure 2: The picture becomes more complex and the options multiply when new variables are introduced. Here, growth in sales by product quantity can be compared to percentage sales increase by division.

concise presentation, some of the information may have evaporated. If the distillation continues, results can be so condensed they become misleading. To best communicate your results, select the level of detail that suits the questions you wish to answer. In some cases, the overall result is more important than specific details. For example, most stockholders are far more interested in the figure that summarizes the return on their investment than in various levels of sales by division or product. If you happen to be the CEO of a firm they hold stock in, however, the variability of sales is vital information. Even more important might be a set of items predicting next quarter's sales performance.

### Feeding the Beast

While data input may seem like the first step in data analysis, it should actually be one of the last items on your list. Many packages are fussy about how data is fed to them. Points as seemingly innocuous as whether numbers have commas between them or whether string variables (words) are enclosed in quotes can determine the usability of a data set. It's always easier to enter the data right the first time than to try to fix an inconsistency later. Of course, the exact data you feed the computer heavily depends on the result you want to achieve, as well as on the software that you'll use to achieve it.

A few cardinal rules govern data entry. First and foremost, remember the "garbage in, garbage out" maxim. The data you supply to an analysis program must be correct or the entire exercise can be for naught. If you are unsure about data accuracy, at least document that fact. Ensuring data integrity is so critical that it's worth whatever effort is required. A good data management program will enable you to set up a data input system that checks data types (variables, formulas, dates, decimal values, and so on) as data is keyed in; spreadsheets inherently have a greater tolerance for error than do data managers.

The second rule is to include all available data. Most programs can easily select a subset of data to analyze but are totally stuck if a needed variable is missing. It's better to have too many variables in the model than too few.

Finally, let the computer do the calculating. Rather than entering an interest amount, for example, put in the principal and the interest rate. The computer will not make computational errors, the prin-



cial and interest variables will be available for other calculations, and you avoid hiding an assumption (in this case, the interest rate) in your data.

## The Graph Formula

As a general rule of thumb, if you have a mass of data to present at once, consider conveying it in graph form. You might want to think of this as a rule of fingers: If you have more than ten numbers, use a graph. As Lotus Development made clear with 1-2-3, no self-respecting spreadsheet vendor can release a product without graphing capability.

A single graph can effectively present hundreds or even thousands of data points. In addition, numerous relationships within the data set can be displayed in a single chart (see Figure 1). In our example of sales of all products by division, a stacked bar graph may be appropriate (see Screen 1).

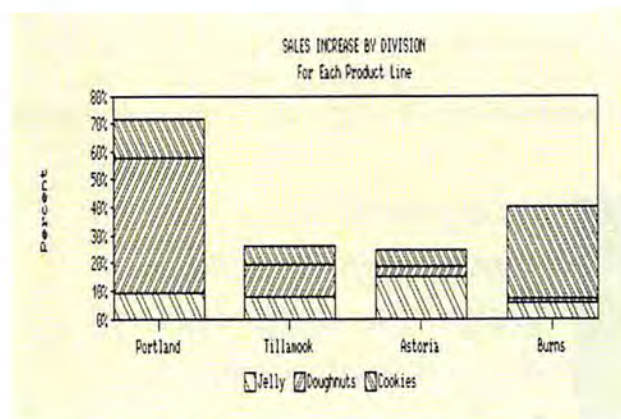
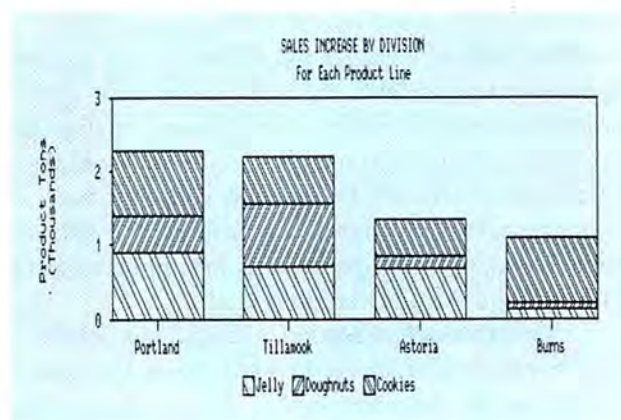
In the graph, the relative size of the differences is immediately evident; the image also presents the overall performance of the company (as the total height of the bar) very clearly.

## Precious Documents

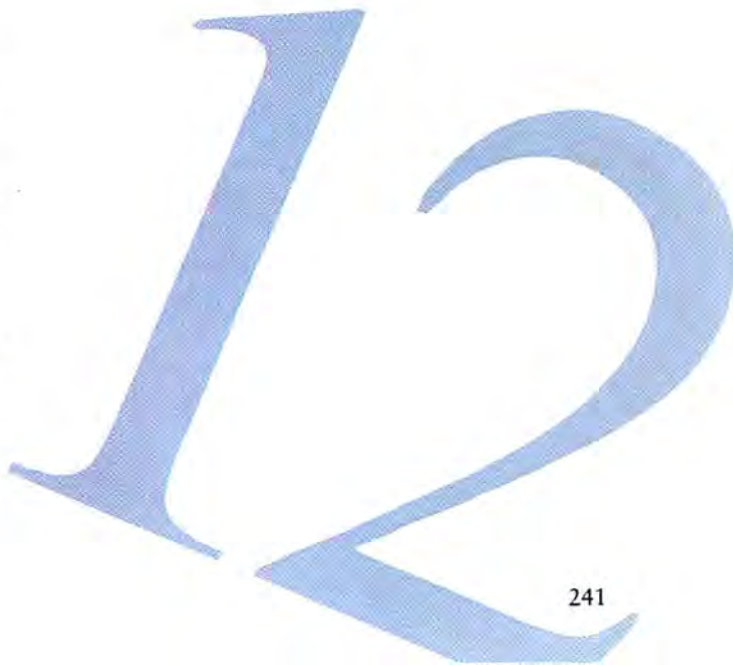
When presenting the results of an analysis to others or documenting the outcome for yourself, the method by which you arrive at your conclusions is as important as the conclusions themselves. Remember that you lose information as you summarize and that the lost components may be important. If your data contains extreme values (that is, numbers out of line with the rest of the data), you may want to be able to examine those entries to determine if, among other possible explanations, data entry was scrupulously accurate.

At times a presentation can convey an impression markedly different from that suggested by other ways of measuring—and displaying—the same data. Using the data from Figure 2, which documents a sales increase from the previous figure, divisional performance appears different if we measure percentage increase rather than sales volume increase (see Screens 2 and 3).

The best method for dealing with such discrepancies is to document the procedures used to obtain all the results. Exactly what data did you use? On



Screens 2 and 3: Interpretations can vary, as these two very different encapsulations of the same data reveal. Screen 2, top, measures divisional sales increases by unit (in this case, product tons). Screen 3 graphs identical data on the basis of percentage growth.





what assumptions are your formulas based? What were the goals of your analysis? Why did you proceed in the way that you did? Did you use the most appropriate analytical method? Is an additional analysis desired? Your answers to such basic questions will enable others to check not only your work but your logic. Especially if you expect controversy to attend your results, or if they're the basis for important decisions, careful documentation is vital.

Vigilant documentation is crucial not only in the presentation of final results but also in the creation of models. At every point in the model construction process, you need to understand the structure of the edifice to which you're adding. The typical model displays the results of many complicated formulas without displaying the formulas themselves; relationships among variables are thus extremely difficult

*As a general strategy, spreadsheets should be designed to display rather than conceal assumptions built into formulas.*

to discern. Any given formula can incorporate a handful of assumptions, such as assumed growth rate, starting values, or nonlinear relationships.

As a general strategy, spreadsheets should be designed to display rather than conceal assumptions built into formulas. Dedicating a section of the worksheet to a list of assumptions should be an essential part of the modeling process. In spreadsheet models, as in backfence chatter, it's wise to document the sources of your information as well as the information itself.

Documentation remains the weakest aspect of the current generation of spreadsheet products. Even if you set aside a portion of the worksheet for annotation as you should, you've also added clutter. These deficiencies haven't gone unnoticed, however, and a host of utilities has evolved to fill the gaps. Both the

*Spreadsheet Auditor* and the *Cambridge Spreadsheet Analyst* can be used with Lotus spreadsheets to track formulas and relationships. But because these programs operate on data files rather than on the full complement of spreadsheet functions, they're only partial solutions. Turner Hall's *Note-It* improves the annotation process by enabling you to attach small pop-up windows (into which you can plug references and notes) to worksheet cells. Among data analysis products, only *Javelin*, with its Notes and Diagram views, intrinsically assumes that you'll need to explain yourself.

### Just One More Iteration

The more organized your approach to data analysis, the fewer glitches you will encounter. Unfortunately, it's all too easy to approach data analysis haphazardly, relying on trial and error to generate an ultimate solution. This temptation is particularly acute with spreadsheets. If you cut corners and live by the seat of your pants, you may pay with a model that does not produce the desired results, produces misleading results, or is so elliptical that you'll leave your audience confounded. Time taken initially will pay for itself before you're through.

In addition, don't become hypnotized by the process. Analyzing data can be fun, especially if you're obtaining useful information in the process. Constructing spreadsheet models that accurately reflect every contingency down to the last decimal place requires a vast expenditure of effort. At some point, however, increased accuracy adds nothing to the accuracy of the final interpretation—and you may find that you've missed another spring.

Finally, don't expect to get it right the first time. Analytical models notoriously court revision before they're capable of generating acceptable final results. The problem isn't that specifications are poorly written or that people are inept at specifying what they want. It's just that our brains are as remarkably tolerant of fuzziness as computers are insistent on clarity. Even when you think you know precisely what you want to do, you can expect the system to goad you for even greater precision. The overall process will proceed more smoothly if you regard the computer as a partner with which you are having a dialogue about data. ●



*Darien Fenn is a management consultant for Coast Consulting in Portland, Oregon, and the author of Symphony Macros and the Command Language (Que Corporation, Indianapolis, 1985).*

*1-2-3 release 2*

*Lotus Development Corp.  
55 Cambridge Pkwy.  
Cambridge, MA 02142  
800/343-5414, 617/253-9150  
List price: \$495  
Requirements: 256K, one disk  
drive, DOS 2.00 or later version  
Copy protected*

*1-2-3 Report Writer*

*Lotus Development Corp.  
List price: \$150  
Requirements: 256K, two disk  
drives, DOS 2.00 or later  
version  
Copy protected*

*Cambridge Spreadsheet Analyst*

*Cambridge Software  
Collaborative  
University Pl. #200  
Cambridge, MA 02138  
617/576-5744  
List price: \$149  
Requirements: 192K, two disk  
drives, DOS 2.00 or later  
version  
Copy protected*

*Enable 1.1*

*The Software Group  
Northway 10 Executive Park  
Ballston Lake, NY 12019  
800/932-0233, 800/338-4646  
New York  
List price: \$695  
Requirements: 192K, two disk  
drives, DOS 2.00 or later  
version  
Copy protected*

*Framework II*

*Ashton-Tate  
20101 Hamilton Ave.  
Torrance, CA 90502-1319  
213/204-5570  
List price: \$695  
Requirements: 384K, two disk  
drives, DOS 2.00 or later  
version  
Copy protected*

*Javelin 1.0*

*Javelin Software  
One Kendall Sq.  
Cambridge, MA 02139  
617/494-1400  
List price: \$695  
Requirements: 512K, two disk  
drives, DOS 2.00 or later  
version  
Copy protected*

*Multiplan 2.0*

*Microsoft Corp.  
10700 Northup Way, Box 97200  
Bellevue, WA 98009  
800/426-9400, 206/828-8088  
List price: \$195  
Requirements: With 128K DOS  
1.10, DOS 2.00, or DOS 2.10,  
one disk drive; with 192K DOS  
3.10, one disk drive  
Not copy protected*

*Note-It 2.0*

*Turner Hall Publishing  
10201 Torre Ave.  
Cupertino, CA 95014  
408/253-9607  
List price: \$79.95  
Requirements: 256K, two disk  
drives, DOS 2.10 or later  
version  
Not copy protected*

*The Spreadsheet Auditor  
Consumers Software, Inc.  
8315 Monterey St., Ste. A  
Gilroy, CA 95020  
408/848-3385*

*List price: \$149  
Requirements: 128K, one disk  
drive, DOS 2.00 or later version  
Copy protected*

*SuperCalc 3*

*Computer Associates  
Micro Products Division  
2195 Fortune Dr.  
San Jose, CA 95131  
408/942-1727  
List price: \$395  
Requirements: 128K, one disk  
drive, DOS 2.00 or later version  
Not copy protected*

*Symphony*

*Lotus Development Corp.  
List price: \$695  
Requirements: 320K, two disk  
drives, DOS 2.00 or later  
version  
Copy protected*

*VP-Planner*

*Paperback Software  
2612 Eighth St.  
Berkeley, CA 94710  
415/644-2116  
List price: \$99.95  
Requirements: 256K, one disk  
drive, DOS 2.00 or later version  
Copy protected*



# Tender Offers: Reflex Takes Over

Today's corporate raiders didn't get to be rich and famous by dint of intuition alone. Here, *Reflex* imparts some of their touch by helping you analyze the numbers behind a prospective merger.

Stephen A. Blumenthal

||||| The process of homing in on a corporate takeover target is known as *risk arbitrage*. They don't call it "risk" for nothing. Even during boom times on Wall Street, often the only real action is in stocks of candidates for acquisition. This occurs because several generations of wheeler-dealers weaned on the game of Monopoly are applying those hard-won skills to various members of the Fortune 1000.

As a means of putting the concept of data analysis into practice, we'll play the game too, using Borland International's *Reflex: The Analyst* to determine what distinguishes takeover fodder from an invulnerable corporate empire.

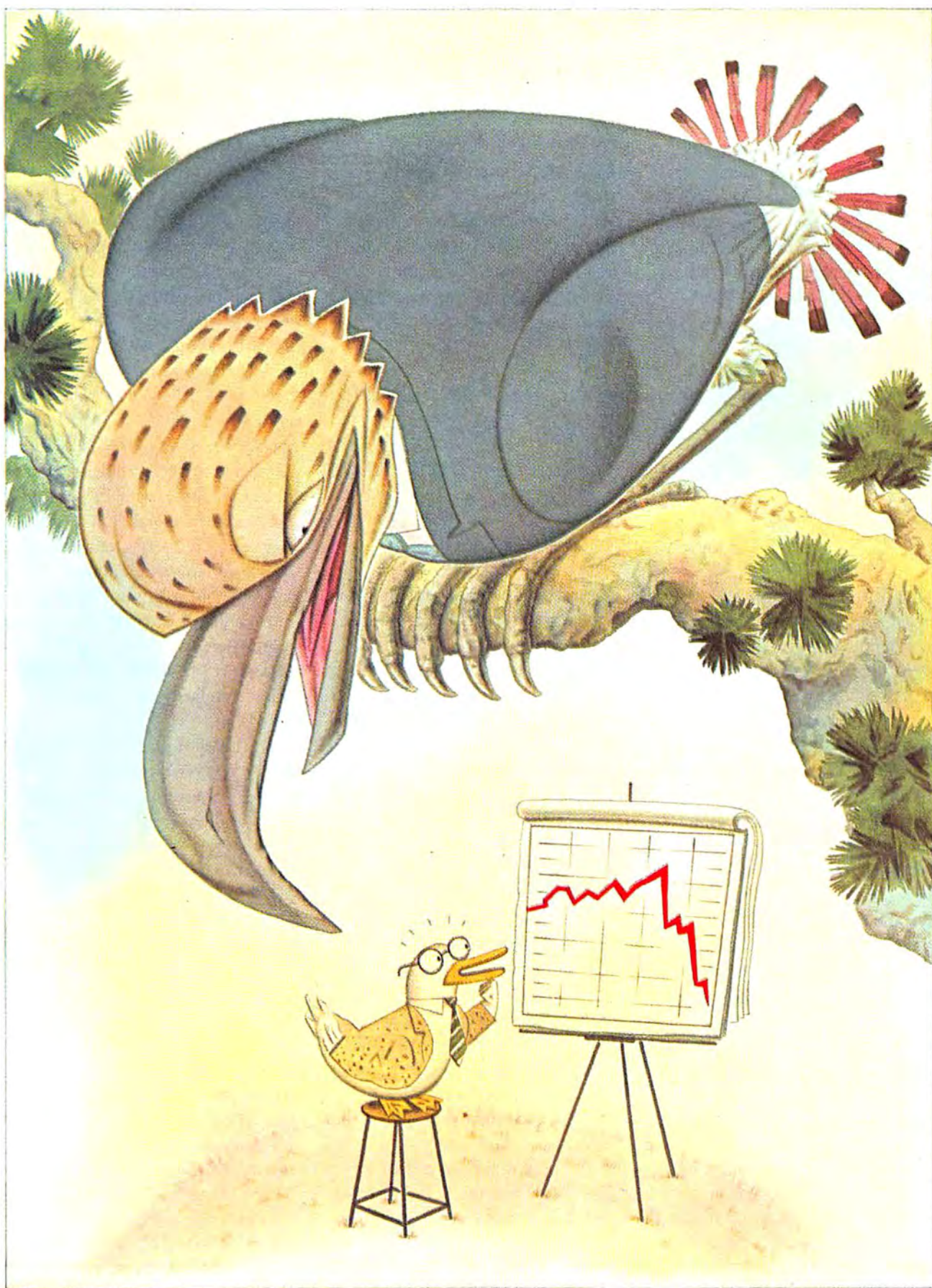
With increasing frequency, the financial press reports on tender offers for major companies. Almost overnight, a mini-industry has sprung up dealing in *mergers and acquisitions* and *special situations*. Swallowing a Conoco or an RCA requires big bucks, and Wall Street works overtime developing creative financing techniques to come up with the cash. One of the most notorious is the *leveraged buyout*, which uses the assets of the takeover target to finance the acquisition. This involves issuing high-yield debt known affectionately as *junk bonds*. The defenses developed by corporate management are just as creative; the lingo is littered with terms like *green-mail* and *white knights*, and self-destruct tactics quaintly called *poison pills*.

## ■ The Only Game in Town

Assume you are vice president of mergers and acquisitions at Grabbem & Run, Inc., a well-heeled but somewhat inept high-tech conglomerate. G&R has never been very good at research and development and has never had an original idea or successfully developed a new product. Its attempts to build new plants have resulted in horrible cost overruns, and more than half the time, anything it actually put together on its own assembly line doesn't work properly. Grabbem & Run's only real assets are cash and a knowledge of its own limitations.

Years ago G&R decided to look for well-managed companies that make fine products—firms whose stock, and therefore assets, could be bought for less than G&R would spend to design, manufacture, and market its own products. G&R is reasonably large and, thanks to its investment







banker's inspired financing ideas, is scouting around for companies with revenues in the \$100 million range.

You start your search by limiting it to public companies. This means the target will have more than \$3 million in assets and at least 500 shareholders. Because of Securities and Exchange Commission rulings on disclosure, re-

you think it might be possible to buy this troubled company cheaply while it is reeling from a financial one-two punch.

### ■ 50 Minutes With the Analyst

All takeover candidates should be analyzed on the basis of two essential characteristics: undervalued assets and earnings power. *Reflex*, a RAM-based analytic

pear at the top of the screen, and you use a slash to invoke Mac-like pull-down menus. To choose a command, you move the pointer to the menu option using the cursor keys or a mouse.

### ■ Building the Data Base

Were you starting from scratch, you would make a beeline for your nearest business library, where your in-depth hunt for information could begin. There you'd scrutinize reports on a company like CSD from Standard & Poor's (S&P) and Moody's Investor Services, Wall Street's dominant investment ratings services. In this example, we'll be plugging fabricated financial data into *Reflex* using categories defined by S&P. (Obviously, an authentic takeover bid requires a great deal more information than we can examine here; we'll also skip the pedagogy of Wall Street analysis. We're primarily on a hunt for trends.)

Start *Reflex* and use */Views Form* to enter the Form View mode. Because we're just beginning (and have not set up a form), the program automatically proceeds to Form Design—*Reflex*'s answer to the old 3-by-5 card. Identify the data base by entering a name preceded by an apostrophe (without the apostrophe *Reflex* will regard the name as a field into which information can be placed).

Form Design is ideal for both creating field (that is, category) names and entering data. Using the S&P sheet, type the name of a category of information, such as net income or total capital, and press <Enter>. Repeat the process for each category. Our data base consists of 18 categories and will be filled with data from the years 1976 through 1985.

*Reflex enables you to amass a body of data, analyze and graph it as you would with a spreadsheet program, and weigh the salient traits of a takeover target.*

searching public companies is an order of magnitude easier than re-searching closely held concerns.

After securing several years' worth of annual and quarterly reports, scouring the trade press, and making discreet inquiries at brokerage firms and banks, you think you have isolated your prey. The initial investigation shows that the target, a chipmaker called Consolidated Sitting Ducks (CSD), best meets the preliminary criteria: The company has carved itself a niche in the market, for some years had been growing at a steady rate, and is managed by people respected for their creativity and administrative acumen.

But the investigation also indicates that all hell broke loose several years ago. Times are hard in the semiconductor business and for those industries that support it. CSD's earnings nosedived, and rumors recently surfaced about a possible default on a debt obligation. Your interest is piqued, and

data manager introduced in 1985 by Analytica—which itself was recently acquired by Borland—enables you to amass a body of data, analyze it and graph it as you would with a spreadsheet program, and weigh the salient traits of a takeover target (see "Reflex: Analysis With Finesse," PCW, September 1985).

*Reflex* presents you with five views: Form, used to build a data base; List, to arrange the data base in list form; Graph and Crosstab, to display and analyze data; and Report, to print information from any of the other views. *Reflex* enables you to assess identical information in different formats and from different perspectives, a process encouraged by commands that are consistent throughout the views.

The program owes a debt to both 1-2-3 and the Macintosh. As in 1-2-3, *Reflex*'s commands ap-



'1985

| Views     | Edit    | Print/File    | Records        | Search  | List           |
|-----------|---------|---------------|----------------|---------|----------------|
| <b>LS</b> |         |               |                |         |                |
| Year      | Op.Inc. | %Op In of Rev | Net Before Tax | Net Inc | %Net In of Rev |
| 1985      | 57      | 18.5          | 40.4           | 28.6    | 9.3            |
| 1984      | 14.4    | 7.4           | 0.5            | 1.4     | 0.7            |
| 1983      | -11.9   | 0             | -35.2          | -14.8   | 0              |
| 1982      | 45.4    | 20.8          | 38.3           | 21.9    | 10             |
| 1981      | 27.1    | 16            | 23             | 13.1    | 7.7            |
| 1980      | 13.3    | 13.7          | 9.7            | 5.3     | 5.5            |
| 1979      | 7.7     | 12.4          | 5.1            | 2.8     | 4.4            |
| 1978      | 5.2     | 10            | 3.2            | 1.7     | 3.3            |
| 1977      | 2       | 4.8           | 0.9            | 0.6     | 1.3            |
| 1976      | 2       | 5             | 0.6            | 0.4     | 1              |

Screens 1-3: The Reflex List View is essentially a data base in matrix form. Once you've entered fields in the Form View, you can plug data into the List View. Scrolling laterally, Screen 2 (middle) picks up where Screen 1 (left) leaves off. Note the figures highlighted in Screen 3 (bottom); entering this formula in a Field & Sort Settings formula cell automatically enters the resulting value as a constant in the List View.

In order entered, fields include: year, operating income, operating income as a percentage of revenue, net income before taxes, net income, net income as a percentage of revenue, cash, current ratio, return on assets, long-term debt, long-term debt as a percentage of capital, total capital, return on equity, book value, earnings, current price, historical average price, and historical price/earnings ratio. Later on, if you find that you can't recall a precise category name, press <F10>, the *Reflex* Choices key, for a pop-up listing of all previously entered fields. You can scroll through the list with <CursorDown> and select a single item by pressing <Enter>.

When the list is complete, leave Form Design by pressing the slash key, which calls up the Views menu. You'll notice that a colon now follows all category entries; invoking the Views menu essentially ratified them as field names.

With Form View, you can store information in the data base by simply typing in entries after the

3.15

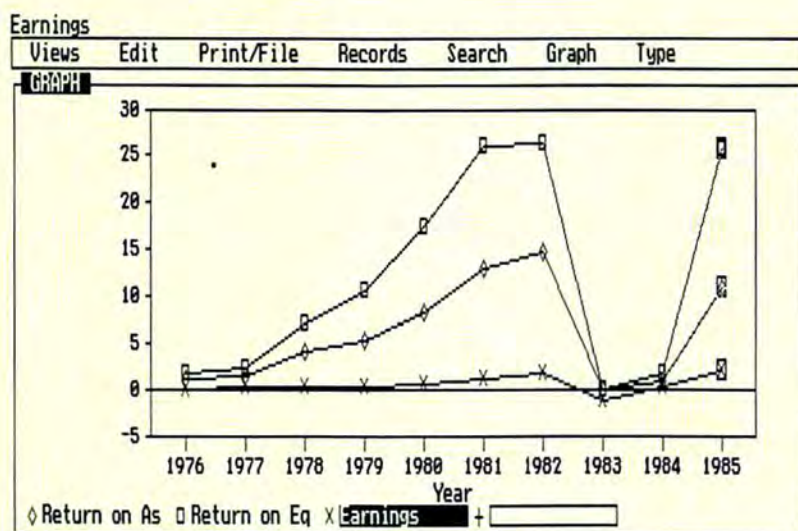
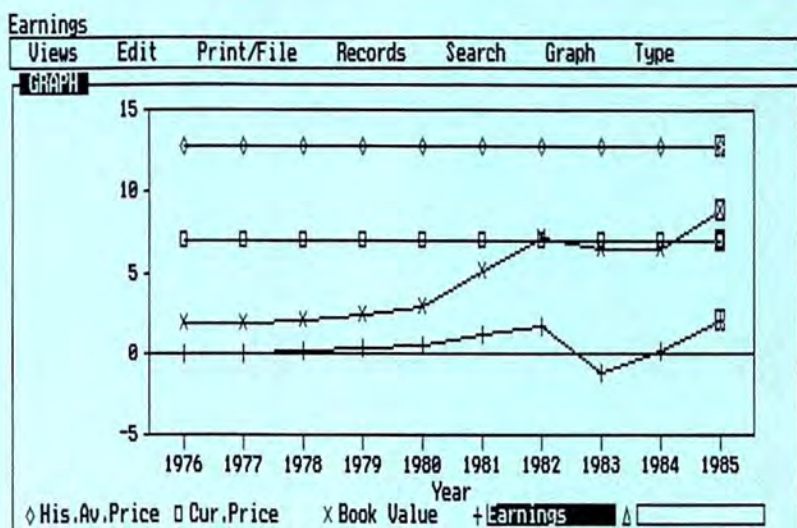
| Views     | Edit      | Print/File       | Records | Search            | List        |
|-----------|-----------|------------------|---------|-------------------|-------------|
| <b>LS</b> |           |                  |         |                   |             |
| Cash      | Cur.Ratio | Return on Assets | L.T.Deb | %L.T.Deb. of Cap. | Tot.Capital |
| 3.15      | 3         | 11               | 89.2    | 40.1              | 222         |
| 4.31      | 3.1       | 0.7              | 65.1    | 40                | 163         |
| 3.45      | 3.7       | 0                | 62.1    | 41                | 151         |
| 3.8       | 4.1       | 14.6             | 34.9    | 25.5              | 137         |
| 4.95      | 3         | 12.9             | 22.3    | 25.4              | 88          |
| 1.82      | 3.2       | 8.3              | 21.7    | 38.1              | 57          |
| 1.53      | 4         | 5.3              | 16.1    | 35.7              | 45          |
| 2.61      | 4.3       | 4                | 15      | 36.3              | 41          |
| 2.04      | 4.5       | 1.5              | 6.9     | 21.9              | 32          |
| 1.78      | 5.1       | 1.1              | 6.6     | 21.6              | 31          |

25.7

| Views            | Edit       | Print/File | Records   | Search       | List      |
|------------------|------------|------------|-----------|--------------|-----------|
| <b>LS</b>        |            |            |           |              |           |
| Return on Equity | Book Value | Earnings   | Cur.Price | His.Av.Price | His.Av.P. |
| 25.7             | 8.81       | 2.1        | 7         | 12.75        | 12.987    |
| 1.6              | 6.39       | 0.1        | 7         | 12.75        | 12.987    |
| 0                | 6.51       | -1.18      | 7         | 12.75        | 12.987    |
| 26.4             | 7.13       | 1.73       | 7         | 12.75        | 12.987    |
| 26               | 5.1        | 1.21       | 7         | 12.75        | 12.987    |
| 17.5             | 2.86       | 0.56       | 7         | 12.75        | 12.987    |
| 10.5             | 2.29       | 0.3        | 7         | 12.75        | 12.987    |
| 7.1              | 2.02       | 0.19       | 7         | 12.75        | 12.987    |
| 2.4              | 1.85       | 0.06       | 7         | 12.75        | 12.987    |
| 1.7              | 1.79       | 0.04       | 7         | 12.75        | 12.987    |



Screen 4: This line graph illustrates a recovery for both earnings and book value. Note that the program automatically assigns symbols to each value plotted along the y-axis.



Screen 5: Using Return on Equity as the principal barometer, Consolidated Sitting Ducks truly bottomed out in 1983—only to rebound just as sharply in 1984.

appropriate category heading. But because the financial information at hand is better dealt with in table form, why not enter it accordingly?

*Reflex* obliges. By switching to the List View with the command */Views List*, you can work instead with a table that will place category headings across the top of a chart. *Reflex* asks whether the List View should replace the Form View or be displayed simultaneously in a vertically or horizontally split screen. Place the pointer

over Replace and press <Enter>, or type the letter R. The List View fills your screen, enabling you to key data into the appropriate cell as you would with a spreadsheet. To expedite our analysis and spare you a trip to the library, enter the values displayed in Screens 1-3.

When you enter numeric data in a *Reflex* table, it's helpful to press <NumLock>, use the keys on the numeric keypad, then move to the cell immediately below by holding down the <Shift> key and tapping <CursorDown>. You should also use the Field & Sort Settings option on the Records menu (*/RF*) to make the Year category a text field (numeric entries automatically define a field as being of the numeric type unless otherwise stipulated). This will permit you to specify 1984 without cluttering graphs with irrelevant month and day information. Although *Reflex*'s date function is smart enough to recognize exact dates as measures of time rather than as values, individual years must be conveyed as text.



## Analyzing Target, Inc.

Whether a shopper loading up on Christmas gifts or a corporation on the prowl for fresh assets, a buyer thinks first and last of price. Our analysis pivots on the price of the stock and its relationship to the target company's other financial characteristics. It's useful to approach the analysis from three perspectives: Is the stock price low in comparison to its historical average trading price? Is it selling at a discount to its historical price/earnings ratio? And perhaps most important, is the stock selling at a discount to the book value of the company? (Book value is what remains after all liabilities have been subtracted from all assets.) Also keep your eye on such critical factors as debt-to-equity ratios and a favorable earnings history.

You could fill each cell in the data base manually, but a shortcut can speed the process. Consider the Historical Average Price category—a simple composite you can compile by downloading historical high and low stock prices from a securities-oriented data base like Dow Jones News/Retrieval or from an old-fashioned, off-line source like Moody's or S&P. (For our example, calculations for Current Price, Historical Average Price, and Historical Average Price/Earnings Ratio have already been performed.) Rather than inserting values by hand, you might enter values in the Form View or the List View as constants. Issue the command `/RF (/Records Field & Sort Settings)`, then plug the appropriate equation into the Formula cell.

Incidentally, calculating the historical average price per share—a matter of simply adding the totals of all yearly highs and yearly lows,



then dividing by the total number of entries—can be a slight chore in *Reflex*. That's because neither the List nor the Form View includes an `@SUM` function. Appearances aside, the List View is a data entry vehicle, not a spreadsheet. Instead, you can use the Crosstab View's `@SUM` function. This case in point illustrates both a strength and a weakness of *Reflex*: The program's impressive complement of built-in financial functions tends to duplicate calculations Dow Jones and S&P supply ready-made. *Reflex* is clearly more efficient at using those functions to analyze raw data than to play with results of someone else's calculations.

## The Graphs on the Wall

On Wall Street creating and interpreting graphs is both an art and a science. Why graphs, when the List View conveys all the information in table form? With our 18- by 10-item matrix, the List

View simply isn't capable of providing the snapshot we need. Moreover, *Reflex* graphs are dynamic, fluctuating as you scroll through the data base. Primarily, however, this analysis demands that we spot anomalies in performance—a task best performed with images. Indeed, our analysis is largely a graphics exercise. (If you insist on using tables, you can eliminate extraneous fields from the List View without removing them from the data base. Deleting a field name from the Form View will, however, erase the field and its contents.)

The first graph is simple but important. When you invoke the `/Views Graph Replace` command, *Reflex* asks that you enter a numeric, date, or text field for the x-axis. In this case, use Year. You can supply that field name in either of two ways. If you can recall its exact spelling, just type it in. Easy enough for Year, but will memory serve to remind you whether you used Oper. Inc. or Op.Inc. for operating income? Select `<F10>`, the Choices key, to refresh your memory.



