

COMPUTER DECISIONS[®]

THE MANAGEMENT MAGAZINE

FEBRUARY 26, 1985

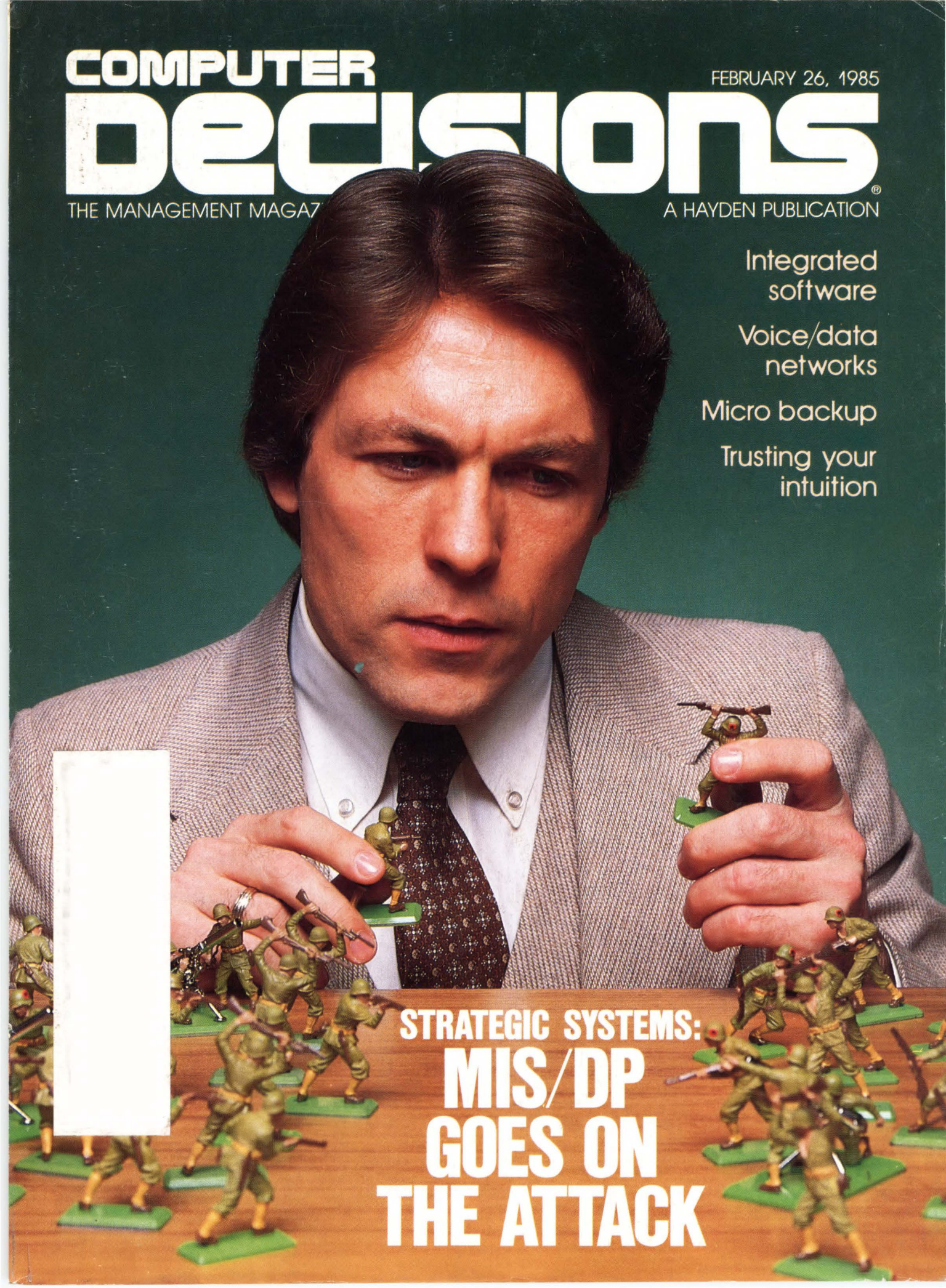
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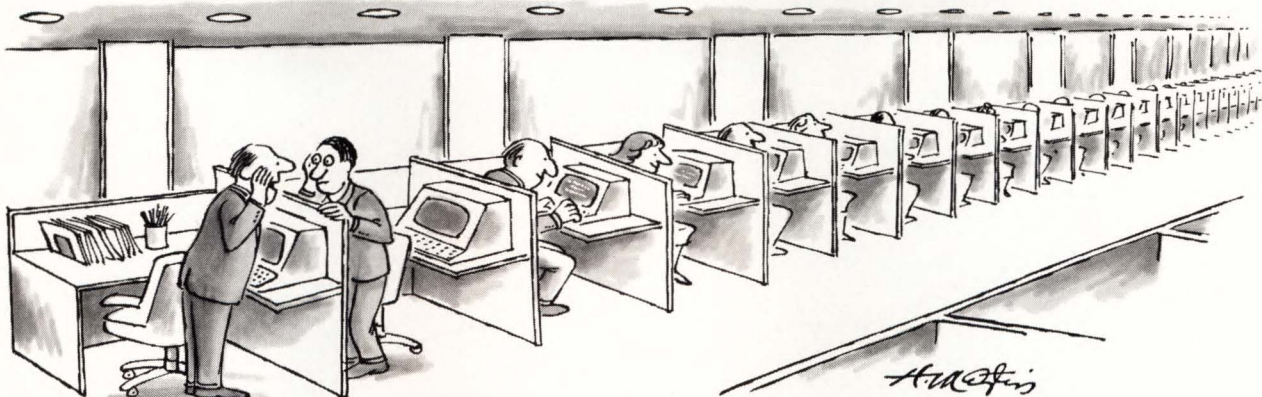
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CIRCLE 1
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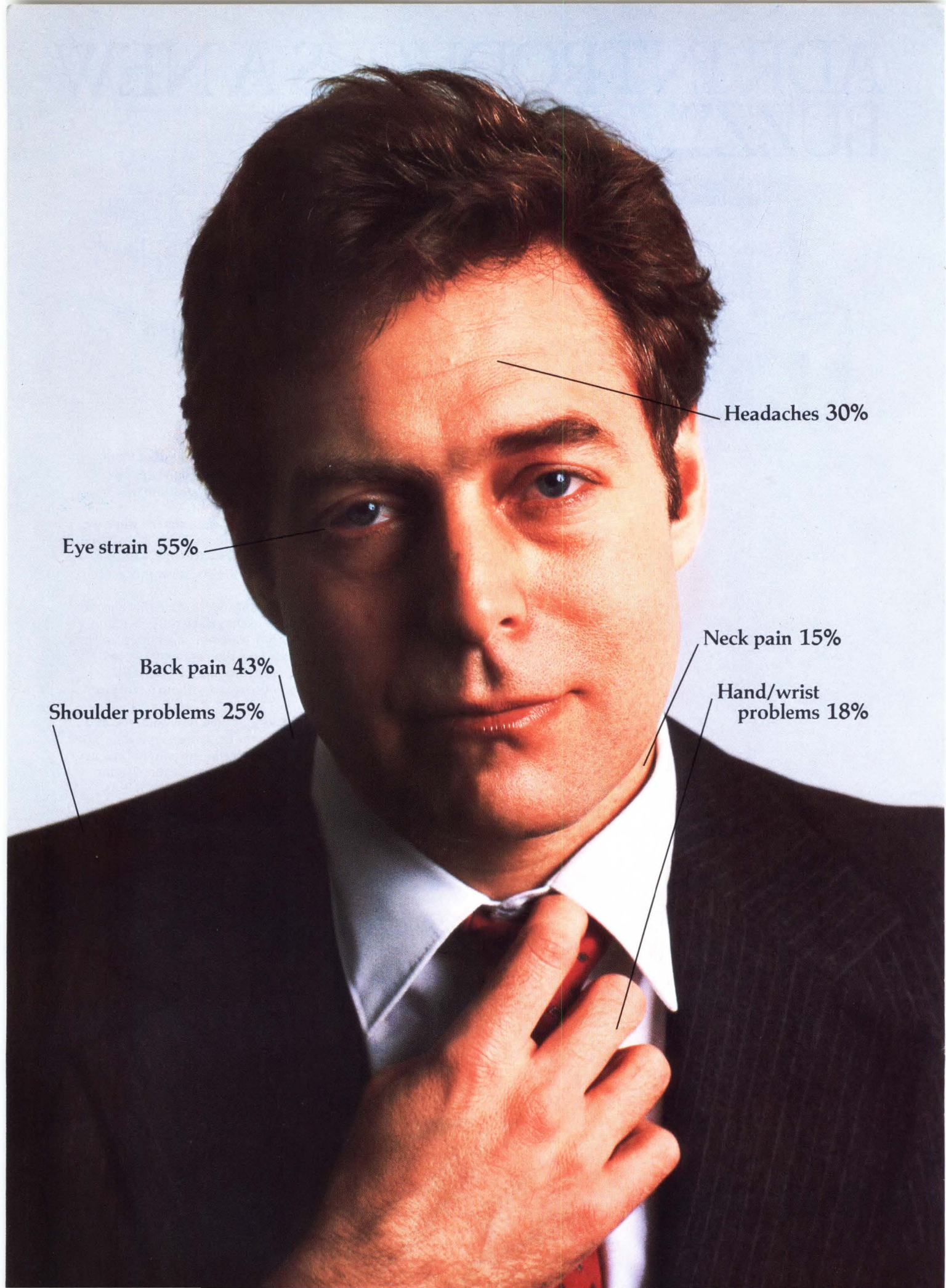
Company _____

Address _____

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Computer Equipment _____



Headaches 30%

Eye strain 55%

Back pain 43%

Shoulder problems 25%

Neck pain 15%

Hand/wrist
problems 18%

Computers can only perform as well as the people who use them.

The chart below is disturbing. It shows the kinds of problems computer users are having.

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

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

Before you dismiss them as trivial, consider two things:

First, more than twenty states are now preparing legislation to protect computer users from problems like these.

Second, it's not just a people problem.

It's a business problem. Because computers do what they're told.

And if someone with a headache or eyestrain is doing the telling, they're likely to make mistakes.

Quite clearly, it's in everyone's interest to solve the problem.

You are not a machine.

As you would expect, computers are designed by engineers.

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

And even less about ergonomics.

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

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

It's a right.

That it isn't just a noble gesture.

That it's demonstrably good business.

Because computers can perform only as well as the people who operate them.

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

As the giant of European telecommunications.

And as the biggest European workstation company by far.

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

Here is one example of how Ericsson got there.

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

The Ericsson P C. It's Ergo-Intelligent.™

Ericsson has spent \$300 million finding ways to make computers more ergonomically intelligent.

Here are some of the results.

Ergo-Screen.™

Aspirin gets rid of a headache.

Ergonomics gets rid of the cause.

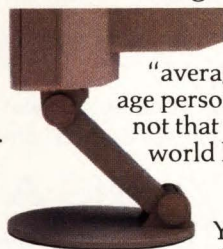
The characters are amber on a specially developed low-fatigue background color.

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

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

You can even have text and graphics at the same time.

Ergo-Arm.™



A computer is designed for the "average" person. The average person is 5'9". If you're not that height, the computer world has a simple answer. It's your problem.

Ericsson disagrees.

Your monitor comes with an Ergo-Arm that lets you move and angle your screen exactly where it suits you.

Far better than back pain, wouldn't you agree?

Ergo-Touch.™

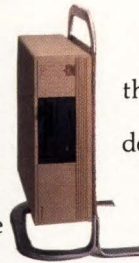
The keys are full-size and the layout is ergonomically planned for greater accuracy and speed.

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

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

Ergo-Color.™

Even the color of the case is ergonomically selected to be restful to the eye over many hours.



Ergo-Space.™

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

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Many companies claim to be compatible.

Some are. Some are stretching the truth.

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It's operationally compatible.

You can take advantage of thousands of PC-compatible programs already available.

In fact, with the best-selling software, program and data disks are interchangeable with those of the IBM PC.

Service. Not Excuses.

Ericsson wouldn't give you anything less than on-site or carry-in service.

The choice is yours.

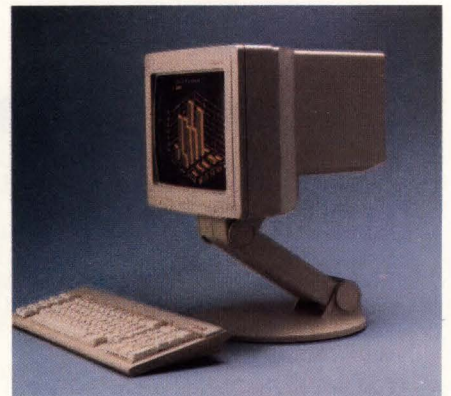
3 Free Offers.

Ericsson will send you revealing literature on ergonomics.

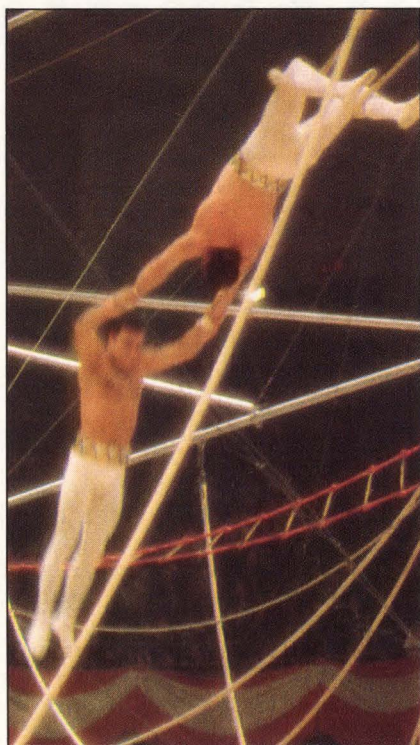
Also a detailed brochure on the Ericsson PC.

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Call toll-free 1-800-FOR-ERGO.



ERICSSON



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Cover photo: Ted Hardin

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With multi-function packages users have integrated applications plus the freedom to transfer data from file to file.

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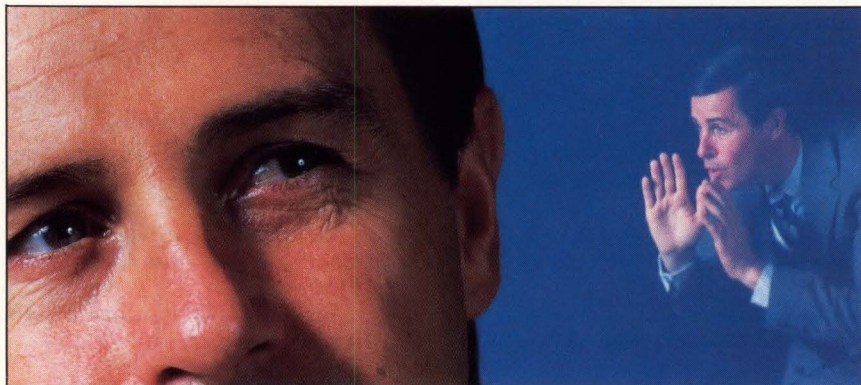
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SAFETY NET/Frederic Paul Backup techniques are the best defense against personal-computer data loss.





No Paper Wait.

Waiting gets you nowhere. Waiting wastes time. It wastes money.

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Headquarters Office

10 Mulholland Dr., Hasbrouck Hts., NJ 07604,
(201) 393-6000

Publisher/Vice President

Don Huber

Editor

Mel Mandell

Managing Editor

John Rymer

Senior Editor

David Whieldon

Software Editor

David Kull

Assignments Editor

Joseph Hillhouse

Art Director

Bonnie Meyer

Microsystems Editor

Susan Foster Bryant

Western Editor

Martin Lasden

(408) 736-6667

New England Editor

Mary Miles

(617) 746-4441

Office-automation Editor

Jennifer E. Beaver

(213) 548-7877

Southwestern Editor

Jordan Gold

(817) 292-8334

Washington Editor

J. B. Miles

(202) 488-8297

Data-Comm Editor

John Seaman

News Editor

Joseph Braue

Associate Editors

David Roman, Gary Stix

Industry Editor

Lee Keough

Regional News Editors

Michael Dobberstein

(408) 736-6667

Anita Micossi

(617) 890-8050

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Robert Moran

Photo Editor

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New Products Editor

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Copy Editors

Donna Jackel, Robbin Juris,

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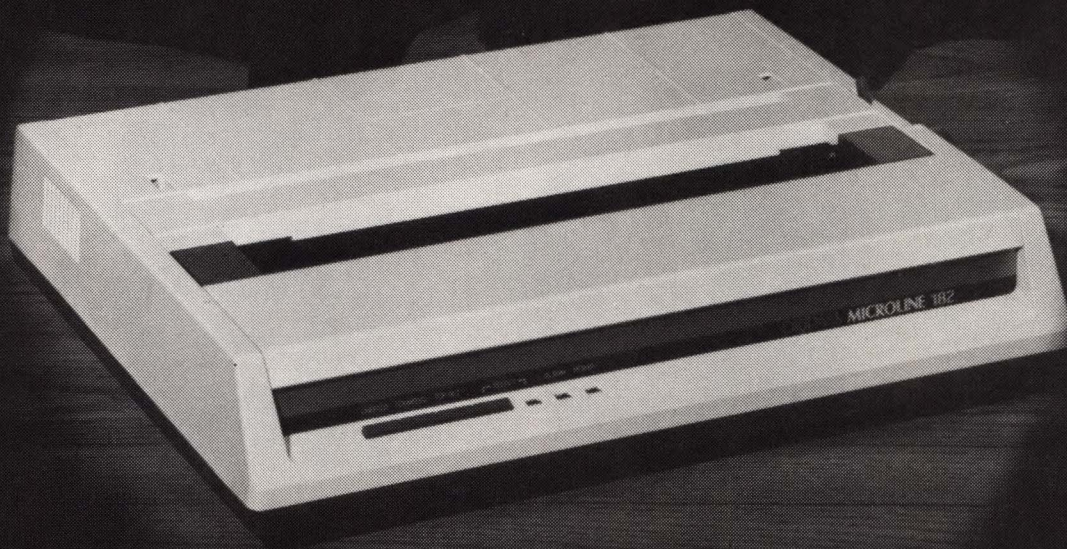
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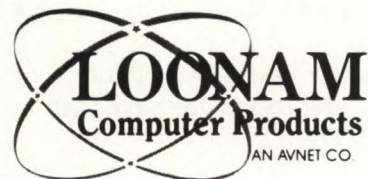
delivery in the industry. And it goes without saying, our backup support and service is just as complete and rapid.

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CONTROL

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Is your company's computing system an unmanageable muddle of isolated workstations and departmental computers?

You need a flexible means to integrate your system and get it under control. UNIX System V from AT&T.

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UNIX System V can help you regain control of your company's system. Its flexibility lets you organize and expand your computing system for maximum efficiency.

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SYSTEM V

OF THE BOTTOM LINE.

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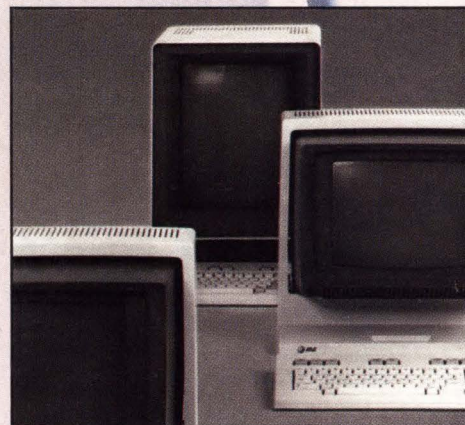
UNIX System V is backed by the full resources of AT&T. We're committed to seeing that it does the best possible job for your company—now and in the future.

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CIRCLE 7

LETTERS

VAX/SPM BEARS MENTIONING

David Kull's "Tapping Top Performers" (November) was informative, but it neglected to mention VAX/SPM in its listing of products available for data-center capacity management. VAX/SPM has had considerable appeal—with almost 1000 licensees—among Digital Equipment Corp.'s VAX/VMS customers.

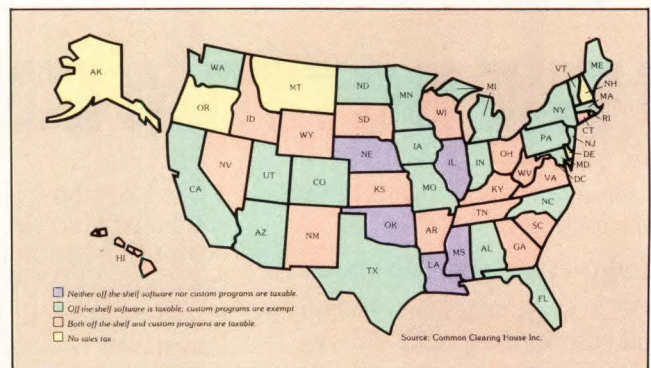
VAX/SPM operates on VAX/VMS processors, ranging from the newly announced 8600 at the high end to the 725 at the low end. A license for Version 2.0 (compatible with Version 4.0 of the VMS Operating System) costs \$4,000. Further information on this product is available through DEC's local sales offices.

Lawrence Rostetter
Manager, Professional Services
U.S. Software Services
Digital Equipment Corp.
Hudson, MA

RIGHT TAX, WRONG STATE

Minnesota passed sales tax on packaged software (only) effective July 1, 1983.

Ben Moyle
President
B.I. Moyle Associates
Minneapolis, MN



Editor's note: Due to a production error, the map describing software-taxation differences among the 50 states in our Jan. 29 issue was incorrect. The correct map appears above. Computer Decisions regrets the error.

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by Mel Mandell

OUR FRIEND FROM THE USSR

By the various ways in which superpowers are usually rated, such as in strength of conventional ground forces, the United States often lags behind the Soviet Union. But our country holds one very significant advantage over the USSR: pervasive computer literacy.

This advantage, which is so great that it doesn't seem likely that the USSR will ever come close—much less catch up—grows each day as thousands more personal computers are put to use in American offices, laboratories, factories, and homes.

This advantage was demonstrated anew to the staff of *Computer Decisions* by the recent visit to our offices of Dr. Victor Aleksandrov, an important figure in the Soviet computer establishment. Aleksandrov, who is a deputy director of the Leningrad Computer Research Center, was the guest of our Data Communications editor, John Seaman, who met him during a visit to Russia several years ago.

Aleksandrov told us that the Center is equipped with two mainframes, a Control Data 172 and a Russian machine. Linked together, they support 40 ter-

minals, only 10 of which are in local universities outside the Center. Personal computers are also quite rare in the USSR—limited to the elite, such as our visitor. Because of the American embargo against the export of technology to the Soviet Union, the only micros in use that are compatible with the omni present IBM Personal Computer are a small number of clones imported from Scandinavia. (The previous embargo on older versions of

the IBM PC has since been lifted.)

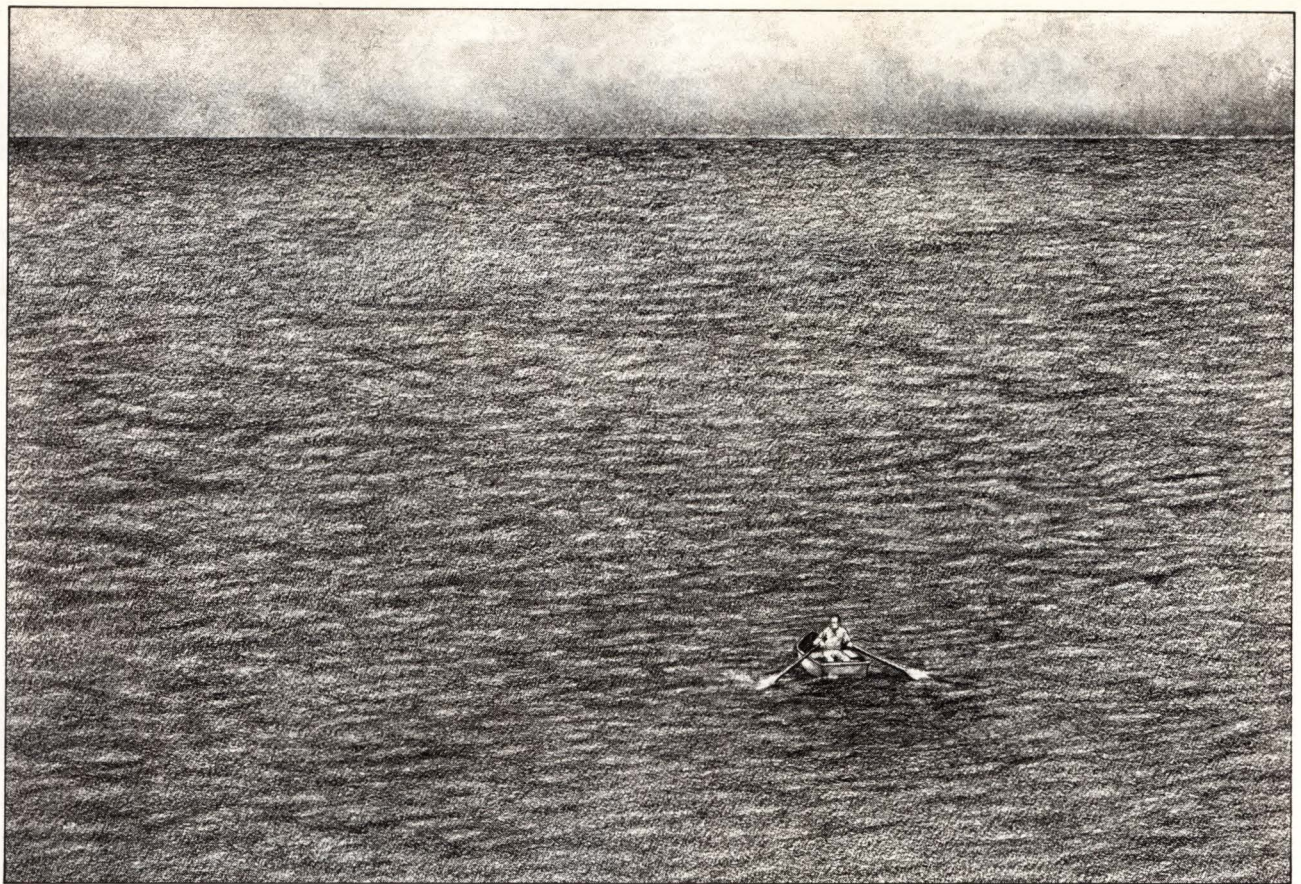
Even if personal computers were widely available behind the Iron Curtain, would they fit the Russian life style and Communist culture? Apparently not, according to a front-page article in the December 28, 1984 issue of the *New York Times*. The notion of many unsupervised individuals maintaining private databanks and perhaps gaining the ability to tap governmental databanks is most likely anathema to the aging top leadership of the USSR.

Victor Aleksandrov was in the United States as part of an exchange program. He is especially interested in artificial intelligence. The Soviets undoubtedly gain more from such exchanges than we do. Nevertheless, we should continue—nay, expand—such exchanges, to help improve relationships. The more Americans and Russians get to know one another, the less likely we are to drift into a nuclear holocaust.

In the meantime, we gain from the near-commodity status of computers in all aspects of life, while the Russians fall further behind because of very limited availability and limitations on use of computers of all sizes. □



Illustration by Peter Bono



Before VM Magic, embarking on a migration from one disk type to another was a formidable undertaking.

At last, an effortless path for DASD migration.

Now you can migrate to the new, faster disk device types in only the time it takes to copy your files—a matter of hours, instead of months or years consumed by program and job control conversions.

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MAGIC you can respond to *any* of the disk device requirements of guest operating systems using *any* DASD. Save thousands of dollars in disk rental, maintenance and operating costs by eliminating outmoded or unnecessary disk device types.

Expand your options under VM.

VM MAGIC also lets you:
■ increase system performance by migrating to, and taking advantage of, new

technology disk hardware.

- select disaster recovery and backup sites without regard for disk configuration.
- prolong the life of your current software by eliminating its dependence on a specific disk environment.
- make decisions about hardware upgrades, program modifications and conversion efforts in a logical, orderly way.

For more information on the time and money-saving applications of VM MAGIC in your installation, call SDI at (415) 572-1200.

SDI[®]

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Until now, complete 4300 systems meant buying from just one supplier. Or piecing them together yourself. Some choice.

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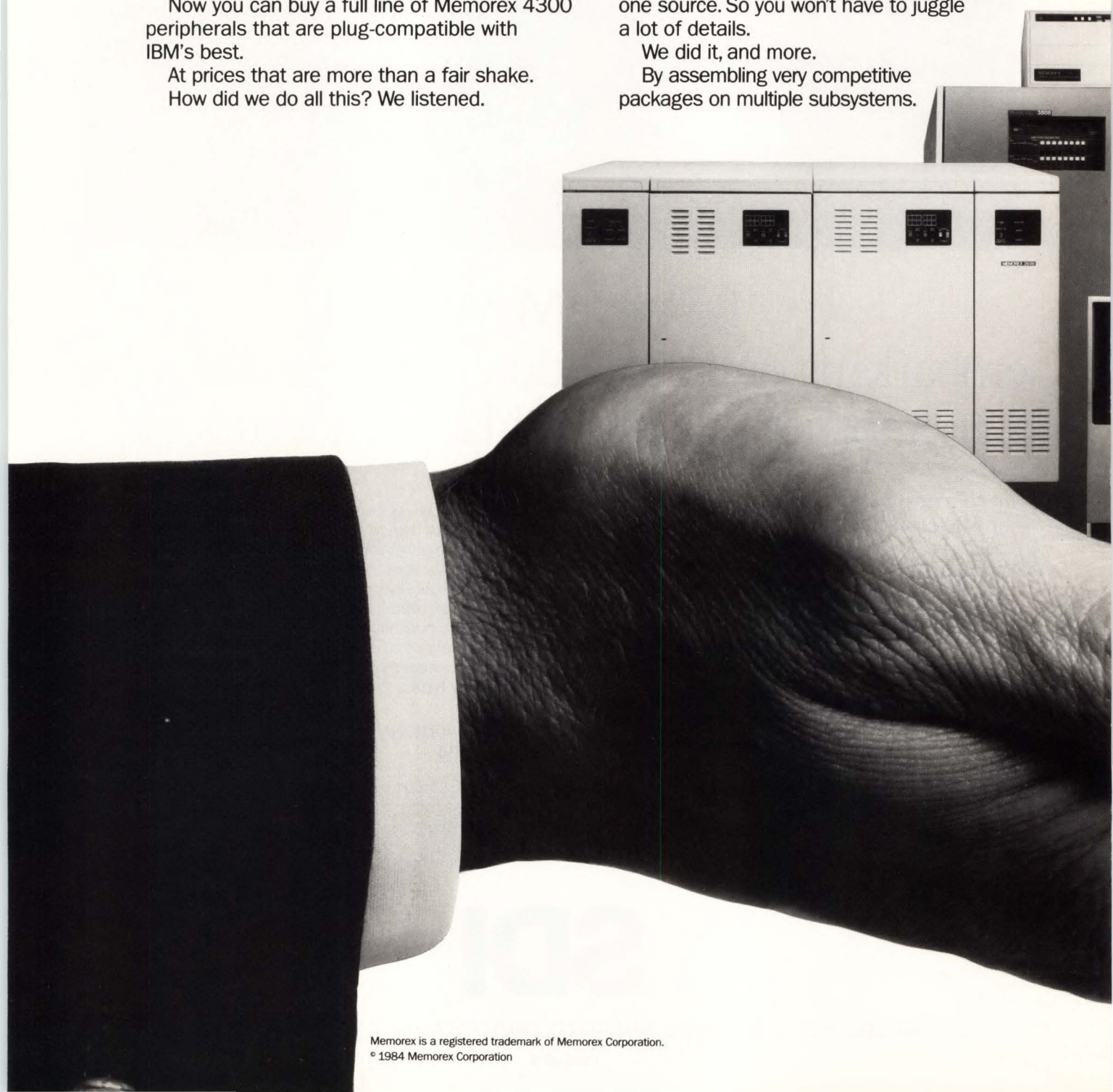
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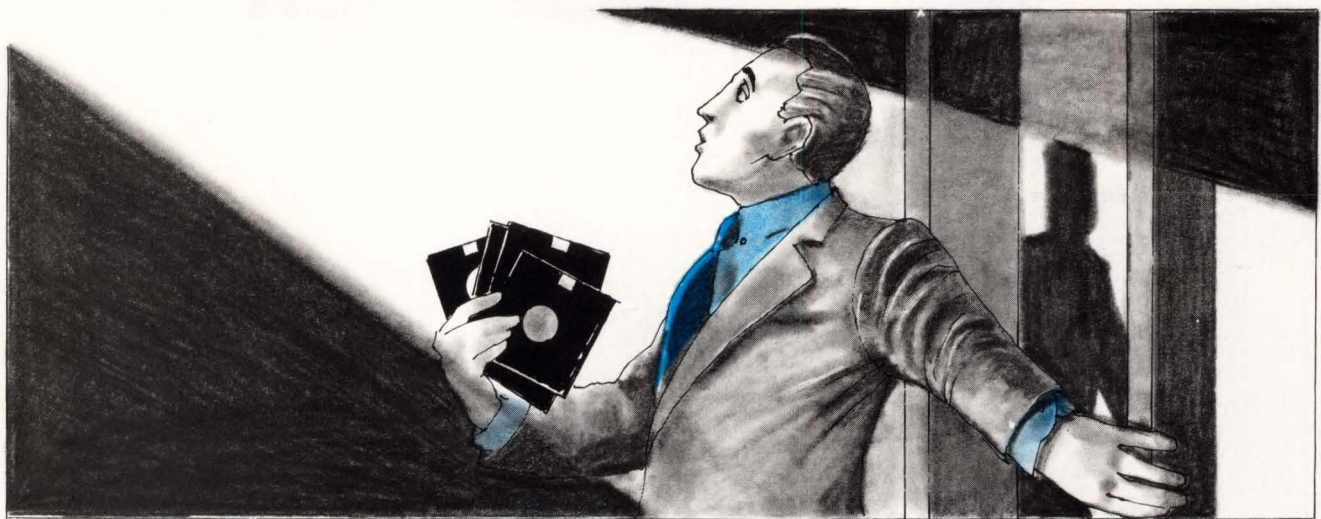
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by Joseph Braue, News Editor

SOFTWARE COPYING: WHO'S TO BLAME?



In two recent software-piracy lawsuits filed against user organizations, Lotus Development Corp. has charged that the MIS directors involved not only were aware that illegal copying was going on but may have abetted these copyright violations.

The Health Group Inc., Nashville, TN, is one of the organizations being sued by Lotus. Lotus' attorney, Eric Deutsch of the Boston firm Testa, Hurwitz & Thibault, says that Health Group's MIS director has been directly implicated in the case. Deutsch claims his client has a memo from the MIS director's desk which states, "Here are your copies. We'll get you the latest version when it's available."

With Lotus and other vendors more frequently taking software pirates to court, MIS executives will increasingly face the possibility that they, as well as

their companies, may be sued. This trend raises two questions: How many MIS executives are aware of, or participate in, illegal copying? Are MIS/dp managers responsible for uncovering and preventing copying within their departments?

Among the defendants listed in Lotus' copying lawsuit against Mueller

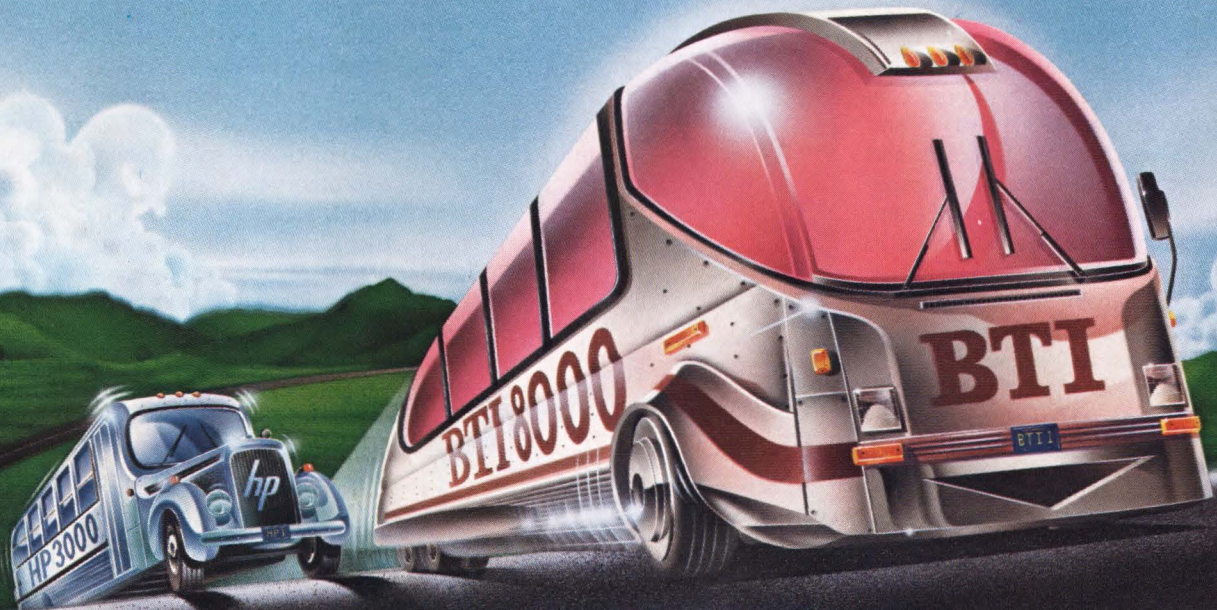
Company Inc., manufacturer of metal valves and fittings in Decatur, IL, is Michael Skelly, corporate manager of data processing. Skelly, along with Daniel Carlson, corporate controller, and Frederick Aushneimer, vice president of manufacturing, were named in an affidavit by a former employee, David J. Sorensen. Sorensen cited the men as "those specific corporate managers and officers of Mueller who I believe had knowledge of, encouraged, and/or participated in the unauthorized copying of Lotus 1-2-3."

What does Lotus gain by making these names public? John Helfrich, a spokesman for Mueller, contends that Lotus is trying to make an example of his company to discourage other businesses from copying software. Deutsch concurs with Helfrich. "The message might not hit home if we only sue the

INSIDE NEWS

- Vendors step up anti-piracy campaign 20
- Telework faces zoning law, union hurdles 20
- Amdahl honing pitch of its mainframe Unix 24

The BTI 8000 outperforms the HP 3000 3 to 1



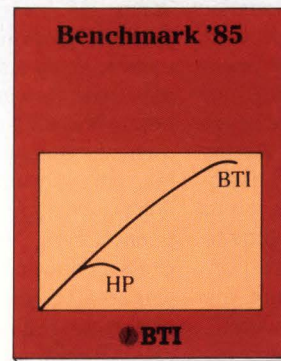
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Test results were examined by the international consulting and accounting firm of KMG Main Hurdman. Their detailed report is yours for the asking.

The BTI 8000 system is a modular supermini multi-processor system that can be sized to fit your needs. The system can use up to eight 32-bit CPUs and 24 megabytes of main memory, but you can start with a single CPU system and build up to larger configurations when your needs grow.



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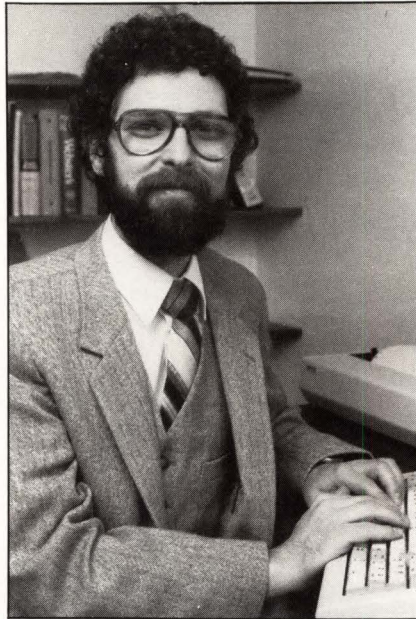
company. We want to let individuals know that it's their responsibility, too."

But many executives believe that management, as a whole, cannot control in-house software piracy and should not be expected to police end users. Mueller's Skelly says his company owns about 12 IBM Personal Computers distributed throughout plants in such states as Pennsylvania, Tennessee, and Wisconsin. "I can't monitor employees copying software on personal computers any more than I can control employees who photocopy copyrighted materials on Xerox machines, which is also illegal," says Skelly.

Gerald Hoffman, an information-technology consultant in Chicago, agrees with Skelly. "MIS/dp managers are aware that the problem exists, and they try to discourage it, but they alone can't prevent it." Even those directly responsible for illegal copying do so out of ignorance more often than malice, says Hoffman. "Many times, employees believe they're doing the company a favor. For instance, an employee might be trying to get a job done that can't wait until a new copy of a software program arrives from purchasing."

Most MIS/dp directors contacted by *Computer Decisions* took a laissez-faire attitude about the copying dilemma. "There are warnings on the software packages," says one senior vice president of dp, who leaves "regulation" up to users. Richard Malmgren, vice president of MIS at Oppenheimer Assets Management Corp., Denver, CO, is annoyed that vendors claim it's his job to monitor users. "I don't have the time to play watchdog, and I don't feel responsible for software piracy. I'm not the guardian of someone else's software."

Whether or not data-processing executives are willing to claim responsibility, software copying remains an important issue with Lotus and other vendors. A recent survey of 45,000 households, conducted by Future Computing, the Dallas market researcher, revealed that up to 50 percent of all



Marv Goldschmitt is Lotus' point man in its campaign to stop illegal copying of its products.

purchased business software has been copied. Marv Goldschmitt, vice president of Lotus, claims that figure represents a 30 to 40 percent cut into software-industry revenues.

A principal way for vendors to express their displeasure with software copying is to file high-profile lawsuits. This may explain why Lotus refused to settle out of court, according to two defendants. Neither Mueller nor Wilson Jones Co., a manufacturer of data-processing forms, the latest company to be sued by a software vendor for illegal copying, were contacted by Lotus before the suits were filed, according to their representatives. American Brands Inc., the parent company of Wilson Jones, was sued by Micropro International Corp., which announced at a press conference in New York that it was taking legal action. "Until I received the call from the press, neither I nor the company was aware of the impending lawsuit," says Daniel Conforti, American Brands' public-information director.

Micropro and the Association of Data Processing Service Organizations Inc. (Adapso) charged that at least since July 1983, Wilson Jones has been

illegally copying Micropro's Wordstar, Mailmerge, and Spellstart, along with unnamed software packages made by other Adapso members. The copies were made "for use and distribution at one or more sales-training seminars and otherwise," according to the complaint, which was filed in the U.S. District Court for the Northern District in Illinois. Micropro and Adapso are asking for \$500,000 in damages.

Unlike the Lotus lawsuit, no individual executives were sued or charged with complicity in the Micropro-Wilson Jones lawsuit. "Individual involvement will emerge later," says David Sturtevant, Adapso's director of public communications.

Software vendors that keep getting burned by illegal copiers insist that management must educate its employees about the copyright laws and monitor the internal distribution of software. This moral responsibility can extend to personal legal liability. According to attorney Robert Spanner, in cases pertaining to the theft of intellectual materials, such as software, a corporation is liable under the doctrine of *respondet superior* or, "The master is liable for the wrongful acts of the servant." When a corporation is sued, any of its employees involved in the litigation can also be sued, says Spanner, a partner in the Palo Alto, CA, law firm of Beckford, Spanner, and Kelly.

Lotus' lawyer Deutsch takes an even tougher stance than Spanner. "Hear no evil, see no evil" won't play," says Deutsch. "Passive assent can make MIS directors legally culpable even if they're not doing the copying themselves or have not personally given the orders to do so."

Ultimately, it's up to the courts to decide the question of active complicity. But the embarrassment of being associated with an organization convicted of software piracy should be incentive enough for MIS executives to assume responsibility for policing their employees, says Deutsch, who has Lotus' interest at heart.

