COMPUTER
decisions®
MAY 21, 1985
THE MANAGEMENT MAGAZINE OF COMPUTING
A HAYDEN PUBLICATION

MANAGEMENT FADS INSIDE AND OUT

Testing and debugging software

The mighty mux

Recycling micros

The first smart terminal under $400.

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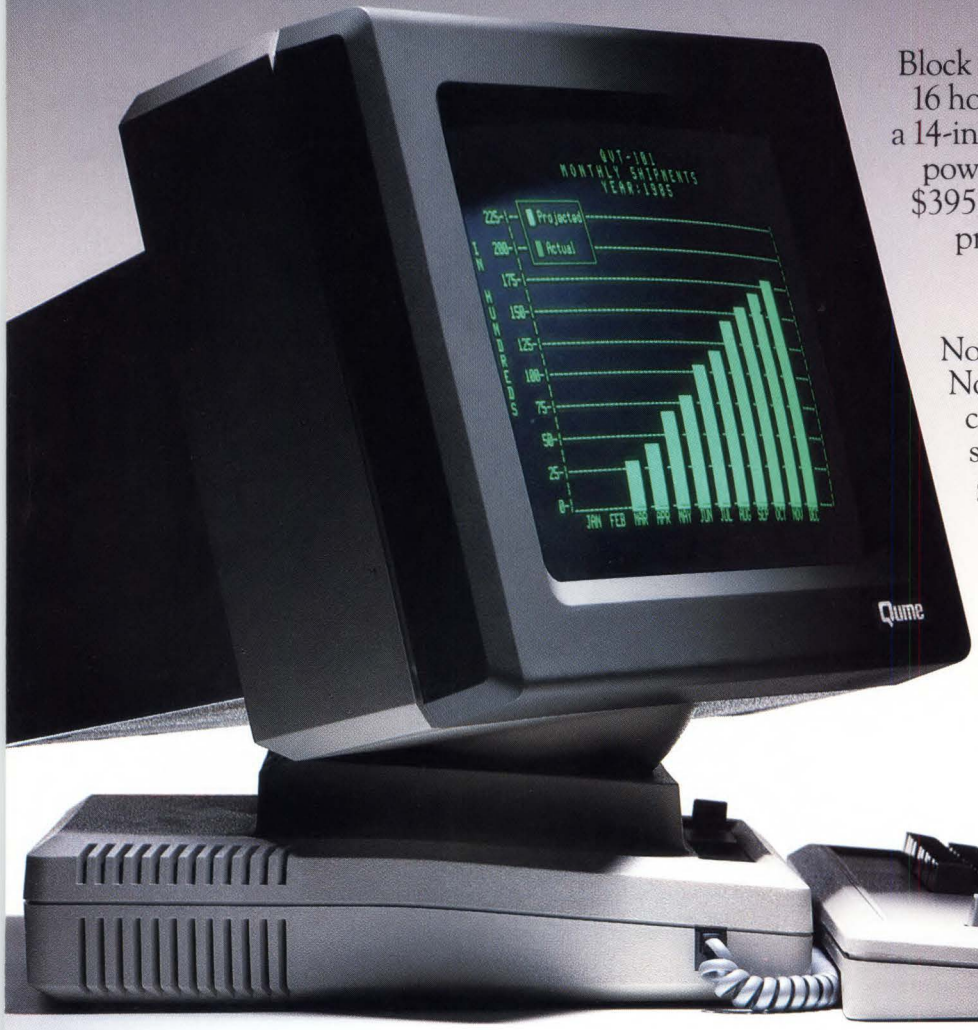
QVT 101™



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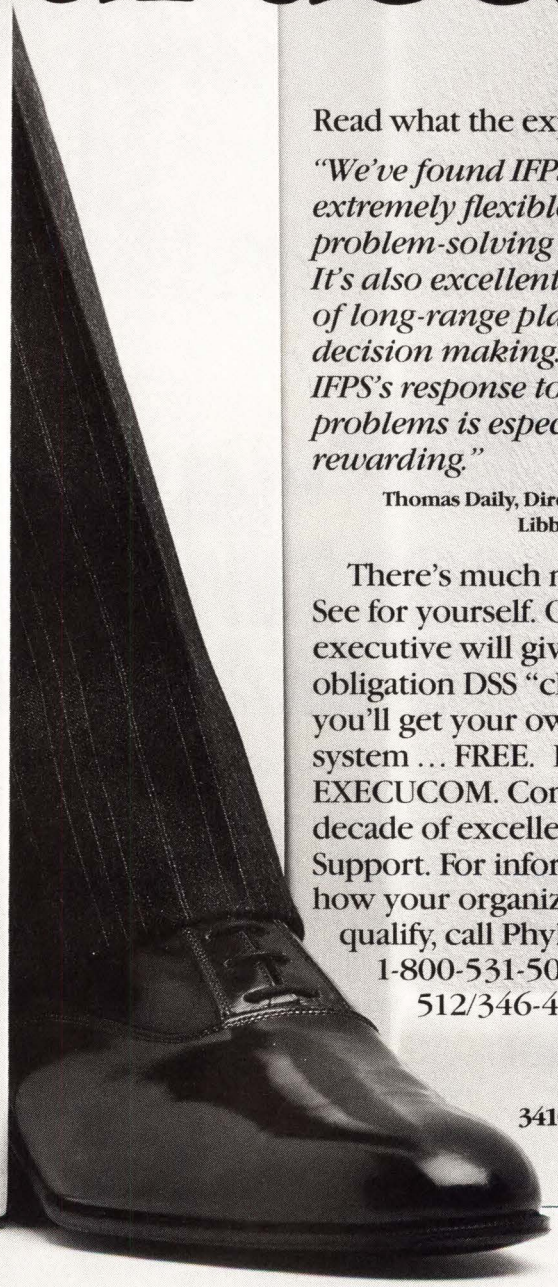
CIRCLE 1

All we want is to get our foot in your door.



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EXECUCOM
A CONTEL COMPANY

*Requires IBM PC, XT, AT or compatible, 512K MS-DOS.

CIRCLE 2

"VAX IS GIVING AMF MORE TIME FOR THE THINGS THAT REALLY MATTER."

Michael Lilly
Director, Corporate MIS/Operations
AMF, Incorporated

To many people AMF means recreational sports. But today it also means electronic components, filtration equipment, automated process equipment and more.

It's a vastly more complex company. A company made vastly more manageable by Digital's VAX™ computers – the vital component of office automation at AMF Corporate/MIS Operations.

As Michael Lilly says, the company's decision to stake its future in MIS on Digital's VAX computers – and the office automation tools like All-In-1,™ DECnet™ and DECmail™ software that run on them – was hardly a snap judgment.

Every major computer company was considered. Lilly says that, "dollar for dollar," only Digital's VAX system offered the power, ease of use and communications capability with other computer systems – including IBM – that AMF needed.

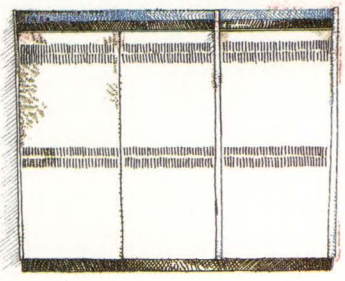
So AMF chose the VAX computer – the best-selling 32-bit computer in the world – and waited to see what the machine could do.

"SUDDENLY WE HAVE TOOLS AND CAPABILITIES WE NEVER HAD BEFORE."

Lilly and his group didn't have to wait long. The system was up and running within days.

Reaction within the department was rapid and gratifying. "We really got excited about it," says Lilly. "Immediately, we were communicating better." And there was more – spreadsheets and word processing and a mail system. "Suddenly," Lilly said, "we had a vehicle for total open communications to every important person or department in the corporation."

Part of the story behind AMF's almost instantaneous rapport with the VAX system is that it's so easy to use. Menus and operating commands are the same for each fully integrated application. Whole functions are completed in as few as two keystrokes. And because everything is in plain English, it's literally as simple as A-B-C to incorporate



any VMS™ application into the daily work routine.

"INSTEAD OF SIX WEEKS TO DEVELOP AN APPLICATION, IT TAKES TWO."

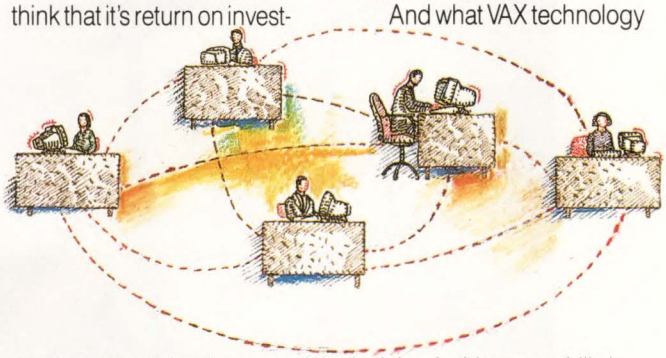
VMS software development tools have so improved the way things are done in his department, Lilly says, that he projects the savings in applications development time and costs alone at some 70 percent.

"Many of our new applications here at AMF will be written on that machine. I can't quantify it exactly. All I know is that I'm getting a heck of a lot more bang for my buck."

The first tests of VAX equipment proved so successful, that AMF quickly enlarged the system, adding terminals and DECmate™ and Rainbow™ personal computers. New departments went on line, for example finance.

"And that," says Lilly, "really created an explosion." Now AMF is implementing programs like general ledger systems, stock options and inventory systems, and keeping more efficient and flexible records, from accounts payable to personnel.

Adds Lilly, "People here are screaming to be on the VAX system, and there's got to be a reason for that. And I tend to think that it's return on investment, mailing lists, discounted cash flows, spreadsheets they couldn't even begin to do before, versatility, tremendous graphics potential. It's just a whole world of opportunity that is elevating AMF to the forefront."



"ANYONE WHO USES VAX IS GOING TO GET THE COMPETITIVE EDGE."

Lilly feels the VAX system has already elevated his own department to the forefront.

"It's put corporate MIS on the map," he says. "It has effectively increased productivity and efficiency. People are beginning to believe we can do the things we say we are going to do."

And what VAX technology is doing for his group, Lilly believes, it can do for all of AMF, or indeed for any company. "Any corporation that employs this technology," he says, "is going to get the competitive edge.

"This technology will explode. Because there are a thousand reasons to have it. But what it really all boils down to is this: everybody will want a VAX system because they can do the job better, faster and more efficiently.

"And that's what really matters."

BEST ENGINEERED MEANS ENGINEERED TO A PLAN.

VAX office automation computer systems, like all Digital hardware and software products, are engineered to conform to an overall computing strategy. This means our systems are engineered to work together easily and expand inexpensively. Only Digital provides you with a single, integrated computing strategy direct from desktop to data center.

To learn more about Digital's VAX system, call toll free: 1-800-DIGITAL, ext. 200, or write Digital Equipment Corporation, 200 Baker Avenue, West Concord, MA 01742.

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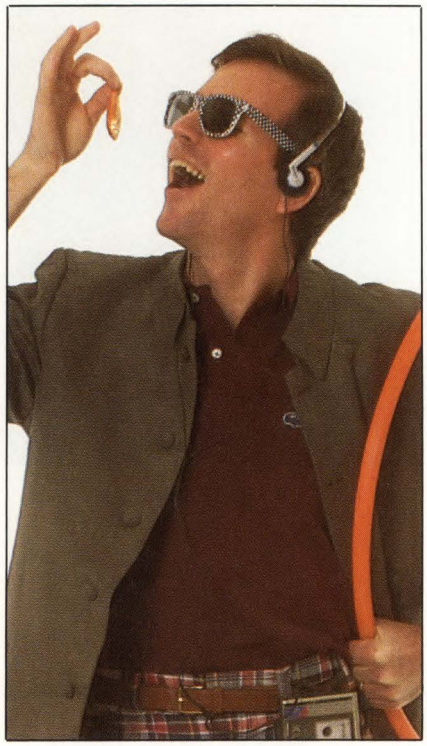

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COVER PHOTO: Ted Hardin

COVER STORY

116

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Many Software Companies Claim To Have Set Standards. Only One Has Actually Set Them Down On Paper.

"Every industry starts at a stage of 'every man for himself,' and some industries never outgrow it. In the applications software business it has become obvious that a criteria of excellence is needed. Such standards will be the way by which customers and users will be able to compare products. It will give us all an idea of what application software should be."

The words above are taken from a 35-page white paper written by Software International, the company whose first general ledger package actually started the applications software industry 15 years ago.

Entitled, "Setting Standards In Mainframe Applications Software," the report may be the first of its kind—the first ever to set down on paper the standards appropriate for application software products.

In it are ten guidelines suggested as standards in the design of applications software as well as standards which cover product installation, customer service and support. In short, standards for how a professional software vendor should build its products and how it should treat its customers.

We think you will find it a concise, common-sense collection of ideas—particularly vital to you if you are evaluating software packages or developing your own.

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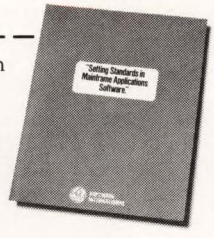

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CIRCLE 4

LETTERS

TEKNOWLEDGE MISSED IN ROUNDUP

I read with interest your article "Expert systems get down to business" (Jan. 15, 1985). I think your angle of the commercialization of AI is a good one. I was disappointed, though, that you did not include in your roundup one of the major players in AI, Teknowledge Inc. of Palo Alto, CA.

With industry giants such as General Motors and Boeing on its list of customers, Teknowledge is considered a leading developer of expert systems for commercial use. Their products range from microcomputer- to mainframe-based systems for a variety of applications, including banking, automotive, communications, oil drilling, and exploration. Teknowledge has over 100 employees and extensive experience in building commercial knowledge systems.

Shirley Gines
Senior Account Executive
Dudley-Anderson-Yutzy
Los Altos, CA

MISTAKEN IDENTITY

In your March 26 issue you referred to "Comnet" in connection with Communication Networks Conference & Exposition. "Comnet" is a registered trademark of Computer Network Corp. of Washington and no use of our trademark was authorized in regard to this conference.

We have discussed the matter with the sponsors of Communications Networks Conference & Exposition and discovered that "CN 85" is the official name of their conference.

Robert S. Bowen
Computer Network Corp.
Washington

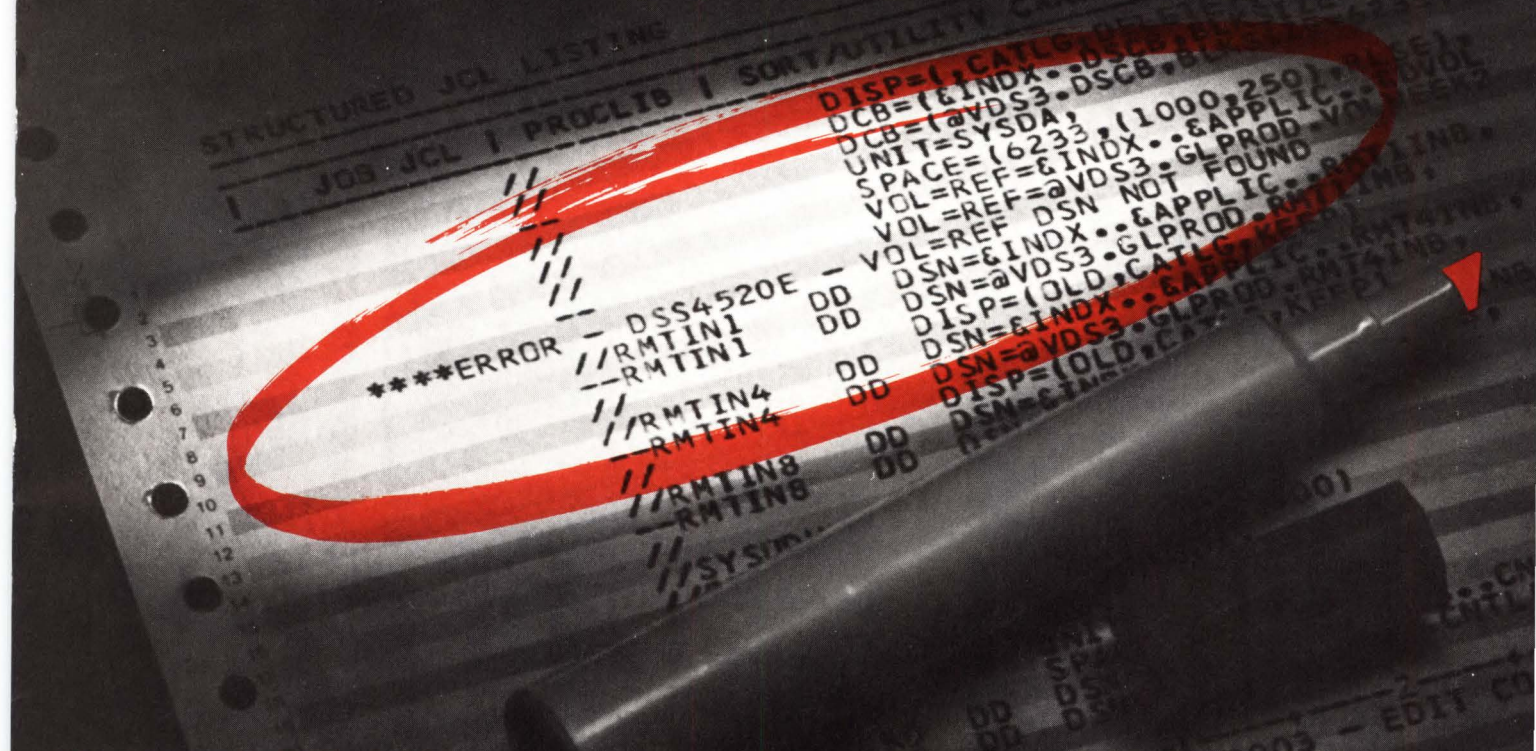
AND THAT'S NOT ALL

Thank you for including the Primages printers in "Small but powerful printers" in your March 26 issue. We would like your readers to note that prices listed include sheet feeders.

Roslyn Willett
Roslyn Willett Associates Inc.
New York

Address letters to the editor to Computer Decisions, *10 Mulholland Dr., Hasbrouck Heights, NJ 07604.*

AND NOW FOR AN IMPORTANT MESSAGE ABOUT A NEW JCL-CHECKING PRODUCT CALLED JOB/SCAN.™



We all know that JCL-checking software can flag JCL errors before a job runs to save you valuable time day or night. That's why we'd like to call your attention to JOB/SCAN, a special new JCL-checking product that can save you more time than ever.

Unlike other JCL-checking products, JOB/SCAN lists error messages right below the statement that caused the error. So you don't have to waste time searching for the message on a separate sheet.

Even those dreaded user exits are a snap to write with JOB/SCAN, and require no systems programming knowledge whatsoever. You can write checks for even the most complex standards in a matter of minutes.

Install JOB/SCAN *today.* And eliminate irritating reruns due to JCL errors like misplaced overrides, misspelled keywords and missing datasets. Because JOB/SCAN makes such a thorough check of syntax, catalog and program libraries you can be sure that a job that's been scanned will actually work when submitted.

When it comes to JCL-checking software, the message is this: No other product can match JOB/SCAN. Or even come close.

To check out JOB/SCAN, call or write today. Diversified Software Systems, Inc., 996 Minnesota Avenue, Suite 205, San Jose, CA 95125 (408) 998-0414.

Diversified Software Systems, Inc.

JOB/SCAN is a trademark of Diversified Software Systems.

CIRCLE 57

INTRODUCING

THE NEXT STEP FORWARD—A UNIQUE

Recently, AT&T Information Systems introduced a product destined to set a new standard for business computers.

Its name: the AT&T **UNIX** PC Model 7300.

What places this PC so far out in front? Extraordinary power *and* exceptional ease of use *and* unsurpassed communications capabilities *and* maximum flexibility.

The operative word is "and." No other PC offers so much at once. No other PC offers this high-performance combination.

No other PC even comes close.

POWER

UNIX System V is the key to the power of the AT&T **UNIX** PC. It

THE AT&T UNIX™ PC

COMBINATION OF COMPUTER CAPABILITIES

allows you to process more data faster. (Not a little more data a little faster. *Lots* more data *much* faster.)

And keep it stored. It's equipped with 512K RAM that can be increased to 2MB with expansion cards. And the AT&T **UNIX** PC will store up to 20 megabytes of data.

This super power also lets you take advantage of the multi-tasking talents of **UNIX** System V. You can perform a number of tasks simultaneously on as many as 12 active windows.

SPECIFICATIONS

Processor	Motorola 68010, 10 MHz clock speed, 32-bit processing, 16-bit data bus
Operating System	**UNIX** System V
Memory	512K expandable to 2 MB, Virtual Memory
Disk Storage	1 ½MB 5¼" double sided/double density drive (unformatted) 10 MB or 20 MB hard disk (formatted)
Communications Devices	1 RS 232C serial, 1 Centronics parallel, 2 Tip/ring line jacks (with cords) 1 Telephone set jack, 1 300/1200-Bps modem
Expansion Slots	3
Display Screen	12" diagonal screen, Monochrome green on black phosphor, 720 x 348 pixels, 80 columns x 29 rows, Reverse, underline, blinking, and high intensity

EASE

You might think that a PC able to perform such varied and complicated tasks would itself be complicated.

Not so. We went to a lot of time and trouble so you won't have to. Even a novice can learn to use the AT&T **UNIX** PC in a matter of hours, thanks to features such as a simplified keyboard. A three-button mouse and help function.

And the User Interface—an electronic office manager that works the way you work. Using words that you use: clipboard, file cabinet, telephone, and wastebasket, for example.

The AT&T **UNIX** PC proves that it can be as easy as apple pie. Or the Apple* Macintosh** for that matter.

COMMUNICATIONS

When is a PC more than a PC? When it's able to integrate voice and data communications. Something the AT&T **UNIX** PC does far better than any of its competitors.

You'll be able to use your computer to handle interruptions without effort. And a built-in modem lets you send data over phone lines.

Not surprisingly for an AT&T product, your phone plays a starring role. Easy-to-use communications features include speed calling, call history, call timer, and call notes.

SOFTWARE

You won't have any trouble getting started on the AT&T **UNIX** PC. Many programs are available, all ready to meet your business needs.

They include the AT&T Business Accounting System. Packages for day-to-day business needs such as word processing, financial spreadsheets, and business graphics. And to drop just a few of the well-known names that can run on the AT&T **UNIX** PC—Multiplan,† dBase III,†† and Microsoft††† Word.

Or you can design your own programs with our Systems Programming Software. The AT&T **UNIX** PC is on speaking terms with the most popular programming languages: FORTRAN, C, COBOL, and BASIC.

That's just for starters. Many more are on the way.

THE COMPUTERS WITH THE FUTURE BUILT IN

Where you go tomorrow will be determined in part by computer choices made today.

So we designed the AT&T **UNIX** PC to be as flexible and compatible as possible. To help you keep your options open, your growth unrestricted. With expansion slots and industry standard interfaces.

And the AT&T STARLAN Network—a low-cost, high-speed local area network that's easy to install using existing telephone wiring. To integrate many kinds of computers, including those running on **UNIX** System V and MS-DOS.†

No wonder we call this a computer with the future built in. *Your* future built in.

And why you'll call the AT&T **UNIX** PC the right choice.

For more information, call your AT&T Information Systems Account Executive, visit an authorized AT&T dealer, or call 1-800-247-1212.

AT&T

The right choice.

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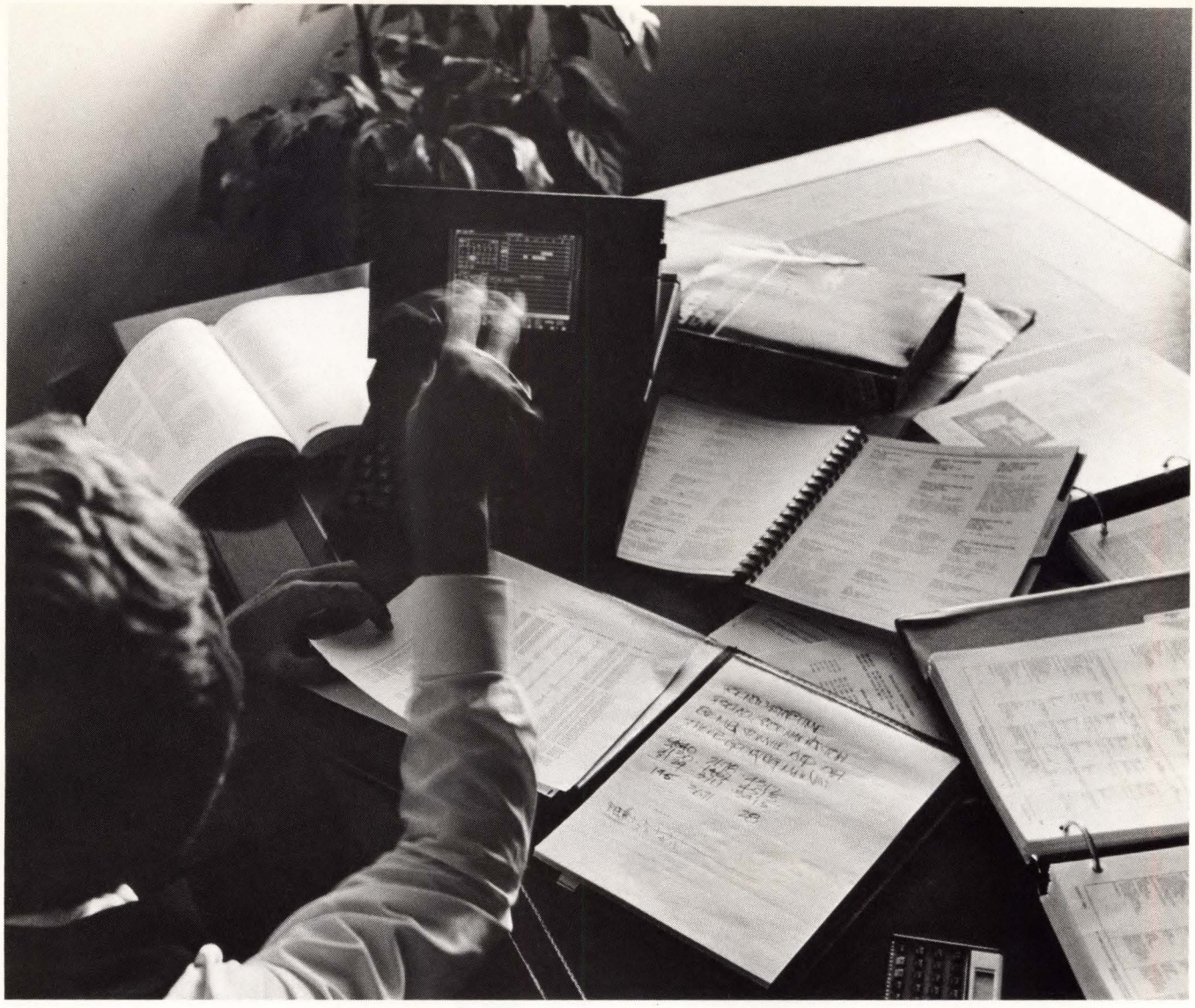

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CIRCLE 9

"About that data base conversion, sir. The department doesn't seem to share our enthusiasm."

ADR® ANNOUNCES THE AUTOMATION OF THE AWESOME CONVERSION PROCESS.

INTRODUCING THE ADR/DL1 TRANSPARENCY™ THE BRIDGE OUT OF DL/1.

Data base conversion. Just the thought is enough to send shudders through even the most seasoned data processing professional. It's been described by some as "trying to change a tire on a moving car." And the whole ordeal can take years to complete. So it's surprising anyone would attempt it.

But a growing company will have to convert eventually. Because DL/1, the old workhorse, just isn't capable of delivering all the sophisticated services a growing company needs.

And the dilemma is ignored by data base companies who simply try and sell you a new data base management system (DBMS) and let you worry about conversion.

That's why we invented Migration Software.

ADR MIGRATION SOFTWARE. MOVE AHEAD WITHOUT FALLING HOPELESSLY BEHIND.

The new ADR/DL1 TRANSPARENCY allows you to migrate from your old DL/1 or IMS/DB DBMS to our high performance relational DBMS, ADR/DATACOM/DB.® And your existing applications will run exactly as they did before. Without modification.

And the ADR/DL1 TRANSPARENCY designs your new data base and reformats your existing data. Automatically. So a conversion with the ADR/DL1 TRANSPARENCY is quick, cost efficient and virtually error free.

ADR TEACHES YOUR OLD DATA NEW TRICKS.

The ADR/DL1 TRANSPARENCY lets programmers make new uses of your old data with powerful productivity tools like ADR/IDEAL,® our 4th generation application development system.

And end-users can make strategic uses of the company data with relational query languages like ADR/DATAQUERY® and decision support systems like ADR/EMPIRE.® And with ADR/PC DATACOM,® they can even access mainframe data with their own personal computers.

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Because, while other software companies are talking about the tools you need for tomorrow, ADR is letting you use them today.

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INSIGHT

by Mel Mandell

CAPITAL GAINS —AND LOSSES

A job I had 25 years ago has helped me to understand why some of today's prominent personal-computer software vendors are failing. Back then, I worked for one of the most active Wall Street underwriters investigating high-tech businesses that wanted to sell stock to the public for the first time.

My employer was greatly concerned about extended viability because that was the only way he really profited from the stock offerings—the underwriting fees were merely small change. It didn't take long to realize that a key factor in the long-term success of these transactions was the ability of the startups' top management to cope with stock-market pressures.

These pressures were twofold. First, the Wall Street analysts and financial journalists who followed these over-the-counter securities clamored for information. If a startup hit a rough spot, these inquisitors would pursue their quarry relentlessly.

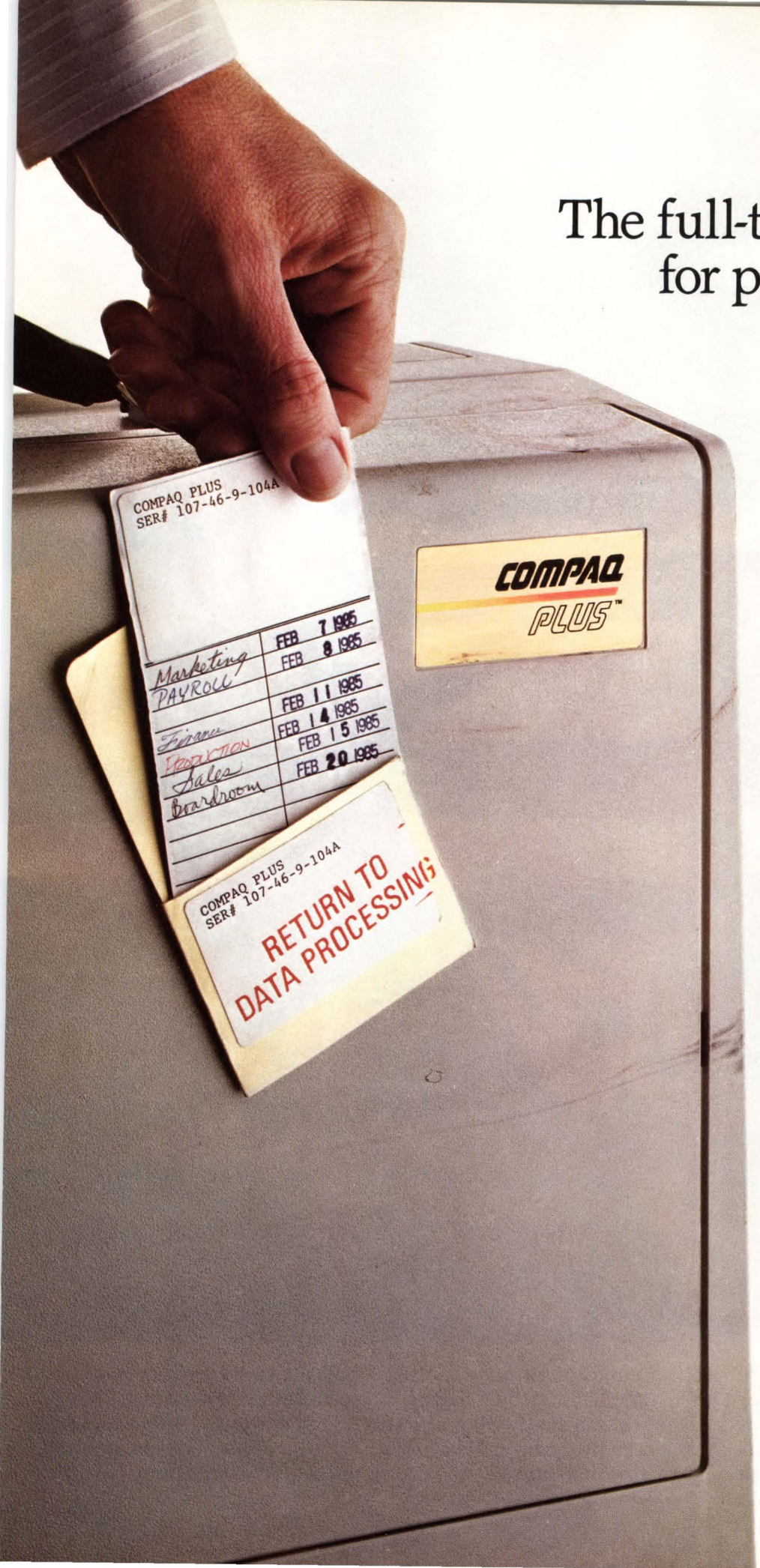
If a total loss of privacy didn't unsettle these startups, the fluctuations of the stock market would. If the entrepreneurs owned 100,000 shares of stock in their own businesses and the price suddenly dropped $3 per share, they'd instantly be worth $300,000 less (on paper, because insiders' stock is usually not subject to sale without a secondary).

When the pressures of directing a company that's in the spotlight are added to the difficulties of running a fast-growing business supplying a volatile market, it's easy to understand why so many personal-computer software (and hardware) vendors are faltering, or going out of business. These organizations are frequently headed by young men and women who rose to the top because they were gifted programmers or aggressive marketeers. Now they run corporations that, in some instances, employ many hundreds of energetic people with high ambitions—and stock options. Some of these young executives can't cope with the stress.

Many of the troubles currently facing many personal-computer software vendors have internal roots. But that's not surprising. After all, it's hard for a rookie to ascend to the major leagues after playing only a few seasons of minor-league ball.

Illustration by Dan Culhane

Lately, there's been much discussion about software piracy and a related issue, "site licensing," whereby large organizations can acquire the right to make many copies of packages for either low or no additional cost per copy. Computer Decisions *supports efforts to eliminate the illegal duplication of micro software. We are confident that our subscribers respect and uphold the copyrights of software vendors. This is in keeping with our defense of our own copy.*



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Not everyone who needs a personal computer in your company needs one full time. That's why full-function COMPAQ® portable computers give you more for your money than most desktop computers. They're built tough enough to share.

In a single day, your research department can use a COMPAQ portable to access information, accounting can borrow it to track receivables, and marketing can take it to make sales forecasts. Everyone can use it as an "extra" computer to take home or on the road.

COMPAQ's unique cross-braced aluminum frame, shock-mounted disk drives and outer case molded from the kind of plastic used to make bulletproof windows help it withstand the rigors of being passed around.

Plus COMPAQ portable computers are software and hardware compatible with the IBM® PC and *XT*, offer high-resolution text *and* graphics on one screen, and can expand to 10 megabytes of storage.

No wonder they outsell the IBM Portable Computer in retail stores by 6 to 1.

Every small company should have one. Large companies should have one for every department.

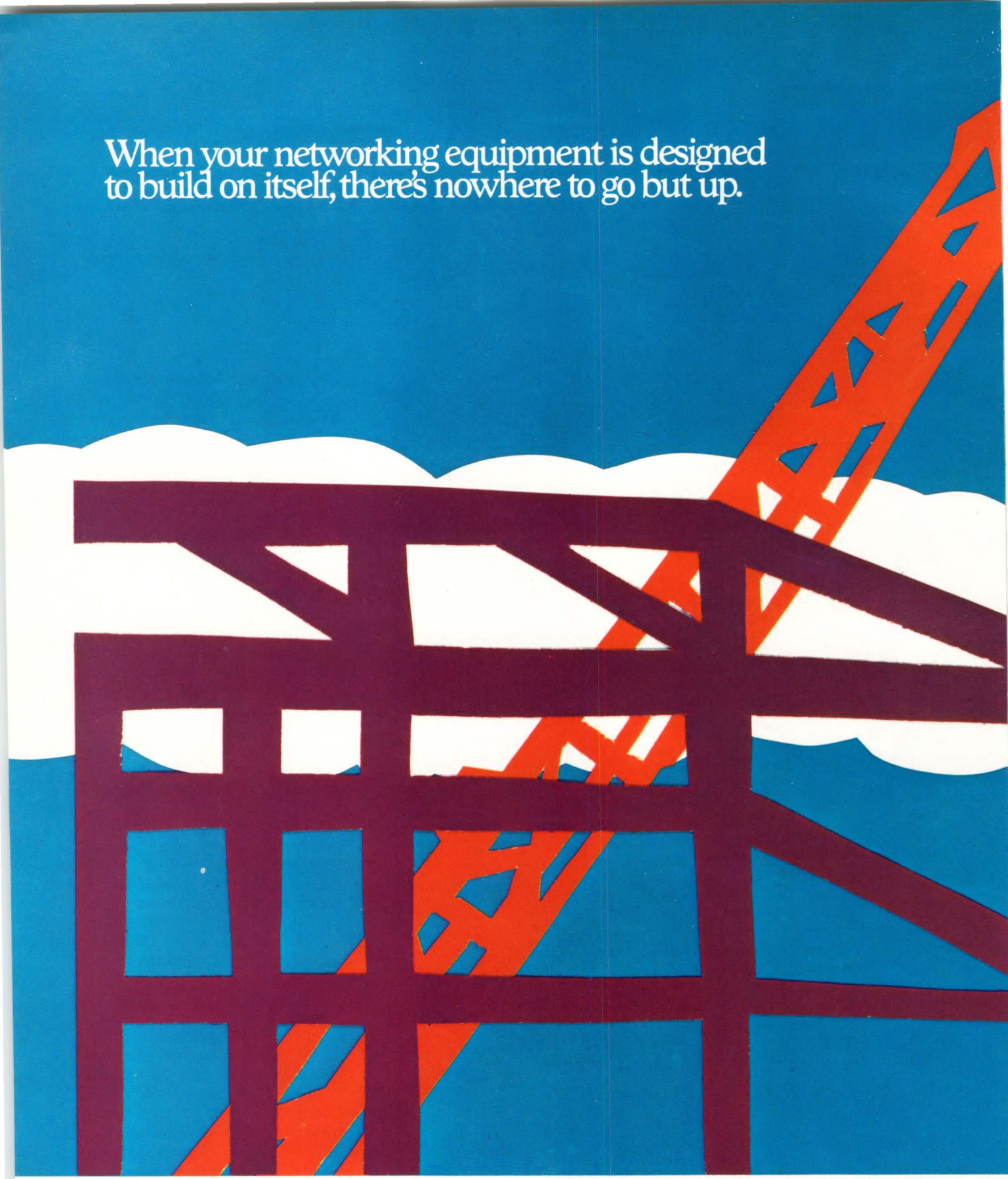
So check it out. For a free brochure or for the location of your nearest Authorized COMPAQ Computer Dealer, call 1-800-231-0900 and ask for Operator 2.

COMPAQ®

It simply works better.

CIRCLE 11

When your networking equipment is designed to build on itself, there's nowhere to go but up.



Because they're so easy to upgrade, DCA's flexible network processors and statistical multiplexors can easily grow with your company. So can our modems, our network management software and our advanced 56KB-to-T1 time division multiplexors.