Next, use the cursor keys to move the cursor to the y-axis box. Again using the Choices key, find the Current Price field. When you've selected it with the <Enter> key, another highlighted y-axis box will appear. *Reflex* plots up to eight numeric y-axis fields, distinguishing among them with legends and geometric symbols. The largest unit of any y-axis field determines the values along that axis. Graphs are scaled accordingly, so it's wise to compare fields with roughly equivalent measures.

For the first graph, plot Historical Average Price, Current Price, Book Value, and Earnings. If you want to name the graph, use /*Graph Options* and the cursor to toggle the Title On/Off box. Select Proceed to return to the Graph view, move the cursor to the Title of Graph space, and enter a title. Your graph should resemble that in Screen 4.

Before moving on, save the graph to an .RXP (picture) file by issuing the /*Graph Print* command. *Reflex* will provide a highlighted cell in which you enter the disk drive, the directory, and the graph name. With the cursor in the Proceed box, press <Enter>, thus saving the graph to disk. To print your handiwork, you must leave the main program and start *Reflex2*, a separate graph-printing and utility program.

### ■ A Swan or a Goose?

Now bring up the Graph and List Views simultaneously. Using the program's windowing capability involves issuing the /*Views List* command. When *Reflex* asks how you want to see the second view, select Vertical, split-

ting the screen and displaying both the Graph and List Views at once. (Use the cursor keys to navigate your way through the data base, and watch the graph change.)

Screen 4 indicates that CSD is trading at a price well below its historical average. The graph also shows that although the company's stock traditionally sells at a premium over book value, it is currently selling at a discount to book. In other words, the stock's historic trading price has in the past exceeded the value of the company's net assets, but that is no longer the case. CSD's stock is trading at a price lower than you would receive were you to sell off all its assets.

The earnings history is favorable; the pattern of growth that was disturbed by a disastrous 1983 has returned. Earnings are positive for the last two years, and as both the Graph and the List Views make clear, the company is earning more per share now than at any time in its recent history.

Note that earnings had been increasing steadily, declined, and are climbing again. In the world of Boone Pickens and Carl Icahn (rather than the world of magazine tutorials), you'd immediately seek out Dow Jones News/Retrieval or the research department of a brokerage firm for an estimate of earnings for the next three quarters.

Using the historical price/earnings ratio and that earnings estimate, you could extrapolate a share price. The 1984 per-share earnings of \$2.10, for example, should produce a market price of \$26 per share—not bad for a company whose stock is currently trading at about \$7 a share. Unfortunately, earnings per share do not translate directly into stock

price movement. Earnings are just one indication of how productively assets are being used. It's necessary, therefore, to graph other measures of Consolidated Sitting Ducks' efficiency.

To see how effectively the company is turning its resources into profits, stay with the Graph View; erase the previous legends on both axes by highlighting each with the cursor and then pressing the <Del> key. Use the <F10> Choices key to plot a graph with the x-axis remaining as Year and y-axis fields of Return on Equity, Return on Assets, and Earnings (see Screen 5).

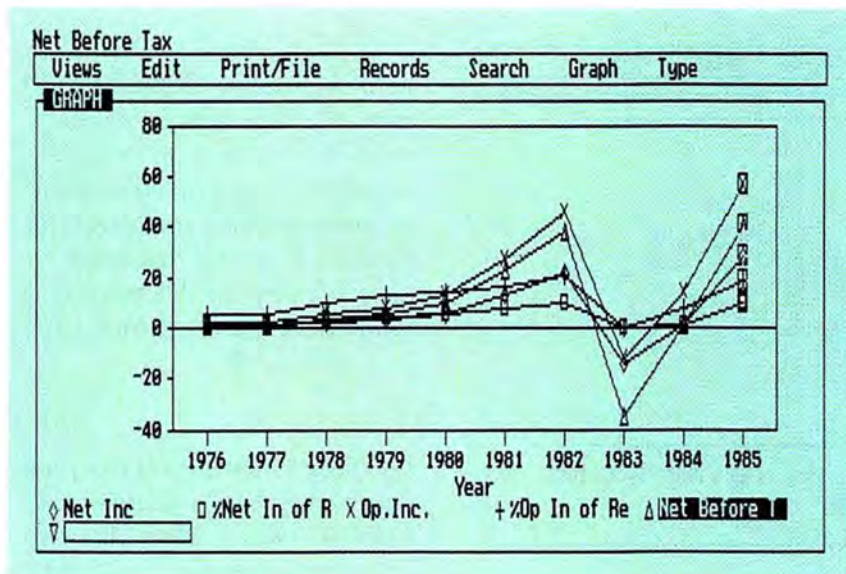
This graph illuminates the first cloud on the financial horizon. The chart demonstrates that when CSD is doing well it does very well—but when it's not doing well it fares badly indeed. Nothing that bounces like a Ping-Pong ball is operating at peak efficiency.

Note that we used earnings per share, not book value. A company can claim substantial assets but elude profitability. (Remember Penn Central?) Assets cannot always be liquidated easily or inexpensively and thereby converted to more productive cash. (Alas, Penn Central again.)

Because we're scouting for a takeover candidate, however, there's no need to eliminate book value. If the stock is selling below book—as Screen 5 indicates our target is—it may be profitable for someone to buy up all the stock and sell off all or part of the company's assets.

An examination of CSD's income is in order to determine if the charts support this strategy. Create a graph as you did pre-



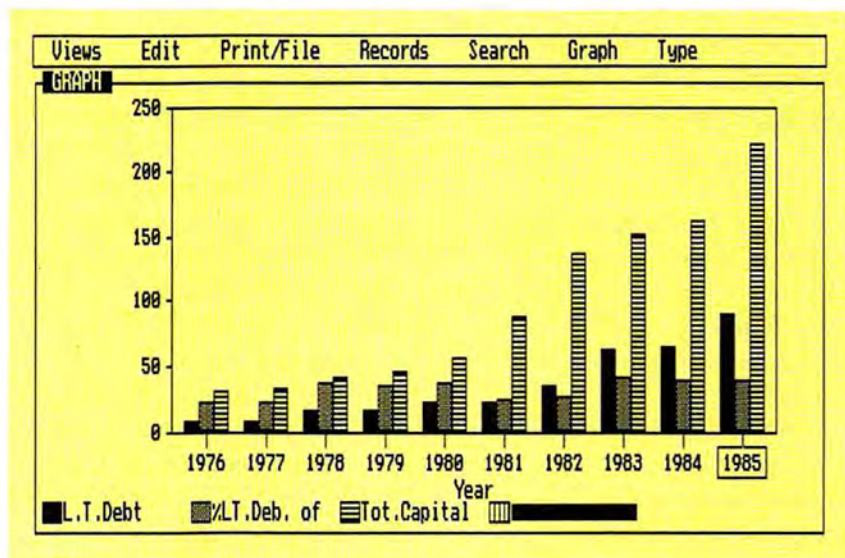


Screen 6: Five more indicators tell a familiar tale of CSD's waning and waxing fortunes.

viously (/Views Graph Replace); this time use the fields Net Income, Net Income as a Percentage of Revenues, Operating Income, Operating Income as a Percentage of Revenues, and Net Before Taxes. This new graph has good news written all over it (see Screen 6).

The disaster of 1983 is clearly history now that operating income hovers at an all-time high. (Operating income is what remains after the firm has subtracted operating expenses from operating revenues.) Net income is also on the upswing. In a growing company the ratio of both operating and net income to revenues should be increasing annually. And that, for the most part, has been happening at Consolidated Sitting Ducks.

What about CSD's long-term debt structure? Use the command /Edit Window Clear to keep the Graph View active but wipe the variables from the axes cells. Use the Choices key (<F10>) to enter Year (along the x-axis) and Total Capital, Long Term Debt, and Long Term Debt as a Percentage of Capital (as fields plotted along the y-axis). Up to now, all our graphs have used the *Reflex* line graph default. This time, select

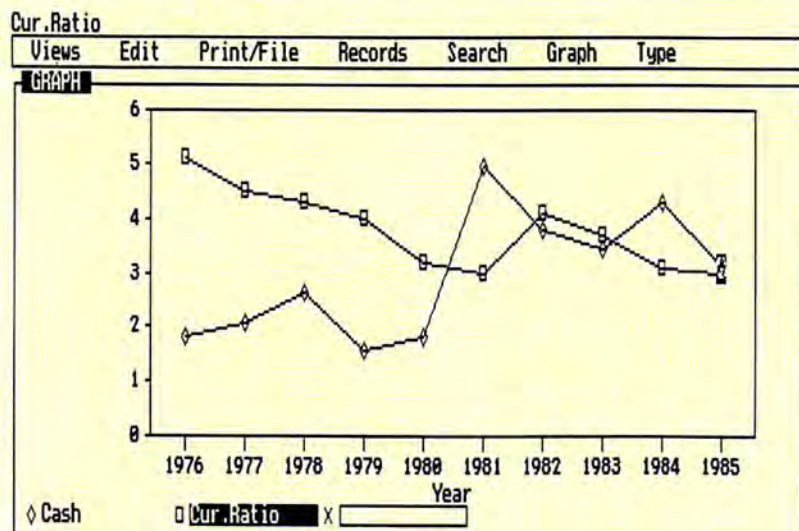


Screen 7: This bar chart offers unsettling signs of long-term debt management but indicates steady accrual of capital—even during 1983, a dismal year.

/Views Type Bar to generate a shaded bar graph. Select /Graph Options, give the graph a title if you wish, and save it with the command /Graph Print (see Screen 7).

Evident here are signs of growth but also reasons for concern. While total assets and total capital are indeed growing in an orderly and positive fashion, the company is increasing its long-term borrowing. Growth that is financed with borrowed money at high interest





Screen 8: For would-be corporate raiders, a flat current ratio, matched with a decline in cash reserves, hints of a potential bum deal.

rates has ravaged more than one business. There's reassurance, however, in the line illustrating the Long Term Debt as a Percentage of Capital; that ratio has barely grown.

Short-term debt is another matter. Two key categories in this phase of the analysis, Current Ratio and Cash, may be raising red flags. Find out by plotting Current Ratio and Cash along the y-axis, with Year remaining along x (see Screen 8). (Current Ratio is computed by dividing all current assets—liquid assets like cash and treasury bills—by liabilities coming due within a year.)

And what do you know? Business is picking up, but cash is leaving the company. Unlike the first four graphs, where all lines were

sloping upward, Screen 8 illustrates an aberration. When probing for a takeover candidate, you're seeking as high a current ratio as possible; in this company the ratio has been falling. Similarly, cash holdings are not historically high or increasing. Because the percentage of capital representing long-term debt has barely grown, all indications are that current liabilities are adversely affecting, even straining, Consolidated Sitting Ducks. Were this an actual emergency, risk arbitrageurs might consider fleeing to more alluring targets.

#### ■ Hatching an Acquisition

In this analysis, the company is selling at a discount because of a terrible year that skewed its growth pattern. The market has not yet forgiven that stutter and does not see the semiconductor industry pulling itself up very soon. CSD is trading at a discount to book, at a price below its historical trading level, and at the low end of its historical price/earnings ratio. Its income looks good, but the company may soon be overburdened with expensive short-

term obligations. All these factors—plus the recent exodus of cash—may not seem to recommend CSD as the soundest of investments, but the company is in the kind of distress that might make it a very suitable takeover candidate. Particularly for Grabem & Run. ●

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*Reflex: The Analyst*  
Borland Int'l

4585 Scotts Valley Dr.  
Scotts Valley, CA 95066  
800/556-2283

List price: \$99.95

Requirements: 384K; two disk drives; DOS 2.00 or later version; IBM Color/Graphics Adapter, Hercules Monochrome Graphics Card, or equivalent

Not copy protected



# Paperback Planner

More than just another low-cost 1-2-3 imitator, VP-Planner has a multidimensional data base and smooth interface with dBASE that make it stand out from the crowd.

*William Urschel*

 When Adam Osborne's company, Paperback Software, released *VP-Planner*, the program was hailed as one of the first inexpensive 1-2-3 clones. Well, it's even more than that. Although *VP-Planner* does what 1-2-3 release 1A does in virtually the same way—for less than a third of the price—a number of pivotal features distinguish this upstart from its progenitor.

What puts *VP-Planner* in a class by itself are two large helpings of data base power. One function enables you to manipulate disk-based dBASE II and III files within the spreadsheet environment. Even

more impressive, *VP-Planner* offers a multidimensional data base that resembles a layered worksheet. Using the program's full range of data base functions, you can create data relationships that would give 1-2-3 a migraine.

## Spreadsheet Onemanship

The *VP-Planner* spreadsheet closely resembles that of 1-2-3. The command tree is essentially the same, although *VP-Planner* adds a few branches. Perhaps the most important differences lie in *VP-Planner*'s added macro capabilities.

In addition to using the normal 1-2-3 worksheet macros, you can create "hyperspace" macros of up to 255 characters. Hyperspace macros exist only in RAM—something like a built-in *Pro-Key*—but you can also convert them to worksheet macros, name them, and save them in a file. You can go the other way, too, and place worksheet macros in hyperspace.

Macro programmers should find *VP-Planner*'s Relative GoTo command especially useful. Pressing <Alt> with <F5> (the GoTo key) lets you specify the numeric contents of two cells as the address of a destination cell (for the cell containing the column identifier, 1 equals A, 2 equals B, and so on). This allows you to create a handy two-column location table, which you can combine with an @vlookup function call to make sophisticated branching a snap.

Other advantages over 1-2-3 include the ability to split the screen into a maximum of six windows as opposed to two for 1-2-3 (see Screen 1), and a built-in print spooler, which enables you to continue working while a worksheet prints in the background. A set of graph printing commands—one of the command tree's extra branches—lets you print graphs while they're on screen without having to load a separate program à la 1-2-3. Other than this divergence, *VP-Planner*'s graphics capabilities are virtually identical to those of its forerunner.

Two engaging little enhancements involve column width. One



enables you to establish the width for a range of columns rather than restricting you to setting either global or individual column widths. The other enhancement, which 1-2-3 release 2 also includes, lets you set column width

## ■ The Data Base Connection

One of the most onerous restrictions of both 1-2-3 and *Symphony* is that all data base files must reside in RAM. Even with 640K of memory humming inside your PC, the size of your data base

the right of the table and a blank row at the bottom.

Establishing a link between the worksheet and the external data base file is accomplished using a single data base reference cell in the upper left corner of the table. When you place the cursor at this designated cell and enter the /Data External Dbase Define Create command, you're prompted for a file name and then asked if you want the file in *dBASE II* or *III* format. Once you make your selection, the table you've created on the worksheet is stored as a *dBASE* file on disk.

Importing a *dBASE* file is just as easy as creating one, whether that file was set up by *VP-Planner* or another program. You start by placing the cursor on what will become the upper left corner of the table and enter the /Data External Dbase Define Table command. When you respond to the program's prompt for a file name, you're given a list of fields to choose from; you can select fields in any order and even import multiple copies of a single field.

You then enter the criteria string that determines which records will be retrieved. Standard logical operators may be used in conjunction with field names to select the desired records. For example, you could choose all people who live in New York from a mailing list by entering `STATE = NY` or all people who are age 40 or older by entering `AGE = > 40`. The criteria system allows you to search on any number of fields, and you can mix imported fields with those you've created on the worksheet.

When *VP-Planner* retrieves records, it automatically distinguishes between *dBASE II* and *dBASE III* formats and changes the column

*Importing a dBASE file is just as easy as creating one, whether that file was created by VP-Planner or another program.*

to zero. Choosing this option makes a selected column disappear from the screen, while any formula or data in that column remains intact and accessible. This feature is perfect for hiding columns that contain macros or intermediate calculations or for comparing columns in different parts of a spreadsheet side by side without relying on cumbersome block moves or awkward windows. You can even move the cursor inside a zero-width column and check the contents of each cell as it appears on the edit line.

Another feature shared by both *VP-Planner* and 1-2-3 release 2 is the so-called sparse matrix memory management system. This technique keeps blank cells from taking up RAM, allowing you to enter a formula in the bottom right cell of an otherwise empty spreadsheet without noticeably affecting memory usage. But ultimately, *VP-Planner's* sparse matrix method is more efficient. If you put a number in the bottom left cell of a 1-2-3 release 2 worksheet whose first row is full, you'll get a 'memory full' message. Given the same test, *VP-Planner's* memory counter doesn't even show an increase.

files is severely limited. When confined to the worksheet, *VP-Planner's* data base function has the same constraints. But if you use the program's ability to link up with *dBASE II* or *dBASE III* files, your data base can grow all the way to the far corners of disk space.

Imagine having 1-2-3 as a front end for *dBASE III*. With *VP-Planner* you can create, edit, sort, and select from external, disk-based *dBASE II* or *III* files. This approach gives you superb analysis and manipulation capabilities in the worksheet environment, plus plenty of breathing room on disk.

Building a *dBASE* file using *VP-Planner* is similar to creating a data table with 1-2-3. Each row is a record and each cell is a field, with column labels supplying the field names for the *dBASE* file. The only unusual requirements are that each column must be one character wider than its corresponding *dBASE* field, and a blank column must be reserved on the left to hold record numbers. To mark where the data ends, you must also leave a blank column on



Tying a data base to a worksheet via a single cell may not be the most intuitive scheme in the world, but in practice it's very simple and very fast. A slew of possibilities comes to mind. You could write full-size macro-based mailing list, inventory, and accounting programs. In 1-2-3-based accounting programs, for example, you have to separate the data into dozens of small files. But with *VP-Planner's* dBASE link, you could store all accounting transactions in one master file and extract them by any criteria—source journal, month, general ledger account, and so forth—saving huge amounts of execution time and programming overhead.

Screen 1: VP-Planner lets you create up to six windows on a single worksheet.

Screen 2: The table shown here was read into VP-Planner from a dBASE file.



|                                                                                                                                                                                                                                                                                                                                                                                                                  |             |                                                            |  |             |            |               |      |      |               |      |         |               |      |         |               |        |               |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|------------------------------------------------------------|--|-------------|------------|---------------|------|------|---------------|------|---------|---------------|------|---------|---------------|--------|---------------|
| <b>DATABASE SPECIFICATION</b><br>*****<br>Number of Dimensions - 4<br>Number of places behind the decimal point.      Rates - 2      Amounts - 8                                                                                                                                                                                                                                                                 |             | Database name - b:widgets1.DIM<br>NUL Account Category - 8 |  |             |            |               |      |      |               |      |         |               |      |         |               |        |               |
| Enter/Edit short and long dimension names:<br><table border="0"> <tr> <td></td> <td>Short Names</td> <td>Long Names</td> </tr> <tr> <td>Dimension 1 :</td> <td>TIME</td> <td>Time</td> </tr> <tr> <td>Dimension 2 :</td> <td>ACCT</td> <td>Account</td> </tr> <tr> <td>Dimension 3 :</td> <td>PROD</td> <td>Product</td> </tr> <tr> <td>Dimension 4 :</td> <td>REGION</td> <td>SALES REGIONS</td> </tr> </table> |             |                                                            |  | Short Names | Long Names | Dimension 1 : | TIME | Time | Dimension 2 : | ACCT | Account | Dimension 3 : | PROD | Product | Dimension 4 : | REGION | SALES REGIONS |
|                                                                                                                                                                                                                                                                                                                                                                                                                  | Short Names | Long Names                                                 |  |             |            |               |      |      |               |      |         |               |      |         |               |        |               |
| Dimension 1 :                                                                                                                                                                                                                                                                                                                                                                                                    | TIME        | Time                                                       |  |             |            |               |      |      |               |      |         |               |      |         |               |        |               |
| Dimension 2 :                                                                                                                                                                                                                                                                                                                                                                                                    | ACCT        | Account                                                    |  |             |            |               |      |      |               |      |         |               |      |         |               |        |               |
| Dimension 3 :                                                                                                                                                                                                                                                                                                                                                                                                    | PROD        | Product                                                    |  |             |            |               |      |      |               |      |         |               |      |         |               |        |               |
| Dimension 4 :                                                                                                                                                                                                                                                                                                                                                                                                    | REGION      | SALES REGIONS                                              |  |             |            |               |      |      |               |      |         |               |      |         |               |        |               |
| Ctrl left and right arrow to jump between columns.                                                                                                                                                                                                                                                                                                                                                               |             |                                                            |  |             |            |               |      |      |               |      |         |               |      |         |               |        |               |
| <b>FUNCTION KEYS</b><br>1. HELP      2. Edit CAT Nm      3.      4.      5.      6.      7.      8. Quit-NO SAVE      9.      10 Save & Exit                                                                                                                                                                                                                                                                     |             |                                                            |  |             |            |               |      |      |               |      |         |               |      |         |               |        |               |

Screen 3: A multidimensional data base under construction, using VP-Planner's data base specification screen

| VP-PLANNER MULTIDIMENSIONAL DATABASE                                                                                   |                                   |       |
|------------------------------------------------------------------------------------------------------------------------|-----------------------------------|-------|
| File: B:WIDGETS.DIM                                                                                                    | # Accounts                        | VALUE |
| Column Dimension: Accounts                                                                                             | 1 Unit Sales                      |       |
| Sales Regions      1                                                                                                   | 2 Unit Retail Price               | 35.50 |
| Eastern Region                                                                                                         | 3 Gross Revenues                  |       |
| Products      1                                                                                                        | 4 Unit Cost of Goods              | 25.25 |
| Portable Widgets                                                                                                       | 5 Gross Profit                    |       |
| Time      1                                                                                                            | 6 Actual Unit Sales               |       |
| January                                                                                                                | 7 Actual Gross Revenues           |       |
|                                                                                                                        | 8 Actual Gross Profit             |       |
|                                                                                                                        | 9 Actual Unit Retail Price        |       |
|                                                                                                                        | 10 Actual Cost of Goods           |       |
|                                                                                                                        | 11 Gross Revenue Variance         |       |
|                                                                                                                        | 12 Gross Rev Variance Fraction    |       |
|                                                                                                                        | 13 Gross Profit Variance          |       |
|                                                                                                                        | 14 Gross Profit Variance Fraction |       |
| <b>COMMANDS: (Execute with FKeys)</b><br>1. Help<br>2. Get Data<br>3. Edit Data<br>4. Save Data<br>5. Print<br>6. Exit |                                   |       |

Screen 4: VP-Planner's "browse" screen enables you to peruse axes in a multidimensional data base one at a time.

## Data Base Dimensions

VP-Planner's "multidimensional data base" is actually a multidimensional spreadsheet. Don't take the geometric implications of the phrase too seriously, or you're liable to find five-dimensional worksheets incomprehensible. Dimensions are simply elements of the worksheet: products, months, salespeople, regions, or whatever.

Not only is the multidimensional solution nicely organized, but the mechanics are much simpler than in traditionally linked worksheets. In effect, one worksheet takes the place of a spider-web of sheet linkage. This means a single entry in one worksheet affects all relevant categories throughout the data base, permitting recalculation in one fell swoop.

Although you must plan a multidimensional data base carefully before labeling or entering data, the program itself provides much of the structure you'll need. From a four-option multidimensional data base menu, you begin by specifying up to five dimensions, followed by the dimension names, the category names (the labels and headings that act as range names), and the simple formulas needed to define the relationships between categories (see Screen 3).

Once you create the data base, you can view a cross section of data using a "browse" window, or build a worksheet for retrieving and manipulating selected data base segments. For either task you must return to the worksheet environment and open the Data External menu.

The browse window provides a one-dimensional view of the data base, displaying "core samples"



where the various dimensional axes intersect. By entering your dimension specifications and moving the browse window with the cursor keys, you can quickly select the contents of the cell or column you wish to view (see Screen 4).

To view more than one dimension at a time, you must create a worksheet to import the appropriate information. Just like linking a worksheet with an external data base, this process relies on a data base definition cell. Because the number of possibilities provided by five dimensions is staggering, planning how you want to set up a table to retrieve the data may take some time. To further complicate matters, you can even import data from the multidimensional data base and from a *dBASE* file into the same worksheet.

#### A Buggy Beauty

Conceptually, *VP-Planner* is a winner. Like *Javelin*, the other new scion of 1-2-3, *VP-Planner* goes beyond the worksheet, letting you create huge reservoirs of data. But unlike *Javelin*, *VP-Planner* uses familiar formats and metaphors, such as *dBASE* disk files and layered worksheets. Essentially, an experienced 1-2-3 user can jump directly into *VP-Planner*.

In execution, however, *VP-Planner* leaves something to be desired. While 1-2-3, *Symphony*, and *Javelin* all look elegant, *VP-Planner* is about as appealing as a leisure suit. The menus have an uninspired look, and the inverse-video first character of each option is singularly distracting.

In contrast, 1-2-3 menu options are clean, one-word items, which you select either by highlighting

with the cursor and pressing <Enter> or by pressing the first letter of the option you want. *VP-Planner* supports both methods, but it also allows you to select menu items with the function keys. Paperback's decision to list the function key numbers next to the items makes the menus difficult to read (see Screens 1 and 2).

The program also suffers slightly in speed trials against 1-2-3. Programmed in FORTH, *VP-Planner* can't quite keep pace with software written in assembly language. A worksheet of interlocked formulas that takes 3.5 seconds to calculate using 1-2-3 takes 6 seconds with *VP-Planner*. However, *VP-Planner* has the edge when it comes to macro execution. A short macro program ran in 11.5 seconds under 1-2-3, and in 11 seconds under *VP-Planner*. The same test program modified to make frequent screen changes took 18 seconds with 1-2-3 but only 12 with *VP-Planner*. However, some existing 1-2-3 macros won't run with *VP-Planner* due to subtle differences between the two programs' menus (although you can quickly program around those differences).

But *VP-Planner*'s bugs are not so subtle. The most dramatic problem I encountered involved a range input sequence. After 1-2-3 completes a range input, the cursor returns to the position it held prior to the call. The cursor in *VP-Planner* does not, wreaking havoc with the worksheet if you're using a 1-2-3 range input macro. Another range input problem is that *VP-Planner* ignores the range boundary when you're entering data but enforces it if you're moving around with the cursor. You may also inadvertently generate

ASCII graphics characters when working in a range by pressing the <PgUp> or <PgDn> key.

Bugs aside, *VP-Planner* is an attractive alternative to the same old spreadsheet. Thanks to an exceptionally well written manual, even users unfamiliar with 1-2-3 should find *VP-Planner* fairly easy to learn. And although the program disk is copy protected and can't be copied onto your hard disk, you can purchase an unprotected backup version for \$10 when you send in the registration card. Users without hard disks should be delighted that the entire program fits on one disk.

Although *VP-Planner* is somewhat slower than 1-2-3, the difference is not significant. What counts is how long a whole job takes—including design and data input—and whether you can do the job at all. With its *dBASE* file link and multidimensional data base, *VP-Planner* easily outmuscles 1-2-3 as an analysis and number-processing tool. ●

*William Urschel is president of Arc Tangent, Inc., a software development firm in Santa Barbara, California.*

*VP-Planner*  
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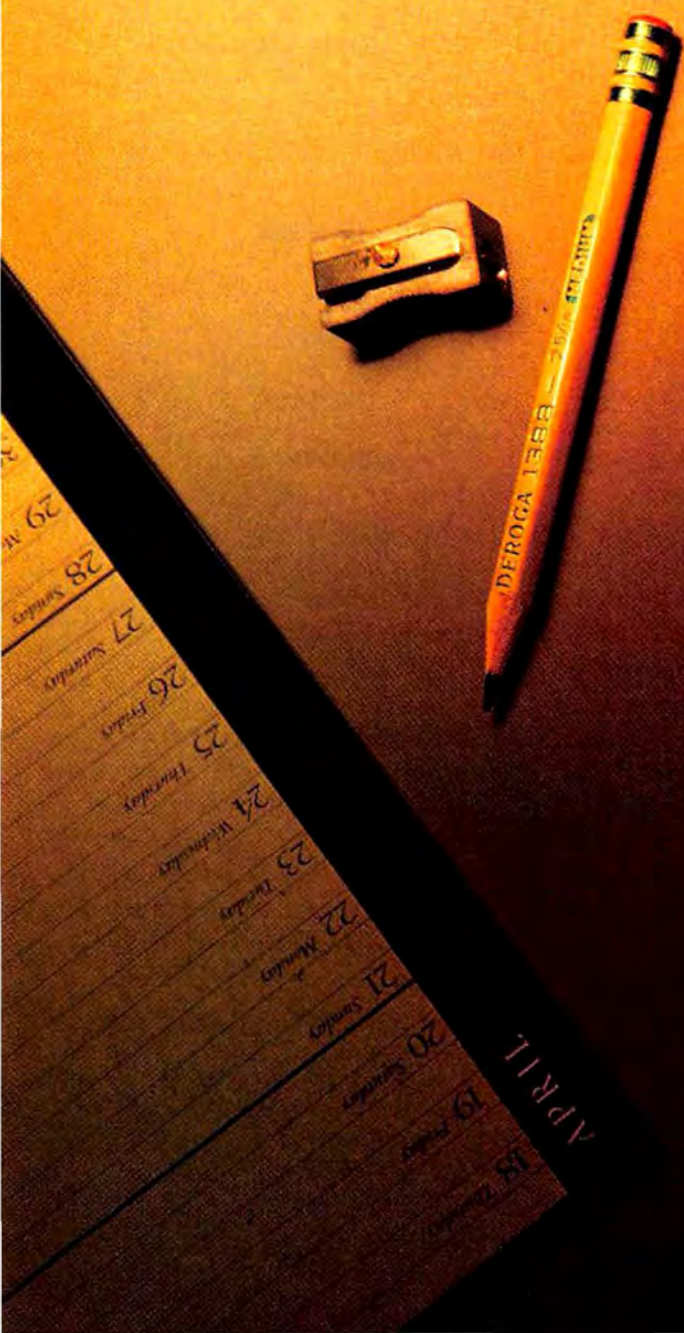
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*Arleen Meadows and Eric Knorr*

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Doffing your old manual system in favor of computerization couldn't happen at a better time. A recent growth spurt has increased management's demand for financial statements as well as better control over assets—especially receivables. Your CPA's selection of a general ledger with a flexible report writer, along with an integrating accounts receivable package, should satisfy the brass on both counts. As an added bonus, low hardware and software prices make your capital investment a fraction of what it would have been a year ago.

Of course, the biggest conversion costs are indirect. You need to run both the old and new systems in parallel to guard against inevitable errors during



A photograph of a book cover, tilted at an angle. The cover is divided diagonally from the top-left to the bottom-right. The upper-left portion is a deep red color, and the lower-right portion is black. The text "S.E. LEDGER" is printed in a gold, serif, all-caps font on the black section. The book is set against a dark, textured background with a subtle gradient of purple and blue light.

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the start-up phase, which may mean hiring temporary personnel. Staff training, vendor support, and continuing counsel from your CPA also take their toll. Because you've taken these hidden costs into account, however, your budget should handle the strain.

### Transformation Tactics

Like a change in government, switching to computerized accounting can be a time of chaos or an opportunity for needed reform. The conversion process forces you to rethink your account numbering system, to nail down job responsibilities, and to put your manual records in proper order for data entry. If you plan ahead, you can evade the pitfalls on the path to better processing and reporting and do some essential housecleaning along the way.

Plotting your conversion strategy should involve the entire accounting staff. Scheduling conversion activities step by step over a period of several months helps reduce disruption of normal operations. You may want to divide the preparatory labor among personnel by category—one person overseeing the physical inventory (if you're installing an inventory module), another ensuring invoice copies are in order, and so on. Staff participation from the ground up reduces employee resistance to change and provides the ultimate assurance that your conversion will be successful.

Choose a transition starting date that's amenable to all. The beginning of an accounting period is ideal, because it affords the cleanest and most current

data. If you prepare interim financial statements on a monthly basis, select a month to begin in which you and your staff have enough time to take on additional responsibilities. Starting at the beginning of the accounting year provides the added advantage of zero balances in temporary accounts.

It's easiest to build up your accounting system one module at a time. Most accounting software vendors offer separate general ledger, accounts receivable, accounts payable, inventory, and payroll modules that can stand alone or integrate with each other. Many businesses begin with the general ledger because it offers financial statements as an immediate reward.

*You need to run both the old and new systems in parallel during the start-up phase, which may mean hiring temporary personnel.*

But ultimately, the module you install first depends on your greatest need. If your creditors want to see a receivables aging schedule, or if sloppy billing practices are affecting your cash flow, then accounts receivable is obviously a logical starting point.

Even though your CPA estimated your storage requirements when selecting your software, the installation process requires more precise specification





of master file sizes. When setting up the chart of accounts, for example, you must allocate enough disk space for your existing accounts plus ample room to grow over the next two years. A safe estimate is usually 2 or 2.5 times the current number.

You'll need to calculate the size of the master file for each accounting module you install. Collect all the necessary information in advance so you can complete this critical task uninterrupted. Thankfully, specifying the size of transaction files should be unnecessary, since the vast majority of accounting software accommodates an unlimited number of transactions.