—Anita Micossi

(News continued on page 20)



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(News continued from page 18)

VENDORS STEP UP ANTI-COPYING CAMPAIGN

Are you a pirate? According to the Association of Data Processing Service Organizations (Adapso), about half the business software now in use is pirated.

Adapso's findings are based on a survey to which 45,000 households equipped with personal computers responded. Egil Juliussen, chairman of Future Computing, Dallas, the market-research firm that conducted the survey, claims that about 25 percent of the respondents are business users.

To prevent piracy, which is a violation of copyright laws and subject to penalties of \$50,000 and more, Adapso has launched a program attacking software copying. At a press conference where the program, of which litigation is a principal recommendation, was announced, Micropo International Corp., San Rafael, CA, creator of the word-processing package Wordstar, announced that it would sue Wilson Jones Co. for software piracy. Wilson Jones is a Chicago-based supplier of office equipment and a division of the giant conglomerate American Brands Inc., New York.

In the past, vendors have tried to prevent copying via technical means, but such protection methods have been relatively ineffective. Sometimes they are too easy to circumvent. At other times they make the package too difficult to use, causing sales to drop. However, widespread pirating costs vendors millions of dollars in lost revenues, says Juliussen.

Marv Goldschmitt, vice president of Lotus Development Corp., disclosed additional new software hardware anti-pirating methods Adapso is considering backing. The most promising offering involves the use of "keys" issued with purchased packages. The keys fit into "key rings" plugged into or mounted on micros. Some of the key rings have eight to 16 "keyways." With this method, many copy-protected packages can

be used simultaneously. Although the key rings are compact, they would be a burden to users of lap-sized micros. Leland Strange, vice president of marketing at Quadram Corp., Norcross, GA, suggests designing the key ring into the micro. Strange says that micro builders who have been approached with this notion are receptive, because many of them also sell software.

A simpler and more tolerable approach—where large corporations are concerned—is the "site license," where a small fee is paid for each additional user.

When reporters at the press conference suggested that one motivation for widespread pirating is the high cost of software, Juliussen responded that Adapso's survey showed that users were copying equal numbers of cheap and expensive programs.

From the tone of the conference, it is evident that both individual and corporate micro users will be under greater pressure not to copy software. And as software vendors come up with copy-protection schemes that work, the temptation to commit piracy will be reduced. □

ZONING LAWS, UNIONS HINDER TELEWORK



The NACI's Kern: "These are not sweatshops."

Although telecommuting is still in its infancy, legal obstacles, both past and future, bar its path to acceptance.

At present the only laws preventing telecommuting are old local zoning laws designed to prevent business from being conducted in residential areas.

But, citing federal laws that monitor the workplace—including the Fair Labor Standards Act, the Occupational Safety and Health Act, the Equal Opportunity Act, and child-labor laws—many unions are hinting at future legal action to curb telecommuting.

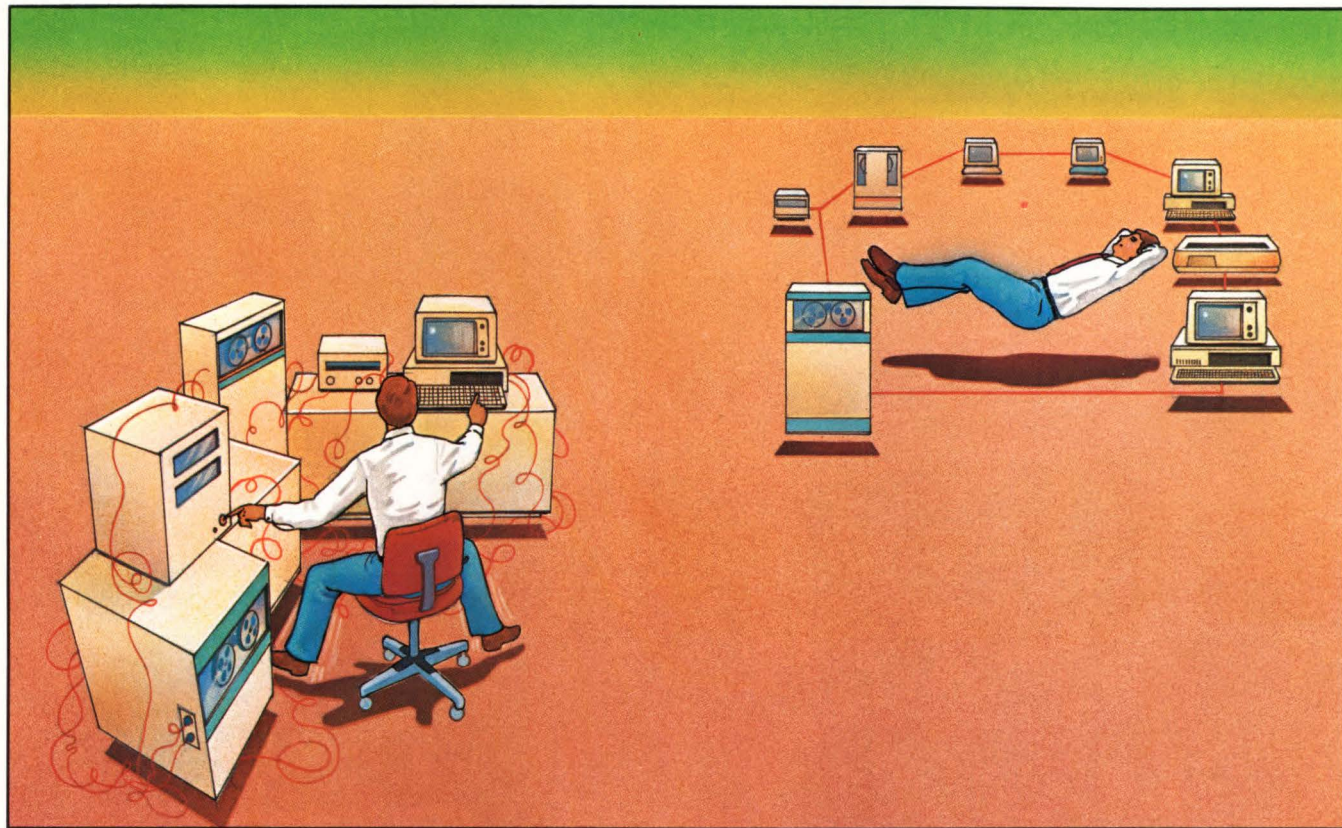
Although there haven't been any telework test cases at the federal level, local laws have stymied some computer-age entrepreneurs. As the AFL-CIO lobbies on Capitol Hill for protective legislation, the pro-telecommuting National Association for Cottage Industry (NACI) is fighting anti-telecommuting zoning laws in Chicago.

Maurice Parrish, Chicago's acting zoning administrator, says Chicago's zoning ordinance, which prohibits individuals from using mechanical or electrical devices at home for purposes other than home maintenance, is embroiled in controversy after neighbors blew the whistle on a couple (a writer and a programmer) who were working at home with computers. The case has not yet been resolved.

Paul Edwards, president of the Asso-

(Continued on page 24)

In automating an office, one must often choose between piece and harmony.



Most companies approach office automation piecemeal. So it's not surprising when their wordprocessors can't talk to their microcomputers. And mainframe text editing is frequently inaccessible to the personnel who need it most. It's also why Boeing Computer Services now introduces Boeing Office Solutions.

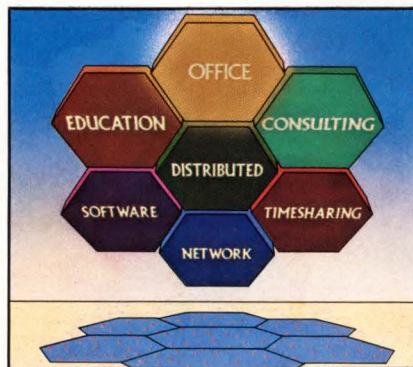
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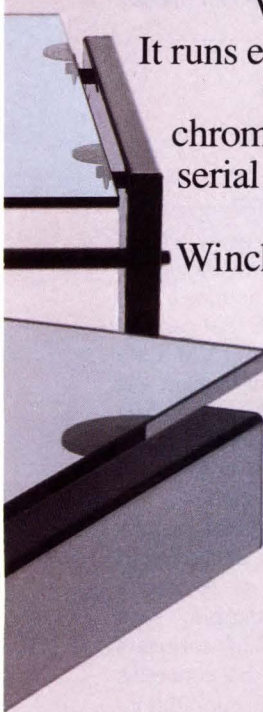
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NEWS & COMMENT

(Continued from page 20)

ciation of Electronic Cottagers, points out that the Chicago incident isn't an isolated case. "Some communities are actually enforcing these laws from a by-gone era," says Edwards. For instance, in one southern Florida town, according to Coralee Kern, founder of NACI, such an ordinance was recently upheld in a court case against electronic homeworkers.

Anti-telecommuting factions focus their criticism on the loss of wages and economic benefits and cite social isolation as one of the disadvantages of homework. Union activists suggest telecommuting will give employers enormous opportunities to flout federal laws covering employee abuse in the workplace.

For example, one nonunion source, Naomi Kalmus, senior consultant with International Resource Development Inc. (IRD), an independent market-research house, Norwalk, CT, notes

that with telecommuting, it's impossible to regulate the minimum-wage-and-overtime provisions of the Fair Labor Standards Act.

In the Blue Cross/Blue Shield of Columbia, SC, program that employs 26 telecommuting claims processors, workers receive no benefits, are paid piece-rate, and have "user fees" for the IBM Personal Computers they work with figured into the wage scale.

Despite these drawbacks, Blue Cross/Blue Shield public-relations coordinator Donna Thorne declares that the program is wildly successful.

Although AFL-CIO spokesman Dennis Chamot concurs that sponsors of these pioneer programs "claim that the homeworkers love it," he has not forgotten the history of home-based work: one of shameful abuses and unenforceable labor laws. The AFL-CIO—anticipating future controversy—came out with a "ban on electronic homework" (excepting disabled home-

workers) at its October 1983 convention.

Proponents of telecommuting emphasize the freedom of working by a personal schedule, reduced commuting and clothing costs, and closeness to the home as benefits of this option.

In response to union claims of potential abuses, NACI's Kern, a long-time civil-rights activist, replies, "This is not the 1930s. These are not sweatshops we're talking about." She suggests that unions find more creative ways to organize cottage workers.

Although the ranks have already formed on both sides of the telecommuting issue, it's a work alternative whose time has yet to come. According to the most generous estimates, 20,000 workers—of a national labor force of 100 million—are telecommuters. IRD conservatively predicts that there will be 500,000 teleworkers by 1986 and six million by 1996.

—Anita Micossi

AMDAHL PITS UNIX AGAINST VM



Photo by Karen Borchers

Amdahl's O'Shea predicts mainframe Unix will be needed as more businesses adopt Unix.

versal Time Sharing (UTS) operating system. Currently, users need VM to run UTS. Later this year, however, Amdahl is expected to announce a "native mode" version of UTS that can run on Amdahl machines without VM. Like the current UTS, the new version will only be able to run on Amdahl's 580 series of mainframes, although Amdahl plans to eventually port it to IBM mainframes, Amdahl officials say.

Unix on mainframes will be "significant competition" for VM, according to Donal O'Shea, director of Amdahl's UTS products. For example, says O'Shea, VM makes it difficult for users to share data. Although he concedes that IBM has found ways around this inhibition, O'Shea insists that sharing data is easier for Unix users.

O'Shea also points out that VM is not popular at universities. This means there will be more new programmers

Amdahl Corp. is positioning its version of Bell Labs' Unix operating system as a future competitor for IBM's VM operating system, currently used

by many large data-processing shops for business-applications development.

In January Amdahl announced an updated version of its Unix-based Uni-



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NEWS & COMMENT

available with backgrounds in Unix than VM. Another advantage of Unix applications is their portability. When necessary, applications can be easily moved to larger-capacity machines.

But does MIS/dp need Unix on a mainframe? Not now, apparently. Only a few commercial dp shops use Unix for business applications on any size machine. And only three percent of computer systems costing between \$6,000 and \$350,000—including those in universities and government—run Unix software, according to Yates Ventures, the Unix market-research firm in Los Altos, CA. And Amdahl has UTS installed at only about 100 sites.

VM is too well established to be threatened by Unix, says Bob Djurdjevic, president of Annex

Computer Research, Phoenix, AZ. Moreover, he says, comparing VM and Unix is like “comparing apples and oranges—the two systems are functionally different.” Djurdjevic points out that VM is a much more broadly based, general-purpose commercial applications operating system, whereas Unix is designed for scientific and engineering applications. Unix does offer performance advantages over VM, Djurdjevic concedes. But the bottom line is, “If IBM users want Unix on their machines, they’ll probably wait for IBM’s version of Unix.”

James Sullivan, senior analyst for Yates Ventures, predicts that mainframe Unix’ time will come, but it will be several years in the future. “The market for Unix-based software is just

starting to expand,” Sullivan maintains. Yates’ user surveys show that by 1989, the three percent of computer users running Unix will expand to 38 percent. Donal O’Shea says one of the main reasons Amdahl users have UTS is because they have micros running Unix and want Unix available on a mainframe.

O’Shea says that Amdahl (50 percent of which is owned by the Japanese computer vendor Fujitsu Ltd.) worked closely with AT&T to make UTS compatible with Unix System V, the Unix version AT&T wants to have standardized. Several industry watchers have predicted that the Japanese and AT&T will use Unix to pry open IBM’s mainframe monopoly.

—Michael Dobberstein

BELLS & WHISTLES FROM BELL & HOWELL

Executives no longer have to choose between confidentiality and cost when they want to make a quality presentation with slides or transparencies, say officials at Chicago-based Bell & Howell. The former camera company

has entered the computerized graphics-display market with Business Graphics System, a product it claims will offer high resolution at low cost.

Aimed at the sales, financial, and education markets, Business Graphics

produces slides, transparencies, and hard-copy visuals of the pie charts and graphs created with an IBM Personal Computer. The system includes a color-film recorder, software, a high-resolution terminal, and a graphics tablet.

The system is digitally driven, which accounts for the product’s high quality, says Craig Douglass, marketing and product manager for Bell & Howell. The user creates the visual on an IBM PC and the color-film recorder makes 35mm slides or prints on Kodak Ektachrome or Polaroid Polachrome. Polaroid film lets users create slides instantly. Users are also guaranteed confidentiality, because the high quality of the graphics eliminates the need for visuals to be produced at an outside graphics service, say company executives.

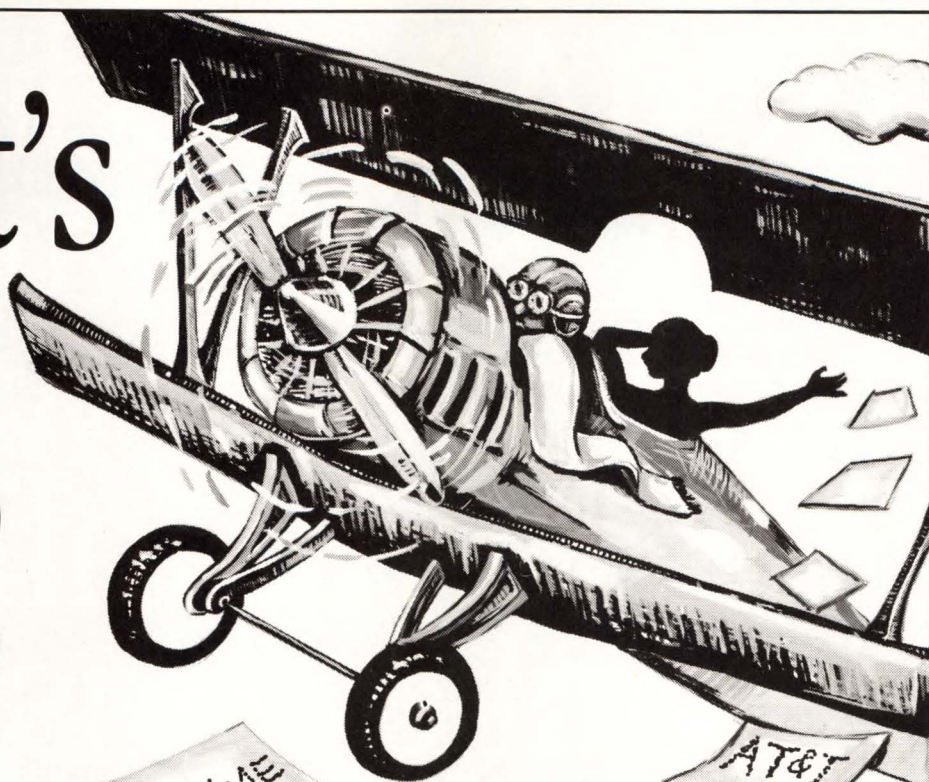
Business Graphics System will retail for \$14,000, including an IBM PC. Without the computer, the system costs \$11,000. For more information, call (312) 673-3300. ☐

(News continued on page 32)



The Bell & Howell Business Graphics System, above, has (from left) a high-resolution terminal, a film recorder, an optional personal computer, and a graphics tablet.

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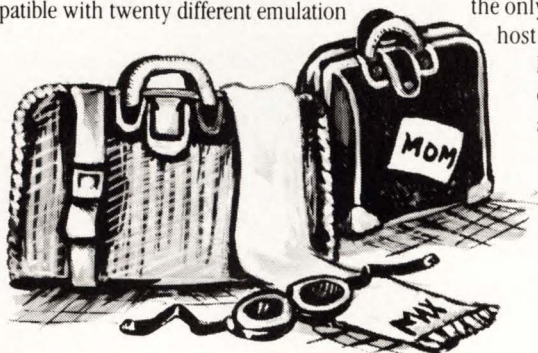
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It's easy to enter and fun to win. Just pick the ten top-scoring ads in this issue of *Computer Decisions*.

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1. Official entry forms are bound in this issue.
2. Read the rules on page 35.
3. Pick the 10 advertisements you

think your fellow readers will best remember having read.

4. List the ads on the entry card by company name, reader service card number and page number.

MAIL BEFORE APRIL 15, 1985.

Your list of selections will be checked against Reader Recall, *Computer Decisions* method of measuring readership.

2nd & 3rd Prizes: Well-known personal computers for business applications.

4th & 5th Prizes: HP 41-CV hand-held computers.

6th through 100th Prizes: Hayden books.

Advertisers & Agencies Can Enter, Too

There's a parallel contest with the same prizes for advertisers,

advertising agencies, and advertising personnel in companies. You, too, can win a luxurious Princess Caribbean Cruise or other prizes.

Free Reruns For Winning Ads

The Top 10 ads in February 26th Reader Recall will run again in *Computer Decisions*—free! It's an opportunity for extra exposure that can't be topped for value. Date of rerun at the discretion of the publisher.

**Readers!
Advertisers!
Don't Miss The
April 15 Deadline!**



(News continued from page 26)

WHICH WID WILL BE WITH YOU IN '89?

In 1989, the most popular workstation-interface device (a tool that works in addition to the keyboard to control the cursor and/or draw) will be the data tablet, a form of the desk-top digitizer, currently the most popular interface device.

These are the findings of a recent report from International Data Corp. (IDC), the Framingham, MA-based market-research house, on workstation-interface devices (WID) in the business and home markets.

The digitizer is used primarily for engineering/scientific and graphics applications. The digitizer is a popular WID thanks to its versatility in graphics and computer-aided design displays. Because the digitizer is comparatively

expensive—running \$640 and up—the data tablet, costing \$100 to \$150, is expected to be more popular. IDC says the data tablet will achieve a 36.4 percent share of a \$962 million market in 1989, whereas the digitizer's share of the WID market will drop from its leading 33.2 percent to 18.6 percent. The data tablet also requires less work space (it measures only 8 x 10 inches), and it can be incorporated into the keyboard.

Another WID, the mouse, is gradually gaining acceptance, accounting for a 9.4 percent share of the market in 1983. It will be about as popular as the touch screen (12.2 percent) in 1989, IDC says.

The touch screen and speech recog-

nition were regarded as more specialized applications. The study found touch screens to be ideal for factory-data collection or for point-of-sale merchandise-ordering systems. Voice recognition is useful for hands-free applications.

The lightpen currently holds nine percent of market share, according to the IDC study, and by 1989 will drop to only 4.4 percent.

The study notes that all WID products possess certain inherent limitations. Bundled WID products, intended for easy use by novices, offer less value as users become more proficient.

The 122-page report is priced at \$1,500. For further information, call (213) 458-1681. □

FEW TRAINING DOLLARS FOR CBT

Computer-based training (CBT) captured only a small segment of the training budget in Fortune 500 industrials last year, according to the recent study *The Market for Computer-Based Training in Business and Industry—84*.

The study found that of the corporations that used CBT last year, 53 percent reported allocating one to 10 percent of their training budgets, including salaries, to CBT. However, the survey also indicated that the CBT audience will increase its CBT expenditures in the future. This year, for example, 22 percent of current users intend to increase their CBT allocations to 11 to 25 percent of their training budgets.

The study, published by RSA/Information Designs, a New York consulting and publishing firm, polled 102 Fortune 500 industrials and government agencies from April through July 1984. The study's purpose was to determine current or planned CBT use in these organizations. Sixty-two percent

of the respondents were currently involved with some form of CBT. A similar study was conducted in 1983 by RSA.

Other findings of the study included the following:

- As in 1983, CBT continues to be used primarily for computer- or technical-skills training. Most firms used CBT to provide training in data processing, technical skills, and software-application use (62 percent). However, they expressed strong interest in using CBT to teach management skills and product/professional knowledge (6 percent of current offerings compared to 35 percent of possible future ones).
- From 1983 to 1984, microcomputers—specifically the IBM Personal Computer—replaced mainframe computers as the primary means of CBT delivery. This past year, 78 percent of the corporations surveyed used microcomputers to deliver CBT either in conjunction with mainframes (35 percent)

or alone (32 percent). In 1983, most corporations reported using terminals connected to a mainframe (37 percent) or both mainframes and micros (26 percent).

● Participants more often obtained their courseware by purchasing off-the-shelf programs (55 percent) than by writing courseware in-house (34 percent) or contracting for custom-designed courseware (11 percent).

● Of the 63 corporations using CBT, 59 percent used authoring systems (specialized computer programs for writing courseware) and 49 percent reported using multiple authoring systems. IBM's Interactive Instructional System (IIS) for mainframes was the authoring system most frequently in use (32 percent); followed by Goal Systems' (Columbus, OH) Phoenix, which is IBM mainframe-compatible (13 percent); and by IBM's Personal Computer Instructional System (PCIS) (11 percent), which permits uploading pro-

NEWS & COMMENT

grams to IBM mainframes.

● Users cited improved training quality. Some of the benefits were self-pacing, immediate feedback, faster learning, and decreased training expenses because of reduced travel costs.

RSA sent 1,040 questionnaires to

training professionals and information-management executives representing 451 Fortune 500 industrials and government. One hundred and eleven employees in 102 firms responded. Of the respondents, 49 percent worked in data-processing/systems or technical

training, 46 percent in human-resources training, and five percent in broad corporate-training functions.

Copies of the report are available from RSA Informations Designs (New York) at \$225 each. For more information, call (212) 673-0848. □

HARRIS GEARS UP FOR OA

In October of 1983, the Harris Corp. bought Lanier Business Products Inc., seeking a renewed thrust in office systems after the failure of its own word-processing venture. Today it seems Harris' expectations have been fulfilled.

Three Harris divisions have simultaneously unveiled new office products. Lanier has announced a network controller that can link up to 28 workstations for a clerical work group. The Dallas-based Harris division is offering a "professional work-group system" for linking Harris or IBM Personal Computers with IBM 3270-type terminals. And Harris Digital Telephone Systems (HDTS), Novato, CA, has introduced a "fourth-generation" voice-and-data switch, the culmination of a four-year effort that preceded the Lanier acquisition. This last offering, dubbed the 20-20, may gain the most attention, primarily because it can work with much existing office hardware.

By tying its workstations and other office hardware to a PBX, Harris is trying to catch up to its toughest competitors, IBM and Wang Laboratories. Big Blue has just gobbled up the rest of Rolm, a leading PBX-maker, while Wang has taken a bite out of Intecom, the Dallas-based maker of digital PBXs. With such competition, it may be too late for Harris to catch up to the chief OA suppliers, especially when it must first surpass powers like DEC, Data General, and Hewlett-Packard. However, Dr. Joseph Boyd, CEO of Melbourne, FL-based Harris, believes that Fortune 1,000 corporations aren't so



The new Harris 9300 controller (in foreground) can connect up to 16 Harris or IBM micros and/or IBM 3270-type terminals to a host with the aid of a Lanier 9178 communications link (far right).

committed to any one OA vendor that an innovative organization can't carve out a rewarding share. To keep them price-competitive, many of these new products will be made in the Far East, says Boyd. He also claims the Lanier operation has been integrated into Harris far faster than anticipated.

The Harris 9300-11 processor, with one megabyte of random-access memory, 37 Mbytes of storage, and hardware connections to Harrisnet—the vendor's "universal-product architecture" for local-area networking—costs about \$11,000. The Lanier 6000 network controller costs from \$13,000 to \$22,000. A smaller network control-

ler, the 4000, which supports up to six Lanier workstations, costs \$4,500 to \$7,500. Lanier has also introduced a new family of workstations, starting with the 1200 and the 1400. The 1200, costing \$3,200, provides access to much micro software plus Lanier's own office-automation packages. The 1400, costing \$6,500, is targeted to more intensive word-processing needs. Both are compatible with most communications protocols, including IBM's office protocols, DISOSS and PROFS. The 20-20 switch costs from \$50,000 to \$1 million. These products will be available in a few months. □

(News continued on page 34)

PROJECT REVIEWS CONTROL SYSTEM COSTS

The key to controlling information-systems costs is reviewing system-development projects to justify their expense after they have been implemented, says Joseph T. Hootman, vice president of Cresap, McCormick, and Paget, a San Francisco-based management consultancy.

Information-systems costs are growing about 20 percent annually, Hootman says. Because technology is infused into corporations at the departmental level, it is difficult to isolate the exact costs of information systems.

Hootman believes the solution is simple and offers six tips for controlling information costs.

After a system is up and running, submit it to a rigorous review. How much money a project will save the organization is usually thoroughly assessed beforehand, but those projections are rarely examined and verified after implementation. Prompt reviews can fix flaws in systems. Without reviews, users tend to exaggerate the savings of the system to justify their efforts and to pave the way for new ones. "One company without post-implementation reviews discovered that the total estimated savings of all the system-development projects waiting to be implemented exceeded the net sales of the corporation," Hootman says.

A proper set of accounts is needed. A disciplined-accounting and filing-procedure helps track costs of labor, consultants, equipment, software, as well as depreciation and amortization. MIS/dp should help define which costs go into which accounts. For example, instead of creating general consulting accounts, it might be helpful to differentiate between management consulting, programming, and other services provided by consultants. A single, company-wide procedure will enable financial analysts to discover how much money is being spent on what

equipment, Hootman says.

Let users know the cost of the information services they use. This does not necessarily mean charging users for information systems. "Let all the users know that they have to have some fiscal responsibility, that they cannot have as much as they want and whatever they want," says Hootman. Comparisons of information-systems expenditures will spur competition to keep costs in line among departments, Hootman says. "If one department's information-system expenses are way out of line, other departments will see it. Conversely, if another department is underspending, it will realize that by not using information resources it could be hurting itself," says Hootman.

Seek to control costs among users rather than MIS/dp pros. Don't expect to cut information-systems costs by simply decreeing that MIS/dp costs must be cut by 10 percent. Users, not MIS, have to cut back.

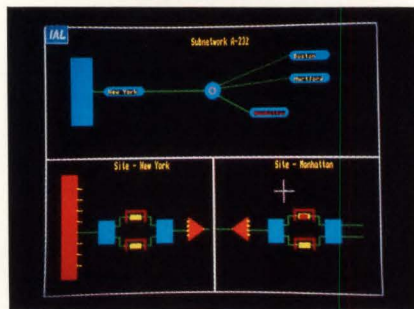
Tie all requests for automation into

the capital-budgeting process. Hootman says departments should plan for future system-development needs at the time they are making capital-budget requests. Both are interrelated and should be done at the same time, he says.

The responsibility for controlling information costs should be separate from MIS/dp. Hootman suggests that the finance department, already the auditor for other areas of the organization, should continue to act as a traffic cop when it comes to information-systems costs. MIS/dp should help create such an auditing system. Accounting or finance should be the bad guys in controlling costs. If MIS/dp plays the tough guy, users will become more wary and cooperate with it. "Users may walk through the MIS door and worry whether they will get MIS' blessing or get beaten over the head," Hootman says.

Implementing these suggestions should cost organizations little, if any extra money. □

MEDIUS DISPLAYS GRAPHICS



Medius' graphics are its most novel feature.

Medius, a network-management system with automatic fault detection and analysis, offers "innovative graphics that are way ahead of anything else commercially available," ac-

cording to a leading consultant.

Medius, from Ocean Data Systems Inc. (Rockville, MD) has been offered in Europe for some time by IAL Ltd., Ocean's UK-based parent company. Shipments in the United States are just beginning now.

Medius' graphics are the system's best feature, according to Charles R. Robbins, president of Strategic Market Trends Inc., a consultancy in Sharon, MA. "Medius' graphics are special because they're interactive," says Robbins. "They let the operator actually see that an action—like switching in a backup modem—has been carried out. It's much easier to understand a

1985 Top Ten Contest Rules

Pick the Top 10 advertisements in this issue and win a Princess Caribbean Cruise for two plus \$500 in cash . . . or a well-known personal computer for business applications . . . or an HP 41-CV hand-held computer.

Reader Contest

Examine this issue of **Computer Decisions** with extra care. Pick the ten advertisements that you think your fellow computer management-subscribers will best remember having read. List these ten advertisements on the special entry form bound in this issue. (*Be sure to check the box marked "Reader Contest."*)

This year your selection will be measured against the ten ads ranking highest in the "Recall Read" category of Reader Recall, **Computer Decisions'** method of measuring readership—see item 6.

In making your choices do not include "house" advertisements placed by **Computer Decisions** or Hayden Publishing Company, Inc. (such as this ad describing the contest). Don't miss your chance to be a Top 10 Winner! All entries must be postmarked no later than midnight, April 15, 1985. Winners will be notified in May, 1985.

READER CONTEST RULES

1. Enter your *Top 10* selections on the entry blank bound in this issue or on any reasonable facsimile. Be sure to indicate 1) the name of the advertiser; 2) the Reader Service Number for each of your choices; and 3) the page number for each of your choices. (House ads placed by Hayden Publishing Company in **Computer Decisions** should not be considered in this contest.)
2. No more than one entry may be submitted by any one individual. Entry blank must be filled in completely, or it will not be considered. The box on the entry blank marked "Reader Contest" must be checked. **Computer Decisions** will pay postage for official entry blanks only.
3. To enter, readers must be engaged in MIS/dp or company management.
4. No cash payments, or other substitutes, will be made in lieu of any prize (except the \$500 prize).

5. Contest void where prohibited or taxed by law. Liability for any taxes on prizes is the sole responsibility of the winners.
6. Entries will be compared with the "Recall Read" category of Reader Recall (**Computer Decisions'** method of measuring readership). That entry which in the opinion of the judges most closely matches the "Recall Read" rank will be declared the winner.
7. In case of a tie, the earliest postmark will determine the winner. Decisions of *Top 10* contest judges will be final.
8. First prize is a Princess Cruise for two and \$500 in cash.

Advertiser Contest

There's a separate contest open to all marketing and advertising personnel in companies, and to advertising agencies.

Examine this issue of **Computer Decisions** with extra care. Pick the ten advertisements that you think will be best "Recall Read" by **Computer Decisions** readers. List these ten advertisements on the special entry blank bound in this issue. (*Be sure to check the box marked "Advertiser Contest."*)

ADVERTISER CONTEST RULES

1. All rules for the Reader Contest will similarly apply for this contest, with two exceptions: those entering the Reader Contest may not enter as advertisers, and entrants must check the box on the entry blank marked "Advertiser Contest."
2. Entrants in this contest may use the official reader contest entry blanks or any reasonable facsimile.
3. This special contest is open to marketing and advertising personnel at all manufacturing companies and advertising agencies, whether or not their companies or agencies have an advertisement in the contest issue.

Use special entry blank bound in this issue
(Blanks are also bound in the front of this issue)

NEWS & COMMENT

graphic display than to interpret alphanumeric information on a screen."

The Medius system allows a single, centrally located operator with little technical knowledge to oversee even the most complex network and to switch in backup equipment, the vendor claims.

The Medius system includes both hardware and software components. Central-site hardware includes a Digital Equipment Corp., Maynard, MA, VAX processor, a logging printer, and an operator workstation. The basic Medius system also employs Network Diagnostic Units (NDUs), which wrap around

each modem in the system, for automatic monitoring of network circuits.

According to Ocean Data Systems, the price for a simple 96-circuit Medius system is about \$135,000. Per line, costs range between \$1,200 and \$1,400. For more information, call (301) 881-3031. —John Seaman

EBB AND FLOW OXFORD GOES TO MARTIN MARIETTA

Martin Marietta Corp., Bethesda, MD, the aerospace and hi-tech conglomerate that already owns mainframe-software vendor Mathematica, Princeton, NJ, announced it has acquired Oxford Software. The privately held computer-software vendor will become a unit of Martin Marietta Data Systems. With the acquisition, Martin Marietta now claims to be the fifth largest independent software supplier. Oxford Software (Hasbrouck Heights, NJ) supplies online application-development software such as UFO/CICS, UFP/IMS, and UFO/Cobol. The company also markets Maxicalc II, an online spreadsheet for CICS, and Pcmainframe, a CICS micro-mainframe link.

NBI, Boulder, CO, has expanded its role in office automation. The independent manufacturer of word processors has signed preliminary agreements to merge with Computer Consoles Inc., a supplier of applied computer systems for office systems and telephone operating companies. According to an NBI company spokesman, stockholders of NBI, the surviving company, will receive 51 percent of the stock, and Computer Consoles' shareholders will get 49 percent. Once combined, the manufacturers will employ over 4,000 workers and expect to have revenues greater than \$400 million this year.

Compupro, Hayward, CA, manufacturer of microcomputer systems, has announced a name change. Since last month, the company has been officially known as Viasyn Corp. William

Godbout, chairman of Viasyn, claims the change was necessary because there are too many companies with names beginning with "Compu." Godbout notes that several of these corporations suffered financial difficulties during the past few years, and he doesn't want Viasyn, formerly Compupro, to be confused with them.

Ryal Poppa has been named chairman and chief executive of *Storage Technology Corp.* Poppa was chief executive officer of BMC Industries Inc., St. Paul, MN, before joining STC in February. STC's principal founder, Jesse Aweida, resigned as chairman of

the company in January. Thomas Wands, a company director, served as president and chief executive during the interim. STC has laid off 5,000 employees in Colorado since filing for Chapter 11 protection from creditors.

Lexidata Corp., Billerica, MA, a manufacturer of graphics equipment, laid off almost 10 percent of its 410 employees.

Exxon Corp. dismissed 305 employees of its Exxon Office Systems unit, Stamford, CT, leaving it with 2,000 workers. Exxon has been negotiating to sell the unit. □

MIS/DP SALARIES JUMP IN 1984

Last year, the median salary for an MIS/dp director in a large shop increased 18.5 percent to an average of \$71,500, according to an annual study by Source Edp, the data-processing recruiters. The study includes a salary survey of 48,000 computer professionals and information from Source Edp's corporate clients.

The median salary for MIS executives in medium-sized shops increased 13 percent to \$56,900. The median salary for directors of computer activities for small shops increased eight percent to \$44,100.

Operations managers received slightly smaller annual-pay increases than large-shop directors, according to the study. In large shops, the median

salary for an operations manager jumped 14 percent to \$46,100. In medium-sized shops, the middle salary also increased 14 percent to \$39,300. In small shops, a typical salary increased 17 percent to \$31,700.

Large shops were classified as those having IBM 3033 or 308X mainframes or similar machines from other vendors. Medium shops were those with IBM 4300, 3031, or System/38 series machines. Small shops were classified as those with a System/34 or smaller system.

The salary study is available in Source Edp's free *Computer Salary Survey and Career Planning Guide*. For more information, call (415) 949-2800. □

NEWS BRIEFS

IMPENDING AI SHAKEOUT?

Is a shakeout among artificial-intelligence vendors imminent? According to DM Data Inc., a Scottsdale, AZ-based consultancy, several AI vendors are already having trouble delivering expert systems on time, weakening their chances of survival. Says Harvey P. Newquist, editor of "AI Trends," DM Data's newsletter, vendors that sell hardware running the Lisp programming language are best bets.

Newquist advises users is to be wary of the hyperbole that attends AI. For the next few years, AI will consist mostly of natural languages, which allow computers to recognize English commands, and expert systems—systems that follow the thought processes of experts in a given field.

SERVICE BUREAU LIST

A directory of 150 data-entry service bureaus is available for \$25 from the Data Entry Management Association (DEMA). The directory, which DEMA says is the first such listing available, includes the sizes, equipment, and services of selected data-entry service bureaus throughout the country. The bureaus are listed geographically and alphabetically. To order, call (203) 967-3500.

STOLEN MANUALS

Some unexpected beneficiaries of the widespread piracy of software (see related articles in this section) are Xerox and other manufacturers of copying machines. Marv Goldschmitt, vice president of Lotus Development Corp., Cambridge, MA, says that the vendor of Lotus 1-2-3 often receives calls from copy shops asking if it's illegal to dupli-

cate the voluminous manuals accompanying micro-software packages. Lotus representatives always respond affirmatively, directing callers to read the copyright notices on the covers of the manuals. But these notices don't seem to dissuade most users, as evidenced by an incident at Mueller Co. Inc., an organization recently sued by Lotus for illicit copying. A Lotus security chief, posing as a potential Mueller customer, toured the Mueller plant. While walking through the plant, he spotted a copy of a Lotus 1-2-3 user manual, according to a Lotus court affidavit.

TRAIN ONLINE, ON-SITE

The best way for users to learn to use mainframe-database software is to install online training modules on a customer host, according to DBMS Inc., a Naperville, IL-based training outfit. "There's no substitute for online training, where the positive reinforcement is immediate," says Andrew J. Filipowski, president of DBMS. His company installs a sample database that forms the basis of all DBMS training courses for users of Cullinet Software Inc.'s Integrated Data Management System. For more information, call (312) 961-5700.

DP RANKS GROW STEADILY

A healthy economy and ever-increasing defense spending could increase the number of current computer jobs by about 140,000 to roughly 600,000 in 1987. Workers from other fields will fill most of these new jobs, but employers in science and engineering fields with needs for more highly trained systems analysts and programmers may be initially stuck with dp workers with insufficient training. That's one conclusion from a National Science Foundation study entitled *Projected Response of*

the Science, Engineering, and Technical Labor Market to Defense and Nondefense Needs, 1982-1987. The demand for programmers, which grew by about 13 percent a year between 1978 and 1982, will grow only between four and five percent a year, the study indicates. The requirements for systems analysts will grow at an annual rate of between 5.6 and 6.7 percent, according to NSF.

AI FOR MICROS

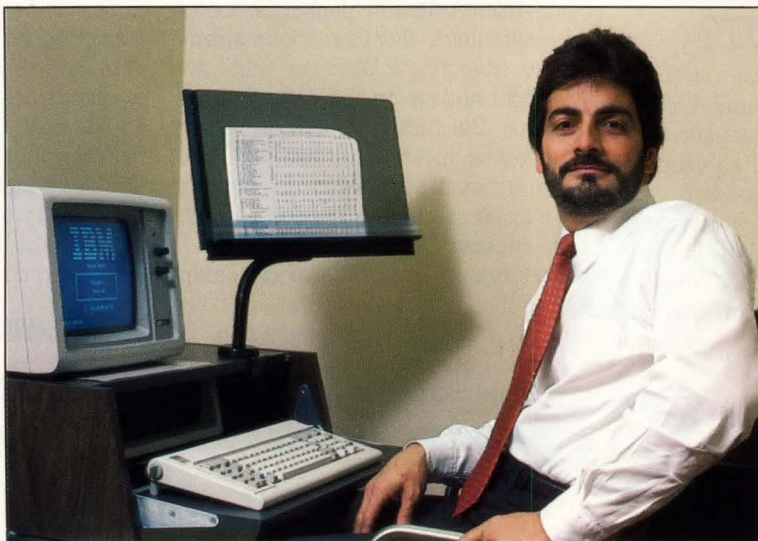
MProlog from Logicware Inc. (Toronto), a version of the artificial-intelligence language Modular Programming in Logic, runs on the IBM PC and compatible personal computers. A programmer using an IBM mainframe or a DEC VAX minicomputer separates an MProlog application into modules that can be handled one at a time on a micro, the vendor says. The application is then put together and run on the mainframe or minicomputer. MProlog is priced from \$950, depending on the computer system and the number of terminals in use. For information, call Logicware at (416) 665-0022.

TECHNOLOGY TRENDS

The technological trends of 1985 will be forecast in a series of one-day conferences held by International Data Corp. (IDC), the Framingham, MA-based market-research firm. Trends in user needs and the information-industry marketplace will also be addressed by IDC analysts. The conferences will take place March 1-18 in Boston, Toronto, New York, Washington, Chicago, Dallas, Los Angeles, and San Jose, CA. Attendance fees are \$495 for one person and \$395 for each additional employee from the same organization. Call (617) 872-8200.

PERSONAL COMPUTING

by Susan Foster Bryant, Microsystems Editor



Photos by Ken Rogers

TALK NATURALLY: PART II

Natural-language systems—software that allows personal-computer users to converse with their machines in English rather than rigid programming-language commands—were discussed in depth in the last issue. At Security Pacific Bank, Los Angeles, *Computer Decisions* discussed the first natural-language banking application on microcomputers with Parris Thermenos, assistant to Bob Smith, vice chairman, Security Pacific Corp. (the holding company of Security Pacific Bank).

To ensure Security Pacific's standing in the intensely competitive banking industry, Smith needed to automate many senior-management tasks. Thermenos found his work cut out for him: His first task was to automate a performance analysis of the top 100 (based on assets) banks in the country. *Computer Decisions*: Why did Security Pacific choose a natural-language program for this project?

Thermenos: We needed a tool we

could use to compare Security Pacific's performance with the competition's. Bob Smith wanted to rank Security Pacific and other banks in return on assets (ROA) and return on equity (ROE). He wanted to examine Security Pacific's performance in detail to see if he could shed some light on the causes of good or bad performance.

I knew Bob was too busy to use a tool that required learning complex procedures, so I looked for a tool where he could use English to ask simple questions and get analytical answers.

CD: Was Smith reluctant to use a micro for this project? Was he already using one?

Thermenos: Bob said he needed a tool he could use for peer-group analysis—he didn't specify what kind. He wasn't using a personal computer at that time, but with the large database necessary for the type of analysis he wanted, there weren't many other alternatives. My objective was to create a tool he

could use himself rather than one a systems analyst would have to use for him. *CD*: Therefore, you chose an automated tool.

Thermenos: Yes. Nonautomated alternatives are available, if you want to buy books with all the statistics, go through them manually, and try to correlate the numbers. But I needed to find a useful tool for middle or senior managers. That's where natural languages came in. First, I acquired call-report information for the top 100 banks (in terms of asset size). These are the data that the FDIC produces—the balance-sheet, income-statement information—on all the banks in the country.

CD: Did you use this information as the foundation for your database?

Thermenos: Yes. I developed a database using a five-year history so that we could look at growth and profit trends.

CD: Did you know how to operate a micro?