You see, ever since 1974 when we introduced the first commercial stat mux to the marketplace, we have built our entire product line around modular hardware and software. Every network we sell incorporates error-controlled transmission and virtual circuit switching. Plus every

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CIRCLE 12

Edited by Joseph Braue, News Editor

USERS CLAMOR FOR SITE LICENSES

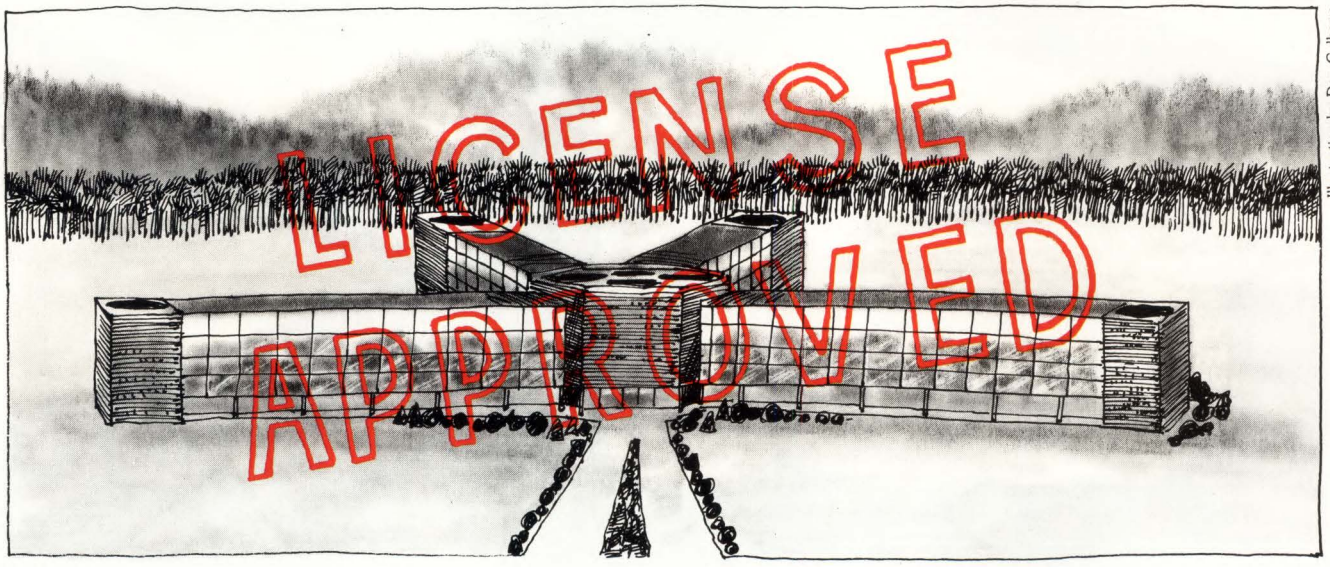

Illustration by Dan Culhane

Site license n. 1. one-time or annual fee that gives the buyer the right to make a specified number or unlimited quantity of copies of a microcomputer program.

Corporate buyers and managers want site licensing. Consultants consider it inevitable. Yet most of the major micro-software vendors are taking a casual-to-hostile stance. Why is so much sweat and venom being vented over site licensing?

In a word, control. Vendors like Lotus Development Corp. (Cambridge, MA) say they are afraid of losing control over the copying and distribution of their software. Retailers who are already howling about price cuts by unauthorized mail-order houses and discount dealers, are scared of surrendering even more big-ticket software sales should site licenses become widespread. Corporate micro managers want centralized control over software distribution within their domains—and volume discounts as well.

The controversy over site licensing has only recently emerged. A group of small vendors, which face possible extinction as the maturing market squeezes out all but the biggest and healthiest manufacturers, lead the site-licensing pack. They hope to grab a share of the market by swiftly responding to user demand for site licenses. "It's a marketing ploy," says analyst Mary Ellen Dick of Software Access International, a Mountain View, CA-based market-research outfit, "but there's no doubt that users want it. In about a year, the demand will be deafening."

Some of the biggest, most successful micro-software vendors, including Lotus and Ashton-Tate (Culver City, CA) oppose site licensing. "We will never do site licensing. Never!" exclaimed Jim Manzi, Lotus' president, recently. Other major vendors are less strident in their opposition, while still others profess to be neutral on the question. Micropro International Corp. (San Rafael, CA), for example, is con-

(Continued on page 22)

INSIDE NEWS

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CIRCLE 13

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(Continued from page 18)

ducting a feasibility study of site licenses. The biggest micro-software vendor that offers site licenses is Multimate International Corp.,(East Hartford, CT).

One of the problems in understanding the site-licensing controversy is that nobody is sure just what it is. A competitor derided Multimate's site-licensing program for its word-processng package, calling it nothing more than a volume discount. To some, site licensing is buying diskettes, documentation, training, and support as needed, while to others it's centralized support. Hardliners claim a "true" site license allows the user unlimited copying rights. The definition and terms of site-licensing contracts are open to negotiation on that issue, but the Microcomputer Managers Association in New York, a group of Fortune 500 users, is trying to sort through the chaos and develop a coherent set of guidelines.

Some of the major players in this dispute link site licensing to software piracy. A representative for Ashton-Tate says users may take advantage of a corporate license to copy software for their personal use. Micro managers debunk this notion. One of the reasons Metropolitan Life Insurance Co., New York, has an unlimited copying license from Sorcim IUS, San Jose, CA, for Supercalc "is to protect against illegal, inadvertent copying," says Marcia Hearst, manager of the information center.

Even a limited site license has the advantage of centralizing software control. As each new disk is copied (under license), it can be branded with names, serial numbers, and a company logo. This form of inventory control is unobtrusive to the user, while giving the MIS/dp directors and micro managers the means to seek out and neutralize potential pirates. So say the micro managers. In the meantime, the Association of Data Processing Service Organizations (ADAPSO) has countered with a plan to provide individual hardware keys to prevent piracy, an idea that's considered clumsy, obtrusive, and expensive by many users.

Ken Scott of Summa Technologies says his program lets corporations with as few as 100 micros in on the site licensing action.

It's arguable whether site licensing is a panacea for software piracy. But the advantages of site licenses to users are indisputable. First, a corporation that buys software packages in bulk (more than 100 copies) usually gets a price break. The advantages don't stop there, however.

Alan Gross, president of the Microcomputer Managers Association, points out that although large corporations have an average annual budget of $2 million to $3 million for micro software and will buy hundreds of copies of a given software package each year, single orders are often for less than 100 packages. This is because departments and branch offices requisition small amounts of software as the need arises. It's much easier to make an additional copy of a licensed program than to go through the hassle of issuing a new purchase order every time a user needs software.

Donald Dobler, dean of the Business College at Colorado State University, Fort Collins, estimates it costs between $30 and $70 to process a single order in a corporation. "This issue concerns us far more than how much we spend on a software package per se," says Gross.

Even cost is overshadowed by management's urgent demand for convenience and control. With a site license, a manager can enforce standardization and compatibility—a must if micros are to be easily integrated into networks. If all users run the same version of the same software, it's more efficient to train and support users and upgrade to new versions. "If one user has a problem with a program," notes a computer specialist with the federal General Services Administration in New York, "we can all share the problem and the solution. If everyone has different packages, it's a nightmare."

Furthermore, when vendor-to-client contact in an information center is centralized, it's easier for users to get prompt attention, for the information

(Continued on page 26)

Winning against the HP3000 isn't everything.

When we recently benchmarked the BTI8000 against HP's top-of-the-line Model 3000/68, we had cause to celebrate. Because the independently-audited test results proved we could outperform HP by more than three to one.

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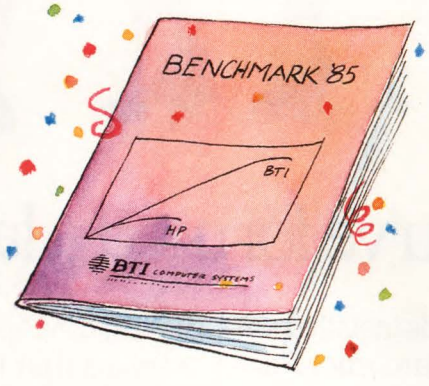

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(News continued from page 22)

center to disperse software and documentation updates, and for the vendor to provide support.

The cornerstone of the site license is the initial, and usually, one-time fee. Multimate estimates that the cost per user amounts to $200, compared with the $495 retail cost of the package. Multimate requires a minimum order of 500 copies for site licenses, so its initial fee is $100,000, which includes the right to copy the documentation as well as the disk up to the limit prescribed in the agreement.

But what if your organization doesn't purchase micro software in such large quantities? Ken Scott, president of tiny ($2 million in sales last year) Summa Technologies in Beaverton, OR, has a cheaper arrangement that depends on the definition of a site. Unlike other agreements, which cover entire corporations, Scott's site license covers only a building within a city plus surrounding satellite operations, such as a college campus or industrial park.

Scott says "any company with 100 micros or more is a candidate for us." The fledgling vendor's site license for unlimited copying of one of its family of products (such as Free Style, a word-processing package) at a defined site costs $7,000 per site. This may seem inexpensive, but with additional options and services, Scott estimates that the average total pricetag of a site license for a large organization is $50,000. Options include a $2,800 (one-time) per site home-use option and $1,000 annual per site for support.

Other site-licensing provisions include:

- The number of copies of the package allowable. For example, the Software Group in Ballston Lake, NY, offers a first-level license of 150 copies of its integrated-function package, Enable.
- Annual maintenance and support dues.
- Document distribution. Multimate lets users copy manuals.

Most site-license agreements try to limit contact between users and the vendor to specific intermediaries,

> "We will never do site licensing. Never!"
>
> —*Jim Manzi, Lotus*

which, in a large corporation, would be information-center employees. With the Enable license, for instance, the ratio between key contacts and users is generally one to 10. These individuals act as go-betweens with priority access to vendor support, often via a dedicated hot line.

Details are negotiable, and "extras" such as training, document updates, and employee home-use options, can be included in a site license for a fee.

For vendors that are still uncertain about how to handle a site-licensing agreement, the Microcomputer Managers Association of New York offers guidance. Its members—which include 80 members from Fortune 500 corporations—have assembled a list of essential elements for successful implementation of a site license:

- The right to copy as much software as specified under the agreement.
- The right to modify software for internal use.
- The right to incorporate the product into a corporation's own internally developed systems.
- The right to distribute software electronically between sites.
- The right to enhance support agreements (having a hot line between the vendor and the corporate-support service center, making available information on new product enhancements and so on.)

According to Gross, all or some of these elements are already part of micro-software site licenses. Gross argues that these tenets benefit vendors, which enjoy a guaranteed after-market, reduced manufacturing and distribution costs, single centralized locations to support, direct communication with the user, reduced dependency on dealer shelf space, and increased protection for the vendor against software pirating. Laura Hoffman, vice president of marketing at The Software Group agrees: "We see nothing but advantages in site licensing. It's a growth deal rather than a one-time volume purchase for use. It encourages standardization on our product. "

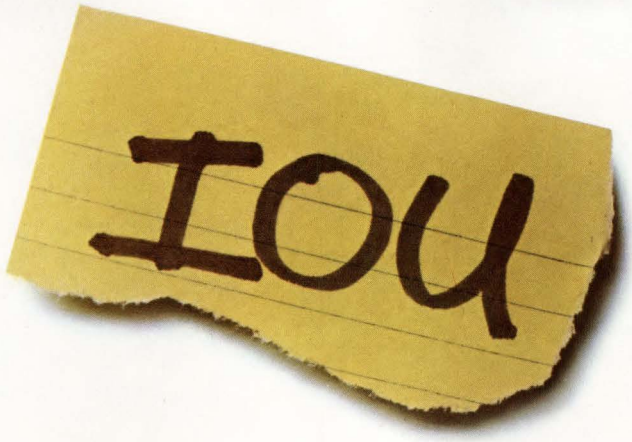
The opposition does seem to be thawing. Despite Lotus' current rejection of site licensing, Kim Shah, project manager for software authorization at Lotus, is investigating the issue. After preliminary meetings with the micro-managers' group and other big buyers, Shah concedes that "there is a segment of corporate users who want site licensing." He plans to submit a formal proposal to Lotus' top management by the end of this summer.

In the meantime, large organizations continue to seek out software that offers site licensing. "I've never before seen such unanimity on an issue," says Robert Petrie, vice president of wholesale user-computing services for Manufacturer's Hanover Trust, New York. "If I can find a product comparable to Lotus' 1-2-3 that offers site licensing, I'm going to steer my employees to it."

The U.S. Air Force has begun to include site licensing as a prerequisite in contract bids. "It's impractical for us to use anything that's copy-protected," says a spokesman.

Ernst and Whinney, a Big Eight accounting firm headquartered in Cleveland, already has three site-licensing agreements, two of which grant unlimited copying. Wayne Knabel, a partner responsible for the corporation's microcomputers in the United States, is an unqualified supporter of site licensing. "I'm well aware of the attitude of the Lotuses and Ashton-Tates," says Knabel. "They've chosen to sell to individual customers. But if they want to do business with corporate America, they're going to have to change. From the standpoint of good business, they must relinquish some of their control and trust us." — *Anita Micossi*

(News continued on page 32)



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CIRCLE 17

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tem can widen your company's horizons.

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CIRCLE 18

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You see, MacCharlie delivers hardware compatibility, as well. For example, IBM letter-quality printers can be easily used with Macintosh.

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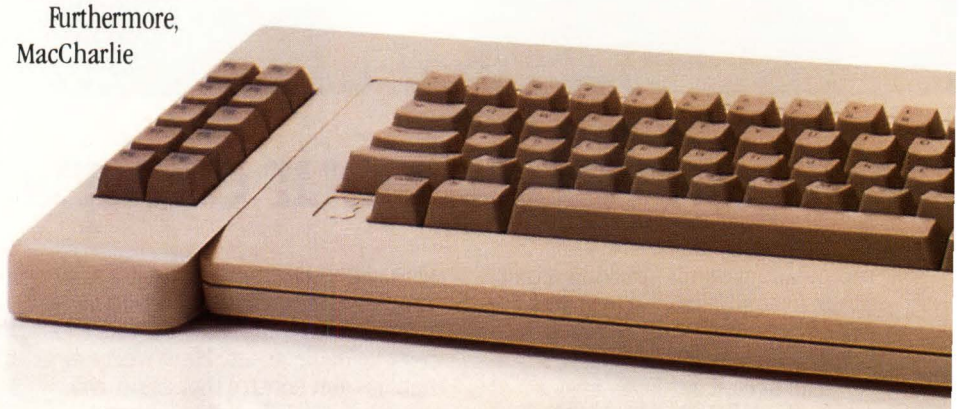
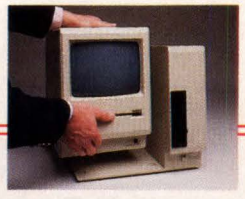


The Macintosh keyboard slides right into MacCharlie's keyboard. About as easy as slipping a letter in an envelope.



Macintosh sets snugly beside MacCharlie, on a custom-fit pedestal.

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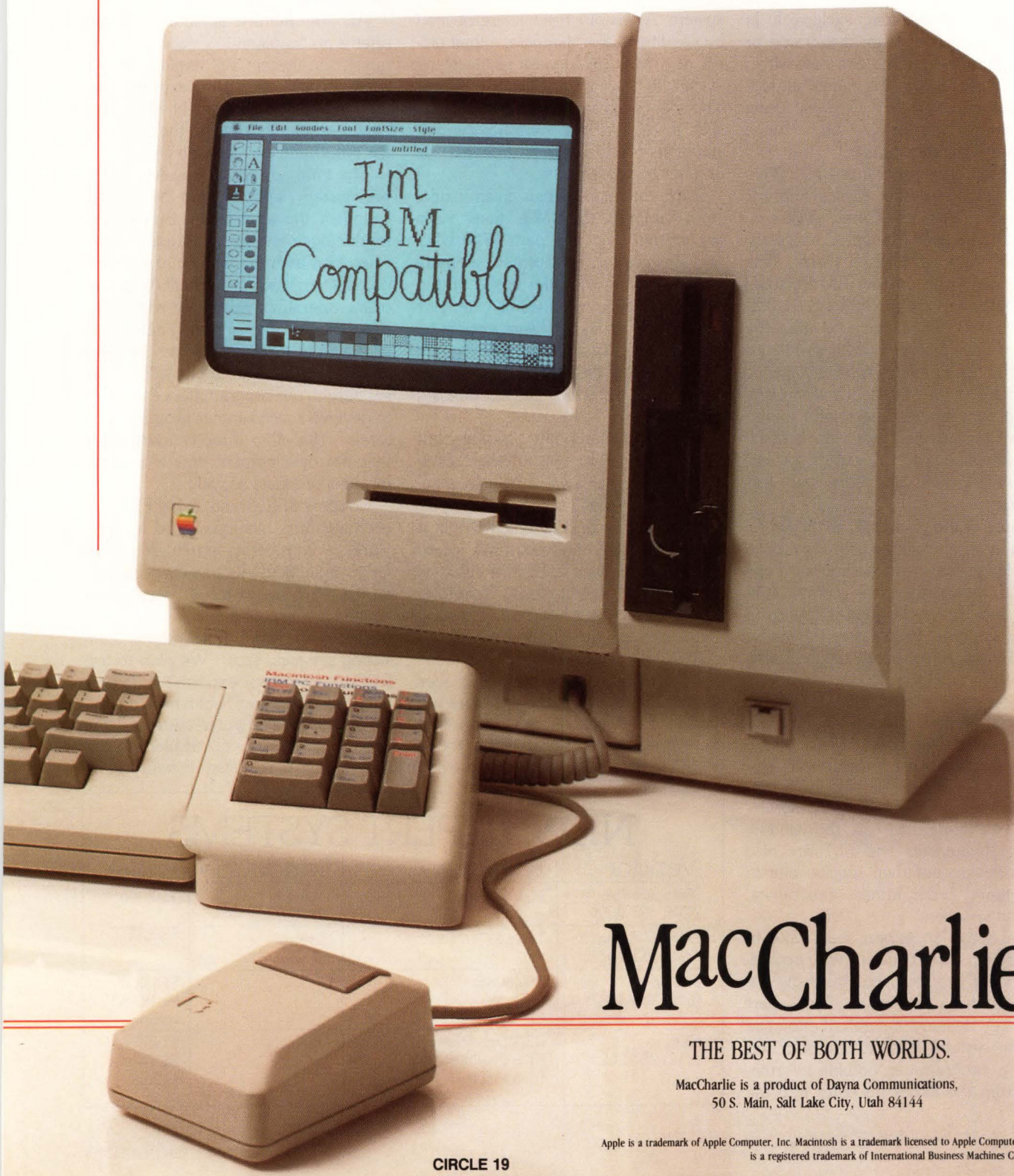

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CIRCLE 19

(News continued from page 26)

EXPERT SYSTEMS IN THE ECONOMY SIZE

Expert systems, long exclusively in the domain of large mainframe or minicomputer systems, are now within micro users' reach. Four new expert-systems packages are available using the more accessible—and much cheaper—microcomputer.

The four new programs—M.1 (Teknowledge, Palo Alto, CA), Timm-PC (General Research Corp., McLean, VA), Rulemaster (Radian Corp., Austin, TX) and KDS (KDS Corp., Willmette, IL)—run on the IBM Personal Computer and are priced from $1,200 to $15,000. They claim to take the task of developing expert systems out of the hands of the artificial-intelligence experts and into those of micro users and programmers. Users with expertise in a particular area can "teach" their knowledge to the expert system, which can then aid users with less experience.

Three of the packages, KDS, Timm-PC, and M.1, allow the user to create a knowledge base using English commands rather than the complicated Lisp and Prolog languages found on larger systems. Rulemaster, however, uses Radial, a high-level language similar to Ada and Pascal.

These micro-based expert systems offer a friendlier interface to both expert-systems developers and users than more sophisticated mainframe systems. Both Timm-PC and KDS are menu-driven and require no programming background to use, the vendors claim. Rulemaster and M.1 are also menu-driven, but they require one to two years' programming experience, say the vendors.

The steps an expert must take to teach each expert system vary according to the program, but the logic the systems follow is similar. The expert begins by defining the area of expertise for the system. With Rulemaster and M.1, a programmer obtains information from the expert to enter into the system. Areas of expertise are defined by conditions. For example, a loan officer at a bank might want to teach the system to qualify applicants for a loan. The loan officer might use conditions such as an applicant's job, salary, outstanding debts, payment records, or number of dependents.

Each condition is then given a rule. With Timm-PC and M.1, these rules are written by the expert. With KDS and Rulemaster, the system automatically generates the rules based on the conditions, case histories, or examples supplied by the expert. A rule might be that an applicant be employed, or make $20,000 or more a year, or have less than $20,000 in outstanding debts.

These rules are not absolute, but they do relate to one another. Each condition is given a value (usually a numerical one) that reflects how important the rule is, or how much weight it should be given. An applicant's salary might not be given as high a value as the applicant's credit rating. Therefore, an applicant might not make $20,000 a year and still qualify for the loan.

Rules are written using "If—then" logic, such as "*If* an applicant makes $20,000 a year, *then* the applicant will receive the loan." A key feature of these programs is their ability to make decisions even if the user can't provide all the facts. The user can answer, "I don't know," anywhere in the program, and the system will make an "educated guess" much as people do.

Another feature all four packages offer is an "explanation" facility. On request, the system will explain its reasoning to the user. But, explains Barbara Wallace, developer of KDS, "the expert system can give to the user only the information it has been given."

The time needed to develop an expert system depends upon the sophistication of the application. Ben Finkel, marketing manager at Radian Corp., says, "An average, industrial-scale expert system, such as for fault diagnosis, online operations advice, or interactive maintenance manuals, can take anywhere from three months to one year to develop. But after a one-week training period, our programmers were able to develop much simpler programs in a week." The other three vendors agree that this development time is average for their products as well.

Coopers & Lybrand, a Big Eight accounting firm headquartered in New York, is considering purchasing KDS for its management consulting-services group, particularly for its services to health-care organizations. Rand Eller, manager of health-care-systems consulting services, says, "We plan to use KDS to extend our expertise in helping hospitals and other health-care organizations select computer systems." Initially, Coopers & Lybrand plans to distribute its expert system in-house to its

NEW EXPERT SYSTEMS

Vendor	Product	Language	Price
Teknowledge (415) 327-6600	M.1	Prolog-1	$10,000
General Research (312) 251-2621	Timm-PC	Fortran	$9,500
Radian (512) 454-4797	Rulemaster	C	$15,000 for PC AT version
KDS (312) 251-2621	KDS Development System KDS Playback Utility KDS Playback Module	Assembly	$795 $150 $495

consultants, but eventually it might sell that expert system directly to its clients, says Eller.

The development of the Coopers & Lybrand expert system is expected to take three to six months. Ten of Coopers & Lybrand's top information-systems managers will combine their expertise to develop one knowledge base, with one staffer responsible for merging that expertise. Says Eller, "That knowledge module, when it contains all 10 experts' knowledge, will be more 'expert' than any one of them."

Harvey Newquist, editor of the newsletter *AI Trends*, Scottsdale, AZ, believes the accessibility of personal computers and the lower price of smaller expert systems are the new packages' key selling points. Expert systems at the mini or mainframe level have starting prices of $30,000 and up—averaging a $500,000 to $1 million for a customized system. Newquist says, "With these new micro-based systems, an organization can spend $10,000 to $15,000 and get a fairly complete expert system."

Newquist believes micro expert systems are a good way for organizations to try out expert systems before making big investments. Teknowledge concedes that M.1 is a tool designed primarily for prototyping and educational purposes. Judy Harris, a Teknowledge representative, says, "You can build simple problems with M.1, but if you have a really elaborate problem, you need a larger-scale system." Teknowledge offers a larger expert system, S.1, which runs on the VAX minicomputer from Digital Equipment Corp., Maynard, MA.

With the micro's advantages also come its limitations. Robert McArthur, an expert-systems-design specialist with Arthur D. Little Inc., Cambridge, MA, says, "Micro-based expert systems are excellent sources for educating and training users in building an expert system, but as far as applying these tools to real end-user applications, they're just not useful. Our knowledge of building expert systems is still very crude."

David Balaban, group leader in the computations department at Lawrence Livermore Laboratories, Livermore, CA, believes a micro "environment" just can't compete with the specialized Lisp processor he works with. "By 'environment' I mean all the tools you need to get the job done, such as debuggers, structure editors, and browsers. These tools increase your productivity, and they just haven't been written for micros," says Balaban.

Yet Barbara Wallace at KDS Corp. says KDS' performance and capacity rival the largest existing mainframe systems. Written entirely in assembly code, Wallace claims that KDS can produce up to 16,000 rules, as many as some expert systems running on large mainframes. "The popular notion is that serious expert systems can't be written for microcomputers," says Wallace, "and with most of the micro-based systems on the market today, that assumption is correct. But KDS is no toy system."

Wallace concedes that users can't change the memory and speed limitations of a personal computer. But software can be written so that the hardware performs at top efficiency.

McArthur advises organizations that want to build an expert-system application using a personal computer to choose programs written in Prolog or Lisp. He believes a program written in one of these two languages can then be applied to a larger-scale system, if the problem grows too large. M.1 is written in a version of Prolog called Prolog-1.

Timm-PC, M.1, and Rulemaster also have versions that run on larger systems. Nancy Nay, a General Research Corp. representative, says, "The only difference between Timm on the VAX and Timm on the IBM PC is memory. On the VAX you can have 500 rules; on the PC, only 100."

—Theresa Conlon

TONGUE IN CHECK

The mysterious East has beguiled Occidentals with its exotica ever since Marco Polo returned bearing shimmering silks and tangy spices. Who among us remains unfazed by the sight of a Japanese chef throwing a pound of vegetables into the air and carving a salad of rosettes before one can say "kung fu"? Today, the culinary excitements and the electronic wizardry of the Orient are enjoyed coast to coast. But a measure of strange delight, as well as a degree of difficulty, still attends the flow of goods from East to West.

The booming transpacific trade in computers and peripherals is no exception. The deep cultural differences that exist between East and West—among them the "politeness factor"—are embodied in the translations of operating manuals that accompany hardware and software. For example, savor the following excerpt from the operating manual for the CI-300 dot-matrix printer, made in Japan:

"The excellent output machine of MODEL CI-300 as extraordinary DOT MATRIX LINE PRINTER, built in two MICRO-PROCESSORS as well as EAROM, is featured by permitting wonderful co-existence such as; 'high quality against low cost,' 'diversified functions with compact design,' etc."

This description of the CI-300 is maddeningly inscrutable. Yet its polite offer of utility is conveyed by an absolute surrender to enthusiasm, and the CI-300's practical virtues somehow emerge from the comical burst of cliches lifted from the West—from high-tech brochures and newspaper headlines.

But pity the harried MIS/dp managers and professionals who have to get the CI-300 up and running. The grand entertainment afforded by the operating instructions won't make up for their panic if they find some of CI-300's parts left over. *—Bonnie DeBonis*

by Fred Dugger, Guest Columnist

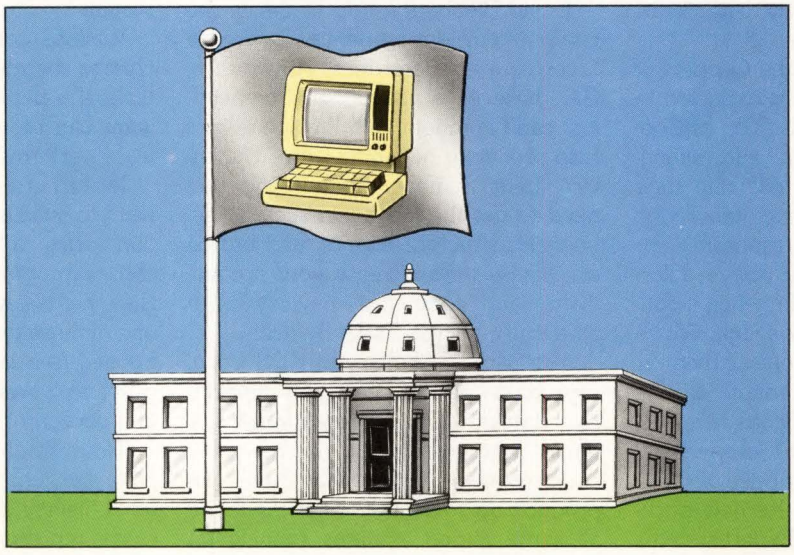

Illustration by Harold Brooks

MICROS ENTER POLITICS

The following is an excerpt from Fred Dugger's Managing Microcomputers in Large Organizations *(National Academy of Sciences, 1985). In this chapter, Dugger examines the strides several state and local governments have made in integrating personal computers into their organizational structures.*

The state of Kentucky has created a new unit within its systems-services branch called the Microcomputer Support Unit (MSU). This unit has been directed to establish policies concerning the evaluation and use of microcomputers by Kentucky state government, and to provide technical, financial, contractual, and management support for these policies. The unit has developed forms for mini-microcomputer needs assessments and cost-benefit analyses. These new forms, along with preexisting ones, provide a way to determine the suitability of a proposed microcomputer installation. The MSU also coordinates all activity with microcomputer vendors on behalf of the state; initiates all hardware and software purchases; and registers all software, whether developed in-house or purchased. Although the unit does not itself provide software development services, the MSU will coordinate with the information-systems department to provide that service if custom software is needed.

The Kentucky Microcomputer Support Unit has the additional responsibility of developing and implementing standards and guidelines for hardware acquisition. The MSU established a recommended list of software packages, specific to the applications desired, and set standard communications protocols for micros that communicate with mainframe computers. The unit is developing guidelines to make installation and operation of microcomputers easier, including suggestions on backup and recovery procedures.

The state of California has long been noted for its centralized control over acquisition of data-processing equipment and procurement procedures. California has formulated a central policy for microcomputer acquisition as well, but has left procurement authority for such equipment with the various data-processing entities throughout the state. Several of these departments have developed their own guidelines for selecting microcomputers. The Health and Welfare Department has implemented the computer-store concept for its internal use. Members of this department may make an appointment to visit the store to discuss their computing requirements with data-processing staff. On display and available for trial use are microcomputers that are compatible with department mainframes. Quantity-discount arrangements have been made with various vendors through the California central purchasing authority. The computer store has been so arranged that it has had to restrict access to only its own staff. *(Continued on page 38)*

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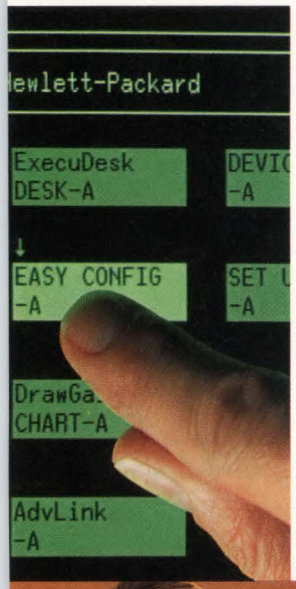

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HEWLETT PACKARD

CIRCLE 22

(Continued from page 34)

The state of Alaska is pursuing a policy that attempts to avoid duplication of mainframe functions on microcomputers. The state recognizes that there are substantial differences in information-systems requirements and that much time and effort can be wasted trying to shoehorn a large application into a small computer in the name of efficiency. Like Kentucky, Alaska is standardizing on off-the-shelf software packages for specific applications, thereby improving the mobility of experienced staff and reducing training requirements.

Several other states have taken less comprehensive approaches. These are understandable if we keep in mind that, in general, state governments more closely resemble a collection of independent companies, each with a unique set of goals, rather than a single large company with an overall profit objective. In other words, providing drivers' licenses has little to do with licensing real-estate brokers, except that both must be accomplished at the lowest cost to the taxpayer and with the highest quality of service. As a result of the disparate functions of the state agencies, decisions about acquisition and use of microcomputers are frequently left to the individual agency. Since most agencies do not have the resources to provide specialized internal consulting for microcomputers, those that want to take advantage of the new technology must fend for themselves. This has sometimes led to a proliferation of microcomputer vendors, software products, and limited communications capability. It has also consumed a great deal of personnel resources as people who are unfamiliar with microcomputers visit computer stores and attend seminars and expositions to increase their technical knowledge. Perhaps the worst consequence is the frustration and disillusionment of managers who must struggle with the consequences of buying the wrong computer for a task or must use novice programmers to try to build customized software.

The state of Washington's Employment Security Department (ESD) offers a good example of a department-level approach to microcomputers. ESD has developed a microcomputer-based system to support its Job Placement Training Act (JPTA) activities. This application involves a local-area-networking system that allows cross-communication between sites and communication to the ESD mainframe.

In Nevada, current planning strategy distinguishes between backbone systems, which are information systems considered vital to the effective operation of an organization, and decision-support systems, which provide digested information to management and program personnel. Examples of backbone systems include payroll, corporation licensing, gaming-tax and license- fee collection, and motor-vehicle registration. Decision-support systems include caseload projections, revenue projections, and tax-impact analysis. Professional data-processing personnel will continue to develop, implement,and maintain the state's backbone systems, thereby utilizing the most expensive "people resource" to insure the quality of the most valuable asset, timely and accurate data.

State governments as a group, functioning through the National Association of State Information Systems (NASIS), have recognized the magnitude of the management problem they face. They have accepted as a primary responsibility the development of policies, procedures, and techniques to make the best use of the new microcomputer technology. They have also recognized that all states have similar, if not identical, problems. In an effort to share ideas and resources and to cooperate in solving common problems, NASIS has established an Information Clearinghouse. This clearinghouse will function as a common repository for states' policies, procedures, plans, productivity techniques, and anything else that might help achieve excellence in information-systems services.

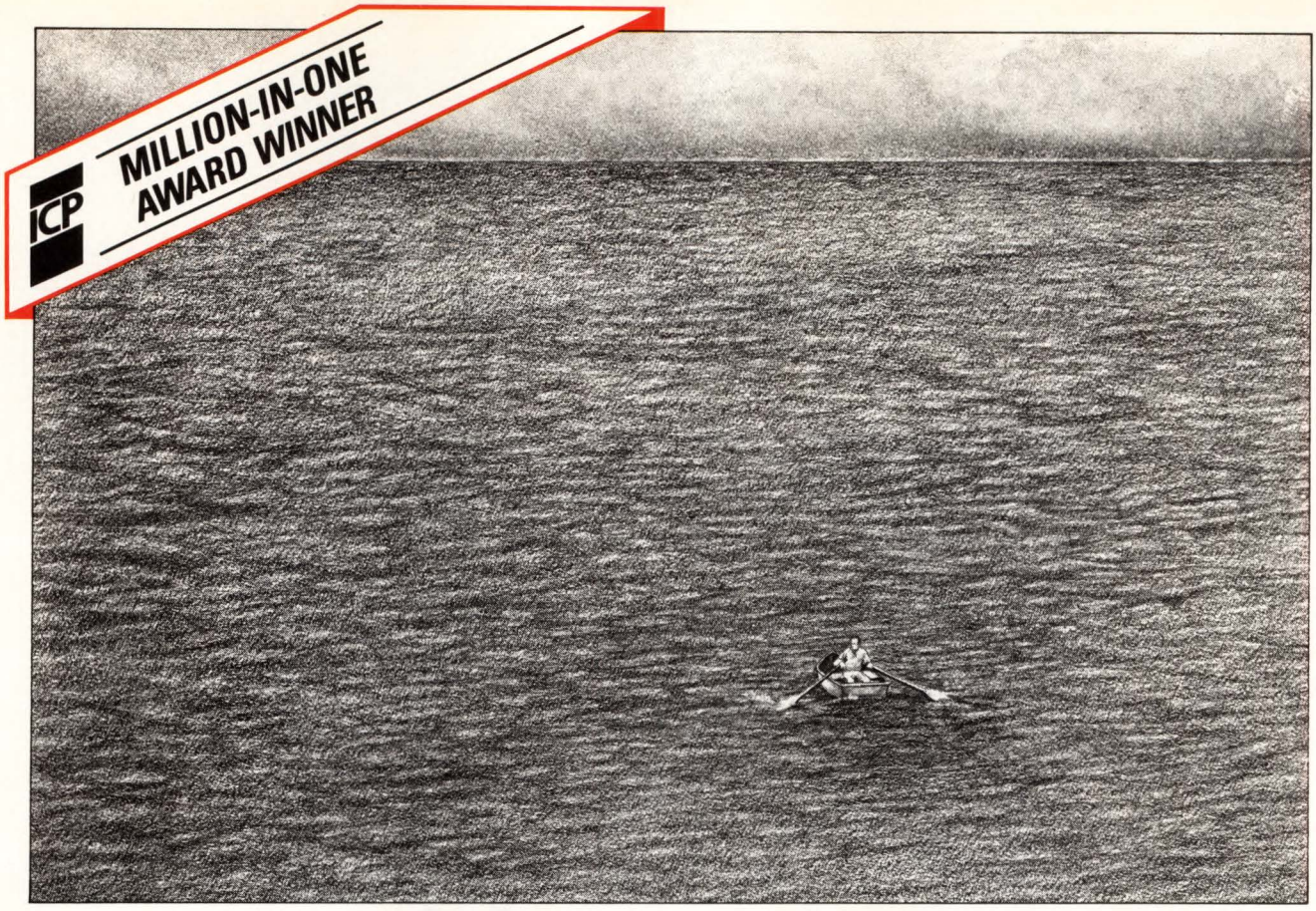
It is too soon to evaluate the approaches of various state and local governments to managing microcomputers within their organizations. Based on some of their early experiences, however, it is possible to make some recommendations about the use of microcomputers by government and private-sector organizations:

- Recognize that microcomputers are becoming an increasingly important tool for your professional staff.
- Provide management support for a cohesive microcomputer policy in your organization.
- Establish an organizational unit that understands microcomputers and can provide quality advice for internal management.
- Use your established expertise in systems engineering.
- Monitor early microcomputer installations closely.
- Provide for and insist on education for your management staff.
- Do not expect microcomputers to replace the large information systems currently in place on mainframes. Properly managed, micros can provide valuable local-support functions while enhancing the quality and quantity of the organization's database. Improperly managed, micros can diffuse the database and confuse the accuracy of data.

Although the challenge of managing the microcomputer invasion appears large, the opportunities that micros provide are also enormous. The power and flexibility they bring will permit quantum leaps in the provision of quality information. These thinking robots are amplifying the analytical power our organizations possess at a cost undreamed of a decade ago. As we learn how to harness this new technology, we will be able to use its powerful capabilities to achieve our goals better, faster, and more economically. □

"Do not expect microcomputers to replace the large information systems currently in place on mainframes."

Fred Dugger is director of the Department of Data Processing, State of Nevada, in Carson City.



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CIRCLE 6

by David Kull, Software Editor

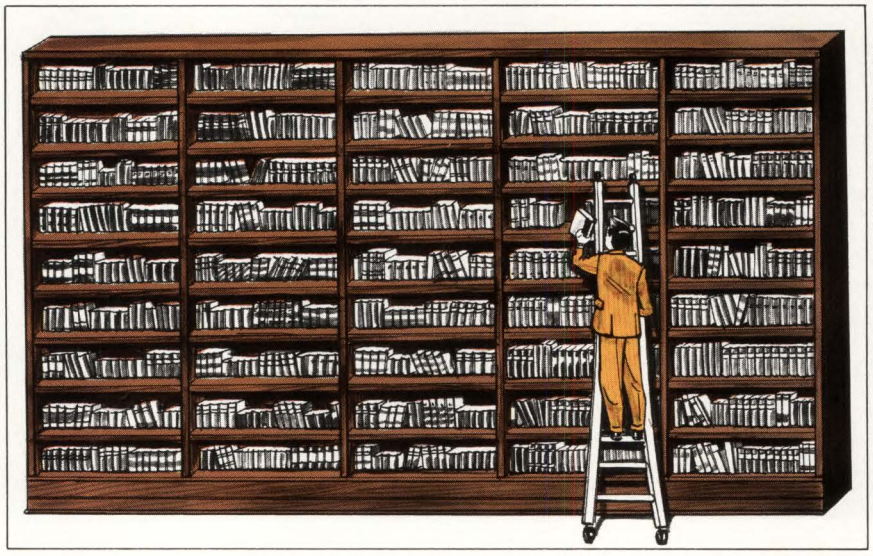

Illustration by Harold Brooks

WHAT'S SO GOOD ABOUT UNIX?

Software developers who work with Unix tend to rhapsodize when discussing its virtues. To the uninitiated, however, the operating system's commands and characteristics frequently seem confusing. They are certainly far different from those in other development systems. What is it about Unix that captivates the believers?

Once a user learns his or her way around Unix, it simplifies much of the drudgery of program development. For example, all programs and data are treated as simple files, eliminating the need for unwieldy input or output commands that other systems require for developing applications. But perhaps more attractive to developers are the library facilities Unix provides for invoking and efficiently modifying existing code. Program library facilities that perform similar functions are available for other operating systems. But Unix offers a host of standard utilities and an ability to store and manage changes in original code that many programmers find wondrous.