Finally, prepare to run both the old and new systems in parallel. This will require no small expenditure of personnel time, but the benefits far exceed the costs. Keep the manual system running for at least two months—three if you prepare quarterly financial statements. The start-up phase is extremely error-prone, and it's essential that you have a tried-and-true system to fall back on.

### ■ Training Your Staff

The accounting functions performed in a computerized system are essentially the same as those performed in a manual one. Respectable, menu-driven accounting software is designed to reflect the correct sequence of accounting procedures. If your staff fastidiously follows the program's menu sequence, the result will be a clear audit trail and a minimum of serious errors.

Nevertheless, any accounting staff new to computers needs extensive training. Your resources will determine which training approach is best, but combining a consultant's formal instruction with a hands-on demo is by far the best approach. If your budget is limited, however, using your hardware and software to set up a fully functional demonstration system is a

viable, inexpensive alternative. Give staff members a turn at the keyboard as you walk them through a dry run of the accounting cycle, from transaction to closing entries.

The training stage is the time to familiarize personnel with any procedural changes in processing accounting data. The new system will streamline many

*Like a change in government, switching to computerized accounting can be a time of chaos or an opportunity for needed reform.*

steps in the accounting cycle—basically, all operations other than making journal entries are completely automated. You can even instruct your system to record certain adjusting entries automatically, provided they recur at regular intervals.

Remember not to confine training to accounting personnel; managers and support staff from other departments also need indoctrination. Tell them how automation will benefit their operations, what reports are available to them, the schedule for converting their respective accounting areas, and any new procedures which may affect their work. Keeping expectations realistic and your entire company fully informed is the best way to head off potential conflict.

### ■ Putting the Books On Line

Entering master file information into your system is the most critical conversion phase. Ensuring the accuracy of your information is vital, of course, but putting all relevant reference materials in the proper sequence for each input session will also reduce data entry errors.

When you're setting up the general ledger, have on hand a current chart of accounts along with the most up-to-date balance sheet, income statement, and trial balance. Review the chart of accounts and determine which accounts are no longer active and which



have names or descriptions that no longer apply. Because some of this information may be difficult to alter once you've entered it, you'll probably be forced to make corrections that you've postponed awhile.

A typical general ledger program supports account numbers from 5 to 12 characters in length. If you've been meaning to implement a cost accounting

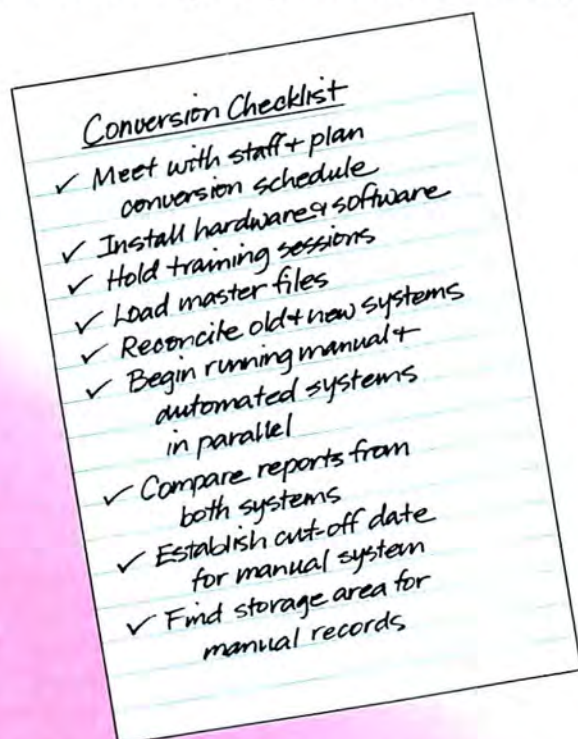
appears on which reports. Consult with department managers—and your CPA—to devise a numbering scheme that's right for you.

Each master file entry will contain an account title, descriptive information, and an actual balance, plus a budget figure and a historical balance if applicable. One of the cleanest methods of entering data at the master file level is to print blank forms that match the format of the account file input screen. For instance, if you go into the accounts receivable master file to make an entry, a blank customer account profile appears on screen. Do a screen dump of this blank profile, make copies, and you have custom data entry forms.

If you're converting at the end of an accounting cycle, you may not have much data to transfer other than the master files. In some cases, however, you also need to enter data at the transaction file level. If you send out statements with open invoice detail, for example, you'll need to key each open invoice in to transaction files after completing the customer file.

After you've built the master files, restrict access. Many accounting software packages secure files by offering multiple password levels: One level allows you to query certain account information, a second level lets you enter transactions, a third lets you add or delete master file entries, and so on. Assigning a separate password to each staff member has the added advantage of identifying which employee has performed a certain task.

Reconcile your new system with the manual system before you begin daily work. If you've just installed the general ledger, print out a trial balance and



system, the account numbering stage is the perfect time. The most common way to identify cost centers is to append a separate character to the basic account number.

Establishing account numbers is often an intricate process. Some general ledger software has fixed ranges for each type of account—100000 to 199999 for assets, 200000 to 299999 for liabilities, and so on. In addition, certain placeholders, such as departmental identifiers, will determine what information





## Chapter 6: The Yellow Stench of Sabotage

When Rama asked me to help Virgil computerize his books, I squirmed. My instincts were correct. Although Virgil had always done the accounting and had a good head for figures, I just couldn't overcome his resistance to computers. He never would have agreed to convert his books to a PC if the addition of Printorama #5 hadn't made it impossible for him to keep up manually.

I had warned him it wasn't going to be easy, especially during the time he would have to run the paper and computer books in tandem to make sure the system was set up correctly. I didn't know how right I was until I came in one morning after a long night of debugging and heard him yelling from his office in the back. "I'm going to pulverize this flaming computer! It's going to wish it was never born!"

I groaned and rubbed my weary eyes. This kind of hand-holding I didn't need after three hours' sleep.

"Looks like you could use a cup of coffee," said Rich Dixie, sympathetically. "I'll buy." He took me next door to the local grease pit, where I tried to rouse myself over a cup of steaming joe. "I'll get straight to the point," said Dixie. "We've got to get Virgil away from the PC." I grunted noncommittally. "Look, Travis, Virgil doesn't need this kind of aggravation," he pleaded. "He has enough to do just running production. But I could do this stuff with my eyes closed."

I still didn't like the kid, but it was hard not to trust him, especially when Virgil and Rama sang his praises every other day. Besides, we had a lot in common—he was a real computer jockey. Why, he even understood blue-line electronic schematics and all the other nitty-gritty mysteries of the PC.

I played devil's advocate, but he convinced me in the end—I'm a pushover when I'm half-asleep. I talked to Rama about it, and she agreed. After a few nights of pillow talk, she persuaded Virgil to give it up. The next day, I got Rich Dixie over to *The Crashed Disk* for a couple of sessions on accounting software and then worked with Rich and Virgil together until the accounting system was running smoothly under Rich's sole supervision.

"I finally know everything I need to know," Dixie told me after our last session. "Now I'm in a position to put this business where it belongs."

It's too bad I didn't know then just where it was Rich thought the business belonged. When I found out, it was too late. The phone call came late at night. Rama was succinct: "We're ruined."

Rama was alone when I arrived. Virgil was in Miami on a business trip. And the data base was strictly

(continues)



compare it with the most current one on hand. You must also reconcile your subsidiary ledgers' summary balances with their respective control accounts and verify the individual accounts that make up the subsidiary accounts. Your general ledger's report generator will provide the printouts you need to make these comparisons.

### Running a Healthy System

Daily work using an automated accounting system primarily entails keying data into transaction files—essentially the same process as making journal entries in a manual system. The real advantage of a computerized system lies in what it does with the information you enter.

If you post transactions in accounts receivable, for example, the customer accounts in the subsidiary ledger are updated and a summary of these transactions is instantly relayed to the general ledger. Other tasks performed automatically—such as printing out customer names and addresses on invoices—eliminate the lion's share of drudgery.

Setting up a daily job schedule will keep this streamlined system running smoothly. To ensure a proper audit trail, the job schedule should follow the menu sequence presented by your software. Each person using the computer should complete his or her daily cycle before signing off. A month-end and year-end schedule can also help your staff process data accurately and efficiently.

Immediately following an entry session, print a journal listing and compare it with your input documents. Unfortunately, correcting mistakes after posting is just as tedious in a computerized system as in a manual one. Detecting and correcting input errors before posting saves both time and tempers.

You'll find that posting under the new system is far less arduous. Some integrated accounting programs allow you to generate reports reflecting up-to-the-minute information at any time, even before posting occurs. Generally, increased process-

ing speed allows you to perform many accounting procedures on a more frequent basis, without overburdening your staff.

Perhaps the most important daily task is backing up your files. A streaming tape backup is an added expense, but it's also the fastest, easiest way to copy the entire contents of your hard disk. Whether you use tape or floppy disks, the time to make backups is after transactions are entered and before posting. If more than one person uses the computer, you may want to back up your files more than once a day.

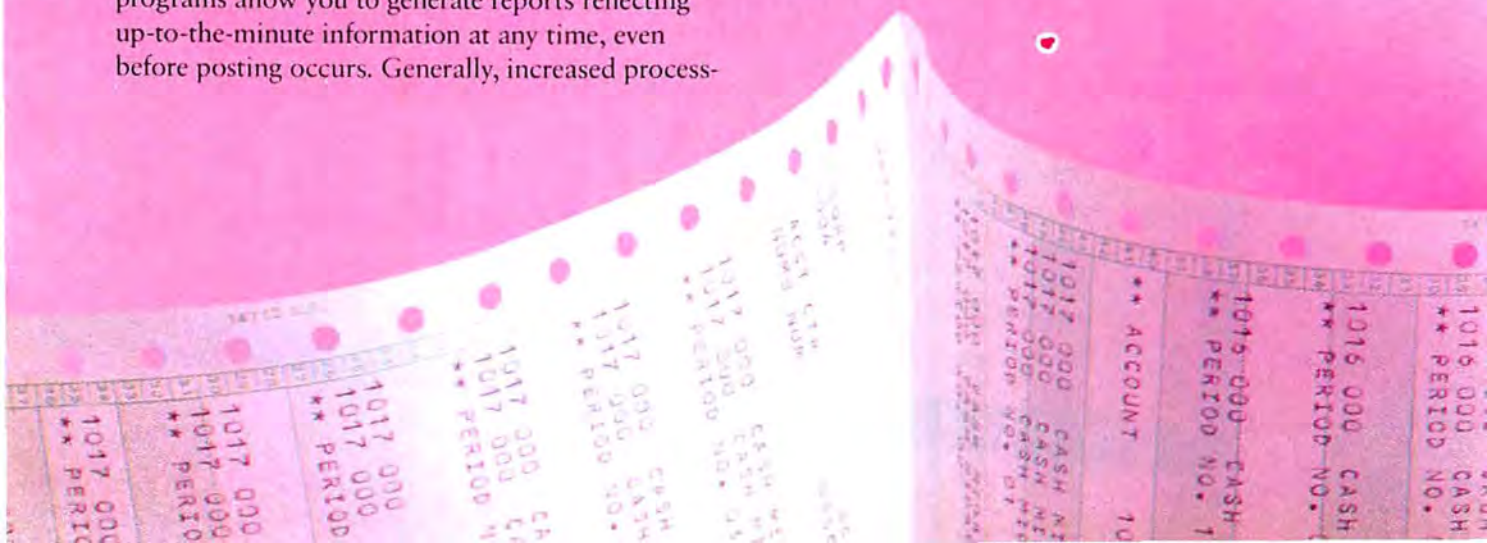
Prepare a backup schedule listing the date, the files copied, the name of the operator, the time, and the last procedure completed before backup. End-of-month processing should include a backup of the entire hard disk. Storing backup copies outside the office is the best insurance against loss by fire or other disasters.

### Trial by Errors

Any difficulties with your system should crop up during the first few months of operation. If a certain procedure consistently hangs up the system, or if your documentation fails to explain an error message, it's important to have comprehensive technical support readily available.

Most software vendors offer technical support by phone for an hourly fee. In some cases the problem may be defective software, which most vendors will replace free of charge. Many dealers also offer support programs, but advice directly from the vendor is usually more beneficial.

Supervise daily work closely until the staff appears comfortable and adept with the new system. It's a good idea to print reports frequently during the start-up phase to ensure that data is being entered correctly. Contrary to popular belief, the audit trail in





a computerized system is stronger than in a manual one, provided daily reports are printed and reviewed by someone other than the data entry person.

A smoothly running system should please just about everyone. Your CPA's auditing job should take less time, invoices and payments will be sent out on the right dates, and management will have all the reports it can handle. Best of all, you'll rid yourself and your accounting staff of some of the most tedious and time-consuming bookkeeping procedures. And when key employees are freed from paperwork, they can spend more time identifying and planning profitable business activities. ●

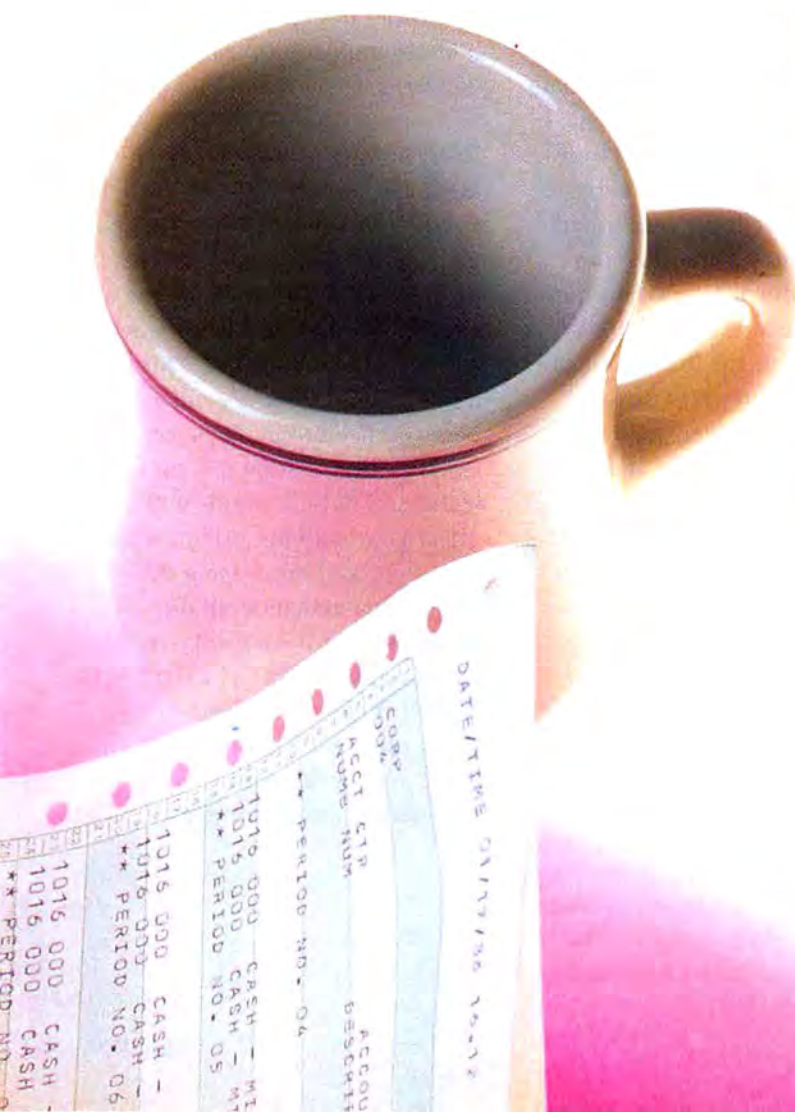
*An associate with Scofield & Pixley of San Francisco, Arleen Meadows has helped a number of Bay Area businesses convert to automation. Eric Knorr is an Assistant Editor for PC World.*

DOA. By appearances, the disk trashing was accidental. The disk and tape controller apparently had gone south, leaving the accounting data base and backup scrambled beyond retrieval. Of course, by that time Printorama had dropped the parallel paper accounting system. Mysteriously, the files containing that month's job orders, from which the receivables file could have been recreated, were also missing.

For the first time since I met her, Rama broke into tears. I had seen her fight brutal spreadsheets without batting an eye, and she had held tough during the Quick and Dirty threats, but this was different. Printorama was operating on pretty close margins during its rapid growth; the loss of a full month's receivables was going to be a severe, probably fatal, blow.

"I just can't believe it," she sobbed. "It's not like Rich." She handed me the resignation note from Rich Dixie. It was a real tearjerker. The kid said he felt responsible and simply couldn't face working there anymore. But somehow the old lachrymal glands wouldn't respond. Controllers just don't go south and trash both the main files and the backup tapes simultaneously. The rat was beginning to assume human form.

*(continues on page 286)*





# Making a Statement With EasyBusiness

A wide array of reports designed to fit specific business needs can be the biggest benefit of computerizing your accounting system. Like many flexible report generators, the EasyBusiness Systems Financial Reporter requires effort to use effectively, but the rewards are legion.

Ralph Soucie

Whether you depend on a CPA, a computerized accounting system, or thin air, you need ready access to financial data to run your business effectively. If you're willing to spend the time and effort, a number of PC-based accounting packages can provide custom reports containing precisely the information you require. The more flexible a program's report generator, the better you can tailor financial reports to your specific business needs.

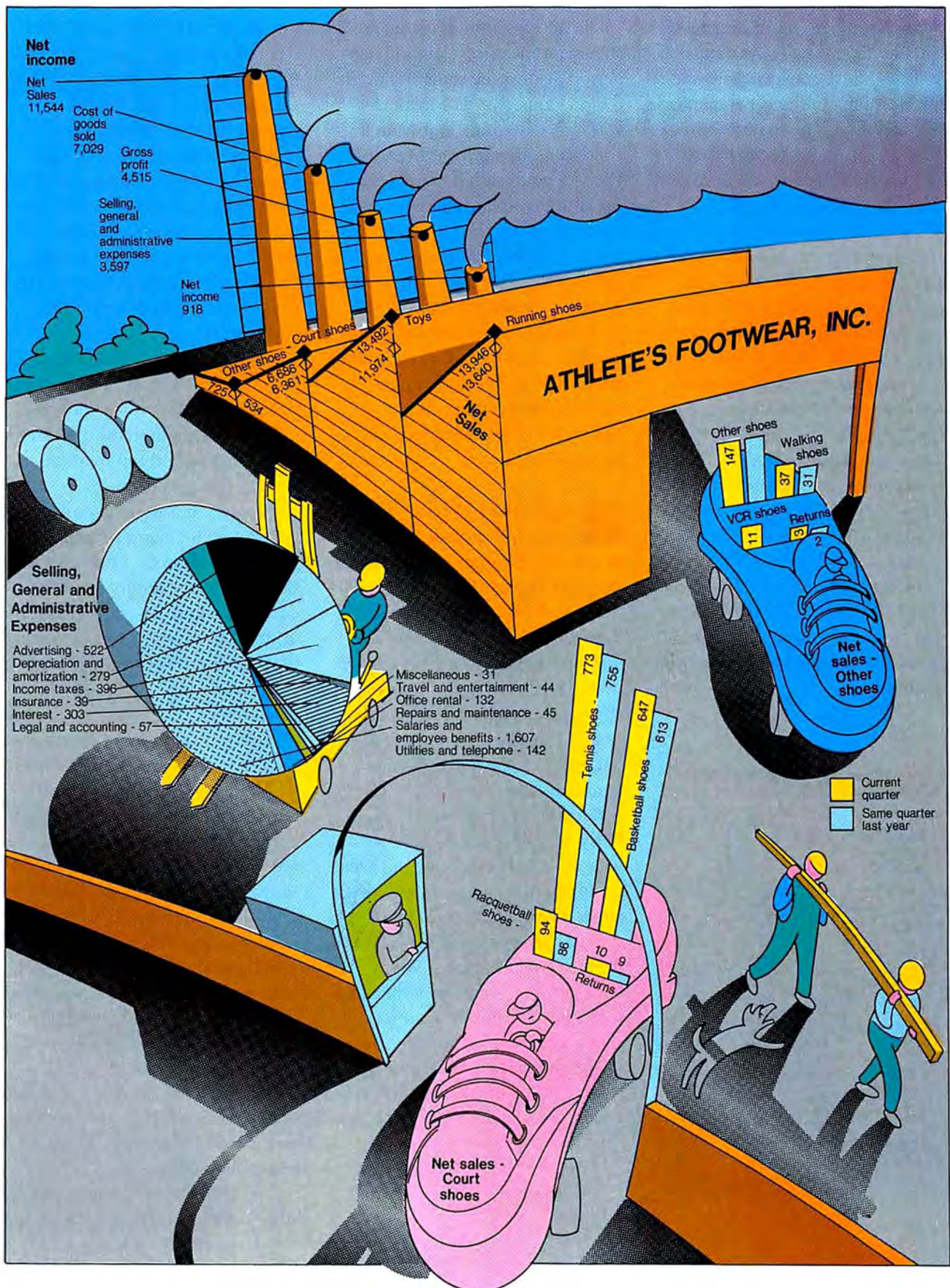
Computer Associates' *Easy-Business* accounting series features one of the most adaptable report generators available, though becoming familiar with it and producing reports take a substantial amount of time and effort. The *General Ledger and Financial Reporter* module of this popular line offers no default report formats, forcing you to create all your reports from scratch using complex formatting codes. The result, how-

ever, can be an elegant collection of custom documents that clearly address important business concerns.

## Financial Reporting Unlimited

Creating financial reports for specific applications involves basic principles transportable to any accounting situation. The process starts with imagination. Think for a minute about the specific numbers you need to make better business decisions. What are your critical costs? Which trends will affect your staffing, pricing, distribution, and purchasing decisions? How much detail do you need? What are your industry's key success factors? The more difficult it is to resolve these questions, the more important the answers are for developing a successful business strategy.







Once you determine your reporting requirements, you must translate those concerns into specific accounts in the general ledger. You may find it necessary to modify the chart of accounts to capture the information you need. For example, if you want cost of goods sold broken out by product line, your chart of accounts must include separate inventory and purchase accounts for each product. A financial reporter then pulls balances from these accounts when you enter the appropriate account numbers in report specifications.

Comparative statements are among the most valuable reports because they provide a historical basis for evaluating your business's current performance. With the *EasyBusiness General Ledger and Financial Reporter*—or any system that supports custom reporting—you decide which figures you want to compare.

The most common comparative statement measures your current period against the same period in the previous year. For instance, you may determine that March 1986 sales are up from March 1985—a good sign if expenses are flat. But if you find that operating costs are up by the same percentage as revenue, you may be headed for trouble. Therefore, when you design a statement of this kind, make sure it clearly shows net income as a percentage of total revenue. The way you format your reports can help ensure that significant trends don't go unobserved.

### ■ Appearance Versus Reality

Only you or your CPA can decide which numbers tell the real story about your business. It's difficult to discuss custom reporting in theory because reporting requirements vary as widely as businesses themselves. The best way to see how key financial information can be distilled from a mass of data is by exploring a specific company.

Because its reporting needs are fairly complex, Athlete's Footwear, Inc. (AFI), provides a perfect example. A stable, growing company, AFI manufactures many types of athletic and leisure footwear as well as toys for young children. The company's shoes fall into three categories: running shoes, court shoes, and all others.

Figure 1 shows AFI's income statement for the quarter and year ended January 31, 1986. Based on

the income statement alone, the company appears to be doing well. Its net income as a percentage of sales is higher in the fourth quarter than for the year as a whole. On the other hand, the fourth quarter would normally be the best quarter because of Christmas. We cannot tell whether sales are higher this year than last because last year's figures are not included. So just how well is the company doing?

Fortunately, to supplement the income statement, AFI's controller has designed several custom reports to highlight items of particular importance to top management. The first of these is a breakdown of sales and cost of goods sold by major product category (see Figure 2). This statement shows full-year results from the current and prior years, with percentage increases. It clearly reveals that the different product lines vary widely in growth and profitability.

Notice that Running shoe sales are flat. This is no surprise, since AFI long ago lost its proprietary edge in this now-competitive market. Interestingly, Court shoes, an even more mature product line, shows better growth than Running shoes. This could reflect one or more of the following: better management of the Court shoe line, more aggressive pricing (note the gross margins are lower as a percentage of sales), or a more favorable competitive situation. Whatever the reason, the sales report indicates that further investigation is in order to see what's being done right.

The Other shoes category seems to be doing well enough, although





not spectacularly. The toy division, on the other hand, is showing strong growth. In fact, Figure 2 shows that Toys accounts for most of the company's overall gross profit increase for the past year.

A further breakdown of sales performance yields still more interesting information (see Figure 3). Other shoes consists mainly of such traditional items as bowling and golf shoes, but the group also includes some relative newcomers. Recognizing how important new products with a proprietary edge are to the company's future growth, the controller has created separate subaccounts for them.

Introduced late in 1984, walking shoes are showing good growth. The brand-new VCR shoe, specially designed for comfort while sitting motionless for long periods of time, is off to a surprisingly strong start. Without the sales report in Figure 3, you might not recognize that among the cats and dogs of the Other category are some products worth nurturing.

AFI also generates a report of gross sales and sales returns by product line. Figure 4 details the Toys division section of this report, which indicates that returns of infants' toys have increased sharply as a percentage of sales. This may be a consequence of recent fast growth, but it might also signal a serious quality control problem—one that could tarnish

|                                                | Current<br>Quarter | % of<br>Sales | Year to<br>Date | % of<br>Sales |
|------------------------------------------------|--------------------|---------------|-----------------|---------------|
| Selling, General, and Administrative Expenses: |                    |               |                 |               |
| Advertising                                    | 522                | 4.52          | 1,824           | 5.23          |
| Depreciation and amort.                        | 279                | 2.41          | 889             | 2.55          |
| Income taxes                                   | 396                | 3.43          | 1,293           | 3.71          |
| Insurance                                      | 39                 | 0.33          | 346             | 0.99          |
| Interest                                       | 303                | 2.62          | 678             | 1.94          |
| Legal and accounting                           | 57                 | 0.49          | 212             | 0.60          |
| Miscellaneous                                  | 31                 | 0.26          | 93              | 0.26          |
| Travel and entertainment                       | 44                 | 0.38          | 163             | 0.46          |
| Office rental                                  | 132                | 1.14          | 348             | 0.99          |
| Repairs and maintenance                        | 45                 | 0.38          | 166             | 0.47          |
| Salaries & employee benefits                   | 1,607              | 13.92         | 5,116           | 14.68         |
| Utilities and telephone                        | 142                | 1.23          | 427             | 1.22          |
| Totals                                         | 3,597              | 31.15         | 11,555          | 33.15         |
| Net income summary:                            |                    |               |                 |               |
| Net sales                                      | 11,544             | 100.00        | 34,849          | 100.00        |
| Cost of goods sold                             | (7,029)            | 60.88         | (21,507)        | 61.71         |
| Gross profit                                   | 4,515              | 39.11         | 13,342          | 38.28         |
| Selling, general, and administrative expenses  | (3,597)            | 31.15         | (11,555)        | 33.15         |
| Net income                                     | 918                | 7.95          | 1,787           | 5.12          |

|                             | This<br>Year | Last<br>Year | Change | Percent<br>Change |
|-----------------------------|--------------|--------------|--------|-------------------|
| Net sales--Running shoes    | 13,946       | 13,640       | 306    | 2.24              |
| Cost of goods sold          | (8,821)      | (8,653)      | (168)  | 1.94              |
| Gross profit--Running shoes | 5,125        | 4,987        | 138    | 2.76              |
| Net sales--Court shoes      | 6,686        | 6,361        | 325    | 5.10              |
| Cost of goods sold          | (4,304)      | (4,110)      | (194)  | 4.72              |
| Gross profit--Court shoes   | 2,382        | 2,251        | 131    | 5.81              |
| Net sales--Other shoes      | 725          | 534          | 191    | 35.76             |
| Cost of goods sold          | (465)        | (386)        | (79)   | 20.46             |
| Gross profit--Other shoes   | 260          | 148          | 112    | 75.67             |
| Net sales--Toys             | 13,492       | 11,974       | 1,518  | 12.67             |
| Cost of goods sold          | (7,917)      | (7,171)      | (746)  | 10.40             |
| Gross profit--Toys          | 5,575        | 4,803        | 772    | 16.07             |
| TOTAL GROSS PROFIT          | 13,342       | 12,189       | 1,153  | 9.45              |

Figure 1 (top): The Athlete's Footwear income statement shows a healthy company overall. Figure 2 (bottom): A breakdown of sales and gross profit by product line offers further insight into product performance.



| ATHLETE'S FOOTWEAR, INC.<br>Sales and Gross Profit by Product Line<br>Quarter Ended January 31, 1986 |                    |                       |          |                   |
|------------------------------------------------------------------------------------------------------|--------------------|-----------------------|----------|-------------------|
|                                                                                                      | Current<br>Quarter | Same Qtr.<br>Last Yr. | Increase | Percent<br>Change |
| Sales--Running shoes                                                                                 | 4,017              | 3,902                 | 115      | 2.94              |
| Returns                                                                                              | (31)               | (31)                  | 0        | 0.00              |
| Net Sales--Running shoes                                                                             | 3,986              | 3,871                 | 115      | 2.97              |
| Cost of sales--Running shoes                                                                         | (2,526)            | (2,439)               | (87)     | 3.56              |
| Gross profit                                                                                         | 1,460              | 1,432                 | 28       | 1.95              |
| Sales--Tennis shoes                                                                                  | 773                | 755                   | 18       | 2.38              |
| Sales--Basketball shoes                                                                              | 647                | 613                   | 34       | 5.54              |
| Sales--Racquetball shoes                                                                             | 94                 | 86                    | 8        | 9.30              |
| Returns                                                                                              | (10)               | (9)                   | (1)      | 11.11             |
| Net sales--Court shoes                                                                               | 1,504              | 1,445                 | 59       | 4.08              |
| Cost of sales--Tennis shoes                                                                          | 506                | 491                   | 15       | 3.05              |
| Cost of sales--Basketball shoes                                                                      | 400                | 381                   | 19       | 4.98              |
| Cost of sales--Racquetball shoes                                                                     | 60                 | 55                    | 5        | 9.09              |
| Cost of sales--Court shoes                                                                           | (966)              | (927)                 | (39)     | 4.20              |
| Gross profit--Court shoes                                                                            | 538                | 518                   | 20       | 3.86              |
| Sales--Walking shoes                                                                                 | 37                 | 31                    | 6        | 19.35             |
| Sales--VCR shoes                                                                                     | 11                 | 0                     | 11       | 0.00              |
| Sales--other shoes                                                                                   | 147                | 147                   | 0        | 0.00              |
| Returns                                                                                              | (3)                | (2)                   | (1)      | 50.00             |
| Net sales--Other shoes                                                                               | 192                | 176                   | 16       | 9.09              |
| Cost of sales--Walking shoes                                                                         | 23                 | 19                    | 4        | 21.05             |
| Cost of sales--VCR shoes                                                                             | 7                  | 0                     | 7        | 0.00              |
| Cost of sales--other shoes                                                                           | 95                 | 91                    | 4        | 4.39              |
| Cost of sales--Other shoes                                                                           | (125)              | (110)                 | (15)     | 13.63             |
| Gross profit--Other shoes                                                                            | 67                 | 66                    | 1        | 1.51              |
| Sales--Infants' toys                                                                                 | 4,643              | 4,126                 | 517      | 12.53             |
| Sales--Educational toys                                                                              | 1,285              | 1,027                 | 258      | 25.12             |
| Returns                                                                                              | (66)               | (56)                  | (10)     | 17.85             |
| Net sales--Toys                                                                                      | 5,862              | 5,097                 | 765      | 15.00             |
| Cost of sales--Infants' toys                                                                         | 2,688              | 2,438                 | 250      | 10.25             |
| Cost of sales--Educational toys                                                                      | 724                | 602                   | 122      | 20.26             |
| Cost of sales--Toys                                                                                  | (3,412)            | (3,040)               | (372)    | 12.23             |
| Gross profit--Toys                                                                                   | 2,450              | 2,057                 | 393      | 19.10             |
| GROSS PROFIT--TOTAL                                                                                  | 4,515              | 4,073                 | 442      | 10.85             |

Figure 3: This report details sales, cost of sales, returns, and gross profits for each Athlete's Footwear product. Note the new VCR shoe's high performance.

the company's reputation and even lead to product-liability lawsuits if left unchecked.

These examples show the value of well-designed custom reports for uncovering the real activity behind aggregate figures. Custom reports are truly management tools, while income statements and balance sheets are most useful for giving the big picture to outside parties such as lenders and shareholders.

**EasyBusiness Made Easy**  
Designing your own financial reports with the *EasyBusiness Financial Reporter* is definitely more fun than a trip to the dentist—but not by much. As in many accounting programs, flexibility is not synonymous with ease of use. Conscientious attention to detail is required to get the results you want.

All *EasyBusiness* financial statements are designed by generating file specifications, the various codes and data that control the layout and content of your reports. Along with the *General Ledger and Financial Reporter*, Computer Associates provides sample report specification files on disk, which also appear in the documentation.