Thermenos: I didn't have much experi-

(Continued on page 40)

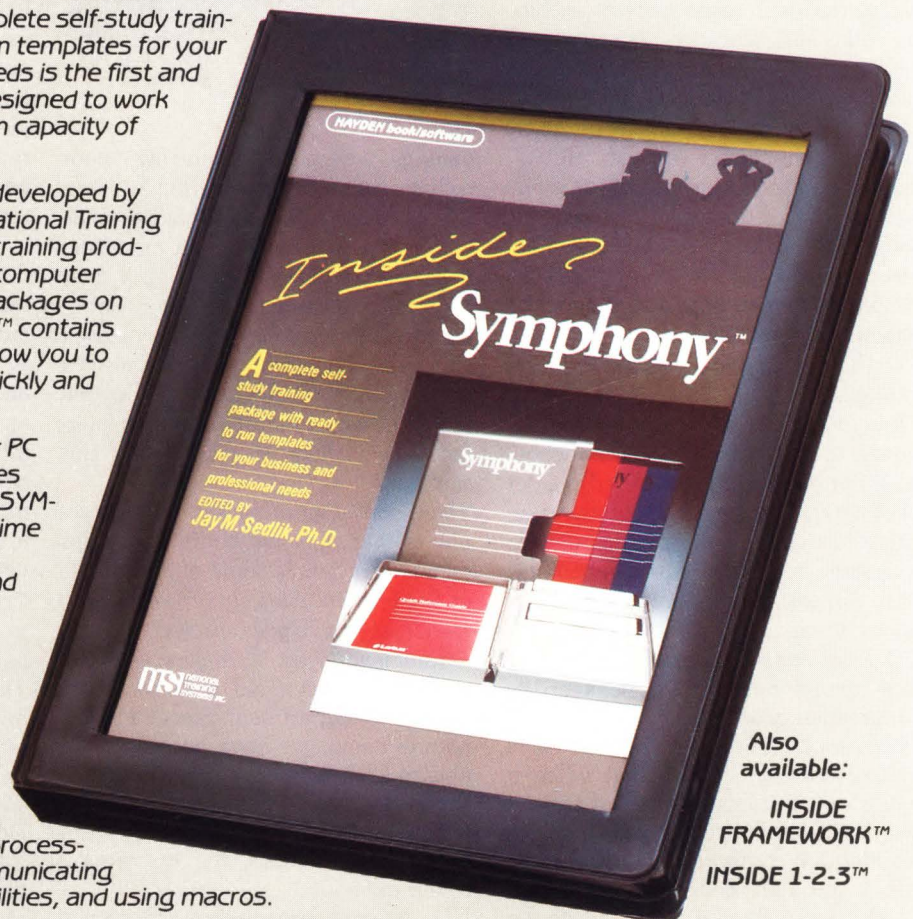
Ahhhhh... the satisfaction of putting Symphony™ to work fast!

When you own an expensive integrated software package like Lotus' Symphony™, you want to cash in on its benefits fast. With Hayden's new book/software package, you'll begin to utilize Symphony™ within hours. Then you sit back, relax, and let Symphony™ work for you.

INSIDE SYMPHONY™: A complete self-study training package with ready-to-run templates for your business and professional needs is the first and only book/software package designed to work with and enhance the application capacity of Symphony™ software.

This self-training program was developed by instructional technologists at National Training Systems, a leading provider of training products and services for the microcomputer industry. Unlike other training packages on the market, INSIDE SYMPHONY™ contains preformatted templates that allow you to use Symphony™ on the job—quickly and inexpensively.

Packaged with an IBM PC, XT, or PC compatible diskette that provides ready-to-run templates, INSIDE SYMPHONY™ saves the micro user time by becoming productive sooner. This book/software goes beyond a simple demonstration of the Symphony™ software features or a simulation of its applications. You use actual Symphony™ software and INSIDE SYMPHONY™ to perform increasingly complex and sophisticated tasks like setting up a data base, creating an electronic worksheet, word processing, automating graphics, communicating electronically, integrating capabilities, and using macros.



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This complete self-training package includes:

- The book, **INSIDE SYMPHONY™**, is interactive with the training diskette which contains preformatted templates that allows one to tailor Symphony™ software to his or her individual needs
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(Continued from page 38)

ence with micros then. I had been using a computer for about three months. I don't have a data-processing background, but I enjoy the independence and computing power that a micro provides.

CD: What happened after you developed the database?

Thermenos: We started with the Clout natural-language program from Microrim [Bellevue, WA]. Clout uses a "dictionary" method for designing and entering analytical formulas. You can create up to 500 formulas or phrases. We started with some general analytical ratios and statistics. We designed the dictionary to contain phrases and synonyms that Bob uses so that if, say, he wanted to look at a ranking of return on assets, he could request "ROA," "return on assets," or "return on average assets." For each formula, we could enter as many synonyms as necessary to help him get information without having to memorize a strict series of phrases or commands.

CD: Did Bob simply type in his requests in English?

Thermenos: Yes. This program was designed to learn an individual's vocabulary. For example, I may refer to a set of analyses one way, but Bob may use different words or phrases to refer to that same set. Each of us can have his own phrases, and the program will recognize them.

CD: How has the natural-language system helped Security Pacific keep its competitive edge?

Thermenos: The real power of a natural-language tool is that when a need for information arises, it can be met quickly. For example, if you're working on primary-capital comparisons, you can get that information much faster than if you had to go through a series of requests or get in a data-processing queue. This is a big ad-



Thermenos: "The power of a natural-language tool is that information needs can be met quickly."

vantage, because tomorrow your needs may be totally different.

CD: Sometimes we hear that personal-computing is a bane to dp managers because they lose some control over computing resources. At other times, we hear that dp managers are pleased with personal computing because it helps relieve the dp backlog. Do you see the ease of natural-language interfaces alleviating or aggravating this situation?

Thermenos: Our organization's philosophy is that personal computing helps many users handle some of their smaller needs themselves, thereby saving dp resources for bigger projects. Thus, natural languages, by making personal computing easier, aid both the users and the dp department. Since tools like natural languages have become available to us, I think our dp group sees itself in the role of producing databases for the users. By producing tools for nontechnical people, the dp group's role is expanded.

CD: Is your organization concerned about unauthorized access to databases?

Thermenos: Not at this point. Any potential applications we see in our organization for natural-language tools would involve readily available information. I don't think anyone at Security Pacific is using databases that need much security now, but I'm sure it will be a concern in the future.

CD: Will you use micros more frequently now that you can do so easily with the natural-language interface?

Thermenos: Yes. Based on our experience with this application, we see many ways we can use natural languages in the future.

CD: For example?

Thermenos: We may use natural languages to examine and analyze our internal profit-center reports. For example, if you have several divisions reporting to you, you can do performance analyses by having the divisional reports automated and structured within a database. You can then see who the winners and losers are. Or, you may use natural languages for a customer-profitability reporting system so you can look at your customer base and perform market-segmentation analysis. You can look at the common attributes of customers who generate above- and below-average profits. You may then want to look at a segment of a Dun & Bradstreet file to try to fine-tune your market targets.

CD: What would you advise managers to look for when considering a natural-language system?

Thermenos: My experience with this application has taught me the importance of experimentation in developing an effective, useful tool. This is good advice for anyone who uses a micro. Don't worry about what might happen. You need to experiment to make sure that your database is designed to maximize the natural-language capability.

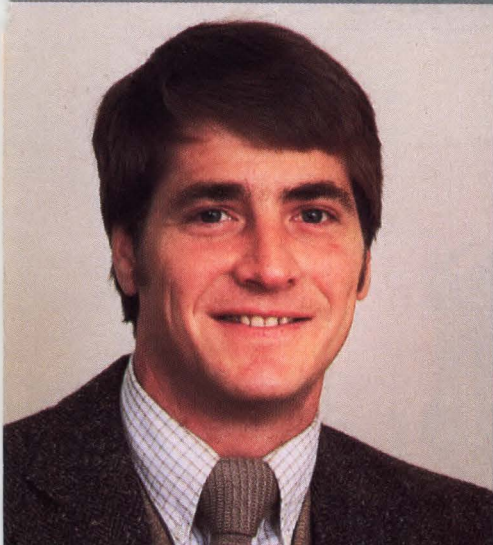
A natural-language system alleviates many of the frustrations managers feel when they can't get timely information. I hope software developers will try to perfect natural-language tools. The need is there. Personal computers have the potential to be much more than status symbols. Natural languages and similar tools will determine whether corporations get their money's worth from their personal computers. □

"Natural languages, by making personal computing easier, aid both the users and the dp department."

Thermenos, Security Pacific

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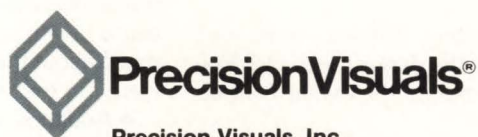
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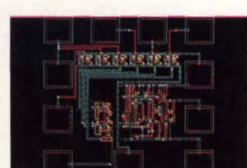


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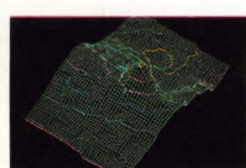
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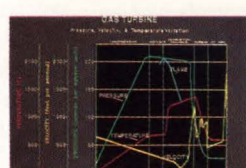
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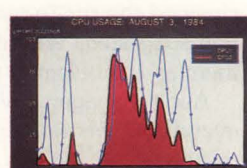
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by John Diesem, Guest Columnist

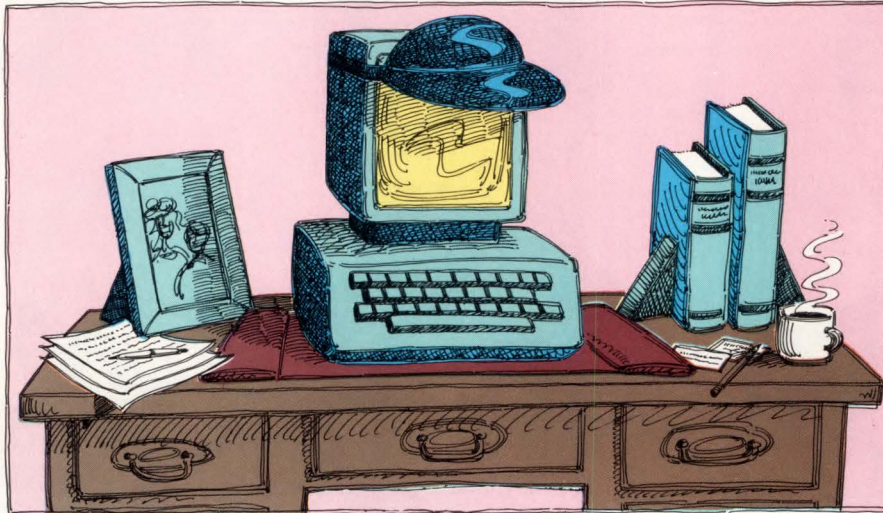


Illustration by Peter Bono

DP AUDITING: A TEAM EFFORT

Do you recognize this exchange? Dp manager: "Now that the general ledger system is almost finished, be sure to get Internal Audit's approval."

System manager: "But they'll criticize every systems control we have, insist on changing everything, and write a long, critical report anyway."

Or:

Dp manager: "Where were you when we had the design meetings? You could have told us then what controls you wanted."

Internal audit manager: "We didn't want to compromise our work by suggesting controls that we would be responsible for auditing!"

Or:

Dp manager: "Wait a minute! We changed the run-to-run controls just as you suggested. Why do you still show them as a problem in your report?"

Audit manager: "We have to report everything we found. You're free to respond!"

These dialogues reflect the prevailing view by MIS/dp managers of data-processing auditing as a necessary evil, an essentially confrontational process performed when it's too late to do any good. This attitude is unsettling because organizations are becoming increasingly concerned about computer fraud, systems control, and data-processing efficiency. It's disturbing because it's frequently based on ignorance about the benefits of dp auditing. Here are the facts:

- Auditors, as the control experts, should be actively involved in the development of controls from the first day systems design begins.

- Since databases for ongoing testing are very important, both to auditors and users, auditors should also be involved in creating them.

- Because of the auditors' unbiased approach, they are best qualified to understand a new system's risks and exposures.

- The auditing and design teams, by

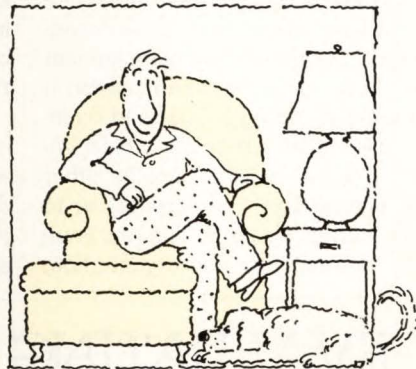
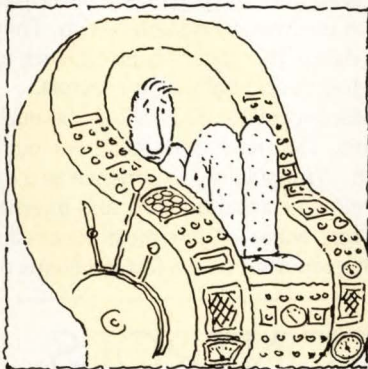
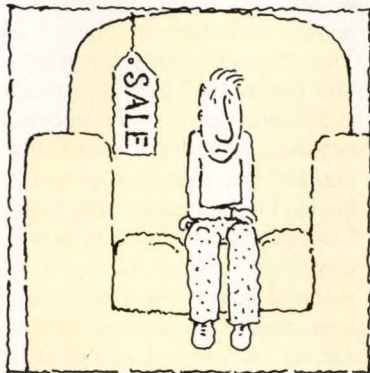
working together, can and should effect change, not just publish a report about potential problems.

The objectives of a dp audit should *not* be to satisfy the audit committee of the Board of Directors. A dp audit should ensure that data-processing systems operate efficiently, effectively, and with integrity. A dp audit should also ensure that systems designers share these objectives, and that dp managers are fulfilling their responsibilities. That's a heavy load, and it's more difficult to carry when dp managers labor under the common misconceptions about dp auditing.

Misconception: The relationship between auditors and dp managers must be confrontational. This belief encourages the attitude of "They're here to find out what we did wrong!" Unfortunately, because auditors are often involved too late to offer real help, frequently all they can do is second-guess the design team. But dp auditing can't achieve its business objectives through

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THE NO-RISK NETWORK



confrontation. The auditors and the dp organization can work together, but it requires joint planning, proper staffing, support from top management, and mutual credibility.

Misconception: The auditors must work independently of the dp department. External—not internal—auditors must be independent. External auditors are not part of the management team. They must form and publish a legal opinion, taking a legal and financial risk that requires independence. Internal auditors, on the other hand, are paid by the corporation to ensure efficient systems. The real issue is lack of bias within the organization.

Internal auditors must be able to take honest positions, but they should be shooting for the best systems installation just as much as the programmers.

Misconception: Auditing is an after-the-fact process. The auditors should be involved from the beginning, participating in preliminary system design. They can design the system controls, such as run-to-run and balancing controls.

Misconception: The longer the audit report, the more successful the audit team. Wrong! In my experience as a dp director, external auditor, and internal auditor, some of the most successful audits reported only a few problems or

none at all. The auditors uncovered several potential problems, negotiated with the dp department about solving them, gave up a few points, and stuck to their guns on others. As a result, they were able to effect change. Finally, the audit team wrote a report, including only those problems where an honest difference of opinion existed. This give-and-take is the most important part of the auditing process.

Misconception: Audit reports can be negative, or perhaps neutral, but never positive! External (public) auditors are known for their conservative approach. For example, saying a system is "well controlled" means taking a position that may later prove to be wrong. However, neutral comments, such as, "We see no evidence of loss of data," are meaningless. Either the system doesn't lose data (and the auditor should say so) or it should be fixed—before the auditor writes the report. To be confident enough to make positive comments, however, the auditor must be involved with the design process.

Those are the misconceptions. What, then, are the components of a well-managed dp-audit program? Hiring some CPAs and setting them loose isn't enough. A successful program involves the following elements:

Top management involvement. Senior management, including the chief executive officer, must be committed to the internal-audit function, understand its programs, and encourage the auditing team to contact top executives whenever necessary. Reporting relationships are equally important. The internal auditor should report directly to an important, powerful officer of the organization—not necessarily the financial officer. Much modern internal auditing, including data-processing auditing, addresses operations efficiency first. Financial controls are secondary.

User participation. Users should always be notified well in advance of an audit. Unfortunately, dp auditors frequently swoop in, do the audit, determine the problems, and publish the audit report before the users even know the audit has been scheduled. This approach only trades short-term avoidance of disagreements for long-

(Continued on page 48)

EVALUATING CONTROLS

		Cause of exposure		
Controls	Loss of a check	Key to strength of controls		
	Training			1
	Secure custody			2
	Prenumbered form			3
	Endorsement			1
	Transmittal document			2
	Amount control total			3
	Document control count			3
	Reconciliation			3
	Discrepancy reports			2
		Exposures		
Key to magnitude of exposure	3	Erroneous record keeping		
		Unacceptable accounting		
	1	Business interruptions		
		Erroneous management decisions		
		Fraud and embezzlement		
		Statutory sanctions		
	2	Excessive costs		
	3	Loss or destruction of assets		
	2	Competitive disadvantages		

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Exposures are risks. Controls are designed to reduce or eliminate exposures. This chart depicts the effectiveness of various controls when the cause of exposure is loss of a check.

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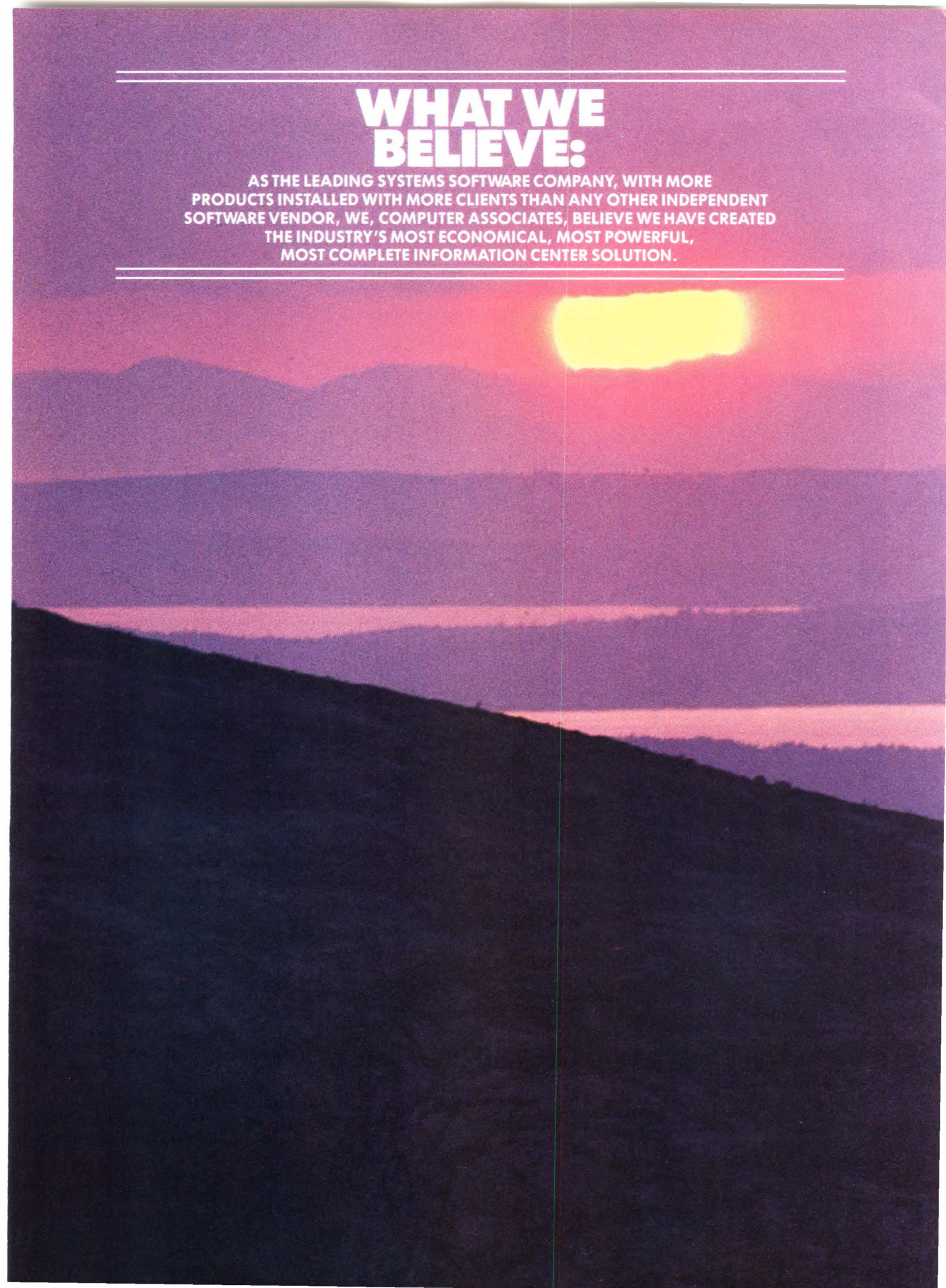
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(Continued from page 44)

term user dissatisfaction. In most organizations, users are assuming more responsibility for their systems. Control weaknesses will affect users most. A well-run dp-audit program schedules audits well ahead of time; allows users to put together manuals, procedures, and documentation; and alerts them that they may be asked for more information.

In many companies, internal auditors are doing more preparatory work for the outside accountants to hold down external-auditing fees. This preparation usually brings internal auditors and users closer together because they must cooperate to make schedules and plans for the external auditors.

Adequate staffing. The sensitivity of the internal audit, as well as its technical complexity, requires more staff than an external audit. The audit department should work in teams, with each audit manager concentrating all his or her effort on one project at a time. A general ratio is one dp auditor to every 25 systems professionals. Several good texts on dp auditing, such as Krauss and MacGahan's *Computer Fraud and Countermeasures* (Prentice-Hall, 1979) and Touche Ross's *Computer Control and Audit* (Institute of Internal Auditors, 1978), offer more precise guidelines.

More important than how many dp auditors are involved, however, is that they be technically qualified. They

must be able to design, code, test, install, and maintain systems as well as perform post-implementation reviews and cost-benefit analyses. Modern dp systems—and auditing tools—are simply too complex for amateurs. Some corporations require all programmer/analysts to serve one year in the dp-auditing department, a policy that enhances the technical expertise of the audit program while it trains programmer/analysts in business functions and introduces them to system controls.

Standard audit procedures. The audit program starts with the company's systems-development standards. These standards should clearly show the responsibilities of all participants, in-

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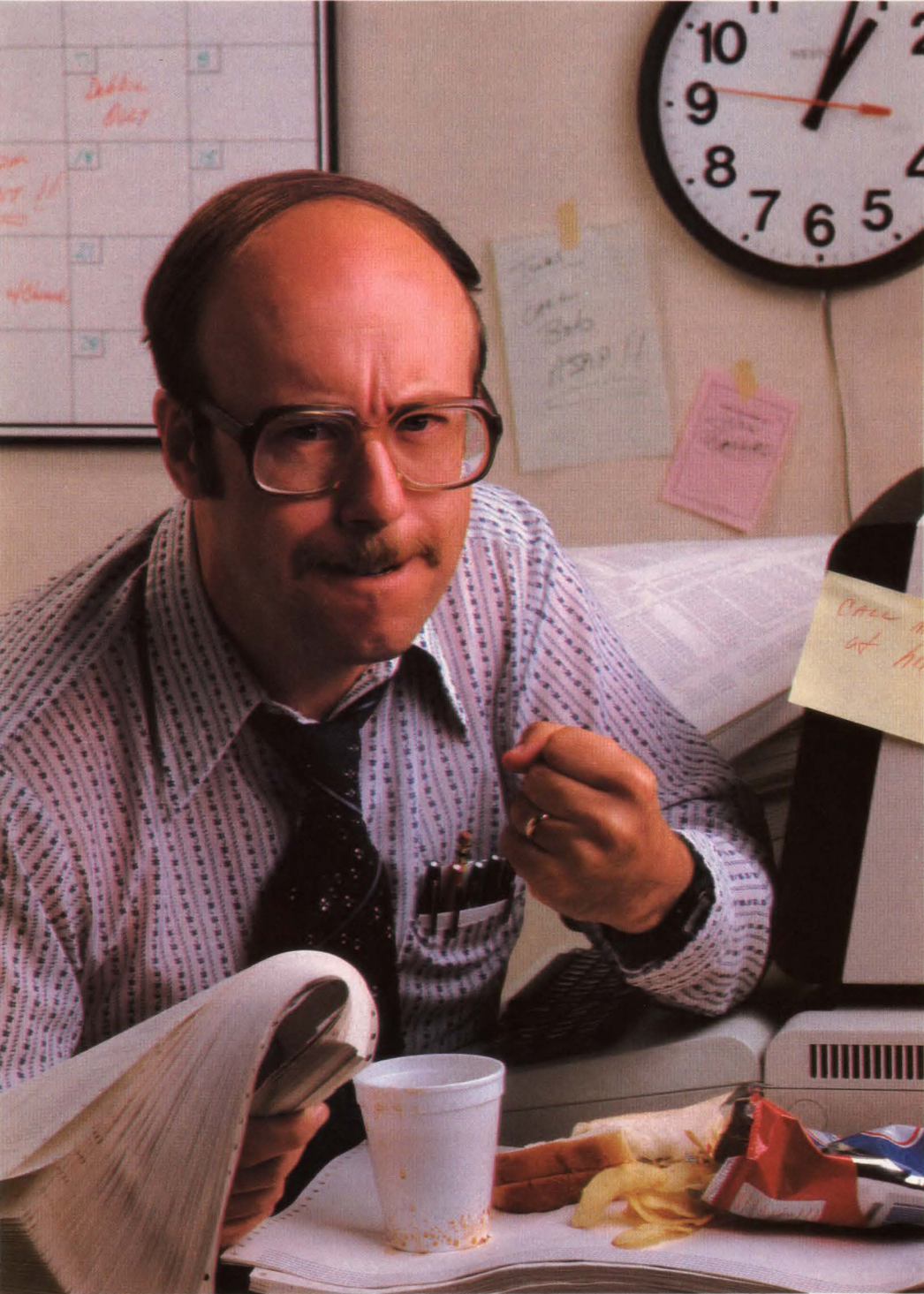
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cluding users, designers, and auditors. Modern testing and sampling tools are also very important. Dp auditors must be able to enter each system, select sample data, and do whatever tests are necessary. The audit software and programs used depend on the application being audited. Sophisticated systems with real-time applications and large databases require audit software that can handle online logging, database images, communication protocols, and user-security access. Smaller systems may be more easily audited by manual samples and tests.

Audit standards should include a questionnaire for audit interviews to help provide consistency across audits. The questionnaire should include specific questions about an application. Not only do auditors have to know what questions to ask, they must also understand whom to ask. For example, the programmer shouldn't be asked, "Does the program prevent duplicate master records from being established?" because he or she may automatically respond with an emphatic "Yes!" The programmer's supervisor or someone else from the development team would be a better source.

If exposure to harm from duplication is great enough, the auditor may actually read the code, if necessary, to ensure that the logic prevents duplication. Then, sampling and specific testing should be performed to ensure that the code works. Parallel testing—where the new system runs alongside the old, using the same data—is not the best approach. The classic example is the payroll system that was parallel-tested for three months, had every error corrected, and then, after installation, crashed on New Year's Day because no one had tested the end-of-year routines. Parallel testing frequently misses that kind of error because it doesn't take into account the logic behind the code. That requires experience.

For example, during my first dp

SOFTWARE BRIEFS

Two widely used software-development products recently became available to a broader range of users. Software AG Inc., Reston, VA, has released a version of its fourth-generation language, Natural, as a stand-alone product for VSAM file users. Previously, Natural was available only in conjunction with Adabas, the company's database-management system. The new release, Natural/VSAM, provides all the functions of the database version, including the programming language, a menu-driven report writer, and a program-management library. It runs on IBM mainframes and costs \$30,000 for a DOS version, \$35,000 under VS1, and \$40,000 under MVS. For more information, call (703) 860-5050.

The Problem Statement Language/Problem Statement Analyzer (PSL/PSA) system-design tool from ISDOS Inc., Ann Arbor, MI, including its support environment for structured analyses, will now run under Bell Labs' Unix operating system. According to ISDOS, its software engineering tools include Unix versions for the DEC VAX, the Hewlett-Packard HP9000, the Gould 3287, and Apollo, Canaan, and Pixel workstations. Previous versions ran under many mainframe and minicomputer operating systems. PSL/PSA for larger systems costs \$45,000. Workstation versions range from \$15,000 to \$22,500. For more information, call (313) 649-4150.

audit, I reviewed a system that maintained the leased-car records for a car-rental firm. The audit manager, wise to the ways of computer systems, went to the audit committee and presented a detailed manual analysis of how the system updated transactions. After an excruciating hour, he asked me, "Are we sure the system works this way?" I boldly replied that we were. "But does the program actually distribute debits and credits this way?" was his next question. "How do I know?" I answered. "I'd have to go into the code to be sure." "Do it!" he said. Sure enough, one transaction had the debit and credit reversed, and small amounts had been accumulating in the wrong accounts for five years! The audit manager had to break the bad news to the chief financial officer about what turned out to be a \$150,000 write-off.

Risk and exposure analysis. The overriding objective of the auditing process is to perform any reviews and tests necessary to minimize risk and exposure. The auditor should approach a system with a clear idea of the possible risks.

Sometimes the major risks are outside the computer system—in the physical storage of input documents, for example, or in the control of manual changes. I saw a good example of this in a consumer-goods company with a modern payroll software package. Management wanted a dp-controls audit of the computer system. Ensuring that the system functioned properly was straightforward. However, when we reviewed the controls over input documents, including access-authorization policies, we discovered a surprising laxity. We extended our audit to include a complete one-for-one comparison of personnel files to payroll master records and found several discrepancies. In one instance, a demotion with pay reduction had been instituted, changed in pencil on the input document, and then reentered into the system.

The Touche Ross book *Computer Controls and Audit*, used by the Institute of Internal Auditors, emphasizes the exposure, cause, and control approach. It works like this: Exposures are produced by causes. Controls reduce or eliminate the risk of exposures. Exposures caused by a specific event, such as a bank losing a check after it's been partially processed, might include erroneous record keeping, loss or destruction of assets, and excessive costs.

(Continued on page 54)

"Auditors should be involved in the development of controls from the first day systems design begins."



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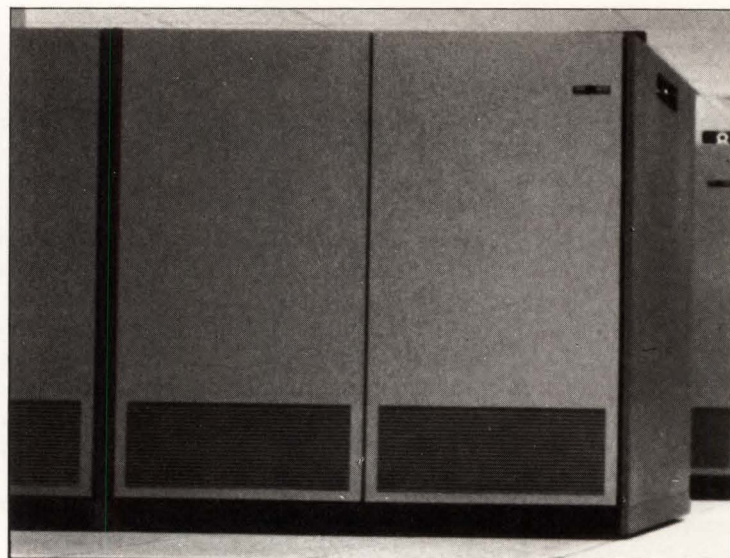
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Photo courtesy of McDonnell Douglas Corp.

(Continued from page 50)

The auditor is concerned with the magnitude of each exposure. For example, in the chart on page 48, the lost check is seen as "virtually certain" to cause erroneous record keeping, but "very unlikely" to cause statutory sanctions.

The effectiveness of the controls to reduce the risk of a lost check can also be classified. For example, a pre-numbered form is a very reliable control for the lost-check exposure. The bank may still lose a check, but because the check will be numbered with the account code, check number, and amount (after initial entry), the risk of loss is sharply reduced, and the chances that the check will be quickly recovered are greatly improved.

Remember, no system—manual or computerized—is completely foolproof. Good auditors know they will encounter diminishing returns as they try to reach a "fail-safe" level. In a large commercial bank, with many branches and immense volumes of checks, some losses will occur. The bank needs to have sufficient controls to keep losses down to an acceptable level. Or, a merchant bank may have only a few checking accounts for the senior officers of its business clients. The loss of a single check would embarrass the bank, so its controls would be much tighter, with higher costs.

Standard work plans and project control. Just as systems-development standards should require work plans for systems projects, auditors should have work plans that itemize the steps involved, estimated staffing requirements, and start/stop dates. Also, all but the shortest audits should follow project-control techniques, including a record of elapsed time, estimated time to completion, and a list of budgets, variances, and specific deliverables.

These work plans and control documents will often be new to the data-processing department. Many systems

"Internal auditors must be able to take honest positions, but they should be shooting for the best systems installations just as much as the programmers."

are designed and installed with the barest project controls—often in the mistaken belief that time spent on paperwork is "nonproductive" or that keeping timesheets offends professionals. There is no other way, however, to ensure that the project team understands and is committed to the entire series of tasks involved in the audit. Progress reports needn't be a major undertaking. In fact, it's often easier to objectively report the status of a systems job manually than with a project-control software package.

Documentation standards. Working papers are an important part of both the internal and external audit processes. They form the basis for conclusions and opinions. An organized approach to developing and retaining documentation will ensure consistency, uniformity, and completeness. Auditors should be proficient in both conducting and recording interviews.

The audit department must organize documentation requirements, including sample questionnaires, checklists, and report samples. Fortunately, good texts can help. Larry Smith's *The Practice of Modern Internal Auditing* (Institute of Internal Auditors) and Lindberg and Cohn's *Operations Auditing* (AMACOM) are two excellent examples.

Sign-off procedures. The capstone of a well-managed internal audit program is a formal set of sign-off procedures. The internal audit staff holds an ideal position to effect real change in the organization. Their charter comes from the top; they are concerned not only with controls but also with economy and efficiency; and they bring an organized, structured, and analytical approach to an issue. Unfortunately, many internal auditors, in my experience, are unwilling to handle this much responsibility, perhaps because they perceive their function as that of watchdogs rather than change agents.

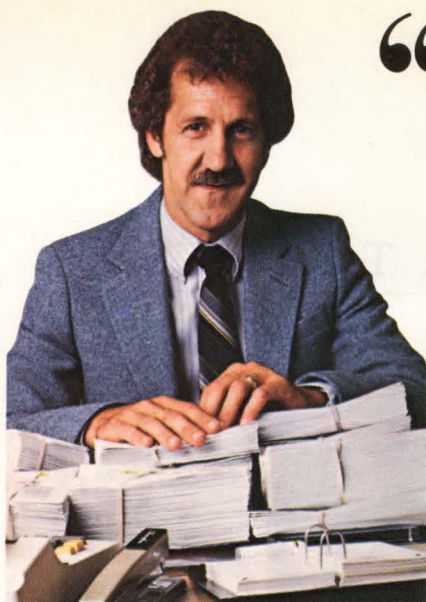
For example, suppose an internal audit finds that user-access controls for an online system are inadequate. The systems designer contends that the user hasn't provided the necessary allowable-access information. The designer tells the auditor that he or she has tried to get this information for two months and finally decided to install the system without the access control, intending to "clean it up" later. The auditor knows that the fix will probably never happen. "Access controls" will consist of locking the office door on the way out.

The auditor can handle a situation like this by writing up the problem, considering it "cleared," and walking away. Or, he or she can take the change-agent approach by concluding that the exposure is unacceptable, lining up support, convincing the user of the problem's seriousness, obtaining the necessary access information, and seeing that the designer includes it in the new system. Then, the auditor can sign off on the problem.

Is this course of action difficult? Of course. Politically dangerous? Not really. The auditor's responsibility is to ensure that the company's systems run with financial and operational integrity. Professionalism, credibility, tact, a sense of humor, and a spirit of cooperation can achieve these goals. □

"The auditing and design teams, by working together, can effect change, not just publish a report about potential problems."

John Diesem is a manager at Touche Ross & Co., the New York consulting firm. He has been active in data-processing auditing as an external auditor, an internal auditor, and a data-processing director.



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DATA COMMUNICATIONS

by John Seaman, Data Communications Editor

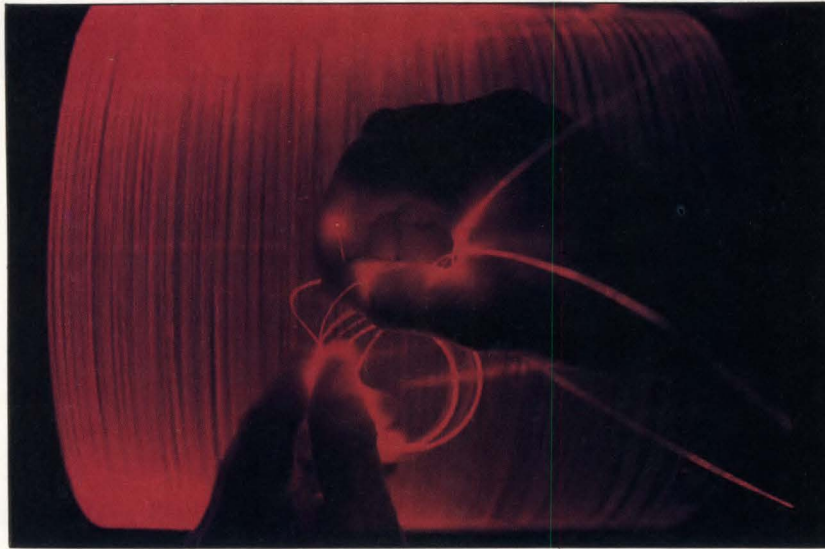


Photo by Jim Sugar/Blackstar

THE FUTURE IS FIBER

Fiber optics, a technology that's barely 15 years old, is coming into its own as it gains a wider base of commercial acceptance. These transmissions, whereby data are sent over lightwaves instead of electrical currents, are gradually taking over long-haul telephone communications. In fact, researchers predict that fiber-optic cables will replace conventional copper wiring within 15 years.

To prepare for this relatively new technology that will revolutionize the data-comm industry, corporations must begin strategic planning now. "Within two or three years, fiber-optic long-haul links will have absorbed a large percentage of the satellite carrier's business—and users must prepare for this," says consultant Peter Balbus, strategic planning director at Network Strategies Inc. (NSI), a Burke, VA, consultancy.

Fiber optics will create more options for data-comm users, particularly among corporations that implement

their own private long-haul networks. (Users who send data only over a public or semi-public network must select from a variety of service offerings that mix fiber with other media.) As long-haul fiber-optic cabling becomes commercially available, its cost will drop. Heavy users will then benefit from buying their own media.

Before considering long-haul fiber-optic cabling, users should be aware of the advantages—and disadvantages—of this medium:

Fiber optics are immune from electrical or radio interference, as well as cross talk, echoing, and ringing. Because of this high immunity, fiber optics have a significantly lower error rate than satellites.

Because of their high error rate, satellites have expensive error-correcting hardware that reduce the chance of error by verifying the original message. In addition, satellites use devices called repeaters placed at one-mile intervals to retransmit any signals passed along

the telephone line. With fiber-optic links, repeaters are necessary only at intervals of over 30 miles. In urban areas, fiber cables don't need repeaters to produce clear, accurate transmissions. Researchers are in the process of extending the range these cables can carry without repeaters.

Fiber optics are also better equipped to transmit during inclement weather. In the rain or snow, satellite users will encounter many more brief outages (lasting a minute or two) than fiber users will. Because fiber cables are buried three or four feet beneath the earth's surface, they're immune to nearly all disasters.

These cables are extremely secure because they don't emit any radiation. This prevents anyone from tapping a fiber link without the sender's knowledge. Because the "footprint" of most satellite transmissions can easily cover the entire continental United States, an eavesdropper located anywhere in the

(Continued on page 60)

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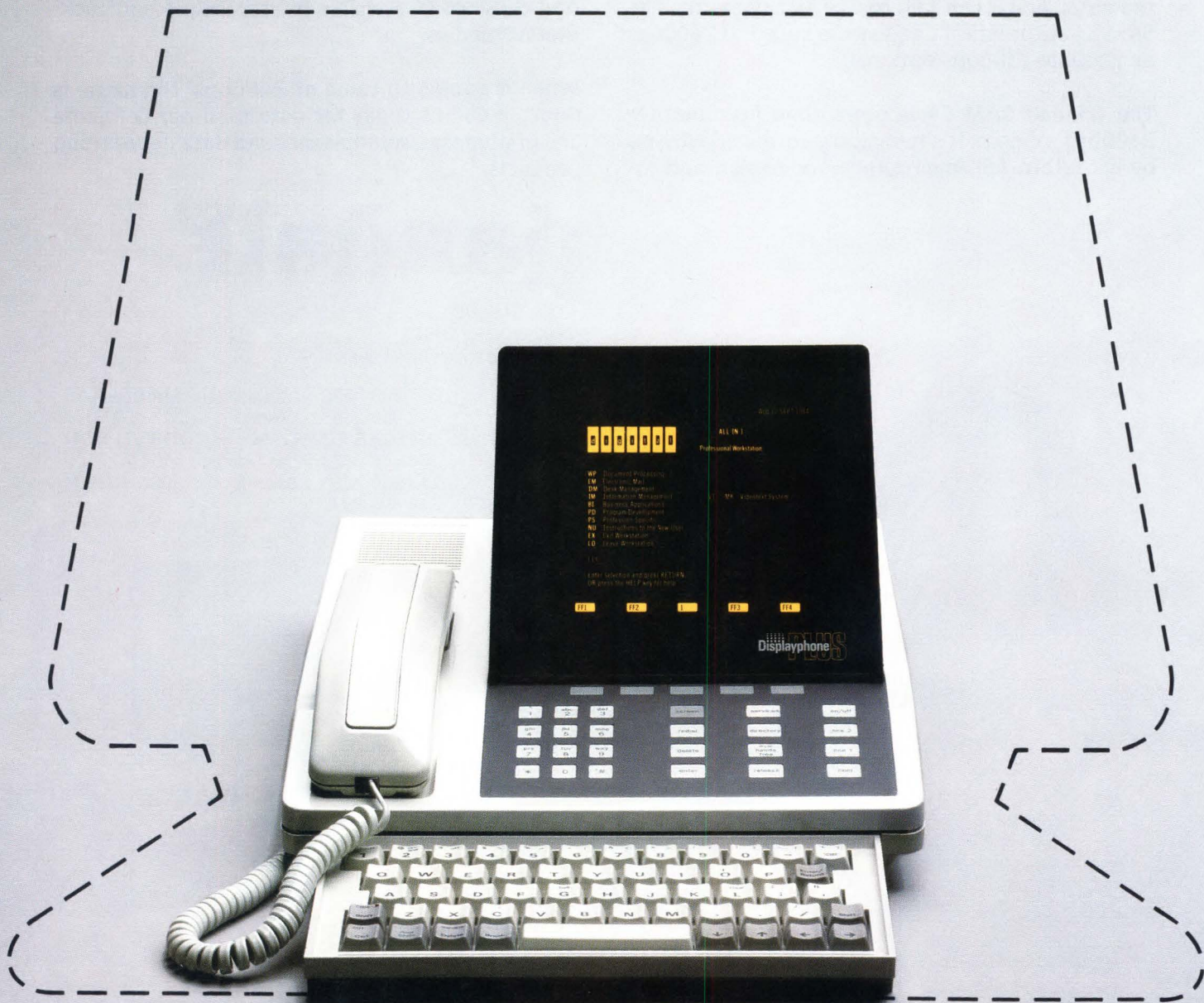
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(Continued from page 56)

country can "listen in" without being detected.