"Having that code available makes my life much easier," says Jordan Mattson, a Unix programmer at the University of California, Santa Cruz, CA, and a part-time consultant. Mattson has used Unix to develop several applications to help the university conduct its business, including course registrations and student-housing billing. In developing and maintaining these applications, he has used standard Unix utilities, a personal library of functions he created, the C programming language, a built-in program to rebuild automatically an entire application when only part of it has been changed, and a facility that remembers the versions a program has undergone during its development. To understand how he uses these tools, it's necessary to understand how Unix works.

Each Unix user interacts with the system via a "shell," which interprets the user's commands into instructions the computer can act upon. Two shells predominate. The C-Shell comes with the Unix version from the University of California's Berkeley Software Distribution. The Bourne Shell comes with AT&T's Unix. Whichever shell a system runs, each user gets a personal copy, which can be customized. In addition to interpreting commands, which invoke utilities and applications from a library, the shells can act as programming languages. Users can string together commands and use traditional programming conditional statements to build fairly complex algorithms, called shell scripts. Because the computer must interpret the commands as the script runs, execution is slow.

Hundreds of utilities are available for Unix. Many come as a standard part of most versions of the system. Utilities that developers frequently use include facilities for extracting, sorting, and combining information from files. Users can also create a library of their own

(Continued on page 44)

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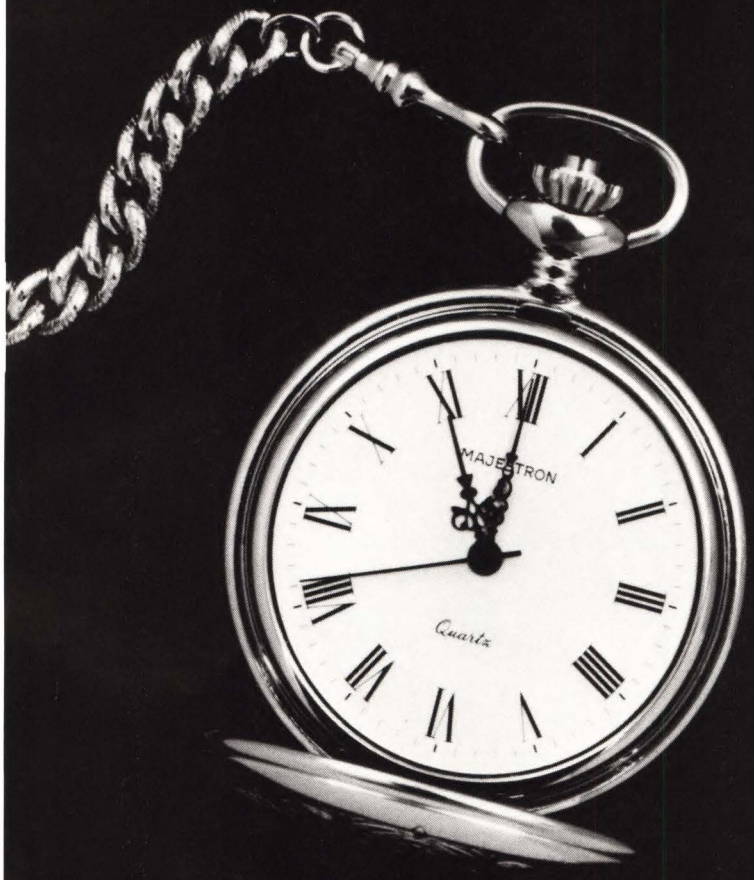

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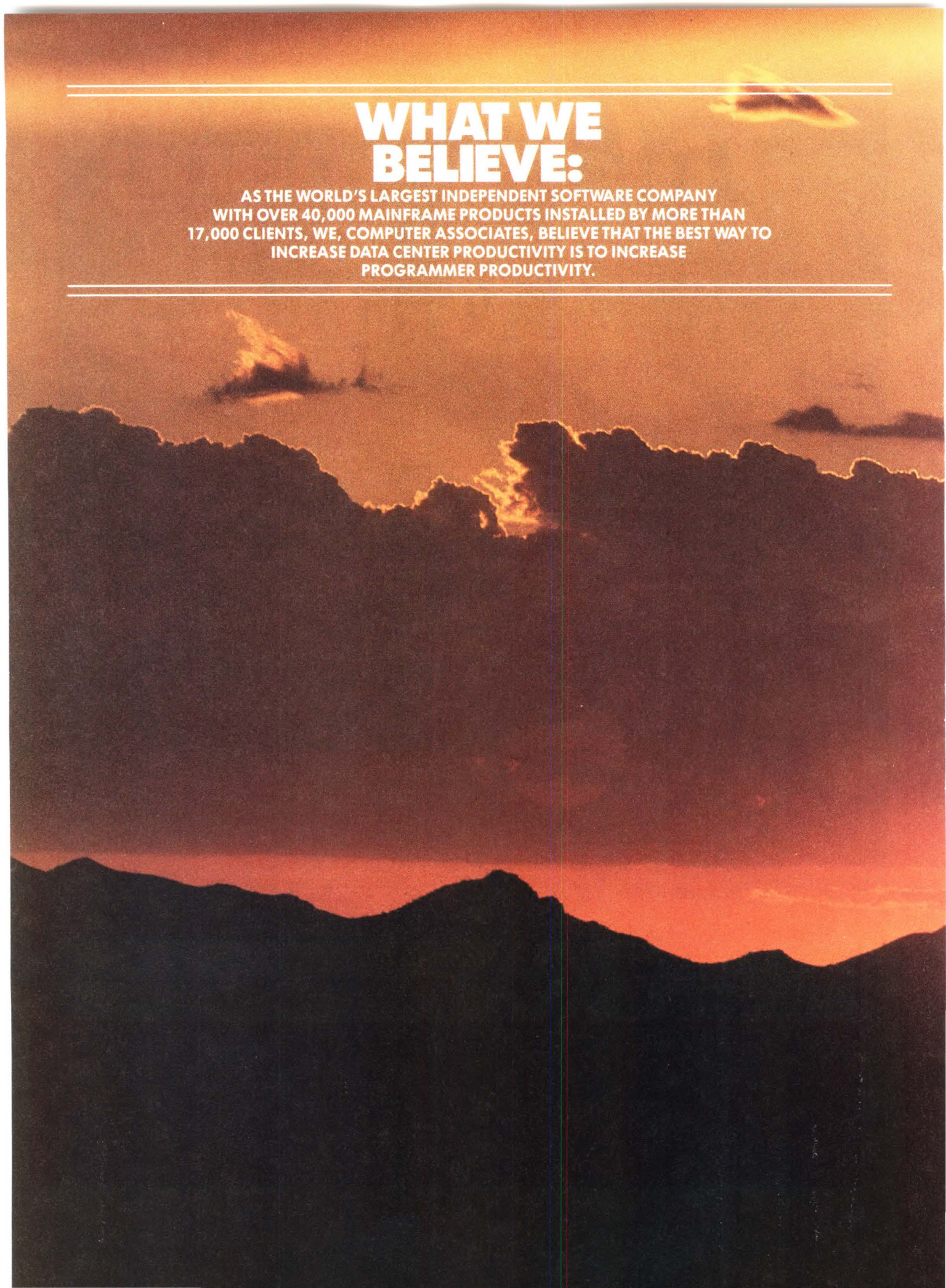
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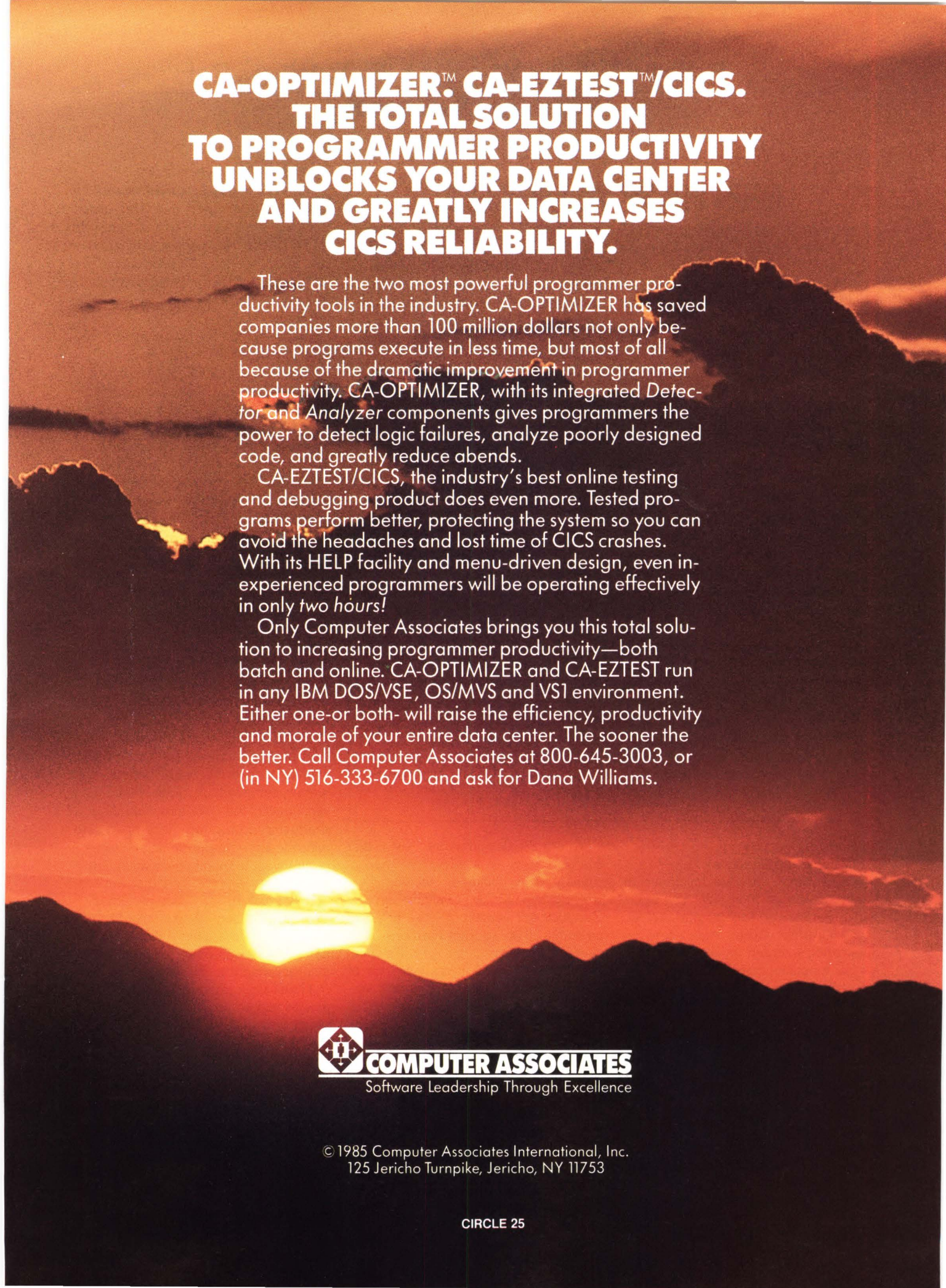
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CIRCLE 25

BIRTH OF A UTILITY

"Unix is a tool-making system," says Jordan Mattson. From the operating system's inception in 1969, software developers using it have created facilities to ease their work. These developers have often shared their tools with other Unix users, sometimes for free.

Students and professors at the University of California, Berkeley, developed several notable enhancements. They are available as part of the BSD 4.2 Unix version, sold by Berkeley Software Distribution. Some of them are offered in AT&T's Unix System V. Individual users continue to make their own development tools for Unix, and many of these tools find their way into distribution. Revision Control System (RCS), the librarian package offered with BSD 4.2, is a good example.

"I developed RCS because I was using SCCS [AT&T's Source Code Control System] and was dismayed by how poorly it worked," says Walter Tichy, assistant professor at Purdue University, West Lafayette, IN. SCCS is the librarian package sold with the Programmer's Workbench, AT&T's collection of Unix development facilities. According to Tichy, his revision of SCCS runs two to three times faster than the original, makes it easier to find the desired program version in the library, and keeps the directory of versions separate from the program's main directory.

Tichy says he gives RCS away "because I was working for the university when I developed it." But because he kept some of AT&T's SCCS code in RCS, he can give it only to organizations that hold AT&T source-code licenses, which give them the right to use such source-code modifications. However, Berkeley Software Distribution can give RCS to its licensees because it has its own agreement with AT&T. BSD 4.2 users can find RCS on the system's directory of user-contributed software, which lists other donated programs. AT&T source-code licensees can obtain RCS from Tichy. He'll transmit the program free over the telephone or, for a $100 handling fee, mail a copy on tape. Contact Tichy at (317) 494-1998 or at the Unix network address UUCP 1HNP4!Purdue!-Tichy.

(Continued from page 40)

utilities and applications.

For example, software developers at Federal Express, Memphis, TN, maintain a library for each major project. The libraries store code for an application's screen layouts and other special functions that would be needed throughout the program. Jordan Mattson has developed his own personal library. One utility, which he calls "pretty date," changes dates in the yy-dd-mm format to the more common month-day-year format—say, "84-05-09" to "Sept. 5, 1984." He can use a standard utility command to extract payment-due dates from a list of overdue accounts, transform them via "pretty date," and invoke another utility to fold them into a program that generates reminder letters.

Another development aid that Mattson uses is a program change-management package, Revision Control System (RCS), available on the Berkeley 4.2 version of Unix. (It's also available free to organizations with source-code licenses for AT&T's Unix. See sidebar.) RCS maintains a list of changes made between different versions of large systems, and automatically re-creates any given version. The alternative to RCS—keeping entire copies of every version—would use too much disk space and require too much record-keeping to be practical.

"It's not unusual for a user to ask for a change in a report and later decide that the old way is better, or that part of an even earlier version is what he or she really wants," Mattson says. "If I didn't have RCS or backup copies of the earlier work, I'd have to start from scratch."

Federal Express uses a similar program from AT&T called Source Code Control System (SCCS). According to Larry Schmidt, a senior technical advisor, the program "gives us some semblance of order." However, Schmidt believes Panvalet, the program librarian from Pansophic Inc., which Federal Express uses for applications developed on its IBM mainframe, provides more facilities.

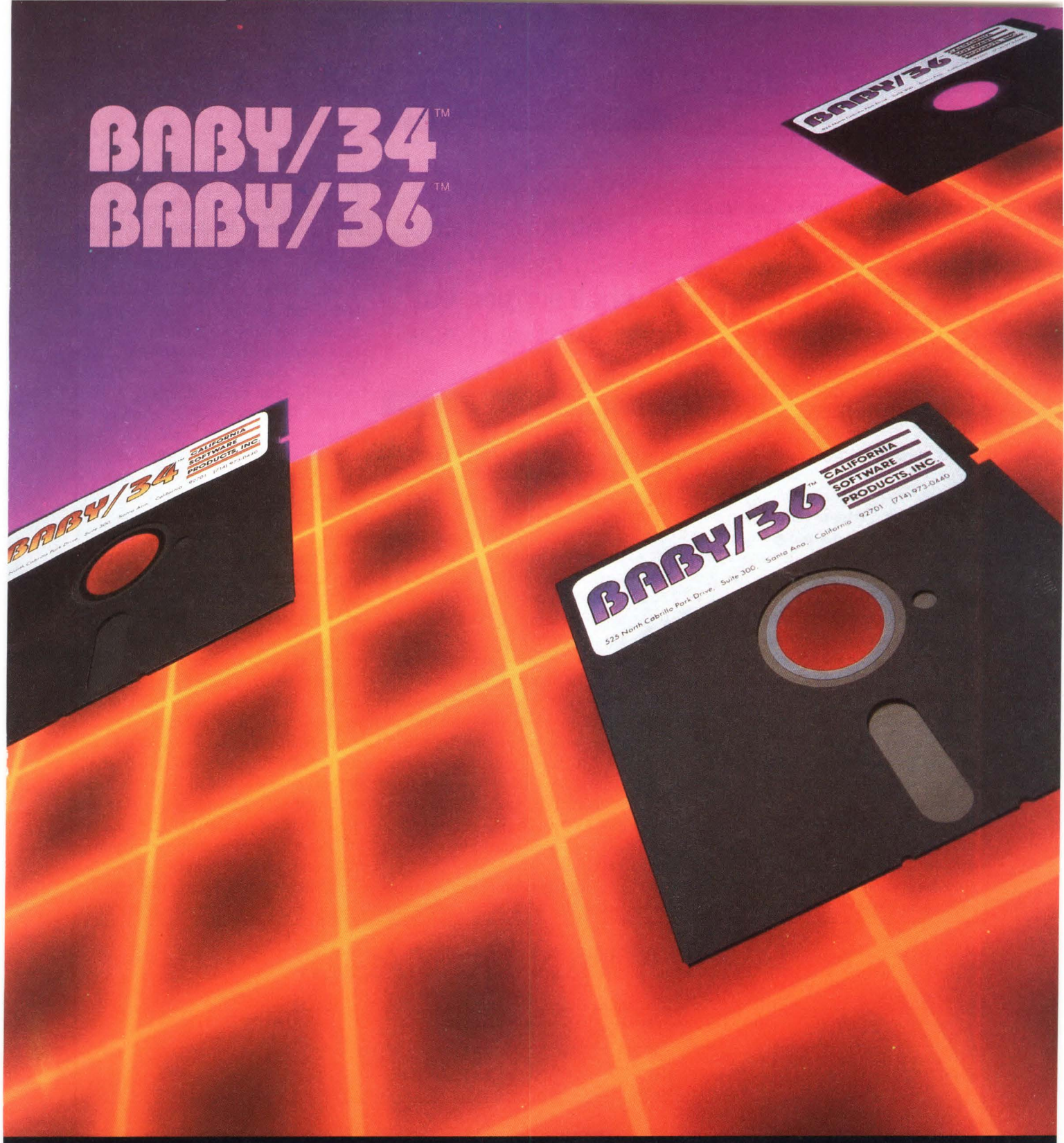
Make, another code-management program, comes as a utility with Unix. Make allows developers to describe the relationships between different parts of an application and rules for regenerating the entire program if any section of it is changed. The description goes into a file, which the developer invokes when changes are made. The Make file examines the source code from revised applications and recompiles only the changed modules into machine code. Compilation times are considerably shorter than if the entire new version were recompiled, of course. Make then reconnects the modules, creating a ready-to-run program that's up-to-date with the latest programming changes.

"If I want to modify the way an application sorts reports, and that application has used code from my library," explains Mattson, "Make will check to be sure I haven't altered that code. If I have, it will regenerate the application, incorporating the changes."

Under Unix, many programming languages can be used for applications development. The most frequently used is C, the language in which Unix itself is written. But other popular languages, in-

(Continued on page 46)

Unix offers an ability to store and manage changes in original code that many programmers find wondrous.



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CIRCLE 26

(Continued from page 44)

cluding Cobol, can also be used. Vi, the screen editor included with Unix, is used to compose programs in whatever language is being employed. Vi takes some getting used to. According to Schmidt, in one day a new user can pick up enough vi commands to get started, but it takes several weeks to get up to full speed. Schmidt prefers System Productivity Facility (SPF), IBM's screen editor, used widely for programming on IBM systems. He'd like an editor that emulates SPF and runs under Unix, but doesn't know of any. Federal Express' many programmers develop applications in Cobol on an NCR Tower running Unix. The applications are then run on an IBM mainframe. Only about a dozen of Federal Express' 600 programmers know C.

Other editors are available for Unix, including versions of EMACS—developed originally at the Massachusetts Institute of Technology's artificial-intelligence laboratory—from CCA Uniworks, Cambridge, MA, and Uni Press Software Inc., Edison, NJ. EMACS automates program composition for several languages, including C. For example, it automatically indents code lines, balances quotes and parentheses, and allows users to create their own abbreviations for commonly used words. It also provides a windowing feature, which allows users to work on several tasks at the same time.

> "You can create prototypes fairly easily using [Unix'] shell scripts, but performance is slow."
>
> *Schmidt, Federal Express*

Unix users don't have to program in a language. Many applications can be developed as shell scripts, but because operating speed is slow, this kind of program is appropriate only in some cases. "You can create prototypes fairly easily using shell scripts," says Schmidt. "But performance is poor. If you want to use the application for production work, you have to reprogram it."

Unix proponents claim that shell scripts can be more widely used. The decreasing cost of computer power makes the tradeoff of development time for machine time increasingly attractive. "We used to worry about saving machine cycles," says Jim Joyce, president of International Technical Seminars, San Francisco, which specializes in Unix training. "Now we worry about saving human cycles."

Joyce suggests prototyping an application from the shell and keeping the program "as is" if it works fast enough to satisfy its users. If not, the developer can try to revise the shell script to make it run faster. If execution time still isn't acceptable, the developer can code it in a programming language. Joyce contends that developers should fight the temptation to reprogram because the new code will need to be tested and debugged. "Debugging a new program is much harder than debugging a shell script," Joyce points out. "Usually, the shell employs code that has been proved correct during years of use."

Is Unix easy enough for users—either in employing its built-in filing and communications facilities or in developing their own applications? It depends on the user. Ford Motor Co.'s engineering division in Detroit has adopted Unix for its office-automation system, where it's been widely used for about a year. According to Dan Langley, a supervisor in the engineering information-systems department, the automotive engineers learned Unix fairly easily. The secretaries have had more difficulty. But because each Unix user interacts with the system through an individual shell, which can be modified, Langley's department can develop shells that are easier to use than the standard version. "It looks like we'll be developing quite a few shells," Langley says.

Jordan Mattson doesn't think Unix is

(Continued on page 48)

LIBRARIAN PACKAGES

Vendor	Package	Requirements	Price	Circle
Applied Data Research (609) 921-3070	ADR/The Librarian	IBM mainframes	$27,200/OS $18,000/DOS	494
Boston Syst. Office (617) 894-7800	BSO/Mlib Microprocessor Program Librarian	Many DEC computers and operating systems	$1,000	495
California Computing Resources (818) 709-2681	Update-Plus	DEC VAX under VMS	$4,000	496
Cincom Syst. (513) 662-2300	LMS-11	IBM mainframes	$22,500	497
Computer and Software Enterprises (805) 544-5821	Quicklib	HP 3000	$1,500	498
Computer Software Unltd. (901) 754-8332	Programming Activity Control System	IBM 370 and 43XX	$9,000	499
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(Continued from page 46)

difficult for determined users to master, especially those who have worked with other operating systems. He believes the job control languages (JCL), necessary to employ applications on other systems, for example, are harder to learn. "I've never had more frustrations as a developer than I've encountered working with JCL," Mattson says.

Nevertheless, Mattson has developed friendly shells for users of the Unix applications he developed at the University of California. The shells appear as menus, allowing users to employ applications by selecting options. He purposely left a print command off the menus, however, so users would have to work through the standard shell to print out their results. "This forces users to move through the system in the standard way just for that one task," Mattson says. "Then those who are inclined to learn more about Unix can see that there's much more available to them."

Under Unix, many programming languages can be used for applications development.

Like other Unix devotees, Mattson thinks anyone who gives the system a fair try will be infused with the same enthusiasm he has. He believes that as users learn their way around Unix, their pleasure with their discoveries will lead them, like so many of their predecessors, into the Unix fold. □

LIBRARIAN PACKAGES

Vendor	Package	Requirements	Price	Circle
ESI (904) 224-5182	Lionl Basys	Burroughs large and medium mainframes Burroughs medium-sized systems	$12,000 to $16,000 $7,000 to $11,000	501
Goal Syst. Int'l. (614) 888-1775	Flee/XP PDSMan/XP	IBM mainframes under DOS/VSE IBM mainframes under MVS	$5,040 $12,544	502
Information Syst. Consultants West (602) 864-0014	Soloman Soloman Management Reporting System	Honeywell Level 66 under DPS, DPS 8, GCOS III, GCOS 8 Same systems	$10,000 $3,500	503
Ivan Software (513) 222-4826	Ivan Lib/Ivan Edit	NCR mainframes running VRX or VRX/IVS	$3,000 and up	504
Mathematica (609) 799-2600	Titan	IBM mainframes and PCMs under DOS/VS(E)	$8,000 to $16,000	505
National Software Enterprises (404) 955-4268	NSE-VM/CMS Source Library System	IBM systems under VM/CMS	$6,500	506
National Syst. (313) 996-1969	Track I	Many minis and mainframes	$4,995 to $29,495	507
Oregon Software (503) 245-2202	Sourcetools	DEC VAX, PDP-11	$3,600	508
Pansophic Syst. (312) 986-6000	LCS (Library Control System) Panvalet	IBM mainframes under OS or MVS/VS1, MVS/XA IBM mainframes	$46,000 to $62,000 $19,000 (DOS) $22,000 (OS)	509
Phoenix Computer (213) 416-9040	Condor/Camlib	IBM mainframes	$19,500 to $24,500	510
Schafer Co. Software (206) 641-3938	Instal	DEC VAX, PDP-11	$250	511
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CIRCLE 27

by John Seaman, Data Communications Editor

Photo by John Harquail

Consultant Steve Caswell believes Meridian's application processing is its most valuable feature.

THE MERIDIAN CONNECTION

It looks like Northern Telecom Inc., Dallas, has jumped on the integration bandwagon. Meridian, Northern Telecom's highly promoted new offering, promises to integrate various office-communications functions, eliminate paper shuffling, and provide users with productivity-raising features.

Unfortunately, Meridian, like similar offerings from Ztel (Andover, MA), Intecom Inc. (Allen, TX), and NEC Telephones (Melville, NY), is just coming out of the lab. Northern Telecom plans shipments to beta test sites later this year, which means that Meridian won't be available until next year at the earliest.

When designing Meridian, Northern Telecom followed a familiar pattern. The product is based on Northern Telecom's SL-1 and SL-100 private-branch exchanges (PBXs). In fact, users of these PBXs will be able to upgrade to Meridian. The promise: a series of enhancements to the existing PBXs that will allow users to finally integrate office communications and tasks. The enhancements include a variety of applications, such as word processing, computerized phone directories, calendars, electronic mail, a business-forms feature, and, of course, a high-speed local-area network (LAN). The LAN, called Lanstar, will route office communications over existing telephone wiring at up to 2.56 million bits per second (Mbps), according to Northern Telecom.

Northern Telecom isn't the first PBX vendor to offer such a product. (See "Is there a PBX to the promised LAN?" March 26.) And it won't be the last. IBM and its new subsidiary, Rolm Corp. (Santa Clara, CA), are expected to offer a PBX that integrates an LAN and other office functions. With all these offerings on the horizon, now's the time for MIS/dp managers to ask themselves: Should these products be included in plans for the office of the future? And if so, when will this future become a reality?

A closer look at Meridian provides a brief glimpse at the office of the future. The Meridian SL applications, except for the mandatory directory, can be purchased separately or together. The electronic directory includes a corporate telephone directory and up to 1,000 personal listings for each user. The messaging service can create, send, and receive text and voice messages, and can integrate voice/text messages. The forms service enables users to create, store, fill in, sign, and route paper forms electronically. According to Toronto consultant Steve Caswell, these two functions will reduce the time needed for tasks such as accounts receivable by 10 to 15 days.

Meridian SL's access service automatically handles basic speed, code, and protocol conversions to speed access to information stored in different computers attached to the system. The share feature permits real-time, desk-to-desk communication between users.

(Continued on page 54)

Where can you find a powerful data processing system that integrates voice, uses multiple operating systems, and delivers voice and data at 2.56 Mbs to the desk over twisted pair telephone wire?

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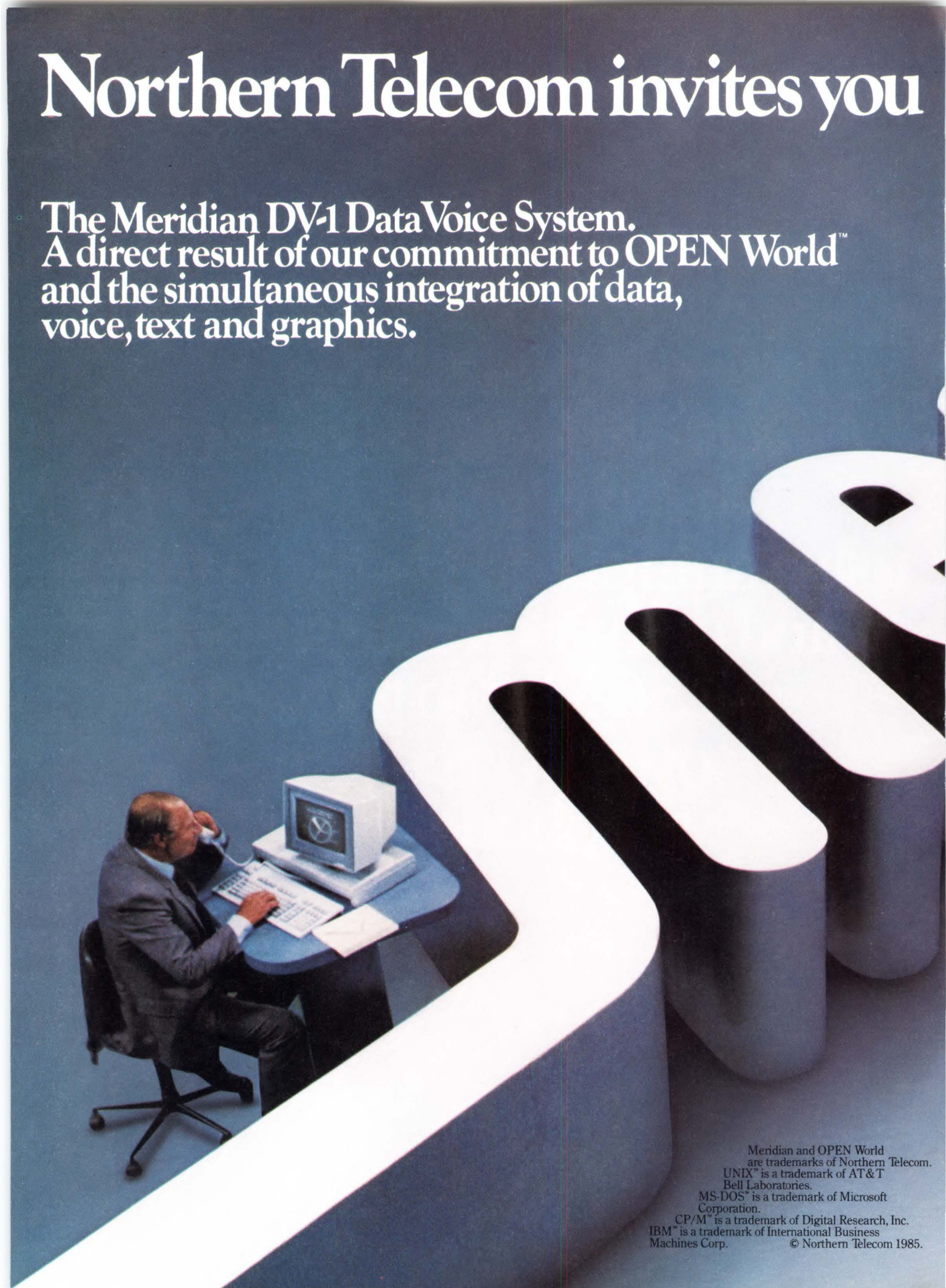

to meet on the Meridian.

The Meridian™ DV-1 is a system designed for departmental and branch office use for up to 100 users, moving data and voice over twisted pair telephone wire at speeds of 2.56 Mbs to the desk.

Because of its multi-processor architecture, users can have multiple applications running simultaneously, enabling them to switch from application to application at the touch of one or two buttons. They can access their preferred UNIX,™ MS-DOS™ and CP/M™ based application software, running on multi-user industry standard operating systems.

Users can develop their own applications using standard languages including "C," COBOL, FORTRAN, or BASIC with the aid of application development tools like generators, editors and debuggers. Applications can be programmed to interact with the call processing capabilities, delivering integrated voice and data solutions.

The Meridian DV-1 links the Meridian M4000 series of integrated terminals and IBM™ PCs at a speed of 2.56 Mbs to the desk. Other vendors' switching systems and computers may also be easily accessed. The Meridian DV-1 allows all relevant media—data, voice, text and graphics—to be handled in a single, integrated system. With voice access through the new Meridian M4000 integrated terminals or standard telephones, users have not only a multi-functional data terminal but also sophisticated phone features from which to choose.

And, because it's based on Northern Telecom's digital telecommunications experience, the Meridian DV-1 is a system that has the reliability you'd expect from a telephone system. And with the same ease of relocation.

For more information on the Meridian DV-1 Data Voice System, write Northern Telecom Inc., P.O. Box 202048, Dallas, TX 75220; or call (800) 328-8800, ext. 412. In Canada, call (800) 361-5883.

When there's business to be done, business meets on the Meridian.

nt northern telecom

CIRCLE 29

(Continued from page 50)

Either party can command information to appear and enter or alter information simultaneously on both screens. The computing feature runs applications software, including calendar management, database management, and word processing from independent vendors.

How have users handled these tasks until now? "Not very successfully," says Charles Robbins, president of Strategic Market Trends, a consultancy in Sharon, MA. "For the voice-mail function, some users have been attaching modules from VMX [Richardson, TX]. And AT&T has implemented a similar solution—although it doesn't have Meridian's power—by using AP16 applications processors with its System 75 and System 85 PBXs."

Lanstar, Northern Telecom's new local-area network, can interconnect a wide variety of terminals, personal computers, and mainframes, enabling them to communicate at high speeds. It also transfers files.

Lanstar can be hooked up with standard twisted-pair wiring, eliminating the need for costly parallel distribution systems using coaxial cable, twin-axial cable, or shielded twisted-pair wiring. Lanstar lets computers, terminals, telephones, and other peripherals operate on a single network over telephone wire, so users and workstations can be easily and inexpensively relocated. Lanstar carries packet-switched data and circuit-switched voice over standard twisted-pair wiring at speeds of up to 2.56 Mbps, over distances of up to 2,000 feet.

Lanstar services include asynchronous and synchronous data communications, data options for Northern Telecom's new line of digital telephones, and associated line-circuit interfaces. According to Northern Telecom, Lanstar's ability to interconnect computers and other peripherals and the cost-effectiveness of using standard twisted-pair wiring are the Meridian line's greatest advantages.

The Meridian's electronic directory includes a corporate telephone directory and up to 1,000 personal listings for each user.

Caswell disagrees with the vendor. "The Meridian itself [the module] is basically a back-end applications processor which, when functioning with the SL-1 PBX, can handle terminals connected to the SL-1 and can also be directly connected to its own workstations and the IBM Personal Computer," he says. "The communications capability of Meridian is not as important as the application-processing part, which can save businesses time by eliminating paperwork."

The Chicago Mercantile Exchange, a large midwestern commodities exchange, reviewed the Meridian line at a recent user-group meeting. "We like the LAN feature and the processor's ability to use twisted-pair wiring," says Joseph Enneser, senior telecommunications analyst at the Exchange. "We also like the messaging feature. Now we compose memos on stand-alone IBM workstations and distribute them manually. With Meridian, we could eliminate the hard copy by using the integral LAN."

"Northern Telecom will ship Meridian units to beta sites this year, which will delay shipments in volume until next year. At this point, it's hard to tell how many features will be incorporated into the early systems shipped," says Caswell. "Most units will have the messaging system, the electronic forms routing, and the LAN, but beyond that, I can't be sure. It will take Northern Telecom several years to get up to speed on this project." Caswell claims that the other major PBX vendors, including AT&T Information Systems (Morristown, NJ), IBM/Rolm, Intecom, Harris (Novato, CA), and NEC Telephones, are working on products similar to Meridian, but none of them will reach the market until late next year or early 1987.

With Meridian, Northern Telecom has tried to establish a line of add-on

Lanstar will route office communications over existing telephone wiring at up to 2.56 million bits per second.

equipment that can integrate many information-handling functions and many different types and makes of equipment. For smaller users, branch offices, and departments, the vendor offers the Meridian DV-1 (Data Voice system). Designed for branch offices or smaller departments of large organizations, DV-1 offers many of the features of the Meridian SL systems, including the Meridian SL's 40-Mbps LAN capacity and 2.56-Mbps distribution system.

Users can expand the DV-1 to meet specific needs for information processing and integrated voice and data communications. Both Meridian SL and Meridian DV-1 systems permit a wide range of other computers to be connected through the system.

Although Northern Telecom will be the first vendor out with such a line, its competitors are close behind. "I'd be surprised if the device IBM/Rolm claims to be working on can do anything that the Northern Telecom unit can't," says Caswell. "But the IBM/Rolm product will have the marketing advantages of any IBM product: Some users prefer to deal with IBM, regardless of the relative technical merits of the products. But IBM/Rolm will be operating on Northern Telecom's (and AT&T's) turf—communications."

Caswell believes the PBX module will be Meridian's ground-breaking tool. But users may find Lanstar (when connected to the PBX) with its ability to switch voice, data, and text at high speeds, more outstanding. Perhaps the Meridian line's greatest distinction is the freedom it will offer users, allowing them to pick and choose features that best suit their needs. □

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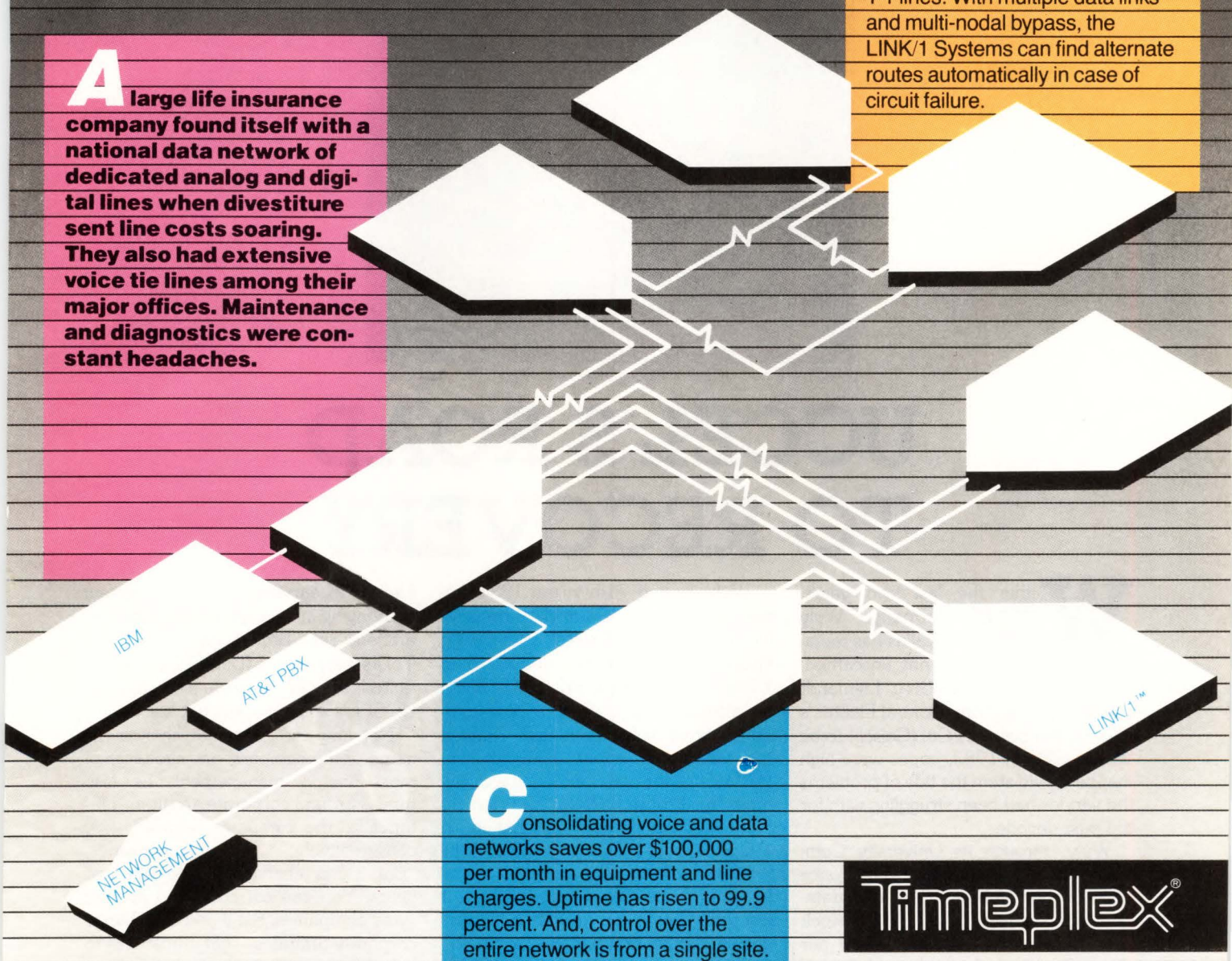

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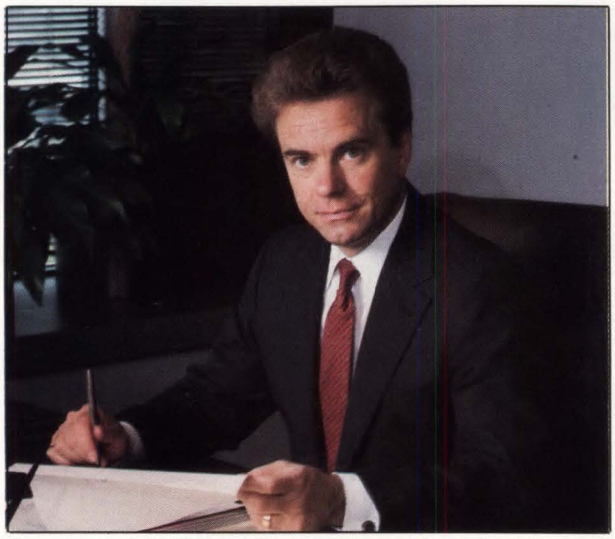
CIRCLE 30

by Jordan Gold, Southwestern Editor



Greg Liemandt, UCCEL's CEO, turned around corporate attitudes.