Illustrations of the resulting financial statements appear in the documentation as well. However, the dollar amounts shown in the illustrations are missing from the sample data disk—that is, all account balances are zero. When getting started, you may find it convenient to open a suitable sample file, make a few formatting changes, and plug in your own



data rather than build reports from scratch.

To customize an existing specification file, choose Fetch Report Specification from the Master menu (see Screen 1). Press <Enter> to confirm that the sample data disk is in drive B:, and the Specification Editor menu shown in Screen 2 will appear. From here, select Create duplicate to copy one of the sample specification files, listed as UNIV1, UNIV2, etc. (Resist the temptation to choose the Edit option, which would permanently change the sample file. The program does not ask for confirmation before saving your modifications.) The *Financial Reporter* will then prompt you for the name of the file you want to duplicate. Once it's copied, you can edit the file to your heart's content.

Be forewarned that the screen editor for specification files is primitive compared with most word processing programs—there's no way, for instance, to duplicate or move blocks of text. One way to make the editing process easier is to use the *EasyPlus* windowing environment, which allows the *EasyBusiness* series to cohabit in RAM with other Computer Associates programs such as the *Easy-Writer* word processor. Because specification files are in ASCII format, however, you can use virtually any word processor without employing *EasyPlus*; both *Word-Star* and *Microsoft Word* performed without a hitch.

Whether you edit existing sample files or create your reports

| ATHLETE'S FOOTWEAR, INC<br>Sales and Returns by Product Line--Toy Group<br>Quarter Ended January 31, 1986<br>(Amounts in thousands of dollars) |                    |              |                        |                   |
|------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|--------------|------------------------|-------------------|
|                                                                                                                                                | Current<br>Quarter | Last<br>Year | Increase<br>(Decrease) | Percent<br>Change |
| Sales--Infants' toys                                                                                                                           | 4,643              | 4,126        | 517                    | 12.53             |
| Returns                                                                                                                                        | (54)               | (45)         | (9)                    | 20.00             |
| Sales--Educational toys                                                                                                                        | 1,285              | 1,027        | 258                    | 25.12             |
| Returns                                                                                                                                        | (12)               | (11)         | (1)                    | 9.09              |
| Net sales                                                                                                                                      | 5,862              | 5,097        | 765                    | 15.00             |
|                                                                                                                                                | Year to<br>Date    | Last<br>Year | Increase<br>(Decrease) | Percent<br>Change |
| Sales--Infants' toys                                                                                                                           | 10,837             | 9,823        | 1,014                  | 10.32             |
| Returns                                                                                                                                        | (123)              | (103)        | (20)                   | 19.41             |
| Sales--Educational toys                                                                                                                        | 2,806              | 2,276        | 530                    | 23.28             |
| Returns                                                                                                                                        | (28)               | (22)         | (6)                    | 27.27             |
| Net sales                                                                                                                                      | 13,492             | 11,974       | 1,518                  | 12.67             |

Figure 4: Although the toy division accounts for a large share of the company's profits, the high percentage of returns could spell trouble.

|                                            |                 |
|--------------------------------------------|-----------------|
| THE UNIVERSAL CORPORATION                  | Date: Dec 23 85 |
| ACCPAC General Ledger Master Menu          |                 |
| Please select activity from the following: |                 |
| 1. G/L Account Maintenance                 |                 |
| 2. Transaction Batch Maintenance           |                 |
| 3. Account Posting                         |                 |
| 4. Reports                                 |                 |
| 5. Housekeeping                            |                 |
| 6. Print Financial Statement               |                 |
| 7. Fetch Report Specification              |                 |
| Press ESCAPE to exit.                      |                 |

Screen 1: The EasyBusiness Financial Reporter's Master menu



```

Listing of Specification F8

.. Specification file name: Figure 2
..
.. Statement of Sales and Gross Profit by product group.
..
.F 10x11,12CPI,6LPI
.R 1
.D 7()

. @C \NAME
. @C Sales and Gross Profit by Product Line
. @C \FSCM Months Ended \DATE
.
.
.CS 1:Y 2:LYY 3:C1-C2 4:C3XC2
.CH | This | Last | | Percent |
.CH | Year | Year | Change | Change |
.CH |-----|-----|-----|-----|
701.1~701.9 :T5 @- Net sales--Running shoes
771.1 :T5 @- Cost of goods sold
*T5 :T9 @>3~v- Gross profit--Running shoes
.
702.1~702.9 :T6 @- Net sales--Court shoes
772.1~772.9 :T6 @- Cost of goods sold
*T6 :T9 @>3~v- Gross profit--Court shoes
.
703.1~703.9 :T7 @- Net sales--Other shoes
773.1~773.9 :T7 @- Cost of goods sold
*T7 :T9 @>3~v- Gross profit--Other shoes
.
704.1~704.9 :T8 @- Net sales--Toys
774.1~774.9 :T8 @- Cost of goods sold
*T8 :T9 @>3~v- Gross profit--Toys
.
.T9 @~v2- TOTAL GROSS PROFIT
.

```

Listing 1: The EasyBusiness Financial Reporter file specifications that produced the report in Figure 2

from the ground up, you'll need to get acquainted with the way specification codes work within a given report. Listing 1 is the specification file for the AFI sales report found in Figure 2.

The first line in the listing is automatically attached by the program and includes the code assigned when the file was first created ('F8'). The lines beginning with '.' are comment lines and are not read by the *Financial Reporter*. The next three lines are more significant—they're the report specifications that set global parameters. The first of these (beginning with '.F') gives the page dimensions, the number of characters per inch, and the number of lines per inch. The '.R 1' line tells the *Financial Reporter* to round all amounts to the even dollar.

'.D 7()' tells the program to accept a maximum of seven digits for dollar amounts and to display negative items in parentheses.

The report specification lines beginning with '@C' set the statement headers. '\NAME' calls up the company name from the Company Profile information held in the *General Ledger*. In similar fashion, '\DATE' pulls in the system date from DOS. The lines consisting of a single dot send linefeeds to the printer.

But enough housekeeping—on to some serious formatting. The line beginning with '.CS' sets the column specifications. In this report, 'Y' for year-to-date has been selected for Column 1, while Column 2's 'LYY' stands for year-to-date for the same month last year. 'C1-C2' in Column 3 tells the program to subtract the amounts in Column 2 from those in Column

```

Specification Editor

Please select activity from the following:

1. Edit          3. Fetch replacement      6. Create duplicate
2. Print         4. Fetch additional       7. Delete
                 5. Fetch EasyWriter II document

Specification name [ ]

Existing Specifications:  TITLE
                        UNIV1
                        UNIV2
                        UNIV3
                        UNIV4
                        UNIV5
                        UNIV6
                        UNIV7
                        UNIV8

Press ESCAPE to exit.

```

Screen 2: The main menu for the Specification Editor, a rudimentary line editor for creating specification files



1; 'C3%C2' in Column 4 calls for the amounts in Column 3 to be expressed as a percentage of Column 2. This rather complicated cross-referencing routine is the only way to display a percentage increase or decrease. The column headers begin with '.CH' and are restricted to a maximum of three lines.

Next come the body specifications for the report itself. Arranged from left to right are the source field, the destination field, various control characters, and the description. In the first body specification, the source operand is a range of account numbers (701.1 through 701.9). The next pulls the balance from just one account (771.1). The source operand can also be a sum of two or more account balances (701 + 702) or a difference (701-702).

The destination operand is optional, except for a line specification whose amount is to be included in your report's totals. 'T5' is the destination operand for the first two body specifications. For the third, 'T5' is the source operand, causing the total from the first two lines to print on the statement.

Line specification operands begin with '@' and are also optional. Of the two line-specification types listed in this file, the first is followed by a dash, which tells the program to change the sign of the account balance. Otherwise, income in Figure 2 would be in parentheses and expenses would stand alone—an unfortunate reversal. The '>3' following the second type of line

specification causes the description to be indented three spaces, and the '^v' inserts an underline.

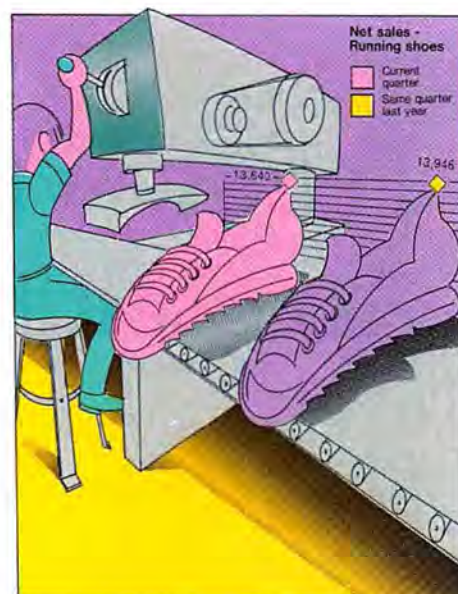
When you've finished editing a specification file, press <Esc>. The program saves your changes to disk automatically and returns to the Specification Editor menu, which offers the option to print the specification file for proofing. To print the report itself, you must first load the specification file into memory by choosing Fetch Replacement. Then press <Esc> once more to return to the main program, and select Print Financial Statement. Finally, after you confirm several options displayed on screen, *Financial Reporter* will print your report.

If you're lucky, that is. Because the *Financial Reporter* has rigid rules for specification files, you'll probably encounter error messages at first. Fortunately, the glossary of error messages in the manual goes a long way toward identifying where you've gone astray.

## Reporting Recommendations

Generating reports with the *Financial Reporter* is so complex, you may want to design prototypes using a spreadsheet—keeping in mind that your report generator has fewer functions. A quick spreadsheet preview of your ideas can help you sort valuable reports from superfluous numbers.

Of course, no matter how much thought you put into them, report designs are never chiseled in stone. Creating handy reports is an iterative process. Refine your report designs as you go along, and you'll probably even come up with some needed changes in your chart of accounts. So don't agonize over fine points. Pick out one report



you would like to have, design it, and change it later if necessary.

If your business has healthy long-term growth prospects, judicious custom reports can be the key to keeping it from outgrowing you. Rapid growth inexorably forces the small business owner to delegate responsibility to others, creating a greater reliance on pertinent financial information. Custom reports can keep key information at your fingertips, from identifying problem areas to revealing hidden profit potential. ●

Ralph Soucie is tax manager for Kenneth M. Mitchell & Co., a CPA firm in Oregon City, Oregon.

*EasyBusiness Systems General Ledger and Financial Reporter*  
Computer Associates Int'l, Inc.  
2195 Fortune Dr.  
San Jose, CA 95131  
408/942-1727  
List price: \$595  
Requirements: 128K, two disk drives or hard disk  
Not copy protected



# Penny-Wise Accounting

Yes, Virginia, you can buy an integrated accounting package for less than \$100, but you might find it a bit quirky.

*Ralph Soucie*

■■■■ Accounting is a rigid discipline that engenders some pretty stodgy software. For an application that's necessarily tradition-bound, however, accounting software has in the past year made a radical departure from one convention—high prices. Instead of asking \$2000 to \$3000 for a five-module system, many vendors now offer accounting packages aimed at small businesses and still smaller budgets.

Among bargain-basement accounting programs, few can underbid Dac Software's *Dac-Easy Accounting*. Offering General Ledger, Accounts Receivable, Accounts Payable, Purchase Order,

Billing, Inventory, and Forecasting modules for a mere total of \$69.95, *Dac-Easy* includes many features found on high-end systems. But it seems too good to be true. How can Dac offer "truly integrated accounting" for a song?

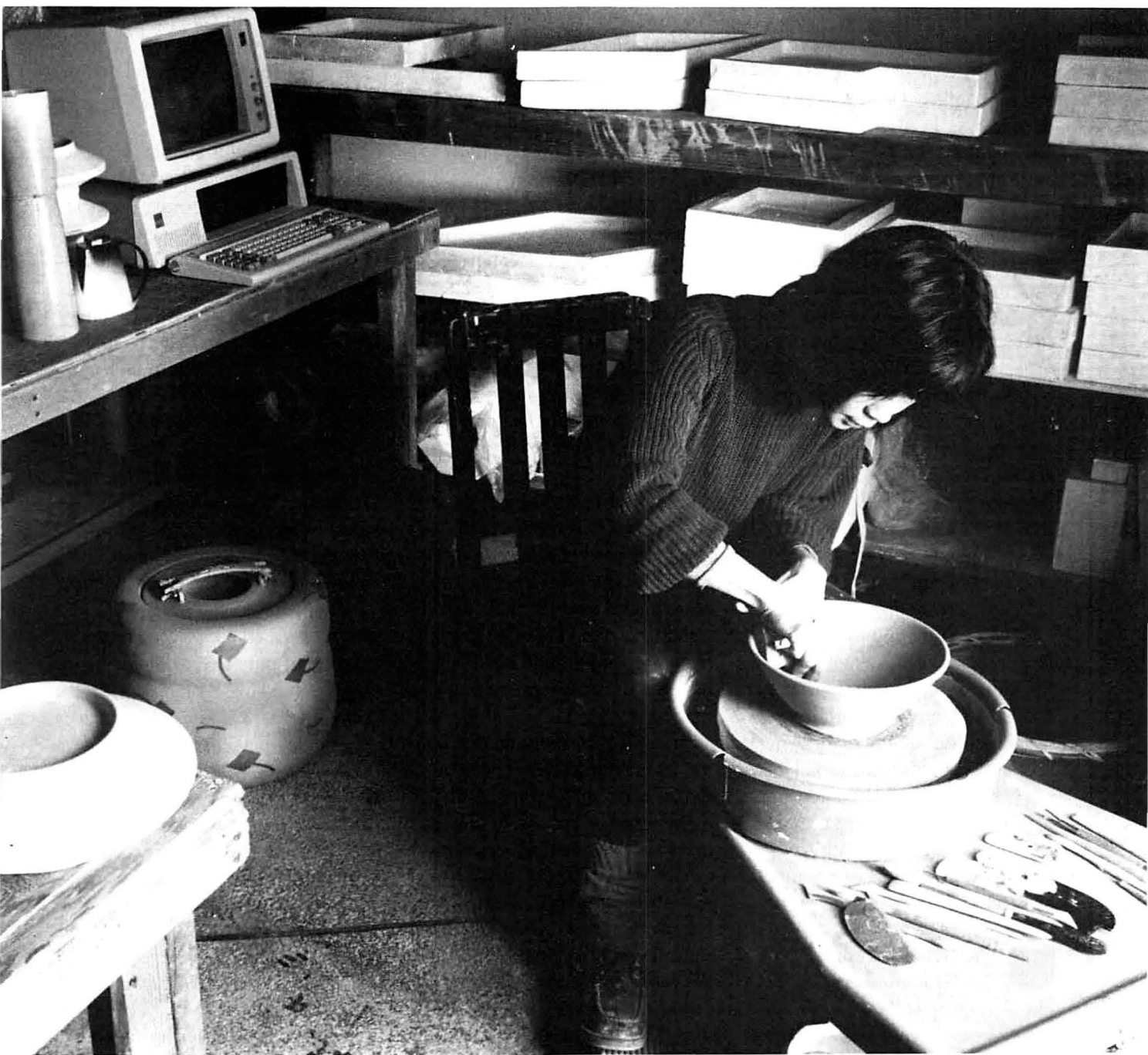
Not surprisingly, the program can't quite match the power and flexibility of its \$600-per-module counterparts. But the bottom line is that *Dac-Easy* works, and it even tosses in a few unexpected extras. Just like the big guys, the Accounts Receivable, Billing, Accounts Payable, and Inventory modules automatically update the appropriate General Ledger accounts. If you can tolerate its idiosyncrasies, *Dac-Easy* can save you hundreds of dollars on your PC accounting solution.

## ■ Setting Up Shop

All seven *Dac-Easy* modules come on one disk, which is not copy-protected. Loading the software is virtually effortless: All you do is type EASY at the prompt, and you're up and running. The next step in the installation process, "defining" your file sizes, is









| G/L TRANSACTION ENTRY |                     | JOURNAL CODE: DE     | TRANSACTION # 0003 | DATE: 850131 |      |
|-----------------------|---------------------|----------------------|--------------------|--------------|------|
| ACCT. #               | ACCOUNT NAME        | DESCRIPTION          | DEBITS             | CREDITS      | REC. |
| 16                    | ACCUM. DEPRECIATION | OCTOBER DEPRECIATION | 0.00               | 618.60       | 74   |
| 540                   | DEPRECIATION        | OCTOBER DEPRECIATION | 618.60             |              | 75   |

### Screen 1: A *Dac-Easy* input screen showing a complete depreciation entry

not so painless. This procedure, unnecessary in many accounting packages, requires that you estimate your transaction volume ahead of time—not always an easy task. The manual's explanation of this routine is a bit obscure, but in the end you're likely to find calculating the size of your files more time-consuming than difficult.

Setting up a chart of accounts is a straightforward, menu-driven procedure. As in any accounting system, careful planning of your account numbering scheme is key. Account numbers may contain up to 6 alphanumeric characters, and account names may be up to 20 characters long.

When setting up a General Ledger account, you assign one of five account levels, designated by the number of digits in the account number itself. With this unusual method, numbers for general accounts have the fewest digits, while numbers for detail accounts have the most, providing a quick way to discern an account's position within the chart of accounts hierarchy.

### The General Ledger

The General Ledger module, like the others in *Dac-Easy*'s system, is completely menu-driven. When you enter transaction information, the program prompts you for a two-character journal code.

For instance, you might enter DE for depreciation, which would later identify the transaction on journal listings. Unlike some programs, however, *Dac-Easy* does not generate reports based on transaction codes alone.

Screen 1 shows a sample input screen containing a depreciation entry. While many accounting programs display only one line item at a time, *Dac-Easy* agreeably leaves all transaction data on screen until you finish the entry. However, the program inexplicably omits a running net balance of debits and credits for the current entry.

In deference to Murphy's Law, *Dac-Easy* lets you correct or cancel an entry in progress. If you make a correction, however, it's advisable to read the manual's instructions very carefully. Straying from the straight and narrow can hang up the program, forcing you to reboot.

In all *Dac-Easy* modules, entering and posting transactions are two separate procedures. Unlike many other programs, which require that you post transactions in monthly batches, *Dac-Easy* lets you post transactions at any time. Rather than make you print out a transaction listing before posting, the program merely gives you a prompt, allowing you to skip this step. This lack of a forced audit trail may trouble some accounting

professionals. However, the General Ledger does prevent you from posting unbalanced entries.

*Dac-Easy* handles 13-month accounting, and it can also keep the prior period open while you post to the current one. One major difference between *Dac-Easy* and many high-end systems is the former's omission of departmental or multicompany accounting.

### Financial Statements and Reports

The content of *Dac-Easy* financial statements is up to you. While planning a statement takes more time than using the default combinations of report data offered by other accounting packages, it also gives you the freedom to tailor the contents of General Ledger statements and reports to your specific needs.

Once you've decided what information to include, however, *Dac-Easy*'s page layout options are decidedly limited. Figure 1 shows a balance sheet, and Figure 2 shows an income statement, both of which are printed in the second of only two available formats. Choosing Format 1 prints only the year-to-date column and the related percentage column. If you want to show current-period and year-to-date results on the income statement without percentages, you're out of luck. In other words, *Dac-Easy*'s report formats are strictly off-the-rack.

This paucity of options is not all bad. Some modular General Ledger packages provide more flexibility than *Dac-Easy*, but they require you to master formatting codes that rival programming languages in their complexity. If your reporting needs are minimal, you may welcome *Dac-Easy*'s simplified approach.



But if neatness counts heavily in your business, take a careful look at Figure 1. The current date and time always appear in the upper left corner of each statement page—a useful feature until the figures become final. At that point most people prefer to suppress this information to give the statements a cleaner look.

In addition, *Dac-Easy* prints the heading “Financial Statements” at the top of every statement. A specific description like Balance Sheet or Income Statement would be far more useful. Furthermore, you’ll have to learn to love the column headers shown in Figure 1 because there’s no way to suppress them.

Many users may also be frustrated by the one-column limit for displaying current-period results. Even if you choose Format 1, which prints out the year-to-date column and related percentages, the individual balances, subtotals, and grand totals all appear in a single column. Likewise, the 20-character limit on account descriptions means you’ll have to abbreviate long entries like Accumulated Depreciation as in Figure 1. Negative dollar amounts are denoted with minus signs, whereas most users would probably prefer brackets. Finally, underlining is not available. The only way to indicate totals and subtotals is by the judicious use of blank lines.

In addition to financial statements, *Dac-Easy* produces a standard array of reports and listings. The one omission is a full-year General Ledger; month-by-month reports of activity by account have to suffice. Although it’s designed for accrual accounting, with some

extra effort cash-basis users can coax *Dac-Easy* into generating a serviceable check register.

### **Billing and Accounts Receivable**

The program’s Billing and Accounts Receivable modules are very closely related; many other accounting systems combine the two categories in a single module. The *Dac-Easy* customer file contains a wealth of data, including contact person, sales territory, credit limit, and year-to-date and prior year sales. The system can even compute monthly finance charges on unpaid balances to  $\frac{1}{100}$  of a percent.

For each customer, you can select either open-item or balance-forward billing. You can print invoices, customer statements, customer directories, and mailing

### **Purchase Order and Inventory**

The Purchase Order module is designed solely for generating and tracking merchandise orders and receipts. The Inventory module, for its part, features a comprehensive product file that includes product number, description, quantity on hand, unit of measure, unit cost, sales price, location, primary vendor, optimum reorder point and quantity, inventory turnover, gross returns, and year-to-date (but not current month) sales in units and dollars. A two-digit code segregates products into subcategories for sorting. The *Dac-Easy* inventory system cannot handle multiple locations for single product items or available discounts for large orders.

When valuing inventory on hand, *Dac-Easy* does not support

*One major difference between Dac-Easy and many high-end systems is the former’s omission of departmental or multicompany accounting.*

lists. *Dac-Easy* can produce aging reports with customer balances spread over seven user-definable intervals. Service businesses, however, may well find *Dac-Easy*’s invoices unsuitable. Their customers would undoubtedly find the irremovable headers “Inventory #,” “Ordered,” and “Shipped” thoroughly confusing.

flow assumptions such as FIFO or LIFO. Instead it multiplies units on hand by one of three choices for per-unit cost: most recent purchase price, standard cost, or average cost. In many (but not all) cases, most recent price is equivalent to FIFO. There’s no way, however, to squeeze LIFO valuation out of the system, and the standard cost option is useful only for manufacturers.

Reports produced by the Inventory module include product



| DATE : 10-12-85   | SAM'S DRY CLEANERS   | PAGE NO. 1 |
|-------------------|----------------------|------------|
| TIME : 00.08      |                      |            |
| DESCRIPTION       | FINANCIAL STATEMENTS |            |
|                   | YEAR TO DATE         | %          |
| INCOME STATEMENT  |                      |            |
| SALES             | 25,947               | 100.0      |
| EXPENSES:         |                      |            |
| RENT              | 3,734                | 14.4       |
| SUPPLIES          | 5,165                | 19.9       |
| DEPRECIATION      | 2,456                | 9.5        |
| OFFICE EXPENSE    | 243                  | 0.9        |
| PROFESSIONAL FEES | 1,232                | 4.7        |
| TAXES             | 568                  | 2.2        |
| UTILITIES & PHONE | 766                  | 3.0        |
| MISCELLANEOUS     | 222                  | 0.9        |
| TOTAL EXPENSES    | 14,385               | 55.4       |
| NET INCOME        | 11,562               | 44.6       |

Figure 1: An income statement printed in the second of two available formats

and price listings and activity reports that you can sort in numerous ways. To trigger reorders, an inventory alert report kicks in when stock is low.

### Accounts Payable

The Accounts Payable module imports invoice information from the Purchase Order module and prints and records checks accordingly. You can also enter invoice data directly.

Before printing a check for a given vendor, you must enter a valid vendor code. Like the other master files sustained by *Dac-Easy*, the vendor file is quite comprehensive, containing the same number of fields supported by Accounts Receivable. A password system prevents unauthorized additions to the vendor file.

You can spread payments across an unlimited number of accounts. While the system allows you to enter miscellaneous debits and credits when recording payments, it does not select invoices for payment based on due date or discount date. However, the Accounts Payable aging report allows for negative days overdue (that is, days until due date). Thus, it can help in scheduling and batching future payments. The module also generates customer directories and mailing labels.

### Forecasting

*Dac-Easy's* most intriguing feature is a Forecasting module that purports to project financial results for future periods. The Forecaster consists of four sub-modules, each of which draws data from a different source: the General Ledger, Accounts Receivable, Accounts Payable, and Inventory modules. Projections in

other modules do not carry over into the General Ledger forecast.

To generate a forecast, you can apply a global percentage increase (or decrease) to current-period figures. Alternatively, you can tell the program to make statistical projections based on prior periods, although certain types of forecasts work only if you've used *Dac-Easy* for a few years. The Forecasting module also generates historical reports from current-year and prior-year data.

Although the concept behind the Forecasting module is praiseworthy, *Dac's* implementation of the idea is primitive. For instance, when forecasting income and expenses, you can't apply varying percentage increases to the accounts involved. If you want to see what happens when sales increase by 10 percent, you'll also



DATE : 10-12-85  
TIME : 00.02

SAM'S DRY CLEANERS

PAGE No. 1

| DESCRIPTION                                | THIS PERIOD | %     | FINANCIAL STATEMENTS |       | LAST YEAR | %   | VARIANCE | %   |
|--------------------------------------------|-------------|-------|----------------------|-------|-----------|-----|----------|-----|
|                                            |             |       | YEAR TO DATE         | %     |           |     |          |     |
| BALANCE SHEET                              |             |       |                      |       |           |     |          |     |
| CASH                                       | 4,434       | 116.2 | 16,402               | 32.1  | 0         | 0.0 | 16,402   | 0.0 |
| EQUIPMENT                                  | 0           | 0.0   | 37,116               | 72.7  | 0         | 0.0 | 37,116   | 0.0 |
| ACCUM. DEPRECIATION                        | 619-        | 16.2- | 2,456-               | 4.8-  | 0         | 0.0 | 2,456-   | 0.0 |
| NET AMOUNT                                 | 619-        | 16.2- | 34,660               | 67.9  | 0         | 0.0 | 34,660   | 0.0 |
| TOTAL ASSETS                               | 3,815       | 100.0 | 51,062               | 100.0 | 0         | 0.0 | 51,062   | 0.0 |
| NOTE PAYABLE                               | 0           | 0.0   | 28,000               | 54.8  | 0         | 0.0 | 28,000   | 0.0 |
| OWNER'S EQUITY                             | 0           | 0.0   | 11,500               | 22.5  | 0         | 0.0 | 11,500   | 0.0 |
| NET INCOME (LOSS)                          | 3,815       | 100.0 | 11,562               | 22.6  | 0         | 0.0 | 11,562   | 0.0 |
| TOTAL LIABILITIES<br>AND OWNER'S<br>EQUITY | 3,815       | 100.0 | 51,062               | 100.0 | 0         | 0.0 | 51,062   | 0.0 |

Figure 2: A Dac-Easy balance sheet

see expenses increase by 10 percent. Look at net income and—surprise! Up 10 percent! The real world works differently, because increases in expenses like rent, personnel, and depreciation seldom match increases in the volume of business.

#### Documentation

The effectiveness of *Dac-Easy's* manual depends on your point of view. If you're experienced with PC accounting applications, you'll probably appreciate the concise, no-nonsense approach. On the other hand, if you're unfamiliar with accounting jargon, the manual may leave you out in the cold. In that case, you should budget an additional \$50

for phone support, which entitles you to one hour of phone consultation over a year's time. If you've used a CPA or a bookkeeping firm to do your books in the past, you may need some help from them, too.

*Dac-Easy's* manual generally speaks only to accrual-basis users.

ful flowcharts show how the various components of the *Dac-Easy* system fit together. Dac has also included numerous sample printouts of reports generated by the program. Unfortunately, these reports are printed in compressed mode and reduced to about one-third actual size, rendering them

*Dac-Easy's most intriguing feature is a Forecasting module that purports to project financial results for future periods.*

Cash-basis users should ignore the Accounts Payable and Accounts Receivable modules and related documentation and use the General Ledger to enter cash receipts and disbursements.

Sprinkled throughout the manual are tips and warnings highlighted by a special symbol; help-

barely decipherable. Nevertheless, you'll need to refer to these sample printouts frequently because the package is devoid of tutorials, sample data, or on-line help.



## Dac Meets Its Payroll

*Eric Knorr*

Many programs can smooth your payroll operations with a minimum of hassle—if your requirements are straightforward. But if your employees draw different commissions, opt for special deductions, and work diverse shifts, the range of packages that can handle your situation quickly narrows.

The latest addition to Dac's low-budget line, *Dac-Easy Payroll*, offers a surprisingly rich selection of options that should suit a variety of businesses. Designed to function as a stand-alone package or to integrate with *Dac-Easy*, *Dac-Easy Payroll* is in some respects a more powerful program than any other Dac module.

One obvious difference from other Dac programs is *Dac-Easy Payroll*'s support of departmental accounting. You can establish up to 99 departments and print departmental payroll reports in detail or summary form. Another added feature supports up to five levels of password protection, with each level allowing a prespecified degree of access to payroll processing and employee records.

Surprisingly, *Dac-Easy Payroll*'s report generator is more flexible than the one found in *Dac-Easy*'s General Ledger. The only generic payroll reports are an employee directory, labels, and a department/codes report. Beyond this you can create

an unlimited variety of custom payroll reports by selecting from 33 sorting options. The range function enables you to generate reports along particularly narrow criteria, such as the number of terminations within the past three months, the employees with upcoming reviews, and so on. Like its General Ledger counterpart, however, *Dac-Easy Payroll* gives you little control over the layout of the printed page.

The most alluring aspect of *Dac-Easy Payroll* may be the program's tax-table update scheme. Because tax laws are notoriously complex and change annually (at least), they're often the biggest barrier to smooth payroll processing. Some accounting software vendors even refuse to offer update support, forcing you to enter reams of amended tax information



yourself. Never to be undersold, Dac offers revised state and federal tax tables on disk for a remarkable \$25 per year.

Like most payroll programs, *Dac-Easy Payroll* accommodates an unlimited number of employee records, and you can set up as many as seven user-defined automatic deductions per employee. The package also tracks dates of hire, raises, reviews, and terminations, as well as vacations and sick time. In addition, *Dac-Easy Payroll* keeps tabs on tips, commissions, and bonuses.

You can process payroll weekly, bi-weekly, semi-monthly, or

monthly, and each run has a separate payroll register. Pay stubs show earnings and deductions as separate line items, and you can print one check, a range of checks, or all the checks for a given period. The program prints on Dac forms only—a major consideration when you realize that 500 checks cost you more than the program.

Service-oriented businesses may judge *Dac-Easy Payroll* to be a cost-effective alternative to either manual or third-party processing. If you loved *Dac-Easy* despite its idiosyncracies, and you have enough personnel to justify it, you'll probably find *Dac-Easy Payroll* a useful, flexible package.

#### Assets vs. Liabilities

Overall, *Dac-Easy* is a capable general-purpose accounting system. Its close integration and straightforward user interface seem to attract experienced users, and the recent release of a separate Payroll module that integrates with *Dac-Easy* should broaden the program's appeal (see the sidebar "Dac Meets Its Payroll"). But if you're fastidious about the appearance of your financial statements, and you run your business on a cash basis, you may prefer one of the low-cost Lotus accounting templates. Businesses with special cost accounting needs, such as manufacturers, job shops, and contractors, may well need a more sophisticated solution than *Dac-Easy* provides. If you have a small to medium-size business with fairly basic requirements, however, the program can very likely do the job for you. At \$69.95, *Dac-Easy* can't help but be a great value—if you can live with the rough edges. ●

*Ralph Soucie is a CPA with Kenneth M. Mitchell & Co. in Oregon City, Oregon.*

*Dac-Easy Accounting  
Dac Software, Inc.  
4801 Spring Valley Rd. #110B  
Dallas, TX 75244  
214/458-0038  
List price: \$69.95, Payroll  
\$49.95  
Requirements: 256K, two disk  
drives or a hard disk*



## Chapter 7: The Guru Is Mauve

Rama and I were up all night, running the gamut of hard disk utilities in a futile attempt to restore the data. I had always dreamed of spending the night with her, but this wasn't exactly what I had in mind. At 8 a.m., we were convinced our rescue effort was hopeless, and we were about to close the shop and get some shut-eye when Dixie showed up and handed Rama a piece of paper. It was an offer he had rounded up, he said, just to keep Rama and Virgil from losing their shirts. When I looked at the paper, my worst fears were confirmed. The offer was from Quick and Dirty Printing to buy Printorama lock, stock, and barrel, for about 60 percent of what it was worth.

"It's the least I can do," young Dixie said, with the solemn air of a funeral director.

"Yeah, and this is the least I can do," I said, socking him with a rusty left hook. With great pleasure I watched the punk slam into an offset printer. Still, it wouldn't do much good. Printorama would be history, and I was probably headed for a nasty lawsuit.