Fiber optics also reduce propagation delay, which is the time it takes a message to be transmitted and then picked up by the receiver. Satellite signals travel at the speed of light. Satellites transmit from 23,000 miles above the earth, producing a round-trip propagation delay of about half a second. Satellite-link propagation delay is no longer a problem for data transmission because compensatory devices support the back-and-forth error checks. Propagation delays do, however, interfere with voice transmissions, creating "cross talk" as senders talk over each other. All-terrestrial fiber-optic transmissions greatly reduce this delay because the distance and the resulting propagation delay are too small to create problems.

Fiber-optic cables are not only fast—they're also cheaper to maintain than satellites. End users can "buy" fiber cabling that will extend between the transmitting station and the receiving destination on a "condominium" basis. This means that a corporation can purchase one pair of twisted cables while other organizations own the remaining pairs. This arrangement offers several advantages to the user. For example, the organization will no longer be subject to arbitrary tariff increases by the carrier. Instead, the user pays a fixed purchase fee, sharing the cost of the sheath that encases the cables and the necessary electronic equipment. There are also minimal monthly operating charges.

Although it's too early to say for sure, researchers predict that each fiber-optic cable will last about 35 years. The orbital life of a satellite is about seven to 10 years. Although satellites can now be recovered by space shuttles or other means (in the past it was impossible to retrieve them), the satellite-link user must make other transmission arrangements while the satellite is being repaired or replaced.

Although fiber optics seem to be the technology of the future, many data-comm users still prefer long-haul satellite links. The fact that satellites are an established technology is one argument for continued use. The satellite's wide

Researchers estimate that fiber has a life expectancy of at least 35 years.

broadcasting range is another advantage. A signal beamed to a transponder (an electronic device in a satellite that receives radio signals beamed from a transmitting earth station and then rebroadcasts it back to receiving stations) may be beamed to earth stations covering regions wider than the United States. Today's fiber signals are essentially point to point. However, as fiber cabling is installed in more cities, a network will emerge and a form of "broadcast" will be possible. These networks will exist all over the world in about 10 or 15 years.

Despite the many advantages of fiber optics, satellite links are less expensive for certain applications. Factors such as the configuration of the data network, the flow of data traffic, and how far apart the stations are will determine which type of transmission will be more economical. As mentioned satellites are still cheaper and more efficient for long-distance broadcasting. The cutoff point in cost-effectiveness between fiber and satellite links is estimated at 600 to 800 miles. For transmissions below this distance, fiber is usually the most cost-effective; for those above it, satellites are preferable. When special considerations are introduced, economic factors change. For example, the cost of error-correcting hardware, such as repeaters, increase the overall cost of satellite links. And if an organization chooses to code or encrypt satellite data for security purposes (usually unnecessary with high-security fiber), there is an additional expense.

There are many public-network systems that are already running or will be in the near future. These fiber networks represent two kinds of business enterprises: MCI, United Telecom, and AT&T Communications have built networks primarily for internal use, whereas other organizations, including some startups, plan to sell capacity to

resellers and directly to large corporations.

The most ambitious, far-reaching fiber-optic project so far is the 23,000-mile network United Telecom is building. It will extend to every Local Access Transport Area (LATA) in the nation. United Telecom has announced that its system will carry traffic for U.S. Telephone (residential voice), Isacomm (voice, data, and video for large corporations), and Uninet (high-speed data). All these organizations are subsidiaries of United Telecom.

One United Telecom user (via Isacomm) that has built a large "virtual" private network is Tenneco, Houston, TX, a large conglomerate with oil, shipbuilding, and packaging interests. "Tenneco chose fiber because it's the best all-around medium for our purposes," says Dan Wickersham, a staff telecommunications consulting engineer. "Because of the propagation delay, satellites are very poor at transmitting voice, and copper transmissions aren't as clear as those on fiber. Our business relies on good communications, and fiber is the most flexible answer to our needs."

To Wickersham, fiber requires a new managerial attitude: "Although Tenneco is a very large company, we can't afford our own dedicated private network. So we lease fiber from Isacomm and build a virtual network that has all the features of a dedicated network. Management must compromise when implementing the new fiber and mixed networks."

Some organizations have turned to fiber optics after being disappointed with more conventional data-comm systems. "We went with fiber because we couldn't get sufficient capacity in copper cabling or microwave at a comparable price," says Ernest Florkowski, corporate manager of communications systems at Firestone Tire and Rubber (Akron, OH).

Florkowski's experience is not unique. Corporate users all across the country are considering fiber and testing ways to get the most for their investment. For organizations that want to decrease telecommunications costs and get better service in the bargain, fiber optics may be the technology of the future. □

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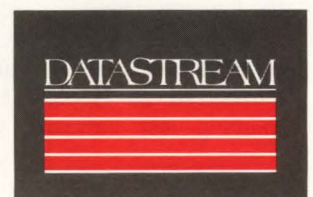
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FOLLOWING THE LEADERS

by Michael Murphy

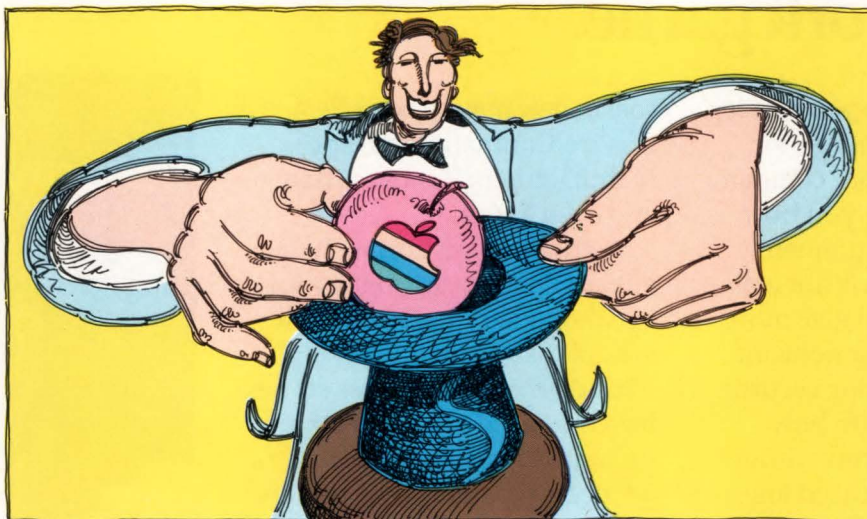


Illustration by Peter Bono

APPLE ABIDES

This is the second appraisal for Computer Decisions of Apple Computer as a vendor by one of the authors of the California Technology Stock Letter. The previous appraisal, published in February 1984, was bullish on Apple at a time when the company appeared to be faltering.

Apple Computer, a company that reinvents itself every couple of years, is about to do so again. Apple began as the manufacturer of a hobbyist's computer, the Apple II. Riding a wave of newly available educational and business software (especially the Visicalc spreadsheet), the Apple II Plus became the first widely used personal computer. Apple then took aim at the business market with the Apple III. That machine never caught on. A second attempt to crack the same market with the Lisa also failed.

With two flops in a row, Apple needed a success in 1984. The Macintosh, introduced at Apple's 1984 annual meeting last January, was initially

aimed at Apple's traditional user base—users who are eager to experiment but who may not be computer literate. These users included members of the academic community, ex-Visicalc users who never switched to using Lotus 1-2-3 on the IBM Personal Computer, and new users attracted by the Macintosh's simple interface. Thanks to these users, the Macintosh became a success. The first production line reached capacity (40,000 Macs per month) by August, and Apple subsequently accelerated its plans to double capacity by the end of last year.

This year, Apple will recreate itself as a vendor of networked business computers. We will not see significant new computers this year (although they may appear in 1986), but we will see a steady stream of support products designed for the Macintosh. For example, at Apple's January annual meeting, we were introduced to the long-awaited Appletalk. Appletalk will provide an inexpensive, low-speed,

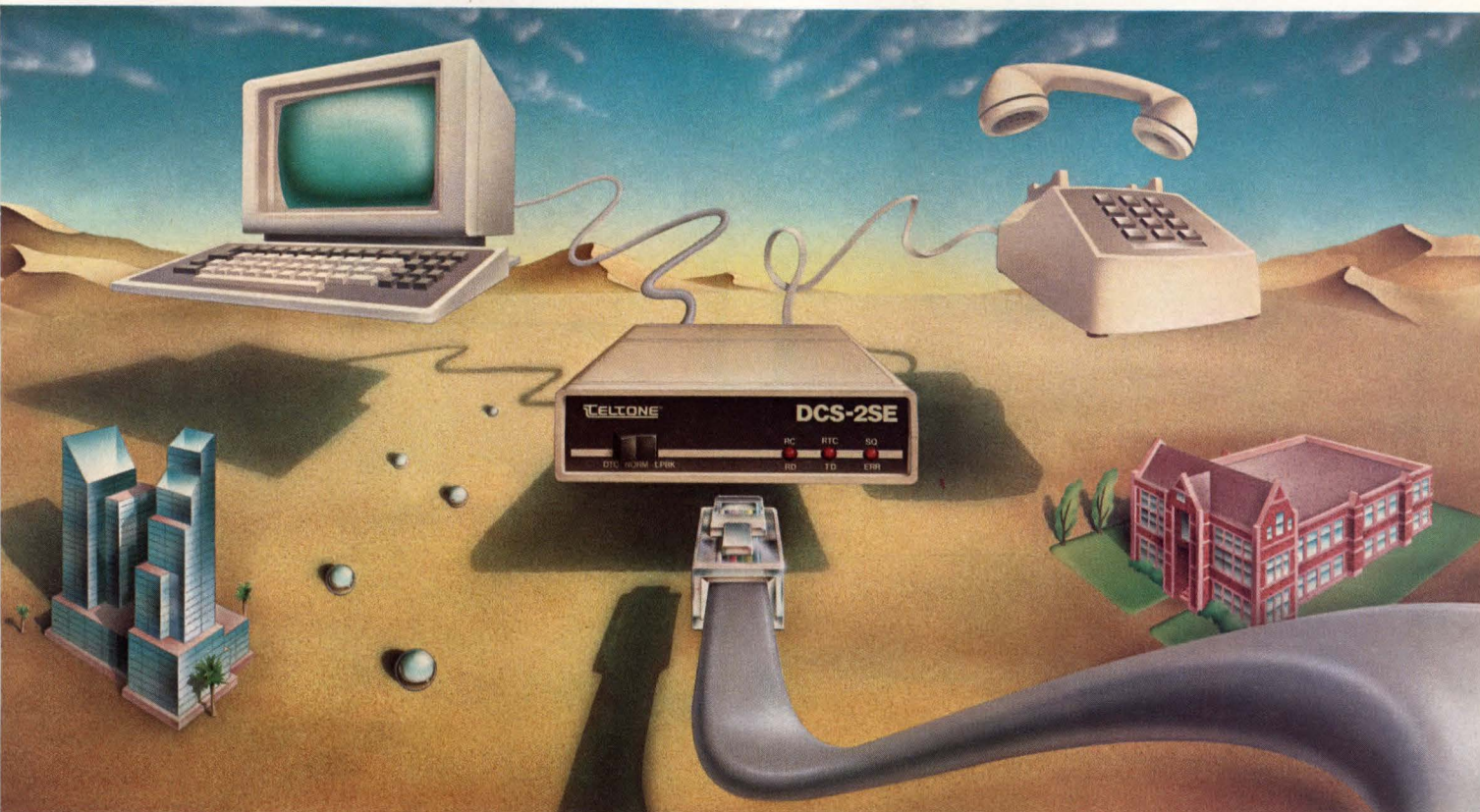
twisted-pair network. The Macintosh already has the electronics to hook into Appletalk. All that each node requires is a \$50 connection. A networked laser printer called Laserwriter that handles both text and graphics and costs about \$6,995 will also be introduced.

Apple was expected to unveil a networked file server, but it announced the product won't be available until the second quarter of 1985. The file server will have a 20- to 40-megabyte hard disk and built-in file-management software. Higher-capacity Winchester disks should be available as an option, either at the same time or shortly thereafter.

With these three products, Apple will be able to offer a complete business system for as many as 32 users, allowing about two Mbytes of storage per user. In beta tests, Appletalk ran with as many as 1,000 users, suggesting that users can expand the network by adding disk storage and printers.

(Continued on page 66)

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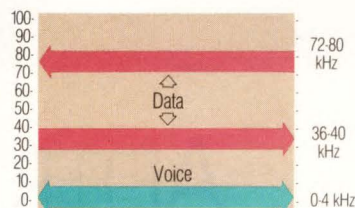


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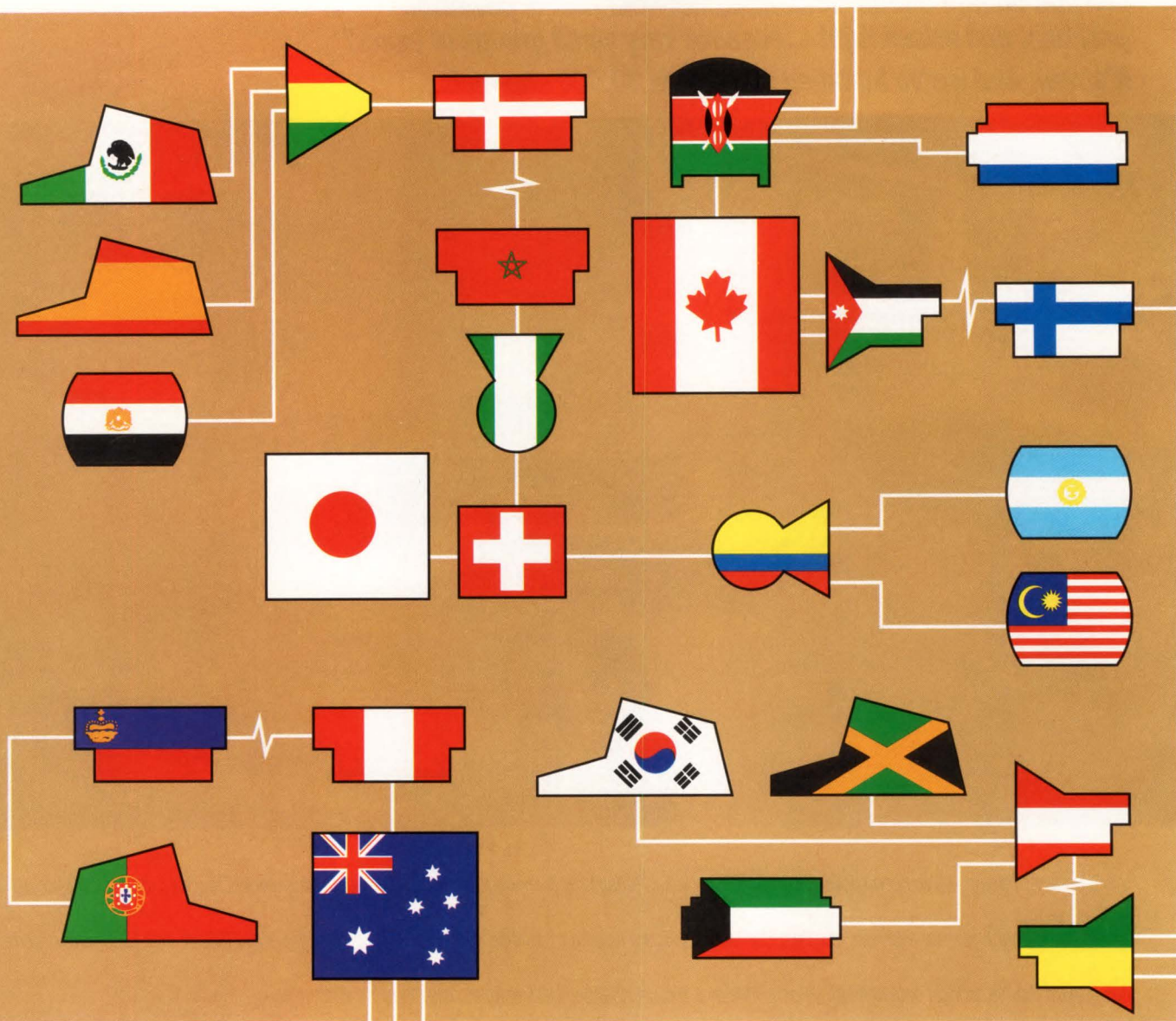
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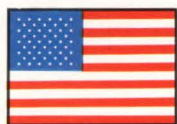


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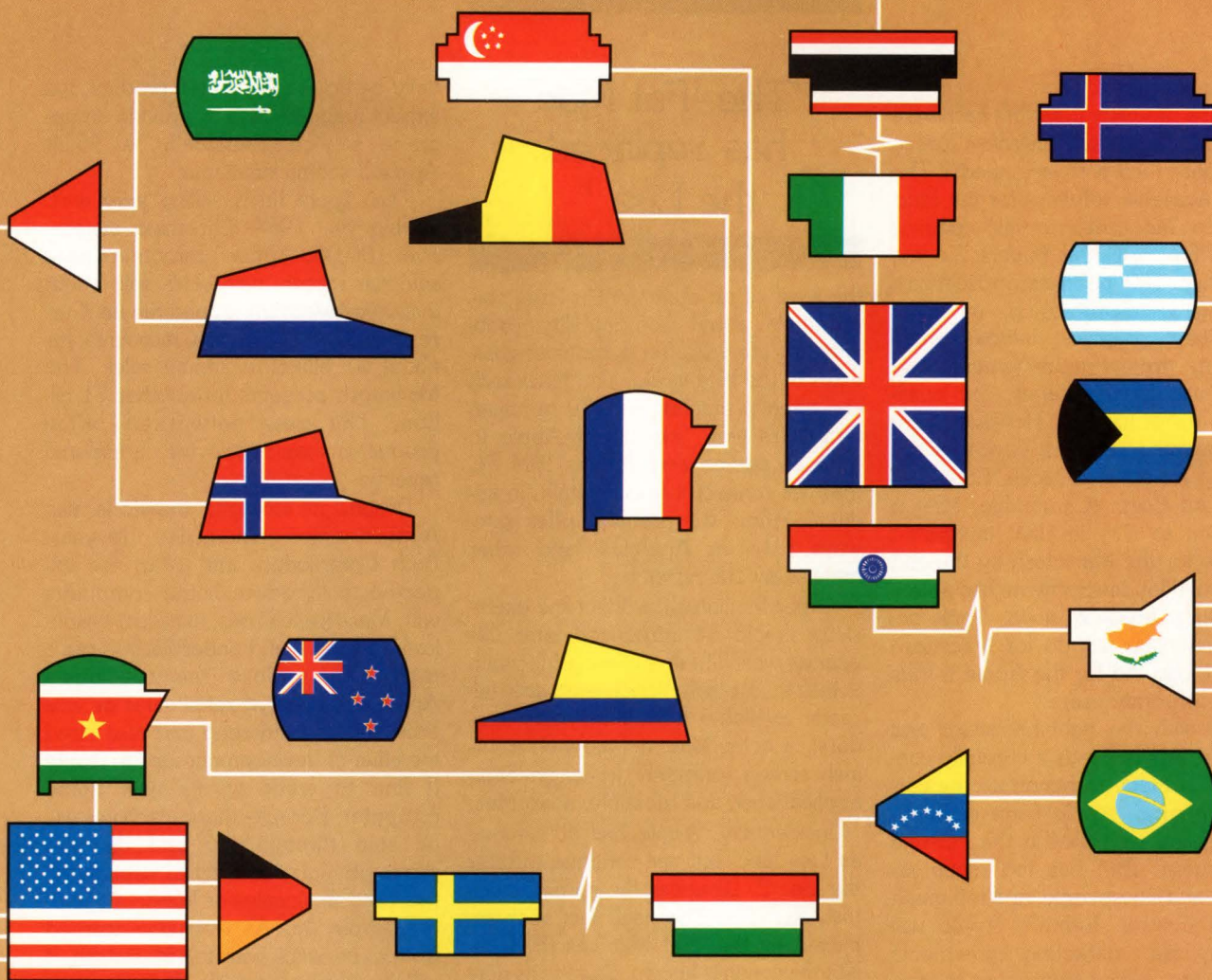
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(Continued from page 62)

If these products meet the hardware needs of networked business users, what about their software needs? The lack of available software for the Macintosh caused problems last summer and fall for early Mac buyers. Today, more than 100 business applications, including word-processing, outlining, spreadsheet, graphics, database management, project management, and communications packages, are available for the Macintosh. However, very few integrated software packages are available for the Macintosh. Lotus Development Corp. (Cambridge, MA) is scheduled to ship its Jazz integrated package for the Macintosh by the end of March. (Hayden Software has a similar package available now.) Apple believes that Jazz will do for Macintosh what Visicalc did for the Apple II Plus among corporate users.

Even with the right hardware and software, Apple needs a carefully constructed strategy to penetrate the corporate market. Apple can't compete head-to-head with IBM in the Fortune 500 market. IBM has too many resources and salespeople, and too much account control. Instead, Apple will probably sign marketing agreements with large office-equipment-related vendors already selling to the Fortune 500. A recent agreement with General Electric Information Services Co. (Geisco) may serve as the model for marketing agreements with other manufacturers, such as Wang Labs., Xerox, ITT, or even AT&T.

In addition, Apple has established "self-supporting" corporate accounts that work directly with Apple instead of through dealers. More than 20 organizations have agreed to provide in-house support for their users and one-year orders of at least \$500,000 (at discount prices).

Apple will market to everyone else through its traditional dealer network and a new direct-sales force. The networked Macintosh system is designed for easy installation by dealers, which makes it practical for larger dealers to sell the system. Apple can then target both small businesses and autonomous divisions of larger companies as sales prospects for the Macintosh. To ease

"The 'Fat Mac' has replaced the Lisa."

the fears of dp managers in large corporations about compatibility problems, Apple will offer a series of gateways to the IBM world. The Macintosh can already emulate a 3270 terminal. Later this year, we expect Apple to offer an add-on card for the IBM PC that will connect it to Appletalk. In addition, Apple will probably offer gateways between Appletalk and other major network systems.

Other Macintosh product-line extensions should be introduced later this year as well. These include a Mac with a built-in 3½-inch Winchester disk (already available from third-party vendors), a color Mac, a Mac with a 14-inch screen (primarily for engineering applications), and, possibly, a lap Mac.

Incidentally, Apple has abandoned its Lisa label but will continue to offer the Lisa 2/10 under the name Macintosh XL. The Lisa itself has been replaced by the "Fat Mac" as the 512-Kbyte version is known. Despite its new name, Macintosh software cannot be run on the XL without the Macworks operating system. Even with Macworks, circles look like ellipses and graphs can be difficult to work with.

Some analysts believe Apple is betting the company on the new networked business system. However, we see sales of that system as an addition to a fundamentally healthy business selling Macintosh to stand-alone business users, the Apple IIc to professional and home users, and the Apple IIe to the elementary- and high-school-education markets.

The Apple IIe was in short supply last year. Apple reduced the IIe's price in April, when the new Apple IIc was introduced. It turned out there were many potential customers for an under-\$1,000 expandable computer.

This year, a 16-bit version of the 6502 microprocessor that drives the Apple II line will be available from GTE Microcircuits. Although this will not ini-

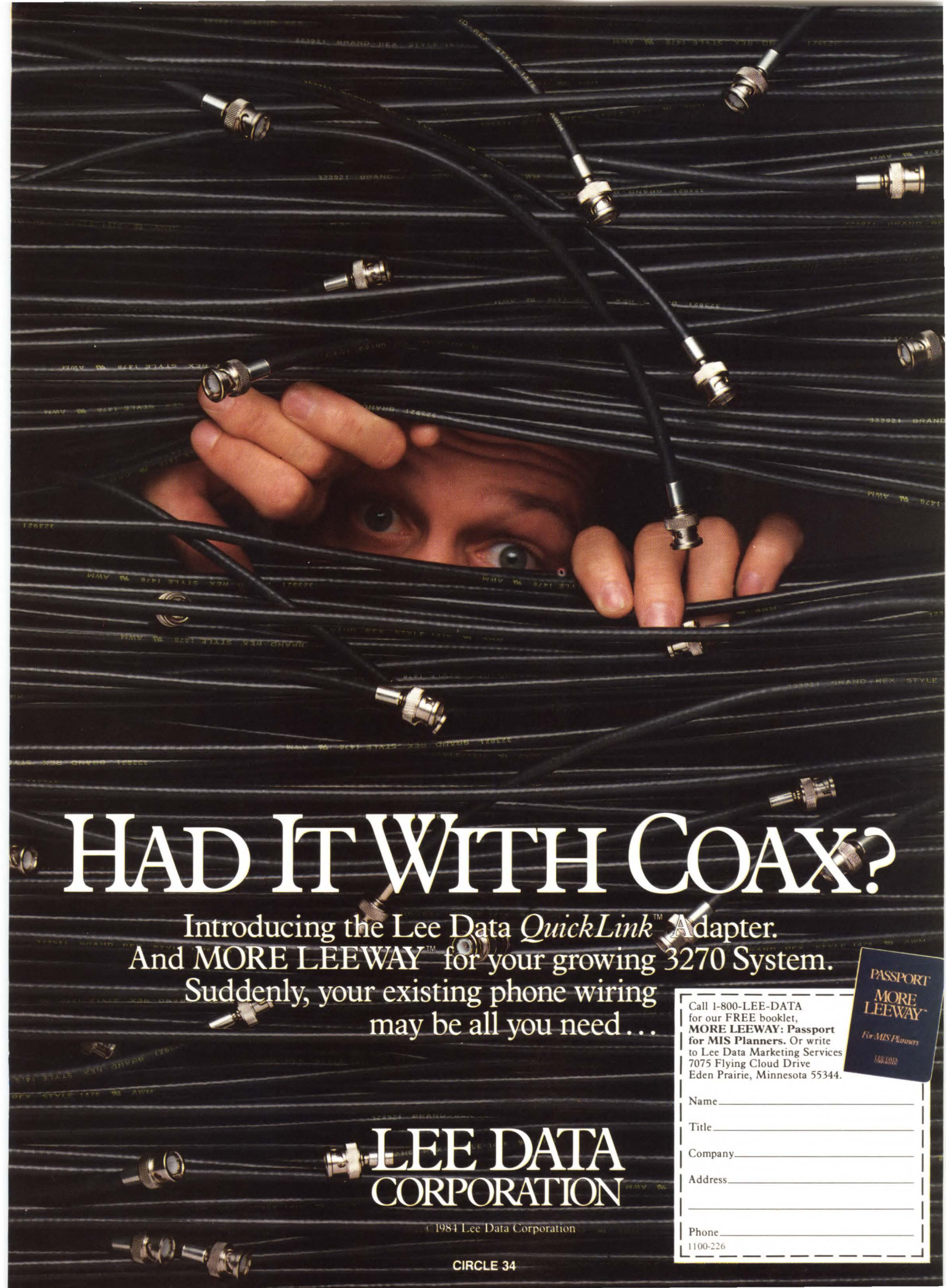
tially be an Apple-labeled product, we expect many dealers to provide an upgrade service. Eventually, a 16-bit Apple II seems inevitable.

The Apple IIc is selling very well. During the 1984 Christmas season, over 100,000 Apple II computers were sold per month, with sales split about evenly between the IIc and the IIe. Currently, the Apple II line accounts for about \$1 billion in annual sales. The Macintosh accounts for another \$1 billion. The new networked office products should provide additional revenue.

Despite its strength, the IIc is also Apple's major vulnerability this year. Both Commodore and Atari are expected to introduce home computers with Mac-like features, excellent graphics and sound, and under-\$1,000 price tags. Commodore recently hired Apple's director of retail sales as vice president of marketing and also hired the chief of development for the Apple II line to work on its new home computer. Because these machines will be sold through toy and discount stores, they are unlikely to strongly affect Macintosh sales or business use of the Apple IIc. As everyone learned from experience with the Macintosh, it will be several months before much software will be available for the new Commodore and Atari computers.

In its 1984 fiscal year, Apple reported revenues of \$1.5 billion. We expect revenues to triple to approximately \$4.5 billion over the next four years, which will maintain Apple's position as the second-largest personal-computer maker. We expect IBM's personal-computer revenues to outdo Apple by 100 percent in 1988, or about \$9 billion. AT&T will most likely be in third place with about \$3 billion in revenues. We expect these three competitors to account for about 60 percent of the total worldwide personal-computer market in 1988. We're still very bullish on Apple. □

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CIRCLE 34

TRAINING

by David Roman, Associate Editor

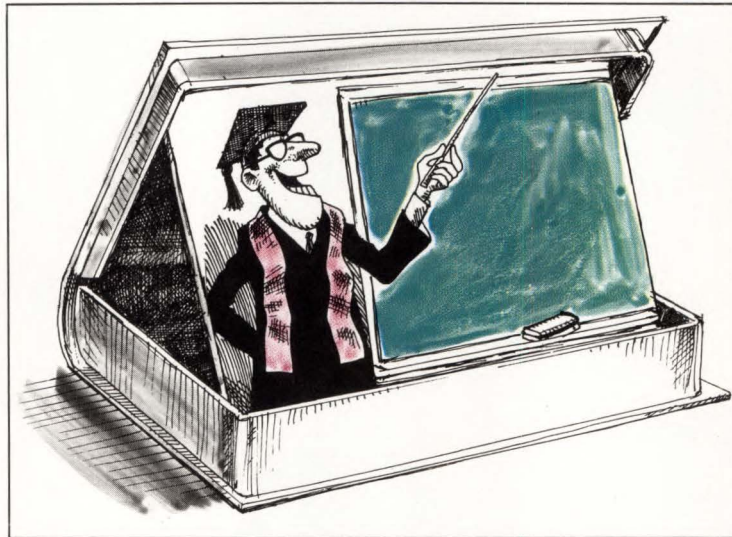


Illustration by Ned Butterfield

QUALITY EDUCATION: A PACKAGE DEAL

Many vendors are becoming more conscientious about the quality of the training programs included with their products. Users are reinforcing this trend by evaluating and comparing the training programs of each computer. "You can't supply a good computer product without giving end users some training," says Kathy Groll, marketing manager for Dunsplus, a value-added reseller of IBM microcomputers and subsidiary of D&B Computing Services, Wilton, CT.

An adequate training program is essential when the users aren't data-processing professionals. "When we evaluate software for non-dpers, we carefully examine what kind of training is available and what form it's in," says Joseph Wedig, manager of computing services for Hercules Inc., a diversified chemical manufacturer based in Wilmington, DE. "If the training's very poor, we'll reject the product—even if it has all the functionality we want."

It's not enough for software vendors to simply sell a product, says William Hammer, director of information services for The Duriron Co. Inc., a pipe and valve supplier based in Dayton, OH. Vendors must also give users the training they'll need to successfully use the package. "Most employees have trouble using a package with an unsatisfactory tutorial," Hammer says. Rick Treitman, manager of Lotus Books for Lotus Development Corp., Cambridge, MA, agrees. "It's not enough to just hand users a bare tool, like a spreadsheet, if they've never seen a spreadsheet before." For these microsoftware users, Lotus offers several forms of instruction—a tutorial diskette, online help screens, documentation manuals, and telephone access to a customer-service group—as part of the software package.

At first glance, competitive products may look alike to users, says Don Wszolek, director of marketing for Information Builders Inc., New York,

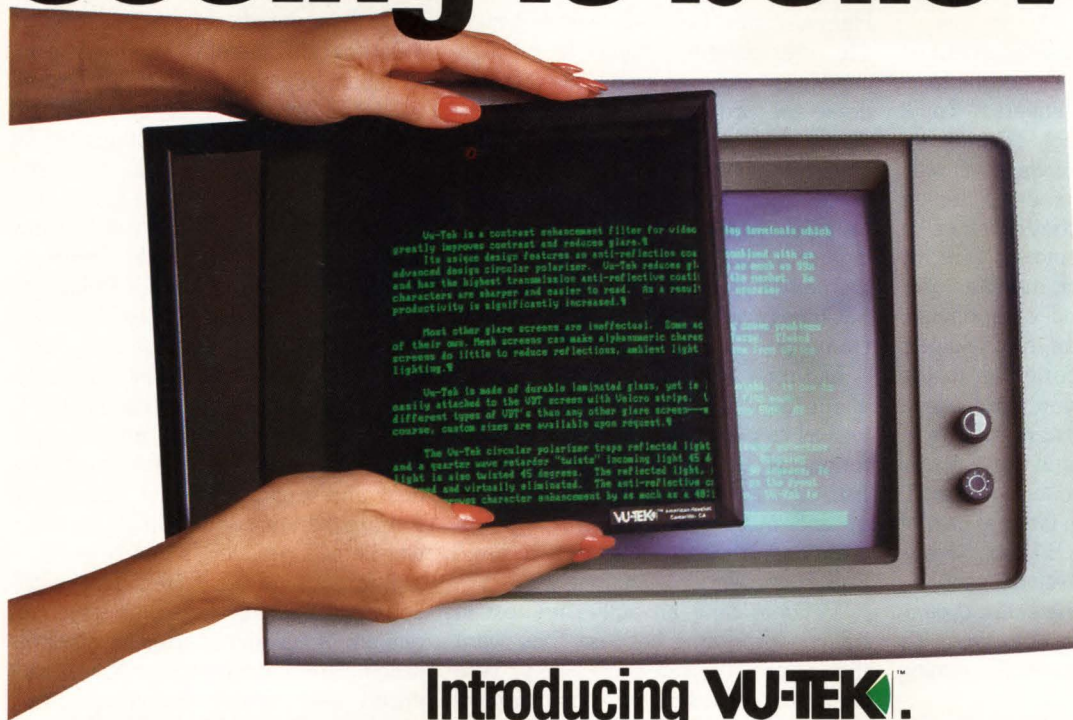
vendor of Focus, the fourth-generation programming language. But if users go beyond a superficial evaluation to examine the products' training programs and the vendor's training methods, Wzolek insists they will find a noticeable difference.

Any training element—including documentation—can entice prospective buyers. "Good documentation proves that the vendor has spent time going over its program to find its shortcomings," says Hammer. "It's something I can put my hands on even before I test the package."

Software packages for dp professionals may be less critically judged than those designed for novices. Joe Wedig says he uses entirely different standards for choosing software for each "user community" at Hercules. He's more likely to forgive certain flaws in software designed for dpers because he believes they can follow skeletal documentation more easily than non-dpers.

(Continued on page 70)

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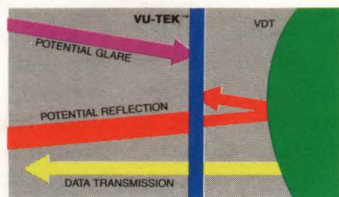
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CIRCLE 35

VU-TEK™ The difference is clear.

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(Continued from page 68)

Although the training component of a product is important, it's not the foremost concern of most buyers. "You'll tolerate less-than-perfect documentation if you know your software will really do the job," says Hammer. "Function is always the primary consideration."

George Snyder, director of MIS for LaBarge Inc., a St. Louis manufacturer of electronic wiring and components, says the importance of a package's training increases in proportion to the number of users. "If you purchase a large manufacturing system for use in 10 plants and everyone in those plants needs to know how to use that software, training will be an integral part of implementation," says Snyder. "However, if the package will be used by only six employees in the entire organization and the software does what it's supposed to, the quality of the training is insignificant."

Although training may be a secondary consideration, it should not be disregarded. In some cases, bundled training (training that's included with the package) is the only instruction users will receive, especially with microcomputer software. "It's difficult to get all the users together for a training session," says William Hammer, "and it's hard to hold everyone's attention because each user needs the package for a different application." In contrast, bundled training "walks users through the fundamentals and builds up their confidence in their ability to use the software."

There are several ways to test the quality of a product and its training. When buying personal-computer software, Hammer pools information from several sources. He reads reviews in the computer magazines. He gleans similar information from subscription services such as McGraw-Hill's Datapro Research Corp. Some micro-software vendors now offer demonstration disks of their packages, but Hammer believes the pared-down copies are too abbreviated to accurately represent the package's offerings.

The most reliable feedback on the quality of a training program is the testimony of past and current users. "We always try to get a user reference,"

Hammer says. Because vendors generally refer potential buyers to satisfied customers who will enthusiastically endorse the product, Hammer independently seeks out users. He's also discovered invaluable contacts through professional associations and several user groups. "Our independent auditing firm has also helped us by giving us the names of its clients who have used packages we're interested in," says Hammer.

Duriron routinely quizzes users about the software's documentation as well as its performance. "Our main criterion is if most users—whether they're data-processing professionals or end users—find the training program comprehensive and easy to use," says Hammer.

Vendors take an active interest in training programs because they want their products used successfully. "We want to help users be more productive," says Kathy Groll of Dunsplus. "We consider training part of the product."

Buyers of Dunsplus systems receive stand-up instruction that explains the particular IBM computer (be it a Personal Computer, PC XT, or PC AT), the Lotus 1-2-3 and Multimate packages, which are included, and Dunsplus' own front-end software, which lets users bypass DOS commands and work with the system by using only a series of menus. The instruction level varies according to the student's expertise. There are beginner, advanced, and managerial-level courses. Telephone support is included free of charge and "there's plenty of online help included so users don't have to refer to the documentation too much," says Groll.

Vendors provide product support

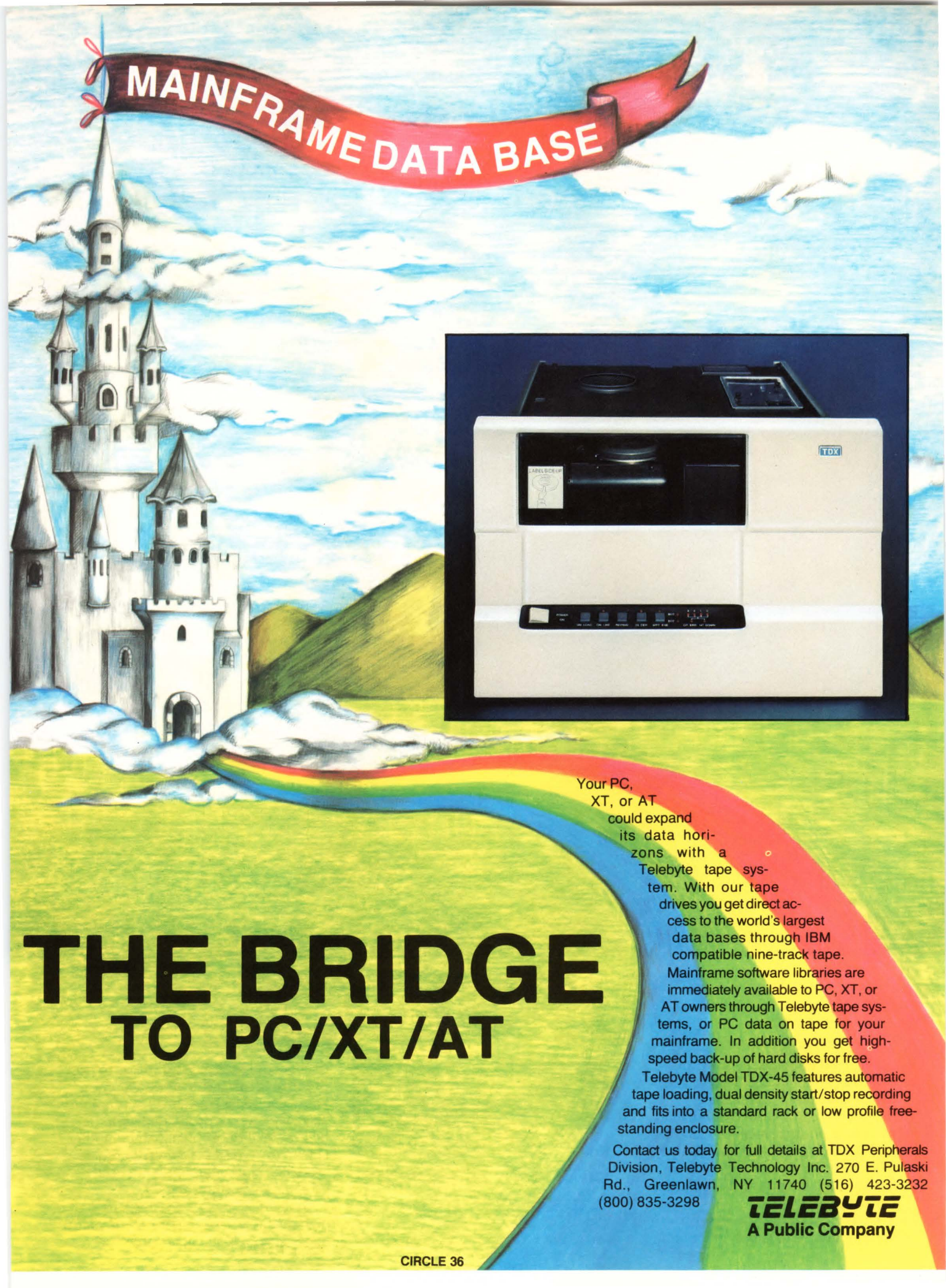
**Software for
dp professionals
may be less
critically judged
than software for
novices.**

through a variety of media—tutorial diskettes, documentation, stand-up instruction, and books. Although some vendors offer instruction only because their customers expect it, others take it much more seriously. Lotus, for example, teaches retailers how to use its software because "they're the front line for our products," says Rick Treitman. Lotus and Addison-Wesley Publishing Co. jointly publish the Lotus Learning Series of books. Dunsplus has developed similar educational products, such as computer-based training (CBT) for Dunsplus units, which are sold separately from its mainstay software packages and turnkey systems. "Education is more than just adding another bell or whistle to a product," Groll says.

Information Builders offers CBT courses for Focus users plus a full curriculum of training courses for students ranging from the novice to the experienced user. Every organization that purchases Focus is entitled to at least three days of stand-up instruction plus seven more days of either stand-up instruction, consulting, or applications development, or a combination of the three. Wszolek estimates that his company trained about 45,000 users on the program last year. Information Builders also grooms users who wish to become qualified Focus trainers.

Although offering training with software packages isn't new, says Wszolek, both buyers and sellers are more concerned with the quality of training than ever before. "Hardware and software prices have dropped, but the cost of human resources has increased," says Wszolek. "You don't want highly paid employees sitting around because they don't know how to use the equipment."

Kathy Groll agrees that users and vendors now have a greater understanding of the importance of adequate training. But Groll believes that vendors are even more aware of this need than users are. "I'm not sure the average corporation fully understands how much user training affects the return investment on their micros," says Groll. Expensive, complicated equipment can only be used to its full potential if its users are receiving the best training vendors can provide. □



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OUTSTANDING DATA CENTER

WESTLAKE SERVICE CENTER



FCA Computer Services, located in Conejo Valley, CA, has transformed two vacant, concrete buildings into a highly sophisticated data-processing center. The buildings, which were already under construction when FCA bought them, were originally intended for light manufacturing. Within a few months, FCA had turned the two shells into the modern Westlake Service Center.

This \$7 million complex totals 62,600 square feet. About one third of Westlake is dedicated to computer operations and immediate support systems. The center houses an IBM 3084-Q64 and IBM 4341-12 mainframes, as well as Burroughs 4890 and 3890 processors, and supports a network of



The redwood floors, plants, and onyx sculptures that adorn Westlake Service Center's reception room (top) balance the hi-tech design of the two-building complex. Wooden bookcases (above) by Van Breda Design Associates contain reference manuals.

over 1,000 IBM terminals. FCA's 208 employees process commercial and residential loans and various financial applications for FCA's parent company, American Savings & Loan, which is the nation's largest savings and loan with assets of more than \$22 billion.

One unique feature at Westlake is its "flexible power drops," designed by Van Breda Design Associates (VBDA) of Los Angeles, the company that designed the interior of the center. "We attached our own flexible power drops to the ceiling," says Bob Van Breda, president of VBDA. "These drops aren't rigid—they have slack in the coil so a workstation can be moved, if necessary. The flexible power drops are also visually interesting, practical, and

OUTSTANDING



Westlake Service Center has 12 IBM 3420 tape drives, and 12 Burroughs 9495-23 and 9495-22 tape drives (above). Color-coded tapes identify stored information. Tapes, which back up data stored on disks, also provide an economical means of transferring information between computers.

extremely economical."