UCCEL'S ROAD TO RECOVERY

Within the last two years, UCCEL—formerly Wyly Corp.—of Dallas has metamorphosed, emerging not unscathed, but improved. When Greg Liemandt was hired away from General Electric's Information Services Co. (Geisco) to be Wyly's CEO in 1983, hopes were high that he would stem the tide of problems the vendor had been struggling with for the past decade.

Wyly, through its University Computing Co. (UCC) subsidiary, had once been a hot company in the data-processing-services market. Its stock had traded for more than $150 per share. By 1983, due to loss of market share, questionable business decisions, and a series of ill-advised investments, that same stock was selling for about $12 a share—a decline that must have demoralized stockholders, especially UCC executives and employees. (Eventually, the stock price sank to lower than $8 per share. It currently sells for approximately $14).

Wyly ranked 74th in the 1984 edition of the "Top 100 in data processing" (based on 1983 sales), after having finished 68th in 1982, and 53rd in 1981. Many of Wyly's problems could be attributed to Datran, a data-communications subsidiary that drained the vendor of about $300 million. Datran's enormous expenditures almost bankrupted Wyly and led to founder Sam Wyly's resignation in 1979. "A successful company took its focus away from what made it successful, tried some new ventures where it lost very heavily, and forfeited its position in the marketplace as a result," summarizes Paul E. Newton, UCCEL's senior vice president of software products and a Wyly employee during the 1970s. "As Sam Wyly said, 'We failed to dance with the one who brung us.'"

Change was a key ingredient in Liemandt's strategy. One of his first moves was to change Wyly's name to UCCEL (pronounced "you sell"). The name change symbolized a new start. Liemandt rearranged top management by bringing in executives from giant operations like IBM (Armonk, NY) and Texas Instruments (Dallas). He also acquired smaller vendors to round out UCCEL's software product line.

Not only did Liemandt change the name of the company and the faces of most of top management, he also turned around corporate attitude. "Historically, the company behaved very conservatively," Newton concedes. "But it has changed in the last two years. You can cut costs and acquire some companies, but if you can change corporate attitudes—get employees to be more aggressive, react more quickly, and take risks more readily—you can really make progress."

So far, UCCEL's metamorphosis has been a change for the better. Revenues were over $173 million last year, up $20 million from 1983. More important, profits from operations were $7.9 million last year, up from $187,000 in

(Continued on page 60)

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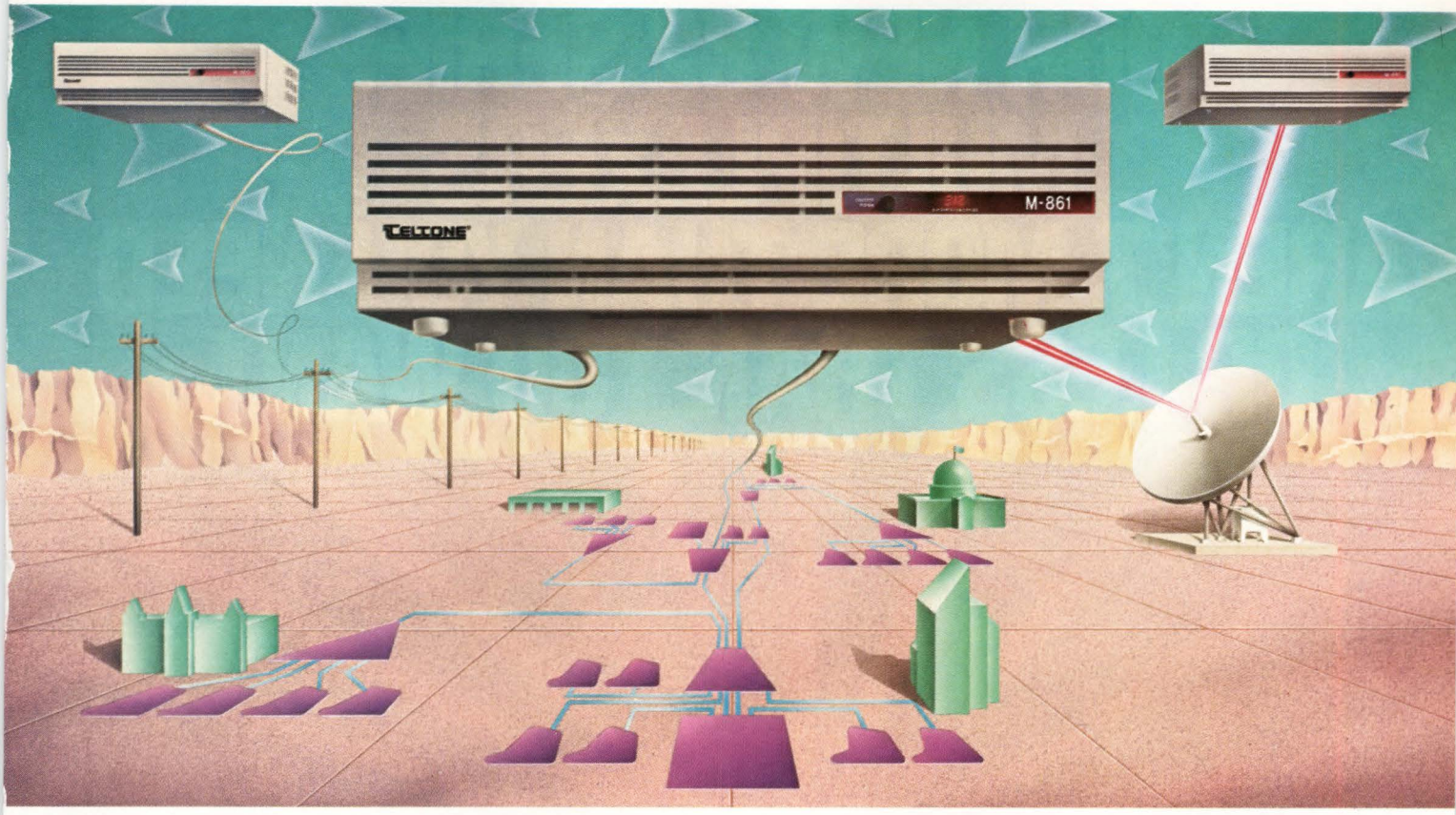

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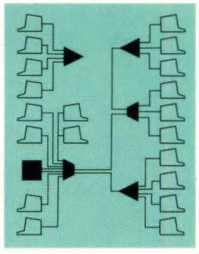

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CIRCLE 31

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CIRCLE 32

(Continued from page 56)

1983. Software, not services, provided most of the vendor's revenues for the first time in its history, according to Newton. He believes this trend will continue: "We envision three-quarters of our business coming from software within the next three years."

UCCEL is a collection of companies, providing services and software to a variety of domestic and international industries. It ranks as one of the top five independent software vendors in the country. Newton puts MSA (Atlanta), Cullinet (Westwood, MA), Applied Data Research (Princeton, NJ), and Computer Associates International (Jericho, NY) in the top five and Software AG (Reston, VA), Cincom (Cincinnati), and McCormack & Dodge (Natick, MA) just behind.

UCCEL is divided into seven divisions and subsidiaries, all but three based in Dallas: Systems Software (SSD), Applications Software (ASD), Open Systems (Minneapolis), Computing Services (CSD), Digital Systems (DSD) (Pensacola, FL), Spectrum Training Corp. (Salem, MA), and Computer Integrated Manufacturing Co. (Cimco).

SSD sells mainframe software to run data centers more efficiently. Ten products are currently available. According to Newton, UCC-7, a production-control package designed to manage production workflow, is the most successful of UCCEL's new products introduced in the past three years. "It's not an 'exciting' product," he says, "But it meets a real market need." SSD sales were almost $50 million last year, up from $35 million in 1983.

ASD sells mainframe banking and general-accounting software. UCCEL has made no secret of its plan to become one of the top banking-software vendors in the country. ASD sales last year were more than $28 million, up from $24.8 million in 1983.

Open Systems creates accounting software for single- and multi-user microcomputer systems. UCCEL acquired Open Systems in 1983 and reported sales of roughly $10 million last year.

CSD provides time-sharing services to a wide range of industries. Revenues were $73 million (split almost equally between domestic and worldwide sales) in 1983 and $68.6 million last year.

Spectrum Training Corp. is a computer-based-training vendor UCCEL acquired on December 31, 1984. Last year's sales were roughly $5 million. According to Newton, Spectrum is small but growing rapidly.

DSD and Computer Integrated Manufacturing Co. provide turnkey computer systems to a variety of vertical markets. Sales were $16.9 million in 1983 and $16.5 million last year. These divisions have not been profitable in the past, and although Charles Frumberg, an analyst for Mabon, Nugent, and Co., New York, expects them to be profitable this year, he also predicts that UCCEL will sell them. "They simply don't fit well with the rest of the corporation," he says.

UCCEL revenues grew by only 15 percent from 1983 to 1984, but figures can be deceiving. "It has strong growth where you like to see it," Frumberg comments. "It's very strong in system software and time-sharing services. Although some divisions are growing slowly or not at all, others are expanding rapidly."

UCCEL has stated that its goal is to achieve $400 million to $500 million in revenues within five years. Its current 15 percent annual growth rate is not nearly high enough to reach that mark. But Newton believes the objective is within reach. "We have the resources to become a $500 million company," he says. The resources include ready cash ($60 million), the desire to spend that cash on worthwhile acquisitions, and Newton's belief that UCCEL's banking and system-software operations will continue to grow rapidly.

UCCEL has launched a dual strategy to reach its goal. First, it's started an aggressive acquisition program to purchase vendors that complement its product lines. Second, it has undertaken an ambitious research-and-development effort to improve its mainframe-software products.

"We have the resources to become a $500 million company."

Newton, UCCEL

Since 1983, UCCEL has acquired three companies: Open Systems, Spectrum Training Corp., and Financial Software of America (FSA) of Winter Park, FL, a banking-software vendor. UCCEL has also acquired the Dallas-based remote-processing business of Sungard Services Co., Wayne, PA. Newton believes acquisition is the best way to reach $500 million in sales because it's faster than internal growth. "You can look for us to make some fairly major acquisitions this year," he predicts.

Perhaps another contributor to UCCEL's future growth will be Leap (Leading Edge Applications Project), a multi-year, $20 million research-and-development project charged with creating a "new generation" of banking and general-accounting mainframe-applications software for UCCEL's applications-software division. Leap was begun in 1983 with an infusion of $20 million from Walter Haefner of Swiss-based Careal Holding AG, UCCEL's largest stockholder. Beginning next year, products are due to be introduced over a two-year period.

Although Newton believes Leap's success or failure will influence corporate morale, he doesn't think Leap's fate is closely tied to that of the organization as a whole. "Leap's primary goal is to develop applications software, which accounted for only 13 percent of our revenues last year," he points out. "If Leap is successful, it will give us 40 percent to 50 percent growth in applications software and keep us healthy for many years to come. If it fails, applications will move along at a very modest growth rate. Leap is the difference between a $400 million company and a $500 million one."

Change—a new name, expanded product lines, and a rejuvenated corporate attitude—has been the key to the turnabout in UCCEL's fortunes. Whether the vendor reaches its $500 million goal remains to be seen, but UCCEL has already traveled far on its road to recovery. □

IBM® Software Notes
News for the DP professional

BancOhio is constantly improving its products and services, with help from IBM's DB2.

Managers at BancOhio Are Banking on DB2

"DATABASE 2 (DB2) is an efficient vehicle for providing our top management with financial and analytic details," says Jack Kiger, Vice President and Director of Data Processing at BancOhio in Columbus, Ohio.

The bank, which has more than 250 branches throughout the state, has been testing DB2, IBM's full-function relational data base system, for a year and a half. "In that time, we did a 22 man-year MIS project in only 24 man-months," reports Kiger.

The key to this outstanding productivity is DB2's powerful Structured Query Language (SQL), which makes corporate data available—simply, economically and with full data security and control.

Through its Query Management Facility (QMF), DB2 provides end users with a friendly interface to SQL, including a full set of helps and prompts. With QMF, users can query the data base directly, ask the system to generate reports or create their *(continued next page)*

A NOTE TO THE READER

To keep you informed of software developments at IBM, we will publish *Software Notes* on a regular basis.

Software Notes will bring you news of programs that help make systems and people more productive. It will feature articles on high-productivity packages such as DB2, IBM's full-function relational data base system, and application development tools such as the Cross System Product Set. And it will tell you about users' experiences with IBM software.

We'll also let you know about new software courses and other IBM offerings that can help you get the most from your DP resources.

The Cross System Product Set Aids Programmers at Corning

Through an innovation in application development, Corning Glass Works, Corning, New York, has eliminated most of the detail work involved in conventional programming.

The innovation is the Cross System Product Set from IBM.

With this program, a developer can complete every phase of a project interactively at a terminal. This includes defining and validating screens, files and logic; testing and debugging a program; running trial executions and putting the application into production.

The Cross System Product Set is especially effective as a development facility for applications designed to run under CICS, or in distributed 4300 and 8100 systems.

According to Steve Grace, Supervisor of Application Development Technology at Corning, "The program's interactive nature and extensive debugging aids lend themselves to developing applications quickly and accurately."

What's more, the Cross System Product Set requires fewer special CICS skills on the part of the programmer.

Such features as trial screens and quick prototype executions improve communication between DP personnel and end users.

The program runs on all 4300 and 30XX series operating systems and on the IBM 8100 with DPPX/System Program. It's portable, so that an application developed on one supported system can be run on another.

Mr. Grace sums up the experience with the Cross System Product Set at Corning Glass like this: "As a result of its many benefits, we've been able to satisfy user requirements faster and more economically." ■

DB2 (continued)

own unplanned reports.

But DB2 is much more than an end-user product.

It's a full-function relational system that lets professional programmers develop complex applications with greatly improved productivity. It provides them with the facilities they need for backup, recovery, restart and security. These functions can be incorporated in an application by simple statements and need little explicit programming.

With these security provisions, transactions are well protected. This means that DB2 can handle online applications while maintaining the integrity of the corporate data resource.

Thus DB2 can meet the full range of needs. It can handle production work as well as end-user query and reporting services.

"Our experience with DB2 has been beneficial," Kiger adds. "From the standpoint of stability and ease of use, it's the best product IBM has delivered to us." ■

'Usability' Labs Help Make IBM Software Easy to Use

It's one thing to create software that works. It can be quite another to make that software easy for users to learn and operate, and to support it with documentation that's easy to follow.

Dr. Lewis Branscomb, IBM's chief scientist, puts it this way: "It shouldn't be necessary to read a 300-page book of instructions before using a computer, any more than it is before driving a new automobile."

That's why, prior to release, IBM evaluates many pieces of software for "usability." We've taken a scientific approach to this process in Usability Laboratories located in cities across the United States.

The evaluators are people who have not had software experience.

In each lab, we've set up a complete office environment, attractively decorated and comfortably furnished. On each desk is an IBM workstation which supports the software to be evaluated.

Here, evaluators at the workstations are handed the instruction manuals and assigned the task of putting a piece of software through its paces. As each evaluator works, he or she is observed and recorded. Every interaction on the workstation screen is recorded too.

Through this feedback we've learned a lot about our software—and our documentation. We've also made software, such as the IBM Business Management Series, a lot simpler to use. ■

Evaluator (rear) works with a piece of IBM software. Observers (foreground) note her efforts and record them for study.

RACF Helps Protect Data At United Student Aid Funds

"We are pleased with the enhancements of the IBM Resource Access Control Facility (RACF)," says Dan Roddy, Manager of Data Center Support for United Student Aid Funds, Indianapolis, Indiana, a nonprofit corporation which guarantees and services student loans.

"In particular, a new system of resource definition in RACF, called 'generic profile checking,' makes administration much simpler. Most data sets can be protected using only the first-level qualifier," Roddy adds.

Profile checking is just one of the many features that make RACF easy to implement and maintain. Flexibility of design and structure is another. In addition, with RACF you need not modify your operating system or system-level software such as CICS, IMS, DB2 or HSM.

RACF uses list orientation, a simple technique for access control. With little effort, you can establish ownership and control over your resources. You can also designate who else may have access—and how much access.

RACF has built-in features which make it easy to demonstrate that the controls have worked.

Positive control, excellent security, simple maintenance and administration: These are the benefits that make RACF a widely accepted access control product. And RACF is designed to work closely with such IBM operating systems as MVS and MVS/XA. ■

VS COBOL II will be available in the first quarter of 1985. This major new COBOL product will let you compile programs to run above the 16-megabyte line in XA systems. And that includes CICS or IMS transactions.

IBM Offers Courses On IS Management

If you're interested in learning about management issues related to information systems, or in getting advice on training, or in just keeping current yourself, you'll be interested in the offerings of IBM's Information Systems Management Institute.

The institute offers over 38 courses in six information systems areas: Information Systems Planning, Applications Development, Service Management, Information Asset Protection, End User and Personal Computing, and Personal Development and Management.

The courses seek to help users increase their productivity in data processing. Lasting from two to five days, the courses are offered in over 25 cities and are taught by staff instructors who combine years of teaching with practical knowledge.

To order a free catalog of courses, just return the coupon. ■

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Please send me literature on:
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☐ Cross System Product Set
☐ Information Systems Management Institute

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IBM®

by David Roman, Associate Editor

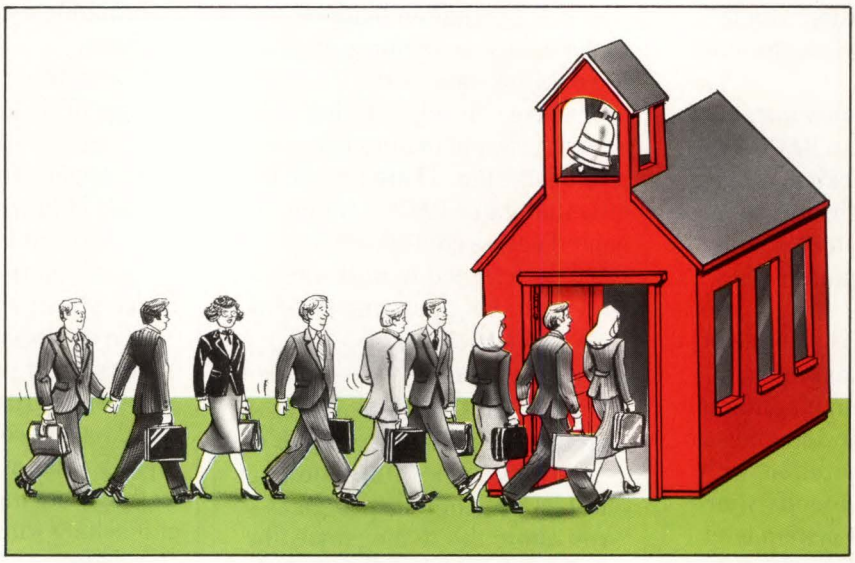


Illustration by Harold Brooks

COURSING THROUGH UNIX

Adopting Unix presents an organization with the considerable task of teaching data-processing employees and end users the peculiarities and intricacies of this Bell Laboratories creation. Fortunately, a large and diverse body of instruction is available for the popular operating system. (For more on Unix, see "What's so good about Unix?" in Strictly Software.)

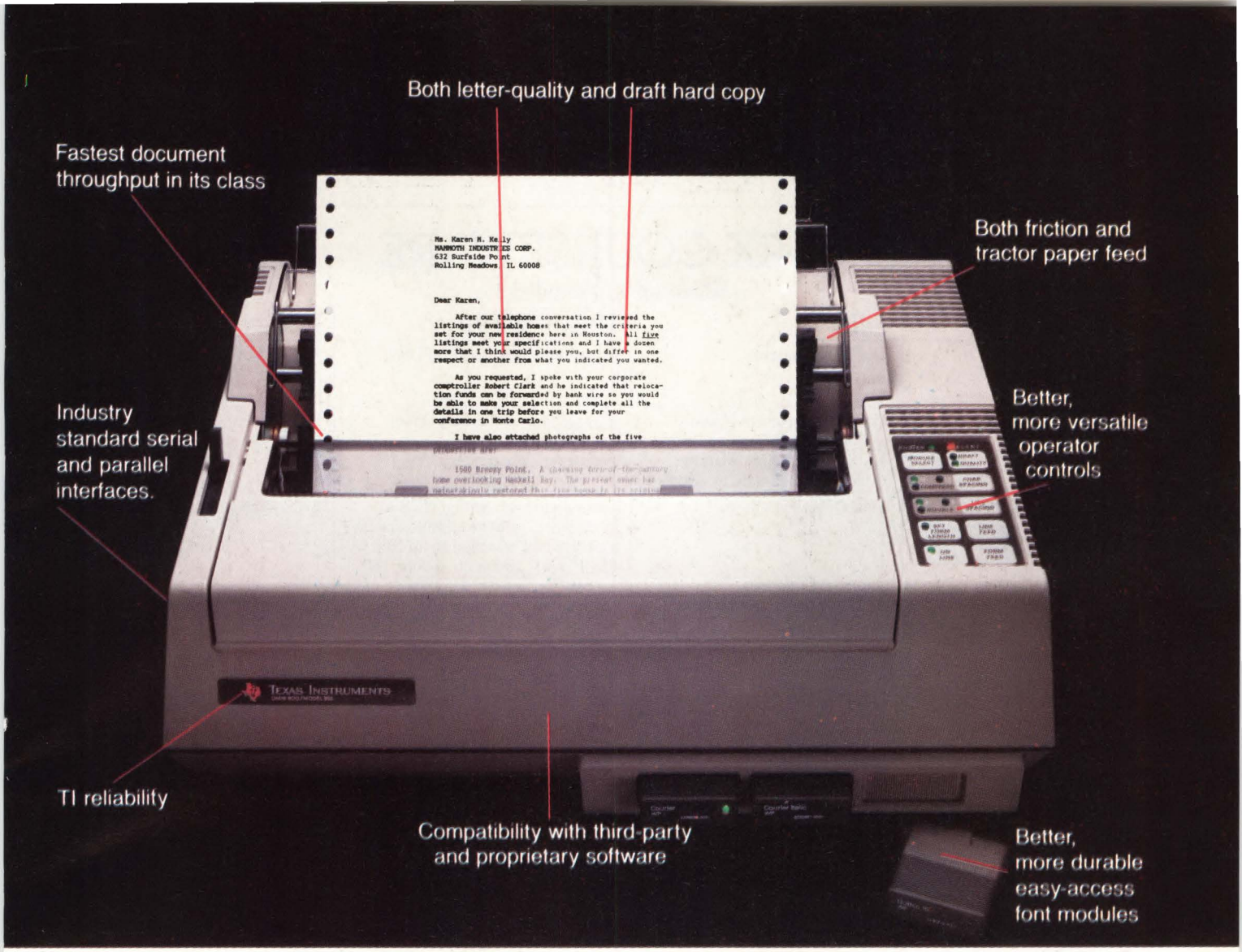
Organizations still mulling over a move to Unix might want to consider an introductory seminar offered by one of the many lecture groups. Generally, these courses target managers and provide an overview of Unix features. Some introductions, such as "The Unix Dilemma" videotape from Deltak Inc., Naperville, IL, review both Unix' strengths and weaknesses. Most of the training available is for organizations already committed to Unix, and addresses programmers, systems managers, administrators, and end users.

Whether you use Unix V, Unix 7, Xenix, Venix, or any other -ix, the training you receive will probably apply to your particular Unix version. "If you've learned one, you've learned them all," says Keith Eisenstark, marketing manager for Structured Methods Inc., a New York consulting group that offers Unix training. "The way each of the Unix-like systems interacts with the user is very similar." AT&T has released several new Unix versions since Structured Methods assembled its training courses several years ago. "But our training still stands up as far as user interaction goes," Eisenstark says. "The commands, use of the utilities, and the shell programming are still the same. The file system hasn't changed, and the editors are still the same."

In addition to the training resources listed here, there's a unique system available from User Training Corp. of Campbell, CA. It's based on an audio-digital cassette player that attaches to most crts and personal computers. This box will play cassettes that simultaneously talk a student through a course and control the demonstration presented on the screen. The player unit costs $1,610. Standard courses for novices, programmers, and administrators are available. The vendor also offers courses on the ex and vi text-editing utilities. Courses range in price from $2,000 to $4,250. Both the player unit and the courses can be leased.

Bundles of books are also available on learning Unix, some of which include directories of Unix software and system vendors.

And there's always AT&T, Unix' birthplace. AT&T offers an extensive curriculum of Unix instruction. Contact AT&T Corporate Education at P.O. Box 2000, Hopewell, NJ 08525, (609) 639-4449. Also available is the recently released Instructional Workbench, a computer-based training system that runs under Unix. For information, contact AT&T Technology Systems, P.O. Box 25000, Greensboro, NC 27420, (919) 697-6530. *(Continued on page 66)*



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Software Compatible. The TI 855 uses industry standard escape sequences for compatibility with virtually all third-party software. And for those with proprietary software needs, a model is available with ANSI standard escape sequences.

Tough Font Modules For Quick Character Change. Three font modules can be inserted into the front of the printer at one time, and are accessed individually. Each contains both draft- and letter-quality character sets. They're easier to use, more reliable and more durable than traditional metal or plastic daisy wheels.

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CIRCLE 35

291380-R2

(Continued from page 64)

UNIX COURSEWARE

Videotapes/videodisks

Vendor	Title	Description	Price	Circle
Deltak (312) 369-3000	The Unix Dilemma	Roundtable discussion on Unix	$50 to $130 per mo.; rent only	487
Hayden Book (201) 393-6300	The Unix System—Making Computers More Productive The Unix System—Making Computers Easier to Use	Introduction courses for senior managers Beginning Unix training	$150 $150	488
Interactive Training Systems (617) 497-6100	Unix Overview Unix Fundamentals C Language Programming	Six-unit courses; run on NCR's Interactive Hardware Station or on a player unit attached to an IBM PC, PC XT, or Zenith 100 or 150 15 units on Unix commands 16 units for programmers	$703 each $703 each $703 each	489

Computer-based training

Vendor	Title	Requirements	Price	Circle
Institute for Advanced Professional Studies (617) 497-2075	Unix Online Tutorials	IBM PC; PC AT Onyx, NCR Tower VAX-11/750, Masscomp VAX-11/780 Amdahl	$250; $450 $650 $1,000 $1,500 $3,000	490
Intelligent Courseware (916) 321-5300	Introduction to Unix Unix Internals Text Processing Courses for programmers and system administrators	Most Unix-based systems For managers and administrators For end-users of Unix	$50 to $1,000 Same Same Same	491
Intelligent Training Solutions (818) 906-8628	Introduction to Unix Courses available for programmers and operators	Unix-based minis and micros	$150 to $2,000 $600 to $5,500	492

Public seminars

Vendor	Title	Description	Price	Circle
AT&T Technologies (609) 639-4449	Overview of the Unix System Fundamentals of the Unix Operating System for Users Wide variety of specialized courses available	One-day overview Three-day hands-on course*	$200 $690 $345 to $1,300	493
Auxton Computer Enterprises (201) 572-5075	Overview of Unix Facilities Introduction to Unix Variety of specialized courses available	One-day overview* Three-day course	$200 $600 $200 to $1,000	475
Bunker Ramo (203) 386-2000	Unix Advanced Unix	Five-day courses*	$500 $500	476
Center for Advanced Professional Education (714) 261-0240	Unix, A User-Oriented Evaluation Unix Systems Design & Software Development	Three-day lecture Three-day lecture	$745 $745	477
Computer Tech. Grp. (312) 987-4000	Unix Overview Unix Fundamentals for Nonprogrammers Variety of specialized courses available*[1]	One-day seminar*[1] Three-day hands-on class*[1]	$225 $735 $500 to $1,400	478
Control Data Institute (301) 468-8576	Unix Programming Workshop Variety of specialized courses available*	Two-day hands-on course*	$745 $745 and $895	479

* On-site sessions available [1] Videotape available

(Continued on page 129)

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It's nothing short of the control and power over your finances that you've always wanted—and the way to make your investment in a personal computer pay off.

See SPECTRUM in action. Call us or come to your nearest Chase branch today and we'll arrange a free demonstration. In New York, 212-223-7794, or outside New York, 1-800-522-7766.

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Photo: Ron Kimball

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CIRCLE 37

Graham Magnetics' commitment is long term: to provide premium-quality permanent computer tape products to data processing managers worldwide. You know your data is a corporate asset worth protecting with the highest-quality, problem-free computer tape in the world. So if you're tired of "bargain" tapes with untimely, costly problems, call Graham.

Graham Magnetics: making sure that high-quality permanent magnetic media never becomes an endangered species.

by Theresa Conlon, New Products Editor

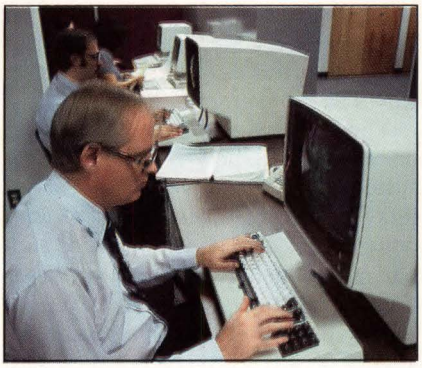
PT COMPONENTS, INDIANAPOLIS

Photos by John Starkey/Black Star

When PT Components (PTC) moved into its new data center in Indianapolis two years ago, it returned home. PTC bought the data center from its former parent, FMC Corp. of Chicago.

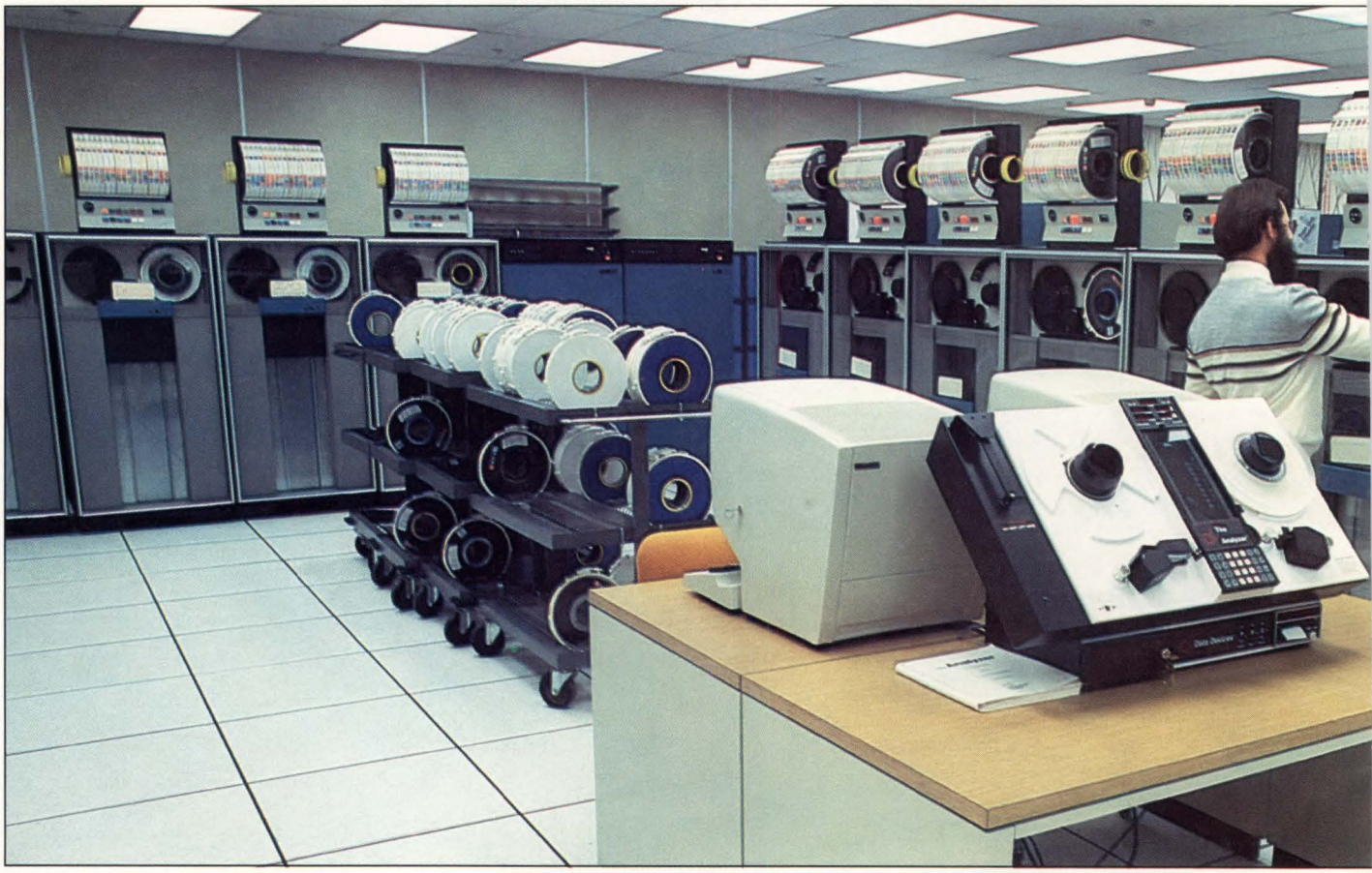
The computer-room section of PTC's data center served FMC operations from 1975 to 1980. PTC, as the Power Transmission Group of FMC, was the center's largest user. By the time PTC was divested by FMC in 1981, the old data center had been shut down. It was closed for two years until PTC purchased, enlarged, rewired, and rechristened its former home in 1982.

A privately held manufacturer of industrial products, including the Link-Belt timing chain used in the engines of General Motors cars, PTC employs approximately 3,000 workers and has eight manufacturing facilities in the U.S. and one in Mexico. It also has sales centers in four states, one in Canada, and one in Belgium. All domestic facilities are served by the Indianapolis computer center.



△*Secretaries in the reception area (above) use a Wang System 5 dedicated word processor, which includes a Wang 5541 printer, for business correspondence, and filing. Systems analysts (below) work on IBM 3278 terminals.*

D.L. Construction, Vionsville, IN, renovated the building and extensively rewired it. The two-foot-thick concrete walls in the computer room are considered tornado-proof; they enclose 12,000 square feet. An office area now occupied by the development staff was added to the original structure by PTC in 1983, giving it an additional 6,000 square feet. *(Continued)*



(Continued from page 69)

The entire data center, renovated strictly for data-processing services, now houses PTC's programming, technical support, development, and management staffs, as well as the computer room and its operations staff. The new portion of the building was started in December 1982. It was completed in March 1983, and by late April PTC's staff moved in.

Explains Jim Slaymon, operations manager, "We downloaded our systems from our service bureau, built our own data center, installed the IBM 3033 mainframe, and got systems up and running. Consultants had advised us that the project would take over a year to complete, but we did it in four months. We're pretty proud of that."

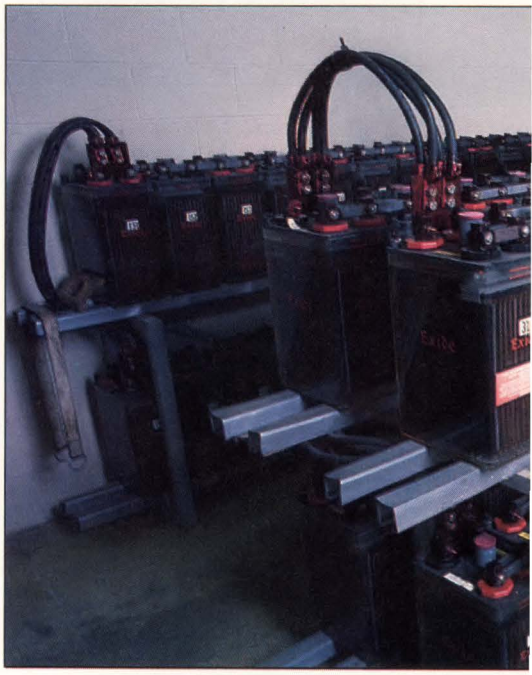
The data center houses 71 professionals who support the computing and programming needs of the manufacturer's domestic operations.

PTC is equipped with IBM 3350 and 3380 disk drives supporting an IBM 3033AP mainframe. Six IBM 3340 disk drives support data from an IBM 4331 mainframe.

The facility is also equipped with an uninterruptible power supply (UPS) system. In addition, two diesel generators, with 1,250 kilowatts of backup power, ensure a nonstop power supply: If one generator fails, the other will kick in.

Together, these power protectors keep PTC's track record of providing maximum uptime to its users impressive. "Goals for 1984 and into 1985 were to hit 98 percent user availability

(Continued on page 72)



◁*PTC's tape library is managed online by the UCC-1 Tape Library Management System from UCCEL Corp. The IBM 3278 displays a message that indicates which tape is to be mounted on one of the IBM 3240 tape drives. Also shown is a Data Device tape verifier.*

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Liebert
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Circle 434

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Circle 435

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Cummins Engine
(812) 377-5000
Circle 437

Exide
(215) 674-9500
Circle 438

Floors
Cincinnati Floor
(513) 321-1837
Circle 439

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IBM
(Contact local sales office)
Circle 440

Network-control syst.
AT&T
(201) 898-3278
Circle 441

Office furniture
Cole Business Furniture
(717) 854-1545
Circle 442

PBX
NEC America
(516) 753-7000
Circle 443

Tape-management software
UCCEL
(214) 353-7100
Circle 444

Word processors and printers
Wang Labs.
(617) 459-5000
Circle 445

◁*Three Halon tanks protect the computer room, tape vault, and battery-backup room from fire. To prevent false alarms, two detectors located in the same Halon zone must sense a fire and sound two alarms before discharging the expensive Halon gas, which costs $1,200 per tank.*

◁*One hundred eighty Exide batteries can operate the computer center for 30 minutes, enough time to activate a diesel generator that can keep the data center running for four days. The motor generator was supplied by International Power Machines; the diesel by Cummins.*

OUTSTANDING DATA CENTER

◁*Judy Faulkner, technical librarian, maintains PTC's technical library. Here programmers can review manuals on any of PTC's online systems. The color-coded filing system—red for main operating systems, blue for IMS—was developed by Western Media. Shelves were supplied by Monarch.*

Dennis Roseth, corporate MIS director, discusses a data-center project with colleagues—James Slaymon, operations manager, and Mike Chappel, data-center manager. ▽

(Continued from page 70)

for our CICS and IMS systems," says Slaymon. "We hit 99.2 percent availability in CICS and 99.1 availability in IMS."