After I decked Dixie I decided to lay low and hang out at Heyer's place. Despite Heyer's attempt to cheer me up with some rum and card tricks, I felt pretty lousy. After all, I was responsible; I never should have let

Dixie get at those records, and I knew it. Now the business was ruined, all because a hard disk had gone south.

South, south. Of course. Rich Dixie from the South. Why hadn't I thought of it before? And that was the name of Rama's mysterious caller a couple months before. I decided to make some inquiries. I always do my best detective work after it doesn't matter anymore.

A little sleuthing and a few phone calls confirmed everything. Rich Dixie was none other than Rich Quick, son of Karl Quick and nephew of Donan Dirty, the owners of Quick and Dirty, Inc. I was sure Rich had come around to Printorama, practically begging to be taken on as an apprentice, just so he could pull off the evil deed. I was just as sure, in retrospect, that it had been Rich Dixie who had known Rama was at my boat and arranged the skywritten threat against Virgil to try to entice Rama to sell. Oh sure, all of it would have been hard to prove in court, and it was probably academic. By the time a judgment came down, Printorama would be out of business.

Still, Virgil and Rama had a right to know. In a sudden onslaught of masochism and misplaced duty, I drove over to Printorama to give them the bad news. When the looming hulk of Virgil met me at door I almost backed away, but I figured I had what was coming to me.

I blurted out the whole story. They tried to stop me several times,



but I kept on going. "So you see, it's all my fault your data base was sabotaged," I summed up. "I should never have let you give up control of your PC."

I looked up in surprise to see the two of them smiling at me. What, was I cracking up, or were they?

"But, Travis," Rama said, patting me on the back. "Nothing was lost." Virgil let out a booming laugh.

I still don't quite believe it, but the thing that saved Printorama was Virgil's distrust of computers. Even though he was pretty slow when it came to running the PC, there were a few basic concepts he had learned well. One of the things I had stressed about data bases—which reinforced his own distrust of the machines—was the need to keep an off-site backup of essential records. Most of my clients don't take off-site backup seriously, but Virgil did. Every Saturday, he had religiously backed up the tapes and deposited them in the safe at home where he kept his baseball card collection. Thus, the "accidental" trashing of the accounting files caused only one day's transactions to be lost.

I could have kissed Virgil, but I didn't. He wouldn't like that any better than if I kissed his wife.

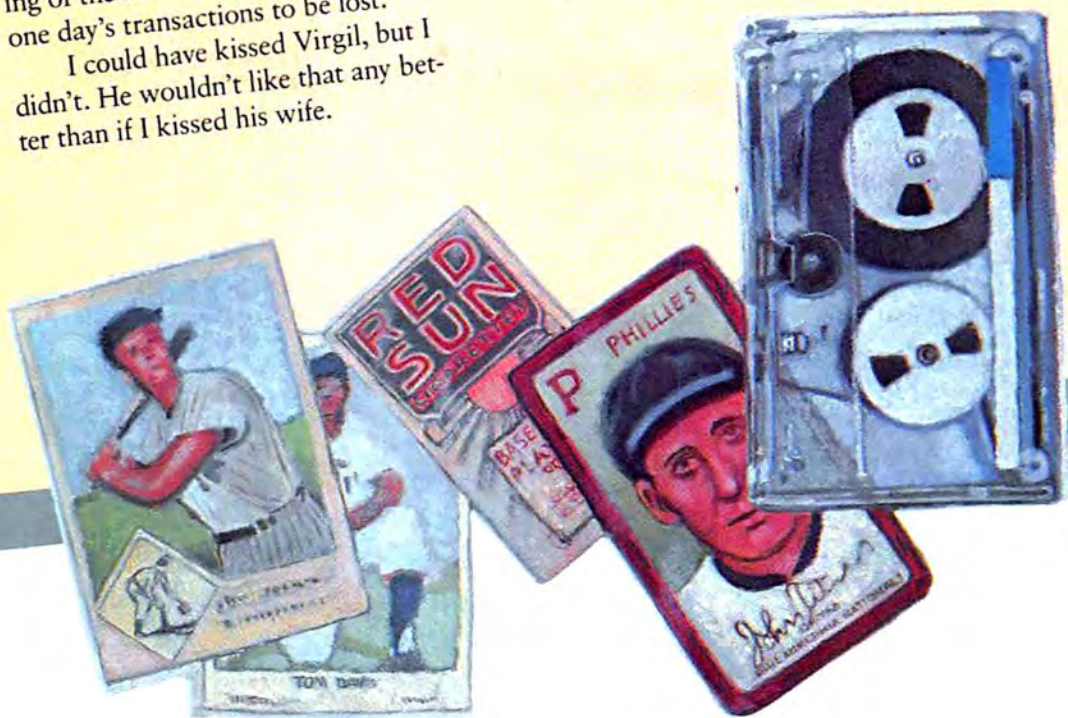
The sea was calm as Heyer and I cruised slowly toward Miami. Heyer's girlfriend had invited him up for a weekend beach party, and Heyer was nice enough to drag me along. Since I had just finished my last big consulting job for Printorama—setting up a conversion table for the photocomposition machine so clients could telecommunicate their type—I decided to accept.

"There'll be a lot of women there," Heyer told me, as he attached some fresh bait to his line. "Single women. You remember single women?"

I had taken about enough of my friend's good-natured ribbing over my unrequited infatuation with Rama. It was time to set things straight. "I was never really serious about her," I said lightly. "You know me—love 'em and leave 'em. I was just trying to do my job."

"Well, it looks like you succeeded with Rama. Heck, it looks like you even succeeded with Virgil, al-

*(continues)*

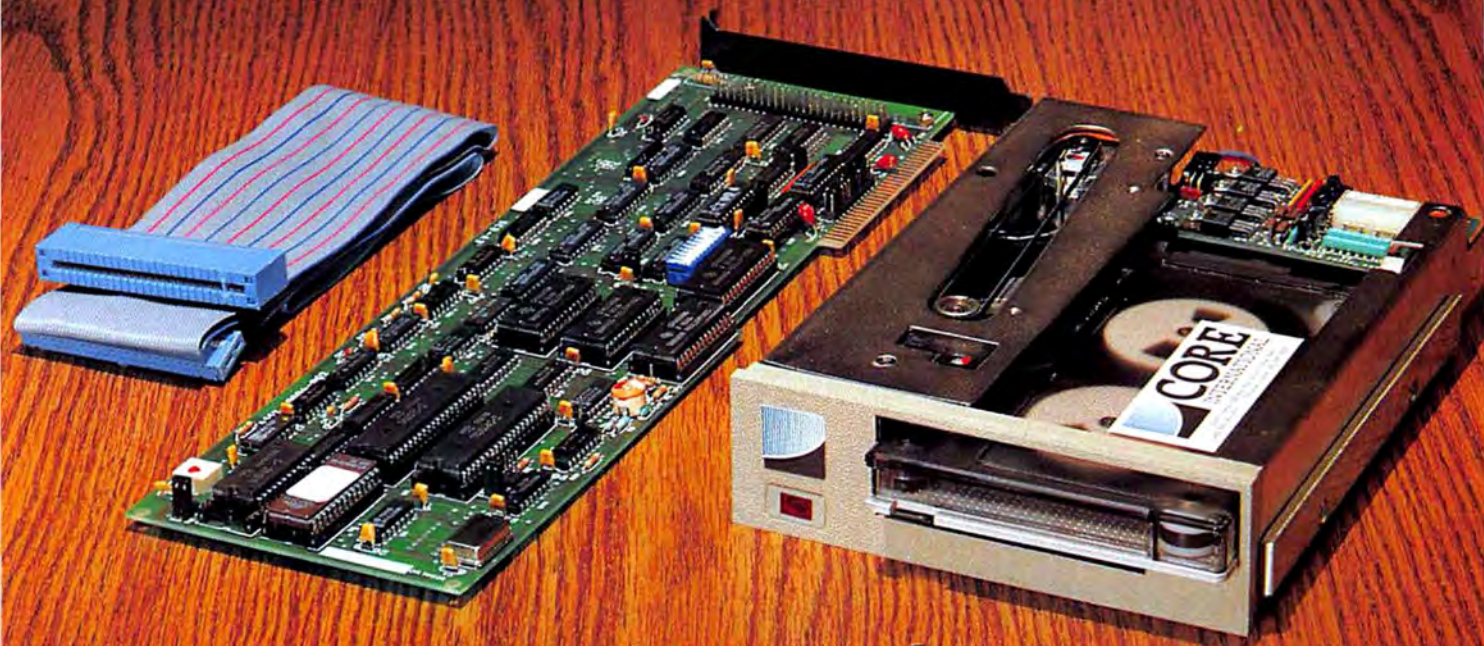




# "Blessed are the Pessimists; for they hath made backups."

— Exasperated 1:16

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though he never really got the hang of anything other than off-site backup."

"Why is that, Heyer?" I asked, as I steered *The Crashed Disk* around a sandbar, one of those uncharted hazards you have to watch for under the still, aqua surface of the water. "Why do some people take to computers and others just never catch on?"

"You know, I never thought about that," Heyer said, staring off at the horizon. With Heyer, that was like the red access light going on—he always stared off into space when he queried that great hard disk of a brain of his. He was at his mental keyboard, compiling his past computer experiences, recalculating them all in natural order, waiting for one "what if" after another to ripple down to the bottom line.

"Take yourself, McByte. You handle a computer the way that other Travis handles guns in those detective novels with the lurid covers and a color in the title," he said. "It's because you're part rebel, part philosopher, and every inch your own man."

"What's that got to do with it, Heyer?"

"I don't know, McByte. But it sounds good on the book jacket blurbs."

I set *The Crashed Disk* on automatic pilot. "Guess you haven't recovered from that blow on the head in *The Bottom Line Drips Red*, huh Heyer?"

"No, I'm serious, McByte. Let me finish. The thing is that people stay beginners—even if they learn how to run one program by rote, or even

two—until they begin to get a sense of freedom and adventure at the keyboard. A lot of people just don't understand. Little hurdles throw them. You have to help them with every little problem. No, they're still beginners until they can maneuver through obstacle courses, until they're willing to look things over and plow their way through a problem, no matter what. Once they know that computers are kind of fun and can't be hurt by pushing the wrong button, once they can sit down with any program and make it work, I'd say they've made it."

"Guess you'll never get rid of that theorizing disease, Heyer. You really should have somebody take a look at it."

Suddenly, the *The Crashed Disk* lurched to a sickening halt. We'd been so busy with philosophical repartee that we'd stopped worrying about sandbars. Good going, McByte. You're not much of a sailor or a detective, but at least you know your way around an 8088.

We rowed back to the marina in my inflatable skiff, *The Floppy Backup*. It took a long time to get home. ●

Part rebel, part philosopher, and every inch his own man, Kevin Strehlo hunts for PC tales from an office overlooking Silicon Valley and has never lived on a houseboat.



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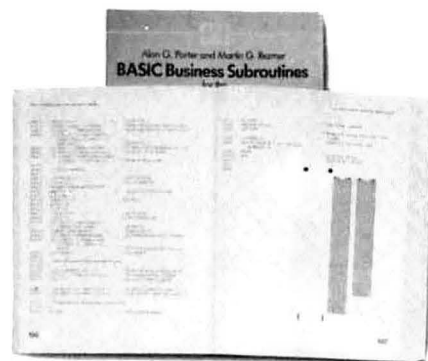
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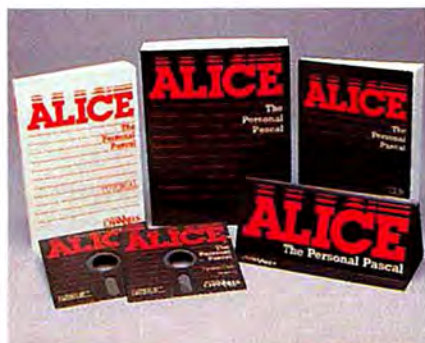
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# From the Software Shelf

*PC World offers first impressions of recent software releases*

This month: Flights of deadly fancy, the end of a great love affair, winning investors, and is your operating system all it could be?

*Edited by Robert Luhn*



## Jet

"Papa Bear One ... Papa Bear One ... this is Mad Dog Leader ... bandit at three o'clock high ... punching afterburners ... have visual contact ... Sidewinder locked on target ..."

"Mad Dog Leader ... this is Papa Bear One ... you've got two on your tail ..."

"This is Mad Dog Leader ... I'm hit! ... all systems gone ... I'm bailing out ..."

The canopy blows, the ejection seat rockets out, and the smoking F-18 careens away. From the bridge of the aircraft carrier, the hardened commanding officer watches his ace pilot drift slowly toward the drink. "Search and rescue," he barks, "immediate." Mad Dog Leader will fly again.

Cap Weinberger's reveries of the good life, perhaps? Or a script from a Clint Eastwood movie? Nope. It's just another mission with *Jet*, a new game from Sublogic that traces its roots to the company's ever-popular *Flight Simulator*. But don't read too much into this connection: *Jet* is to *Flight Simulator* as Rambo is to Wally Cox.

In essence, *Flight Simulator* instructs you in the peaceful art of mastering the controls of a Cessna 150 or similar private aircraft. *Jet* is pure entertainment, a dramatic simulation of the art of supersonic fight and flight. Your mission is to sink missile-toting warships and fell sleek MIGs firing heat-seeking missiles—or eat dirt at Mach 2 trying.

In contrast to *Flight Simulator*, *Jet*'s simple controls and instrumentation require very little practice to

master. *Jet* has no navigational radios, rpm gauges, or flaps to distract you. Your primary flight aids are speed, altitude, and G indicators, plus a pop-up line of horizon, radar screen, and gunsight. The cursor keys (or preferably a joystick) steer this supersonic aircraft; <GrayPlus> and <GrayMinus> control thrust; the <Space> bar unleashes a missile or bomb. If you can get the plane into the air, it pretty much flies itself—a fairly realistic simulation of today's computer-controlled aircraft. And unlike *Flight Simulator*, *Jet* is very forgiving of mistakes—I've pulled out of some pretty drastic power dives with hardly a scratch.

*Jet*'s opening menu gives you the option of flying a carrier-based F-18 to seek out enemy jets and ships or a land-based F-16 to locate and destroy enemy beet factories. As you raise the level of difficulty from 0 (practice) to 9 (ace), flying becomes tougher and your opponents multiply and get wilier. After one successful sortie (3 MIGs confirmed, 2 probable), I leisurely came in for a landing and was shot out of the air by a MIG that had snuck up behind me. Hardly sporting—but then that's the point.

Though *Jet*'s F-18 is relatively easy to fly, carrier takeoffs and landings are all too realistic. A catapult launch off the deck can drop you quickly in the water if you don't apply sufficient thrust and lift the F-18's nose up in time. Similarly, a successful landing means lining up with a moving carrier, cutting airspeed (without stalling), and letting your wheels gently kiss the deck.

Beginners should fly at the practice level if they want to stay in the air for more than a few minutes. In this mode the Russians miss a lot—in fact, they always miss. *Jet* also



offers a free-flight mode that's good for practicing carrier landings and aerobatics.

And honing your barrel rolls and chandelles is advisable—they come in handy when three MIGs have you cornered at 20,000 feet and you're out of ordnance. *Jet's* alternate views—to either side of the jet, to the rear, directly above, and even a commander's-eye view from the carrier's bridge—come in handy when you're skidding across the sky in a dogfight. Of course, there is a way to avoid these pesky devils, but you'll have to discover that on your own.

Because *Jet* is related to *Flight Simulator*, Sublogic offers six optional scenery disks of western cities that can be used by both programs; six disks of eastern cities are in the works. The disk for San Francisco, Los Angeles, and Las Vegas clearly needs more work—there's little in the way of specific landmarks, the visual effects aren't up to *Jet's* crisp graphics standard, and flight motion is rather jerky. Sublogic is planning a separate disk series that will provide identifiable buildings and landmarks.

Overall, *Jet* is a well-crafted program that matches *Flight Simulator's* superb graphics. The documentation is cursory at times (particularly on dogfighting tactics), but it's generally adequate. If you want a taste of the complexities of real flight, pick up *Flight Simulator*. But if you're hungry for a freewheeling midair fracas that lets you save Mom and Apple Pie in the process, *Jet's* the only game in town. —J. E. Durbin



A night mission with *Jet*

#### *Jet*

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## NewWord 3

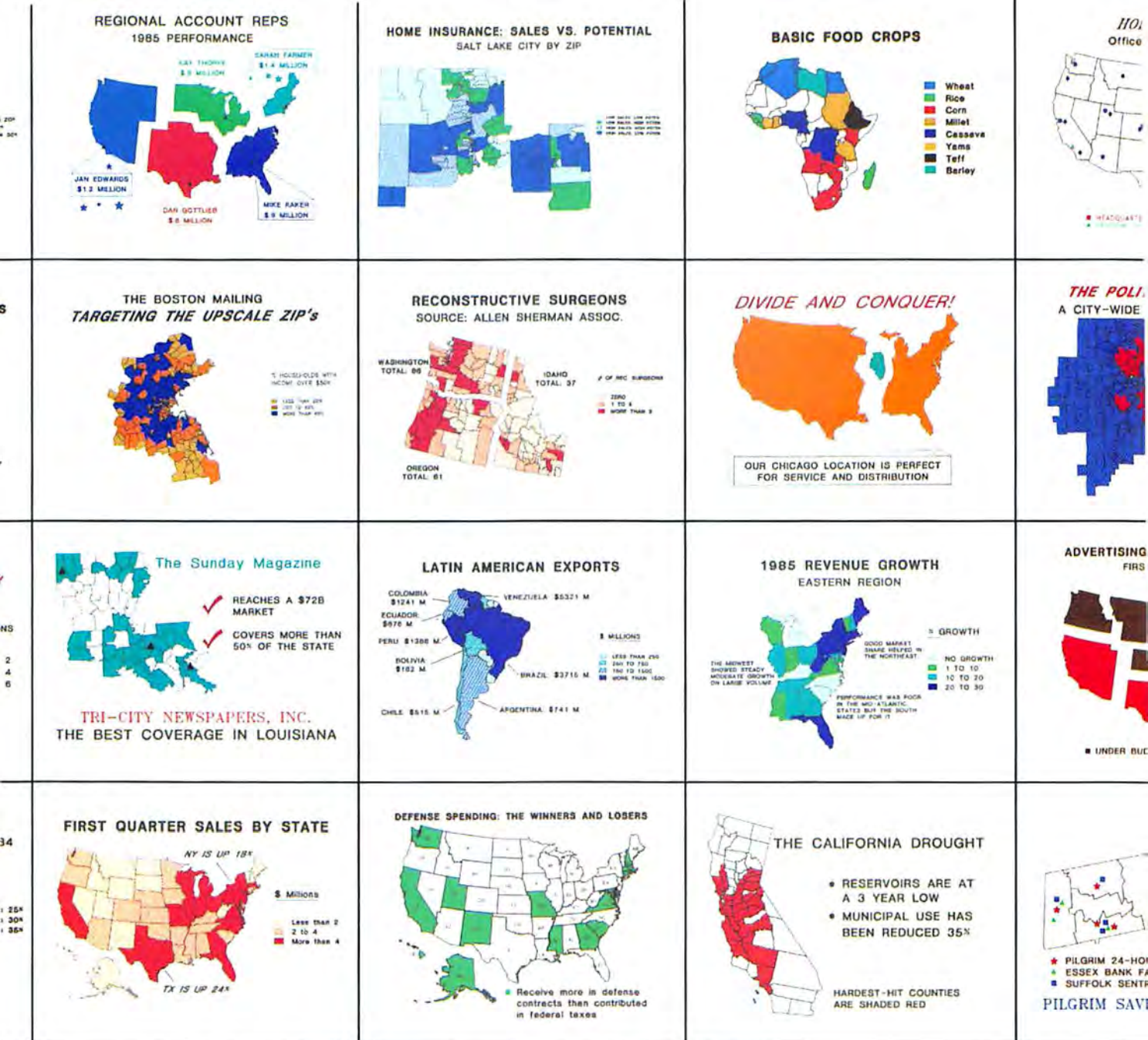
I still remember my introduction to PC word processing. One Friday afternoon my boss handed me a 60-page handwritten grant proposal, a copy of *WordStar*, and said, "Have fun!"

I wasn't thrilled at the prospect of learning this forbidding program in a weekend, but I accepted the challenge with my usual pluck and verve. The next morning I strolled down to the banks of the River Charles and spent the day getting sunburned, watching sailboats, and absorbing the whys and wherefores of *WordStar*.

After several days of constant companionship, our bond was cemented. Despite a few setbacks—such as periodically running out of memory before saving a file and printing out 15 consecutive pages

(continues)





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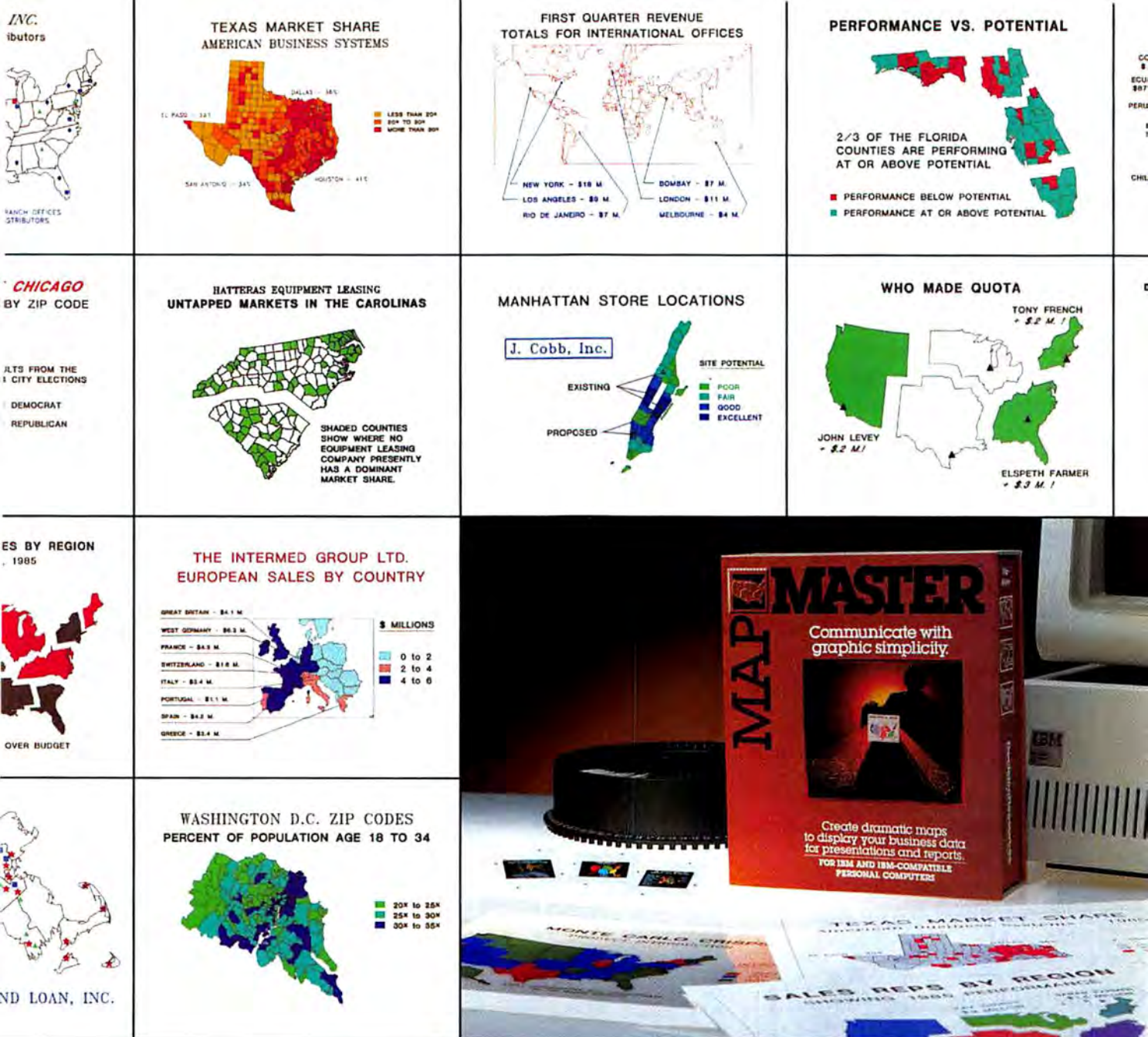
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From the Software Shelf



It's harder than it looks: a Jet catapult launch



An F-18's-eye view of a carrier landing

of underlined text—I became hopelessly devoted to *WordStar*.

But in this modern age, even the most promising marriages don't always go the distance. After using NewStar's *NewWord*, I'm seriously considering throwing away four years of commitment for something newer.

*NewWord* reminds me a lot of my faithful but outmoded word processing pal. But like Annie Oakley, it's ready to sing out, "Anything you can do I can do better." *NewWord* retains that old familiar feel while boosting *WordStar*'s creaky features, adding new ones, and correcting many gross deficiencies. Although you won't get windows with *NewWord*, you do get a *WordStar*-like product that offers

automatic paragraph reform, LaserJet support, a built-in macro processor and mail merge utility, a spelling checker, an Unerase command, and more.

Familiarity, of course, is half the battle when learning a new program. All your favorite *WordStar* functions are here—<Ctrl>-KD to save, <Ctrl>-OJ to toggle justification, even the famous cursor control diamond (ESDX). But familiarity doesn't make you want to leave home.

I knew I was smitten when I created my first *NewWord* document. The most noticeable deviation from the *WordStar* standard is that

(continues)



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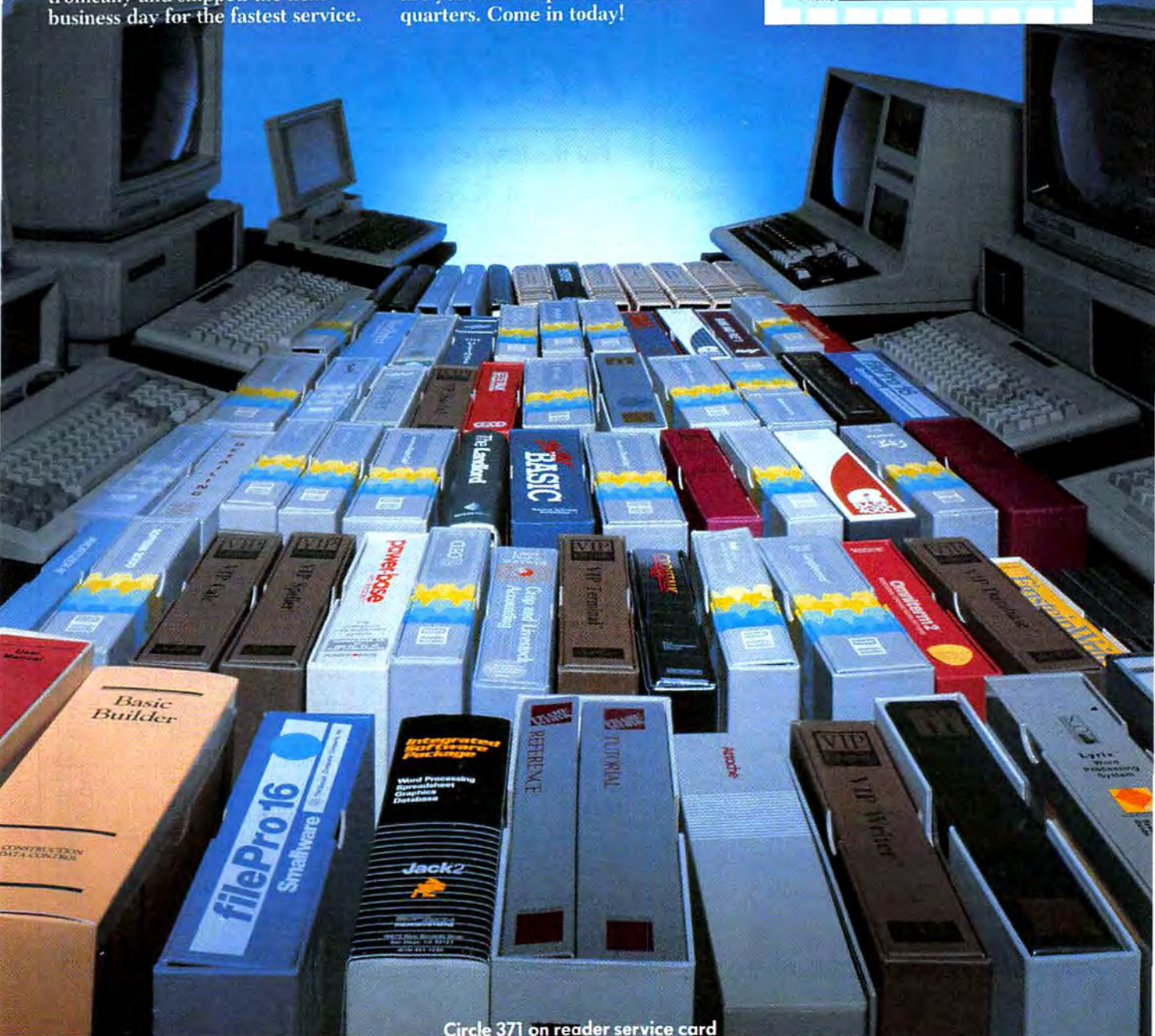
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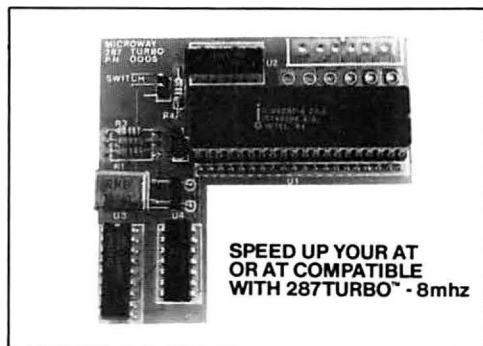
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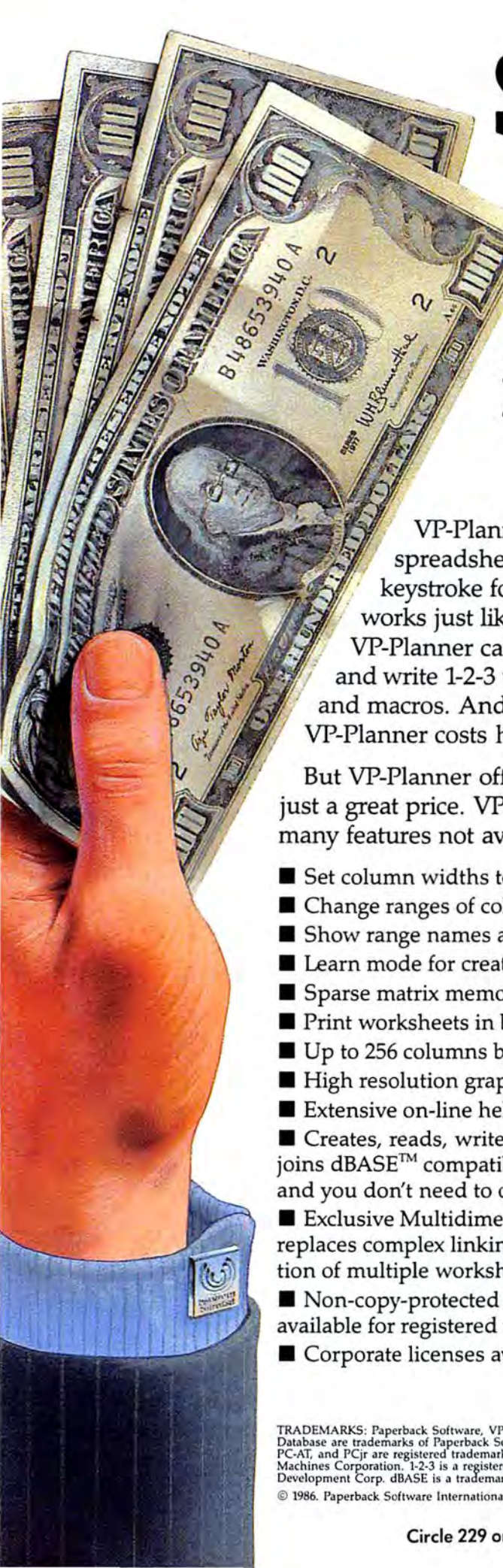
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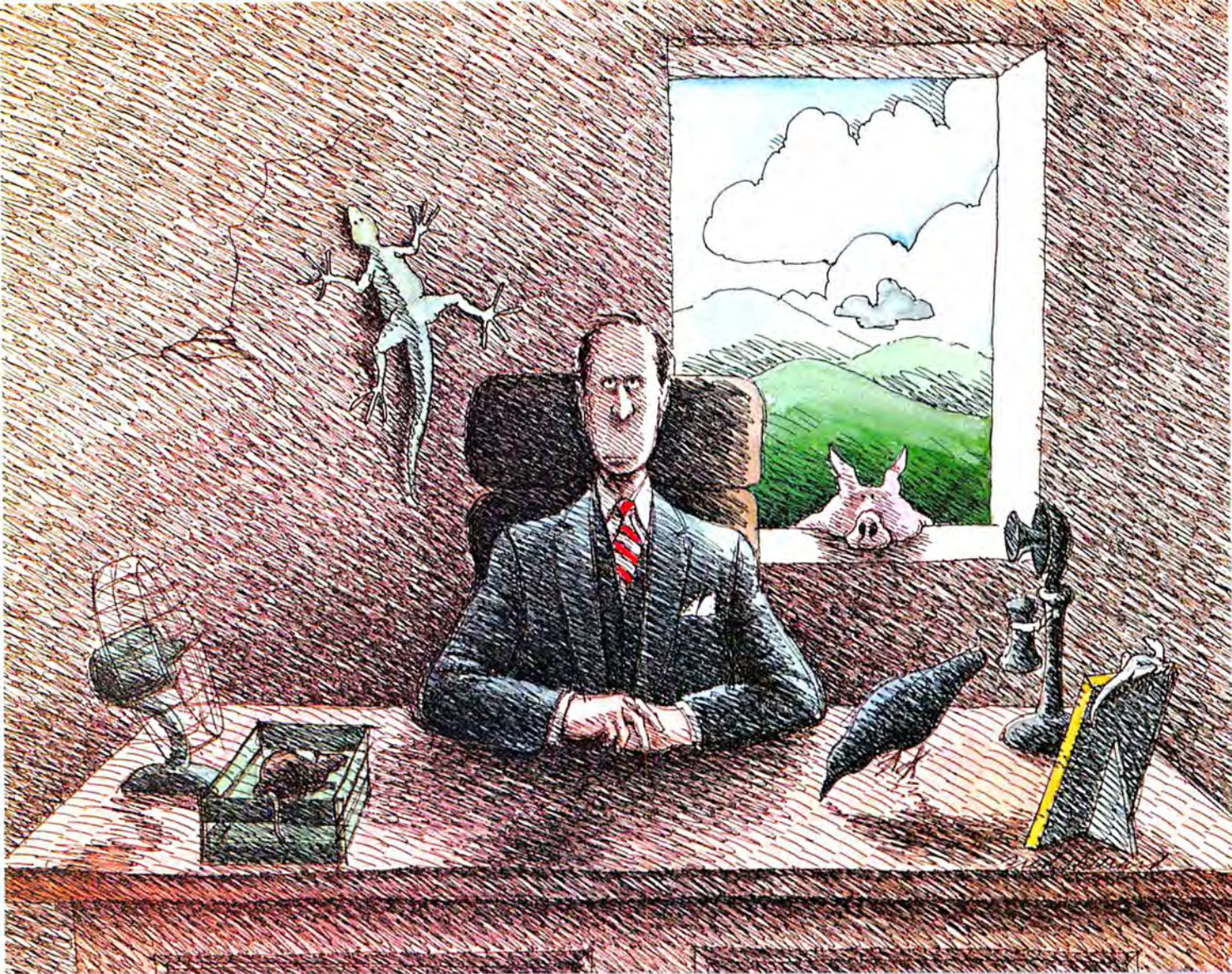
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boldface text is displayed bold, underlined text resembles its hard-copy counterpart, and best of all, marked blocks are highlighted. Other additions and refinements have relegated *WordStar* to the back of my drawer for good.