The coiled flexible drops were also successful in solving a sticky installation problem. "If it weren't for the flexible drops we would have been forced to cut holes in the concrete floor to run cables for telephone, crts, and electrical power. This would have been very expensive. And, more importantly, it never would have worked," says Van Breda. "There wouldn't have been any office mobility—employees would have been married to their workstations. We probably would have ended up removing the whole concrete floor."

The computer room, designed and constructed by Computer Facilities Services Group, Cypress, CA, is protected by strict security measures. Fire-

(Continued on page 78)



DATA CENTER



To avoid breaking through the concrete floor of the office when installing cables, Westlake Service Center hung coiled 3-inch flexible piping from the ceiling (below). These "power drops" supply telephone connections and power to each workstation. The diagonal layout can be repositioned to create space for additional workstations.



Dave Van Lear, president of Westlake Service Center, and Edward Schoonover, general manager (left), discuss plans for the center. Salman and Herman Miller supplied the furniture for the executive offices.

The center offers training on the various systems and equipment to programmers, operators, service clerks, and branch tellers. At left, programmers work on IBM 3279 terminals connected to an IBM 3084 mainframe.

OUTSTANDING



The network control center (above) is the nucleus of the Westlake Service Center. It serves as a focal point for such equipment as the IBM 3084-Q64 and 4341-12 mainframes. Operators in a glass-enclosed, soundproof room, have a clear view of all hardware.

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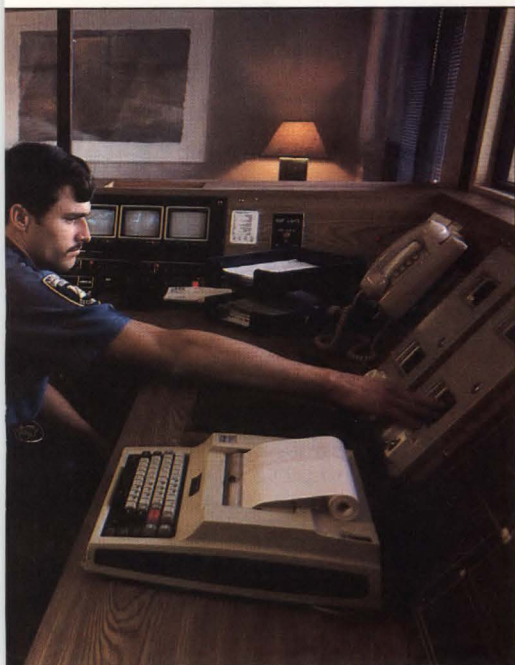
Word processors
CPT
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Circle 526



DATA CENTER



Fail-safe is a microcomputer system supplied by International Power Machines (below). It monitors the UPS systems, tracking component failures and power losses or failures. Fail-safe also monitors the air-conditioning units and sprinkler system in the computer room.



Eight 3395-20 Burroughs tape controllers (left) monitor and control the passage of information between the Burroughs 4890 and 3890 processors and the Burroughs tape drives.

A guard station (left) located near the reception room is equipped with a camera network from Javelin Electronics, which enables guards to monitor the entire complex. Fifteen discretionary access levels used in the data center have alarms connected to the guard station.

OUTSTANDING DATA CENTER



Although Westlake Service Center provides dp services for a very number-oriented business, word-processing applications are also extensively used (left). User charts, documentation, and policy and standards manuals are prepared in the word-processing department. Word processors, supplied by CPT Corp. (models 8520 and 8100), share memory.

The central room (below) houses an IBM 3084-Q64, and 4341-12 mainframes. Burroughs 4890 and 3890 processors are also utilized, but management plans to have applications that run on the Burroughs systems converted to IBM systems. Carpeting in the computer room, supplied by Lees, prevents the buildup of static and absorbs sound.

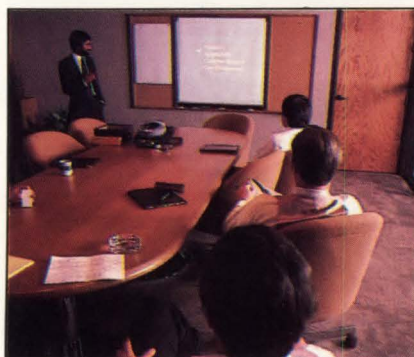


(Continued from page 74)

protection equipment includes a Halon 1301 gas system. Twenty-four hour surveillance, discretionary access levels, and man traps provide continuous security.

The building that houses the computer room was completed and occupied in September 1983. The adjacent building, with 30,000 square feet of executive and administrative office space, was occupied six months later.

When the facility was first planned, FCA considered either moving its scattered dp operations into a conventional office space or purchasing the two unfinished buildings. "FCA saw the potential of the two concrete buildings and be-



Benedetti, located in Los Angeles, furnished the conference room. A custom-designed bulletin board comes equipped with erasable whiteboard, a projection screen, and a paper pad.

lieves the acquisition has paid off," says Van Breda. "Moving into a conventional office building would have entailed cementing up all the windows surrounding the computer room and replacing the windows with bullet-resistant glass. By restructuring these two buildings, Westlake Service Center faced fewer design restrictions and gained space."

The architectural and spacial design of the center is sensitive to employee comfort. To compensate for the lack of windows, VDBA designed "inside-out" offices that face the center of the building where redwood-framed skylights and many plants and greenery give an "open space" effect. □

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MIS ON THE ATTACK

Information systems can be strategic weapons, but you may have to persuade the brass that a hot new project is worthwhile.

by David Roman, Associate Editor

An innovative strategic information system can yield a powerful competitive advantage for an organization. Its implementors may also win recognition, but these accomplishments cannot become a reality until opposition to the new system is quelled.

"A system is strategic if it's related to the strategy of the business or helps to carry out that strategy," says David Robinson, a vice president with Index Systems Inc., a management consultancy in Cambridge, MA. Such systems are most effective when they reduce a corporation's production costs and allow it to undersell the competition, or when they help it introduce an appealing new product or service ahead of the opposition. "Merrill Lynch achieved a significant 'first-mover' advantage with its Cash Management Account (CMA) and the competition has been trying to catch up ever since," notes Gregory Parsons, a professor for the school of business at the University of Southern Maine in Portland.

The strategic use of information systems is no longer a foreign idea to managers. "Management is becoming aware that information technology can be used for uses other than the traditional backroom data-processing applications," says Kevin Moody, the director of systems planning and research



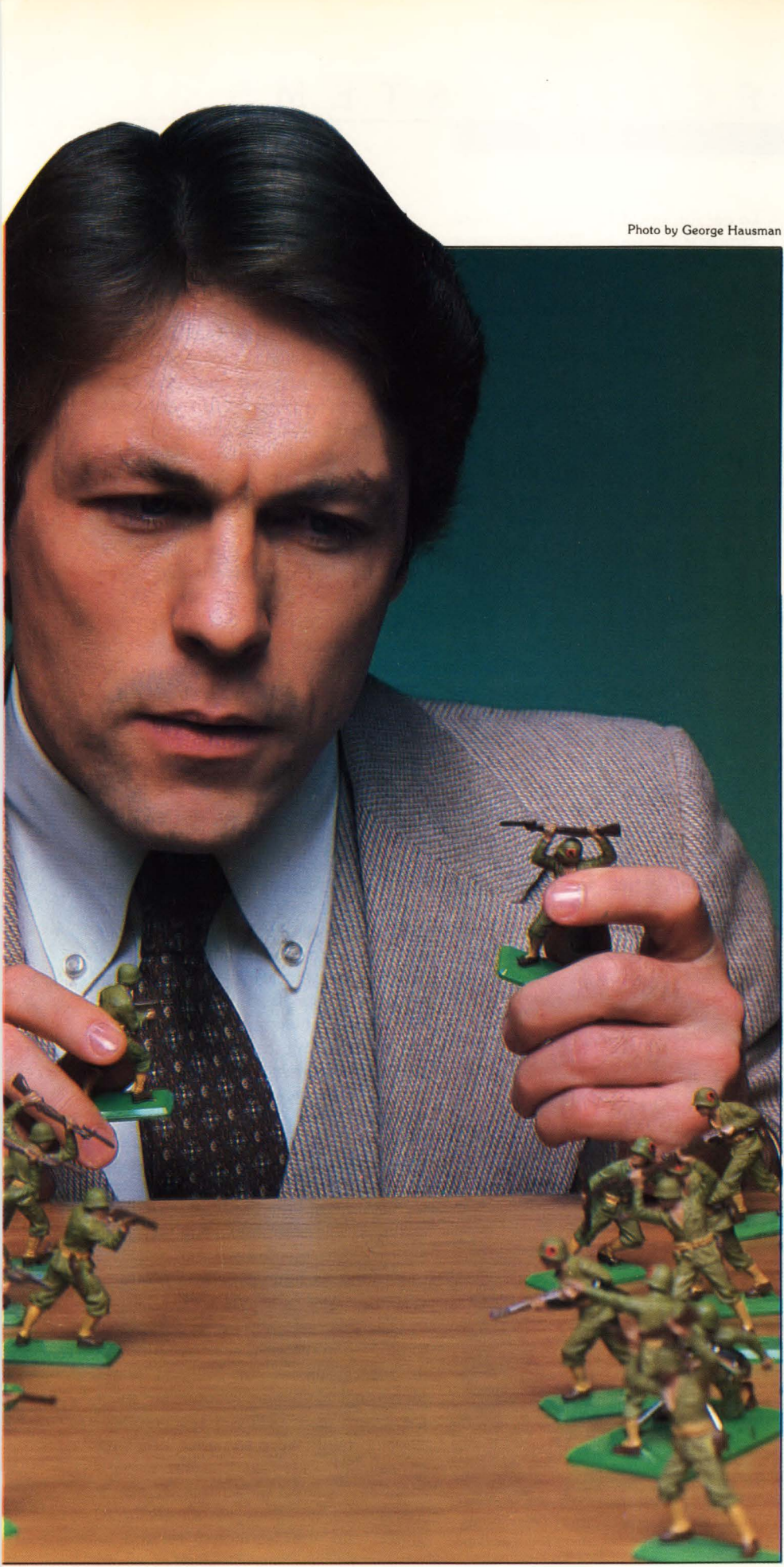
A close-up photograph of a man with dark hair, wearing a light-colored suit jacket, a white shirt, and a dark patterned tie. He is looking down with a focused expression at several small green plastic toy soldiers on a wooden surface. He is holding one soldier in his right hand, and another is in his left hand. Several other soldiers are scattered on the table in front of him. The background is a solid dark green color.

Photo by George Hausman

for Gillette Co. of Boston, the manufacturer of personal-hygiene products.

Eugene Bedell automated meat processing in the mid-1970s when he was a divisional vice president for Iowa Beef Processors of Dakota City, NE. "The computers let us surpass the competition by lowering our manufacturing costs and improving the quality of our beef," Bedell recalls. The success of Bedell's effort was one of the reasons he was elected to the corporation's board of directors. When he moved to FMC Corp., Chicago, to serve as the diversified manufacturer's director of corporate MIS, he put information systems to work improving customer service and controlling the working capital. "Strategically, these factors were intrinsic to the business' success," he says. Bedell has since moved on to First Boston Corp., the New York-based investment house, as vice president and manager of information services.

Although some corporate managers appreciate the value of strategic systems, others need convincing. For example, before the First National Bank of Florida introduced its automatic-teller-machine (ATM) network in 1977, proponents of the strategic system faced internal opposition. The ATM system had been proposed by a five-member investigating committee that had been appointed by T.L. Ekman, the Tampa-based bank's chairman. Although Ekman recognized the technology's potential to transform banking practices, the committee was alone in its vision of the ATM system as a potential strategic advantage.

There were logical reasons for the bank management's reluctance to commit to the ATM project. Implementing these systems can be technologically, financially, and strategically risky. "ATMs had been around for several years at that point, but they hadn't been widely accepted by the public," remembers Fred Dobbins, a senior vice president for the bank. "Management was hesitant to invest the capital and employees necessary to bring the system up. Our original expenditure of about \$450,000—while not overwhelming—caused management to

question the recommendation."

Aside from the big investments required to develop and implement a strategic system, some systems can change a business's relationship with its customers, a possibility that worried many banks considering ATM networks during the mid and late 1970s. And, if a strategic system is groundbreaking—as was Merrill Lynch's CMA—it will be peerless, without a counterpart in its own organization or any other. With a totally untried system, the prospect of failure looms large. "If you're developing a strategic system, there's no guarantee it will work, and you can't calculate a return on investment," says David Robinson. "You can't prove the system's value until it's in place."

MIS/dp managers are well suited to lead an organization's development of strategic systems, yet Robinson believes that finding an appropriate strategic system for a business is easier than finding support for it. "It takes twice as much time and effort to get upper management to agree to a strategic system than it does to come up with the original idea," he says. "Many MIS managers don't clearly understand that."

To get the brass to consider the use of strategic systems, Robinson says MIS/dp managers must raise its awareness. "You can start by passing pertinent magazine articles along," says Robinson. "If you have a steering committee, make presentations. Tell it what the competition's doing. Before long, the brass will see the light." Executives accustomed to dp systems that handle day-to-day operations—such as order entry, accounting, and monitoring inventory—will understandably have difficulty conceiving of these same systems as competitive weapons.

It takes time to clear away such cautiousness and skepticism. First National Bank of Florida went through an exhaustive justification of the ATMs, projecting a reduced demand for tellers and additional branches. "We showed there was a break-even point on the system at a certain level of usage," Dobbins says. "And if usage exceeded that level, it was reasonable to expect a very high return." But management remained unimpressed until the committee dropped its promotion of the ATM as a product aimed at the individual bank customer and concentrated on portraying it as a service that could be offered to smaller banks.

First National was not the only Florida bank to offer ATM systems and data-processing services to smaller banks. But other banks in the state had decided they would no longer offer dp services to any bank that wasn't a member of the same holding company. This decision reduced First National's competition for providing dp services to smaller banks. The remaining competitors were strictly dp-service vendors.

The independent banks First National targeted as users of the ATM service were ideal customers because they were prime candidates for other dp services. The ATM service would be an entree to the independents. When management realized the ATMs could attract customers, it finally grasped the strategic importance of them. The ATMs would be used as the bank's first line of assault to gain new customers.

The process of winning over management is evolutionary rather than revolutionary, according to Kevin Moody at Gillette. It should start early—don't wait until you have a strategic proposal to begin a management-education program. By starting early, you won't have to put an idea for a strategic system on the back burner while trying to convince management a project has merit. This is especially important if your system is to provide 'first-mover' advantage.

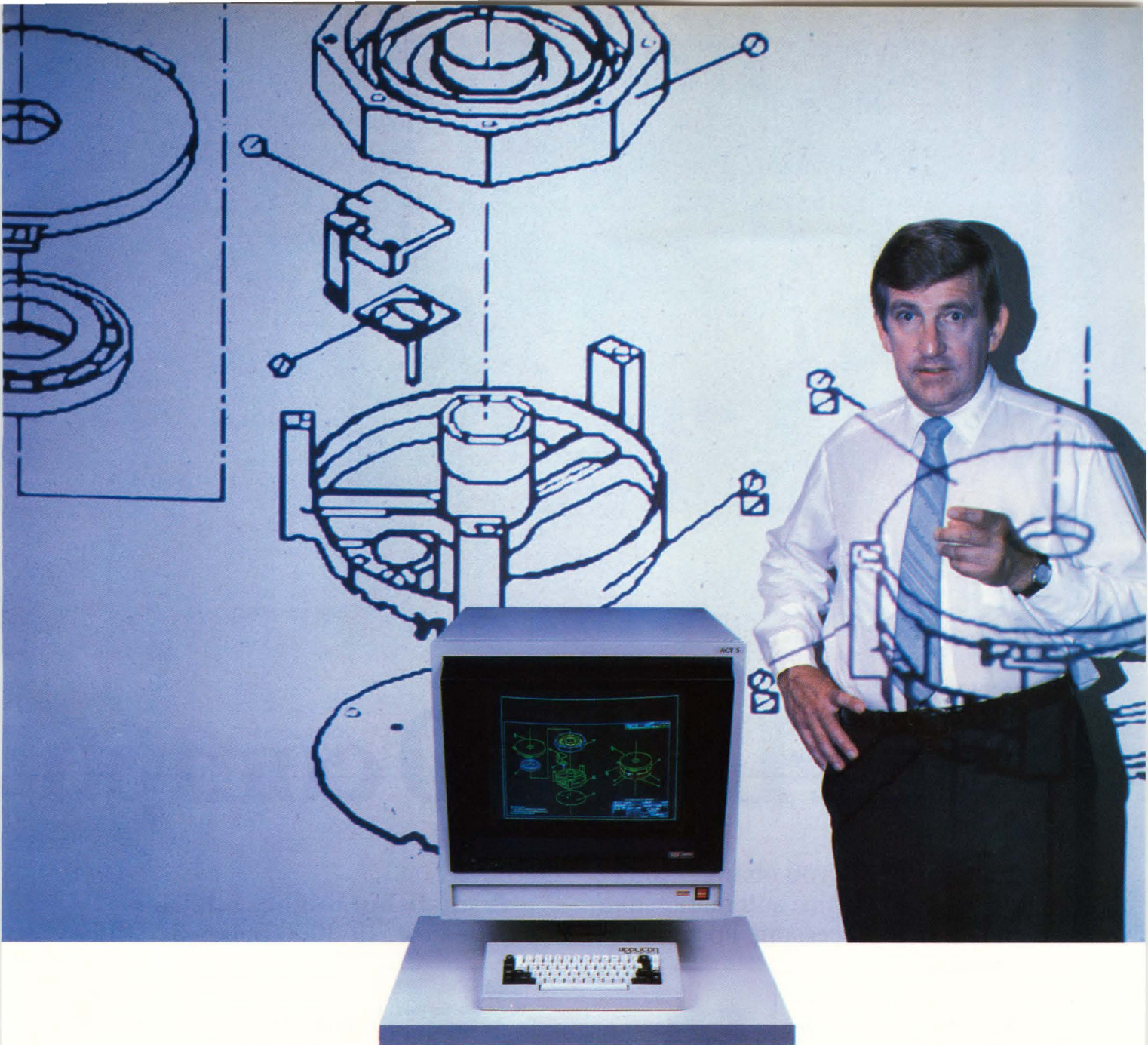
Gillette didn't have any particular strategic system in mind when it began its executive-awareness program on the strategic possibilities of information systems. Consultants and speakers were brought in to brief senior management on the changes in information technology and the implication of those changes. The company's ongoing training program encouraged management to expand its notions of how strategic systems might be used.

Gillette's educational process also expanded management's conception of its responsibilities for bringing about technological change. Moody says most managers once believed technological developments were someone else's responsibility—such as the dp department's. "Today Gillette tells its senior managers: 'It's your responsibility to understand the technology-related is-

(Continued on page 86)



Fred Dobbins, a senior vice president at the First National Bank of Florida, is pictured here. After an exhaustive campaign, Dobbins' committee was able to convince top management to support an automatic-teller-machine network.



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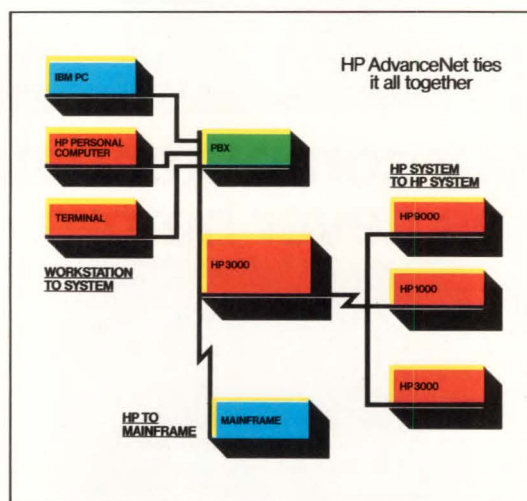
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HEWLETT PACKARD

(Continued from page 82)

sues, and to accept the responsibility for incorporating them into your business decisions," Moody says. "It's no longer a task senior managers can delegate away."

Just as general management must grapple with dp concepts, so must dp be willing to understand business issues. "There has to be accommodation on both sides," Moody says. "Dp has to understand the market issues business management faces."

Mutual understanding becomes particularly important after a strategic system is implemented. At that point in the project's evolution, it's important to build a cooperative organizational effort because a strategic system may alter standard operating procedures. For example, information may be handled differently because responsibilities for dp systems may extend to non-dp managers. Also, the additional employees supporting the new system may rearrange dp's pecking order. If an organization forms a cooperative effort to



Photo by Rick Friedman

Dave Robinson, a vice president of Index Systems Inc., Cambridge, MA, strongly believes that MIS/dp managers should teach top management about the benefits of strategic systems.

understand, develop, and direct a strategic system, it will be easier for all employees involved in the project to respond to these changes.

Without teamwork, a strategic-systems project may suffer unnecessary problems. The marketing department of Dayton's, a 13-store retail chain headquartered in Minneapolis, had an idea for an automated bridal registry, but instead of wrangling with its own dp department, it developed the system without the department's help. "We knew if we went behind their backs, we'd get it done faster," says Stacy Fure, the computer marketing manager for Dayton-Hudson Department Store Co., the chain's parent.

With the help of third-party vendors, the marketing department got the system up. It was an instant success, thereby undercutting any future opposition from management. (Even the slighted dp department was excited about it.) Shoppers looking for wedding gifts could call up the bride-to-be's wish list on an easy-to-use terminal to find out which items hadn't been purchased. The system worked like a charm—until orders mounted. The system developed by third-party vendors couldn't

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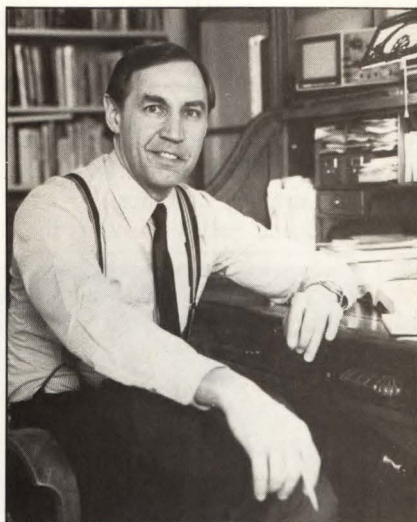
STRATEGIC SYSTEMS

handle a large number of customers. "Over the lunch hour, when the stores were busy, the system's response time was very slow," concedes Fure. The last thing busy customers want is long waits to complete purchases. To keep up with the demand, Dayton's developed a more powerful system—this time with the help of its own data-processing personnel.

The second system remedied the deficiencies of the first, and was equally successful with shoppers. So Dayton's went ahead and developed another touch-terminal system—the Stork Club registry for expectant mothers to record the items they needed. Just as with the wedding registry, buyers could call up the gift list to help them decide what gifts to purchase.

The Stork Club was such an innovative project that it caused problems. Unlike a bridal registry, most of the public was unaccustomed to an infant registry.

Dayton's found that expectant mothers were easy to reach—easier to



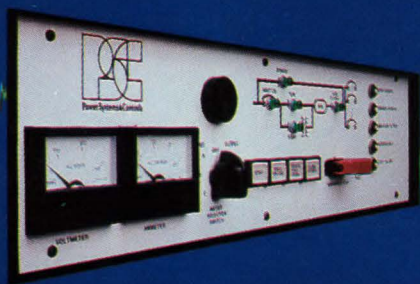
Eugene Bedell, who automated meat processing when he was a divisional vice president of Iowa Beef Processors of Dakota City, NE, went on to become vice president and manager of information services at First Boston Corp., a New York-based investment house.

reach than the gift buyers. Local hospitals allowed store representatives to speak to prenatal training classes. Incentives—such as a free gift for regis-

tering mothers—also helped. To reach shoppers, Dayton's relied on advertising and word-of-mouth. Also, the display floors where the terminals were located were decorated. Dayton's biggest promotional effort for the Stork Club has been three-to-four-day "events" featuring the infant registry service. Nonprofit groups such as hospitals and vendors selling products for children or for child care distributed information and made presentations. Fure says this program will be repeated annually.

American Hospital Supply Corp. of Evanston, IL, a distributor of health-care products and medical equipment, has also improved customer relations thanks to its new strategic system, ASAP (Analytical Systems Automated Purchasing). ASAP provides automated order entry to hospitals and medical laboratories that purchase supplies and equipment from American Hospital. Customers that chose to use the system were "groundbreakers," says Robin Wienke, manager of man-

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agement-systems consulting in the information-services division of American Hospital.

American Hospital has worked hard to make this change trouble-free. All customers had to do was find a communications device to hook to ASAP, whether a terminal, a microcomputer, or a teletype device. American Hospital supplied everything else free of charge. When ASAP was introduced during the mid-'70s, the benefits to American Hospital were substantial. "When customers placed an order, we could guarantee which items would be delivered in the next shipment," says Gail Gulinson, vice president of American Hospital Systems, a marketing group within the corporation. "That sounds simple, but it was a tremendous help to our customers. They were ecstatic." ASAP enabled buyers to reduce their inventories because they were better able to get a handle on their buying patterns so American Hospital could send supplies as needed.

American Hospital has also made the system flexible enough to be customized to each buyer's operation. The supply corporation cross-referenced the system so the hospitals and labs could use their own code numbers for the items they ordered. A toll-free hot line and a consolidated ordering system, which lets each hospital use one purchase order to buy items from different divisions of American Hospital, further simplified procedures.

Although strategic systems create change in an organization, customer-business relationships don't have to be altered. A strategic system can function strictly behind the scenes. Sears, Roebuck and Co., the nation's largest retailer, uses information systems to track down customers who buy appliances. If a shopper buys several appliances over a period of time without purchasing any service contracts, Sears contacts the customer to offer a package service-contract deal. The customer-business relationship remains unchanged, but the system may sell service contracts—and generate revenues—for the Chicago-based giant.

Corporations that install strategic systems risk customer rejection, an indefinite return on investment, and the

substitution of new, untested procedures for those already in place. However, consultant David Robinson believes the word "risky" is an overused excuse to avoid developing strategic systems. "Risk is inherent in any business strategy," he says.

Eugene Bedell discounts the risk of

developing a strategic system. "The risk is fairly limited if the system's never been tried before—if it fails all you've lost are the development costs," says Bedell. "That won't be much as long as you don't jump whole hog into a system that's never been tried. And if you go with a limited prototype, you only

The advertisement features a blue background with a grid pattern. On the left, the word "COMPUTER" is written vertically in large, outlined letters. In the center, there are several pieces of equipment: a large blue cabinet labeled "PROGRAMMED POWER" and "75KVA", a smaller blue cabinet, and a white computer terminal with a monitor and keyboard. On the right, there is a large white cabinet labeled "Liebert". The text "SUPPORT SYSTEMS" is written in large, outlined letters at the top right. At the bottom, the text "One source for: Precise environmental control... Power protection selection... Full System surveillance..." is written in white. The Liebert logo, which consists of a stylized flame or drop shape, is followed by the word "Liebert" in a bold, sans-serif font. In the bottom right corner, the text "CIRCLE 43" is written.

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risk a failed system, which is insignificant once you realize that the payoff for such a system can be enormous."

There is less risk in basing a strategic system on one that already exists than venturing out on your own, says Gregory Parsons. "Risk cannot be eliminated, but it can be managed," says Parsons.

"If no strategic systems exist in your particular industry, look for ones being used in similar industries for comparison."

An innovative strategic system has the potential for greater success—and for greater failure—but imitative systems can also be strategic. "Many busi-

nesses make reactive strategic changes in their systems just to remain competitive," says David Robinson. "They have to mimic someone else's system." Bedell insists there's no risk to developing an imitative strategic system—in fact, it's a matter of survival—if you don't keep up with the competition, you'll be out of business. Gail Gulinson says that ASAP's strategic system spawned a slew of imitators. "There probably isn't a competitor out there today that doesn't have some form of automated order entry," she says.

It's comforting for the less adventurous to know a system doesn't have to be developed overnight to be successful—it can progress slowly, step by step. Tests are also valuable. Once the test system is in place, its effectiveness can be observed and measured. Unfortunately, your competitors also get a chance to copy the system.

A test system doesn't have to bear a perfect resemblance to the final system to prove beneficial. Dayton's first touch terminals were used as promotional devices to draw shoppers into the store during the Christmas season. By pressing the correct items on a menu screen, customers could call up the gift list for the bride-to-be they were shopping for. The fact that customers readily accepted the system convinced John Pellegrine, senior vice president of marketing for Dayton's, that he could transform the chain's bridal registry to a touch-terminal system.

Pellegrine, who conceived the original touch terminal, also led the effort to develop the automated bridal and infant registries. After the success of the latter two systems, Pellegrine was rewarded with a promotion to senior vice president of marketing for Dayton-Hudson Department Stores, the parent company.

Successful pioneers have already conquered many of the greatest risks involved with implementing strategic systems. But each corporation will encounter its own obstacles when creating a strategic system. By providing upper management with a strong strategic education, you will win the battle within your own ranks, leaving you free to create a competitive strategic system. ☐

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JOINING MICRO TASKS

Integrated software packages piece together many functions, but all packages are not created equal.

by Ira S. Miller, Data Decisions

To paraphrase John Donne, no personal-computer application is an island. A spreadsheet can do calculations amazingly fast, but without text and graphics to explain and illustrate, a spreadsheet is often an unfathomable array of numbers. A graphics program can generate astonishing visual aids, but without significant data, the visual aids are nothing more than pretty pictures. Without relevant information from such tools as spreadsheets and database management systems (DBMSs), a word-processing program does little more than turn a micro into a fancy typewriter.

Enter integrated software for personal computers. Multi-function packages not only provide necessary applications like spreadsheets, word processors, and DBMSs, but they also allow easy movement of data from one application to another. Users no longer have to be bothered with auxiliary programs or file-transfer utilities to make data compatible among applications. With an integrated package, users can transfer data files and move between applications quickly and easily, making the micro a more productive and efficient business tool.

The dozens of multi-function packages available are all designed to achieve the same goal—to provide users with inte-



Photo by Bob Ward

grated applications. For most of the packages, the similarity ends there. Some of the critical differences between any two integrated packages are obvious, such as the kinds of applications the packages offer. Others aren't so apparent, but they can be crucial to managers shopping around for the right integrated-software system for their organizations.

One key difference between integrated packages is the extent to which applications are integrated. The most highly integrated applications are featured in "all-in-one" packages like Symphony from Lotus Development Corp. and Ashton-Tate's Framework. In an all-in-one package, applications act more like a single unit rather than separate entities. For example, all applications in Symphony are simultaneously loaded into a micro's random-access memory (RAM), and all are based on the package's massive spreadsheet, which measures 256 columns by 8,192 rows. Text created with Symphony's word processor is stored on the spreadsheet, as are database files, graphic images, and communications data. Features like cursor movement and text highlighting are executed with a spreadsheet-like command structure.

Although it is not based on any one application, Framework also provides an all-in-one approach via an outline format. The user organizes applications in sections, or "frames," using Framework's outline processor. For example, the user can create an outline that includes text, graphics, and database functions, and then move among the applications simply by moving up or down within the outline.

All-in-one programs are easy to use and accomplish the goal of software integration, but they do have drawbacks. All-in-one packages need vast amounts of RAM, limiting the size of working database and word-processing files, which are also stored in RAM. Symphony needs at least 512,000 bytes (512 Kbytes) of RAM to operate effectively. And although Framework's applications aren't simultaneously loaded into RAM, the outline processor makes

POWER MERGE

Framework highly dependent on RAM. A Framework user needs at least 384 Kbytes of RAM to operate the package successfully.

Another drawback of all-in-one packages is that the quality of an application is sometimes compromised to fit the package's interface. For example, although Symphony's spreadsheet is outstanding, operation of other applications is cumbersome because they are all based on the spreadsheet. Symphony and Framework allow the concurrent operation of a DOS program, so users who don't like the Symphony word processor can operate a more comprehensive program—like Wordstar from Micropro International Corp. of San Rafael, CA—with Symphony. But doing so means spending money for applications that won't be used

(in this case, Symphony's word-processing component) and negates one of the reasons for buying an all-in-one package.

Enable, the multi-function package from The Software Group, provides a way around the limitations of the all-in-one approach to software integration. Enable contains all the applications found in Symphony and Framework, but the applications operate as separate programs with different interfaces. Enable is not as easy to use as Symphony or Framework; the applications have different keyboard templates and function-key assignments, and they use slightly different commands. On the other hand, the applications aren't restricted by a common interface. Enable's word processor is not fit into the spreadsheet or any other application

interface, as with Symphony.

Enable's master control module provides an on-screen cut-and-paste facility to integrate applications. Instead of having to transfer files from application to application or open new files, users simply move on-screen data from one application to another. For instance, a user can place on-screen data from Enable's DBMS right into a spreadsheet, and then insert the spreadsheet into a document created by the word processor. The master control module provides up to eight separate on-screen windows; files can be marked and copied from one window to the next. The module also allows the concurrent operation of three functions: a main program, a print-spooling program, and communications.

(Continued on page 94)

COMPARING INTEGRATED PACKAGES

Communications Features	Apple Works	Aura	CA-Executive	Corporate MBA	Decision Manager	Electric Desk	Enable	Encore	Framework	Goldengate	Handle	Integrated-7	Intuit	Knowledge Man	Lotus 1-2-3	Open Access	Owl A-B-C	Personal Decision Series	Report Manager AV	Series One Plus	Smart Set	Supercalc 3	Symphony	III E-Z Pieces	T/Maker Integrated Software	20/20	Windowpack
Terminal emulation			•	•		•	•			•		•					•			•							
Micro-mainframe link			•	•	•	•				•		•					•	•		•							
Electronic mail					•	•	•					•				•	•	•									
Micro-micro communications			•	•	•	•	•		•			•				•	•	•		•			•				
Online-database access			•	•	•	•	•		•			•				•	•	•									
Asynchronous communications			•	•	•	•	•		•	•		•				•	•	•					•				
3270 support			•	•	•	•	•										•	•		•							
Programmable			•	•					•			•				•	•	•					•				
Selectable data formats			•		•		•		•	•		•					•					•					
Spreadsheet Features																											
Consolidation			•	•	•			•	•	•		•	•	•	•	•		•	•	•	•	•	•	•	•	•	
Range and cell naming			•	•	•			•	•	•		•		•	•	•		•	•	•	•	•	•	•	•	•	
Menu-driven command entry			•			•	•	•	•	•		•			•	•			•				•	•	•	•	
Command-line entry				•	•	•	•			•				•	•	•			•	•	•		•	•	•	•	
Split-screen feature	•					•				•		•								•		•		•	•	•	
Multiple windows				•	•		•		•		•				•	•			•	•	•		•	•	•	•	
Absolute and relative reference			•	•	•	•	•	•	•	•		•	•	•	•	•		•	•	•		•	•	•	•	•	
Financial operators	•		•	•	•	•	•	•	•	•	•	•						•	•	•	•		•	•	•	•	
User-selectable recalculation			•				•	•	•	•		•						•				•	•	•	•	•	
Save and print by range			•		•	•	•	•	•		•	•	•	•	•	•			•	•	•	•	•	•	•	•	

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CIRCLE 44

POWER MERGE

(Continued from page 92)

Most multi-function packages take a more modular approach to integration than do the all-in-one packages. One such modular system is Aura from Softrend Inc. Aura treats each of its applications—DBMS, word processing, spreadsheet, and graphics—as a separate module, but it allows data to be transferred among applications automatically or with minimal effort.

The modular setup gives Aura's applications powers similar to those found in single-function packages. Aura's

DBMS lets users create both file definitions and data-entry screens. The graphics application can create graphics using either data from other applications or manually entered data.

One critical element that Aura lacks is file transportability between its applications and outside applications. Most multi-function packages, including Symphony, Framework, and Enable, can use data from existing programs like Lotus Development's 1-2-3, Ashton-Tate's dBase II, and Micropro's Wordstar. Such a feature can be crucial

for organizations that want to switch from single-function programs to integrated packages.

Lack of file transportability is not a problem with the Smart Software Set from Innovative Software Inc. Each of the Smart Software Set's modules, which can be purchased separately or in a package, can convert files from popular single-application programs. The data manager can use files from both dBase II and The Information Manager from Compuflux Corp. of Nashua, NH. The spreadsheet, which

COMPARING INTEGRATED PACKAGES

DBMS Features

DBMS Features	Apple Works	Aura	CA-Executive	Corporate MBA	Decision Manager	Electric Desk	Enable	Encore	Framework	Goldengate	Handle	Integrated-7	Intuit	Knowledge Man	Lotus 1-2-3	Open Access	Owl A-B-C	Personal Decision Series	Report Manager AV	Series One Plus	Smart Set	Supercalc 3	Symphony	III E-Z Pieces	T/Maker Integrated Software	20/20	Windowpack
Relational		•	•				•			•		•	•	•		•					•	•	•	•	•		
Hierarchical				•									•														
General purpose			•	•			•			•		•	•	•	•	•	•	•	•	•	•			•	•		
Application generator		•	•				•		•					•		•		•									
Filer/data manager	•		•		•	•	•			•				•	•	•	•	•								•	
Data-entry screens	•	•	•	•	•	•	•		•			•	•	•	•	•	•	•		•		•	•	•	•	•	
Reporting facilities	•	•	•	•	•	•	•		•			•	•	•	•	•	•	•		•	•	•	•	•	•	•	
Custom reports	•	•	•	•	•	•	•		•				•	•	•	•	•	•		•		•	•	•	•	•	
Query language			•			•	•		•	•			•	•	•	•	•	•					•	•	•		
Index		•	•	•	•	•	•					•		•	•	•	•	•		•				•	•		
Sort	•	•	•	•	•	•	•		•	•		•	•	•	•	•	•	•		•	•	•	•	•	•	•	
Multiple index		•	•	•	•	•	•					•	•	•	•	•	•	•		•			•	•	•		
Multi-keyed sort	•	•	•	•	•	•	•			•		•	•	•	•	•	•	•		•	•	•	•	•	•	•	

Graphics Features

Business graphics	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Text/chart graphics	•	•		•			•	•	•	•	•	•	•													•
Spreadsheet input	•	•	•	•	•	•	•	•	•	•	•	•	•		•	•	•	•	•	•	•	•	•	•	•	•
Direct input	•	•		•			•	•	•	•	•	•	•				•									•
Bar graphs	•	•	•	•	•	•	•	•	•	•	•	•	•		•	•	•	•	•	•	•	•	•	•	•	•
Line graphs	•	•	•	•	•	•	•	•	•	•	•	•	•		•	•	•	•	•	•	•	•	•	•	•	•
Circle graphs	•	•	•	•	•	•	•	•	•	•	•	•	•		•	•	•	•	•	•	•	•	•	•	•	•
Area graphs				•	•		•		•	•								•		•	•	•			•	
High-low resolution				•						•								•		•	•	•				•
Multiple graphs				•	•				•	•					•				•							
Special fonts	•			•		•				•	•	•			•			•		•	•	•				•
Text manipulation	•		•	•				•	•	•	•	•					•			•	•	•				
Shape support	•	•				•			•	•	•				•		•			•	•	•				

POWER MERGE

includes graphics, uses Lotus 1-2-3 files. The word processor has a conversion utility for Wordstar files. In addition, the package can convert Data Interchange Format (DIF) and ASCII files.

The Smart series offers three levels of integration. Data integration allows data to be transferred among the three applications without having the programs interact directly. With the data-integration feature, a user can transfer data from the spreadsheet to the word processor without having to boot up the

spreadsheet program. Program integration gives users the option of running the applications together under a common interface, much like an all-in-one package. This third level of integration lets users operate the package's various applications without having to move from module to module.

The Smart series showcases the advantages that modular packages have over all-in-one packages, but it shows the weaknesses as well. Each application comes with its own hefty operating manual; users need extensive training

to master all the applications. Also, users who want to switch between applications face the problem of having to switch floppy disks frequently. Disk switching isn't a problem with all-in-one packages, especially those that have all applications simultaneously loaded in RAM.

Some modular packages go beyond offering integrated applications to also offer communications links between micros and mainframes. IBM's Personal Decision Series includes modules to link an IBM Personal Computer to IBM

COMPARING INTEGRATED PACKAGES

Components	Apple Works	Aura	CA-Executive	Corporate MBA	Decision Manager	Electric Desk	Enable	Encore	Framework	Goldengate	Handle	Integrated-7	Intuit	Knowledge Man	Lotus 1-2-3	Open Access	Owl A-B-C	Personal Decision Series	Report Manager AV	Series One Plus	Smart Set	Supercalc 3	Symphony	III E-Z Pieces	T/Maker Integrated Software	20/20	Windowpack
Word processor	*	*	*	*	*	*	*		*	*	*	*	*			*	*	*	*	*	*		*	*	*	*	
Spreadsheet	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*		*	*	*	*	*	*	*	*	*	
DBMS	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	
Graphics		*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	
Data communications			*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	
Software Compatibility																											
Lotus 1-2-3			*				*		*			*		*	*		*				*	*	*			*	
DIF	*		*			*	*			*					*		*	*	*	*	*	*	*	*		*	
dBase				*			*		*			*		*	*				*	*	*	*	*	*		*	
ASCII	*		*		*	*	*	*	*	*		*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	
Wordstar				*			*		*					*		*	*	*	*	*	*			*		*	
Data Exchange/General Features																											
Data exchange via separate menus			*			*		*																		*	
Multiple windows or split screen			*	*	*	*	*		*			*	*		*				*		*		*		*	*	
Hard-disk supported	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	
Menu driven	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	
Word-processing Features																											
Foreground/background printing						*			*		*					*	*									*	
Multiple-document editing				*	*	*			*	*		*	*						*	*		*			*	*	
Text-edit capacity	*		*	*	*	*	*		*	*	*	*	*			*	*			*	*			*	*	*	
Mail merging		*	*				*		*		*	*	*		*	*	*					*		*	*	*	
Spelling checker			*								*		*			*	*	*					*	*	*	*	
Automatic reform	*		*		*	*	*		*	*	*	*	*		*	*	*	*	*	*	*	*	*	*	*	*	
Undo feature					*	*			*	*	*	*	*		*	*	*			*	*		*	*	*	*	
Boldfacing	*	*	*		*	*	*		*	*	*	*	*		*	*	*	*	*	*	*	*	*	*	*	*	

mainframes or System/36 minicomputers. Goldengate from Cullinet Software connects to Cullinet's mainframe Information Data Base (IDB) and, through IDB, to its IDMS/R mainframe database or to similar databases, such as IBM's IMS. Information Builders of-

fers PC/Focus, a micro version of Focus, the fourth-generation mainframe language and DBMS. Although PC/Focus lacks some important features, such as a spreadsheet and graphics, its ability to link to mainframes and to use the Focus user interface and files

warrants consideration. PC/Focus lets users access a number of mainframe files and systems, including QSAM, VSAM, IMS, IDMS, Total, Adabas, Model 204, and DL/1.

Despite the advantages that integrated software holds over single-application programs, many managers may be reluctant to drop packages that have served them well and that are familiar to users. Installing an integrated software system means not only purchasing new software, but also retraining staff, converting data files, and changing methods of operation.

Two new software packages hold the promise of equipping existing single-application programs with integrated software features: Quarterdeck Office Systems' Desq and IBM's Topview. Desq provides a common interface between application and operating system, and between application and user. It can run most programs that operate under version 2.0 of MS-DOS.

As each application is started under Desq, it is placed in its own window. Information from any open window can be marked and then transferred either to another application or to another part of the same application. Up to nine windows may be open simultaneously, although only one actually executes at a given time.

Desq saves micro users the pain of learning to use new application software, but at a price. Because Desq requires 256 Kbytes of RAM, users will need to equip their micros with a full 640 Kbytes to run most business applications. Even with 640 Kbytes, some of the more powerful spreadsheets will be limited by Desq. And although Desq comes on four floppy disks, micros without hard disks will not run the program effectively.