PTC's data center is protected by an electronic surveillance system, supplied by ADT, with connections to the local fire and police departments.

A fireproof tape vault and the computer room are protected from fire by Halon gas and water sprinklers. The vault stores 15,000 reels. For backup, PTC sends more than 120 tapes per day to a location 12 miles away. In addition, a full disaster-recovery plan is also in place and has been successfully tested. PTC uses Sungard, which has a hot site in Northbrook, IL. "We're allotted two eight-hour tests per year," says Slaymon. "We had no problem getting our systems running at Sungard."

△*In the network-control room, Larry Tury, data-communications analyst, runs diagnostic tests. PTC's eight remote-job-entry locations and six service centers are connected to the data center. More than 300 IBM terminals operate on this network.*

PTC plans to install an NEC 2400 private branch exchange that uses T-1 carrier circuits. The system will connect all of PTC's divisions in Indianapolis, allowing them to transmit voice and data simultaneously without having to depend on local telephone facilities. Says Slaymon, "The system will effectively select the least-costly route for the call. There should be no delay in dialing—it's transparent to the user."

PT Components has done well on its own. Its experience suggests that you *can* go home again. □

Too many MIS Directors spend money on something that can pay for itself.

Many companies depend on a micrographics service bureau for Computer Output Microfilm (COM). Tapes are picked up one day, delivered the next. Even if you need your data right away.

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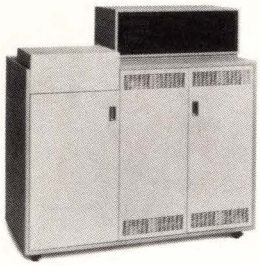

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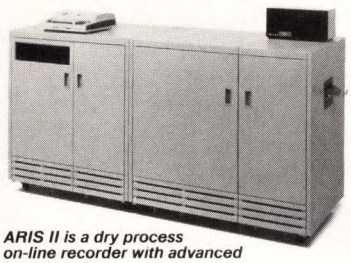

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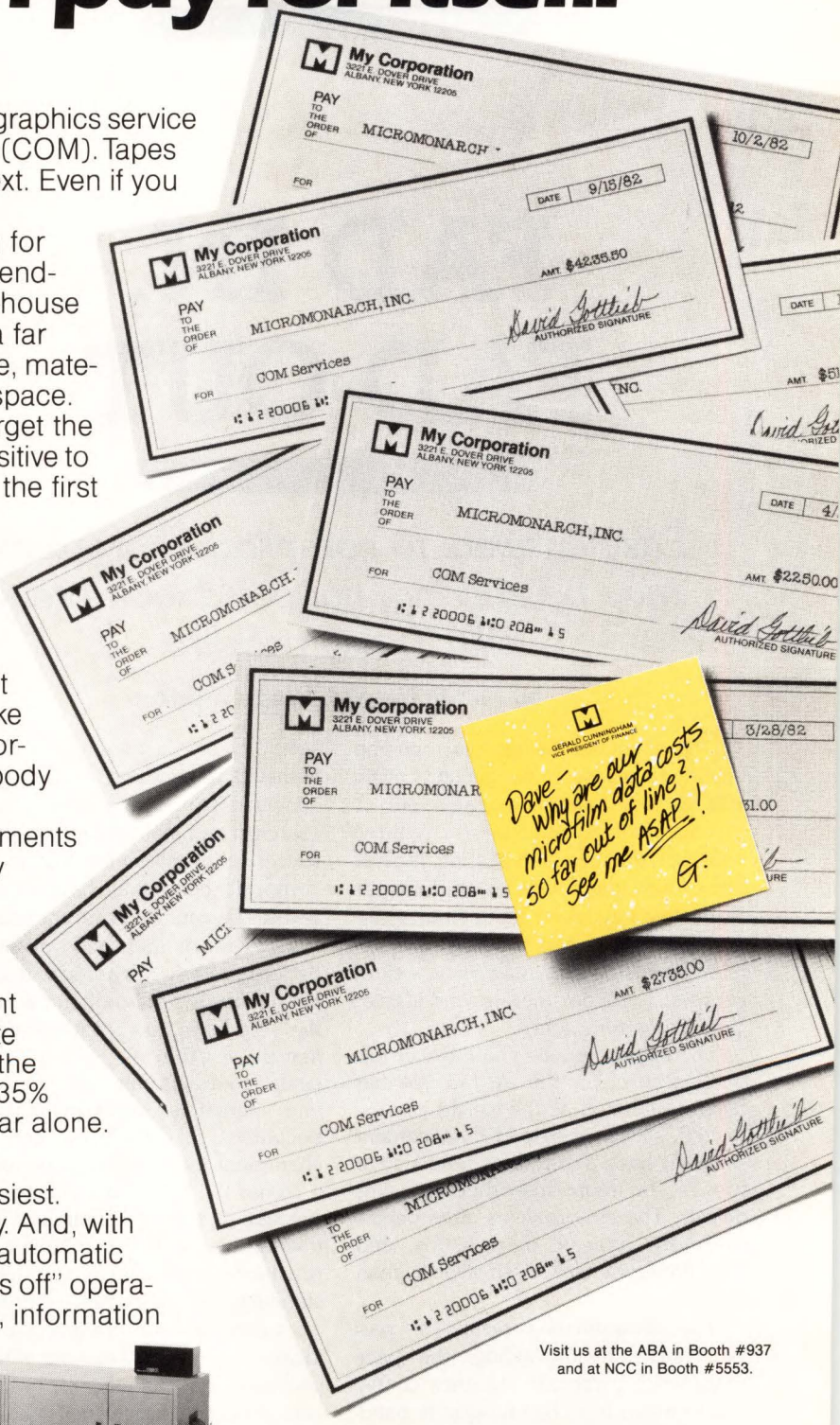

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CIRCLE 38

FAD IN, FAD OUT

Easy answers to complicated problems may be enticing, but you'll look pretty silly if they backfire.

by Martin Lasden, Western Editor

Remember the hype surrounding zero-based budgeting? How about matrix management or management by objectives? Promoted with zeal, pursued with passion, each of these "new ideas" was hailed during its respective heyday as the ultimate solution to complex and pressing management problems like inefficiency, lack of coordination, poor morale, and inertia. You remember, right?

Then again, maybe you'd rather forget. Because, like the last fad diet that failed to take off all the weight you expected, slickly packaged management solutions have a disturbing tendency to promise far more than they can ever deliver. The old problems often persist or return after a short hiatus, and sometimes they're even worse than before.

The disappointing results of past panaceas notwithstanding, the pace with which corporate America continues to move from bandwagon to bandwagon has yet to show any evidence of slowing down. In fact, consider the slew of hot new corporate crazes we've seen over the last few years. Strategic planning, Japanese-style management, "one-minute" management techniques, searches for management excellence in successful corporations, and managing corporate culture all have caught on across the country in recent years.

Each fad is launched with a bang, but just as likely discarded with a whimper, its quick demise often the result of the very hype that got it started in the first place. After all, hype sells books, lands contracts for the consultants, and, ultimately, raises managerial expectations that can't be met. Disenchantment inevitably follows, and with it comes the end of the latest fad. The success of trendy solutions is further thwarted by weak commitment, strong resistance, and conceptual misunderstandings by managers. Gurus—the ones credited with dreaming up these ideas—are particularly fond of blaming problems on managerial misconception, especially when their ideas begin to fall from favor.

Gurus, after all, love to talk about how misunderstood they are. Which is

Photo by Ted Hardin

precisely the sort of lament that Robert H. Waterman Jr. voiced last year when *Business Week* took a retrospective look at some of the "excellent" companies cited in *In Search of Excellence* (Harper & Row, 1982), the bestseller that he co-authored with Thomas Peters. As *Business Week* gleefully pointed out in a Nov. 5, 1984 cover story entitled "Oops!" some of the companies that were acclaimed by Waterman and Peters—Atari, Revlon, Texas Instruments, Caterpillar Tractor, and Walt Disney Productions among them—have not fared well in the marketplace since the book's publication. How come? "The book has been so popular that people have taken it as a formula for success rather than what it was intended to be," Waterman complained. "We were writing about the art, not the science, of management."

To be sure, such subtleties are easily lost upon the managerial masses intent on finding pat solutions to complex problems. But when trying to evaluate the merits of one management approach over another, there is an even more basic issue to consider: What works in one company often cannot work in another. Blithely transporting trendy elixirs across company lines—perhaps even divisional or departmental lines—is bound to yield disappointing results.

Clearly what is needed is a sense of perspective that will allow managers to learn from their mistakes rather than repeat them. In the pursuit of that perspective, consider four of the trendiest notions to hit the management scene in recent history: management by objectives, quality circles, matrix management, and managing corporate culture. Where did these ideas come from? Where have they taken MIS/dp managers? Have they produced the results that so many hoped for? If not, why? With untold numbers of new fads undoubtedly waiting to hit the presses, the answers to these questions will have bearing on the future as well as the present.

MBO

Management by objectives (MBO) has been revealed to be forms without substance. The concept first appeared in 1954 in *The Practice of Management* (Harper & Row) by Peter Drucker. As MBO evolved, it came to be known as a planning effort in which senior and subordinate managers jointly identify the organization's common goals, define each individual's major area of responsibility and the expected results, and use these measurements as guides for operating the organization and assessing the contribution of each manager. These plans were recorded in reports—often standard forms—that were then distributed to other managers.

As a piece of theoretical research that tried to cull the essential factors that distinguish effective from ineffective executives, Drucker's work has won much praise. But as a practical tool that seeks to turn ineffective managers into good managers, MBO is not nearly so well regarded. Indeed, critics charge that MBO is a classic example of how good research gets packaged into ridiculously simplistic solutions.

During the mid-1970s, one dp manager for an east-coast manufacturer participated in a new, formalized MBO program. The idea was to improve coordination between departments by making managers explicitly state their goals and share these reports with each other. At first, it seemed to work, says the manager. But when the recessions of the early part of the '80s hit the corporation, the team spirit quickly evaporated. It became "every group for itself," the manager, who asked not to be named, remembers. From that point on, filling out the MBO form became an empty formality. "I still do it every year," the manager says. "I fill out a form that states my general objectives and the resources required to meet them. And then it gets turned over to my division director. But it's really just a formality. Other groups may not know what's on my MBO form. For me it's an obstacle, not an aid, and like all obstacles you figure out how to get around it."

Another dp executive, this one located in the midwest, talks of the underlying problems that MBO failed to address at his organization. "The underlying problem," he says, "was that our middle managers were weak on project-management skills. Instead of trying to develop those skills, we gave them criteria to be judged by, and then just stepped back and expected things to be fine. But it didn't work out that way. By the end of the first year, the objectives that were set weren't necessarily met. Eventually MBO died a quiet death."

MBO consultants failed to appreciate Drucker's observation that effective goal-setting occurred naturally as a result of the trust, mutual understanding, and integrity that *already* existed within the organization. Such conditions cannot be created by passing forms around, but that's precisely what MBO became to many managers. As Charles M. Kelly, a consultant based in Charlotte, NC, attests, once corporations go down this route, there are plenty of pitfalls. Among them:

- Seeing MBO transformed into a whip rather than a planning tool.
- Seeing an increase in boss-subordinate conflicts because of rigid expectations and standards—imposed from above.
- Seeing managers take fewer risks, following a natural tendency to pursue only safe objectives.
- Perceiving a greater degree of clarity, objectivity, and control that is largely illusory.

"When a managerial group tries to use an MBO 'system' to correct problems of planning, coordination, cooperation, and distrust by force," Kelly wrote in the September–October 1983 issue of *Business Horizons*, "they usual-

"I used to believe that 1 percent of the quality circles that started failed, but it's probably closer to 10 percent."

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ly make them worse, that is, more political. The system inevitably becomes an inflexible straitjacket at some lower levels and in some functions. The emphasis changes from substance to form as the program grows away from its initiators."

Is MBO just another fad? Not exactly, Kelly says. The principles behind the theory are sound. What's unsound is the way in which the concept has been implemented, for, as Kelly argues, good MBO systems are not made, they evolve.

QUALITY CIRCLES

In the recession-racked '70s, quality circles became the great American hope. If the popularizers of MBO reduced theory to form, then the popularizers of Japanese management techniques have reduced an entire culture to a single circle; a quality circle, that is.

The theory behind quality circles is straightforward and certainly well-meaning. If managers really want to improve productivity, they must listen to their workers who do, and therefore know, their jobs best. Through the quality circle, managers solicit and receive advice and suggestions and discuss ways to put them into practice.

Wayne Rieker is believed to have instituted the first quality circle in the United States. In 1974, Rieker was manufacturing manager of the Missile Systems division of Lockheed Corp., Burbank, CA. Rieker's gathering of production workers and managers to discuss quality imitated a participative-management technique used by Japanese manufacturers. Several years later, Rieker went into business for himself, establishing his own consultancy in Los Gatos, CA, called Quality Control Circles Inc. His firm, by his own account, has implemented some 600 quality-circle programs across the United States since.

Riding the tide of enthusiasm about Japanese management techniques, quality circles received a tremendous amount of acclaim at the beginning of this decade, hailed among recession-ridden businesses as the wave of a more profitable, productive future. But lately, the enthusiasm seems to have waned, for in a growing number of companies quality circles are not doing as well as expected. "In the beginning it was a big to-do," says one manager of test systems on the west coast. "But then it went away. Managers just didn't see the benefit."

One harbinger of the disenchantment with quality circles was an article published in the *Harvard Business Review* last January. The article, "Quality circles after the fad," suggested that the technique is on the way out.

"Few QC programs turn into other kinds of programs; more commonly decline sets in," declare authors Edward E. Lawler III and Susan A. Mohrman.

When a quality-circle program begins to decline, there's almost no stopping it, they write. As the groups meet less often and become less productive, the resources committed to the program dwindle. The groups continue to meet primarily for social reasons—not because they're effectively solving problems. As managers begin to recognize the decline of the program, they cut back further on the resources available to quality circles and the program shrinks more. The employees who have resisted the program all along recognize that it is less powerful than it once was, and they openly reject and resist the ideas generated by quality circles. "The combination of overt resistance from middle managers and staff, budget cuts, and participants' waning enthusiasm usually precipitates the decline of the QC program," conclude Lawler and Mohrman.

Critics of quality circles point out that employees on the line don't always know best. "The perspective from which these circle groups make their recommendations is an inherently narrow one," charges the dp manager at a Wisconsin out-patient clinic. She, for example, cites one circle group in her organization that decided to rearrange desks and cabinets to improve the efficiency of paper flows throughout an office. On paper, the plan looked good, but it did not take into account the location of electrical outlets and telephone jacks. As a result, the manager says, "a bundle of money" eventually had to be spent to rewire the workplace to accommodate the new arrangement. It was, she notes, an idea that was supposed to save money.

Such stories notwithstanding, Rieker (who recently renamed his consultancy Rieker Management Systems Inc.) maintains his faith in the quality-circle concept and strongly denies that quality circles are on the way out. A recent survey conducted by the New York Stock Exchange found that 75 percent of the largest manufacturing firms in the United States have quality circles, he says.

Still, even Rieker admits that in the rush to mimic the Japanese, mistakes were made, not the least of which was trying to paste quality circles onto organizations without regard to individual organizational culture or structure. "Circles don't operate in a vacuum," Rieker says now, acknowledging that at first he, among others, hadn't fully appreciated this given. "I used to think that only 1 percent of the circle programs ever failed, but it's probably closer to 10 percent." It could be even higher, he concedes.

Distinguishing between the success and failure of a program, however, is not easy. As Lawler and Mohrman note, while some circles die, others linger on in less effective forms. Moreover, the results that circles bring can

vary not just among corporations, but within corporations as well.

Consider what has happened at an eastern "money-center" bank where nine circles were started several years ago. Seven of them are now defunct, but the two that remain are apparently prospering. How can this be? The key variable, suggests Richard Strand, the bank's assistant vice president of education and research, is top-management support. In those departments where circles have died, he says, such support was not forthcoming, giving middle managers little reason to take the initiative seriously. By contrast, in the two departments where circles have done well, middle managers received strong signals from their superiors. In such cases, the success or failure of quality circles have a direct effect on the way the middle managers' performance is appraised, promotions are awarded, and training activities conducted. Middle managers have been told in no uncertain terms to make quality circles work.

It is in this way, Strand maintains, that top managers can nurture participatory "oases" in barren corporate landscapes—oases that, with enough care, can spread elsewhere. However, as Strand himself readily acknowledges, there is an ominous side to this metaphor. Just as oases can prosper, so too can they be swallowed up by the surrounding desert.

THE MATRIX

Matrix management is an elegant solution that often doesn't work. Some 10 years ago, the idea was the darling of the business schools. In a management matrix, a powerful executive is placed at the top of a diamond-shaped grid. Below this executive are second-level matrix bosses, who, in turn, tug the subordinates below them in different directions within the organization. Within the matrix, subordinates report to more than one boss of equal rank at any particular time. The matrix' theoretical advantage over the traditional single-boss arrangement is that it promotes greater flexibility and balanced decision-making within the organization.

"On paper, it's the most beautiful thing I've ever seen," declares the technical supervisor for an east-coast software house. "But when matrix management is implemented, it's usually implemented out of cowardice or ignorance, and it usually brings on chaos."

This manager, who asked to remain anonymous, witnessed the chaos of matrix management firsthand during the early '70s. As a consulting computer scientist for an aerospace manufacturer, he reported to both a departmental manager and a program manager. Right away, he noticed the obvious—with two bosses of equal clout making demands on him, it was impossible to satisfy them both. He was constantly trying to catch up in a no-win situation.

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(Continued on page 84)

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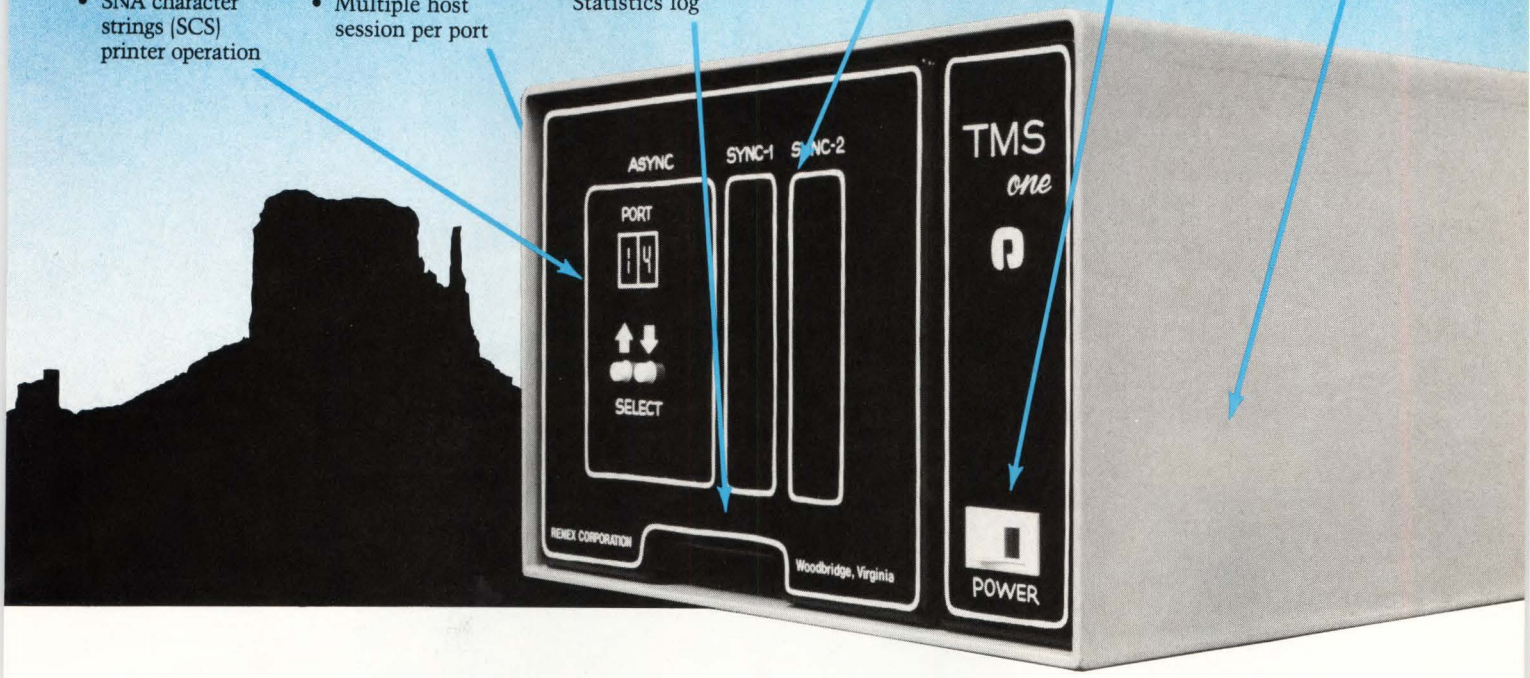

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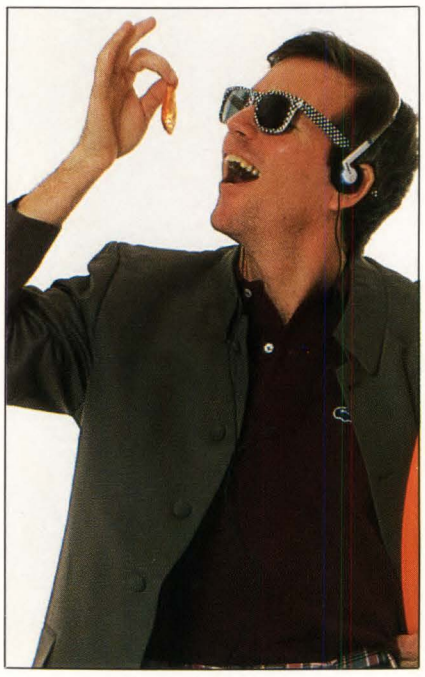
with either of his bosses. He blames the matrix for this fact, arguing that under the matrix plan he and his bosses did not get a chance to develop the close relationship that otherwise would have been possible. Under the matrix, as his specific skills were required, the manager was loaned by his department manager to a particular project manager. When the specific job was finished, he either went back to a holding status within his department or was loaned to yet another project manager. Consequently, no boss got to know him very well. Not only did this arrangement reduce his job security, but also his job mobility. Within the matrix, a Cobol programmer is a Cobol programmer is a Cobol programmer, and there is little, if any, chance that a particular boss would give him the opportunity to do something else.

"On paper, there's apparent flexibility and interchangeability of resources, and rapid response to needs," the manager says. "But it doesn't work out that way. When you finish one job, you have to sit around until another one comes along that fits your perceived expertise. Sit around too long, and you could end up getting laid off."

The director of administration for an eastern market-research house also recounts an unpleasant run-in with the matrix system. Matrix management promised better coordination, better dialog, and a better transfer of skills within the company, she says. But again, in practice, what was supposed to happen didn't. "At our departmental meetings," she recalls, "not only did the matrix subordinates show up, but the matrix bosses as well. It was a case of paranoia. The bosses felt that they had to be there. They didn't want their subordinates knowing something that they didn't know. The upshot was, however, that instead of four or five people showing up at our meetings, we'd have 11 people there. And what in the past would take us 20 minutes to get through, now took us two hours. The system started to disintegrate about a year after we started it," she adds. "The company was having financial troubles, and top management realized just how inefficient the matrix was."



Considering the seriousness of such complaints, it's ironic that much of what was said by the two professors most often credited with promoting matrix management supports the views of the critics. In fact, in a *Harvard Business Review* (May–June 1978) excerpt of their 1977 book, *Matrix* (Addison-Wesley), Stanley M. Davis and Paul R. Lawrence describe in detail what they call potential matrix "pathologies." They write of organizational tendencies toward "anarchy," "power struggles," "severe groupitis," "collapse during economic crunch," "excessive overload," "sinking to lower levels," "uncontrolled layering," "navel gazing," and "decision strangulation." Yet, Davis and Lawrence manage to maintain their faith in the matrix to the bitter end. "We believe that in the future, matrix organizations will become almost commonplace and managers will speak less of the difficulties and pathologies of the matrix than of its advantages and benefits," they conclude.

Encouraging words to be sure, but the epitaph for matrix management may already have been written. In "Aftermath of the matrix mania," an article in the Summer 1984 issue of the *Columbia Journal of World Business*, Robert A. Pitts and John D. Daniels report their finding that among 93 Fortune 500 industrials surveyed, only one was still maintaining what could be called a true matrix-management scheme. Pitts and Daniels conclude that matrix management isn't going anywhere, and, in fact, violates a fundamental principle of management articulated in 1916 by Henri Fayol, the father of modern management theory. Fayol's principle: "For any action whatsoever, an employee should receive orders from one superior only." By extension, as soon as two superiors wield authority over the same employee, organizational pathology is the inevitable result.

MANAGING CULTURE

Corporate culture might more appropriately be called the management unfad. Implicit in the concept of culture is an appreciation of the way corporations are molded by unique sets of values, rituals, and personalities. Corporate-culture theorists see the differences that exist between organizations as being more significant than the similarities. Solutions and strategies must be unique to an organization to be successful. Faddists, on the other hand, tend to suggest the reverse. They prescribe packaged solutions as if all problems can be treated alike.

But—and here's the rub—the ingenuity with which faddists are able to package theories and methods cannot be underestimated. So it is with corporate culture. Just listen to the hype surrounding the subject these days, and you'd think that changing the culture of a company is as easy as changing reels of tape. Consultants, dubbed "corporate-culture vultures" by one business magazine, are actually selling the idea that a corporate culture can be deliberately altered. Their assertions may be aided by the naivete of some executives. "At one point during a meeting," relates Alan Kennedy, coauthor of *Corporate Cultures* (Addison-Wesley, 1982), "I heard a CEO turn to his second-in-command and say: 'Corporate culture. . . hmmm . . . I want one of those.' "

That all corporations have cultures is indisputable. But the idea that cultures can be manipulated in premeditated ways within the course of weeks, months, or even years, is debatable.

(Continued on page 88)

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"Those who have popularized corporate-culture management have done the concept a great disservice," declares Joanne Martin, an associate professor of organizational behavior at the Graduate School of Business Administration at Stanford University, Palo Alto, CA. "The link between culture and profit is tenuous at best. And the idea that culture can be managed easily is downright ridiculous." Corporate culture, she adds, may not even be manageable; the best executives can hope for is exerting a bit of influence on it.

With prospects for success so uncertain, and with great resources required to even make the attempt, getting involved with a corporate-culture consultant is clearly not advisable unless your reasons for doing so are extremely compelling. Carl Jacobson, a senior vice president with Management Analysis Center, Menlo Park, CA, one of the most active corporate-culture consultancies, readily acknowledges this. But he maintains that under today's competitive conditions, there are several corporations that must attempt to alter their cultures. AT&T, for example, used to do whatever the government allowed it to do. Now, the market dictates AT&T's moves. AT&T must make a fundamental shift from an administrative to a marketing orientation. How promotions are rewarded, how budgets are allocated, how recognition is received should be examined and perhaps changed, says Jacobson. Those are the kinds of factors that a corporate-culture consultant examines when trying to effect change, he says.

AT&T, of course, is an obvious, oft-cited example of a corporation hampered by its own culture. Other, less obvious examples of cultural difficulties exist in the corporate world. Corporations that merge, for example, often have problems reconciling differences in style without first suffering through walkouts and a certain amount of strife.

Even though the concept is interesting, does the corporate-culture craze represent nothing more than the latest in consulting-employment acts? At Blue Cross of California, Bruce Jones, senior vice president of systems, suspects culture "management" is just another fad. Back in 1982, Jones watched a team of consultants approach his employer to facilitate a merger between Blue Cross of Northern California in Oakland and Blue Cross of Southern California in Woodland Hills. The cultures of the two organizations differed significantly and in obvious ways. The Oakland office was a by-the-book operation, while Woodland Hills was more relaxed. Help was clearly needed to get the two sides to work effectively with one another. But, says Jones, eventually culture-consulting became a joke. "All we needed," he says, "was to get employees and managers together to help them communicate better. But the consultants wanted to take up thousands of hours of employee time to improve 'cultural' awareness, something that would do nothing for our bottom line."

The man responsible for coordinating the effort, has, predictably, a different point of view. Robert Koenigs, who was terminated by Blue Cross only four weeks into the project, now heads his own consultancy, the Symlog Group in Woodland Hills, CA. He believes the Blue Cross culture project, which originally was slated to last one year, had a lot going for it, and he accuses Blue Cross itself of having a quick-fix mentality that prevented success. "You can work to create meaningful change, or you can work on the surface issues to create the illusion of change," he says. Blue Cross, he claims, opted for the latter course.

"There were some basic questions that needed to be examined," Koenigs explains. "What should Blue Cross' mission be, how should authority be exercised, and what makes Blue Cross unique? These were questions that needed to be resolved so that Blue Cross could begin to shape its values for the future. But to the executives at Blue Cross, this seemed like a waste of time. They opted instead for a quick-fix solution; a motivational program that got people charged up—strictly hygiene measures."

"Matrix management is usually implemented out of ignorance, and it usually causes chaos."

Jones, however, believes studying corporate culture is too esoteric an activity for the real world. "Studying corporate culture does not tell you how to fill a market niche," he says. "That's a strategic-planning problem, and that's something for senior management, not analysts, to work out. Corporate culture defines where a company has been, but it doesn't tell you where the company should go. Only the marketplace can tell you that."

Like the hot new diets that America chews up and spits out at such a frantic pace, there will always be new management fads to contend with. The allure of pat solutions to complex problems, after all, is quite compelling. But the fact is that whether you're trying to lose lots of weight or trying to manage an array of human and technical resources, panaceas are rare. Managers learned that lesson with MBO and matrix management, and they're learning it with quality circles, as well.

Corporate culture is somewhat different because it does recognize the idiosyncrasies of organizations and management problems. But can corporate culture be manipulated in highly predictable ways within reasonable periods of time for profitable gain? Stay tuned for further developments. □

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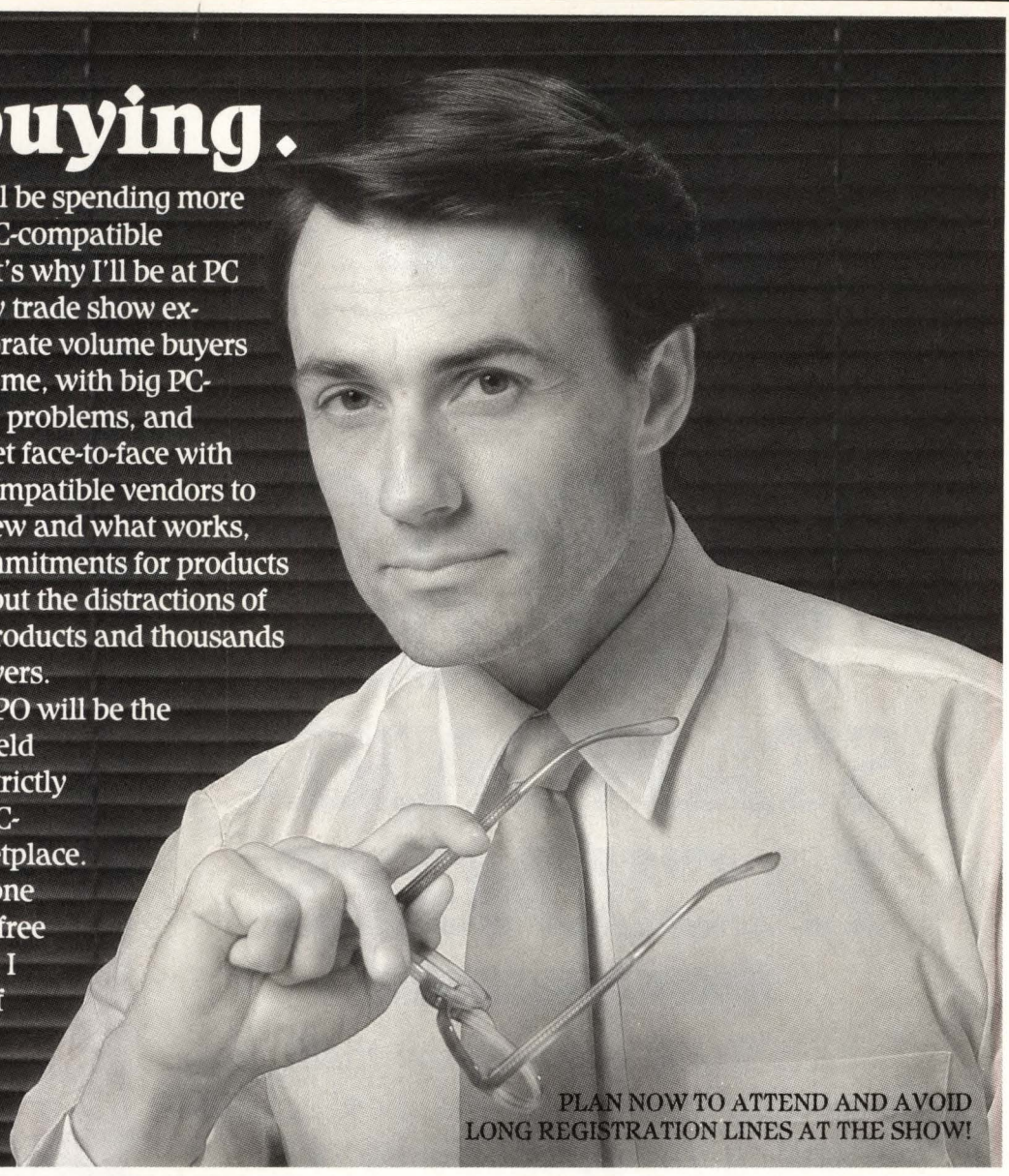

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CIRCLE 46

CUSTOMIZERS

WHEN TO SOUP UP STANDARD PACKAGES

Part V: Although off-the-shelf software may seem to be the ideal solution to cutting the applications backlog, sometimes it pays to modify a package.

by George deLucenay Leon and Richard Mikita

With all the packaged software available, reducing the applications backlog should be as simple as pulling solutions off the shelf. The evidence, however, belies this simple assumption. Despite the abundance of packaged software, corporations have watched their applications backlogs grow and grow—sometimes to two years or more. Off-the-shelf packages rarely meet an organization's precise needs. The trick is finding a package that—with modification—is close enough to the right solution.

Adapting packaged software requires time and effort, but many corporations prefer it to developing applications in-house. "How much modification has to be done before a package fits our users' needs? That's the question," says Thomas McManus, technical-support specialist at Arco Chemical Co., Philadelphia. Arco's working principle is that packaged solutions are always cheaper and faster to install. "We usually go to the outside for new applications rather than to our own programmers," says McManus.

Barry Walsh, associate director of administrative computing at Indiana University, Bloomington, agrees. "We believe that if there is a package that can do what we need, we'll try to find

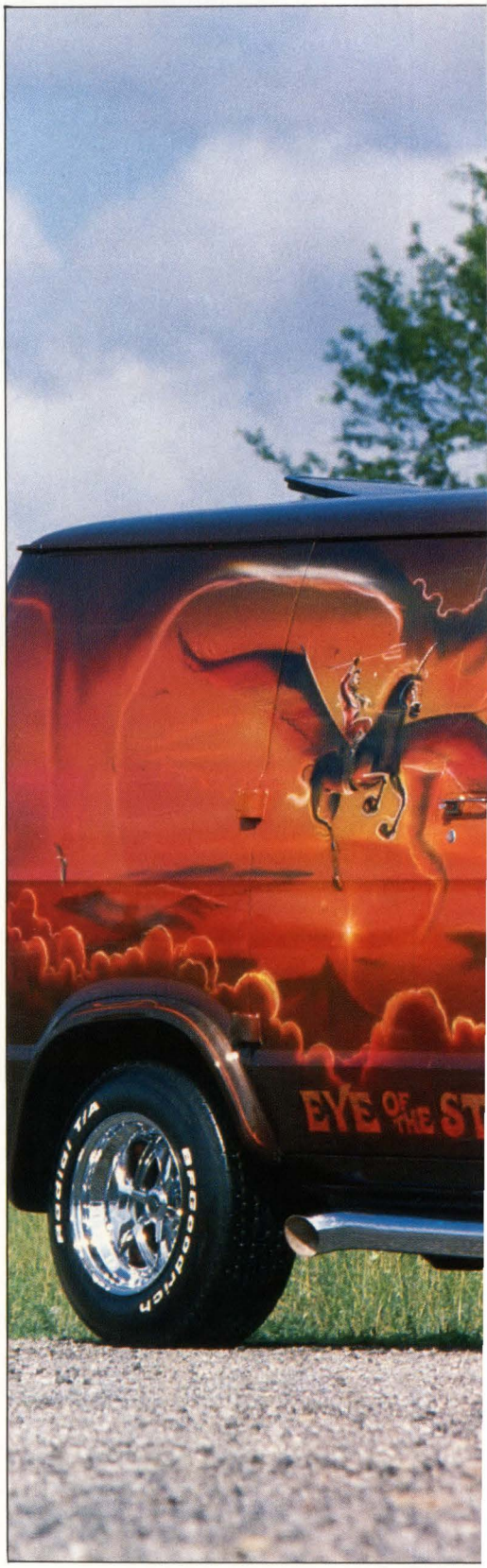

Photo by Todd Kaho

and install it rather than write a package ourselves."

However, some organizations believe that to get the applications software you need, you have to write it yourself. "Our attitude toward software packages is based on the difficulties we've had integrating them with our other systems," says Jack Burpee, dp manager at Humphrey Products, Kalamazoo, MI. As a result, unless the commercial package needs no modification, he has the application written in-house. Burpee adds that his organization does use one commercial general-ledger package. "It works very well. But a general ledger is a well-defined application," he notes.

Fred Bridge, vice president for information resources at Mineral Processing Systems Inc. (MPSI), York, PA, combines both approaches. MPSI uses both in-house-written and packaged software. In his experience with off-the-shelf software, Bridge has found that quality varies widely. "Some packages are super, some are lousy, and some are so-so. And it's not necessarily a matter of price."

Unlike applications packages, when it comes to systems software—the code that controls the basic functions of the computer—almost everyone chooses to buy or lease. If packaged systems software has been so widely accepted, why hasn't the same been true for applications packages? The answer is that machines are the same, but businesses are different. The cost of creating a custom-designed system for proprietary use can be justified if the system gives the corporation an edge over its competitors. However, if the necessary features can be found in a commercial package at a reasonable cost, it would not be wise—although also not uncommon—for a manager to reject the package simply because it was not written in-house.

History also has something to do with the lingering tendency to write rather than buy applications software. Before 1969, when a company bought a mainframe computer from IBM or most other vendors, applications packages as well as systems software were included in the price of the hardware. Because this software was "free," the market for applications software was small. In 1966, there were probably only 45 vendors selling about 100 packages.

In June 1969, IBM announced that it was "unbundling" software and hardware. Although most user corporations continued to buy operating-system software from the hardware vendor, decisions about applications packages were more problematic. Many organizations were accustomed to modifying the "free" applications packages so much that they bore little resemblance to the original. As a result, they had come to expect—and were staffed—to write most important applications themselves.

The two primary reasons for choosing to buy or lease rather than write ap-

CLEARLY, GET IT IN WRITING

So you're thinking of getting an off-the-shelf software package and modifying it to suit your needs. It could be the answer to your problems and give you cheaper, faster results. But before you sign the supplier's standard contract or sales order (or write your own purchase order), here are some suggestions to think about and some rules to follow.

Will the software meet your expectations? How do you know that the package (before and after modification) will do what you want it to? This is the biggest potential problem. It can be solved by following these rules:

- If you have any questions about the program—the modifications, what they will do, the speed at which they will run, their adaptability, and so on—ask the vendor. Get *clear, detailed* answers in writing and include the written answers in the contract as part of the supplier's performance obligation.
- Attach to the contract a list of clear performance and operational specifications that the supplier must meet before you authorize payment.
- Establish a good acceptance test that must be met before you make payment—or at least before you make final payment.

Get it in writing. If it isn't in writing, it's probably *not* part of the contract and therefore not legally binding. Every supplier's contract has an "integration clause," which says, in essence, that if a promise is not both in writing and incorporated in the contract, it's not binding. Remember, a salesperson's promises are worth absolutely nothing!