One feature topping the list is *NewWord*'s built-in macro processor. Although it doesn't have the power of a *SuperKey*, *NewWord* is more than enough for most applications. You can store text and commands up to 80 characters long with <Esc> and almost any key. For example, if you frequently type <Ctrl>-PB Personal Com-

puter<Ctrl>-PB, you can quickly designate <Esc>-P to represent that sequence. *NewWord* does reserve a few <Esc>-key combinations for special functions, such as <Esc>-@ for inserting the current date and <Esc>-T for transposing words.

*NewWord* also runs rings around the competition when it comes to performing calculations. Many contemporary word processors can add columns of numbers; with its Quick Math function *NewWord* even puts *TenKey* to shame. Quick Math solves equations encompassing everything from simple addition to complex calculus; the result of the last computation can be inserted into a document with

<Esc>-=. The Block Math function totals the numbers—both in columns and rows—in a marked block.

As I browsed through *NewWord*'s manual and menus, I came to admire the program's subtle but oh-so-handy features. Never again would I curse the fates for a mistakenly entered <Ctrl>-Y; *NewWord* includes an unerase command that restores deleted text. Tired of resetting margins and tabs every time *WordStar* is loaded? *NewWord* document rulers can be saved with a document. Does every

(continues)

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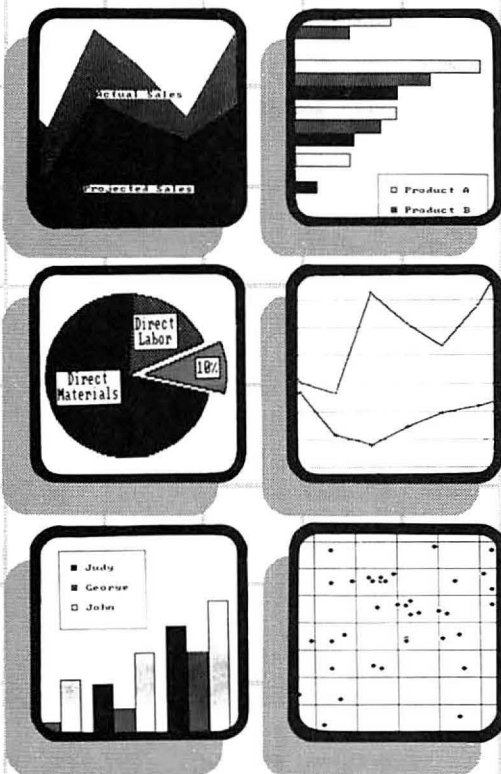
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subdirectory on your hard disk possess a copy of *WordStar*? Delete them all—*NewWord* works like a charm with DOS subdirectories. And are you itching to use the fonts on the HP LaserJet down the hall? Unlike *WordStar*, *NewWord* easily accesses LaserJet cartridge fonts using its special dot commands.

As an added attraction, Newstar bundles *NewWord* with *Word Plus*, a 45,000-word spelling checker that can check a word or an entire document. Equipped with a host of phonetic rules, *Word Plus* performs orthographic gymnastics. A suspect word can be ignored once or throughout the document, added

to a supplemental dictionary, replaced with one of *New Word*'s recommendations, or corrected from the keyboard. For on-the-fly spell checking, *New Word* stashes a small dictionary of commonly misspelled words in memory.

*NewWord*'s documentation is rather thorough, though its gee-whiz tone can be a little grating after a while. NewStar provides an excellent reference section and a "job aids" section that outlines and explains program functions minus the boosterism.

Although I wasn't in the market for a new word processor, I'm beginning to think I should have been shopping all along. *NewWord* is completely compatible with *Word-*

*Star* files—well, you fill in the rest of the story. Something tells me this could be the start of a beautiful relationship. —Karen Dowell

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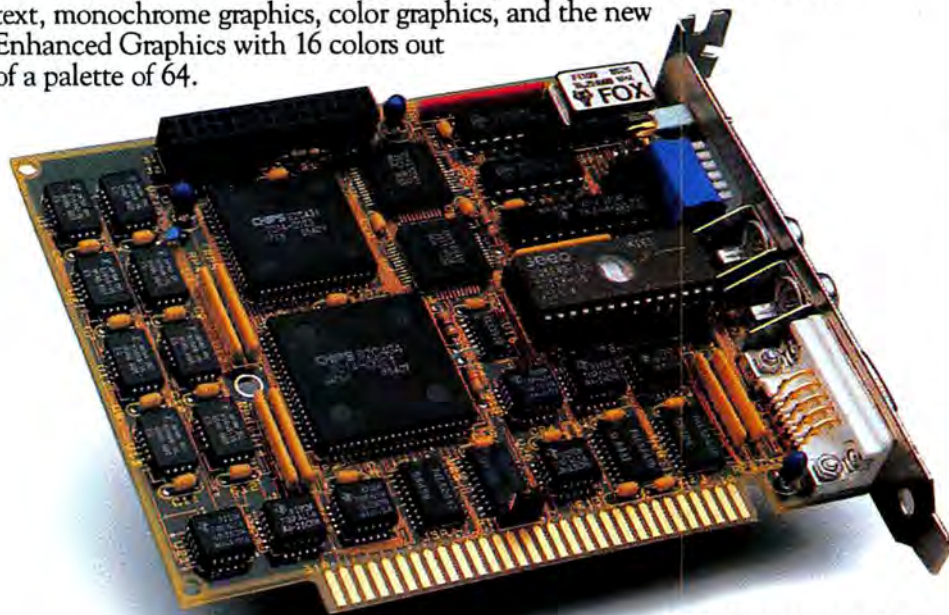




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(1) Short card availability limited through Feb. 1986. Long card available now.

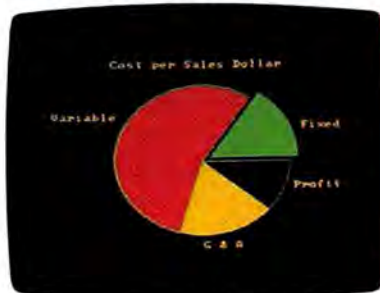


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Remember that TV ad in which the overwrought daughter screams, "Mother please! I'd rather do it

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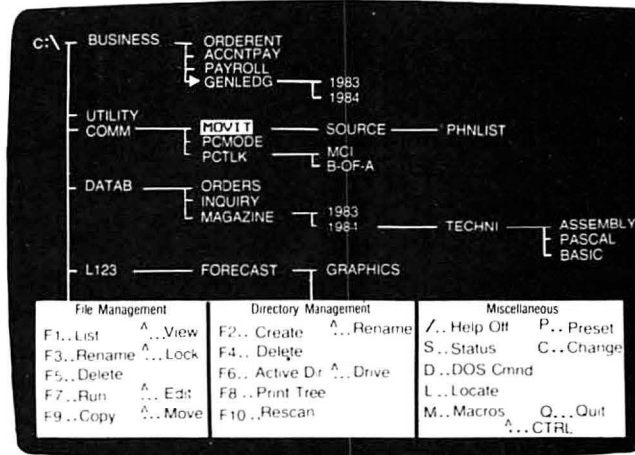
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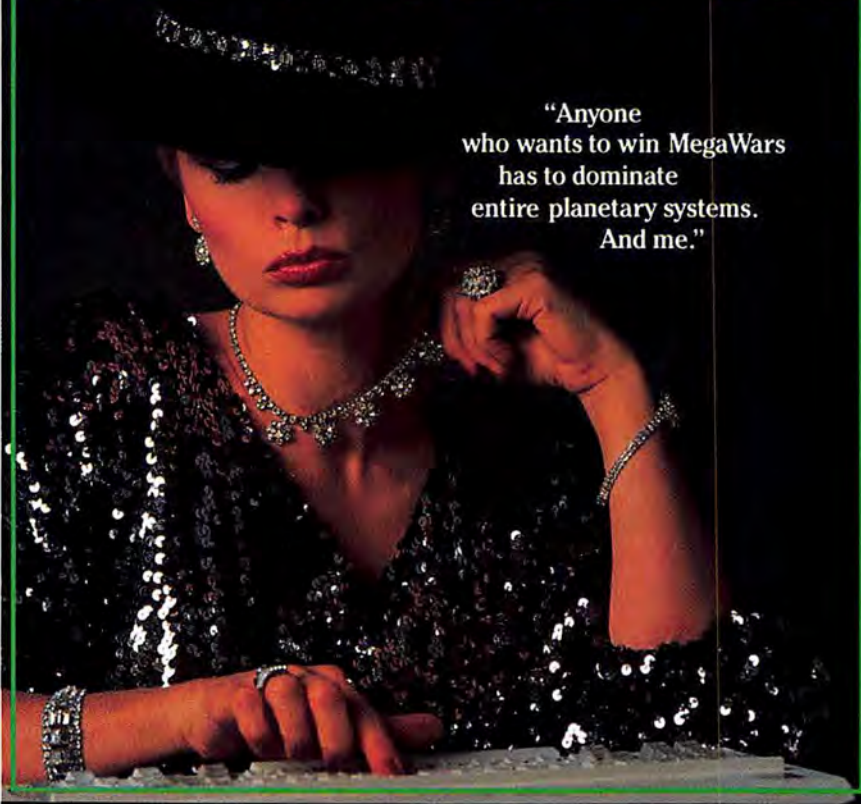
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Circle 296 on reader service card

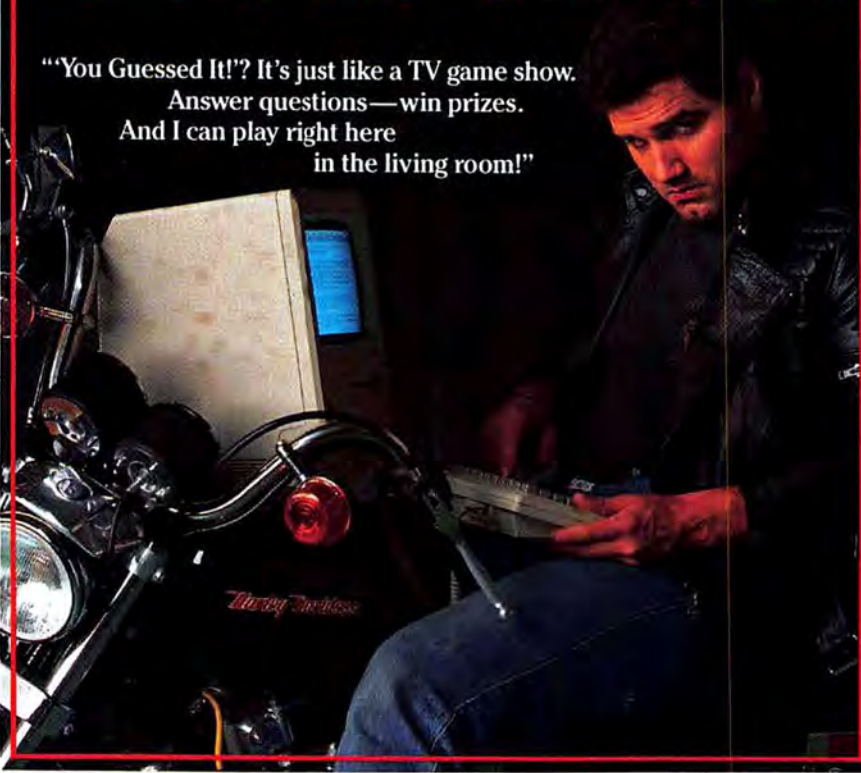


# COMPUTOUGH



"Anyone  
who wants to win MegaWars  
has to dominate  
entire planetary systems.  
And me."

# COMPUFUN



"'You Gussed It!?' It's just like a TV game show.  
Answer questions—win prizes.  
And I can play right here  
in the living room!"

From the Software Shelf



myself!" You may experience this feeling when using *Winning Investor*. It's a program for those who like automatic transmissions in sports cars: You don't have to think about it, and it more or less gets you where you're going.

Professionals in the securities business are suspicious of any program that won't divulge its investment assumptions—and how heavily they're weighted. A couple of boffo ratios may vault a security to the top of *Winning Investor*'s list—but the program doesn't tell you which ratios they were. If you knew, you might not agree with the weighting. And let's face it: No program can read the nuances of the market like an experienced broker. If nothing else, can a PC hold your hand when the Dow drops 40 points and takes your fortune with it?

In spite of my bias, *Winning Investor* can be a useful tool—but not the only tool—in an investor's arsenal. Given the choice between laying out \$200 for this program and spending the equivalent sum on a market newsletter, I might well choose the former. But don't swallow the advertising hype that claims the package (using historical data) has outperformed the Standard & Poor's 500. Past performance guarantees nothing in the turbulent, futures-oriented securities market.

Computers crunch numbers very well and draw pretty pictures. But when it comes to making recommendations on spending your hard-earned cash, there is no substitute



for the personal (and better informed) touch. Remember: You pays your money, and you takes your chances. —Stephen A. Blumenthal

*Winning Investor*

*DeskTop Broker, Inc.*

*300 Montgomery St. #460*

*San Francisco, CA 94104*

*800/332-1414*

*List price: \$200 (includes one-*

*time hookup charge to IDC),*

*\$45 for monthly on-line service*

*Requirements: 256K, DOS 2.10*

*or later version, serial port,*

*Hayes or compatible modem,*

*two disk drives recommended*

*Copy protected*



## Media Master Plus

Long hair, VW microbuses, and CP/M are out; Swatches, blue shirts with white collars, and MS-DOS are definitely in. When I finally faced up to being behind the times with my Osborne I, I did what any sensible and cost-conscious user would do: I lived with obsolescence. But as my Osborne continued its downward slide toward senescence and the power of the PC came within financial grasp, I realized I'd soon take the plunge. One obstacle loomed far above any monetary considerations: To join

*(continues)*

# COMPU CRAZY

"Ready for an adventurous challenge?  
We're a team. And Nellie  
doesn't horse around."



# COMPU SERVE GAMES

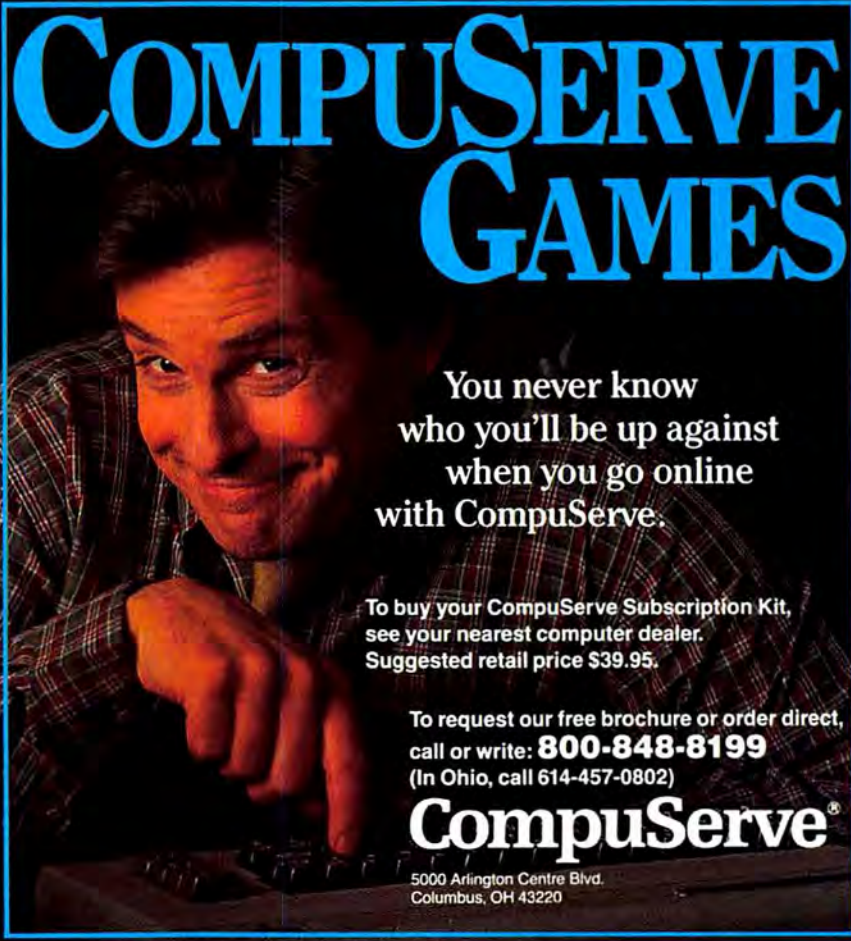
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**CompuServe®**

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Columbus, OH 43220



Circle 856 on reader service card



# What the world really needs is a 69 cent Double Sided, Double Density Diskette with a LIFETIME WARRANTY!

## And DISK WORLD! has it.

**Introducing Super Star Diskettes:  
the high quality diskette with  
the lowest price  
and the best LIFETIME WARRANTY!**

In the course of selling more than a million diskettes every month, we've learned something: higher prices don't necessarily mean higher quality.

In fact, we've found that a good diskette manufacturer simply manufactures a good diskette...no matter what they charge for it. (By way of example, consider that none of the brands that we carry has a return rate of greater than 1/1,000th of 1 percent!)

In other words, when people buy a more expensive diskette, they aren't necessarily buying higher quality.

The extra money might be going toward flashier advertising, snazzier packaging or simply higher profits.

But the extra money in a higher price isn't buying better quality.

All of the good manufacturers put out a good diskette. Period.

### How to cut diskette prices ...without cutting quality.

Now this discovery posed a dilemma: how to cut the price of diskettes without lowering the quality.

There are about 85 companies claiming to be "diskette" manufacturers.

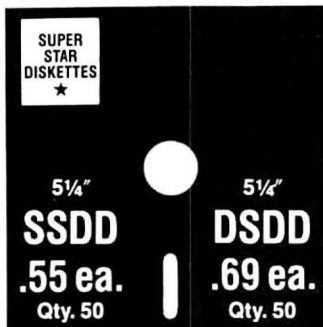
Trouble is, most of them aren't manufacturers. Rather they are fabricators or marketers, taking other company's components, possibly doing one or more steps of the processing themselves and pasting their labels on the finished product.

The new IBM diskettes, for example, are one of these. So are IBM 5 1/4" diskettes. Same for DYSAN, Polaroid and many, many other familiar diskette brand names. Each of these diskettes is manufactured in whole or in part by another company!

So, we decided to act just like the big guys. That's how we would cut diskette prices...without lowering the quality.

We would go out and find smaller companies to manufacture a diskette to our specifications...specifications which are higher than most...and simply create our own "name brand" diskette.

Name brand diskettes that offered high quality at low prices.



Super Star diskettes are sold in multiples of 50 only. Diskettes are shipped with white Polymer-impregnated cardboard sleeves, reinforced hubs, user ID labels and write-protect tabs.

**Boy, did we get lucky. Our Super Star Diskettes are the same ones you've been using for years...without knowing it.**

In our search for the low priced, high quality diskette of our dreams, we found something even more interesting.

We found that there are several manufacturers who don't give a hoot about the consumer market for their diskettes. They don't spend millions of dollars in advertising trying to get you, the computer user, to use their diskettes.

Instead, they concentrate their efforts on turning out the highest quality diskettes they can...because they sell them to the software publishers, computer manufacturers and other folks who (in turn) put their name on them...and sell them for much higher prices to you!

After all, when a software publisher or computer manufacturer or diskette marketer puts their name on a diskette, they want it to work time after time, everytime. (Especially software publishers who have the nasty habit of copy-protecting their originals!)

**Super Star Diskettes. You already know how good they are. Now you can buy them...cheap.**

Well, that's the story.

Super Star diskettes don't roll off the boat from Pago-Pago or emerge from a basement plant just east of Nowhere.

Super Star diskettes have been around for years...and you've used them for years as copy-protected software originals, unprotected originals. Sometimes, depending on which computer you own, the system master may have been on a Super Star diskette. And maybe more than once, you've bought a box or two or more of Super Star diskettes without knowing it. They just had some "big" company's name on them.

Super Star Diskettes are good. So good that a lot of major software publishers, computer manufacturers and other diskette marketers buy them in the tens or hundreds of thousands.

We buy them in the millions.

And then we sell them to you.

Cheap.

**When every little bit counts,  
it's Super Star Diskettes.**

You've used them a hundred times...under different names.

Now, you can buy the real McCoy, the same diskette that major software publishers, computer manufacturers and diskette marketers buy...and call their own.

We simply charge less.

### Super Special!

**Store 75 diskettes for only \$5.95!**

Yep, that's right, order 50 Super Star diskettes, add \$5.95 and we'll include a Media Products DISK MINDER II...a well made unit that we're impressed with.

It holds 75 diskettes securely and looks nice too!



### FRAUD ALERT!

Please be careful!

A lot of the "no-name" diskettes flooding the market at prices of less than \$1.00 are what we in the industry call "floor sweepings."

In other words, they're garbage...stuff that six months ago, no self-respecting manufacturer would have sold.

But times got tough and some people's scruples got a little lost in desperation...and so a lot of computer users are getting some really bad disks...and that isn't bargain at all.

So, when the price seems too good to be true...like 39 cents, be careful...very careful!

### HOURS:

8AM-6PM Central Time, Monday through Friday

### HOW TO ORDER:

**ORDERS ONLY:**

1-800-621-6827

(In Illinois use 1-312-256-7140)

**INQUIRIES:**

1-312-256-7140

FOR FASTEST SERVICE, USE NO-COST MCI MAIL: Our address is DISKORDER. It's a FREE MCI MAIL letter. No charge to you. (Situation permitting, we'll ship these orders in 24 hours or less.)

**SHIPPING:** 5 1/4" & 3 1/2" DISKETTES—Add \$3.00 per each 100 or fewer diskettes. **OTHER ITEMS:** Add shipping charges as shown in addition to other shipping charges. **PAYMENT:** VISA, MASTERCARD and Prepaid orders accepted. **COD ORDERS:** Add additional \$5.00 special handling charge. **APO, FPO, AK, HI & PR ORDERS:** Include shipping charges as shown and additional 5% of total order amount to cover PAL and insurance. We ship only to United States addresses, except for those listed above. **TAXES:** Illinois residents, add 7% sales tax.

**MINIMUM ORDER: \$35.00.**

### The Super Star LIFETIME WARRANTY!

Super Star Diskettes are unconditionally warranted against defects in original material and workmanship so long as owned by the original purchaser. Returns are simple: just send the defective diskettes with proof of purchase, postage-paid by you with a short explanation of the problem, and we'll send you the replacements. (Incidentally, coffee stained diskettes and diskettes with staples driven through them don't qualify as "defective".)

**WE WILL MEET OR BEAT ANY NATIONALLY  
ADVERTISED PRICE  
ON THE SAME PRODUCTS AND QUANTITIES  
SUBJECT TO THE SAME TERMS AND CONDITIONS.**

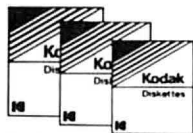
# DISK WORLD!, INC.

**629 Green Bay Road  
Wilmette, Illinois 60091**



# KODAK DISKETTES:

Discover the  
future today!



**KODAK.  
THE NAME  
SAYS IT ALL.**

Take a Century of experience in coating products like photo film, add two brand-new state-of-the-art plants for manufacturing diskettes and you have something new: KODAK diskettes, a taste of the future.

Kodak spends more than three million dollars a day in research and development. They have more than 120,000 employees and manufacture and market more than 30,000 products.

**But George Eastman  
said it best:**

George Eastman, the founder of Eastman Kodak and the man who made it possible for everyone to have a family album expressed Kodak's philosophy almost a century ago: make "good goods!"

That's why we're so pleased to add KODAK diskettes to our line.

**Great quality,  
great value!**

For those of you who want a "brand name" diskette with top-of-the-line quality...without paying through the nose, the choice is simple: KODAK.

**Of course, there's a  
LIFETIME WARRANTY!**

Except as noted, all KODAK diskettes are packed in boxes of ten with Tyvec sleeves, user ID labels and write-protect tabs. Bulk packed diskettes are labelled as KODAK diskettes and are packed in 4 bundles of 25 diskettes with Tyvec sleeves, user ID labels and write-protect tabs.

|               | Qty.<br>20-40 | Qty.<br>60+ | Qty.<br>100 |
|---------------|---------------|-------------|-------------|
| 5.25" SSDD    | \$1.11 ea.    | \$1.01 ea.  |             |
| 5.25" DSDD    | \$1.46 ea.    | \$1.33 ea.  |             |
| 5.25" DSDD-HD | \$3.47 ea.    | \$3.15 ea.  |             |

### 3.5" KODAK DISKETTES

|            |            |            |
|------------|------------|------------|
| 3.50" SSDD | \$2.06 ea. | \$1.87 ea. |
| 3.50" DSDD | \$2.73 ea. | \$2.48 ea. |

### KODAK LABELLED BULK DISKETTES

|                              |        |
|------------------------------|--------|
| 5.25" SSDD in package of 100 | \$ .93 |
| 5.25" DSDD in package of 100 | \$1.24 |

**FOR ORDERS ONLY:**  
**1-800-621-6827**  
(In Illinois: 1-312-256-7140)  
HOURS: 8AM-5PM Central Time, Monday-Friday  
**WE WILL BEAT ANY NATIONALLY ADVERTISED PRICE  
ON THE SAME PRODUCTS AND QUANTITIES!**

**DISK WORLD!, Inc.**

629 Green Bay Road • Wilmette, Illinois 60091

**DISK  
WORLD!**



FANTASTIC LOW PRICES ON

# BASF QUALIMETRIC DISKETTES!

LIFETIME WARRANTY!

Buy in bulk and save. 150 to the carton with envelopes, write-protect tabs and user ID labels. Boxed product is the same, except in cardboard boxes of 10.

|                   | Qty. 50  | Qty. 150 |
|-------------------|----------|----------|
| 5.25" SSDD        | .83 ea.  | .80 ea.  |
| 5.25" DSDD        | .94 ea.  | .92 ea.  |
| 5.25" DSDD-HD     | 2.13 ea. | N/A      |
| 5.25" SSDD-96TPI  | .94 ea.  | N/A      |
| 5.25" DSDD-96TPI  | 1.06 ea. | N/A      |
| 3.50" SSDD-135TPI | 1.84 ea. | 1.68 ea. |
| 3.50" DSDD-135TPI | 2.40 ea. | 2.28 ea. |

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(In Illinois: 1-312-256-7140)

HOURS: 8AM-6PM Central Time, Monday-Friday

**WE WILL BEAT ANY NATIONALLY ADVERTISED PRICE  
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**INFORMATION &  
INQUIRIES:**

**1-312-256-7140**

**DISK  
WORLD!** Authorized Reseller  
Media Information Processing BASF

# DISK WORLD!

## Ordering & Shipping Instructions

**Shipping:** 5 1/4" & 3 1/2" DISKETTES—Add \$3.00 per each 100 or fewer diskettes. **Other Items:** Add shipping charges as shown in addition to other shipping charges. **Payment:** VISA and MASTER-CARD accepted. **COD Orders:** Add additional \$5.00 Special Handling charge. **APO, FPO, AK, HI & PR Orders:** Include shipping charges as shown and additional 5% of total order amount to cover PAL and insurance. **Taxes:** Illinois residents only, add 7% sales tax.

Prices subject to change without notice.

This ad supercedes all other ads.

Not responsible for typographical errors.

MINIMUM TOTAL ORDER: \$35.00

**FOR ORDERS ONLY:**

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(In Illinois: 1-312-256-7140)

**INFORMATION &  
INQUIRIES:**

**1-312-256-7140**

HOURS: 8AM-6PM Central Time

Monday-Friday

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**DISK WORLD!, Inc.**

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**DISK  
WORLD!**

# ATHANA DISKETTES

The great unknown!

**60¢** ea. + 5 1/4" SSDD **74¢** ea.  
Qty. 50 5 1/4" DSDD → Qty. 50

You've used these diskettes hundreds of times...as copy-protected originals on some of the most popular software packages. They're packed in poly-bags of 25 with Polymer-impregnated cardboard sleeves, reinforced hubs, user identification labels and write-protect tabs.

**LIFETIME WARRANTY!**

**SOFT SECTOR ONLY!** Sold in multiples of 50 only.

**FOR ORDERS ONLY:**

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(In Illinois: 1-312-256-7140)

HOURS: 8 AM-6PM Central Time, Monday-Friday

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**DISK  
WORLD!**

Authorized Distributor

**ATHANA  
MAGNETIC  
MEDIA**



Now, the lowest  
prices ever on  
**3M** diskettes.  
**LIFETIME WARRANTY!**

All 3M diskettes are factory packed in boxes of 10 and come with Tyvec sleeves, user ID labels and write-protect tabs.

|                  | Qty. 20-40 | Qty. 50+   |
|------------------|------------|------------|
| 5.25" SSDD       | \$1.20 ea. | \$1.09 ea. |
| 5.25" DSDD       | \$1.70 ea. | \$1.54 ea. |
| 5.25" SSDD-96TPI | \$2.18 ea. | \$1.98 ea. |
| 5.25" DSDD-96TPI | \$2.73 ea. | \$2.48 ea. |
| 3.50" SSDD       | \$3.45 ea. | \$3.14 ea. |
| 3.50" DSDD       | \$2.18 ea. | \$1.98 ea. |
|                  | \$3.09 ea. | \$2.81 ea. |

**3M DATA CARTRIDGES**

(Sold 10 to a carton only.)

(Add \$5.00 shipping charges for cartridges!)

|          |             |
|----------|-------------|
| DC1000   | \$12.43 ea. |
| DC300XLP | \$19.09 ea. |
| DC600A   | \$20.30 ea. |

**DISK  
WORLD!**

Authorized Distributor  
Information Processing  
Products



# PRINTER RIBBONS:

at  
extraordinary  
prices!

Brand new ribbons, manufactured to Original Equipment Manufacturer's specifications, in housings. (Not re-inked or spools only.)