Like Desq, IBM's Topview promises to provide users with the ability to integrate dissimilar products. Scheduled for release during the first quarter 1985, Topview gives users an operating environment in which they can easily switch from application to application. Topview also offers multi-tasking, a feature that Desq lacks. However, ordinary PC-compatible programs must be customized to use Topview's multi-tasking feature. Topview's RAM re-

INTEGRATED SOFTWARE

Vendor	Package*	Price	Circle
Access Tech. (617) 655-9191	20/20	\$495	465
Alpha Software (617) 229-2924	Electric Desk	\$345	466
Apple Computer (408) 996-0101	Apple Works ¹	\$250	467
Ashton-Tate (213) 204-5570	Framework	\$695	468
Computer Assoc. Int'l. (516) 333-6700	CA-Executive	\$1,295	469
Context Mgt. Syst. (213) 378-8277	Corporate MBA	\$895	470
Cullinet Software (617) 329-7700	Goldengate	\$795	471
Datamension (312) 564-5060	Report Manager AV	\$495	472
Executec (214) 239-8080	Series One Plus	\$495	473
Ferox Microsyst. (703) 841-0800	Encore	\$695	474
Haba Syst. (213) 901-8828	III E-Z Pieces ¹	\$295	475
Handle (916) 583-7283	Handle ²	\$1,995	476
Information Builders (212) 736-4433	PC/Focus	\$1,595	477
Infotym (408) 446-7366	Tym IV	\$495 to \$895	478
Innovative Software (913) 383-1089	Smart Set	\$895	479
IBM (Contact local sales office)	Personal Decision Series	\$250 to \$1,450	480
	Topview	\$149	
Lotus Development (617) 492-7171	1-2-3 Symphony	\$495 \$695	481
Martin Marietta (301) 982-6500	It Software Series	\$450 to \$3,125	482
Micro Data Base Syst. (317) 463-2581	Knowledge Man ³	\$500	483
Mosaic Software (617) 491-2434	Integrated-7	\$695	484
Noumenon (415) 521-2145	Intuit	\$90	485
Owl Software (818) 989-0883	Owl A-B-C	\$240	486

*All packages run on IBM PC only, except as noted: ¹Apple ²Bell Labs' Unix ³IBM PC and CP/M-80.

INTEGRATED SOFTWARE

Vendor	Package*	Price	Circle
Quarterdeck Office Syst. (213) 392-9851	Desq	\$399	487
Peachtree Software (404) 239-3000	Decision Manager	\$625	488
Softrend (603) 898-1777	Aura	\$595	489
The Software Grp. (518) 877-8600	Enable	\$695	490
Software Products Int'l. (619) 450-1526	Open Access	\$695	491
Sorcim/IUS (408) 942-1727	Supercalc 3	\$395	492
Structured Syst. Grp. (415) 268-1488	Windowpack	\$495	493
T/Maker (415) 962-0195	T/Maker III ³	\$450	494
Xanaro Tech. (519) 746-1645	Ability	\$495	495

*All packages run on IBM PC only, except as noted: ¹Apple ²Bell Labs' Unix ³IBM PC and CP/M-80.

quirement (512 Kbytes) may also pose problems for users of RAM-dependent programs.

The right integrated-software system can help a department's micro users operate more effectively and efficiently. The dozens of integrated packages now available offer a variety of integration alternatives to suit most organizational needs. Sifting through the alternatives will help managers find the package that's right for their organizations' needs. □

Ira S. Miller is an editor and analyst at Data Decisions. This article is based on hands-on laboratory tests and evaluations conducted by Data Decisions and published in Microcomputers, a three-volume, monthly updated information service that covers micro hardware, software, and peripherals. Additional information on Microcomputers is available from Data Decisions, 20 Brace Rd., Cherry Hill, NJ 08034, (609) 429-7100.

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CIRCLE 45

INTUITION: THE VOICE OF SUCCESS?

When making decisions, listen to your "inner voice." It may be whispering secrets to success.

by Martin Lasden, Western Editor

It's almost embarrassing for executives to talk about the power of intuition. Such talk goes against the grain of what hard-headed management is supposed to be about: pure unadulterated logic—no messy emotions, no leaps of faith, no capricious judgments. Yet time and time again, the role of intuition has been cited as a critical factor to success.

Whether you're trying to decide which strategy to pursue, which vendors or employees to depend on, or how to solve a technical problem, the whispered voice of intuition may call, trying to move you in strange and mysterious ways. Should you listen? First, try to get some hard evidence to back up your feelings. Running with a hunch without the benefit of supporting evidence, especially when much is at stake, can be like jumping out of a plane without a parachute. If disaster

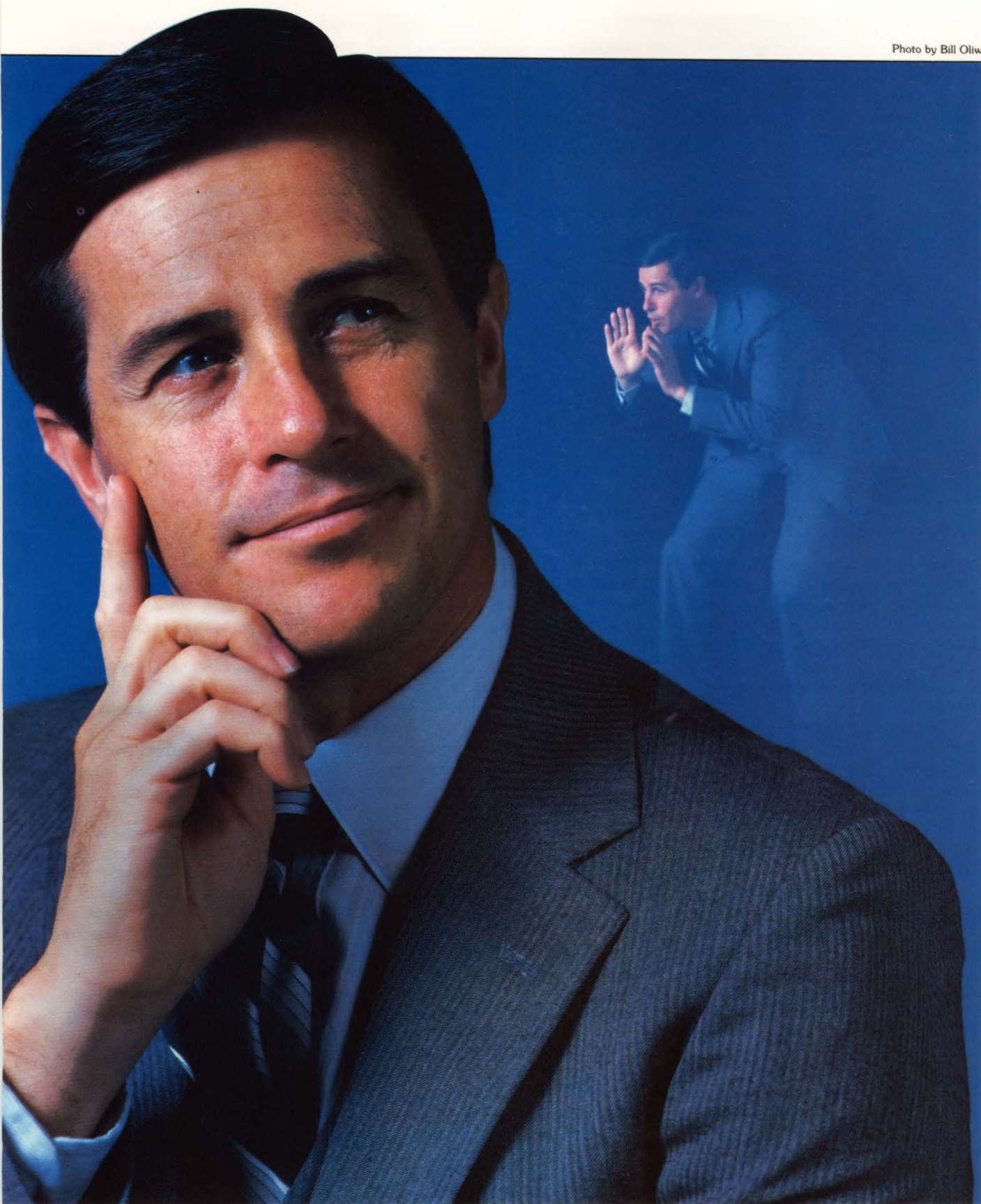
strikes, imagine trying to explain your errors by telling your boss that your actions were prompted by a "gut feeling."

For executives heavily involved with computers, there is a paradoxical twist to the role of intuition in decision-making. Computers are governed by precise logic. Yet it is the onslaught of computers on organizations that has engendered the conditions under which intuitive thinking becomes most valuable: conditions such as fast change, turmoil, and leaps into the unknown. Faced with these conditions, managers may find intuition to be their best resource for decision-making.

Henry Mintzberg, a well-known authority on business management at McGill University, Montreal, alluded to intuition in 1976 in an article in the *Harvard Business Review*. He wrote: "The evidence here is that a great deal of the



Photo by Bill Oliwa



INNER VISIONS

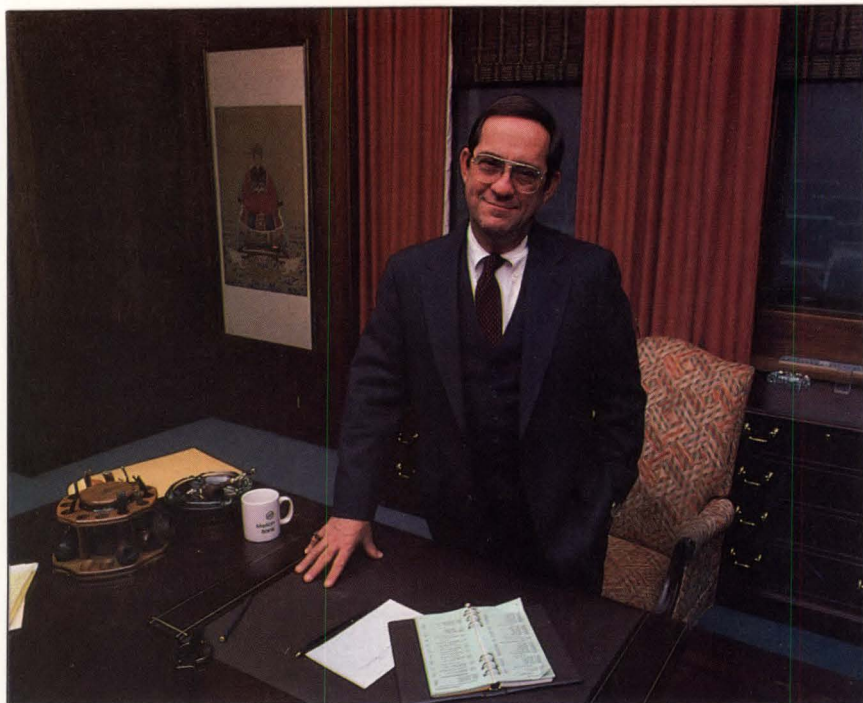


Photo by Matt Bulbony

George DiNardo of Mellon Bank, Pittsburgh, has frequently taken on new ventures on the basis of the "star in the east." His "star" has yet to steer him wrong.

manager's inputs are soft and speculative—impressions and feelings about other people, hearsay, gossip, and so on. Furthermore, the very analytical inputs—reports, documents, and hard data in general—seem to be of relatively little importance to many managers."

Corroborating support is offered by John Naisbitt, author of the best-seller *Megatrends* (Warner Books, 1983): "Another shift I see that really impresses me is a new respectability for intuition in corporate settings . . . Now people are willing to say, 'I just feel this is going to work.'"

And Robert Bernstein, chairman of the board at Random House, the New York-based book publisher, has observed: "Only intuition can protect you from the most dangerous person of all—the articulate incompetent."

Intuition gets dicey when there is no time to garner the necessary evidence, when the pace of change is such that future trends cannot be extrapolated from past experiences, or when there are not enough facts available to make a rational analysis. Both risks and potential gains are often at their peak at these times: Careers may literally rise or fall on a hunch.

There are no definitive answers to the questions of where intuition comes from and how it works. There are those who ascribe to the intuitive process the most mundane of qualities. Intuition, they attest, is a process of rationalization that happens so quickly that the intuiter is not aware of all the steps his or her mind takes. Others equate intuition with such arcane phenomena as precognition and extrasensory perception.

In a series of experiments conducted during the late 1960s at the New Jersey Institute of Technology, Newark, groups of top executives submitted to tests designed to evaluate their precognitive powers. Of the CEOs who had doubled their companies' profits within a five-year period, 80 percent scored above the levels allowed by chance alone.

In addition, Harvard University researchers have observed that just before making correct intuitive decisions, subjects' hearts beat faster and their palms perspire. When using logic to make decisions, however, subjects revealed no such physiological changes.

Then there's the left-brain/right-brain research that's been pursued recently. According to many of these

studies, the left side of the brain is more responsible for logical, linear thinking, whereas emotion and intuition originate in the right side. To determine which half of the brain successful executives rely on more often, Robert Doktor, a business professor at the University of Hawaii, Manoa, working with a neurosurgeon, several years ago actually wired up 17 CEOs to an electroencephalograph to record which of their brain halves was more active when working on verbal-analytical and mathematical problems. Doktor reported that in every instance, the processing power of the emotion-oriented right side was more heavily relied on.

Admittedly, it would far exceed the limits of the research cited above to suggest that you must be intuitive to be a successful executive. However, intuition—whether you consider it to be fast thinking, ESP, or something in between—is a real phenomenon in the business world that should be taken seriously.

At Mellon Bank in Pittsburgh, George DiNardo, the senior vice president of information systems and research, says he has relied on intuition throughout his career. "I hate the lemming-like behavior banks often exhibit," he declares. "I've taken on many ventures that fly in the face of what others have done."

On what basis were those ventures entered into? "The 'star in the east,'" DiNardo chuckles. Apparently, that star burned brightly for DiNardo in 1970. That was the year he decided it would be feasible to create a central information file on one mainframe that would incorporate all data generated daily by the bank's entire customer base. In 1970, conventional wisdom dictated that three mainframes couldn't accommodate that kind of load, let alone one. However, DiNardo managed to pull it off. He did it by buying the largest mainframe available, which at that time was an IBM System 360, Model 195—the kind of machine bought by agencies like NASA and the London Observatory, not by banks. He then unleashed a dedicated, hand-picked staff on the problem. And he loaded the machine up to 90 percent capacity instead of the conventional 60

percent, and still squeezed satisfactory performance out of it.

DiNardo remembers his boss telling him, "If this doesn't work, you'd better find another job." But it did work. The system functioned for 10 years, yielding all the advantages that accompany maintaining a highly integrated centralized file, putting Mellon Bank considerably ahead of the competition.

How did DiNardo know? "The 'star in the east,'" DiNardo says again. "It's a sense that you can accomplish something without any evidence that it can be done. Other than that, I can't describe it."

DiNardo cites other examples. Once he decided to buy automated terminals from a small vendor hardly anyone had heard of at the time. On another occasion, he woke up in the middle of the night with the idea of selling extra computer capacity to other banks through terminals hooked up via communication lines. And then there was the time he came up with the idea of entering data at the source instead of by a central data-entry group, another idea considerably ahead of its time. DiNardo maintains that in all the years he's been in data processing, when he's had a strong gut feeling about something, he's never been wrong.

Does DiNardo ascribe his enviable record to extrasensory perception? "Come on!" DiNardo responds. "It's not like that at all. I have a trained mind, a qualified staff, vision, and the ability to implement that vision. We're taking the technology and extending its potential five years out. We're not taking any Einsteinian leaps."

In 1960, the late Ray Kroc was offered what his advisors considered a bad deal: buying the McDonald's fast-food chain for \$2.7 million. Some years later, when asked to recall the fateful decision, he said, "I closed my office door. I cussed up and down and threw things out the window. Then I called my lawyer back and said, 'Take it!' I felt in my funny bone that it was a sure thing."

For Kroc to stick to that intuitive feeling took courage. All managers need that same courage when making intuitive leaps. At the Chicago Board of Trade, Robert Jirout, vice president of

information services, certainly needed courage when, in the midst of adding a massive amount of new communication technology to the Board, he decided not to go with AT&T's communications services. "We chose an untried vendor," Jirout says. "In fact, we installed the second system they ever built. I had a gut feeling, a sense of where the communications industry was going." The divestiture of AT&T shortly thereafter proved Jirout right.

To say that choosing an untried vendor is risky is an understatement. Although an unknown vendor may offer a better price and more customized service, at least with an established vendor like AT&T, Jirout would have been assured that the system would work—eventually.

"It's hard to pinpoint what turns you on or off about a vendor," Jirout says. "Part of it has to do with the 'chemistry' between the two organizations. Will my technicians get along with theirs?"

Jirout hastens to add that if this vendor had fallen flat on its face, he had a backup plan ready. But, he acknowl-

edges, that would have been uncomfortably embarrassing. Fortunately, the backup plan was never needed.

Just as there is room for intuition in vendor selection, there is also room for intuition when deciding whom and whom not to hire onto your staff. Of course, there will always be attempts to quantify the process—administering tests to systematically compare qualifications, conducting highly structured interviews. But, as many managers readily admit, a strong gut feeling—one way or the other—can immediately circumvent any standardized procedure. As Bill Synnott, the senior vice president of information systems at the First National Bank of Boston, says, "Intuition is always more valuable in managing people than in dealing with things." He acknowledges that on several occasions he has hired people whose qualifications were not very impressive on paper, but who subsequently performed well nevertheless.

During a face-to-face meeting, an intuitive manager may observe a thousand different subtle cues. As Mintzberg of McGill University points out, "Oral communication enables the manager to 'read' facial expressions, tones of voice, and gestures." Thus, Mintzberg says, it is not surprising that of the managers he's studied, all display a marked preference for oral, face-to-face communication.

However, insists Robert Umbaugh, vice president of information systems at Southern California Edison Co., Rosemead, CA, this doesn't mean reacting to potential employees on the basis "of how your hormones are flowing that day." He says, "It's your total experience that tells you whether or not that person will fit." Umbaugh admits that he, too, has shunned the objective "evidence" on several occasions when hiring new employees.

In addition to choosing among clearly defined alternatives—such as whom to hire, which vendor to use, what strategy to pursue—the voice of intuition should also be heeded when you have to solve problems that don't offer any clear-cut choices. In both art and science, anecdotes abound about great thinkers whose insights came as flashes

(Continued on page 104)



Photo by Richard Derk

Robert Jirout of the Chicago Board of Trade chose an untried communications vendor rather than AT&T communications services. His "gut feeling" was proved right when AT&T divested shortly thereafter.

Scouting For Management Talent?

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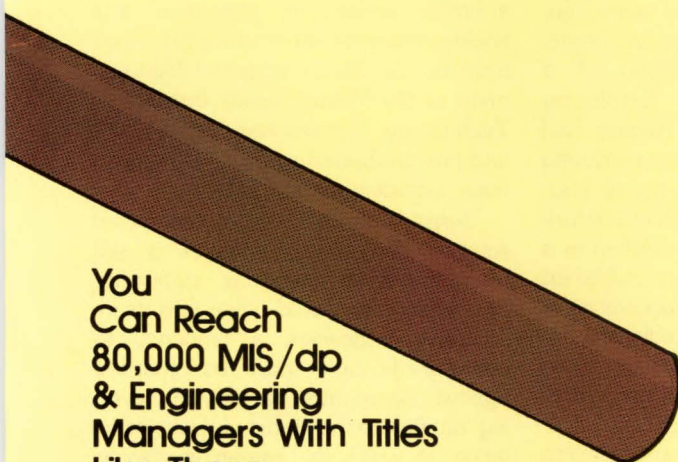
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(Continued from page 101)

of revelation, a kind of "Eureka!" syndrome.

Some of these accounts can be almost spooky. For example, the 19th-century German chemist August von Stradonitz Kekule struggled for months trying to determine the molecular structure of certain organic compounds. Then, one day, according to Kekule's recollections: "I turned my chair to the fire and dozed," he wrote. "Again the atoms were gambolling before my eyes. This time the smaller groups kept modestly in the background, my mental eye rendered more acute by repeated visions of this kind, could now distinguish larger structures of manifold conformation; long rows, sometimes more closely fitted together, all twining and twisting in snakelike motion. But look! What was that? One of the snakes had seized hold of its own tail, and the form whirled mockingly before my eyes. As if by a flash of lightning, I awoke. . . ."

In that instant Kekule realized that certain organic compounds are not open structures but closed rings. Kekule had literally dreamed the benzene ring—one of the cornerstones of modern chemistry.

Examples like this demonstrate intuition's close association with creativity. Both intuition and creativity represent a breaking away from conventional lines of logic to arrange data in new and innovative ways. Creativity theorists claim that this is more than a process of stubborn persistence. Indeed, they believe the contrary is true. For example, in the process of problem solving, theorists refer to the need for "incubation"—periods when the problem solver must mentally "walk away" from the problems at hand to allow the mind to subconsciously wander and slip away from the blinders that excessive persistence may bring. The late Arthur Koestler alluded to these periods in his book *The Art of Creation* (Macmillan,

1964) as times when the mind is actually engaged in quiet rebellion against itself. "This rebellion against constraints which are necessary to maintain the order and discipline of conventional thought, but an impediment to the creative leap, is symptomatic both of the genius and the crank," he observes. "What distinguishes them is the intuitive guidance which only the former enjoys."

For pragmatists who would like to be able to rely on such gifts, there's one obvious question: Can the intuitive process somehow be tapped on demand, perhaps even instilled into an organization? At Tektronix Inc., Beaverton, OR, Steven Rogers, decision-systems project leader, sought to answer that question. Five years ago, he headed a team to design an interactive, color-graphic simulation of a production-control system. Employing visualization techniques, Rogers had team members close their eyes during brainstorming sessions to try to visualize solutions to the problems before them. The process was described in a paper, co-written by Rogers, published in the 1980 conference proceedings of the American Institute of Industrial Engineering: "[One] guided-imagery exercise was employed to 'take' the participants to a place where they could 'see' [the system] in use. Important things to focus on included the physical appearance, the user, the kind of information being selected, and the environment in which the output was to be used. Based on this experience, the team's sharing of impressions and discussion formed the first series of graphic records. . . . The records, in turn, led to a working definition of the system being designed and pointed to areas that needed a more careful analysis in order to be understood."

What were the project's results? It was not an unqualified success. The system never came to fruition. Its development was halted as a result of

other problems outside the team's control. However, Rogers admits that there were members within the group who were highly skeptical of these meditative practices. "It's true that software engineers may have more problems with this approach," Rogers says. Still, he insists, there were many team members who were enthusiastic about these techniques and found them helpful in examining system alternatives.

Are Rogers' methods a harbinger of things to come? Perhaps. The Stanford University Graduate School of Business (Palo Alto, CA) offers a course, "Creativity in Business," that seeks to put students in better touch with their intuitive voices. A company called Innovation Associates in Framingham, MA, offers a similar seminar for executives, and boasts among its instructors a professor from the Sloan School of Management at the Massachusetts Institute of Technology. The seminar costs \$1,350 and has graduated some 1,000 executives, including many CEOs.

Despite attention from respected sources like these, intuition is still fraught with tremendous ambiguity. For those who would delve into its inscrutable intricacies, a tendency to over-mystification must be guarded against. Some must be wary of elevating intuition to the status of divine revelation, in which the intuiter is seen as beyond reproach, above the dictates of reason. Consultant Philip Goldberg, in his book *The Intuitive Edge: Understanding and Developing Intuition* (Jeremy P. Tarcher Inc., 1984), cites a study in which 83 percent of the scientists surveyed admitted to having assistance from their intuition. However, Goldberg continues, what is frequently not mentioned by those who cite the study is that only 7 percent of these scientists said their intuition was always correct. Other estimates ranged from as high as 90 percent to as low as 10 percent.

Thus, although managers may wish to enjoy the benefits of listening to their intuitive voices, it is the flaws in those voices that remind us that intuition, as a tool for success, is still, and probably always will be, more art than science. Managers should listen to their inner voices, but heed them judiciously. □

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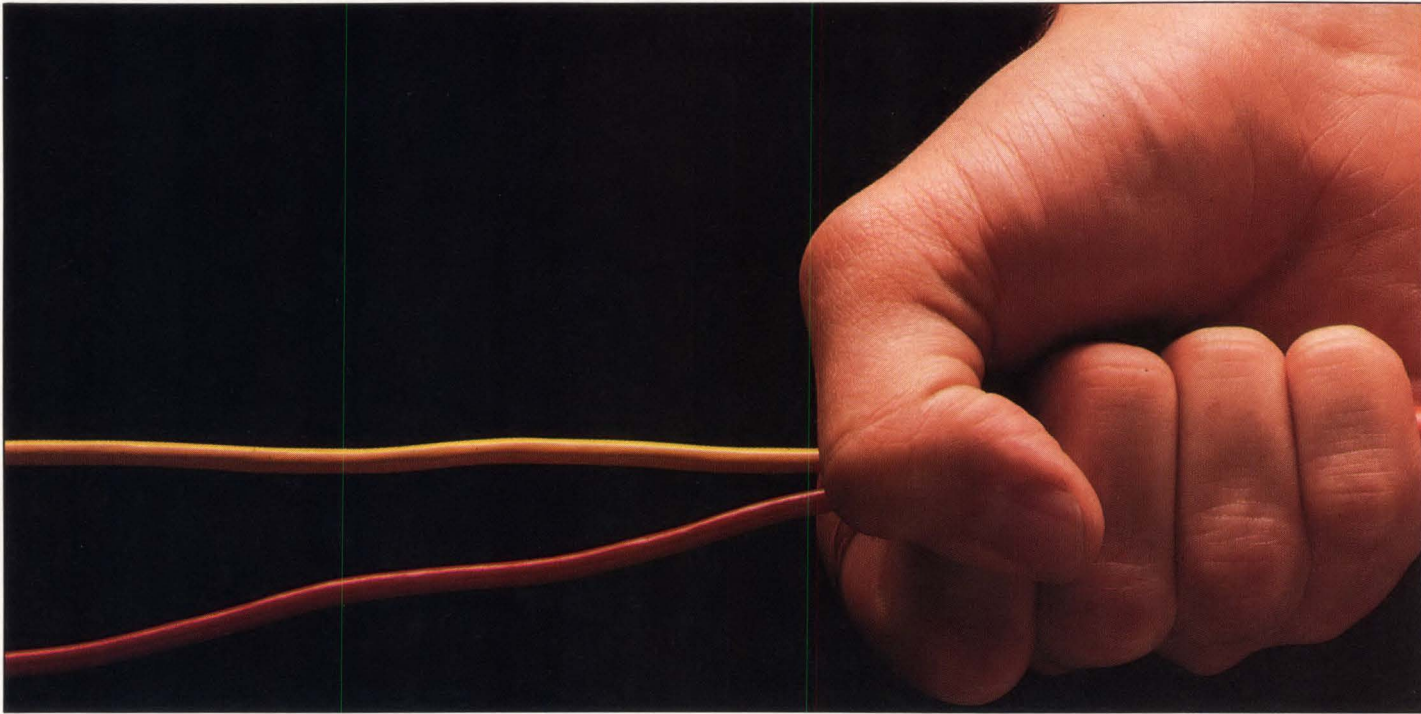
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PART II: HERE COMES THE ISDN

A system for transmitting voice and data anywhere in the world over a single line is only 10 years away.

by Robert Moskowitz

An information network that allows voice, data, and visuals to be exchanged between locations almost anywhere on the globe over simplified, standardized equipment has been a dream for a decade or more. Sound far-fetched? It isn't. A similar communications system is already up and running: It lets you punch in a series of numbers to make contact with just about any telephone any-

where in the world.

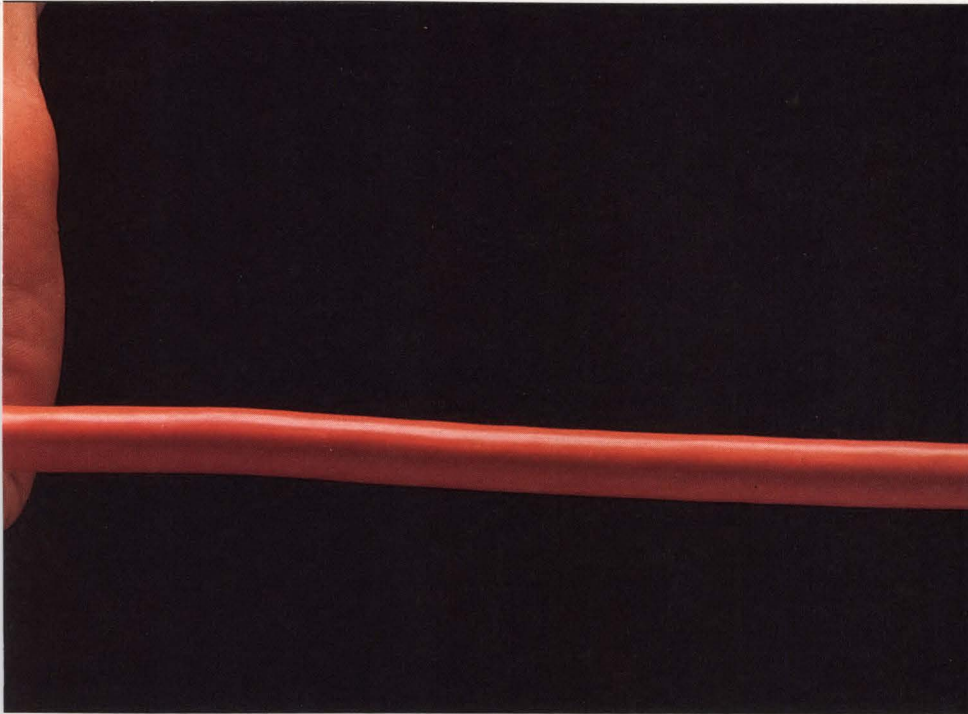
But it will take a network much more complex than the intercontinental telephone system to allow transmission of voice and data over the same line, and setting up such a network worldwide will be difficult. Nevertheless, there is growing agreement that a voice/data network is not only necessary, it's inevitable. Already engineers have given it their stamp of validation, an abbrevia-

tion: ISDN, for Integrated Services Digital Network.

"We have to have an ISDN," says Philip James, previously director of strategic planning for Northrop Corp. and now executive director of the new Information Institute, Santa Barbara, CA. "If we are to bring the world together, we need worldwide communications. The ISDN will be the vehicle, the backbone, for addressing such is-

INTEGRATION

Photo by George Mattei



sues as transborder data flow, cultural differences, and information access from third-world countries."

According to Susen Kay, senior products planner for AT&T in Chicago, it's the inadequacies of global data—not voice—communications that create the need for the integrated network. "Current systems for intercontinental transmission of data are totally unsatisfactory," she says.

The ISDN concept calls for a standard set of connections to every telephone and computer terminal on the network. These connections will be routed through standard private branch exchanges (PBXs), central telephone office equipment, or Centrex. In this arrangement, users will be able to send and receive high-speed information, and control signals encoded and packaged in a standardized digital form. Any equipment that meets ISDN standards should be able to connect to the network at any point to send and receive virtually any type of message, including voice, data, graphics, telemetry, and more.

Does this mean it's time to rush out and invest in new equipment? No, the concept of ISDN has been around for a dozen or more years, and it may be another decade before such a network is operational. But the handwriting is on the wall: ISDN standards have been promulgated, and it would be foolish to install new equipment, such as analog or digital switches, that cannot be upgraded to meet the network's standards.

ISDN-compatible digital switches should be introduced by vendors within two years. Then it will be easier to determine how swiftly the new standard will come to dominate telecommunications. Kay advises executives responsible for telecommunications and information-systems managers to "look to the future before you buy any more equipment, and question your vendors of PBXs and office-automation equipment. What is the vendor's commitment to the ISDN standard? When will ISDN-compatible products become available? What level of support for ISDN users will be offered? These are

critical issues for corporations that will require significant data and voice communications in the next 10 years."

The concept of an ISDN represents a dramatic improvement over the existing unwieldy makeshift apparatus for national and international data communications. The most immediate benefit is that terminals will be able to operate anywhere on the network. With the ISDN in place, differences in local networks will disappear or become less important, because all systems will accept certain standard data. The same terminals, telephones, and other communications devices will work just as well in Hong Kong as in New York.

Another improvement is in data transmitted between computers. The existing global telecommunications maze—filled with conflicts, contradictions, and electronic roadblocks—severely limits the computers users can contact and the information they can exchange. Digital Equipment Corp. VT100 terminals, for example, can't talk to other vendors' mainframes, because their RS-232C leads are slightly different. And if you have ever sent electronic mail or data files to another computer user—even in the same building—you know that any one of several possible technical glitches can interrupt the flow of information. When you try to connect across an ocean or halfway around the world, these problems become even knottier.

The ISDN promises to simplify communications processes, standardize equipment and procedures, and improve the quality and volume of service. For example, under ISDN standards, a single telephone line supports simultaneous voice and data channels. Thus, anywhere there is now a telephone there will soon be capacity for a computer, without interrupting or blocking the voice line. That means telecommunications managers will be able to provide more channel capacity without having to worry about allocating it among different services in advance. In addition, the "integrated" in



Photo by Karen Borchers

Henry Theloosen, director of product management for Northern Telecom, believes the ISDN will provide many more services to users.

ISDN means users won't have to learn separate procedures for telegrams, telex, teletext, telemetry, telecommand, intercomputer transmissions, electronic funds transfer, videotex, radio paging, voice mail, and all other types of communications. Once you learn how to operate the ISDN system, you should be able to use all its features and services.

"Integration of network services is an issue that's separate from standardization," points out Henry Theloosen, director of product management for Northern Telecom, a Richardson, TX-based vendor. "Many integrated services are already available to businesses, even though there is no single standard. And even when standards are available, the services may not be as integrated as some managers imagine."

In Europe, where businesses, because of regulations and controls set by the national postal, telephone, and telegraph services use dumb terminals more than their own computers, the ISDN may also provide built-in software, intelligence, and processing. If these features are included, any dumb terminal will be able to handle word processing and use intelligent messaging features and other sophisticated services offered by the ISDN.

The ISDN will offer many benefits, but exactly how many remains to be seen. Despite the tentative nature of most ISDN plans, newspaper articles, seminar speakers, and industry rumor mills have been making blue-sky predictions about the wonders of the integrated digital network. For example, one pundit says the new network will allow any terminal to connect with any host computer, or access any online system. But this is not intrinsic to the ISDN concept; protocol translation is already available through other means, and is not part of the ISDN standard.

Other predictions about the ISDN include two-way wristwatch video communications and instant access to a central computer library. Talk like this evokes memories of 150 years ago, when it was predicted the railroad would turn America into a single family, and eliminate both giant cities and sleepy rural villages.

In truth, the ISDN—like the standard-gauge railroad—is only a pipeline. Users and service providers determine what it carries, where and when. The ISDN certainly could facilitate almost any kind of information services imaginable, but ultimately will do so only if enough users want those services, and are willing to pay for them.

"I suspect the network will perform

some protocol conversion to [IBM's] SNA," says Stephen Caswell, a principal of Trigon Systems Group, a Toronto consultancy. "That means you'll be able to hook a terminal to your telephone line, and go directly to a host without having to go through a leased line. The whole world will be on a single wide-area network."

But according to Theloosen, "Chances are, most of the blue-sky services attributed to the ISDN will be in place before the network becomes operational. Indeed, we can provide most of them right now. What the ISDN really gives us is a better channel with simpler procedures for day-to-day communications, and better mixing of many different communications services in almost any combination."

As a practical matter, therefore, Theloosen believes the ISDN should be viewed as "a standard for integrating voice, data, and other protocols. It will accept anything you can squeeze into 64,000 bits, and it will function much like a wide-area network anybody can plug into."

The level of standardization proposed for the ISDN will have immediate and worldwide economic impact. For example, it will free large users to buy their telecommunications equipment and disperse it again anywhere in the world without worries about local communications requirements. Other results of standardization are not so clear-cut. "Standardization has good and bad aspects," James points out. "At this stage of the game, it has got to be done, but it should be done with due regard for the fact that standards might have to change later on. If we go too far down the pike, we might get into trouble, as we have with, say, broadcast television, in which better systems are available, but are not usable because of a huge installed base on the earlier standard. We have to be careful of this on the ISDN, because with technology advancing as fast as it is, today's standards can become tomorrow's albatrosses."

So far, the ISDN standards are proposed only at the lowest levels of interconnection. "Under the present standard," says Theloosen, "the number of

(Continued on page 112)

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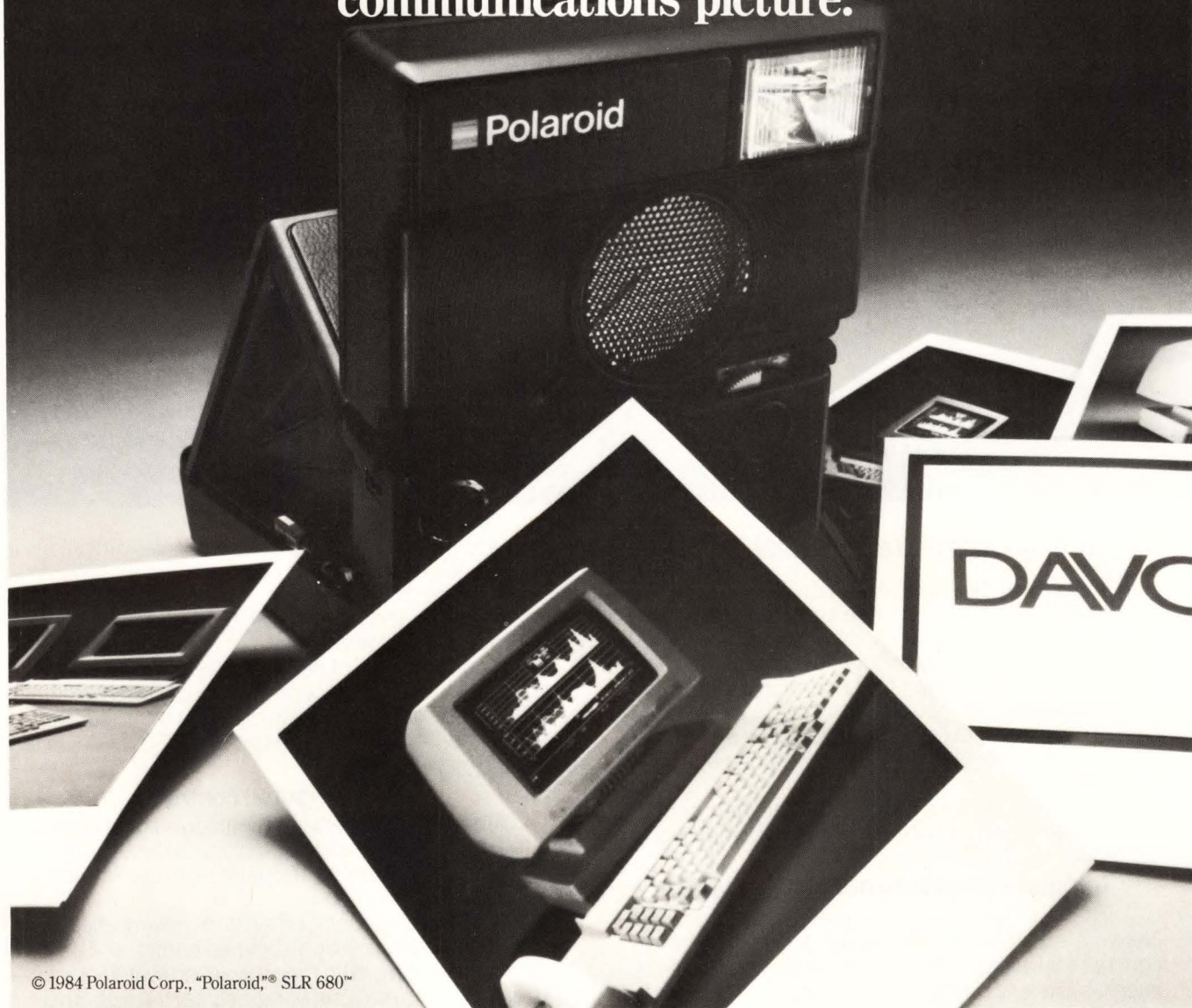
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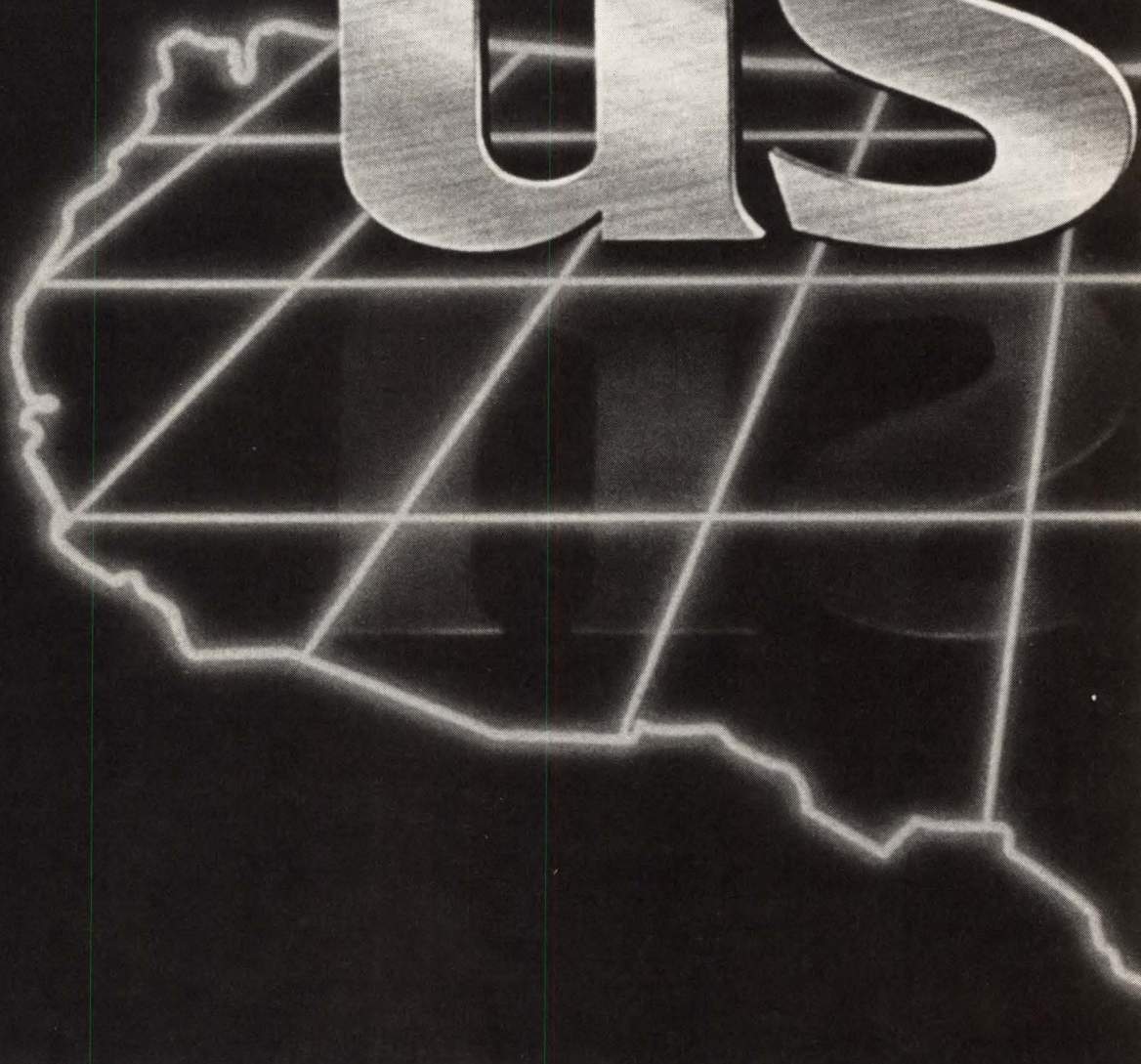


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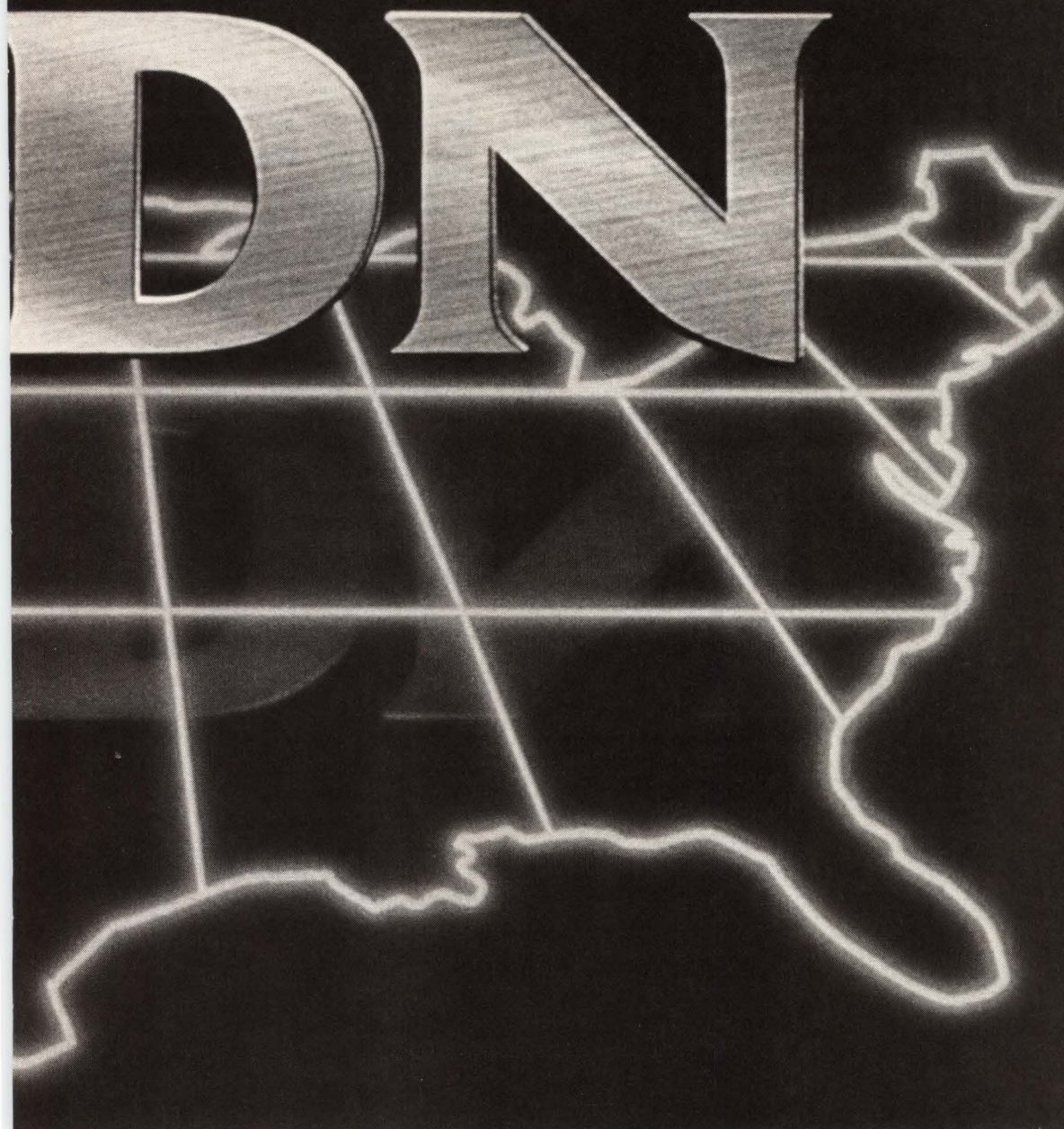
By contrast, and of necessity, the U.S. must have its own unique network concept. A concept based on integrated access to multiple networks. It is this modified ISDN concept that ITT has designated USDN, for United States Digital Networks.