Price and time. If the supplier or another software specialist is doing the modifications, how do you know that it will be done for a specified price and in a specified time? Get it in writing! If the work is done on a "time and materials" basis, agree on a "not to exceed" price.

Modifications of manuals. If the supplier makes the modifications, does the contract price include modifying user and technical manuals? If so, get it in writing and make sure that the supplier's obligations are clear.

Special maintenance problems. If you're going to rely on the supplier for maintenance, will you get the benefit of updates, enhancements, and modifications as quickly and completely as users of the "off-the-shelf" product? Get it in writing!

Source code. If you, the customer, are making the modifications, you will get the source code as part of the initial delivery of the package. Is the supplier obligated to provide you with source code for modifications made at later dates? Get it in writing! If the supplier is handling maintenance, what assurance do you have that the supplier will meet its obligations? A source-code escrow is very important, and most are useless or difficult to enforce. The source-code escrow should clearly state the conditions upon which the source code is released from escrow. You should determine whether or not those conditions will meet your needs. Arguing with the supplier after the fact about whether you are entitled to the source code

plications software in-house are the lower costs of off-the-shelf packages and the ability to put them to work more quickly than an application that is developed entirely in-house. Whether those advantages are realized largely depends on how closely the package's standard features match the user's needs.

Barry Solem, manager of the consulting division of Boeing Computer Services, Morristown, NJ, estimates that "a package developed in-house versus an off-the-shelf package with modifications is the difference between $100,000 and $20,000. You can get much better value, service, and new features with off-the-shelf packages."

Even with over 15,000 packages offered by 6,000 different vendors, sometimes a package doesn't exist that meets user needs and the operational requirements of the data center. More often, a package is available that comes close to what is needed but is not completely right. The question then becomes whether to modify that package or develop the software in-house.

Dan Coleman, dp manager of The Village Cos. in Chapel Hill, NC, says that his staffers treat software they buy and software they write "pretty much the same, except that we tend to assume that the programming in the software we buy is correct—which is often not a safe assumption. There tends to be less testing with an off-the-shelf package."

Coleman has noticed that acquiring an off-the-shelf package can sometimes turn the development process around. "The way we work when writing a system ourselves is to get the basic application up and running and then work with it, modify it, and enhance it," he says. With an off-the-shelf package, the user may be able to work with some parts of a system early on, rather than getting all of them at once later, particularly if the package requires much modification once it's acquired.

The scarcity of specialized products can sometimes be more troublesome than the overabundance of more standard packages. Barry Walsh describes his department's experience with a product designed to move text from distributed word-processing systems to the mainframe for low-cost archival storage: "We needed to do the job in a hurry, and there was really only one suitable product on the market at the time. What we ended up with was better than nothing, but just marginally."

Time pressures and inadequately defined requirements can also lead to a poor match between package and user needs. But even the best matches frequently require some compromise. "Actually, nothing right off the shelf ever does everything we need," McManus says. Even when the application meets users' needs, the package may not meet the broader needs of the data-processing department. "It's more a question of how well the package fits with other applications. We're not going to alter the general ledger for

from escrow will do you little good.

Confidentiality. If the supplier sends its representatives into your shop to make the modifications, you will be providing them with access to your valuable proprietary information. Your supplier should agree to hold in confidence all your information. It should also have agreements with all its employees having access to your confidential information to do the same. This will establish your rights and show that you are taking all legally necessary precautions to preserve those rights.

Ownership of modifications. If you do the modifications or even if the supplier does them, who owns those modifications? The supplier probably will. That's OK, but what if the supplier makes the modifications and wants to sell them to one of your competitors? The supplier can do it faster, cheaper, and better, and perhaps even give your competitor a more favorable price. This may be acceptable to you, but perhaps you should insist on a percentage of the income that the supplier gets if it installs the modified system with one (or more) of your competitors. Or it may be reasonable to protect your interests by insisting that the supplier will not modify its software for someone in your type of business for a reasonable period, such as a year. A limited restriction should be acceptable to the supplier.

Use of the software. If the software is accessed by networking, if it needs to be duplicated for use on a remote computer, or if your company is acquired by or sells its relevant assets to another company, do you have the right to do all these things without payment to the supplier? You should, so get it in writing! If an additional royalty is payable to the supplier, that may be fair, but be sure that the amount of the royalty is specified in the contract.

Can a lawyer help? Computer-related contracts, even the type that only involve modifying off-the-shelf software, can be complicated. The supplier's printed form relieves it of virtually every liability known to humankind. Some of these liabilities can be modified and even negotiated away. Computer contracts are often so ambiguous (especially when it comes to the terms inserted by the salespeople or your dp staff) that they are incomprehensible, especially to someone who is not part of the negotiations, such as a judge. An experienced lawyer who is knowledgeable in computer contracts can look over your contract quickly and make useful suggestions that could save you a lot of time and effort down the road.

The bottom line. Modification of off-the-shelf software is a convenient way of getting what you want while saving time and money. If you choose that approach, be sure that you follow these suggestions. Legal fees after the problem arises are much greater than getting the contract right the first time. —*Robert S. Bramson*

Robert S. Bramson is an attorney with the firm of Schnader, Harrison, Segal & Lewis (Philadelphia), where he is head of the computer-law group.

some new package. The new package must be adaptable to our main systems," says McManus.

Jack Burpee has experienced more problems integrating packages with his principal systems. "We're a manufacturer, and we have a rather large manufacturing database. We've always had a lot of problems trying to work packages in," he says. He doesn't even consider off-the-shelf packages anymore, even though the development backlog at Humphrey Products is "a year to a year and a half. Management mentions it once in awhile, but we dig in our heels."

To avoid the cost of modifying standard packages, some organizations have established policies governing whether, or to what degree, they will alter commercial software.

At the administrative computing department of Indiana University, "it comes down to how essential the system is," says Barry Walsh. "If it's a big, heavyweight system, we'll probably invest some time modifying it. With less important systems, we'd rather leave them alone and let the vendor make the changes."

The need to modify a package extensively can easily eliminate time and cost savings, according to Daniel Coleman. "Usually you can get a packaged system online faster, but to get to the point where it's doing the job you want it to may take just as long and involve just as much work."

Changing administrative procedures can sometimes eliminate the need for extensive modifications to the software. "If the package benefits our company," says Bridge, "either by allowing us to save money or control the operation better, we'll alter our internal procedures to suit the package."

As with systems written in-house, making changes to packaged software is almost inevitable. First, there are changes that can be identified before acquiring the system. These changes must be made for the package to meet the user's basic requirements. Then, there are the unforeseen changes that surface as the system requirements themselves change.

A clear understanding about who will make changes to a commercial package and how they should be done is essential. If the vendor is going to maintain the package, make sure the terms and conditions of that arrangement are clearly specified in the contract. Also be sure the source code and technical documentation are maintained, and negotiate the terms of your access to them in case the vendor goes out of business or fails to support the package according to the contract.

The cost and availability of the expertise required to maintain the package will determine whether you should maintain it in-house or rely upon the vendor. McManus recommends using contract programmers to do modifications and maintenance. "There's no sense hiring full-time staff for short-term projects," he says. Regardless of who makes them, changes to the package must be well documented to avoid wasting time and effort when new versions of the package are released by the vendor.

Because of the amount of work required to transfer modifications from one release to the next, Dan Coleman is selective about which new releases are installed. "We look at each new release program by program to see if there are changes we want to make," Coleman says. "Generally, if we've made many modifications, we don't upgrade the package." Frequent releases need not be a serious drawback, however, if the program is well designed and documented. The pertinent points of change can be easily identified and only those modules affected will have to be modified and recompiled with each release.

Customizing a package can result in a perfect fit or a perfect flop. But with improvements in commercially available software, the cherished uniqueness of each organization may no longer be sufficient reason for developing all applications from the ground up. A cost comparison of in-house-written and off-the-shelf software, taking into account the extent of necessary modifications to meet user needs, must be carefully considered. □

George deLucenay Leon is a free-lance writer based in Brooklyn, NY. Richard Mikita is a free-lance writer based in Boston.

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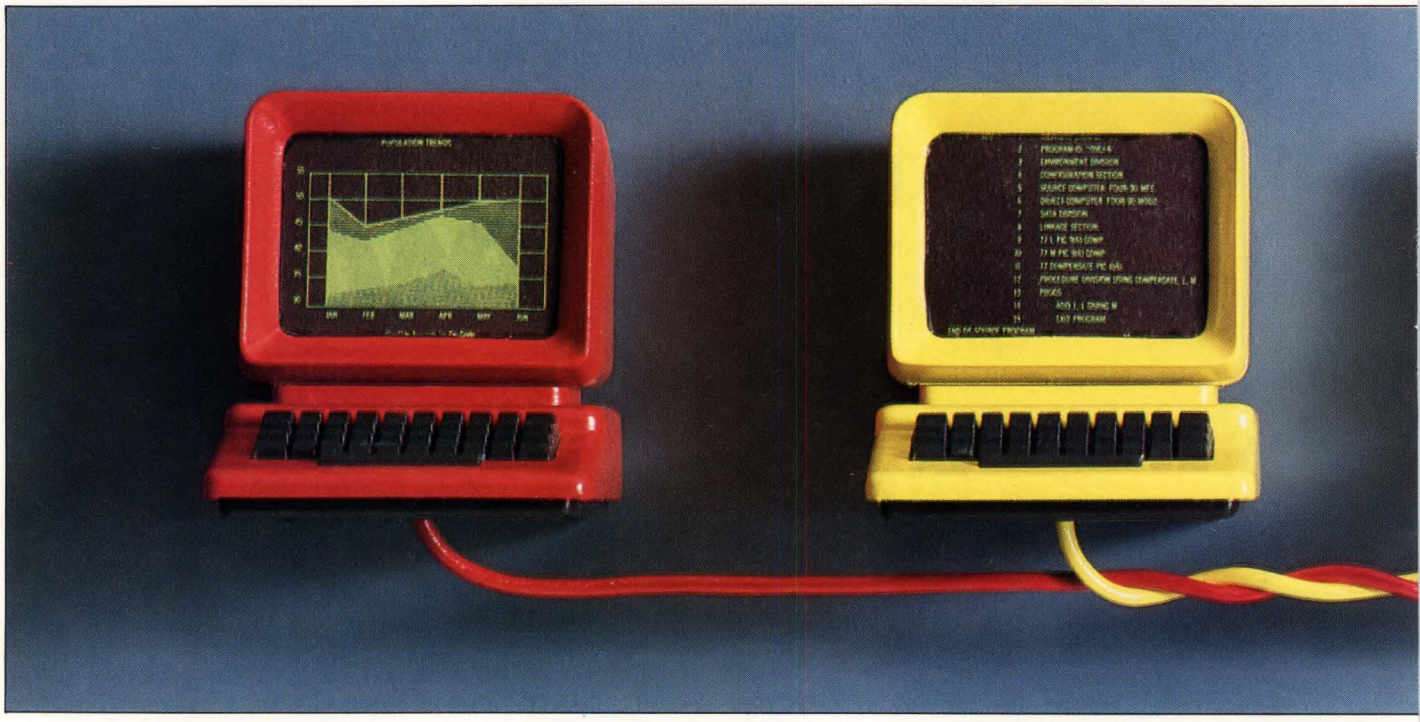
CIRCLE 47

MIGHTY MUXES



YOUR ROUTE TO LOWER LINE COSTS

The right multiplexer can make the difference between costly inefficiencies and a lean, smooth-running operation.

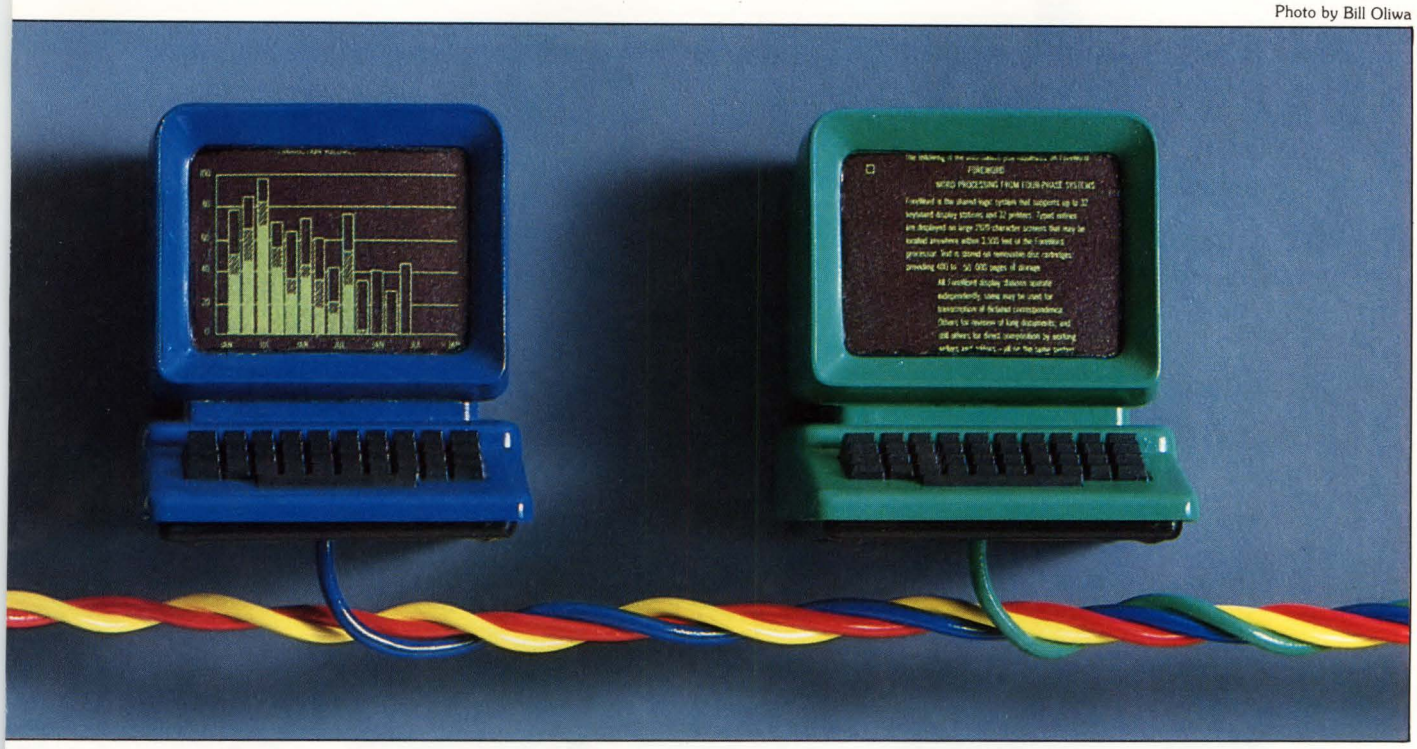
by William Welling

As more and more operations have gone online, multiplexers have become increasingly important. Distributing data processing and providing access to central databases inevitably cause communications costs—specifically, the cost of dedicated lines—to climb. Multiplexers stunt the growth of line costs while streamlining the communications needed to run distributed operations.

Controlling line costs and efficiency of operation go hand in hand. Take the example of the Elliott Co., a Jeannette, PA-based division of United Technologies Corp., Stamford, CT. Elliott used to link five offices in Morningside, NJ, Houston, Los Angeles, Scranton, PA, and Jeannette with four separate host computers: a Prime 750 and a DEC PDP-11/70 at headquarters, and an IBM 3089 and a 3033, respectively, at offices in Syracuse, NY, and Orlando, FL. If a user in one office needed data on the inventory of parts for power-plant equipment stored on one of headquarters' host computers and engineering data on the other, he or she had to use separate terminals to get them. Two years ago, this arrangement caused a backlog in requests for parts-availability information, and field-office users began telephoning orders to ter-

MIGHTY MUXES

Photo by Bill Oliwa



minal operators at headquarters.

Faced with a network nightmare, MIS/dp decided to streamline operations and give all operators access to all of the host computers. The solution was to introduce Timeplex Microplexer switching statistical time-division multiplexers, which combine many slow-speed lines into a single high-speed transmission line for access to any one of the four computer hosts. The new system eliminates the need to maintain separate terminals for each host and allows users to share the corporation's resources. Using the same terminal, a service technician in Los Angeles, for example, can tap into the PDP-11 for parts-availability information and then switch over to the Prime 750 to place an order.

Technicians also no longer have to switch cable connections and patch cord to make changes. Data from branches are transmitted over 9,600-bit-per-second links to headquarters' two 48-channel muxes, then to two single-data-link switching muxes. A dual-data-link mux is the link to the other computer centers. Operators don't have to make desperate phone calls to headquarters anymore. If all ports on a host are in use, a user will get a "busy" signal while the multiplexers try to establish a connection. A new attempt is made every 10 seconds.

Elliott's plan sounds simple enough. But it took some selling to gain top management's approval of the new system. Harold Holloway and Marc Stull, Elliott's MIS/dp managers, were recruited to request money for an unproved network during an economic downturn. The two dp-ers also found it difficult to explain in plain English what they were hoping to accomplish.

Every system today is characterized as being "user friendly," and capable of offering "sophisticated management of complex data networks." As elements of the underpinnings of efficient communications systems, however, multiplexers are difficult for top-level management to understand. Characteristics like user friendliness are largely irrelevant. It can take some explaining to convince management that the "architecture" of one kind of multiplexer is superior to, or will prove more cost-effective than, that of another. The differences between multi-drop and point-to-point lines and "bit-interleaved" and "character-interleaved" muxes are significant, but top management will best understand the effect muxes have on line costs.

Keeping operating costs in line, after all, is of paramount importance. The cost of dedicated lines can mount rapidly as new communications services are installed, and recent developments at the federal and state agencies that regulate telecommunications suggest that private-line costs will rise during the next several years as regulators tinker with rate structures in the wake of the AT&T divestiture.

Even grasping cost savings, however, can be difficult; some are easier to understand than others. For example, Chemical Bank in New York estimates that its installation of a Series 790 statistical mux to handle traffic between European operations and the United

(Continued on page 100)

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CIRCLE 48

MIGHTY MUXES

(Continued from page 97)

States initially saved $150,000 a year. That figure, however, represents savings accrued from the new communications setup when it was only 30 percent implemented. Also, the cost-savings figures don't reflect the advantages Chemical Bank realized from a more efficient network between its many dp sites in Europe and its network of distributed IBM sites in this country.

Chemical Bank's Chemnet includes Series 790 muxes at processing centers in New York, nearby Jericho, NY, and Somerset, NJ. Each center is linked by a high-speed microwave channel, allowing the bank to set up alternate routes for transmissions when necessary. Also, as a private network, Chemnet can be tailored to fit Chemical Bank's unique needs.

It may be initially helpful to top management to have some idea of what current technology offers. Beginning last year, users turned their attention principally to the offerings of time-division multiplexers able to condense and assign bits and characters from many data streams into fixed-bandwidth time segments for synchronous transmission at up to 1.544 megabits per second. That rate of transmission is commonly known as T-1. About 100 million miles of T-1 cable have been used by telecommunications carriers in the United States and Canada since the early 1960s for data transmission. Interest in T-1 communications was fueled by last year's introduction by AT&T of its Accunet T-1.5 service, which provides the wide bandwidth required to handle data, voice, and video simultaneously at high speeds.

Whether used in private or common-carrier fashion, James C. Hahn, president of Infotron Systems Corp., estimates that 30 million additional T-1 links will become available to corporate users by 1990. Infotron is among the latest of the major suppliers of multiplexers to offer a new "big ticket" T-1 product, called Infostream. Infotron claims the mux is capable of providing multi-node networking at higher than T-1 speed (handling both computer data and compressed digitized voice). Priced from $45,000 for 64 channels to $78,000 for 128 channels, Infostream joins such other new offerings as Network Equipment Technologies' INDX, Timeplex' Link/1, and General Datacomm Industries' Megamux. (See the buyer's guide accompanying this article for complete listings.)

All of these systems are among the so-called "intelligent" T-1 muxes able to accommodate higher input rates, and targeted principally at organizations needing to manage their own networks from central stations. For example, Digital Communications Associates characterizes its Netlink mux as a "software programmable" system able to carry data, compressed video, and digitized voice transmission at full T-1 trunk speeds. Like Infostream, Netlink supports up to 128 channels.

Eighty percent to 90 percent of IBM mainframe-computer access is via some two million IBM 3270 terminals and compatibles reported to be in use by Datapro Research Corp., Delran, NJ. Limited-distance time-division muxes can greatly speed communications in these terminal networks by eliminating the need for coaxial cabling from each terminal to a cluster controller.

Statistical time-division multiplexers not only divide the bandwidth of a communications line vertically in the manner of the time-division mux, but also assign empty portions of the bandwidth to terminals that are momentarily "active." These muxes are also important. Stat muxes deploy portions of lines that would otherwise be wasted by inactive terminals.

The smallest and most inexpensive stat muxes cost about $2,000 and integrate switching, polling, links to public packet-switching services, and other features for small networks (such as LANs). Competition among vendors offering these muxes has given users more features for less during the past year, according to International Data Corp., a Framingham, MA, research house. Gandalf, for example, added an X.25 packet interface to its Model 9101, while Halcyon introduced switching, and Micom added polling to its low-end stat muxes.

Stat muxes are vital links in a layered network scheme maintained by

(Continued on page 104)

The fastest way to bring your voice, data and video under software control: New MEGAMUX® Plus.

If your communications network is behaving like an untamed animal, the smartest thing to do is check out MEGAMUX Plus with new, advanced software features. It's the real-time multiplexer that moves voice, data and video faster, and at less cost, than any other performer on the range.

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With new MEGAMUX Plus, power consumption is decreased by more than half. While a 2-to-1 packing density cuts space requirements 50%. Infinitely expandable, you can mix and match synchronous, asynchronous, and isochronous data with digitized voice channels – all without restrictions. You can even change channel speeds or types in record time from either a supervisory terminal or GDC's NETCON®-6 Network Management System.

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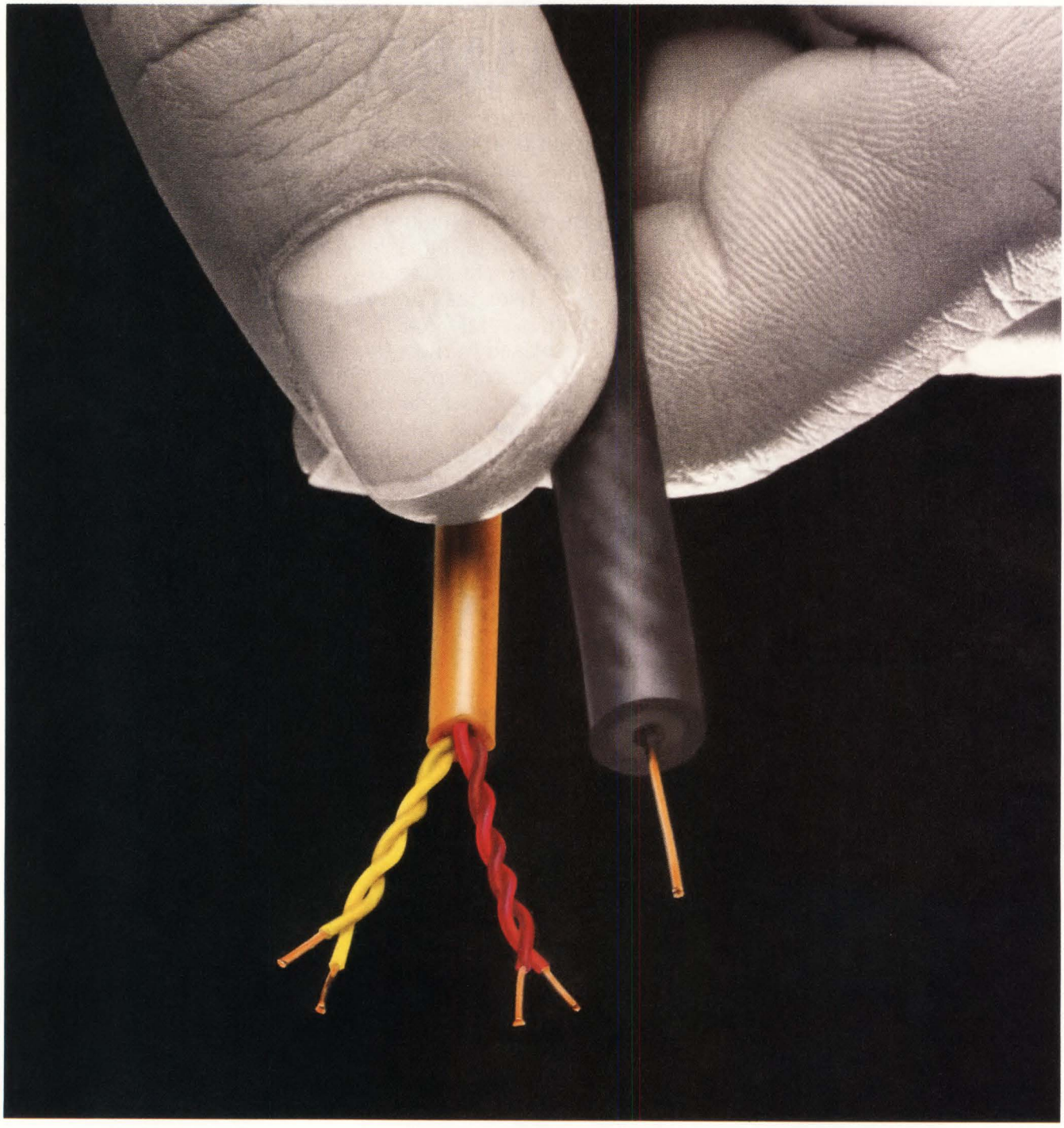
CIRCLE 21

Toward Clearer Communications:

InteCom discus



ses LAN alternatives.

The manufacturer of the first integrated voice/data switching system considers the factors in local networking.

The need for a Local Area Network is no longer an issue for most organizations. The question is whether a LAN should be separate or an integral part of the voice communications system.

The purposes of a LAN are to share resources such as expensive peripheral devices, allow devices to communicate with each other, and permit users to share data bases. Communications managers must sort through several options to find the most cost efficient way to combine these benefits.

Choices to consider.

There are several ways to create a communication network that includes a LAN. The first solution is to build three separate networks—one for voice, another for data, and still another for higher speed office automation devices.

A second choice: retain the existing voice system and add a new system that combines data and LAN capabilities. Both alternatives, however, involve multiple systems to administer, multiple cable plants and complicated system reconfiguring during moves and changes.

Faced with the costly realities of separate voice, data and local area networks, astute managers are choosing a third option—a voice/data system with integral LAN—*one* network for all communications.

Five years ago InteCom introduced the IBX™ Integrated Business Exchange, the first integrated voice/data system using a twisted pair network. And LANmark™ local area networking has been an integral part of the IBX from the start, operating on the same twisted pair network!

The benefits of an integrated LAN.

The primary benefit of an integrated LAN is major cost savings. The payback is quickly realized through the management efficiency of a single system. Such a system also provides for modular growth as needed.

With LANmark, an organization can begin with voice and add or expand its data capability because the required network, standard telephone wiring, is already in place. No separate wiring or bulky and expensive coaxial cables are needed. Nor does LANmark require separate modules or separate ports. Moves, adds and changes are simplified through reconfiguration at the host. The administration of one system also cuts down overhead and streamlines management reports.

Universal Connectivity

To cope with changing technology, companies now realize the importance of selecting a flexible communication system. Because, as yet, there is no recognized standard among the many approaches to office automation. The only safe choice is a system designed like the IBX/LANmark for compatibility with the equipment of many vendors. For only such a system can protect your investment in equipment by providing the capabilities for dissimilar devices to communicate.

Some organizations already have one or more dissimilar LANs in place, and that's a major investment that can't be disregarded. But if existing LANs are too limited, the situation demands a change. Several LANs can actually be improved and combined into one master network through an integrated voice/data/LAN system.

One of LANmark's primary advantages is the ability to connect multiple Ethernet LANs. And in IBM 3270 configurations, LANmark increases efficiency, growing the network by eliminating the high costs of coaxial cabling. Relying on laser-driven fiber optics and two-pair telephone wire, LANmark uses the network that's already installed for voice communications.

Speed

Data speed is often irrelevant... except when it's too slow. For many situations, 64 Kbps circuit switching fills the requirement, but as data use continues to grow, high speed packet switching will become increasingly important.

With the growing numbers of workstations and terminals in simultaneous use, and the high speeds required for computer-to-computer information exchange, the value of LANmark capabilities becomes more apparent. LANmark can accommodate device speeds up to 10 Mbps!

Whether this high speed capacity is used now or retained for the future, it's excellent protection against obsolescence and helps a company prepare the infrastructure for an automated office.

Size

Every LAN has limitations on the distance it can cover, the number of users who may access it, and the number of devices you may connect. It's important not to become trapped by a network that's too restrictive for future growth.

InteCom's LANmark offers unusually generous capabilities. It can connect up to 8,000 devices located as much as ten miles apart.

LANmark for the future.

Since the introduction of the IBX in 1979, InteCom has been setting the pace for the office communications industry. The system has been proving its merits in nationwide installations for more than three years. It's backed by comprehensive support and refined through an ongoing program of research and development. Software oriented, flexible for new technology and protected against obsolescence, the IBX and LANmark offer you connectivity for the automated office of tomorrow.

We hope you'll find this information useful in your LAN decision-making. InteCom has met the networking requirements of companies in a wide range of industries. And today, our representatives are ready to help you evaluate your specialized needs.

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CIRCLE 50

MIGHTY MUXES

(Continued from page 100)

Penn Mutual Life Insurance Co., Philadelphia, to serve its agents. The "top" portion of the network is built on an IBM host at the carrier's headquarters. The "bottom" portion of the network, which has been built during the last four years, ties together 60 Data General minicomputers in agencies around the country. Fifty pairs of muxes from Racal-Milgo's Omnimux line keep the network's line costs lean, says Ronald Lefferts, telecommunications manager. "It's simple," he says. "We either put in two lines between point A and point B or we put muxes in and use one line."

Penn Mutual used to have a terminal network linked to its headquarters computer via WATS lines. "Traffic was growing so fast that the WATS lines, which operate at 2,400 bits per second, became obsolete," says Lefferts. "We needed higher speeds." The mini-based network ties smaller offices to agencies in metropolitan areas via "tail circuits." Transmissions from many terminals are combined and transmitted via high-speed lines to the nearest minicomputer for processing or switched to the IBM host at headquarters.

Not all the terminals on Penn Mutual's network operate constantly. Hence, the decision to incorporate stat muxes, which can assign bandwidth to terminals as they become active. Penn Mutual's stat muxes are located where minicomputers are not warranted, but computer support is needed. "They operate online between terminals and printers, and between terminals and the minis," says Lefferts.

The State University of New York (SUNY) installed stat muxes to save online costs by running synchronous and asynchronous transmissions on the same lines. SUNY/Binghamton is linked to campuses in Albany, Buffalo, Utica, Delhi, and Purchase via seven dedicated lines. Without the campus' Racal-Milgo MPS 48 and 9601 stat muxes, 14 lines would be needed to handle communications, says Norman Quinn, assistant director of the SUNY/Binghamton computer center. "We're able to get three remote-entry stations and some terminals processing data on the same lines," he adds.

SUNY's campuses around the state operate mainframes supplied by other vendors, like Burroughs (Detroit), Honeywell (Minneapolis), and Sperry (Blue Bell, PA), but if students want to work with IBM systems and software, they have to plug into the Binghamton center, says Quinn. (IBM itself has a large development facility in the city.) During the early 1970s, SUNY campuses established their own lines to Binghamton to provide IBM experience to their students. A budget crunch in 1976 ended this practice, however, as campuses were forced to terminate their separate lines to Binghamton, says Quinn. The current network was built in response to the budget crunch.

Stat muxes play a different kind of role in the Ohio Educational Computer Network (OECN), Columbus, which serves regional planning and operating groups throughout the state and ensures uniform accounting standards at schools in the state's 88 counties. The network links 27 host-computer sites. Much like users at Elliott Co., the Ohio school-planning groups need to share resources.

The Ohio network permits sharing, but in a different way. Rather than deploy switching muxes, the OECN uses a method called "data pathing." For example, the Northwest Ohio Computer Association has a network tied to a DEC PDP-11/70 host at Archbold, which serves school districts, county boards of education, and the joint vocational school for Defiance, Fulton, Henry, and Williams counties. Digital Communications Associates configured a network using trunk lines and facilities provided by six small telephone companies whose underground cabling runs approximately 70 miles from one end to the other. All communications are sent along a single trunk between a DCA Model 355 network processor supporting 105 DCA stat muxes in the field and a DCA System 205 stat-mux interface connected to a DEC PDP-11/70.

The cost of a System 355 ranges from $9,995 to $11,295, depending on its level of operating sophistication. The cost of a DCA 105 stat mux is $2,000 to $3,000. If all terminals were connected directly to the PDP-11/70 via leased lines, the annual phone bill

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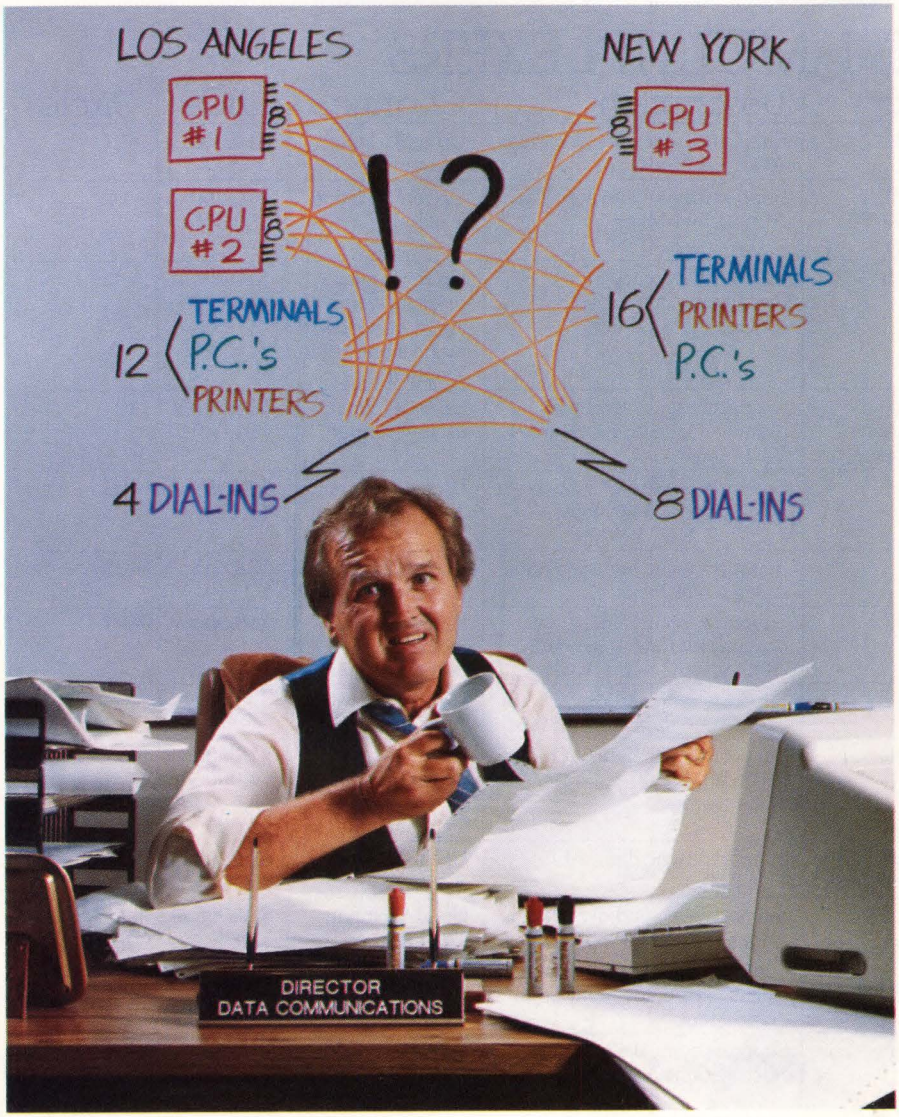

Struggling to tie everything and everyone together without sacrificing performance or breaking the bank? Let your stat mux do it for you!

Get everyone into the act with the new TS-600 Series.

If increasing demand for computer ports and distributed resources has your system in a stranglehold, there's no limit to the breathing space you could enjoy with the TS-600 Switching Stat Mux.

The newest addition to the ComDesign family of networking products, the TS-600 Series provide the same cost savings and network control as the popular TC-500A. With no limit to the number of users who may contend for any available ports, the TS-600 offers all the features of a data switch, port contention unit and intelligent statistical multiplexer in one.

When used individually, a TS-600 acts as a port selector and front-end processor, permitting local resource sharing. Connected in pairs, TS-600's become the central point of control in a powerful transparent switching network, concentrating up to 32 devices over a single communications link. ComDesign's modular hardware and firmware plan allows for easy network expansion and access to the latest software developments.

The TS-600 Series multiplexers are designed for ease of use, and are available with integral 4800 or 9600 bps modems. For more information on the new TS Series or for help with any data comm problem, call us. Toll-free (800) 235-6935, or in California (800) 368-8092.

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would be $45,000, according to the association. The cost of the single, high-speed trunk is considerably less, say officials, although they decline to reveal it.

An important new use of muxes is in local-area networks (LANs). Many corporate users are still sizing up LANs, but some have already made moves into the technology. Racal-Milgo, for example, says it has 500 users of Planet LAN. Planet uses a baseband coaxial cable in a twin-token-passing ring, and can accommodate up to 500 word processors, terminals, computers, and peripherals. Portions of the network, for example, might include a point-to-point communication line serving word-processing stations, a multi-drop line to stations such as accounting and inventory control, and a direct-broadcast line to all stations from a director's location. On a baseband network, each station shares LAN communications cables by gaining brief access to the line, via time-division multiplexers, in order to transmit. After the transmission is made, the device "yields" to another transmitting device.

Fiberoptic muxes are also expected to become increasingly useful in the coming years. Data Systems believes that fiberoptics holds promise for the future, although the vendor contends that fiberoptic cable "is difficult to tap and repair." Datapro asserts that fiberoptic muxes are sometimes preferable to limited-distance time-division muxes for short-haul applications. Fibronics has introduced a new series FM1600 of short-haul (up to 2 miles) fiberoptic muxes to address this need. Optical-fiber cable provides much more bandwidth to carry more traffic. A fiberoptic mux can also repeat data bits on each channel several times—a process called oversampling—eliminating the need to synchronize bit streams.

Local-area networks and fiberoptic links are relatively new communications technologies. Although the mux isn't new, it plays a role in both LANs

(Continued on page 110)

William Welling is a free-lance writer based in New York.