**LIFETIME WARRANTY!**

|                 |                        |
|-----------------|------------------------|
| Epson MX-70/80  | \$2.70 ea. + 25¢ Shpg. |
| Epson MX-100    | \$4.08 ea. + 25¢ Shpg. |
| Okidata Micro83 | \$1.37 ea. + 25¢ Shpg. |
| Okidata Micro84 | \$2.98 ea. + 25¢ Shpg. |

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WORLD!**

# DISKETTE STORAGE CASES

**AMARAY MEDIA-MATE 50: A REVOLUTION  
IN DISKETTE STORAGE**

Every once in a while, someone takes the simple and makes it elegant! This unit holds 50 5 1/4" diskettes, has grooves for easy stacking, inside nipples to keep diskettes from slipping and several other features. We like it!

**\$9.69** ea. Shpg. + \$2.00

**DISKETTE 70 STORAGE: STILL A GREAT BUY.**

Dust-free storage for 70 5 1/4" diskettes. Six dividers included. An excellent value.

**\$9.95** ea. Shpg. + \$3.00

**DISK CADDIES** The original flip-up holder for 10 5 1/4" diskettes. Beige or grey only.

**\$1.65** ea. + 20¢ Shpg.

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**DISK  
WORLD!**

The value leader in  
Computer supplies  
And accessories.



the IBM family, I would have to tackle the monumental task of transferring all of my CP/M *WordStar*, *dBASE II*, and *SuperCalc* files to MS-DOS.

Data conversion, even between two popular operating systems, is no trivial pursuit. In the past, the computing pioneer had to rely on expensive media conversion companies or send files from the old system to the new one via modem—a risky venture given the challenges posed by transmitting 8-bit files.

Don't put off joining the MS-DOS club any longer. *Media Master Plus* from Intersecting Concepts

can easily bridge the gulf between nearly 43 different microcomputers (using 5-inch, double-density disks), over 70 operating systems, and the PC. But this span isn't solely for one-way traffic. You can just as easily convert Epson QX-10 files for a Superbrain. Better still, *Media Master Plus* will retain a word processing file's original document formatting. Thus, if you transform a CP/M *WordStar* file into its MS-DOS equivalent, control characters, dot commands, carriage returns, and so on are retained.

*Media Master Plus* is a breeze to operate, being fully menu-driven and packed with prompts. The program copies files with all your favorite wild-card options, displays

directories, erases, or displays files a screen at a time. A submenu allows creating, changing, and removing subdirectories, on both the source and target disks. This proved particularly handy when I copied files from one floppy disk to several directories on my XT's hard disk.

Another nicety is the program's ability to emulate Osborne, Kaypro, and Zenith CP/M. CP/M software crawls in these ersatz environments, and any program that makes hardware calls will grind to a halt, but there are situations

(continues)

## Hard Disk and Tape Back-Up SubSystems for the IBM PC/XT, PC/AT and Compatibles

Order Today, Don't Miss These Great Prices:

- 30 MB Int. Hard Disk **\$795.00\***
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- 60 MB Int. Tape **\$825.00**
- 60 MB Ext. Tape **\$995.00**
- KELLECO Subsystem **\$1895.00**  
60 Meg Tape Back-Up & 30 Meg Hard Disk

\*Subtract \$100 from above prices for IBM AT since controller card is not required with this configuration.



**KELLECO  
TECHNOLOGIES**

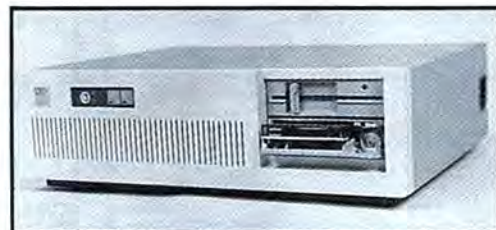
7 South La Grange Road  
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(312) 352-4001

Kelleco Technology subsystems are completely tested and formatted with DOS 2.1. Each includes tape and/or hard disk controller, cables, installing hardware, software, manuals and One Year Warranty. Other sizes and cabinets available.



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To place an order or for more information, call (312) 352-4001 between 7:00 AM and 7:00 PM CST. Visa, Master Card, Certified Checks, Money Orders and pre-pay by check accepted. Our 30 day money-back guarantee assures your satisfaction.



Circle 395 on reader service card



# How does WordPerfect top 4.0? Extra credit.

## WordPerfect 4.1 Performance Report

*A  
+5 extra  
points*

A lot of people have been saying a lot of good things about WordPerfect, lately. In fact, our 4.0 version has been called the industry standard for word processing.

Of course, our first reaction was smiles all around (and a celebration or two). Our second reaction? Back to work on WordPerfect. Not because it isn't already a great program. But because the one thing that has made WordPerfect a success is our commitment to constant improvement. Reaching for perfection.

The latest result of that commitment is WordPerfect 4.1. And with several new features, it scores more than a few extra points.

### *1. Thesaurus*

With a built-in thesaurus, WordPerfect 4.1 lets you choose synonyms for any words in your document.

### *2. Split Screen*

By splitting the screen

horizontally, you can view two documents at the same time. And editing either document or moving text between the two windows is fast and easy.

### *3. Text Columns*

Columns are displayed side-by-side on the screen. In addition to newspaper-style columns, WordPerfect 4.1 includes parallel columns, ideal for scripts.

### *4. Line Drawing*

Horizontal and vertical lines can be drawn and configured to form boxes or other graphic applications. Many available line styles include single, double and asterisks.

### *5. Sort*

WordPerfect 4.1 allows you to sort lines, paragraphs or merge files alphabetically.

Other new WordPerfect 4.1 features include an expanded spelling dictionary, improved

critical error handling, improved proportional spacing, three-level undelete, type-thru and more.

Learn the finer points of word processing. Get WordPerfect 4.1. For more information, call or write:

SSI Software  
288 West Center Street  
Orem, Utah 84057  
Information: (801) 227-4000



**SSI Software**  
Reaching for perfection.



# DataSaver<sup>400</sup>

## Standby UPS

Power protection for the most powerful microcomputer systems with peripherals is here, now, with the 400 Watt DataSaver. Protect your investment in application software and hardware with reliable, continuous power. 90 and 200 Watt capacities and international models are also available. Dealer, O.E.M. inquiries invited.



**Cuesta Systems Corporation**

3440 Roberto Court  
San Luis Obispo, CA 93401

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Write or call 805/541-4160  
Telex 4949381 CUESTA

Circle 50 on reader service card

where running an old 8-bit program might be crucial. *Media Master Plus* also doesn't distinguish between regular and hidden files. So if you need extra disk space, you can erase IBMBIO.COM and IBMDOS.COM—there's no need to resort to assembly language or to reformat the disk.

*Media Master Plus* won't find its way into everyone's library of utilities, but if you have to convert data to or from different systems, its value is clear. This is a straightforward, easy-to-learn, reliable program that delivers what it promises. —Rick Altman

*Media Master Plus, version 1.15*  
*Intersecting Concepts*  
4573 Heatherglen Ct.  
Moorpark, CA 93021  
805/524-5073

List price: \$59.95

Requirements: 128K, one disk drive, one of the following: another floppy disk drive, a hard disk, or a RAM disk greater than 128K

Not copy protected

J. E. Durbin is a Berkeley writer and a former naval aviation maintenance instructor who specialized in bailing out. Karen Dowell is International Editor for PC World Communications. Stephen A. Blumenthal is a Washington, D.C., attorney and vice president and director of regulatory relations for the Securities Industry Association. Rick Altman is the editor of a California sports magazine and a computer consultant living in Hayward, California. ●

## PMS-II PROJECT MANAGEMENT

Optimize time and money with professional planning and control



- Powerful, yet easy to use
- Unlimited multi-level networking
- Interfaces to everything
- Comprehensive reporting system
- Complete time-scaled presentation graphics available
- Full cost control — Planned & Actual
- Comparative scheduling
- Multiple-project resource and materials control add-ons
- Satisfies government specifications
- Time-saving features — Spend more time managing, less time computing.

PMS-II: \$1295, Demo: \$50  
Formatted for PC-DOS, MS-DOS, CP/M-86

NORTH AMERICA MICA, INC.  
**MICA**

5230 Carroll Canyon Road, Suite 110  
San Diego, California 92121

Call for newsletter and free literature: (619) 458-1327

Circle 985 on reader service card



# MathPlan measures up to the leading spreadsheet in every way. Except one.



## High price is not necessarily the measure of a good spreadsheet program.

Just because the leading spreadsheet happens to cost more than twice as much as new MathPlan doesn't mean it is more capable of meeting your needs. In fact, MathPlan has several important capabilities to which the leading spreadsheet simply doesn't measure up.

## MathPlan is fully integrated with WordPerfect.

MathPlan has a close relationship with the most praised word processing program on the market. Budgets, tables and graphs created with MathPlan move easily into WordPerfect documents. And text from WordPerfect moves into your worksheet with equal aplomb.

## MathPlan has graphics flexibility.

Sure, you get great graphics on a color monitor with MathPlan. But if you don't happen to have a color

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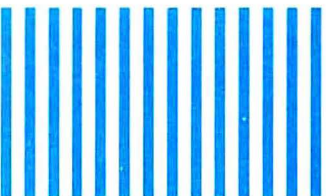
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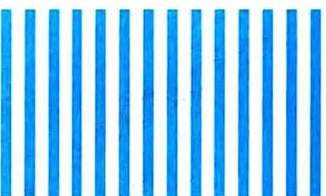
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# From the Hardware Shelf

*PC World offers first impressions of recent hardware releases*

Amqute impresses the bargain squad, Turner Hall's short board lengthens memory, and the Epson Equity I gives the Tandy a run for the money.

*Edited by Eric Knorr*

## Amqute

The name's Thursday—Joe Thursday. It was Friday and raining. My partner and I were working the Saturday computer detail. Our assignment: Cover the computer fair and find the bargains. It was dirty work, but somebody had to do it.

Inside the convention hall I could hear the rain strafe the steel roof. "Joe," said my partner, "I can't decide what to get Gladys for her birthday."

"Tough decision," I replied. My eyes swept the hall. He'd get no help from me—we had work to do.

We started checking booths looking for bargains. There were plenty of candidates. One place was selling XT compatibles by the pound. Buy a power supply, a couple of boards, and take the whole thing home in a brown paper bag. But we were looking for a luggage—something to take on trips and build the biceps at the same time. We looked for hours and found only three Compaqs and an Osborne 1 headed for the museum.

Then it happened. A short guy in a raincoat pushed an orange flier into my hand. "Amqute," I muttered, glancing at the headline.

"Sure you are," said my partner, "but you don't have to make such a big deal about it."

"No. Amqute. It's a computer. One hundred percent IBM compatible," I read. "Smaller and lighter than a Compaq, 704K on the motherboard, 120-watt power supply. Serial port for a modem. Parallel port for a printer. RGB port for an external color monitor. Four expansion slots." Then I stopped short. "You'd better take a look at this," I said.

"\$1395 with two drives, \$1995 with a 10MB hard disk, \$2195 with

a 20MB hard disk," read my partner, his voice quavering a little. "Looks like a Code 3."

We were at the booth in minutes. An Amqute sat there looking like a Compaq had given birth. Same off-white molded plastic case over a steel frame. Same slide-open panels on the sides. Shock-mounted and sturdy like the Compaq.

But there were some big differences. The Amqute had half-height drives and function keys along the top of the keyboard, making the machine a good five inches narrower than a Compaq. Probably fit

*(continues)*





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# EnGarde™

A product of Systems Control, a division of M.J. Electric, Inc.

Circle 167 on reader service card



A bonus for bargain hunters, the Amqute features a diminutive Compaq-like design.

under an airline seat. And there was a nice big hole behind one of the side panels for stowing the power cord. You have to push and shove the Compaq's cord to store it.

"Amqute for real?" I asked.

"Whatever you say," replied the lady in the booth, "but I wouldn't make such a big deal out of it if I were you."

"Just the facts, ma'am," I said.

"Everything we say and more. Guaranteed 48-hour turnaround on factory warranty service, at least \$500 to \$1000 cheaper than a Compaq, 6 pounds lighter, and the extra memory and serial port don't even take up a slot."

"What about compatibility?" I asked.

"Great," she said, "but don't take my word for it. The guy standing behind you is Karl Warner. He's from the Software Centre in Sunnysvale, and they use Amqutes as demonstration machines."

I whipped around and lobbed Warner the obvious question:

"What's your line on Amqute?"

"A real performer," he replied. "We've tried over 500 programs on it, and they all run without a hitch. Of course, there's no IBM BASIC so you have to get GW BASIC or one of the other generics."

"Sounds too good to be true," I said, pulling a box of killer software from my holster. "Suppose we take a look."

I tried *Flight Simulator 1-2-3* release 2. *Symphony 1.1*. *SideKick*. You name it, Amqute played it. Even the IBM diagnostic routine ran with only a few error messages. But compatibility has a price. Amqute's medium resolution version of the IBM Color/Graphics Adapter is one place where the machine pays through the nose. You do get graphics, and you can choose between amber and green screens, but the text lacks the crisp characters of a Compaq or IBM Monochrome Display.

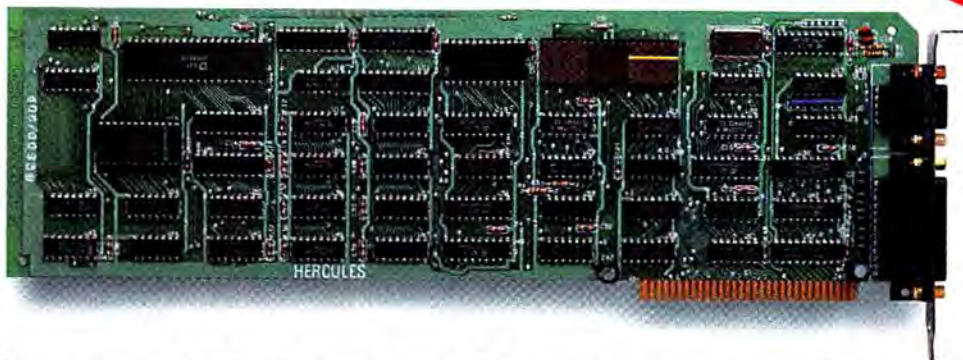
I didn't like the keyboard either. It had that mushy feel of an old Compaq. So I asked the lady with all the answers if she could take care of my problems.

"Easy," came the reply. "You can use a Hercules or other high-res card to drive an external monitor, and for \$30 we'll hook up any IBM-compatible keyboard your heart desires. When you want portability, just plug in the keyboard that comes with the machine."

(continues)



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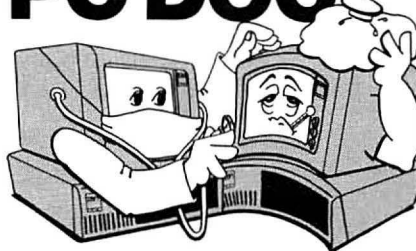
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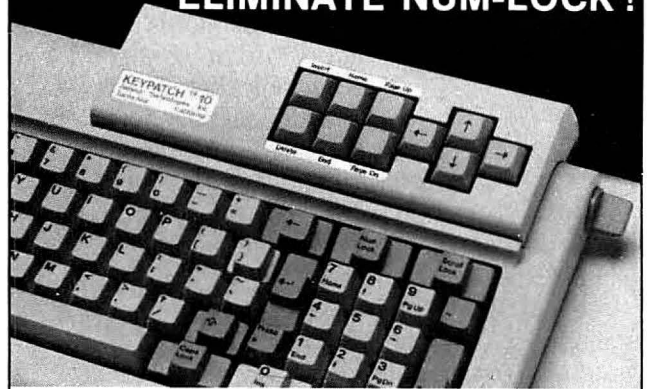
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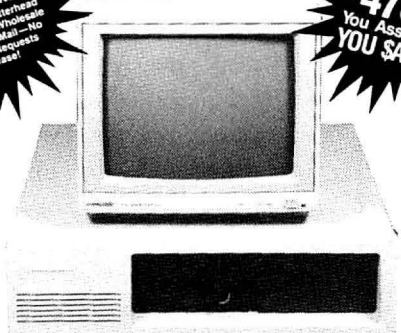
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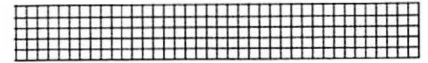
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## From the Hardware Shelf



"How about I get Gladys an Amqute for her birthday?" asked my partner as we walked away.

"Don't think so," I replied.  
"What would a dog do with a computer?" —Andrew Williams

### *Amqute*

*Amqute Computer Corp.  
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408/559-0781*

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*(continues)*



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The Epson Equity I's low cost, reliable support, and exceptional IBM compatibility make it a hot contender.

compatibility problems, the Equity I has all the makings of a strong competitor.

The Equity I is an attractive machine, considerably smaller than an IBM PC and, like its printer cousins, housed primarily in plastic. Setting up the machine involves removing the cover with a Phillips screwdriver to install either a monochrome or a color video display board, plus any other desired boards. Only the removable top cover and internal struts are metal.

The two half-height 360K 5¼-inch floppy disk drives are mounted one atop the other on the front of the system unit. Three flip-down plastic doors on the front panel conceal the power switch, the keyboard connector, and a conveniently located set of system switches that let you select the RAM size, one or two floppy drives, the parallel or serial port, and a color or monochrome 40- or 80-column display. Behind one of these doors you'll also find a handy system reset switch, which provides a one-button alternative to <Ctrl>-<Alt>-<Del>.

The motherboard comes with 256K of RAM, built-in serial and parallel ports, and a connector for a small 256K memory expansion

board. Because the floppy disk drive controller is built into the motherboard, you could boost the machine to 512K and have two out of a total of three expansion slots free (only the video display board would take up a slot). But if you want more memory, you'll have to sacrifice another slot.

Another expandability issue is the Equity I's power supply. At 53 watts (10 less than the IBM PC), the machine might seem underpowered. But thanks to its efficient CMOS circuitry, the Equity I draws quite a bit less power than the IBM PC, leaving enough for Epson's 20MB hard disk plus an Intel AboveBoard with 2MB of RAM. All things considered, the Equity I's power supply limitations are roughly equivalent to those of the PC.

The Equity I's disk drives connect to the computer in an unusual way, which precludes the possibility of installing anything but Epson drives. More important, they don't work like an IBM PC's drives. Although running popular programs such as *Microsoft Flight Simulator*, 1-2-3 release 2, and

(continues)



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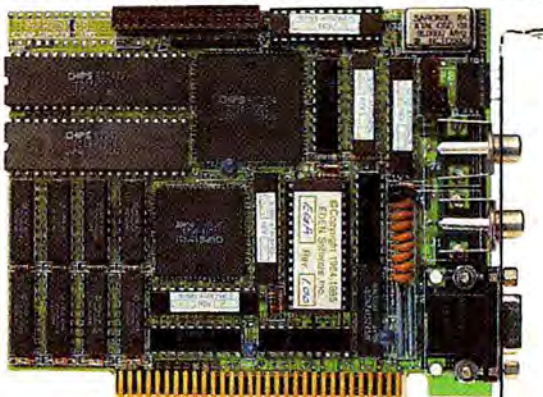
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## From the Hardware Shelf



*Framework II* was not a problem, I had difficulty with my favorite conversion utilities, *CrossData* and *Uniform*. These programs bypass normal MS-DOS routines to read and write files into or out of formats used by non-MS-DOS machines. And many games (and even some business software) use peculiar formatting as a crude form of copy protection, so you may want to make sure the Equity I's disk drives aren't befuddled by your favorite package. However, *WordStar*, *TopView*, *SideKick*, *Ready*, *Smartcom II*, *Microsoft Access*, *Jet*, *Pop-Up DeskSet*, *TenKey*, *Vdisk*, *SuperKey*, and a number of public-domain MS-DOS utilities all ran successfully.

The Equity I's keyboard is actually an improvement on IBM's. It has a firm, snappy response, a PC AT-style layout with enlarged <Shift> and <Enter> keys, and a slight separation between the numeric keypad and the rest of the keyboard.

The monochrome monitor is crystal clear and rock solid; the nonglare green screen is perfect for word processing. But the phosphor's persistence (the time it takes an image to fade from the screen) is as long as a Compaq's. While this reduces flicker to zero, the ghosting makes scrolling text nearly impossible to read.

Besides GW BASIC and the standard MS-DOS utilities, the Equity I is bundled with several programs designed to make the machine easier to use. One program, *Xtree*, is a DOS shell that enables you to

(continues)



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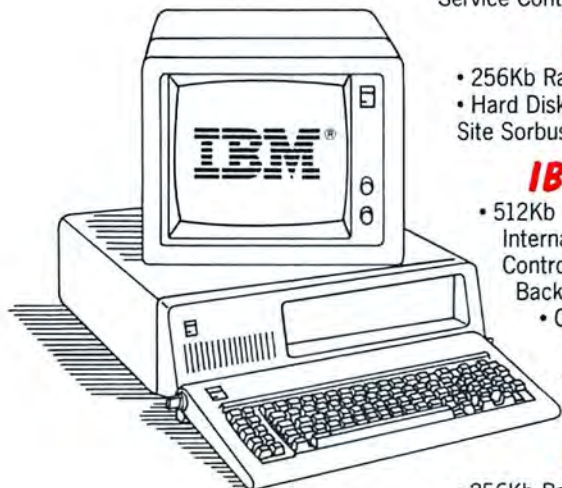


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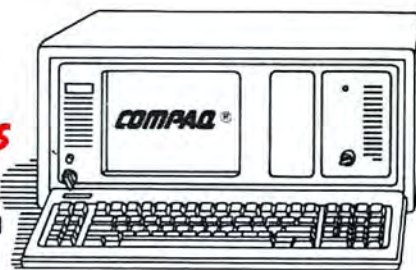
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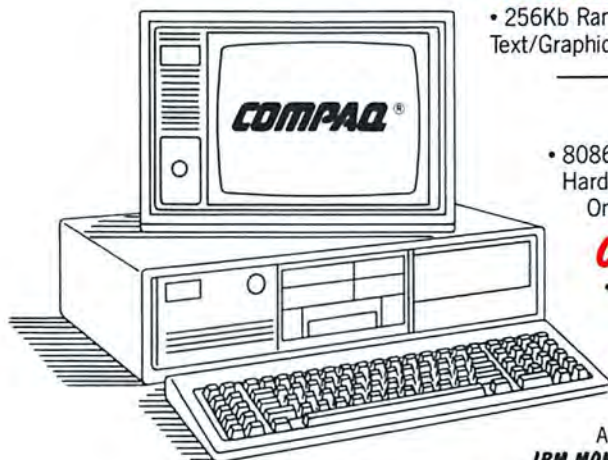


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| Cobol Compiler (MS)    | 399   |
| Business Basic (MS)    | 309   |
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Like the engineers who went out and built the TVA after hearing their supervisors bellow, "Damn it all!" the engineers at Turner Hall Publishing must have heard their boss exclaim, "Keep it short!"

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The package includes the utilities normally supplied with multifunction boards: a clock driver, a RAM disk, and a print spooler. Also on disk are two text files that explain how the RAM disk and spooler work.

An informal test of the print spooler yielded fairly typical results. It took about 5 minutes for an Okidata 92 printer to print a 36K document, but you could start using the computer for other tasks about 25 seconds into printing.

Expansion board installation usually requires some jumper and

DIP switch fiddling, and the Turner Hall Card is no exception. Because your system's motherboard must contain the maximum possible memory for the Turner Hall Card to function, you may also have to buy and install a few more chips.

In a "less is more" world dominated by marketers of semiconductors and NutraSweet, the Turner Hall Card's diminutive dimensions take nothing away from its performance. This product goes a long way toward setting a new price standard in multifunction boards.

—Robert Nusbaum

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*Andrew Williams is a Contributing Editor for PC World and the author of several books on PC software. Mark Haas is editorial director of Osborne/McGraw-Hill. Robert Nusbaum is a freelance writer and programmer based in Grand Rapids, Michigan. ●*

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*Edited by Steven Cook*

### Hard Disk Elbowroom

If you're a PC XT user who works with DOS 3.10, you may have more room to rattle around your hard disk than you thought. While it's impossible to physically enlarge a hard disk, you can reduce the average file size by at least 1024 bytes. If, for example, your disk contains 500 files, you can gain access to as much as half a megabyte of otherwise unused space.

This recovery trick is possible because of the way DOS allocates disk space. Space on a disk consists of many sectors, each 512 bytes in size. DOS apportions that space in chunks called clusters. A cluster is made up of one or more sectors; DOS sets the number of sectors per cluster when the disk is formatted. In DOS version 2.xx the cluster size for a 10MB disk is eight sectors (4096 bytes). Thus, a file containing only one character will occupy 4096 bytes of disk space, and a file 4097 characters long will occupy two clusters—that is, 8192 bytes.

DOS versions 3.00 and later reduce the number of sectors per cluster to four—provided you have a 20MB disk. The cluster size for a 10MB disk remains set at 4096 bytes.

Reducing the cluster size from 4096 to 2048 bytes will trim 2048 bytes off all files whose last cluster is less than half full. On the average, half your files probably have a half-full (or less) last cluster. If your disk is littered with short files (that is, less than 2048 bytes), the savings is even greater.

In following my procedure to change the cluster size of your disk, you must use DOS 3.10, not version 3.00. First, display a directory of your hard disk and note

the amount of available space. Because adjusting the cluster size involves erasing all the files on your disk, back up the entire disk.

When you've concluded the backup, put the original DOS 3.10 disk into the floppy disk drive and start or restart the computer. Do not use a copy of the DOS disk unless you are certain it has not been modified.

Run the FDISK program to create a DOS partition on the hard disk, then format the hard disk using the FORMAT command. Do not use the /V or /S options.

When formatting is complete, place the DOS Supplemental Programs disk into the floppy drive and enter the commands listed in DISKSIZE, pressing <Enter> at the end of each line and substituting the appropriate hard disk drive number for *n*—drive B: is 1, drive C: is 2, drive D: is 3, and so on.

Next, insert the DOS 3.10 disk into the floppy drive and press <Ctrl>-<Alt>-<Del> to restart the computer. Format the hard disk again, but this time specify the /S option to transfer DOS to that disk. You may also use the /V option to assign a volume label.

Finally, reload your files onto the hard disk from the backup you made. *Do not* reload files IBMBIO.COM and IBMDOS.COM (called IO.SYS and MSDOS.SYS on some PC compatibles), because they'll be placed in the wrong location, forcing you to reformat the hard disk and start over. If your backup contains a version of COMMAND.COM other than DOS 3.10, do not re-

*(continues)*



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Circle 31 on reader service card



```
A>DEBUG
-L 0 n 01
-E 0D
xxxx:000D 08.04
-E 16
xxxx:0016 08.15
-W 0 n 01
-Q
```

## DISKSIZE

load it, either. If you are relying on the RESTORE command, you can use the /P option, which prompts you before any system files are reloaded.

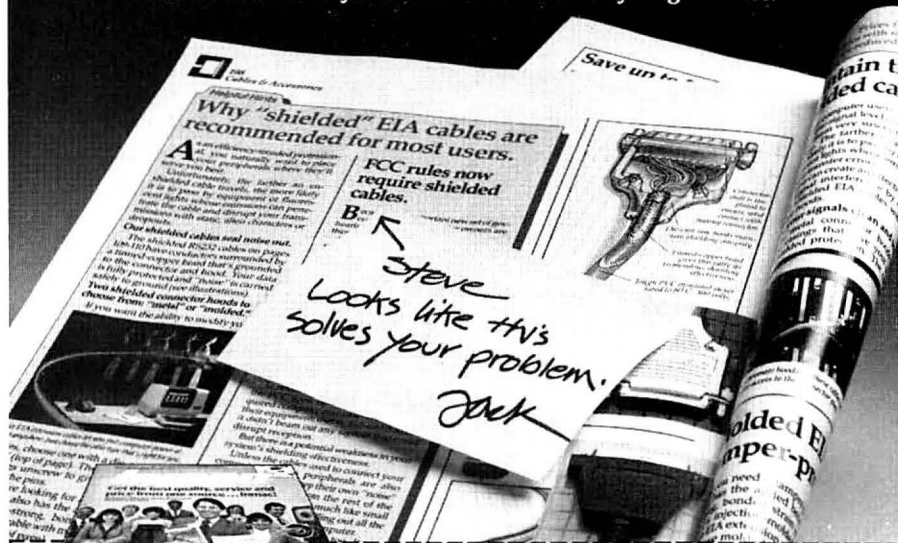
Now remove the last backup disk and restart the computer from the hard disk. You should see a significant increase in the amount of available space.

Bill Todd  
Palatine, Illinois

*Editor's note: Remember, this procedure applies only to 10MB disks; DOS 3.10 automatically formats 20MB disks with 2048-byte clusters. If your hard disk contains any copy-protected software, be sure to "uninstall" it before you begin this process. Note that DOS 3.10 was expressly designed to use the larger cluster size on 10MB disks. Without probing the reason for that design decision, you should consider that implementing a smaller cluster size might conflict with some existing or future products.*

(continues)

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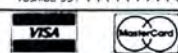
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### For Environmentalists

I generally find that DOS provides an insufficient amount of environment string space for my needs. [Environment string space is a block of memory that DOS reserves to hold names and parameters, such as  
COMSPEC = *parameter*,  
PATH = *parameter(s)*, and  
PROMPT = *parameter(s)*.  
This arrangement enables all DOS commands and applications to be "aware" of the current status of the environment (see the SET command in the DOS manual).] In the past I have patched COMMAND.COM to expand that space, but DOS 3.10 includes an undocumented parameter that does the job more efficiently.

That parameter is /E:*mm*, where *mm* is a decimal value indicating the number of 16-byte paragraphs to be allocated as environment space. The minimum value permitted is 10 (160 bytes), the maximum 62 (992 bytes).

To use this feature, put the statement

```
SHELL=[d:][path] COMMAND-  
.COM /P/E:mm
```

into the CONFIG.SYS file on your DOS disk. [d:] and [path] represent the disk drive and path you want DOS to use when loading COMMAND.COM, and *mm* represents the desired number of 16-byte paragraphs to be allocated to environment space.

When you start the computer, the SHELL command will load COMMAND.COM using the /E parameter to allocate the specified amount of environment space and

(continues)



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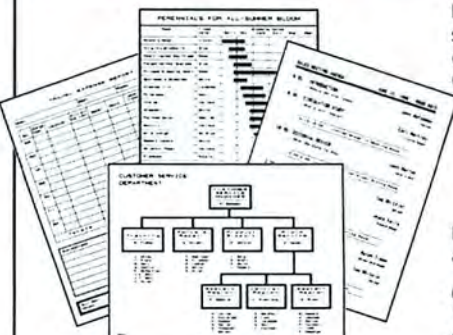
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the /P parameter to make COM-MAND.COM the primary command processor.

Note that if you specify an invalid number of paragraphs, you will not receive an error message; the allocation simply will not take place.

Brenda Santo  
San Jose, California

*Editor's note: This is an undocumented feature—use it with caution.*

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(continues)



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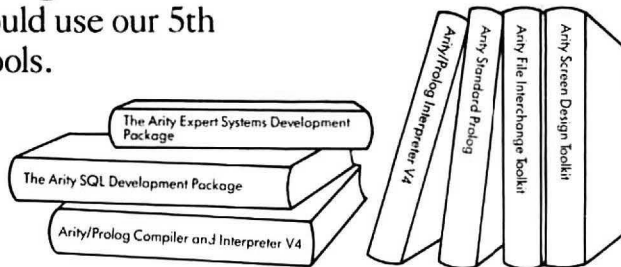
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mand and the pipe symbol (|) that precedes it.

Whenever I need information about a particular utility, I simply type DOC followed by the program's name. For example, I type DOC WHEREIS to view on-line documentation for WHEREIS.COM.

D. H. Kaye  
 Tempe, Arizona

## dBASE Defect

Version 1.1 of *dBASE III* has a problem that could result in the loss of significant amounts of data. When the SET CARRY ON condition is in effect and records are APPENDED to the end of a file, the image of the last record is copied into the appended record. If, however, the last record has its delete flag set on, the delete flag on the appended records will be set on as well. When the data base is PACKED, all the new records will be removed from the file because they are flagged for deletion.

There's no logical reason to flag records for deletion while they are being added to the data base, so I consider this a bug.

The problem also exists when you use the INSERT command but does not occur when you issue the APPEND FROM filename command.