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(Continued from page 108)

commands available for signaling is very limited. All we have, basically, is connection setup and connection tear-down. We need many more of these commands to make possible value-added services on the ISDN."

Optimists hope for a new era of simplified networks, but nothing has yet been done to establish handshaking protocols, data encryption, and other security measures, or special features and services. "Even so," says Kay, "standardization will give users a wider choice of equipment. No corporation will be wedded so strongly to a single vendor, because all ISDN-compatible equipment will provide compatibility. Price, quality, and special features will count a lot more than they do today."

Idealists claim the ISDN means cheaper service, but communications charges most likely will take an upward hike. First, costs of developing and manufacturing ISDN equipment are likely to be higher than those for today's gear. And services, though better and more sophisticated, will probably cost more. "The ISDN won't be cheaper," predicts Theloosen. "It will require a big investment, and it will be a premium service—at least in the beginning. But the end users will receive many more services than they do now."

Stephen Caswell explains it this way: "You'll probably pay more for ISDN, but you'll get more, too. The ISDN's

single line will probably cost more than the two lines presently required for simultaneous voice and data transmission, but it will give significantly more communications power and capacity for the money."

By far, the most significant step toward establishment of the ISDN has been the acceptance of international standards for actual trial and evaluation during the next four years. During its last plenary session, this past October, the International Telephone and Telegraph Consultative Committee (CCITT) approved two sets of standards for the ISDN. With these standards defined, manufacturers have solid information with which to design and build switching and terminal equipment that will be able to communicate with others on the same standard, and link up with the ISDN when it becomes reality.

The first standard is for Basic Rate Access. It defines a two-channel connection between an end user's terminal and a local PBX or central telephone office. Basic Rate Access will provide one voice channel and one data channel at the same time over a twisted-pair wire—the same you now use for your telephone.

The second standard, Primary Rate Access, defines two different systems for multi-channel connections between a local PBX and a central telephone office. In Europe, the ISDN standard calls

for 30 information channels, one signaling channel, and a spare channel. In the United States, the standard specifies 23 information channels, a spare channel, and a signaling channel. Each channel operates at 64,000 bits per second (bps). Although these standards are technically different, users will never notice because the channels themselves are identical. The standard leaves room for several channels to be combined to achieve multiples of the 64-Kbps standard, and for standards to be upgraded to any multiple of 64 Kbps as technology develops.

"In both Basic Rate and Primary Rate Access, there is agreement in principle about what the standards should be," says Theloosen. "The next step will be for manufacturers and telecommunications authorities to get together and talk about experiments and trials. Their goal will be to iron out loopholes and different interpretations of the standards. We can expect to see a number of different ISDN trials during the next four years. In some cases, the standards may be implemented on small private networks before they are offered on public networks. At the next CCITT plenary session, in 1988, the results of these trials will be evaluated and problems or undue limitations will be addressed."

Meanwhile, the Exchange Carriers Standards Association (ECSA) is working on ISDN standards exclusively for the United States. Other committees are looking at all the issues associated with ISDN, and all are trying to determine if they want to go along with the CCITT initiatives or develop their own approaches. "I'm sure there is a little bit of the profit motive being exploited," Theloosen admits.

Despite the possibility of new standards and divergent sets of standards, the first pilot systems for CCITT ISDNs have already been announced. In Stuttgart, West Germany, for example, ITT plans to build a 400-user ISDN for the national postal, telephone, and telegraph service. All future West German exchanges will also meet the CCITT standards for the ISDN.

Matching the voice network's level of standardization, compatibility, and accessibility for digital data will require



Photo by Richard Derk

Susan Kay, senior products planner for AT&T in Chicago, advises managers to question vendors about their commitment to the ISDN.



John Trumbull. *The Declaration of Independence*, 1786-1797. Courtesy The Bettmann Archive.

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a whole new generation of hardware, new and universally accepted computer-communications handshaking protocols, and a whole new series of international agreements and electronic standards. The problems, issues, controversies, and conflicts are undeniably large and very technical. On a practical level, political and security concerns may create a separate logjam of delays and detours. "Transborder data flow may cause governments to stand in the way of participation in the ISDN," says Philip James. "Governments are understandably concerned about the risks. Already corporations that have installed private networks in good faith have inadvertently caused the flow of confidential information (trade secrets and personal information about employees) to other countries. The ISDN will make it even easier for this to happen."

Despite the steady progress and strong demand for an ISDN, a few difficulties must be resolved before it can be implemented on a wide scale. One such difficulty is analog equipment. A good deal of today's PBX and transmission equipment is still analog, rather than digital. And analog equipment continues to account for a large percentage of telecommunications purchases. Most of the installed wiring—but none of the analog switching or terminal equipment—will work with the ISDN. Until the installed analog equipment is replaced, or until an inexpensive converter is developed to adapt this equipment to the ISDN standard, the ISDN network will have to wait.

According to Theloosen, "It's very expensive to convert analog to ISDN-standard digital. Because of this, I envision an evolutionary change toward ISDN. Those who can justify the expense will convert quickly. The rest may have to wait."

Also, competitive systems may act as a drag on ISDN development. "Big players have been proceeding down different paths toward the ISDN standard," says Philip James. "Now the CCITT standards will cause them to change direction and try to travel down the same road together. In any large organization, this causes stress and loss of

momentum until new standards are internalized."

Another problem is that ISDN equipment requires very-large-scale integration technology to achieve high speeds and sophistication at relatively low costs. But VLSI circuits are still two to six years away from commercial availability.

Then there's the problem of fair pricing. One bit of a telephone call looks the same to a system as one bit of an electronic funds transfer. Theoretically, users should pay by the bit, but this would make bit-hungry telephone calls inordinately expensive. And that won't sit well with most corporations, which have grown accustomed to doing business by telephone.

The ISDN will probably never be built if telephone costs rise too high. That's why ISDN planners are considering other payment plans, such as WATS-type arrangements with flat-rate billing for unlimited calling to specific locations, and "transaction fees" for special services that are particularly valuable to users. For example, the ISDN will greatly simplify electronic funds transfer. Suddenly, it will become a simple matter for suppliers' computers to send invoices to their customers' computers and automatically trigger payments when shipments are received.

If ISDN users will pay relatively high rates for transactions that require relatively few bits, telephony and other services may well be cheaper on the new network than they are today.

International economics can also seriously slow the ISDN: One of the big benefits of the ISDN will be to allow third-world countries to draw needed information from the developed nations. Unfortunately, this will require extensive payments by already debt-burdened, less-developed nations. Until these countries prove they are a sound

market for ISDN equipment and services, development and installation of the network around the world will inevitably be delayed.

A related issue is the settlement of payments. International communications requires international payments. But transactions, which travel both ways, make it easier to cancel offsetting payments and settle the differences at regular intervals. Mechanisms for doing this exist for other forms of international exchange. They will have to be extended or adapted to cover the costs of the international ISDN. Differing U.S. and foreign standards are another concern. Some experts fear the United States may choose a standard for an ISDN that differs from that of the rest of the world. For technical reasons, the CCITT has already established different Primary Rate Access standards for Europe and the United States. "A double standard may become permanent," admits James. "It may be something like the double standard we already have for telephones. This makes work for the technicians who operate the systems. But if the end user doesn't notice, it's not a serious problem."

Big plans are in the offing for ISDN. Built-in intelligence—providing messaging, applications, protocol transfers, and the like—may be part of its future. But that's an issue that will most likely be determined by the users rather than the regulators.

There is also room for both proprietary signals and additional standard signals to make possible special services, such as call forwarding, remote control of equipment, personal code numbers allowing managers to reach employees anywhere, automatic-return routing of reply messages, and so forth.

What should managers do to prepare for the advent of the ISDN? The most important action, according to Philip James, is to "watch with great interest, and shift your strategies and decisions as the ISDN unfolds. It's probably unwise to adopt the new standards immediately, but take the standards into account as you modify or extend existing networks." □

Robert Moskowitz is a management consultant based in Woodland Hills, CA.

"The whole world will be on a single wide-area network."

Theloosen, Northern Telecom

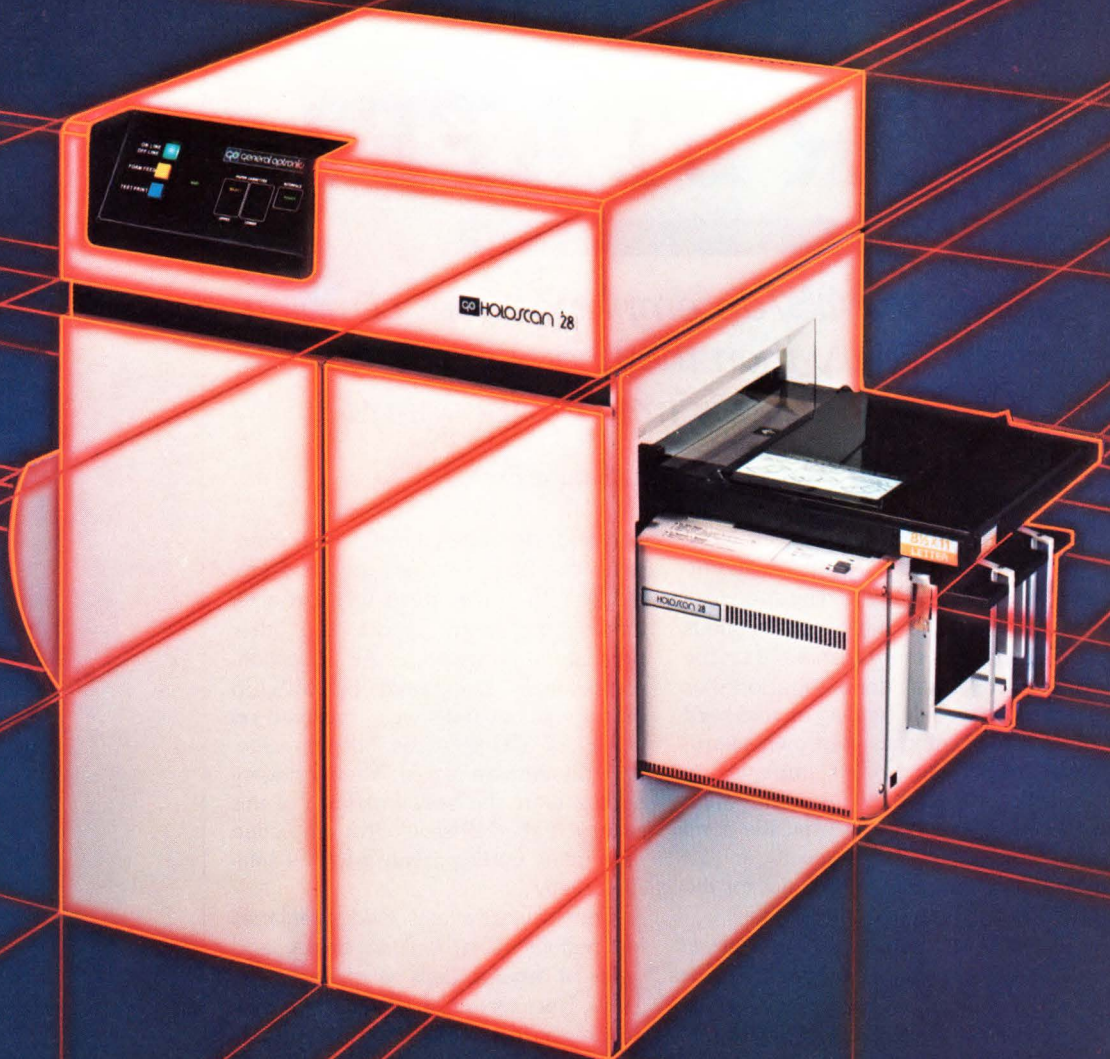
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Salaries of MIS/dp employees are climbing more slowly than they have in the past. Chances are this trend will continue.

by David Whieldon, Senior Editor

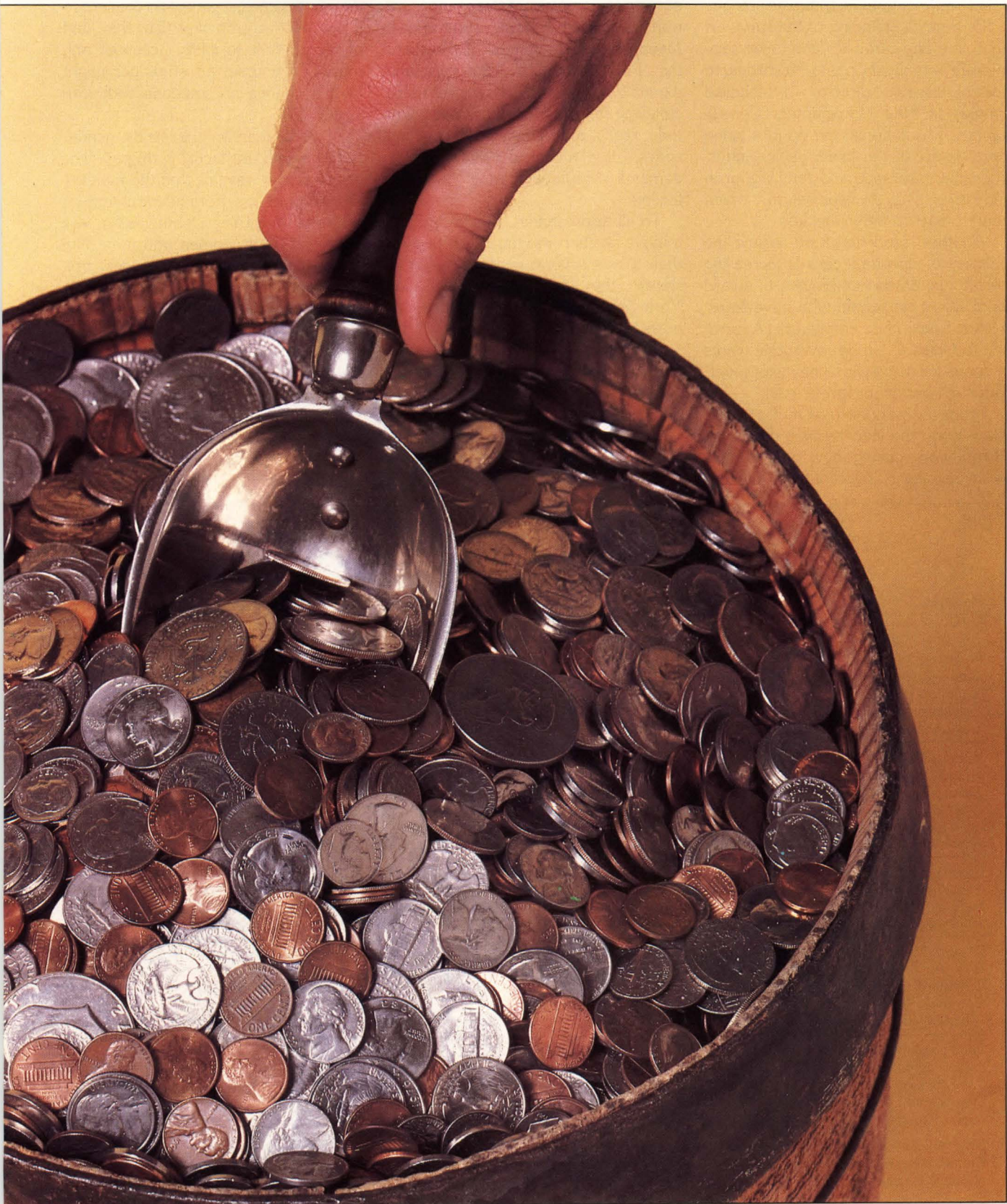
Rare is the employee who works solely for self-gratification. Maintaining the loyalties of even the most conscientious worker requires more than a pat on the back for a job well done—it also takes a generous weekly helping of cold hard cash. Indeed, next to your own salary, the market value of your employees is the most important wage information you can have. Knowing what the competition is paying helps you judge just how much you have to shell out for the brightest MIS/dp talent available.

To help you compare your company's wage policies with those of the rest of the nation, *Computer Decisions* included employee salaries in its sixth annual Salary-Status Survey. To arrive at the figures for MIS/dp employee salaries, two questionnaires were sent to 27,206 managers randomly selected from our MIS/dp readership. One

questionnaire dealt chiefly with compensation both for managers and employees; the other dealt with benefits, employment status, perks, and other personal information. All questionnaires were completed by MIS/dp managers, but data were received on nearly 17,000 positions, both managerial and nonmanagerial. The managerial data were the basis for Part I of this survey (Feb. 12 issue); the employee data make up this month's Part II salary survey.

The survey reflects median salaries for regions, metropolitan areas, and types of organizations as of August 1, 1984. Data were also gathered on salaries according to sales, assets of financial institutions, and value of policies in effect for insurance underwriters. Abbott, Langer & Associates administered the survey and compiled its results. The Crete, IL, consultancy is





SALARY SURVEY

nationally renowned in personnel administration and industrial psychology.

One startling finding of the survey is that, in many cases, dp employee salaries are actually dropping. According to Daniel Glasner, director of technical studies at Hay Management Consultants in Philadelphia, the dp jobs being created are in the lower-paying industries, like insurance and retailing, or in industries like transportation, which tend to pay dp personnel less.

Another trend that may reduce the salaries of dp employees is increasing reluctance among employers to award bonuses to personnel who have transferred from other employers. According to Glasner: "In dp, everyone wants a bonus for going with a new employer. But such perks are rarely used."

From the periphery of metropolitan New York, the view is much the same. "Employers eyeing new recruits are willing to pay 10 percent to 15 percent

over what candidates are currently earning, regardless of salary range," reports Veronica Varian, a partner in Management Recruiters of Rockland Inc., Pearl River, NY. "But applicants expect 20 percent to 25 percent more, believing they're more in demand than they really are. However," she concedes, "if a technical skill is truly in demand, employers may be more flexible."

To all appearances, though, making a move has become much less popular than it was several years ago. For instance, the Diebold Group, a New York management consultancy, reports that 90 major manufacturers in a recent survey experienced only a 5.6 percent turnover of computer personnel last year. That compares with 16 percent in 1981.

"Job-hopping is of much more concern to employers now," says Veronica Varian. "Several years ago, if a candi-

date had two or three jobs lasting 18 to 24 months each, it was of no concern to a prospective employer. But that kind of record isn't so easily accepted any more. Of course, an employer might take a chance on someone with rare skills."

More so than in other fields, gender is an insignificant factor in dp pay. The salary survey reveals that the majority of staff positions, from junior computer operator to project/team leader, are filled with both women and men. Not surprisingly, female employees predominate in four low-rank categories: tape librarian and lead, senior, and junior key-entry operator.

How much is enough? The survey reveals that the answer to that question varies not only from region to region, but within particular areas. The Menasha Corp., for example, a Neenah, WI, manufacturer of corrugated containers and plastics, pays about 10

SUBORDINATES' PAY BY AREA

Position	All respondents	Northeast	Boston	New York	Philadelphia	South	Washington	Florida	Midwest
Database analyst/programmer	\$36,000	\$23,000	\$ N/A	\$ N/A	\$ N/A	\$28,200	\$23,200	\$25,000	\$37,000
Project/team leader	38,750	38,750	37,000	40,280	37,493	33,850	34,454	N/A	33,603
Lead systems analyst/systems programmer	34,000	30,000	34,000	34,000	N/A	31,000	N/A	25,094	29,000
Junior systems analyst/systems programmer	24,000	20,000	N/A	20,000	N/A	28,000	N/A	N/A	24,000
Lead systems analyst/applications programmer	34,000	34,000	35,427	38,675	N/A	39,700	N/A	N/A	33,787
Junior systems analyst/applications programmer	24,629	28,000	25,000	29,350	26,000	22,750	23,000	N/A	25,000
Lead systems analyst	35,202	40,000	N/A	40,000	N/A	N/A	N/A	26,161	30,380
Junior systems analyst	27,500	27,810	N/A	28,000	25,500	30,000	30,000	17,265	27,000
Lead systems programmer	36,300	35,600	N/A	N/A	N/A	30,300	39,789	N/A	36,400
Junior systems programmer	23,115	25,000	25,000	N/A	N/A	22,000	19,000	N/A	23,115
Lead applications programmer	32,000	32,000	N/A	28,000	28,750	28,200	30,000	N/A	29,564
Junior applications programmer	22,000	21,350	N/A	22,000	20,000	20,200	20,000	14,000	22,996
Documentation specialist	17,068	15,860	N/A	N/A	N/A	14,725	N/A	N/A	21,900
User-support coordinator	24,000	25,000	24,000	25,000	17,000	19,500	N/A	N/A	22,603
Communications operator	20,965	22,100	N/A	N/A	N/A	20,965	26,000	15,700	16,878
Computer input/output control clerk	15,123	13,040	N/A	18,000	11,684	14,884	15,000	11,335	14,560
Lead computer operator	19,240	19,700	25,000	18,250	19,000	19,000	24,500	17,500	19,268
Junior computer operator	16,603	14,196	112,480	17,500	14,020	14,950	17,500	13,000	14,000
Tape librarian	13,500	15,154	N/A	N/A	N/A	14,624	20,000	N/A	14,000
Lead key-entry operator	16,000	15,672	15,000	N/A	N/A	13,504	13,881	N/A	14,291
Junior key-entry operator	12,000	13,500	N/A	17,000	8,000	8,000	13,000	8,300	13,832

Note: All figures in the tables are medians. According to statisticians, medians best show the "central tendency" in a group of data.

Certain metropolitan salary medians are listed in separate columns in the "Subordinates' pay by area" table. However, regional medians also include salary data from all metropolitan areas within those regions.

SALARY SURVEY

percent less than do organizations in Milwaukee, which is about 100 miles south, according to Dennis B. Biederman, head of MIS at Menasha.

Of course, employees with skills that are in scarce supply command top dollar wherever they go, Biederman admits. "For high-level jobs, like project managers and perhaps senior programmers, we follow the national averages." Biederman monitors a staff of 11, losing less than one employee a year, he says.

Naturally, a salary that's fair today can seem like a pittance tomorrow. If your employees are to remain faithful, you must combat inflation and reward good work with adequate raises. Glasner of Hay Management Consultants anticipates raises of similar magnitude for all MIS/dp employees. "Our survey data suggest that salary increases for all kinds of jobs will be on the order of 6 percent to 6½ percent for

1985, though nonexempt positions are likely to be a bit lower—probably 5½ percent. Dp salaries will be within the same range." (Employees in nonexempt positions usually do routine work for hourly pay and receive overtime pay; exempt employees usually carry more responsibility and don't receive overtime pay.)

Biederman of Menasha explains how he determines annual increases: "For employees with three or more years' experience, the average increase is about 6 percent to 7½ percent. For employees with one to three years of experience, we offer double that rate, or more, because they acquire value so quickly."

Robert Paynter, director of compensation planning for the Coca-Cola Co. in Atlanta, advises: "Budget for an average 6 percent merit increase—and pay for performance, don't just keep up with inflation. If you pitch for lower

raises—say, 3 percent or 4 percent, then the lowest would be 2 percent or 3 percent, which isn't very much. And the highest would be 6 percent or 7 percent—not enough to reward excellent performance. With 6 percent, though, you can give a really outstanding person 7 percent or 8 percent above that."

Paynter further points out that merit raises, more than cost-of-living raises, help employees beat inflation. He claims last year's merit increases at Coca-Cola averaged 6½ percent to 7 percent, while inflation ran at 4 percent to 6 percent. Employees who received average raises gained on inflation by about 2 percent. "When inflation went up, salary increases lagged behind, and when inflation went down, the rate of salary increases dropped more slowly," he explains.

Most companies seem to agree with Paynter, and are basing pay boosts on

Chicago	Ohio	North Central States	Southwest	Dallas-Ft. Worth	Mountain States	Denver-Colorado Springs	Phoenix	Pacific States	San Francisco-Oakland	Los Angeles-Long Beach
\$37,000 36,000	\$40,000 32,000	\$21,400 29,500	\$40,000 45,036	\$48,720 52,576	\$28,475 35,800	\$21,239 44,500	\$ N/A 33,453	\$29,250 42,000	\$ N/A 29,232	\$30,000 39,858
N/A	27,000	25,200	35,000	N/A	N/A	N/A	N/A	37,000	N/A	N/A
N/A	24,360	29,000	N/A	N/A	N/A	N/A	N/A	40,000	40,000	N/A
27,393	33,787	24,500	N/A	N/A	32,200	N/A	30,415	27,000	18,000	N/A
26,000	24,629	20,500	22,200	N/A	26,380	26,690	N/A	20,000	15,000	20,000
35,101	27,500	N/A	52,576	52,576	40,450	40,450	N/A	39,124	N/A	39,215
27,000	24,312	N/A	39,494	39,494	25,000	N/A	25,500	22,185	22,185	19,500
40,320	33,873	36,908	39,500	N/A	36,300	N/A	36,300	37,158	N/A	N/A
29,000	23,620	20,375	28,000	N/A	23,800	N/A	29,600	26,941	N/A	N/A
33,251	27,600	22,680	34,700	48,770	30,000	N/A	N/A	35,000	43,845	N/A
23,000	21,055	25,000	25,000	39,494	23,924	23,924	19,425	25,562	25,500	25,812
N/A	N/A	N/A	14,000	N/A	N/A	N/A	N/A	21,883	N/A	21,580
22,355	26,760	23,129	20,000	N/A	23,736	N/A	N/A	28,800	N/A	31,746
16,878	N/A	N/A	16,000	N/A	20,100	N/A	N/A	27,125	N/A	27,125
N/A	15,808	13,903	13,500	13,565	14,593	15,000	18,391	17,449	17,651	14,569
20,360	17,600	16,950	18,000	N/A	22,120	N/A	22,120	19,704	N/A	18,614
15,500	12,000	19,000	15,000	13,889	16,000	15,288	16,000	15,500	N/A	15,378
N/A	12,500	12,000	N/A	N/A	14,832	N/A	N/A	N/A	N/A	N/A
15,080	15,000	16,000	15,000	N/A	15,681	N/A	N/A	16,542	N/A	16,542
12,000	10,250	10,750	20,800	N/A	12,200	13,500	N/A	14,000	N/A	14,250

* Information not available.

SALARY SURVEY

SUBORDINATES' PAY BY INDUSTRY

Position	All respondents	Manu- facturing	Banking/ finance	Merchandising	Insurance	Govern- ment	Education	Health services
Database analyst/ programmer	\$36,000	\$ N/A*	\$ N/A	\$34,300	\$22,000	\$26,406	\$27,305	\$ N/A
Project/team leader	38,750	38,595	36,000	37,000	38,750	33,700	33,000	N/A
Lead systems analyst/ systems programmer	34,000	36,890	34,000	34,000	30,000	35,000	28,000	27,216
Junior systems analyst/ systems programmer	24,000	26,750	20,000	N/A	20,000	N/A	N/A	N/A
Lead systems analyst/ applications programmer	34,000	34,000	32,200	37,575	34,000	31,595	30,415	N/A
Junior systems analyst/ applications programmer	24,629	27,000	29,000	25,000	23,700	20,000	18,774	N/A
Lead systems analyst	35,202	36,000	N/A	35,202	30,400	26,292	30,000	N/A
Junior systems analyst	27,500	N/A	25,000	26,000	28,260	25,000	26,700	25,107
Lead systems programmer	36,300	36,100	39,789	32,500	40,320	33,441	36,300	N/A
Junior systems programmer	23,115	28,000	23,800	23,000	23,115	28,000	20,487	N/A
Lead applications programmer	32,000	35,000	42,000	30,635	32,000	28,750	28,000	27,000
Junior applications programmer	22,000	24,000	26,000	23,000	21,000	21,300	19,425	23,000
Documentation specialist	17,068	18,170	13,860	N/A	N/A	14,225	17,596	N/A
User-support coordinator	24,000	23,736	25,000	N/A	17,000	22,092	21,708	22,866
Communications operator	20,965	21,900	20,100	N/A	21,500	15,755	N/A	N/A
Computer input/output control clerk	15,123	16,334	12,500	14,560	11,000	16,421	14,569	12,480
Lead computer operator	19,240	21,120	19,500	17,500	20,400	19,536	18,614	16,950
Junior computer operator	16,603	15,288	13,800	14,000	16,000	19,000	13,992	15,500
Tape librarian	13,500	14,832	N/A	N/A	13,150	12,000	13,858	N/A
Lead key-entry operator	16,000	14,790	13,504	14,250	N/A	16,000	16,410	16,182
Junior key-entry operator	12,000	8,000	12,200	13,832	14,900	12,545	12,508	12,000

*Information not available.

merit rather than inflation. According to Hewitt Associates, a compensation consultancy in Lincolnshire, IL, only about 5 percent of the 689 employers it recently examined based increases on the rise in the cost of living. All others awarded raises for good performance.

Ultimately, the question of how much is enough can only be answered by consulting our tables. Briefly, here's how they're organized:

1. In the first table you'll find the job title that fits, or most closely fits, the position you're concerned about. The first column, entitled "All respondents," contains the median salary for that job category nationwide.

2. The next column will show the median salary for the position you're researching, based on geographical region.

3. The next column lists the median salary for metropolitan areas. (These tables treat both Ohio and Florida as metropolitan areas.) Not all metropoli-

tan areas are represented because of the structure of the survey or inadequate responses.

4. The second table displays salaries by type of organization.

Comparing all the figures appropriate to your organization will give you a ballpark salary figure for the position you're concerned about. In some cases, a figure for your region and type of organization may not be available. Even so, comparison of existing figures will still yield an accurate salary figure.

In certain instances, you may have to do some creative extrapolation. For example, salaries for senior-level employees—such as senior applications programmer—were left out of the survey to make the tables more manageable. To arrive at such a figure, average the salary for a lead-level employee and a junior-level employee.

Of course, money isn't everything, and salary increases and benefits aren't the only legitimate rewards for talented subordinates. Managers should estab-

lish training and promotion plans, be liberal with compliments, pay bonuses, provide nonmonetary rewards, and build stimulation into daily tasks.

But if you notice a valued systems analysts' resume stored on a floppy disk, or a drastic improvement in your star programmer's choice of ties, consult the tables. You may persuade the employee to stay with you, if you keep your pay policies on a par with those of the competition. □

Abbott, Langer & Associates, the consultancy that conducted and compiled the Salary-Status Survey, offers a complete report of its findings. "Compensation in the MIS/dp field. Second Edition," devotes 396 pages to managerial and nonmanagerial salaries cross-tabulated by several variables. The cost is \$250—minus five percent for cash—plus \$3.50 for handling and shipping. It's available from Abbott, Langer & Associates, 548 First St., Crete, IL 60417, (312) 672-4200.

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ELECTRONIC MAIL CAN SET YOU FREE

Cast off the shackles of the telephone- and paper-bound office with voice-text mail.

by Jennifer E. Beaver, Southwestern Editor

Were you ever expecting an important phone call the same day your boss announced an all-day board meeting? If your company had electronic mail, you could go to the meeting with a clear conscience, knowing the message would be waiting for you in an electronic mailbox when you returned.

Text-based electronic mail, the older of the two most widely used electronic-messaging systems, can save businesses time and money—as long as the system is carefully chosen to suit each corporation's particular needs. Electronic mail lets the sender transmit a message or document to a "mailbox," where it is stored until the receiver is ready to accept it. This store-and-forward technique cuts across continents and time zones, allowing simulta-

neous receipt of messages regardless of the location(s). The same technique is available in voice-mail systems. However, actual spoken messages, as opposed to documents, are handled by the latter systems.

Many corporations still prefer to send letters "cheaply" through the U.S. Postal Service. However, it costs 22 cents to send a letter through the mail. And by the time the average business letter is typed, proofread, retyped, and reproofed, the total cost of its preparation comes to about \$10. That's steep.

With electronic mail you have a choice: Install your own system or use a service bureau. An in-house system gives each company the freedom to choose equipment that best suits its needs. In-house systems can also be

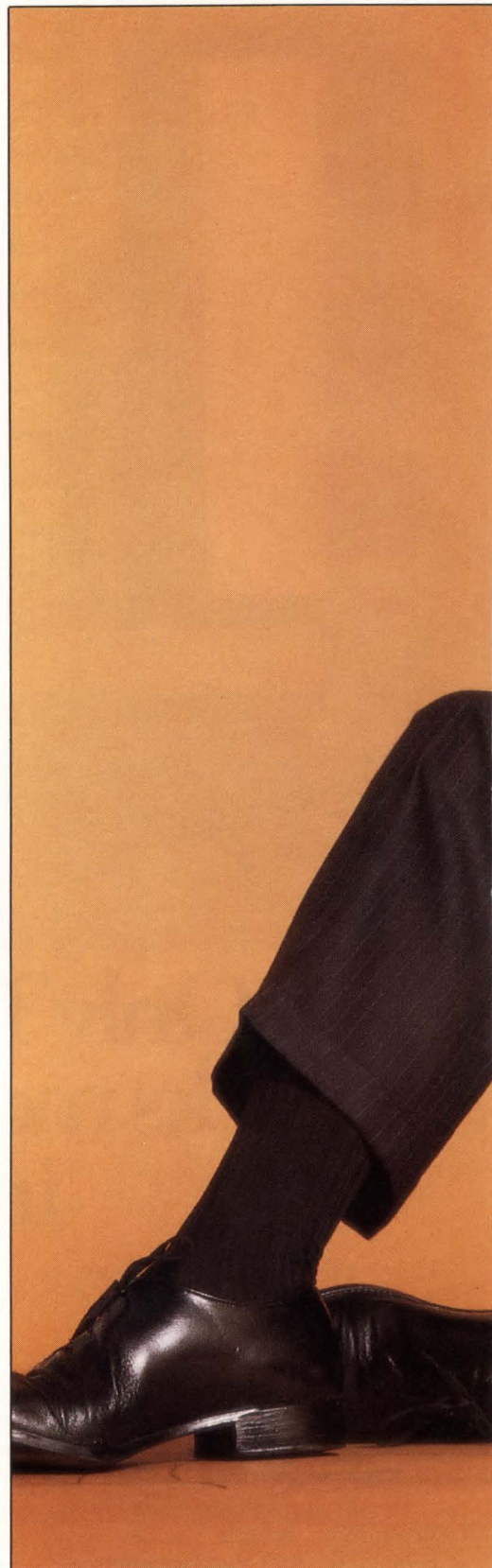
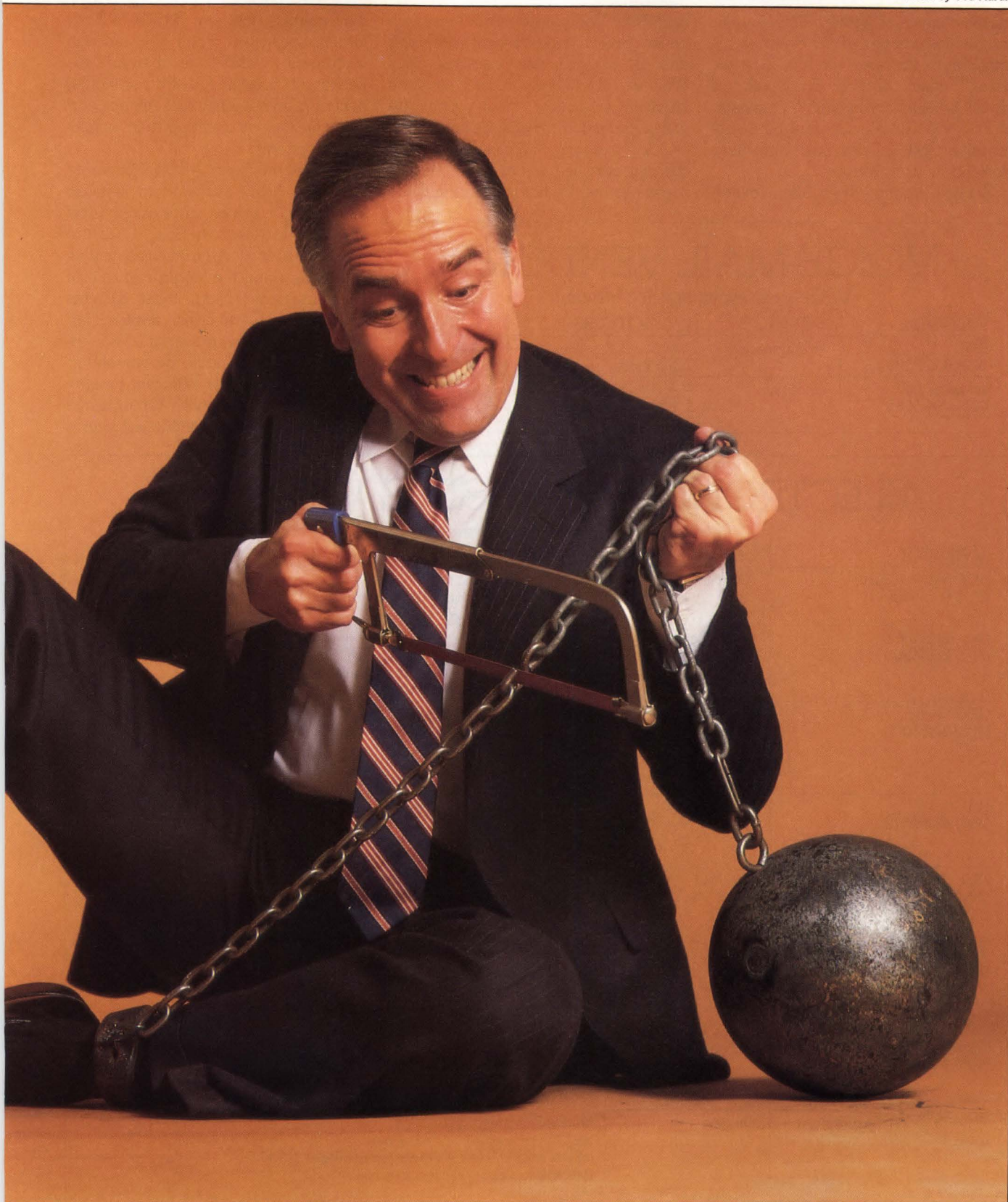


Photo by Ted Hardin



MESSAGE MASTERS

cheaper for high-volume users. "With messages of about 600 characters, domestic charges of under a dime and international charges of 20 cents aren't uncommon for large-volume, in-house users," says Walter E. Ulrich, a Houston-based consultant. "A message of the very same length sent by a subscription service can cost anywhere from 85 cents to a dollar."

Service bureaus often offer volume

discounts, notes Mark Winther, communications director at Link Resources, a New York-based market-research house. Still, service bureaus are losing out to big in-house systems, says Winther. Carefully check each vendor's survivability before casting your lot with a particular service, he advises.

For example, Western Union's Easylink service handles 3 million messages per month, but is suffering finan-

cial difficulties despite its high volume. In 1984, Western Union reported a third-quarter loss of \$15.5 million, largely because it didn't have enough customers to offset the operating expenses of Easylink. In the meantime, declining equipment costs are encouraging businesses to set up their own in-house systems.