T-1 MULTIPLEXERS

Vendor	Product	Description*	Channels	Price	Circle
Amdahl (408) 746-6000	Model 2211	Supports async and sync data; AOS: 1.5 Mbps	Up to 96 input; 1 output	$10,000	401
AT&T Information Syst. (201) 953-6174	Dataphone II Series 700 T-1 Multiplexer	Supports async and sync data; AOS: 1.544 Mbps	Up to 128 input; 1 output	$10,460 to $55,000	402
Avanti Communications (401) 849-4660	Ultramux 1.5	Supports async, sync, digital-voice, and video data; AOS: up to 1.5 Mbps	Up to 96 sync or digital-voice input; up to 192 async input; up to 2 output	$14,000 to $100,000	403
Codex (617) 364-2000	6240 Digital Transmission Multiplexer	Supports async, sync, and digital-voice data; AOS: up to 2.04 Mbps	Up to 64 input; up to 4 output	$16,000 to $64,000	404
Digital Communications Assoc. (404) 448-1400	Netlink	Supports async and sync data; AOS: up to 1.544 Mbps	Up to 128 input; 1 output	$3,995 to $7,295	405
Gandalf Data (312) 541-6060	GLM 528	Supports async and sync data; AOS: 1.544 Mbps	Up to 128 input; 1 output	$3,240 to $7,740	406
General Datacomm (203) 574-1118	Megamux Plus	Supports async, sync, digital-voice, and video data; AOS: up to 2.048 Mbps	Up to 54 sync input; up to 18 async; 1 output	$15,000	407
Infotron Syst. (609) 424-9400	T-1 Mux	Supports sync and digital-voice data; AOS: up to 1.544 Mbps	Up to 48 input; 1 output	$3,500	408
M/A-Com Linkabit (619) 457-2340	MX24A Series TMX144 Trunkmaster	Supports async data; AOS: up to 1.544 Mbps Same features	Up to 48 input; up to 2 output Up to 6 input; 1 output	$3,000 to $4,900 $3,500 to $7,000	409
Micom Syst. (805) 583-8600	Instamux 480 T-1 Local Multiplexer	Supports async data; AOS: 1.544 Mbps	Up to 128 input; 1 output	$3,200 to $12,200	410
Paradyne (813) 530-2000	DCX	Supports sync and digital-voice data; AOS: 1.544 Mbps	Up to 96 input; 1 output	$10,000 to $35,000	411
Racal-Milgo (305) 592-8600	Omnimux	Supports async, sync, and digital-voice data; AOS: up to 2.048 Mbps	Up to 96 input; 1 output	$35,000 to $70,000	412
Tellabs (312) 969-8800	430 T-plexer	Supports sync, digital-voice, and video data; AOS: 1.544 Mbps	Up to 128 input; 1 output	$7,650 to $70,000	413

**AOS = aggregate output speed.*

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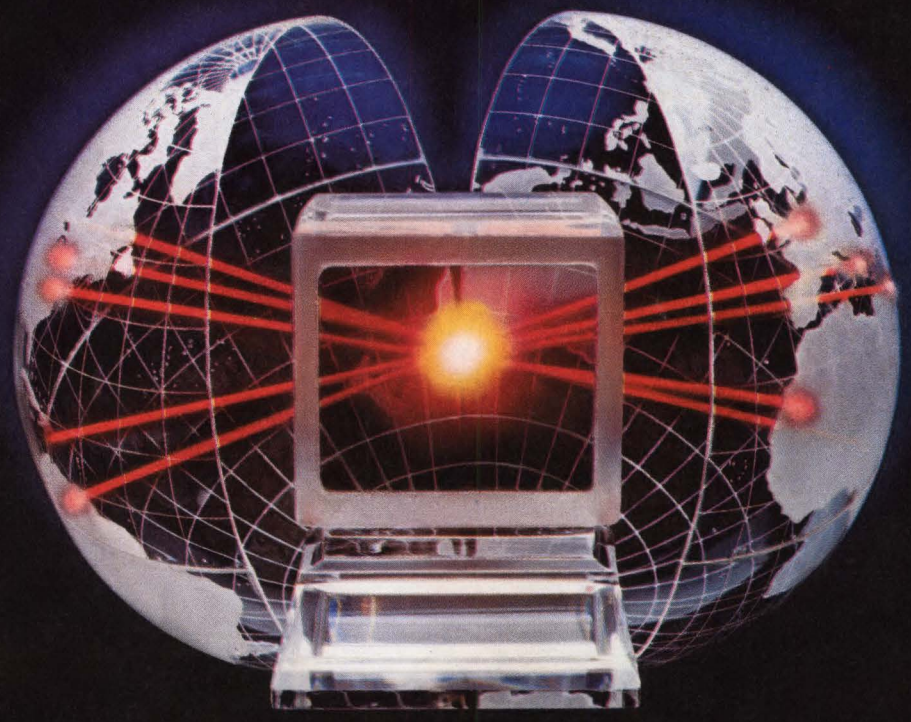

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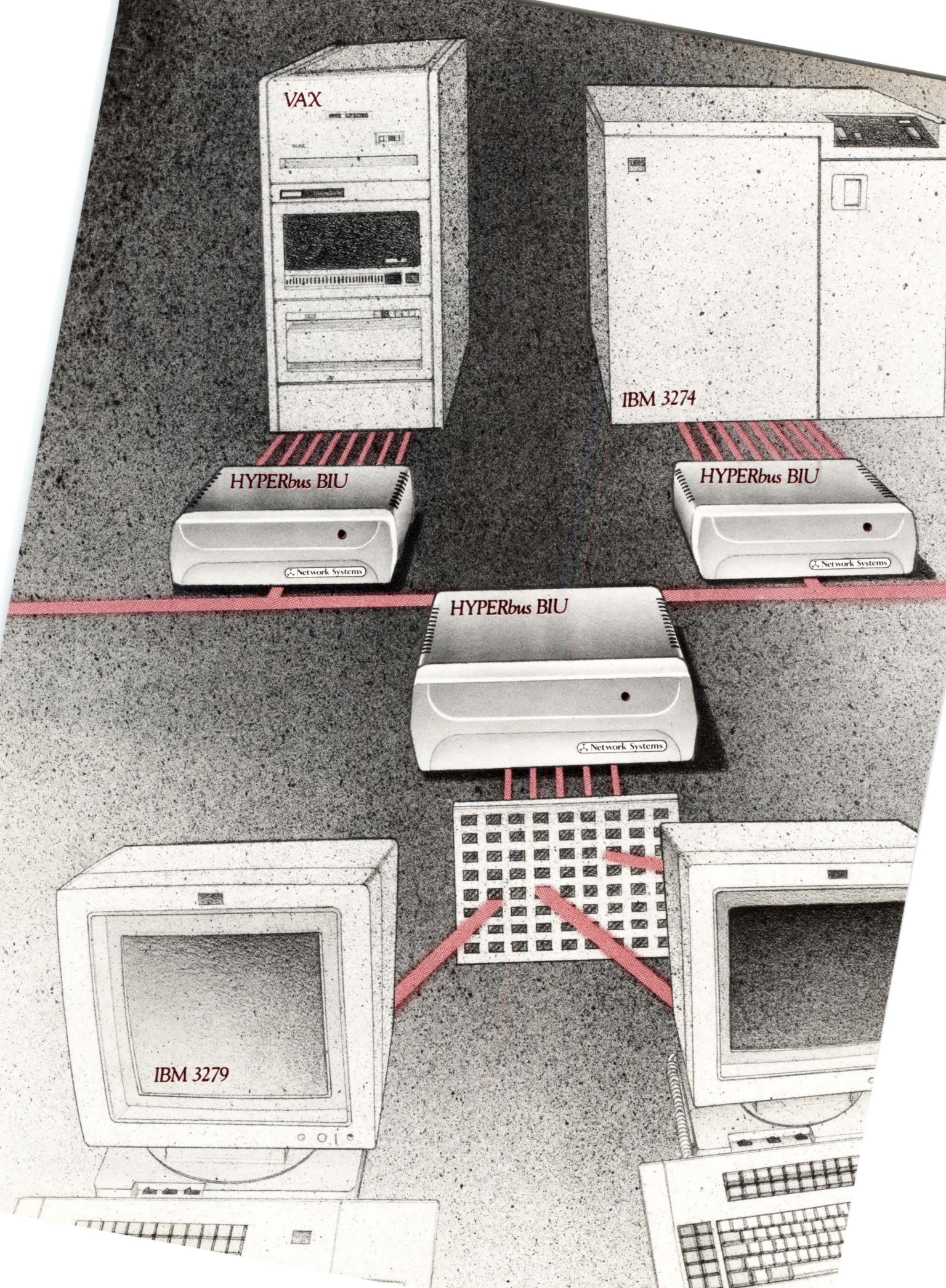
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Twist No. 2: Flexibility.

HYPERbus is your most flexible strategy, too. Equipment from different manufacturers, with varying protocols and speeds, can share a HYPERbus network without costly modifications or accessories.

Twist No. 3: Modularity.

The HYPERbus network is modular so you can expand without compromising efficiency. It's a LAN and more. Connect PC to PC, or PC to mainframe, and transmit at ten million bits per second for native-like response time no matter how many terminals you add. HYPERbus supports a full range of devices including RS 232's, IBM 3270 and even IBM 3279 3SG Graphics terminals!

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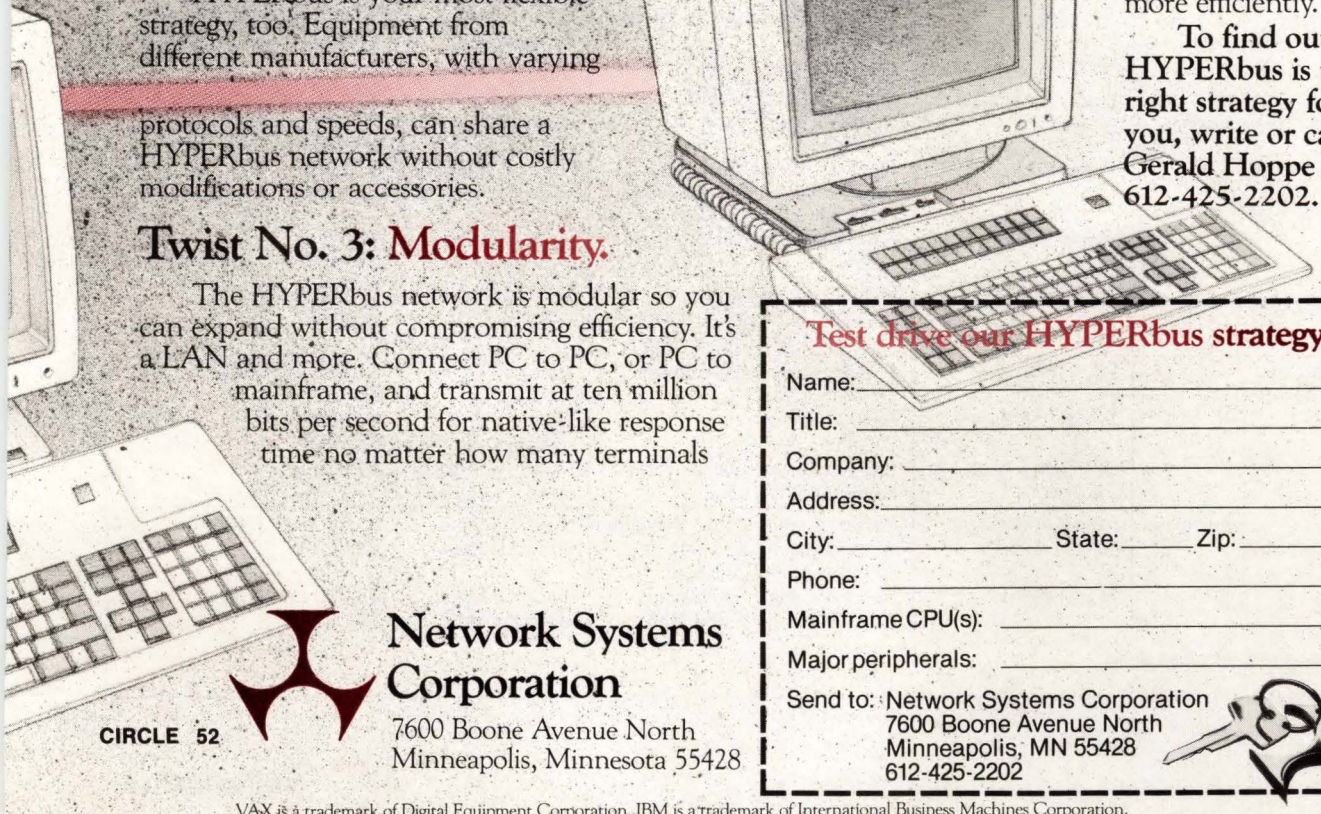

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CIRCLE 52

(Continued from page 106)

and fiberoptics. Most experts agree that the volume of digitized communications between corporate users is climbing and will continue to rise. Muxes will help MIS/dp managers make sure soaring line costs don't stunt the growth of important new communications services. □

STATISTICAL MULTIPLEXERS

Medium-speed output (10 Kbps to 500 Kbps)

Vendor	Product	Description*	Channels	Price	Circle
Anderson Jacobson (408) 263-8520	AJ Expressway	Supports async and sync data; AOS: up to 19.2 Kbps	Up to 16 input; 1 output	$1,850 to $7,500	414
AT&T Information Syst. (201) 953-6174	Dataphone II Series 700	Supports async and sync data; AOS: 76.8 Kbps	Up to 32 input; up to 2 output	$3,200 to $11,000	415
	Dataphone II Series 700 Networker	Switching mux; supports async and sync data; AOS: 76.8 Kbps	Up to 32 input; up to 18 output	$5,050 to $12,000	
	Dataphone Multiplexer	Supports async, sync, and bisync data; AOS: 19.2 Kbps	Up to 48 input; up to 2 output	$4,700 to $20,000	
Backus Data Syst. (408) 279-8711	Dial Multiplexer	Supports async data; AOS: up to 19.2 Kbps	Up to 5 input; 1 output	$1,545	474
	Line Multiplexer	Same features	Same	$1,545	
Case Rixon (301) 381-2300	DCX Series	Supports async and bisync data; AOS: 72 Kbps	Up to 60 input; up to 14 output	$1,000 to $7,500	416
	81XX Open Line Models	Support async and bisync data; AOS: up to 19.2 Kbps	Up to 9 input; up to 2 output	$2,000 to $3,000	
Codex (617) 364-2000	Model 6050	Supports async and bisync data; AOS: up to 64 Kbps	Up to 120 input; up to 8 output	$25,000 to $75,000	417
	Model 6035	Supports async and bisync data; AOS: up to 19.2 Kbps	Up to 248 input; up to 4 output	$5,000 to $15,000	
	Model 6005	Same features	Up to 16 input; 1 output	$3,300 to $8,000	
	Model 6002	Supports async data; AOS: up to 19.2 Kbps	Same	$1,900 to $6,000	
	Model 6001	Supports async data; AOS: up to 14.4 Kbps	Up to 8 input; 1 output	$1,500 to $2,350	
Comdata (312) 470-9600	Model 824	Supports async data; AOS: up to 19.2 Kbps	Up to 8 input; 1 output	$1,650 to $1,850	418
Comdesign (805) 964-9852	TC-500A	Supports sync data; AOS: up to 19.2 Kbps	Up to 32 input; 1 output	$1,800 to $8,000	419
	TS-600	Supports sync and bisync data; AOS: up to 1.92 Kbps	Up to 32 input; up to 2 output	$3,100 to $8,500	
Digital Communications Assoc. (404) 448-1400	Series 100	Supports async data; AOS: 19.2 Kbps	Up to 32 input; 1 output	$1,295 to $8,995	420
	Series 200	Operates with DEC Unibus interface; supports sync data; AOS: up to 19.2 Kbps	Up to 128 input; 1 output	$1,295 to $8,995	
	Series 300	Supports sync data; AOS: 56 Kbps	Up to 124 input; 1 output	$6,795 to $16,995	
DEC (617) 897-5111	DFM Series	Includes switching and contention; supports async and sync data; AOS: 19.2 Kbps	Up to 16 input; 1 output	$2,600 to $4,800	421
Gandalf Data (312) 541-6060	Pin 9103	Supports async data; AOS: 19.2 Kbps	Up to 32 input; 1 output	$1,550 to $5,750	422
	Pin 9101E	Same features	Up to 16 input; 1 output	$1,950 to $3,650	
	Switchmux	Supports async and sync data; AOS: up to 64 Kbps	Up to 16 input; up to 2 output	$2,050 to $4,250	
Halcyon Communications (408) 293-9970	Model 4001	Port-contention option available; supports async and sync data; AOS: up to 307.2 Kbps	Up to 32 input; up to 2 output	$1,700 to $8,000	423
	Model 4220	Supports async and bisync data; AOS: up to 384 Kbps	Up to 60 input; up to 2 output	$5,000 to $14,000	

*AOS=aggregate output speed.

A. Jones. *Patrick Henry Delivering His Speech at the House of Burgesses*. Courtesy The Bettmann Archive.

There's no argument that in today's business arena, 2400bps full duplex dial modems provide the lowest cost and fastest route to data communications. But of all the modem manufacturers that are promising you great dial line savings, there's only one company delivering the modem products you really need – Concord Data.

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CIRCLE 53

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Vendor	Product	Description*	Channels	Price	Circle
Infotron Syst. (609) 424-9400	SM380	Supports async and sync data; AOS: up to 19.2 Kbps	Up to 8 input; 1 output	$1,450	424
	SM616	Same features	Up to 16 input; up to 2 output	$1,900	
	SM632	Same features	Up to 32 input; up to 2 output	$2,800	
Memotec (514) 738-4781	Mpac Synchronous Multiplexers	Support sync data; AOS: 19.2 Kbps	Up to 6 input; up to 2 output	$7,200	425
	Mpac Asynchronous Multiplexers	Support async data; AOS: 19.2 Kbps	Up to 16 input; up to 2 output	$4,680	
	SP Synchronous Multiplexers	Support sync data; AOS: 19.2 Kbps	Up to 6 input; up to 2 output	$6,000	
	SP Asynchronous Multiplexers	Support async data; AOS: 19.2 Kbps	Up to 16 input; up to 2 output	$4,680	
Micom Syst. (805) 583-8600	Micro 800/2 Data Concentrator	Supports async and sync data; AOS: 19.2 Kbps	Up to 16 input; 1 output	$1,450 to $4,600	426
	Micro 860 Concentrator Switch	Provides switching for Micro 800/2 users; supports sync data; AOS: 19.2 Kbps	With Micro 800/2, up to 128 input; up to 128 output	$2,250 to $3,250	
	Micro 800/X25 Concentrator Pad	Supports sync data; AOS: 19.2 Kbps	Up to 16 input; 1 output	$2,050 to $4,600	
	Series 11 Bus Driver Unibus Communications	Supports async data; AOS: 19.2 Kbps	Up to 32 input; up to 16 output	$6,300	
Network Products (919) 544-8080	Babymux	Supports async data; AOS: 19.2 Kbps	Up to 8 input; 1 output	$1,350	427
	Babynet	Multi-point mux; supports async data; AOS: 19.2 Kbps	Up to 22 input; 1 output	$1,450	
	Components/ VCX 1500	Supports async and sync data; AOS: 256 Kbps	Up to 288 input; multiple outputs	$4,500	
Paradyne (813) 530-2000	DCX Models 815, 825, 840, 850	Support async and bisync data; AOS: up to 72 Kbps	Up to 240 input; up to 15 output	$1,000 to $50,000	428
Penril Datacomm (301) 921-8600	Model 6814	Supports async data; AOS: 19.2 Kbps	Up to 8 input; 1 output	$1,750 to $2,195	429
Racal-Vadic (408) 946-2227	Scotsman II	Supports async, sync, and bisync data; AOS: 19.2 Kbps	Up to 8 input; 1 output	$2,950 to $5,750	430
Timeplex (201) 930-4600	Series II Microplexer	Supports async and sync data; AOS: up to 19.2 Kbps	Up to 48 input; up to 2 output	$4,000 to $11,000	431
	Microplexer Switching Multiplexer	Same features	Same	$6,000 to $12,000	
	QSM Switching Multiplexer	Same features	Up to 48 input; up to 4 output	$7,000 to $20,000	

Output speeds of 9.6 Kbps or less

Vendor	Product	Description*	Channels	Price	Circle
Astrocom (612) 227-8651	ASIM-3	Supports async data; AOS: up to 4.8 Kbps	Up to 3 input; 1 output	$640	473
	ASIM-7	Same features	Up to 7 input; 1 output	$1,300	
Case Rixon (301) 381-2300	Commux	Supports async and bisync data; AOS: up to 9.6 Kbps	Up to 8 input; 1 output	$2,000 to $2,800	432

**AOS=aggregate output speed.*

(Continued on page 130)

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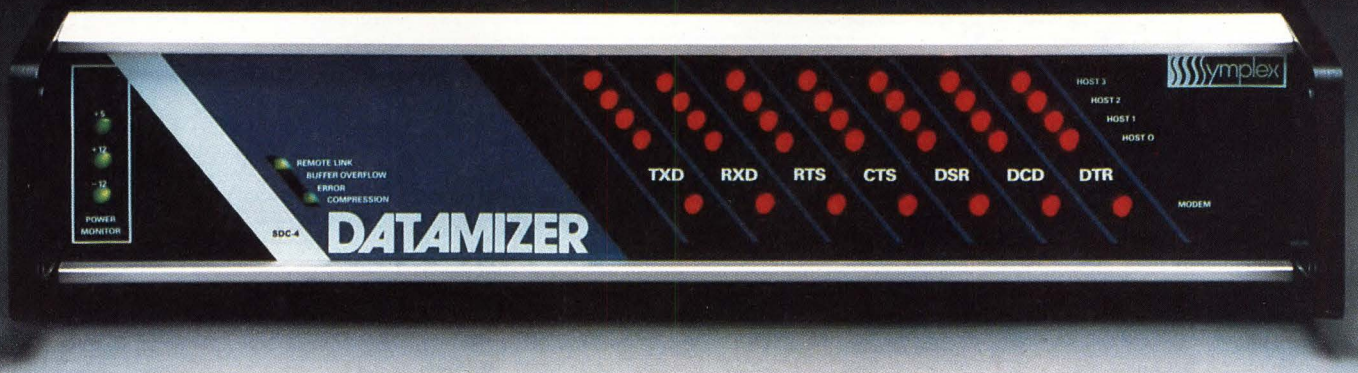

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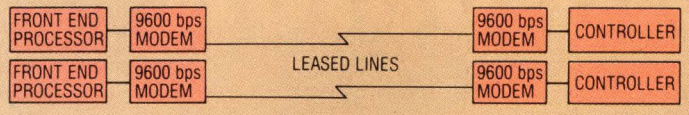
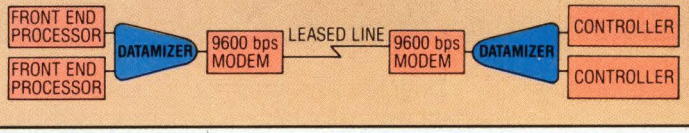
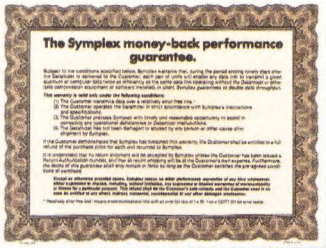


After: Datamizer eliminates one line: $23,433/year savings

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CIRCLE 54

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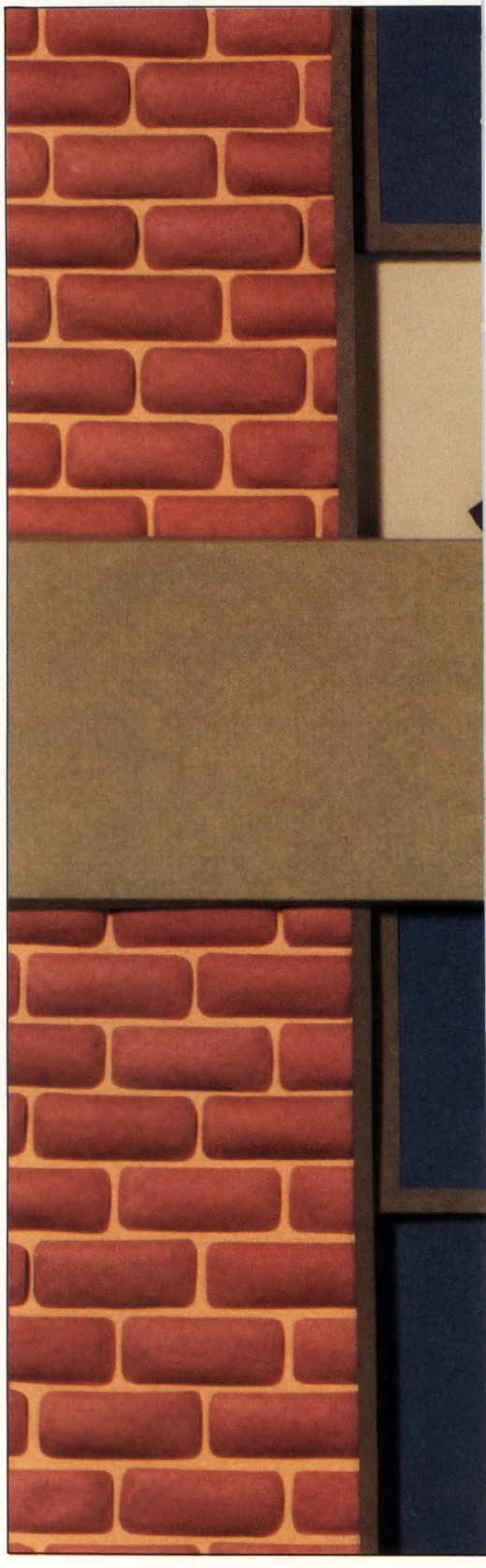
CIRCLE 55

MICROS ON THE REBOUND

Castoff personal computers don't have to collect dust from disuse—there are needy new users everywhere.

by Jennifer E. Beaver, Office Automation Editor



No matter how wise the initial investment, micros may need to be replaced due to age, a shortage of power or storage, or incompatibility. But frugal businesses can make way for new machines while gracefully disposing of the old.

Recycling personal computers in-house is an economical way to relocate unwanted equipment. "There's always another employee who can really use the micro when the original owner no longer finds it useful," says Mark Burnham, vice president of micro training and acquisition at Security Pacific National Bank, Los Angeles.

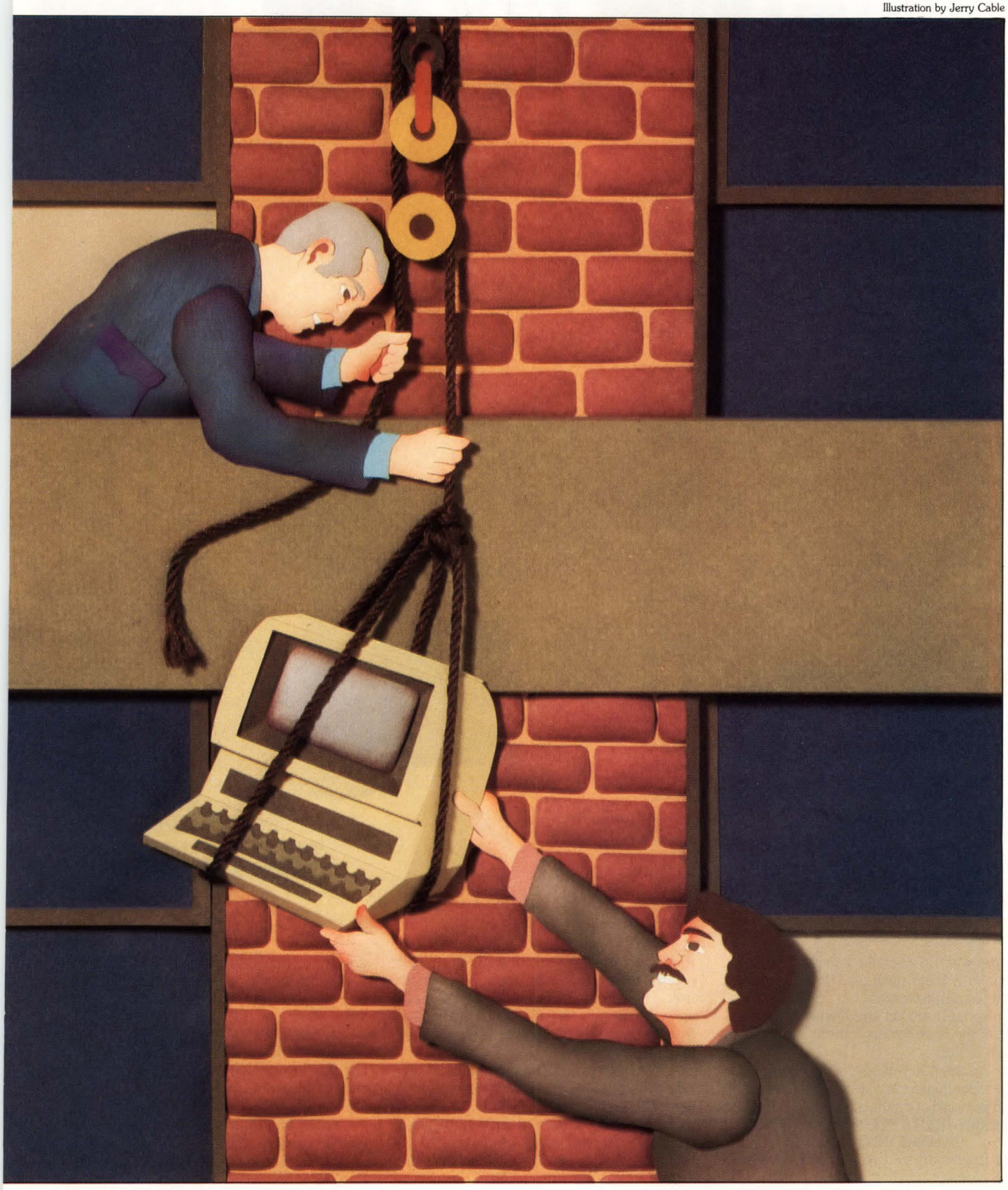
An office with an overabundance of outmoded micros can ship them to regional offices in need of equipment. When Security Pacific made the IBM Personal Computer its standard micro, the Apple IIs it had used for credit analysis were farmed out to branch offices, where communication with the corporate IBM mainframe wasn't critical.

Although organizations may want to replace their micros for many reasons, chances are the machines still work. The micro's solid-state circuitry has few breakable moving parts, and those can usually be replaced. And with the increase in third-party support groups, users can depend on backup even when the original manufacturer or dealer will no longer stand behind the product.

Although the sturdiness of micros gives them a good trade-in value with dealers, most never leave their original buyers. Few businesses own so many computers that all their users—or potential users—would reject castoffs. At Chase Manhattan Bank, New York, a proposed policy to sell employees used equipment at discount rates was shelved because the targeted micros

(Continued on page 120)

Illustration by Jerry Cable



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CIRCLE 56

(Continued from page 117)

were in too much demand in-house to justify selling them. And Ford Motor Co., Dearborn, MI, can't fill requests received from schools that need used micros because it doesn't consider any of its micros obsolete. Even Ford's old Radio Shack TRS-80s from Tandy Corp., Fort Worth, TX, are still earning their keep.

Office micros may pass through several hands in an organization or they may remain with their original users. Before the business world "blessed" personal computers in 1982 by adopting the IBM PC, most micros were brought in through the back door. Some of these machines hold their original jobs. Several TRS-80s at a west coast savings and loan association continue to process simple loan amortizations and depreciation calculations at branch offices. Although the rest of the company has chosen the IBM PC as its standard, the older, privately owned machines continue to do their jobs.

Even micros from defunct or financially troubled manufacturers can still pay their own way. Once the original support is gone, many users believe that these "orphaned" computers become white elephants. Not necessarily. The First Osborne Users Group (Fog), Daly City, CA, with a worldwide membership of 15,000, provides software and hardware support to Osbornes and other computer devices. For an annual fee of $24, Fog provides members with equipment, publications, and an opportunity to discuss common problems with other users. Other user-support groups, such as The Apple Core, San Jose, CA, and the Tandy Business Users Group (Tbug), Fort Worth, TX, offer similar user services.

This evidence suggests that micros, like cats, may have nine lives. Managers like Hannah Blank tend to bristle when any personal computer is termed obsolete. "That's such a negative adjective," says Blank, who heads new-product development at Chase and was formerly manager of MIS for institutional banking. "The word 'obsolete' implies that a device is no longer useful, which is seldom true. The older machines have found niches with new owners. They still have processing power, and the budget doesn't always have room for a new micro."

Photo by Tom Sobolik

Hannah Blank, head of new-product development at Chase Manhattan Bank, refuses to call any working personal computer obsolete.

Blank is somewhat of a micro historian. She's seen several generations of personal computers come and go at Chase. She's also written a book on micro phenomena, *Mastering Micros* (Petrocelli Books, 1983). And in 1981, Blank was responsible for bringing personal computers to Chase—replacing each division's calculators with Apple II micros.

During Chase's next wave of computer technology, IBM PCs were introduced to the bank. The Apple IIs stayed in use, circulating throughout the organization. For instance, the director of planning and budgeting felt restricted by the limits of 8-bit technology. He received a PC and passed along his Apple II to a subordinate product manager.

Who decides when a micro has outlived its usefulness? The user generally makes the initial overture. But Arnold Hooton, manager of information technology at Westinghouse Furniture in Grand Rapids, MI, won't order new equipment until a department head personally requests an upgrade. Justifiable requests at Westinghouse included a manager who required Lotus 1-2-3 (Lotus Development Corp., Cambridge, MA), which couldn't run on his Apple II, and several users whose systems were incompatible with CAD (computer-aided design) equipment, an integral part of furniture design.

A personal computer's appeal seems to be in the eye of the beholder. A perfectly adequate micro may appear unbelievably stodgy to a user bedazzled by new technology. All micro managers receive requests from users who crave machines with the latest additions and features. If a user simply wants a new toy, the request will probably be denied—unless the applicant holds high rank.

Kavin Moody, director of systems planning and research at the Gillette Co., headquartered in Boston, says the mania for state-of-the-art hardware and software has diminished over the past few years. "Users have settled down in a usage pattern with products like Lotus 1-2-3. They know it works well and don't feel compelled to try every new program that's introduced," he says. "They've also become wary of 'vaporware' that promises but doesn't deliver."

But some organizations encourage a spirit of experimentation. Westinghouse's Hooton doesn't feel he's doing his job unless his users clamor for the best and the brightest. "If I tried to stifle their enthusiasm, I'd be doing the company a disservice," says Hooton. "I'm usually the one who exposes our users to new products in the first place."

Even businesses whose first micros came from IBM are pressured by users to update their equipment. Some managers are skeptical about the validity of the demand for the IBM PC AT and the PC XT. "You must ask yourself if a response time of 3 seconds versus .3

(Continued on page 124)

"There's always someone in-house who can really use a micro, even when its original owner no longer finds it useful."

Burnham, Security Pacific National Bank

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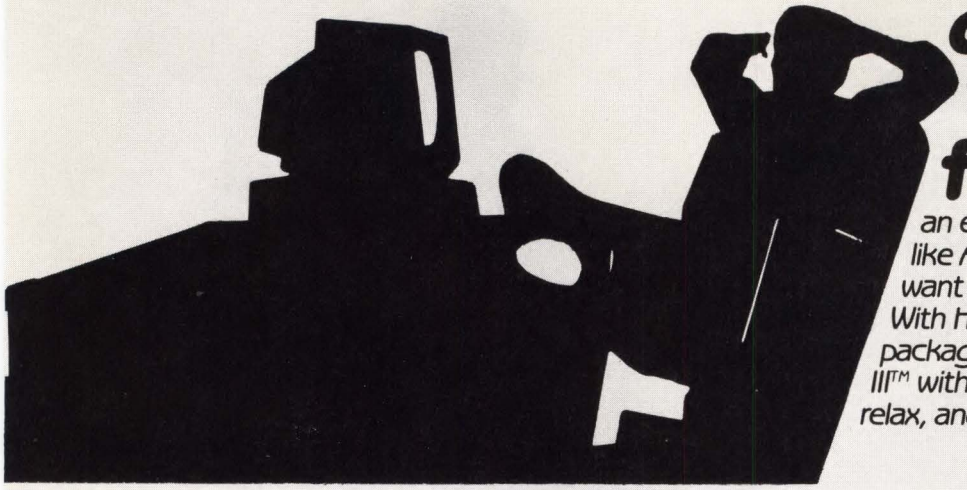

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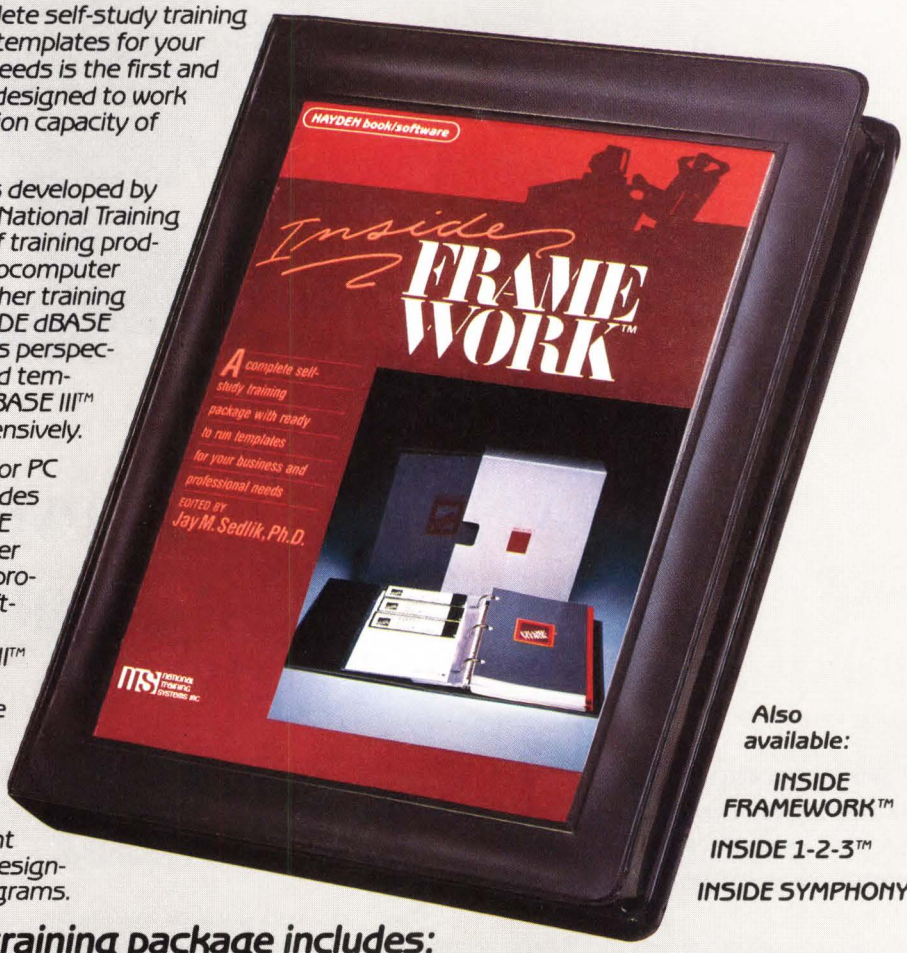

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CIRCLE 59

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CIRCLE 58

(Continued from page 120)

seconds is really worth the extra money," says James Haner, founder of the nationwide Micro Managers Association and a consultant in Palmdale, CA.

At Connecticut Mutual in Hartford, CT, demand for the PC AT is so great that Glenn Baron, director of personal-computer sales and servicing, anticipates a surfeit of IBM PCs, currently being used by 2,000 of the insurance carrier's agents. The agents purchase their equipment through Baron. He also helps them dispose of unwanted micros. Baron is considering offering some IBM PCs to new users at a discount and then selling the rest to a third-party dealer. He hasn't struck any deals yet because Connecticut Mutual, like many businesses, is still waiting to receive its PC ATs.

Every organization disposes of micros in its own way. At Security Pacific, the process is similar to selling a used car. When a "buyer" finds a "seller" willing to take over the payments, they sign a transfer-of-fixed-assets form, and the device has a new home. Each department has financial responsibility for its own equipment and can choose to upgrade whenever the budget allows.

This approach has the virtue of simplicity. Since it's an IBM shop that encourages the purchase of that vendor's products by offering software and networking support, Security Pacific is unlikely to become a warren of strange and unpredictable machines. In decentralized situations like this, decisions to upgrade or pass on equipment are made more quickly and efficiently on a local level.

In-house newspapers are another way to unload used micros. At Gillette, Chase, and Security Pacific, dissatisfied users advertise for fellow employees whose departments are willing to take over payments on relatively new equipment. Some users are so anxious to dispose of dust-gatherers, they actually give the equipment away.

For many managers whose micros become inadequate, the answer is to enhance their machines rather than trade or sell them. Some micros can be brought up to speed by bolstering them with supercharged circuit boards that increase memory and add new capabilities, such as graphics and color. (See "Enhancements for Productivity" in the Jan. 29 issue.) The Apple II, for example, has seven expansion slots, which help it keep pace with the times better than many of the early micros.

Although some managers find boosting their equipment with these add-ons successful, enhancement is only a stopgap measure if an organization's future needs include more processing power and storage. No amount of supercharging will turn a TRS-80 or Osborne 1 into an IBM PC.

The enhancement process itself can be tedious. "People get tired of calling the micro-services department and requesting an Irma board [from Digital Communications Associates Inc., Norcross, GA] or a Hercules graphics card [from Hercules Computer Technology, Hercules, CA] every few months," says James Haner.