David Brown  
 Greensboro, North Carolina

Editor's note: Ashton-Tate advises that you use the SET CARRY ON and APPEND commands with caution to avert potential data

(continues)



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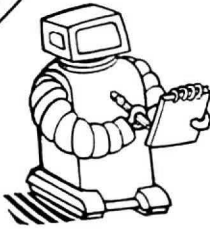
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The format of the LIST command is  
LIST [d:][filename][.ext]  
where d: is an optional drive specification, filename is an optional file name, and .ext is an optional extension. You may use the characters \* and ? as wild cards to specify a group of files. Because the file name and the extension are separate options, you may specify either, both, or neither. LIST will display each file name matching your specification, then wait for your instruction. With each

(continues)



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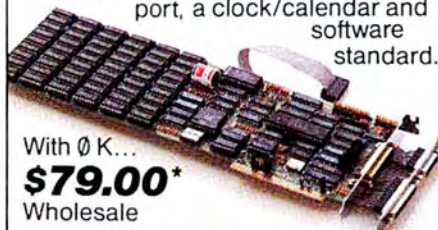
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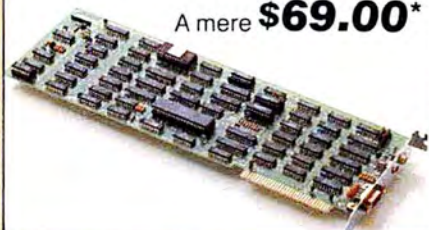


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| Ryan McFarland RM COBOL (Dev. System)           | 520.00*    |
| Sanna Sanna - Word Processor                    | 340.00*    |
| Satellite Software Word Perfect                 | 360.00*    |
| Softcraft Fancy Fonts                           | 125.00*    |
| Softstyle SET-FF                                | 35.00*     |
| Software Arts TKI Solver                        | 200.00*    |
| Software Group Enable                           | 195.00*    |
| Software Publishing PFS: File, Write, Graph     | 68.00*     |
| Software Publishing PFS: Report                 | 64.00*     |
| Sorcim Supercalc II                             | 169.00*    |
| Xanadu Ability                                  | 247.50*    |

### HARDWARE

(Please add shipping and handling charges found in italics next to price.)

| Wholesale                                                                                                                                                | Wholesale           |
|----------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|
| Apple Macintosh Base System                                                                                                                              | CALL                |
| Apple Apple IIe                                                                                                                                          | CALL                |
| Apple IIe                                                                                                                                                | CALL                |
| AT&T 6300 PC CPU2                                                                                                                                        | CALL                |
| 128K/2 Floppy 1 Serial/1 Parallel                                                                                                                        | \$1,575.00* (34.02) |
| Columbia Desktop & Portable Systems                                                                                                                      | CALL                |
| COMPAQ Hard Disk Portable                                                                                                                                | CALL                |
| 10MB Hard Disk 1 Floppy 26K                                                                                                                              | 2,446.00* (61.11)   |
| COMPAQ DeskPro Tape Backup System                                                                                                                        |                     |
| w/64K/1 Floppy/10MB Hard Disk                                                                                                                            |                     |
| 10MB Tape Drive Monitor                                                                                                                                  |                     |
| IBM PC Base System 2050D/10C/256K                                                                                                                        | 1,325.00* (26.62)   |
| IBM PC Professional Hard Disk                                                                                                                            | 1,985.00* (36.40)   |
| IBM PC/AT AT Base Unit                                                                                                                                   | 2,795.00* (60.33)   |
| IBM PC/AT Base Unit—1 2MB Floppy 256K                                                                                                                    |                     |
| Texas Instruments Professional                                                                                                                           | CALL                |
| Apparat AT Ram Expansion Card                                                                                                                            | \$139.00* (2.50)    |
| AST SixPakPlus™ w/64K                                                                                                                                    | 195.00* (2.50)      |
| AST I/O Plus II                                                                                                                                          | 120.00* (2.50)      |
| AST Advantage for AT                                                                                                                                     | 355.00* (2.50)      |
| PC Network 512K Memory Board w/6K                                                                                                                        | 65.00* (2.50)       |
| PC Network The Multi-384 Board                                                                                                                           | 79.00* (2.50)       |
| A clone of the AST's™ SixPakPlus™. Includes up to 384 Kb of expansion memory, 1 serial, 1 parallel, 1 game port, a clock/calendar and software standard. |                     |
| PC Network I/O Plus II Clock                                                                                                                             | 59.00* (2.50)       |
| See Part Games/Clock Standard                                                                                                                            |                     |
| Quadram Improved QuadBoard w/6K                                                                                                                          | 170.00* (2.50)      |
| Quadram Quadboard Turbo Board                                                                                                                            | 360.00*             |
| Tecmar Captain Multifunction Card/IO                                                                                                                     | 146.00* (2.50)      |

### DISK DRIVES & CONTROLLERS

|                                          |                     |
|------------------------------------------|---------------------|
| Iomega Bernoulli Box Dual 10MB Drives    | \$2,149.00* (46.42) |
| Maynard Maynard System 20 w/CTLR         | 879.00* (18.99)     |
| Forcible 20MB Tape Backup System         |                     |
| Panasonic Half Height DS/DD Drive Pair   | 145.00* (3.10)      |
| PC Network 1MB INTERNAL 1/2 Height       | 340.00* (7.34)      |
| Autoboot Drive: New lower price          |                     |
| Drives by Shugart                        |                     |
| PC Network 20MB INTERNAL 1/2 Height      | 400.00* (8.64)      |
| Drives by Seagate: Microscience or CM    |                     |
| PC Network 10MB Tape Backup              | 395.00* (9.48)      |
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| PC Network Half Height DS/DD Drive       | 59.00* (1.27)       |
| Tandon TM 100-2 Full Height DS/DD Drive  | 93.00* (2.20)       |
| Tallgrass 25MB External Hard Disk        | 2,250.00* (48.60)   |
| with 60MB Tape Backup                    |                     |
| Teac FD 55-B Half Height DS/DD Drives    | 80.00* (1.73)       |
| Teac 1 2MB Half Height Disk Drive for AT | 110.00* (2.40)      |

### MEMORY CHIPS

|                                   |              |
|-----------------------------------|--------------|
| 64K Memory Upgrade Kits (4 chips) | 9.00* (1.00) |
| 64K Dynamic Ram Chips (Each)      | 1.00* (1.00) |
| 128K Dynamic Ram Chips (Each)     | 2.00* (1.00) |
| 128K AT Mother Board Chips (Each) | 5.50* (1.00) |

### MODEMS

|                                      |                  |
|--------------------------------------|------------------|
| Anchor Signamax Express              | \$205.00* (5.00) |
| Everex Evercom II w/Windows software | 119.00* (4.50)   |
| Short Slot Hayes Compatible Modem    |                  |
| Hayes Smartmodem 300                 | 125.00* (5.00)   |
| Hayes Smartmodem 2400                | 525.00* (5.00)   |
| LATEST IN COMMUNICATION TECHNOLOGY!  |                  |
| Hayes Smartmodem 1200B with new      | 312.00* (2.50)   |
| Smartcom III VT 100 Emulator         |                  |
| Hayes Smartmodem 1200B Alone         | 265.00* (2.50)   |
| Hayes Smartmodem 1200                | 340.00* (5.00)   |
| Prometheus Promodem 1200             | 276.00* (6.00)   |
| External 100% Hayes Compatible       |                  |
| U.S. Robotics Password               | 195.00* (4.00)   |
| LOWEST PRICE 1200BPS Modem!          |                  |
| U.S. Robotics Courier 2400BPS Modem  | 395.00* (5.00)   |

### MONITORS

|                                          |                  |
|------------------------------------------|------------------|
| Amdek Video 300G Composite Ureent        | \$110.00* (3.00) |
| Amdek Video 300A Composite Amber         | 120.00* (3.00)   |
| Amdek Video 310A IBM Type Amber          | 130.00* (3.00)   |
| Amdek Color 300 (NEW) Composite          | 215.00* (4.64)   |
| Amdek Color 600 (NEW) High Res RGB       | 365.00* (7.88)   |
| Amdek Color 1200 (NEW) Ultra High Res    | 455.00* (9.93)   |
| Amdek Color 710 (NEW) 700 w/IBM          | 475.00* (10.48)  |
| Glare/Long Phosphor                      |                  |
| Princeton MK 12 Monitor                  | 399.00* (8.60)   |
| Princeton MAX 12E                        | 156.00* (5.00)   |
| Supports Either Mono or RGB Cards        |                  |
| Princeton SR 12 Ultra High Res RGB       | CALL             |
| Quadram Quadchrome II NEW                | 289.00* (6.24)   |
| 640x200 RGB w/14" Screen!                |                  |
| Black Phosphor Mask/IBM Case             |                  |
| Magnavox 12" TTL IBM Type Amber          | 85.00* (5.00)    |
| A great looking performing monochrome    |                  |
| Tascan 640 Highest Res (720 x 400)       | 495.00* (10.69)  |
| Currently Available—Works with Persyst   |                  |
| BOB Card                                 |                  |
| Zenith ZVM 1204 Green High Res/Non Glare | 81.00* (2.50)    |

### PRINTERS

|                                         |                   |
|-----------------------------------------|-------------------|
| Citizen MSP-10 NEW!                     | \$ 265.00* (5.72) |
| 160CPS/80CPL/11" w/Trac                 |                   |
| Citizen MSP-15 NEW!                     | 350.00* (7.56)    |
| 160CPS/132CPL/11" w/Trac                |                   |
| Citizen MSP-25 NEW!                     | 499.00* (10.76)   |
| 200CPS/132CPL/11" w/Trac                |                   |
| Citizen Premier 35 NEW!                 | 385.00* (8.32)    |
| 35CPS/132CPL/11" w/Trac                 |                   |
| Epson LK-80 100CPS/80CPL/11" w/Trac     | 199.00* (4.30)    |
| Epson FX-85                             | 299.00* (5.46)    |
| Epson FX-286 NEW!                       | 459.00* (9.91)    |
| Epson LQ-1600 NEW! 180 CPS/60 CPS NLQ   |                   |
| Epson SLD-2000 NEW! Inkjet Printer      | 1,350.00* (29.35) |
| 100CPS LQ Model 1170CPS Draft/132CPL    |                   |
| NEC 7050 200CPS Letter Quality Printer  | 605.00* (13.00)   |
| NEC 7150 33CPS LQ High Res RGB          | 888.00* (19.87)   |
| NEC 7350 33CPS Letter Quality Printer   | 920.00* (19.87)   |
| NEC 8350 55CPS Printer                  | 1,330.00* (28.73) |
| Okidata ML 162 New 120CPS/LQ            | CALL              |
| Mode FRM/IBM Graphics - mono            |                   |
| Okidata ML 192 New 120CPS/160CPS/       | CALL              |
| LQ Model FRM/IBM Graphics               |                   |
| Okidata ML 193 New 120CPS/160CPS/       | CALL              |
| LQ Model FRM/IBM Graphics - mono        |                   |
| Oume Sprint 11/40 40CPS Letter Quality  | 1,155.00* (24.00) |
| Oume IBM Cable and Interface (required) | 72.00* (1.00)     |
| Texas Instruments 855 DP LQ w/Tractor   | 550.00* (11.88)   |
| Toshiba P1340 80CPL/140CPS              | 430.00* (9.29)    |
| Toshiba P351 New! 132CPL/288CPS         | 975.00* (21.06)   |

### VIDEO CARDS

|                                                            |                   |
|------------------------------------------------------------|-------------------|
| Everex The Edge Color & Mono Adapter                       | \$ 219.00* (7.50) |
| 100% Hercules Compatible                                   |                   |
| Hercules Color Card w/Parasol Port                         | 142.00* (2.50)    |
| Hercules Monochrome Graphics Cards                         | 263.00* (2.50)    |
| Parasol New Modular Graphics Card                          | 219.00* (2.50)    |
| PC Network Hercules Mono Card Clone                        | 99.00* (2.50)     |
| 100% Hercules Compatible!                                  |                   |
| PC Network Color Card                                      | 69.00* (2.50)     |
| Quadram Quad EGA - Enhanced Graphics                       | 340.00*           |
| Adapter                                                    |                   |
| Peris Bob Card Ultra High Res Color                        | 299.00* (2.50)    |
| Card with Mono Quality Text in Color                       |                   |
| STB The Chautau Color & Mono Card                          | 239.00* (2.50)    |
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|--------------------------------------------------------------|-----------------|
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| DS/DD Bulk Pack Special                                      | 59. ea.         |
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| Guaranteed for Life!                                         |                 |
| PC Network Replacement 130 Watt IBM-PC                       | 70.00* (2.70)   |
| Power Supply—Gives your PC (Did or New) the same             |                 |
| capacity as an AT. Good for add in tape drives (without need |                 |
| for a piggyback unit) and larger capacity disk drives        |                 |
| SMA PC Documents: Keyboard templates for                     | 9.99* (1.00)    |
| Lotus/DATABASE/Multimate and others (Each)                   |                 |
| Sony DS/DD Diskettes                                         | 15.95* (1.00)   |
| Sony AT High Density Diskettes                               | 39.95* (1.00)   |
| WP Printer Paper 2400 Sheets                                 | 17.00* (10.00)  |
| Microfilm Perfs (invisible when torn)                        |                 |

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Circle 340 on reader service card

```
10 DEFINT A-Z:CLS:KEY OFF:DEF FNHEX(X$)=VAL("&h"+X$)
20 LOCATE 3,1:PRINT "X-Maker":READ F$
30 LOCATE 5,1,1:PRINT "Now testing for data errors...please wait";
40 SUM=0:READ LN:IF LN<0 THEN 80
50 READ H$:IF VAL(H$)<0 THEN 70
60 SUM=(SUM+FNHEX(H$))*2:SUM=(SUM\256)+(SUM MOD 256):GOTO 50
70 READ CKSUM$:IF SUM=FNHEX(CKSUM$) THEN 40 ELSE GOTO 170
80 RESTORE:CLS:LOCATE 3,1:PRINT "X-Maker":READ F$
90 LOCATE 5,1,1:PRINT "Press any key except ESC to create ";F$;": ";
100 AS=INPUT$(1):PRINT:IF AS=CHR$(27) THEN END
110 LOCATE 6,1:PRINT "Working...";
120 OPEN F$ AS #1 LEN=1 : FIELD #1,1 AS B$
130 READ LN:IF LN<0 THEN 160
140 READ H$:IF VAL(H$)<0 THEN READ CKSUM$:GOTO 130
150 LSET B$=CHR$(FNHEX(H$)):PUT #1:GOTO 140
160 CLOSE:PRINT:PRINT F$;" has now been created.":END
170 PRINT:PRINT "Error in DATA line";STR$(LN);". ";
180 PRINT "Check your work.":BEEP:END
1000 DATA "A:LIST.COM"
1010 DATA 1,BA,68,02,84,C0,75,74,BE,A4,02,8F,5D,00,B9,08,00,-1,36
1020 DATA 2,80,3D,20,75,02,F3,A4,BF,65,00,B9,03,00,80,3D,20,-1,15
1030 DATA 3,75,02,F3,A4,BA,5C,00,B4,11,CD,21,BA,78,02,84,C0,-1,C2
1040 DATA 4,75,49,B4,0F,CD,10,88,26,B0,02,A0,80,00,04,40,A2,-1,45
1050 DATA 5,B7,02,8E,81,00,BF,94,02,B9,08,00,F3,A4,47,B9,03,-1,9A
1060 DATA 6,00,F3,A4,BA,94,02,B4,09,CD,21,B8,01,0C,CD,21,3C,-1,91
1070 DATA 7,59,74,1E,3C,79,74,1A,BA,B4,02,B4,09,CD,21,BA,5C,-1,49
1080 DATA 8,00,B4,12,CD,21,84,C0,74,C9,CD,20,B4,09,CD,21,CD,-1,29
1090 DATA 9,20,BA,B4,02,B4,09,CD,21,80,01,A2,B1,02,A2,B2,02,-1,0C
1100 DATA 10,BE,81,00,BF,B9,02,B9,08,00,F3,A4,B9,03,00,47,F3,-1,A9
1110 DATA 11,A4,BA,B7,02,B8,00,3D,CD,21,72,13,8B,E8,FC,BA,C6,-1,CB
1120 DATA 12,02,B9,00,10,8B,DD,B4,3F,CD,21,0B,C0,75,08,B4,3E,-1,F9
1130 DATA 13,8B,DD,CD,21,EB,A1,8B,C8,8B,F2,AC,3C,1A,74,EF,24,-1,A2
1140 DATA 14,7F,3C,0D,75,08,C6,06,B2,02,01,90,EB,4D,3C,0A,75,-1,B1
1150 DATA 15,06,FE,06,B1,02,EB,43,3C,08,75,0D,80,3E,B2,02,01,-1,0B
1160 DATA 16,74,38,FE,0E,B2,02,EB,32,3C,09,75,12,8A,26,B2,02,-1,6A
1170 DATA 17,80,C4,07,80,E4,F8,FE,C4,88,26,B2,02,EB,1C,3C,20,-1,A9
1180 DATA 18,72,1E,FE,06,B2,02,8A,26,B2,02,3A,26,B0,02,76,0A,-1,C3
1190 DATA 19,FE,06,B1,02,C6,06,B2,02,01,90,8A,00,B4,02,CD,21,-1,F4
1200 DATA 20,8A,26,B1,02,3A,26,AF,02,72,22,BA,88,02,B4,09,CD,-1,AA
1210 DATA 21,21,B4,07,CD,21,3C,03,74,1C,BA,B3,02,B4,09,CD,21,-1,93
1220 DATA 22,C6,06,B2,02,01,90,C6,06,B1,02,01,90,49,74,03,E9,-1,8F
1230 DATA 23,68,FF,E9,48,FF,E9,56,FF,49,6E,76,61,6C,69,64,20,-1,C2
1240 DATA 24,64,72,69,76,65,0D,0A,24,4E,6F,20,66,69,6C,65,20,-1,A0
1250 DATA 25,66,6F,75,6E,64,0D,0A,24,0D,2D,2D,20,4D,6F,72,65,-1,40
1260 DATA 26,20,2D,20,24,20,20,20,20,20,20,20,2E,20,20,20,-1,2B
1270 DATA 27,20,3F,20,24,3F,3F,3F,3F,3F,3F,3F,3F,18,-1,67
1280 DATA 28,50,01,01,0A,0D,0A,24,20,3A,20,20,20,20,20,20,-1,5E
1290 DATA 29,20,2E,20,20,20,00,-1,51,-1
```

LIST.BAS: Star-Dot-Star's

X-MAKER.BAS configured to  
create LIST.COM

prompt you may cancel the pro-  
gram with <Ctrl>-C, display the  
file by typing Y or y, or bypass it  
by pressing any other key.

Typing LIST without a file name  
or extension will prompt for all  
file names in the current directory.  
A command with an extension but  
no file name (like LIST .LTR) will

prompt for all file names that  
match the extension. If the first  
few characters of a file name are  
followed by an asterisk (such as  
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all file names beginning with those  
letters and ending with any exten-  
sion. To see one file only, type

(continues)



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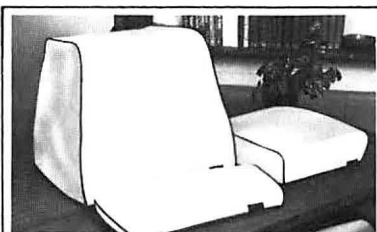
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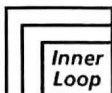
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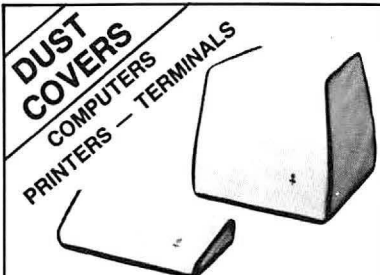
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```
1000 DATA "A:QUERY.COM"
1010 DATA 1,B3,00,BE,81,00,80,3C,0D,74,47,B2,0D,B4,02,CD,21,-1,DD
1020 DATA 2,B2,0A,B4,02,CD,21,46,8A,14,80,FA,0D,74,33,80,FA,-1,C6
1030 DATA 3,40,75,EF,B2,07,B4,02,CD,21,BB,00,00,B4,08,CD,21,-1,0B
1040 DATA 4,3C,61,72,06,3C,7A,77,02,24,5F,43,8A,20,80,FC,0D,-1,CD
1050 DATA 5,74,E7,80,FC,3F,74,0A,3A,E0,75,EF,8A,0D,B4,02,CD,-1,9B
1060 DATA 6,21,B2,0D,B4,02,CD,21,B2,0A,B4,02,CD,21,8A,C3,B4,-1,4A
1070 DATA 7,4C,CD,21,-1,0B,-1
```

### QUERY.DAT, corrected

both its name and extension; for example, LIST XXX.LTR.

LIST.COM does not show any control codes or special characters as it displays the contents of each file, so the text from many word processors will be perfectly legible. If the file is longer than one screen, the "--More--" prompt will appear every 24 lines. You may press <Ctrl>-C to cancel display of that file and move on to the next, or press any other key to see another screenful.

*Clifford J. Vander Yacht  
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### Correction

QUERY.DAT in \*.\* of January 1986 is incorrect. The values that appeared in error are shown here, corrected and shaded. Note also that the valid response characters that follow the @ sign must be uppercase, unlike those shown in January's USERTEST.BAT.

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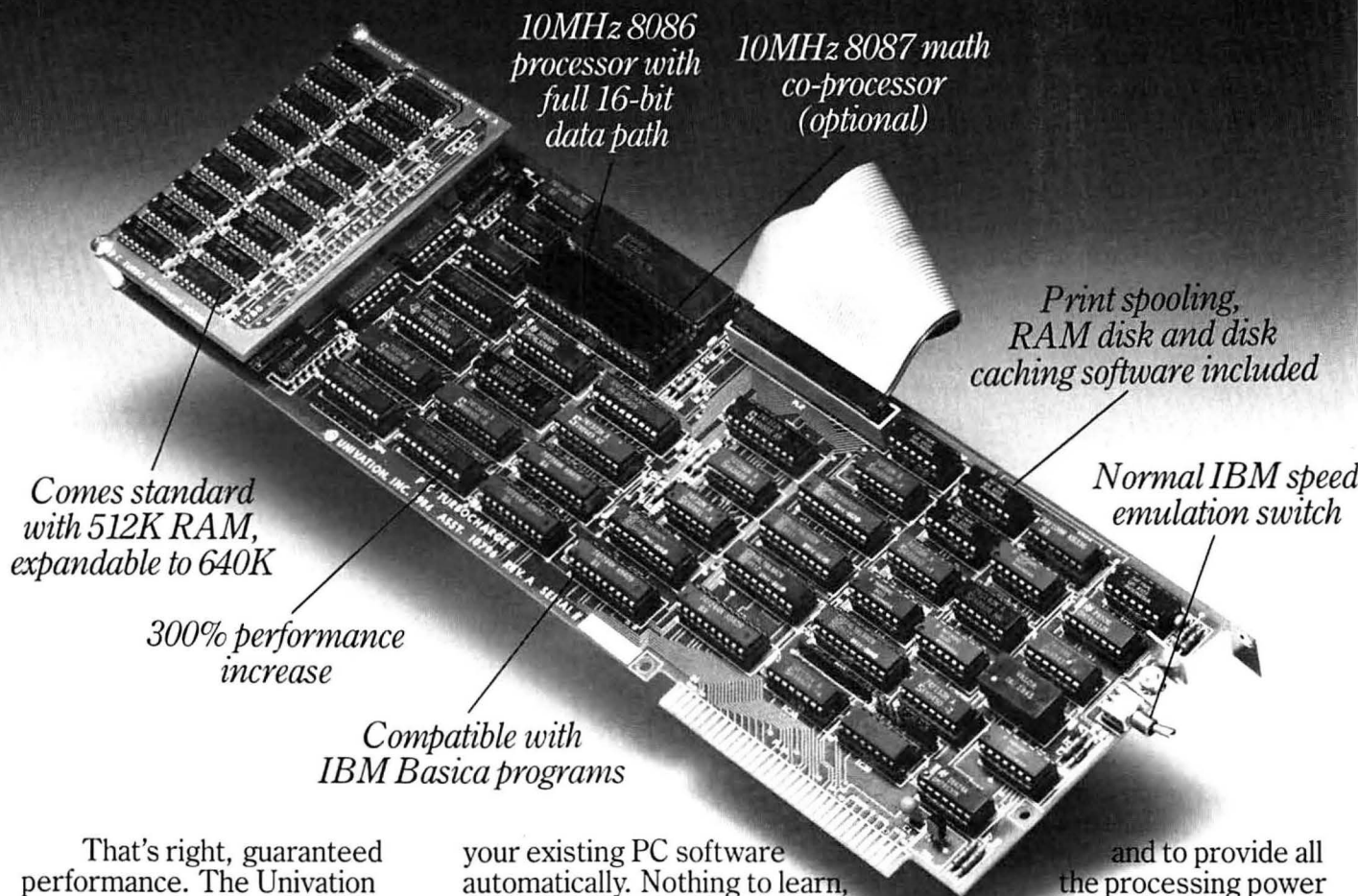
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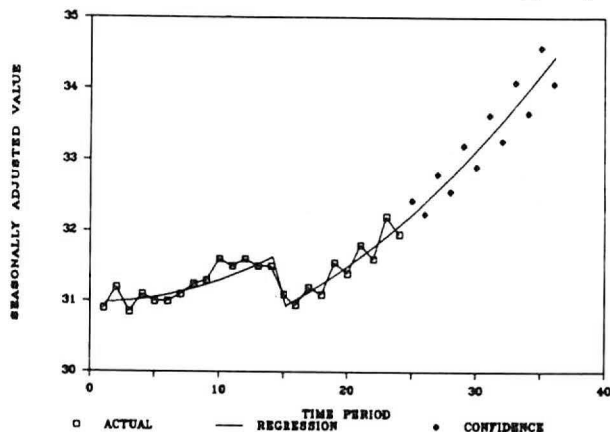
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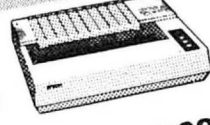
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| 841 | 842 | 843 | 844  | 845 | 846 | 847 | 848 | 849 | 850 | 851 | 852 |
| 853 | 854 | 855 | 856  | 857 | 858 | 859 | 860 | 861 | 862 | 863 | 864 |
| 865 | 866 | 867 | 868  | 869 | 870 | 871 | 872 | 873 | 874 | 875 | 876 |
| 877 | 878 | 879 | 880  | 881 | 882 | 883 | 884 | 885 | 886 | 887 | 888 |
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| 949 | 950 | 951 | 952  | 953 | 954 | 955 | 956 | 957 | 958 | 959 | 960 |
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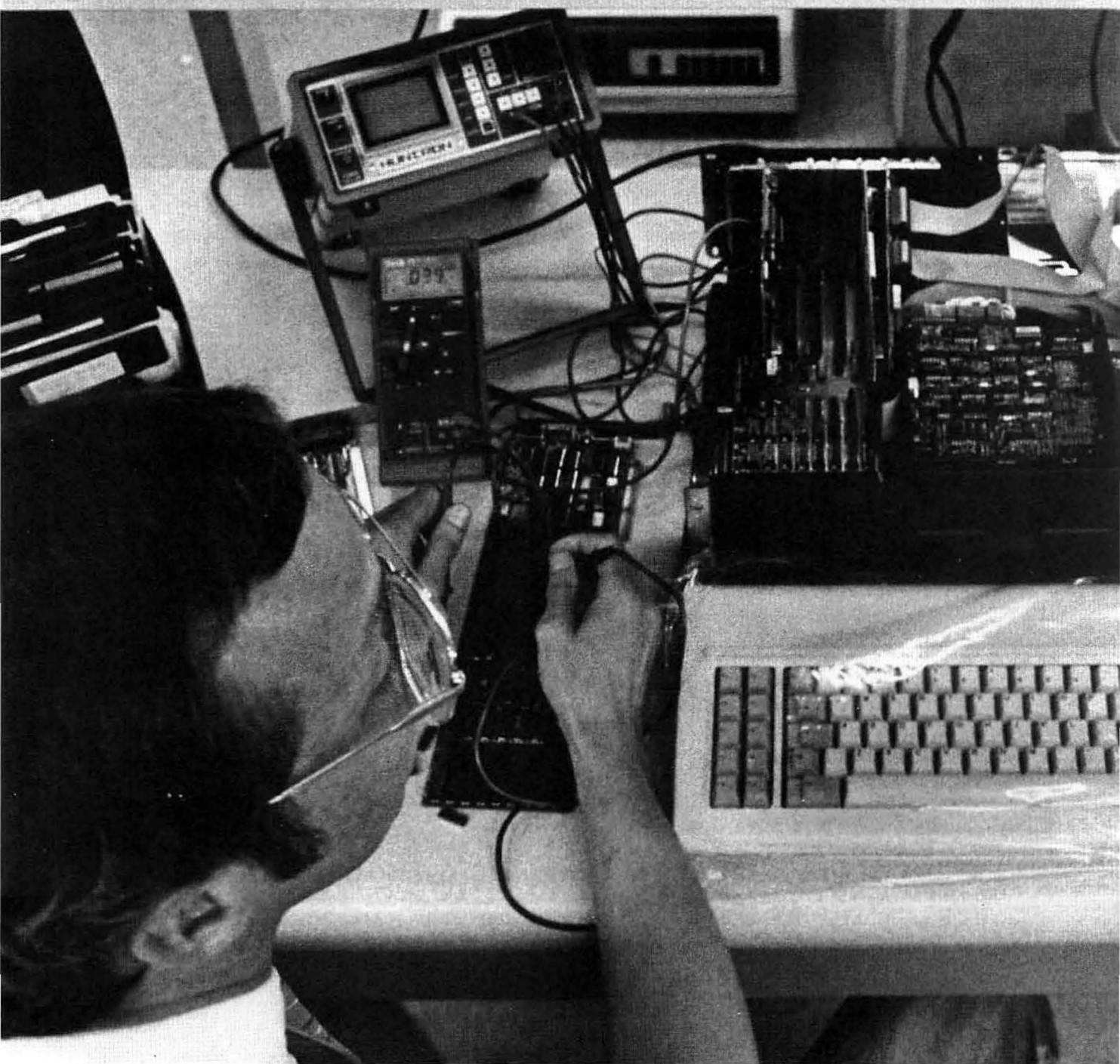
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- **Best for Business**

Hardware and software products tailored to small businesses, including accessible accounting packages.

- **Over-the-Counter**

The emphasis is on retail marketing: strategies for setting up PC-based point-of-sale and mail-order systems. Also, prospecting for customers with a Dun & Bradstreet on-line data base service.

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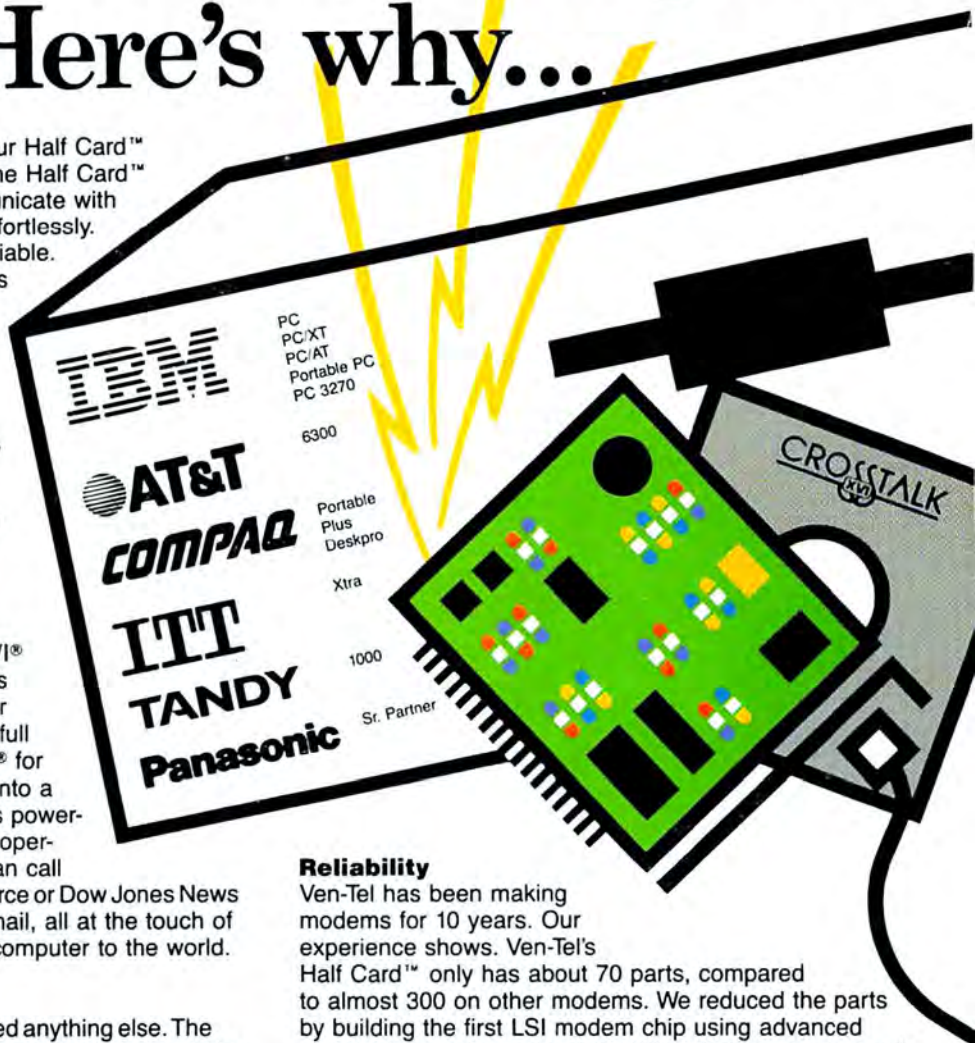
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