One of Haner's clients, a savings and loan association, issued an edict last January 1 that all new micros must have 512 kilobytes of internal memory. This mandate was an attempt to give managers some growing room, although it won't be long before their micros will need refitting again. "By the time most corporations agree to standardize on 512 Kbytes, it's no longer an option but a requirement," says Haner. "The financial industry does much modeling that won't run in 256 Kbytes and will barely run in 384 Kbytes, so you might as well go for the maximum when you first invest in the equipment."

Occasionally, supercharging is pointless, and no one in the organization wants a hand-me-down. In these cases, technological limitations force companies like Equitable Life Assurance Society, New York, to find more creative ways of disposing with micros.

When Equitable agents purchased 400 Osbornes for sales presentations, management supported their endeavors by supplementing their software and hardware purchases. Before long, management was reselling the micros to a west coast third-party vendor. The 8-bit machine fell into disfavor at Equitable because it was too slow. Then, a company-developed software program designed for 16-bit computers put the final nail in Osborne 1's coffin. Equitable agents who parted with their old Osbornes and paid $300 got an IBM PC in return.

The trade-in market for used equipment is taking off as dealers like Hugh Gelch, a Haverford, PA-based trader who bills himself as The Computer Broker, offer "matchmaking" services between buyers and sellers. With these outfits, businesses can realize equity

Photo by Greg Dorsett

Some executives, like Arnold Hooton, manager of information technologies at Westinghouse Furniture, encourage their users to experiment with the latest micro products.

from trading and selling unwanted equipment without having to do the negotiating themselves.

About 30 percent of all computer stores will eventually be devoted to used and excess equipment, says Fred Brown, head of the Micro Computer Inventory Exchange, Santa Barbara, CA. Experts predict that the potential market for this used equipment is huge. Brown's company alone has moved $50 million worth of merchandise in the past eight months.

Brown, former national-accounts director at Osborne Computer Corp., set up a facility in Santa Barbara, CA, that serves as a halfway house for computer manufacturers and other businesses with excess inventory. Brown's outfit transfers micros on a company-to-company basis. This may be the ideal solution for organizations that want to roll over their old equipment.

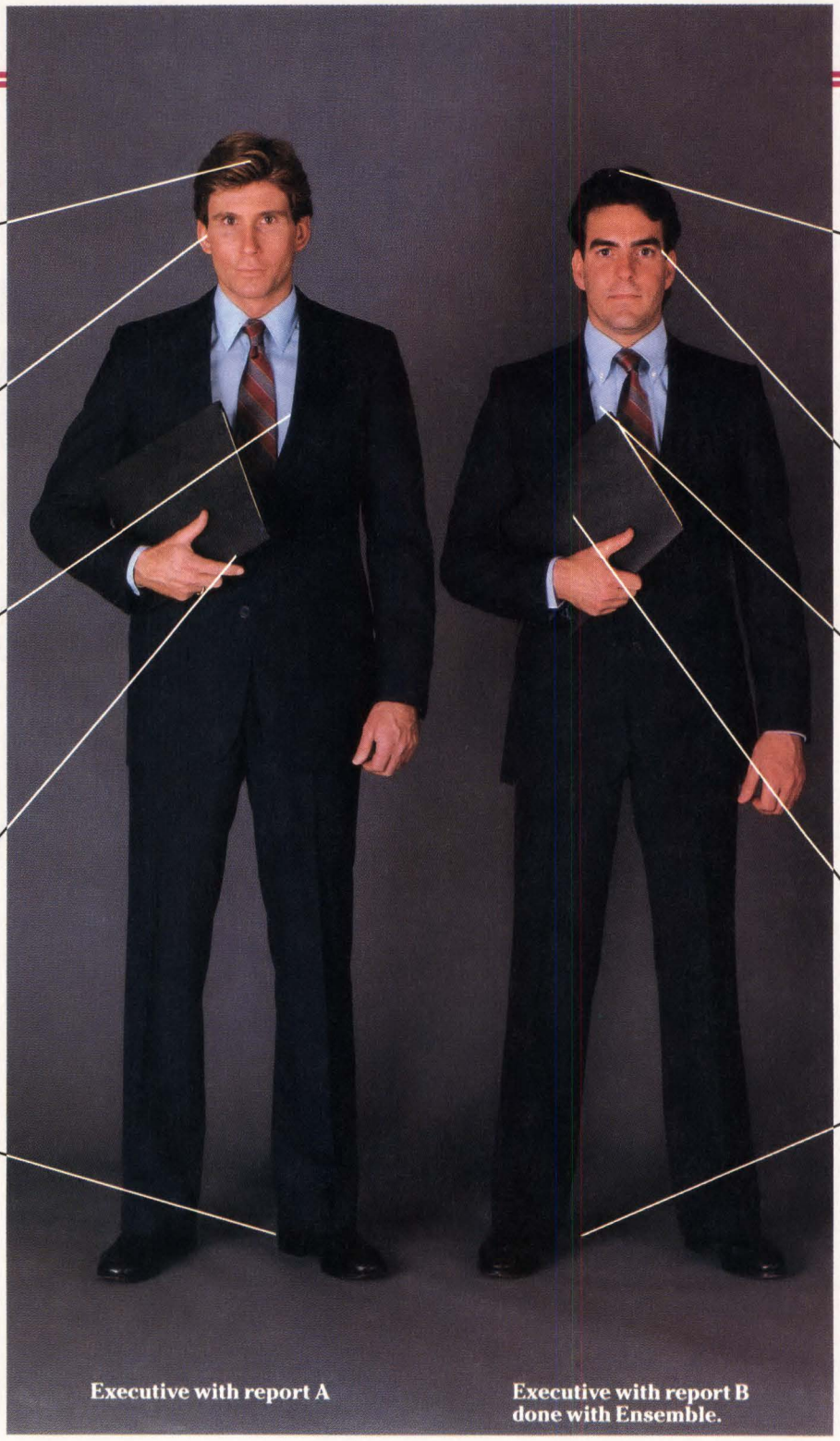
Third-party support by corporations like Xerox, which services Osbornes, makes users less edgy about buying used equipment. User groups include corporations in their membership, says Gail Rhodes, executive director of Fog. Business users frequently require handholding, so membership in such a group can be a lifeline. "Ninety percent of corporate users don't know anything about their tools," says Rhodes. "It's like driving a car without knowing where to put the gas."

Dependence on computer manufacturers can throw users into a state of panic if a vendor goes under or ceases to support a product. Richard B. DeSimone of the New York-based Information Management Group helps users who own out-of-favor machines such as Victor 9000s, Osbornes, and Apple IIs. As long as a personal computer does the job it was purchased to do and DeSimone can get the parts, he recommends that the client keep it. If the micro can't run the software the company needs, he advises them to replace it.

And if an organization can't sell or trade its old micros, it can always give them away. A micro with a few prime depreciation years left may yield a respectable payback in merchandise or tax deductions. Nonprofit organizations usually welcome computer contributions. Donations to charitable organizations—including churches, libraries, research groups, and educational institutions—may entitle your organization to a tax break.

Disposing of a micro is like returning to the trading post of the Old West. The key word is barter. Whether the payment is cash, an exchange of micros, or credit toward a new machine, there's always a deal to be made and a new user waiting. As Fred Brown of the Micro Computer Inventory Exchange says, "There's no such thing as obsolete computers—just obsolete prices." □

What do your reports reveal about you?



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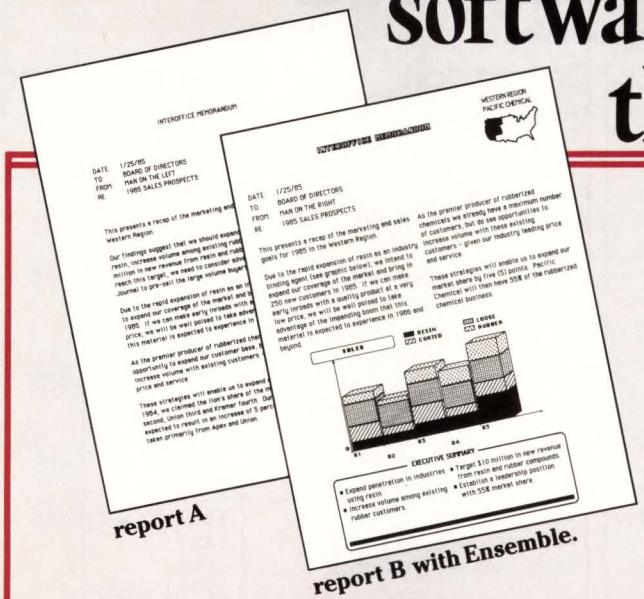

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PROFIT ANALYSIS

1985

	% of Net
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	Q1	Q2	Q3	Q4	Total
Net Sales	5000	3000	3000	7000	18000
Cost of Goods	1250	750	750	1750	4500
Expenses	2250	1350	1350	3150	8100
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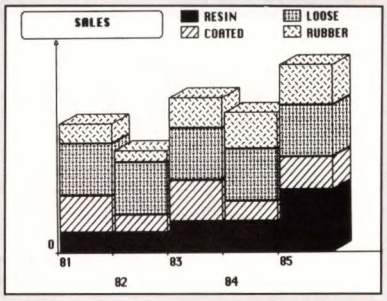

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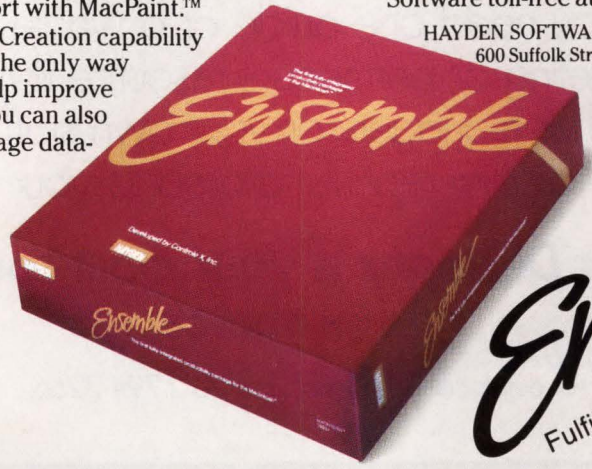

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(Continued from page 66)

UNIX COURSEWARE

Public seminars

Vendor	Title	Description	Price	Circle
Human Computing Resources (416) 922-1937	Unix Executive Seminar	One-day lecture*	$295	480
Integrated Computer Syst. (213) 417-8888	Unix: A Hands-On Introduction Programming in C	Four-day hands-on course* Four-day hands-on course*	$995 $995	481
Intelligent Training Solutions (818) 906-8628	Unix Perspectives Unix Concepts Variety of courses available	Introductory one-day seminar* Three-day hands-on workshop	$200 $600 $450 and $800	482
Int'l. Technical Seminars (415) 621-6415	Introduction to Unix for Nonprogrammers Variety of courses available	One-day seminar*	$250 $175 to $325	483
Plum Hall (609) 927-3770	Unix Workshop Variety of courses available	Five-day hands-on course*	$1,000 $1,000	484
Structured Methods (212) 741-7720	Introduction to the Unix System Unix System Fundamentals Unix System Workshop Variety of courses available*	Two-day lecture* Two-day hands-on workshop* Five-day hands-on workshop*	$695 $450 $900 $250 to $625	485
Uniq Computer (312) 879-1566	Introduction to Unix Variety of courses available*	Four-and-a-half-day courses*	$950 $950	486

* On-site sessions available [1] Videotape available

(Continued from page 112)

STATISTICAL MULTIPLEXERS

Output speeds of 9.6 Kbps or less

Vendor	Product	Description*	Channels	Price	Circle
Concord Data Syst. (617) 890-1394	Super Duplex	Includes integral modem; supports async and sync data; AOS: up to 2.4 Kbps	Up to 3 input; 1 output	$1,695	433
Datagram (401) 885-4840	The Steamer	Stat mux/data compressor; supports async data; AOS: 9.6 Kbps	Up to 8 input; 1 output	$1,395 to $4,995	434
Develcon Electronics (215) 443-5450	ISM	Supports sync data; AOS: 9.6 Kbps	Up to 60 input; 1 output	$2,000 and up	435
	DS 1600	Supports async data; AOS: 9.6 Kbps	Up to 16 input; 1 output	$2,600	
	DS 1800	Same features	Up to 9 input; 1 output	$1,550	
	DS 4800	Same features	Up to 52 input; 1 output	$3,650	
Gandalf Data (312) 541-6060	Pin 9106	Supports async data; AOS: 9.6 Kbps	Up to 4 input; 1 output	$825 to $1,085	436
Micom Syst. (805) 583-8600	Micro 900/2 Multidrop Concentrator	Multi-point mux; supports async data; AOS: 9.6 Kbps	Up to 16 input; 1 output	$900 to $4,600	437
Multi-Tech Syst. (612) 631-3550	Multimux	Supports async data; AOS: 9.6 Kbps	Up to 8 input; 1 output	$995 to $2,095	438
Prentice (408) 734-9810	SNP	Supports async data with sync option; AOS: 9.6 Kbps	Up to 8 input, 1 output	$695 to $1,995	439
Racal-Milgo (305) 592-8600	Omnimux 4	Supports async data; AOS 9.6 Kbps	Up to 4 input; 1 output	$1,200	440
	Omnimux 8	Same features	Up to 8 input; 1 output	$2,300	
Racal-Vadic (408) 946-2227	Scotsman I	Supports async data; AOS: up to 9.6 Kbps	Up to 8 input; 1 output	$1,850 to $5,100	441
Symplex Communications (313) 995-1555	Multiplexer and Data Compressor	Supports async and sync data; AOS: 9.6 Kbps	Up to 4 input; 1 output	$5,000	442
Teltone (206) 827-9626	M860	Supports async, bisync, and bitsync data; AOS: 9.6 Kbps	Up to 32 input; up to 2 output	$2,600 to $7,300	443
Timeplex (201) 930-4600	E/Series	Supports async and sync data; AOS: 9.6 Kbps	Up to 16 input; 1 output	$1,650 to $6,000	444
Universal Data Syst. (205) 837-8100	SM-2A	Supports async data; AOS: 2.4 Kbps	Up to 2 input; 1 output	$675	445
	SM-2S	Supports sync data; AOS: 9.6 Kbps	Same	$675	
	SM-4A	Supports async data; AOS: 9.6 Kbps	Up to 4 input; 1 output	$1,160	
	SM-4S	Supports sync data; AOS: 9.6 Kbps	Same	$1,160	

AOS=aggregate output speed.

TIME-DIVISION MULTIPLEXERS

High-speed output (up to 2.5 Mbps)

Vendor	Product	Description*	Channels	Price	Circle
Avanti Communications (401) 849-4660	Ultrapac	Supports async, sync, digital-voice, and video data; AOS: up to 1.5 Mbps	Up to 16 sync or digital-voice input; up to 32 async input; 1 output	$8,900 to $34,000	446
	Tpac	Supports async, sync, and digital-voice data; AOS: up to 1.5 Mbps	Up to 4 input; 1 output	$8,900 to $14,000	
Canoga Data Syst. (818) 887-1897	CDX-327	Attaches to IBM 3274 controller; supports async data; AOS: up to 2.3587 Mbps	Up to 32 input; 1 output	$2,200 to $3,700	447
Coastcom (415) 825-7500	A/I Mux	Includes drop and insert features; supports async and sync data; AOS: 19.2 Kbps async, 1.536 Mbps sync	Up to 48 input; 1 output	$3,000 to $30,000	448
Fibronics Int'l. (617) 778-0700	Unimux FM 832	Supports async and sync data; AOS: 2.0 Mbps	Up to 128 input; 1 output	$7,000	449
Infotron Syst. (609) 424-9400	Infostream 1500	Supports async, sync, and digital-voice data; AOS: up to 1.544 Mbps	Up to 64 input; up to 2 output	$7,400	450
Interactive Syst./3M (313) 973-1500	3M Model 6600 Series Multiplexer	Supports binary bipulse data; attaches to IBM 3274 controller; AOS: 4.717 Mbps	Up to 32 input; 1 output	$1,600 to $3,090	451
Network Products (919) 544-8080	Local Mux	Supports async, sync, and bisync data; AOS: 1 Mbps	Up to 8 input; 1 output	$850	452
Scitec (401) 849-4353	BSPT-1	Supports async and sync data; AOS: 1.544 Mbps	Up to 128 input; 1 output	$4,000 to $35,000	453
Timeplex (201) 930-4600	Link/1	Supports async and sync data; AOS: 2 Mbps	Up to 200 input; up to 10 output	$10,000 to $70,000	454

Medium-speed output (10 Kbps to 500 Kbps)

Vendor	Product	Description*	Channels	Price	Circle
AT&T Information Syst. (201) 953-6174	56-Kbit Multiplexer	Supports sync data; AOS: 56 Kbps	Up to 21 input; 1 output	$8,515 to $15,000	455
Avanti Communications (401) 849-4660	Dpac	Supports async, sync, and digital-voice data; AOS: up to 64 Kbps	Up to 16 sync or voice input; up to 32 async input; 1 output	$7,300 to $28,000	456
Canoga Data Syst. (818) 887-1897	CMX-320	Supports async data; AOS: up to 19.2 Kbps	Up to 64 input; 1 output	$5,000 to $7,000	457
	CMX-816	Supports async and sync data; AOS: up to 76.8 Kbps	Up to 16 input; 1 output	$5,500 to $6,280	
Codex (617) 364-2000	8000 Series	Supports sync data; AOS: up to 64.8 Kbps	Up to 20 input; 1 output	$5,000 to $9,000	458
Dataproducts New England (203) 265-7151	MC^3	Supports async and sync data; AOS: up to 64 Kbps	Up to 16 input; 1 output	$5,500 to $11,400	459
	DPMux-256A	Supports async, sync, digital-voice, and conditional diphase data; AOS: up to 256 Kbps	Same	$4,100 to $10,000	

AOS=aggregate output speed.

TIME-DIVISION MULTIPLEXERS

Medium-speed output (10 Kbps to 500 Kbps)

Vendor	Product	Description*	Channels	Price	Circle
Gandalf Data (312) 541-6060	GLM 504	Supports sync data; AOS: 56 Kbps	Up to 4 input; 1 output	$1,550	460
Infotron Syst. (609) 424-9400	TL280	Supports sync data; AOS: 64 Kbps	Up to 24 input; 1 output	$2,070	461
	TL300	Same features	Up to 6 input; 1 output	$2,700	
Infinet (617) 681-0600	MX 600	Supports sync data; AOS: 14.4 Kbps	Up to 6 input; 1 output	$1,200	462
Micom Syst. (805) 583-8600	Instamux 470 Local Multiplexer	Supports sync data; AOS: 153.6 Kbps	Up to 8 input; 1 output	$695 to $1,150	463
	Micro 750 Wideband Multiplexer	Supports sync data; AOS: 256 Kbps	Up to 38 input; 1 output	$2,600 to $12,000	
	Micro 700 Band Splitter	Supports sync data; AOS: 38.4 Kbps	Up to 4 input; 1 output	$1,150	
Minntronics (612) 770-5247	Octomux	Supports async data; AOS: 102.4 Kbps	Up to 8 input; 1 output	$988	464
Racal-Milgo (305) 592-8600	Omnimux TDM 56	Supports sync data; AOS: 72 Kbps	Up to 8 input; 1 output	$3,200	465
Solana Electronics (619) 481-6384	Model 822	Supports async data; AOS: 76.8 Kbps	Up to 8 input; 1 output	$495	466

Output speeds of 9.6 Kbps or less

Vendor	Product	Description*	Channels	Price	Circle
Bo-Sherrel (415) 792-0354	MX-1	Supports async data; AOS: 9.7 Kbps	Up to 8 input; 1 output	$495	467
General Datacomm (203) 574-1118	TDM 1209	Supports sync data; AOS: up to 9.6 Kbps	Up to 4 input; 1 output	$995 to $2,375	468
Infinet (617) 681-0600	MX 496	Supports sync data; AOS: 9.6 Kbps	Up to 4 input; 1 output	$900	469
	IMX 600	Same features	Up to 6 input; 1 output	$1,200	
Micom Syst. (805) 583-8600	Multiport Modem	Supports sync data; AOS: 9.6 Kbps	Up to 4 input; 1 output	$3,150	470

**AOS = aggregate output speed.*

FREQUENCY-DIVISION MULTIPLEXERS

Vendor	Product	Description*	Channels	Price	Circle
Comdata (312) 470-9600	Series 200	Supports sync data; AOS: up to 1.2 Kbps	Up to 8 input; 1 output	$350 per channel per end	471
Gandalf Data (312) 541-6060	DOV 1150	Supports async data, with sync option; AOS: 9.6 Kbps	1 input; 1 output	$245 to $295	472

**AOS = aggregate output speed.*

Ethernet

8010 Star Workstation

8044 Print Server

8073 Communications Server/8032 File Server

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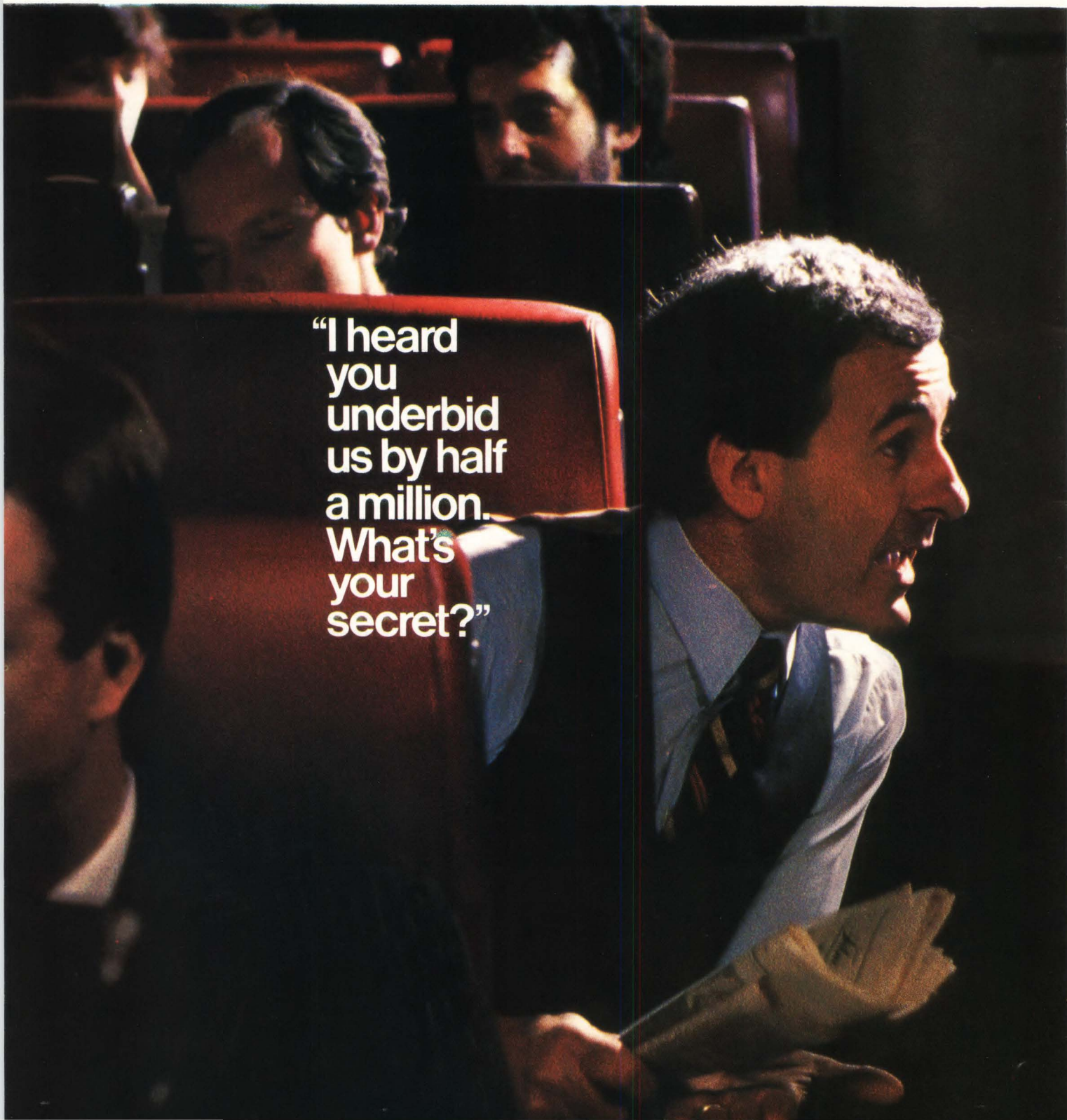

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by Mary Miles, New England Editor

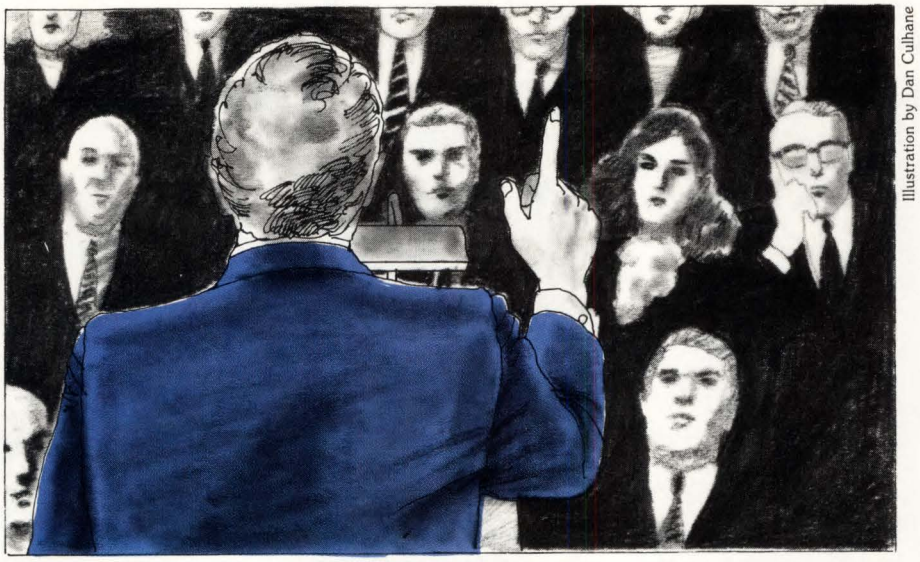

Illustration by Dan Culhane

PART II: HONING YOUR PRESENTATION SKILLS

Did you fill out the communications-style inventory in the May 7 "Your Career" column? If so, you can characterize your style of presenting information as amiable, passive, intellectual, driver, or some combination of these. And you've probably begun to observe others to determine their styles. Now you need to know what these styles mean and how your presentation style and the styles of others affect the way information is received and evaluated.

Recent studies show the predominance of oral communications in executives' work routines. George Plotzke, district manager for planning and strategy at AT&T (Morristown, NJ), reports that executives spend about 94 percent of each workday in communications-related activities. Sixty-nine percent of that time is devoted to oral communications—53 percent face-to-face and 16 percent over the phone. Twenty-five percent of executives' time involves written communications. They use the remaining six percent for problem-solving, conceptualizing, and planning. Without a doubt, the ability to give information that's clear, concise, professional, and accessible helps separate the corporate winners from the rest of the herd.

Elizabeth Cheever, senior consultant at The Mitterling Method, the Winchester, MA, consultancy that invented the communications-style inventory, says no one style is "better" than another. "Most people have a primary style and a secondary style, and they can adapt their styles to particular situations," explains Cheever.

A technical-services representative, for example, might communicate in an outgoing, warm manner—a typical amiable style. However, when promoted to management, this individual might adopt some of the characteristics of drivers, using less emotional language, developing more assertive vocal tone and body language, and becoming more information-oriented.

However you may suit your communication style to a particular situation to accommodate your needs, The Mitterling Method's focus on presentation skills involves close attention to the needs of others. To create the most receptive audience possible for your information and ideas, Cheever says, you must first learn to assess your communications styles, then make a conscious effort to determine and analyze the style of your audience. Finally, you must become skilled at adapting communications appropriately to others' styles when necessary.

That adaptability is the key. To get people to truly listen to the information you're imparting, consider it intelligently, and accept that it entails much more than tailoring only your choice of words to particular audiences. You need to be acutely aware that everything you say and do, even the way you look and move, affects the reception of your message. Cheever cites several characteristics of oral communication that in-

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ADVERTISER INDEX

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fluence the success or failure of your presentations.

- Organization. How you present information: whether you make the main point first and then give supporting data or give supporting details first and work up—with varying degrees of speed and directness—to the main point.
- Nonverbals. Gestures, facial expressions, eye contact, body language, and proximity to listeners.
- Paralinguistics. Vocal pitch, volume, speech rate, and tone of voice; the use of emotional language and personal references; technical terminology; and word complexity.
- Motivation. Knowledge of the needs that motivate your communications style(s) and that of others.

Amiables are motivated by a need for affiliation. They tend to speak at a moderate rate and tone in order to appeal to the majority of listeners. They use personal references, anecdotes, and qualifying statements to present information. Amiables organize their presentations by developing supportive information first, so it takes them a while to get to the point. Their many gestures are vivid and often not relevant to what they're saying. As listeners, they're usually accepting and involved.

People who have a passive style often make their statements sound like questions. That's because they are motivated by a need for acceptance. They watch for others' reactions to see if they should continue speaking. They speak softly and slowly in a straightforward manner, and their gestures are limited. Like amiables, they tend to present supporting information first, then get to the main point. However, they're more organized than amiables and are generally more interested in the information than in the audience. Passives are terrific listeners—they don't miss a thing. They make an excellent audience for some speakers, but they can be bothersome to others—amiables, for instance—because they don't visibly respond.

Intellectuals are motivated by achievement. They almost worship information—to the point that they tend to forget that everyone else isn't necessarily attuned to information the way they are. They organize a presentation with the main point first, then give supporting facts. Often, they give the audience—whom they sometimes seem to forget—enough supporting information to sink a ship, using very specific, technical language. Intellectuals use few gestures. As listeners, intellectuals are most comfortable with impersonal facts and figures; they prefer a formal presentation to a "chummy" style.

Drivers are motivated to control. They speak quickly in a medium-to-loud voice, embellishing their presentations with many illustrative gestures. Drivers are primarily interested in getting the point across and adapt their choice of words to get the audience control they need. However, drivers may not necessarily get to the point of a presentation immediately, depending on what they perceive the audience wants. But as listeners, drivers want the bottom line right away.

How do you assess a prospective audience to determine the style to which you must adapt? "Get some demographics about the group," counsels Cheever. "Who will be there? How large—or small—will your audience be? Who, if anyone, from your organization last spoke to the group? Where will you be giving your presentation? What is the seating arrangement? Why have you been asked to speak, and how many presentations other than yours will be made? You can gain more control over the impact of your presentation by getting some facts about your audience ahead of time."

You can surmise employees' styles from their roles in the organization.

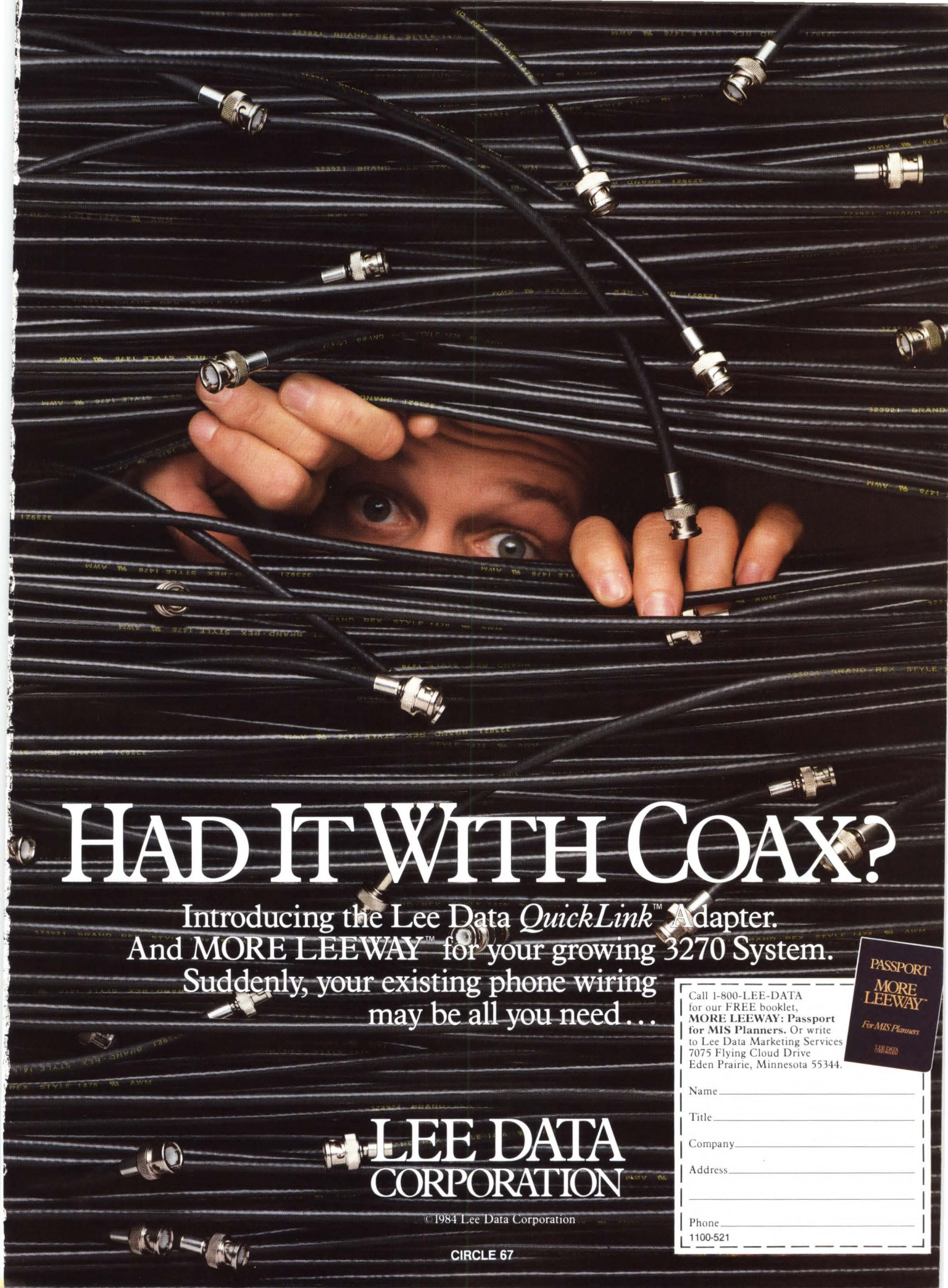
If you're speaking to the decision-makers of an organization, you'd be wise to tailor your presentation to suit drivers' needs. Give those main points up front; don't lose your listeners' attention with details or personal anecdotes. If you're an intellectual, you may have to bite the bullet and cut your presentation in half. If you're a passive speaking to a roomful of amiables, be aware that they are outgoing and need that personal touch. You may have to smile quite a bit and establish eye contact rather than hide behind your charts. And if you're an amiable faced with giving a presentation to passives—perhaps the accounting department—cut out those amusing stories and hit them with the main point first, then provide supportive statistics.

Even if pertinent information about your audience is unavailable, you can make some common-sense assumptions. You can surmise employees' styles from their roles in the organization, says Cheever. "Top salespeople tend to be driver/amiables; high-level managers are usually drivers; human-resource people are probably amiables; and technical types lean toward the intellectual style. Passives tend to be research people and support personnel."

The idea is to analyze your audience *before* you make your presentation. Understanding the four basic styles—both for listening and speaking—can give you a powerful communications advantage. "You may have to be a bit of a chameleon," says Cheever, "but it's vital to control the style you present to others. Get your message across in a way that is most acceptable to your audience. When you forget about the listeners, your percentage of *effective* communication invariably goes down." □

"When you forget about the listeners, your percentage of effective communication invariably goes down."

Cheever, Mitterling Method



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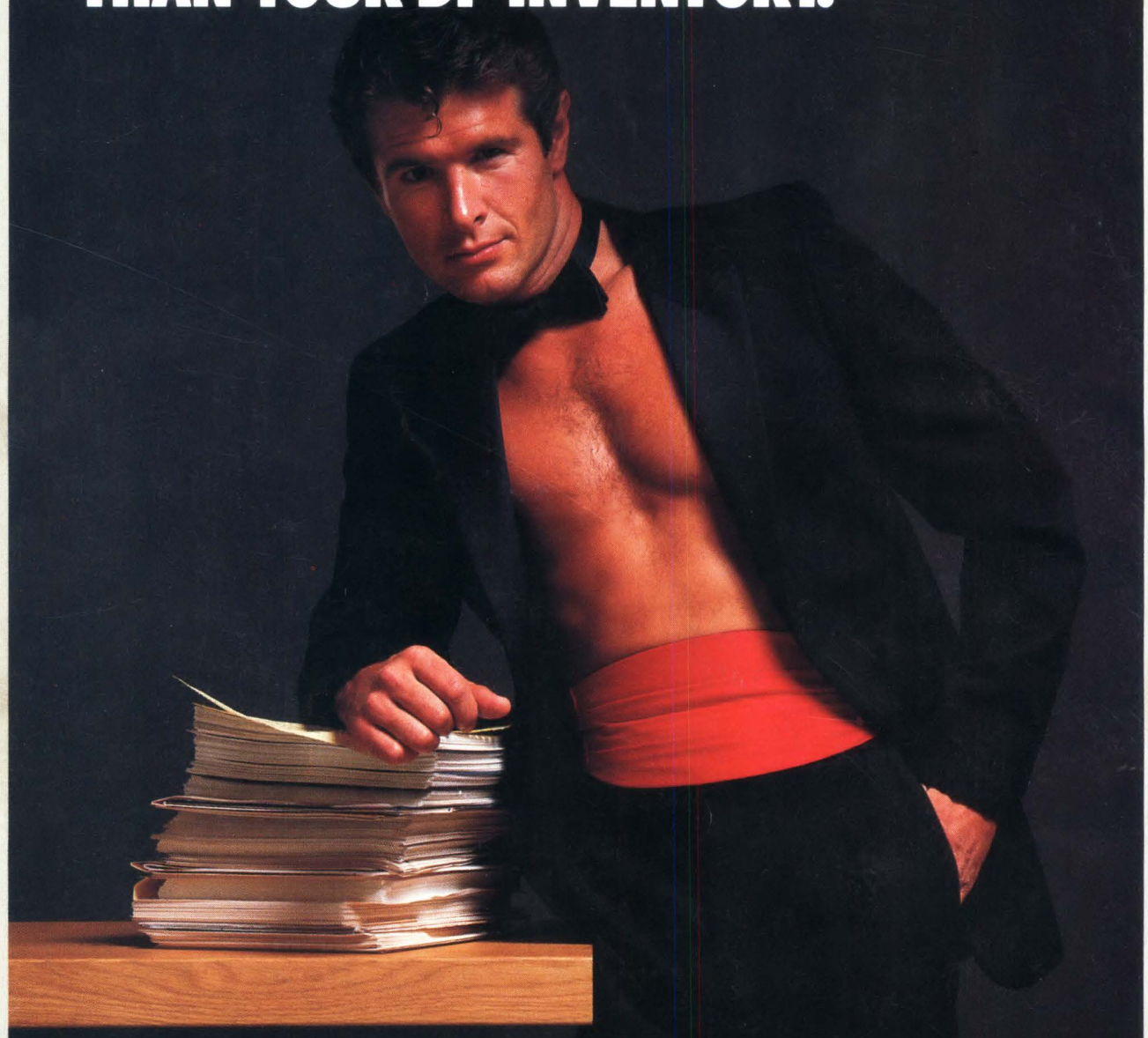
CIRCLE 67

IF YOU DON'T WARE UCC-4, YOU'LL LOSE MORE THAN YOUR DP INVENTORY.



You'll lose your shirt in time, money and wasted management manpower. Because the bare fact is, your present manual method of tracking hardware can't cover your data center's growing needs.

You need greater inventory control. You need UCC-4, a revolutionary new software system that delivers central, automated control of both physical and financial DP inventory data. Innovative software that will streamline your data center with billing verification, inventory control, on-order tracking, cost distribution, configuration analysis, current book value tracking, procurement analysis and flexible reporting.

To find out more about our complete line of systems software products, call UCCEL today. We'll give you the shirt off our back.

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Systems software that makes you look good.