Cost is only one factor. Corporate users are being attracted to in-house systems by a variety of features. Most systems start with In-Box, a feature that indicates what messages you've received, giving the length and title of each message. Next, most systems have a facility to easily answer, forward, or delete messages. The addressing system should be straightforward, based on the recipient's name rather than cryptic codes. Other useful features include an ability to send items

VOICE-MAIL VENDORS

Voice-messaging service bureaus

Vendor	Service	Charges	Circle
GTE (203) 965-2000	Telemessenger	\$15 to \$35 per user per month	441
Voicemail Int'l. (408) 496-6555	Voicemail	\$25 sign-up fee \$20 per month per user	442

ELECTRONIC-MESSAGING VENDORS

Electronic-mail services

Vendor	Service	Charges	Circle
ADP Network Serv. (313) 995-6400	Auto Mail	Monthly subscription fee: \$100 Per message segment of 1,000 characters: 75 cents Per addressee: 30 cents	433
General Electric (301) 251-4800	Quick-Comm	Per note (up to 300 characters): 35 cents Per memo (301 to 1,500 characters): 70 cents Per document (1,501 to 3,000 characters): \$1 Per additional document: 80 cents	434
GTE Telenet (703) 442-1000	Telemail	Monthly subscription fee: \$140 Monthly minimum after first 3 months: \$500 Prime time: \$14 per hour Nonprime time: \$7 per hour Nights (9 p.m. to 7 a.m.): \$4 per hour	435
ITT (301) 588-1572	Dialcom	Monthly minimum: \$100 per month Prime time: \$16.50 to \$20 per hour, depending on volume Nonprime time: \$12.50 per hour	436
MCI (202) 833-8484	MCI Mail	Electronic letter up to 7,500 characters: \$1 Hard-copy letter: \$2 Overnight letter: \$6 4-hour letter: \$25	437
RCA Global Communications (212) 806-7736	RCA Mail	Monthly subscription fee: \$140 Monthly minimum after first 3 months: \$500 Prime time: \$14 per hour Nonprime time: \$7 Nights (9 p.m. to 7 a.m.): \$4	438
Tymshare (408) 446-6000	Ontyme II	Monthly subscription fee: \$200 Monthly minimum after first 3 months: \$500 Connect time: \$3 per hour Character charge: 25 cents per 1,000 characters	439
Western Union Telegraph (214) 437-7500	Easylink	Monthly minimum: \$25 Easylink to Easylink: 30 cents per minute at 300 baud; 45 cents per minute at 1,200 baud Easylink to Telex: 43 cents per minute	440

MESSAGE MASTERS

that are registered, confidential, or urgent, plus a forms generator.

Like text-based electronic mail, voice mail generally offers the store-and-forward feature. In-house systems, generally considered too expensive by most corporations when voice mail was first introduced, are gaining popularity as prices drop and features are improved.

Busy managers are particularly fond of voice mail because most of these systems allow users to leave or receive messages from any Touch-Tone tele-

phone. "Our marketing pros have taken to it like ducks to water," says Ross O. Watson, vice president for information resources at Hercules Corp., Wilmington, DE. The chemical manufacturer has 2,900 users on its Voice Message Exchange System from VMX. Although many of Hercules' traveling employees have Hewlett-Packard Model 110 portable computers that they can use to download electronic-text messages, most prefer to use the VMX system. "We'd rather have users dial the inbound number and retrieve

their messages than be saddled with a text-downloading procedure," says Watson.

Voice messaging can be cheaper than the text-based systems. Judy Lee, facilities manager at Spectraphysics, a laser manufacturer in San Jose, CA, chose an Aspen voice-messaging system from Octel. She discovered that the cost of adding the terminals and additional equipment necessary to tap into an electronic-mail system was prohibitive—about \$100,000. Spectraphysics' sales force, like sales

ELECTRONIC-MESSAGING VENDORS

Large-system electronic-mail software

Vendor	Product	Requirements	Price	Circle
Consolidated Data Processing (216) 942-1166	Arrow Mail	Burroughs mainframes	\$7,000 and up	443
Fischer Innis Syst. (813) 793-1500	Emc2	IBM mainframes running under TSO, CICS, or CMS; Interfaces with ACF/VTAM	Monthly leasing fee: \$500 to \$800	444
Orion Software (617) 576-0470	Telemerge	IBM S/34, /36, and /38	One-time license fee: For the S/34, /36: \$2,600 For the S/38: \$3,900	445

Micro electronic-mail software

Vendor	Product	Requirements/features	Price	Circle
Advanced Micro (415) 349-9336	Micro Ez Lnk	Runs on micros under: CP/M, MS-DOS, PC-DOS, and MP/M. Auto-dial; Auto log-on, log-off.	\$150	446
Hewlett-Packard (contact local sales office)	HP Message	HP touchscreen micros and IBM PCs. Exchanges documents between HP and IBM.	\$300	447
MCTel (215) 668-0983	Post-Plus	Runs on CP/M-based micros and TRS-80 line. Telecommunications software with integrated word processing; 1-key access to host services.	\$160	448
Micropro Int'l. (415) 499-1200	Telmerge	PC-DOS-based micros and Hayes Smartmodem asynchronous communications adaptor communications adaptor. An option on the 3.3 Wordstar menu converts document files to ASCII and supports command and protocol of most networks.	\$695; Wordstar Pro Plus package \$145 as add-on	449
Microstuf (404) 998-3998	Remote	IBM PC and compatibles. Allows micro with auto-answer modem to be operated from remote micro.	\$195	450
Omni Computer Syst. (617) 825-6700	Flash-com	IBM PC. Includes word processing forms manager, mail-list manager, and communications.	\$299	451
Software Connections (408) 988-0300	LAN: Mail Monitor 2.0 boxes.	IBM PC. Turns IBM PCs into an electronic-mail system.	\$745 for up to 75 users in same location; \$1,195 for up to 10,000 users; price includes modem software for communication over phone lines.	452

MESSAGE MASTERS

reps at Hercules, wanted convenient access to the home office without relying on cumbersome equipment. Spectraphysics now has 400 in-house users and may extend its network to customers as well.

Apart from price, when is a voice-based system preferable to a text-based system? Although their uses overlap, according to Walter E. Ulrich, voice is best suited for short, simple messages where tone and inflection may impart important information, such as a sender's displeasure or anger. Also, voice mail lets you deliver a mes-

sage at a specific time even if you or the receiver are away from your desks.

Some basic voice-mail features include an indicator—such as a light—that denotes when a message is waiting, the ability to get out of the system and back to a live attendant, and the ability to annotate someone's message and then pass it back to the sender or a third party.

Geisco, the data-processing division of General Electric, has found electronic mail to be the best choice for its communications operations. "Efficient, ef-

fective communication will be an increasingly significant distinguisher between successful and unsuccessful companies," says Ruann E. Pengov, general manager of GE's office-communication operation, based in Rockville, MD. Pengov says electronic mail has improved Geisco's communications abilities. "When coordinating a major project involving up to 15 countries, we'd be at a competitive disadvantage without electronic mail," she says.

Geisco has found numerous applications for its electronic-mail system. The

(Continued on page 134)

ELECTRONIC-MESSAGING VENDORS

Selected PBX-based voice-messaging systems

Vendor	Product	Features	Price	Circle
Centigram (408) 291-8200	Voicemail	2 to 14 ports; up to 13 storage hours	\$28,000 to \$62,000	453
Ericsson (714) 895-3962	Prodigy	System handles trunk or dedicated lines or a combination. Up to 40 lines support 400 users.	Under \$500 to \$650 per user	454
Genesis (916) 985-4050	Cindi 404	4 ports, 4 storage hours	\$10,400 to \$40,000	455
	Cindi 816	8 ports, 16 storage hours	\$40,000	
Octel Communications (408) 947-4500	Aspen	4 to 24 ports; 7 to 43 storage hours	\$55,000 and up	456

Stand-alone voice-mail systems

Vendor	Product	Features	Price	Circle
Commterm (617) 663-4442	Electronic Voice Exchange Office Messaging	Up to 32 ports; 60 storage hours	\$23,000 and up	457
	EVX 500	5 to 500 users	A no-penalty upgrade allows application of original price of EMX to any larger system.	
	EVX 1000	400 to 1,000 users		
	EVX 2000	800 to 2,000 users		
Sudbury (617) 443-8966	RTAS	Integrates voice and text over the same phone wires Up to 64 storage ports	\$40,000 and up	458
Sydis (408) 945-1100	Voice Station System	Integrates voice, text, and graphics 8 to 2,000 users	\$5,000 to \$8,000 per user; including terminals	459
VMX (214) 699-1461	Voice Message Exchanges:			460
	VMX 4	up to 500 users	\$50,000	
	VMX 64	up to 8,000 users	\$500,000	
Votan (415) 490-7600	VPC 2000	Single-channel system for IBM PC. Includes printed circuit board and 3 software packs.	\$2,450	461
	VTR 6000	Voice terminal, 128-K memory	\$4450	
	VMS	4- or 8-channel system for multiple users	\$25,000 to \$36,000	

ELECTRONIC MAIL IN VOICE OVER THE TELEPHONE

Pick up the phone anywhere, any time and get your E-mail in voice.

"Important messages inevitably arrive when you are not there to receive them."

— *Another Murphy's Law.*

How many times have you been away from your office when important or urgent messages arrive in your electronic mail box? You might be in an airport terminal, but nowhere near an E-mail terminal.



Think what it could mean to get your E-mail anywhere you go. Across town. At home. In another time zone.

Now you can. Any time, 24-hours a day, whether you're in the office or not.

Just add CallText™ to your present E-mail system.

CallText combines a telephone interface with the most advanced text-to-speech technology in products that automatically answer the telephone and speak your E-mail messages to you.

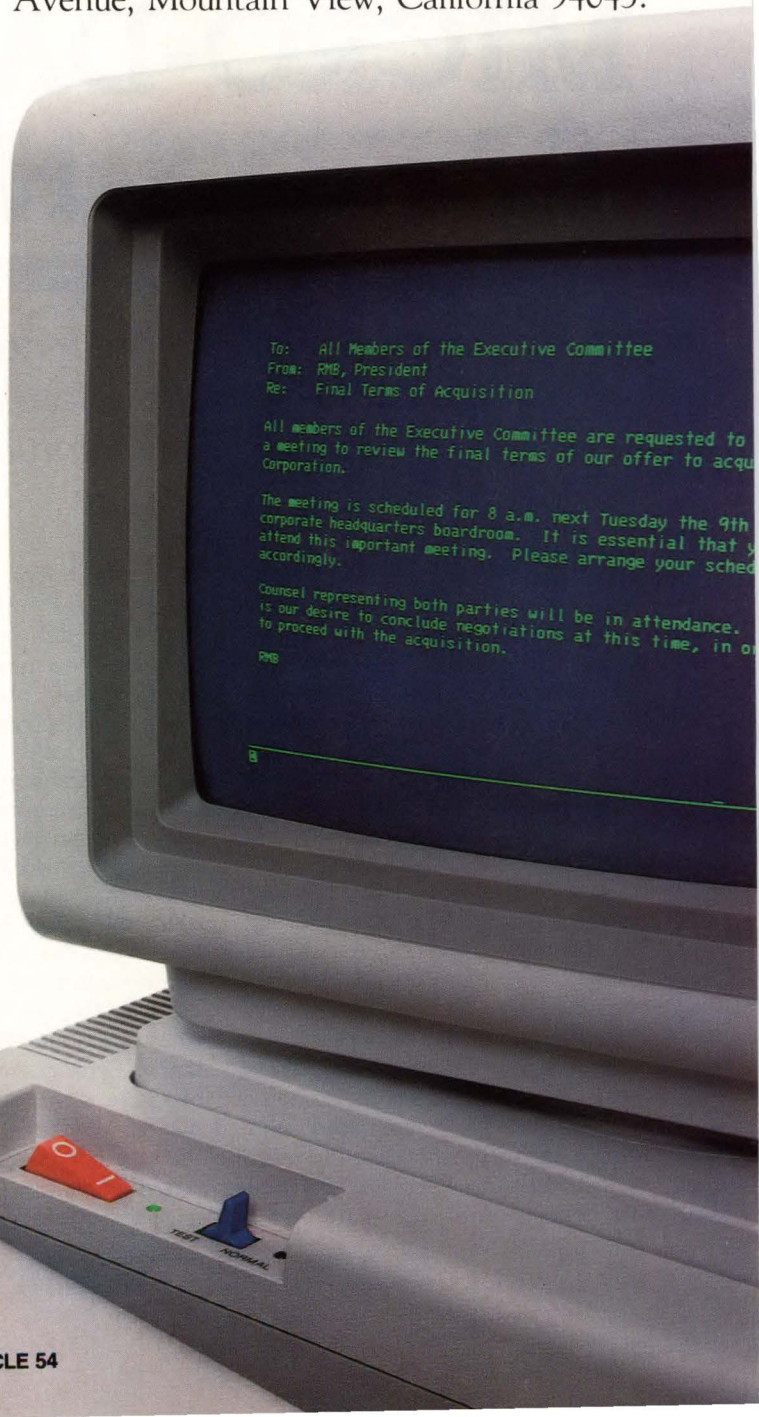
It's easy to add a new dimension in flexibility and convenience to your electronic mail system with cost-effective Call-Text Systems.

CallText products are available for any

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BOOSTING MICROS

PROVIDING A MICRO-DATA SAFETY NET

Backing up personal-computer data may be a nuisance, but the consequences of ignoring backup can be painful.

by Frederic Paul

What parts of the personal computers you manage are irreplaceable? Hardware and software come to the minds of most MIS/dp managers, but equipment and most software can be replaced. On the other hand, the data on a microsystem can be lost forever. Even if you can retrieve damaged data, the recovery process is costly. And think of the business lost while you're chasing lost data. The only insurance against a potentially catastrophic data loss is backup.

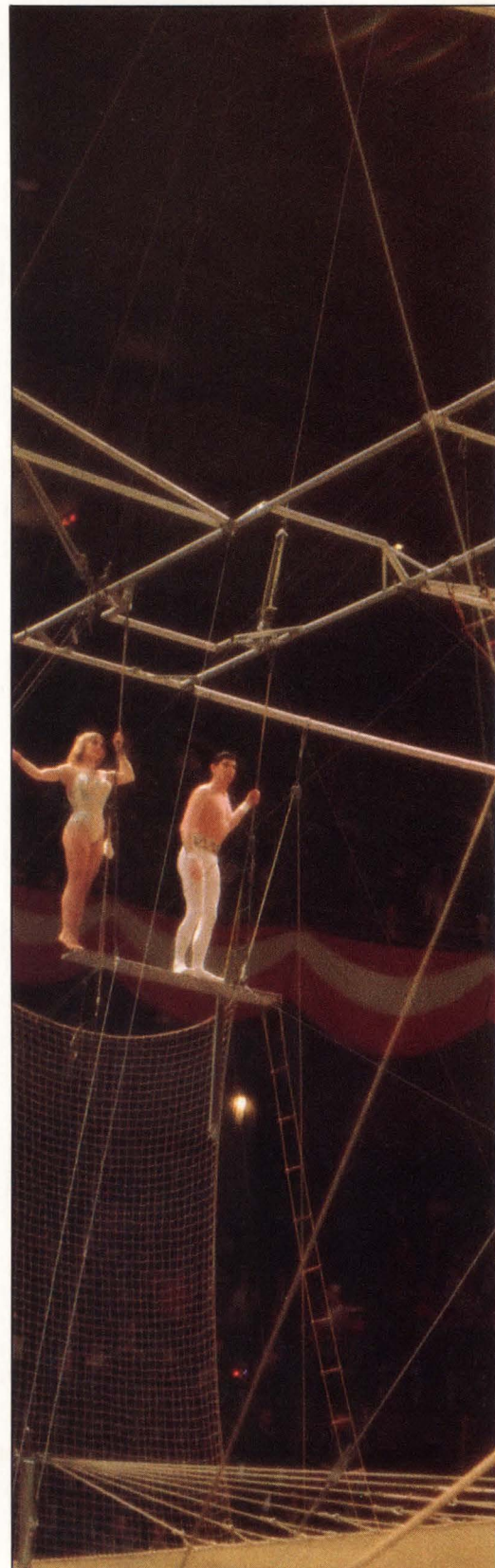
Just a few years ago, microcomputer data were much less vulnerable. They were stored almost exclusively on floppy disks, inherently limiting the severity of a data loss. But the spread of hard-disk storage units raised micro storage capacity, increasing the risk of big losses of data. Local-area networks that depend on a single hard disk to

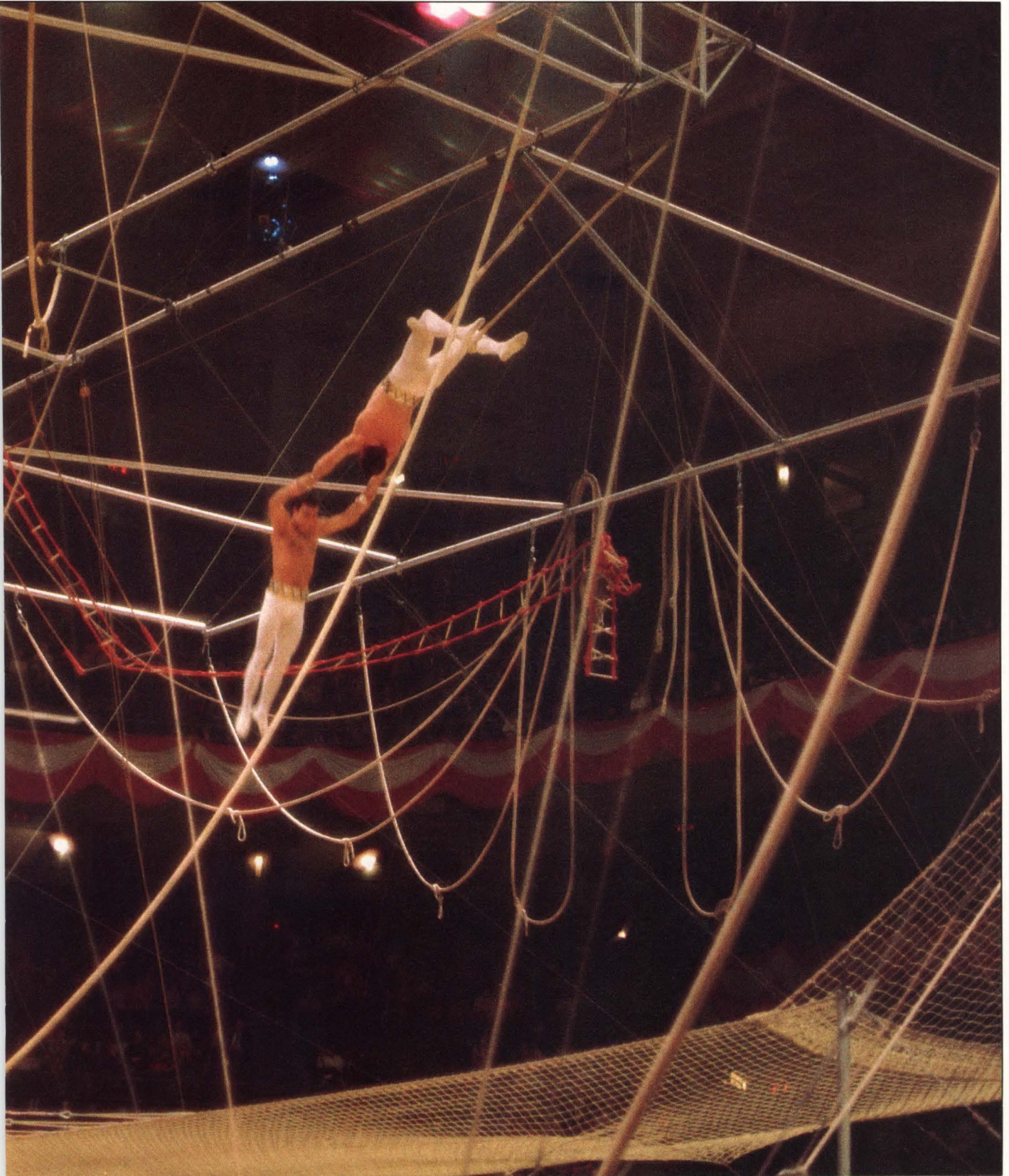
serve an entire group of personal computers raise the stakes still further. If the server disk goes down, the data used by the entire network could be lost in a single crash.

As personal computers begin to take over many tasks formerly assigned to mainframes and minis, MIS/dp managers must ensure that new users use the backup techniques and practices routinely performed in the data center to safeguard data on large systems.

Imposing such standards is no mean feat. When it comes to micros, authority is decentralized, and backup can fall between the cracks. Jim Siler, at the Chase Computer Store at Chase Manhattan Bank in New York, says, "No one here is responsible for microcomputers. We have a lot of fiefdoms. We're divided along banking lines, not computer lines."

Ben Katz, MIS consultant at the





accounting firm of Laventhal and Horwath, New York, also worries about this issue. "My responsibility is to inform end users; their responsibility is to take care of their own business. For the most part, everything on a hard disk gets backed up, but we've lost spreadsheets holding many hours of work. Backup isn't always done."

It's too easy to succumb to the temptation to simply trust the hard disk. After all, hard disks are quite reliable and getting more so all the time. According to a recent study by Datapro Research Corp. (Delran, NJ), the mean time between failures for Winchester hard disks ranges from 8,000 to 12,000 hours of use.

But that's not good enough. Although not common, disasters do happen. Waiting until your users suffer one is akin to shutting the barn door after the horse has left. David Peters, vice president of MIS operations at MCI, Washington, which has over 700 micros, says that "backup systems haven't had to save the day yet, but as

"Although not common, disasters do happen."

much as we're using the micros as integral parts of our processes, that day won't be far off."

Outside events, such as power outages or brownouts, or natural catastrophes such as fires, floods, or earthquakes, can destroy the hard disk along with the data it holds. More common, more insidious, and more often ignored, however, is human interference, both accidental and malicious.

Recognizing the need for backup is easy, but choosing the right methods and equipment can be confusing. You must consider tradeoffs between speed, convenience, flexibility, data integrity, transferability, equipment costs, and media costs. Organizations can choose among floppy disks, superfloppies, tapes, and newer meth-

ods to back up personal-computer data. No one product or method is perfect for all applications, so you have to carefully weigh your users' needs against the available options.

Traditionally, floppy disks have been backed up relatively quickly and easily onto other floppy disks. Backing up a 10-megabyte hard disk with another hard disk, however, is expensive. And if you back up a hard disk with floppy disks, be prepared to spend some time on it. Al Harding, who owns the Computerland store in Santa Fe, NM, says, "Nobody's going to buy 30 floppies and sit there for hours backing up a hard disk. So, usually, there is no backup at all." Nevertheless, IBM's manuals still recommend backing up with floppies.

Infotools (Santa Clara, CA) has created special software to help speed backup with floppy disks. David Alderman, president, claims that Infotools' \$150 Backup management program can make floppy-disk backup competitive with faster tape systems. "The

BACKUP FOR MICRO DATA

Vendor	Product	Requirements	Price	Circle
Advanced Digital Information (206) 822-5579	Data Library tape drive	IBM PC	\$3,900	401
Advanced Peripheral Tech. (301) 992-1952	PC Tape	IBM PC	\$1,595	402
Alloy Computer Products (617) 875-6100	PC Qic-Tape PC-Backup PC-Stor PC Qic-Stor	IBM PC IBM PC IBM PC under DOS IBM PC	\$2,295 \$2,195 \$4,295 to \$10,995 \$4,595 to \$11,295	403
Cipher Data Products (619) 578-9108	F 880 1/2-inch streaming-tape drive Model 540 1/4-inch streaming-tape drive Model 990 1/2-inch streaming-tape drive, cache memory, and GCR Floppy Tape Model 5210	IBM PC IBM PC IBM PC	\$4,000 \$970 \$9,000	404
CMC Int'l. (206) 885-1600	Targa + Tape hard disk and tape backup	IBM PC	\$1,945 to \$1,995	405
Control Data (612) 853-8100	Storage Master 745	IBM PC, PC XT, and PC AT	\$2,495	406
Corvus Syst. (408) 559-7000	The Mirror VCR-based backup The Bank tape drive	IBM PC XT and most micros using hard-disk drives IBM PC XT	\$495 to \$990 \$2,195	407
Datatron (714) 544-9970	Slim 2000 hard disk and backup tape drive	IBM PC	\$2,995	408

BOOSTING MICROS

copy routine is so fast that it allows a 10-Mbyte hard disk to be backed up in 28 minutes, and incremental backup of changed files can be done in up to three minutes," says Alderman. "It's also affordable, so every user in the company can have a copy, and it's auditable." Backup works with any file-oriented storage medium.

Increasing floppy-disk capacity is another way to improve backup performance. IBM's PC AT, with its half-Mbyte floppy drives, has garnered the most attention in this respect. In fact, IBM's decision to sacrifice file-access time for capacity on the AT makes it clear that the floppy drive was configured specifically for backing up data and loading programs, rather than as a primary storage device.

Of course, floppy disks will always have a place backing up micro-based data. They require no new investment and all users know how to use them. According to Katz, all backup at Laventhal and Horwath is done on floppies, and incremental backups gen-

erally take no more than five minutes.

If your users need faster, hands-free backup, tape subsystems offer a relatively fast and reliable alternative. A while ago, floppies displaced tape as the primary storage medium for microcomputers, but tape is making a comeback in backup applications. Mainframes have long used half-inch, reel-to-reel tape for backup, and half-inch drives, such as those supplied by Telebyte Technology for the IBM PC, are still appropriate for certain applications. However, a variety of new tape formats are now available for personal-computer backup.

Most of today's micro tape drives use quarter-inch tape in some form of cartridge or cassette. Perhaps the key distinction among tape drives is between mirror-image drives and file-by-file systems. "Historically, mirror-image versus file-by-file meant streaming drives versus start-stop drives, but that's no longer true in most circumstances," says James Stevenson, president of the Strategic Planning Group, a

San Diego consultancy. "While start-stop has its advantages, today's streaming-tape systems can back up in almost any way possible. The software just takes the files from the hard disk, rearranges them on the hard disk or in random-access memory, and then streams them onto the tape in the new organization. Since the files are no longer fragmented, you can retrieve them individually. You don't even have to think about it."

Stevenson adds, "One problem is that every vendor uses the word 'streaming' differently. To some it means any quarter-inch drive, to others it means only mirror-image backup without file-by-file capability, and to others it merely means high-speed, file-by-file backup."

"Start-stop" has a clearer meaning. These drives separate blocks of data with gaps that help the software find particular files and file fragments, allowing speedy backup and restoration of individual files, as though the drive were a huge floppy disk. You pay a

BACKUP FOR MICRO DATA

Vendor	Product	Requirements	Price	Circle
Datrex (602) 272-9491	Super XT removable-cartridge drive	IBM PC	\$1,995	409
Davong Syst. (408) 734-4900	System Tape Data System tape drive	IBM PC, PC XT, and PC AT Same systems	\$1,610 to \$1,895 \$2,795 to \$4,995	410
Eicon Research (212) 719-5353	Terra-Drive superfloppy	Apple IIe and II Plus	\$995 to \$1,595	411
Emerald Syst. (619) 270-1994	Series 2000 hard disk and cartridge-tape drive	IBM PC, PC XT, and PC AT	\$4,350 to \$15,850	412
Genie Computer (818) 991-6210	Genie 5 + 5 Winchester disk and tape backup	IBM PC; Apple IIe and II Plus	\$2,000 to \$4,000	413
Great Lakes (312) 884-7272	Hard disk and tape backup	IBM PC	\$2,490	414
Helix Labs. (818) 710-0300	Bubble boards	IBM PC; Apple II	\$475 to \$1,495	415
Hicomp Computer (206) 881-6030	MBM-502A and -506AR bubble drives	IBM PC	\$995	416
IDE Assoc. (617) 663-6878	Ideadisk hard disk and cartridge or streaming-tape cartridge backup	IBM PC, PC XT, and PC AT	\$1,595 to \$5,145	417
Iomega (801) 776-7330	Bernoulli Box	IBM PC and PC XT	\$2,695/single drive \$3,695/dual drive	418
Lancore Tech. (818) 991-5100	PC Core 45 and 75 hard disk and tape backup	IBM PC AT	\$5,995 and up	419

BOOSTING MICROS

price for this capability, however: slower speed when dealing with a disk full of data and a more sophisticated drive motor. Also, the gaps reduce data density and consume more tape.

Competition between these two major formats also divides the tape-backup alternatives. One format was submitted by the Quarter-Inch Compatibility (QIC) Committee, which attempted to set accepted streaming tape standards for quarter-inch applications. Representatives from several major vendors, including AT&T, Cipher Data Products, Data Electronics,

and Tandberg Data, were part of the committee, which called its format Qic-24. The other format is a standard submitted by Tallgrass, a leading maker of disk and tape drives that is trying to buck the Qic trend with its Personal Computer/Tape (PC/T-11) format.

What are the differences between the two formats for tape backup? Ken Cruden, vice president of marketing for Data Electronics, describes Qic-24 as "a method in which data are laid out on tape so that you can interchange from one manufacturer's drives to another's. It is streaming only, which is one of the

differences between it and Tallgrass' PC/T-11."

Tallgrass' PC/T-11, the other major tape format, combines start-stop with "quasi-streaming" modes to fit up to 60 Mbytes of formatted storage on a standard quarter-inch DC-600A tape cartridge.

The PC/T-11 format secures data more cheaply, easily, and conveniently than does Qic-24, claims Steve B. Volk, vice president of marketing at Tallgrass. "Backup must be inexpensive, and Qic is expensive. Our drives use a tape head that is less than one-

BACKUP FOR MICRO DATA

Vendor	Product	Requirements	Price	Circle
Mountain (408) 438-6650	MT-4000-04 hard disk and tape backup	IBM PC and PC XT	\$5,595	420
North Atlantic Quantex (516) 582-6060	Ram Tape PC	IBM PC	\$1,995 to \$2,295	421
Omega Electronics (214) 234-6900	Bubble boards	IBM PC, PC XT, and PC AT	\$750 to \$1,825	422
Quadram (404) 923-6666	Quadtape	IBM PC	\$1,395 to \$1,895	423
	Quaddisk	IBM PC	\$1,795 to \$3,095	
Shugart (408) 737-7900	Optimem 1000 optical disk	IBM PC	\$12,000	424
Sunol Syst. (415) 484-3322	Sun-Safe tape backup	Many micros	\$1,400	425
Sysgen (415) 490-6770	Image tape backup	IBM PC, PC XT, and PC AT	\$995	426
	Qic-File tape backup	Same systems	\$1,395 to \$1,495	
	XL Winchester disk and tape backup	Same systems	\$3,295	
Tallgrass Tech. (913) 492-6002	TG-4060 cartridge-tape backup	IBM PC	\$1,995	427
Tandberg Data (714) 978-6771	Deputy 1/4-inch streaming-tape drive	IBM PC, PC XT, and PC AT	\$1,295/add-on \$995/ add-in \$995/	428
Telebyte Tech. (516) 423-3232	TDX-45	Many micros	\$4,200 to \$8,000	429
	TDX-75	Many micros	\$5,500 to \$9,500	
Upland Tech. (516) 231-0770	Silo/PCX tape backup	IBM PC	\$2,195	430
Variant Tech. (818) 904-9780	Bak Pak cartridge-tape backup	IBM PC XT	\$995	431
	Bak Pak II cartridge-tape backup	IBM PC AT	\$1,095	
XComp (619) 573-0077	10-N-10 dual-disk system	IBM PC; micros under CP/M-86	\$4,295	432
	X Series hard disk-Winchester combination	Same systems	\$4,295 to \$5,195	

third the cost of a Qic head and an inexpensive single-chip formatter," he says. And, while Qic has no significant error correction, PC/T-11 can recover up to 4,000 bytes per block, and it's user-transparent.

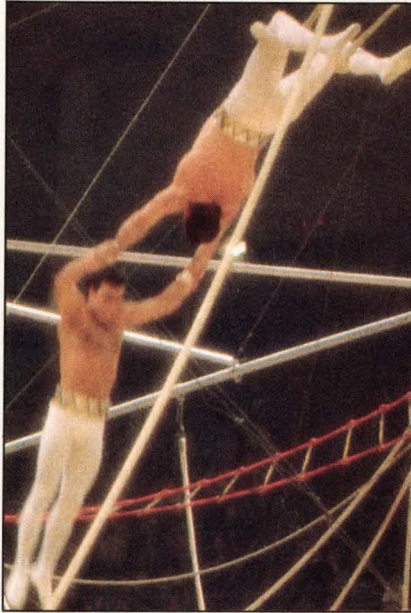
Of course, PC/T-11 and Qic-24 are not the only factors to consider when looking at tape drives. A big trend in start-stop drives is the attempt to emulate MS-DOS floppy-disk commands, so the user can treat the tape drive as just another floppy.

Cipher Data Products uses what it calls "floppy-tape" technology in its 20-Mbyte file-by-file Model 5210, which will debut early this year. Upland Technologies offers a floppy-type interface in its 67-Mbyte Silo/PCX. Davong Systems Inc. makes the System Tape, a 24-Mbyte start-stop tape drive that also emulates a 24-Mbyte floppy disk under DOS.

Tape drives often come neatly packaged with the hard disks they're supposed to back up. The Sysgen XL, for example, combines a 20-Mbyte half-height Winchester (expandable to 100 Mbytes) with a 60-Mbyte half-height tape drive. The Davong Data System combines (10- to 43-Mbyte) hard disks with a 24-Mbyte random-access tape drive. These are especially well suited for use as the primary data storage and backup system for Davong's Multilink network. Alloy also markets integrated products, such as its PC-Stor and PC Qic-Stor, with hard-disk capacities up to 170 Mbytes, and formatted tape-cartridge capacities up to 17.7 Mbytes on PC-Stor and 40.6 Mbytes on PC Qic-Stor.

Compaq Computer Corp., Houston, and Columbia Data Products Inc., Columbia, MD, have taken the concept of integration a step further; they make microcomputers with both the hard disk and tape drive built in. The \$7,195 Compaq Deskpro 4, for example, comes with a 30-Mbyte Winchester, a 10-Mbyte tape drive, and a floppy drive.

With special software and interfaces, video recorders can also be pressed into service for backup. Backing up personal-computer data on a VCR is relatively slow, but it does boast a high per-tape capacity and a low price. The



\$495 Mirror, from Corvus Systems, for example, connects an IBM PC expansion slot to a VCR format recorder. A \$990 version includes a network bus.

Tape drives have other uses besides day-to-day backup. Advanced Digital Information Corp. makes a 67-Mbyte file-addressable tape drive called the Data Library. It costs \$3,900, significantly more than standard tape drives, but Data Library can back up individual microsystems and Novell network LANs; it comes with software to archive data that isn't needed every day and is designed to work like a slow hard disk so that your department doesn't screech to a halt if its mass storage crashes. It even functions as a data-transfer medium. "Although its main function is backup, we also use the Data Library to transfer data from our Hughes Aircraft job site in California to our headquarters in Spokane, Washington," says Lee Pointer of Tele-dynamics Inc. "We use it instead of transmissions over phone lines for security reasons and because of the large amount of data involved."

The Bank, from Corvus Systems, is a 200-Mbyte random-access tape drive that was designed specifically to support micro networks. The drive has an interface for Corvus' Omninet LAN, and its large capacity enables backup of many hard disks. The Bank can find any record on a 200-Mbyte cartridge in a maximum of 20 seconds, according

to the vendor. The device also accepts 100-Mbyte cartridges, a feature that cuts access time in half.

When dealing with hard disks, perhaps the best backup is another hard disk. Equipping every user with dual hard disks can get expensive, however, and two hard disks attached to the same system would share many of the same vulnerabilities to crashes. In networks, in which two disks can be physically separated, this provides an excellent backup solution.

What is forecast for the future? Tape is likely to remain the standard backup medium for quite a while, and consultant Stevenson sees a trend toward large systems that can actually emulate a slow hard disk when necessary. Improvements in removable-hard-disk technology will put increasing pressure on tape-drive makers to offer more speed, convenience, and features. Prices of removable hard disks should go down, and that will affect the prices of tape drives as well.

Further down the road, completely new technologies hover on the horizon, promising to revolutionize data storage and backup. Optical storage in particular has the potential to hold staggering quantities of data in extremely small spaces and provide practically instantaneous access to it. The only obstacle holding back optical storage is the lack of erasable disks. Still, financial and insurance companies that need permanent audit trails find uses for nonerasable optical disks. Systems using 12- or 14-inch disks already are being used for mainframe storage, but Stevenson believes the 12-centimeter compact-disk format is sufficient for micros. The drives could be variations of the audio players now in use, which might help lower the almost \$2,000 price tags these machines are expected to carry.

Until erasable optical disks arrive, backup is doomed to a secondary role in many organizations. Eventually, however, you'll have to provide a safety net for those all-important data. With hard disks and other backup products available, why wait? □

Frederic Paul is a free-lance writer based in New York City.

(Continued from page 126)

system is used externally to furnish bids on construction sites throughout the world and to coordinate workers at up to 10 construction sites. Internally, the system is used to give notice of personnel changes and dispense sales orders, sales reports, and client reports. In addition to using its system in-house, Geisco offers Quik-Comm, a worldwide electronic-mailbox service, to outside subscribers.

Albert B. Crawford, Digital Equipment Corp.'s manager of internal information processing, heartily supports electronic mail. In a 1982 report on DEC's internal system, Crawford wrote: "Most managers reported that EMS (Electronic Messaging Service) increased the speed of their decision-making because information collection and staff coordination were facilitated." DEC has the largest private electronic-mail service in the world. Forty thousand of the vendor's 85,000 employees send an estimated 400,000 messages daily from personal computers, terminals, and other workstations. DEC also markets its DECmail/MS messaging service to subscribers.

After a slow start, electronic messaging is starting to take root in Fortune 1,000 corporations. Could 1985 be the year that this 10-year-old technology finally blossoms in the office?

The progress of text messaging is closely tied to a greater overall acceptance of computers as management tools. "Computers aren't just being used for back-room operations, but by and for professionals in the front office," says Pengov of Geisco.

Another catalyst on the electronic-mail scene is the increasing availability of easy-to-use communications software featuring auto log-on and auto-dial features. Even the popular Wordstar word-processing program from Micropro, San Rafael, CA, has an electronic-mail option called Telmerge that lets users send messages on communications networks.

Every day, executives must make decisions that will, in one way or another, shape their organization's future. Although text and voice messaging provide information pipelines that can im-

Some analysts predict that this is the year electronic mail, a 10-year-old technology, will gain momentum.

prove decision-making, managers have been slow to tap these resources.

One reason for this hesitancy is that it's easier to measure how many letters a secretary has typed in one day than it is to measure how much brain power an executive has invested in a project. "OA planners like to concentrate on the clerical level, where any improvement is easy to measure," says Susen Kay, a senior planner at AT&T in Lisle, IL. "This is unfortunate because knowledge workers stand to gain the most benefits from any OA effort."

Another roadblock to voice and text messaging is the common misconception that executives and technology mix like oil and water. Many managers simply refuse to use keyboards. The problem here, according to Kay, is not in the complexity of learning the keyboard, but rather the amount of time and effort it takes to operate it. "Administrators want to keep keyboard contact to a minimum," says Kay. "They certainly don't want to spend time loading diskettes and operating systems." But what many managers don't realize is that communications software now exists that can automate some of the functions managers find distasteful.

Executives react differently to electronic messaging's tendency to reduce face-to-face contact. "Many stated that it [lack of contact] was a problem because it reduced the 'interpersonal flavor of working,'" reported DEC's Crawford in his report. "Others said that they liked some reduction in face-to-face contact because it saved them time."

When managers and executives develop a bias against text and/or voice messaging, they are doing themselves and their corporations a disservice. "These technologies free managers

from the restrictions of paper-and-telephone communications," says Tom Hannagan. "Managers who have access to voice or text messaging don't have to waste as much time playing telephone tag and composing and proofing letters."

Success will remain elusive, resulting in a tremendous waste of time and effort, unless the technology corresponds to a corporation's specific needs. "Every manager has select responsibilities," says Hannagan. "Unless the new technology addresses his or her needs, the manager won't use it. When supplying corporations with a new system, we look for applications they can use, discuss it with them clearly and simply, and then tell them how it can best suit their particular environment."

One of Hannagan's clients, an energy company, spent millions in research and planning, but its electronic-mail system failed because the OA planners failed to ensure that the technology was made accessible to all the new users. Instead, the implementers became enamored with the new technology. "The guys out there moving tankers from the Mideast to the states don't care about lines-per-second, baud rates, or smart or dumb terminals," says Hannagan. "They just want to keep track of their oil tankers and get them to the right port at the right time. Electronic mail may help them do that, but their OA planners didn't stop to show them how."

Businesses must learn that voice and text messaging are not a panacea for corporate ills. "Organizations have so much inertia that merely introducing a new technology won't change the whole organizational structure," says Walter E. Ulrich. "A healthy, well-organized firm has developed an environment that encourages communications—with or without voice or text messaging."

It's true that most corporations won't sink or swim solely on the basis of their communications network. Yet, those businesses that dare to risk investing in these new technologies are sending and receiving messages faster and cheaper than ever before. And this initiative just might be enough to give these pioneers a leading edge. □

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Circle 213

DEC VT-220 EMULATOR

The Zephyr DD-220 fully emulates DEC's VT-220 terminal. Price: \$850. Model DD-220's 14-inch, high-resolution, lockable tilt-and-swivel monitor can display 25 rows and either 80 or 132 columns in five character fonts. The model features bidirec-

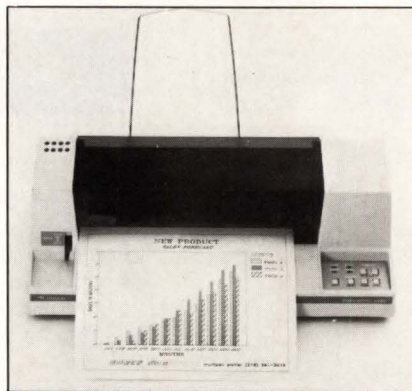


tional scrolling, and 15 of its 20 function keys are programmable. The model has two standard communications ports: an RS-232C/RS-423 or 20mA current loop and a buffered RS-232C interface.

Zentec Corp., 2400 Walsh Ave., Santa Clara, CA 95050.
(408) 727-7662.

Circle 214

MICRO PLOTTER



The Colorwriter 6120 includes seven multicolor roller and ceramic-tipped pens for use on standard bond paper, coated paper, or transparencies. Price: \$895 and up. Colorwriter has a resolution of .002 inches, plots at 7.8 inches per second, and uses an RS-232C or Centronics interface. It is compatible with most micros and micro applications.

Gould Inc., Recording Systems Div., 3631 Perkins Ave., Cleveland, OH 44114.

(216) 361-3315.

Circle 215

DUAL-MODE PEN PLOTTER

Model 1044, the newest entry in Calcomps' 1040 series of pen plotters, operates in both cut-sheet and contin-

uous-roll modes and offers an eight-pen turret with automatic pen capping. Price: \$11,995. The plotter operates in a local or remote environment and provides full-width plotting capability up to ANSI size E or ISO size AO. Features include non-volatile set-up memory, automatic log-on messages, self-test diagnostics, and an integrated communications interface that makes the plotter compatible with all CAD systems, including MS-DOS and CP/M-based systems.

Calcomp, 2411 W. La Palma Ave., Anaheim, CA 92801.

(714) 821-2142.

Circle 216

GRAPHICS TERMINALS

The Tektronix CX4106, CX4107, and CX4109 color-graphics terminals are plug-compatible with the IBM 3270, affording IBM users the use of Tektronix' Plot 10 graphics command set. Price: \$7,950 to \$13,305. The terminals display up to 16 colors simultaneously and support VT100 extensions and ANSI X3.64 editing and word-processing standards.

Tektronix, P.O. Box 500, Beaverton, OR 97077.

(503) 644-0161.

Circle 217

VIDEO-DISPLAY TERMINAL

The CIE-7800 Model 2 video-display terminal is plug-compatible with IBM 3178 and IBM 3278 Model 2 display stations. Price: \$1,275. The Model 2 has a 14-inch nonglare screen, 24-line-by-80-character screen format and an RS-232C printer port. Options are available.

CIE Systems, 2515 McCabe Way, Irvine, CA 92713.

(714) 660-1800.

Circle 218

We interrupt this
magazine to introduce...

ENSEMBLETM

The first integrated productivity software for the MacintoshTM

Featuring: Data Base, Report, Form,
Graphics, Word Processing,
Calculations.

Runs in 128K or 512K.

HAYDEN
SOFTWARE

Runs in 128K

ENSEMBLE -- A phenonemon in 128K

Ensemble integrates data base management, report and form generation, graphing, word processing, and calculation capability into a cohesive productivity tool that handles numbers, text, and graphics equally well. It was designed specifically for the Macintosh and fully utilizes the system's unique features.

Ensemble runs on both the 128K and 512K versions of the Macintosh. The 512K version takes advantage of the additional RAM by providing faster operating speed.



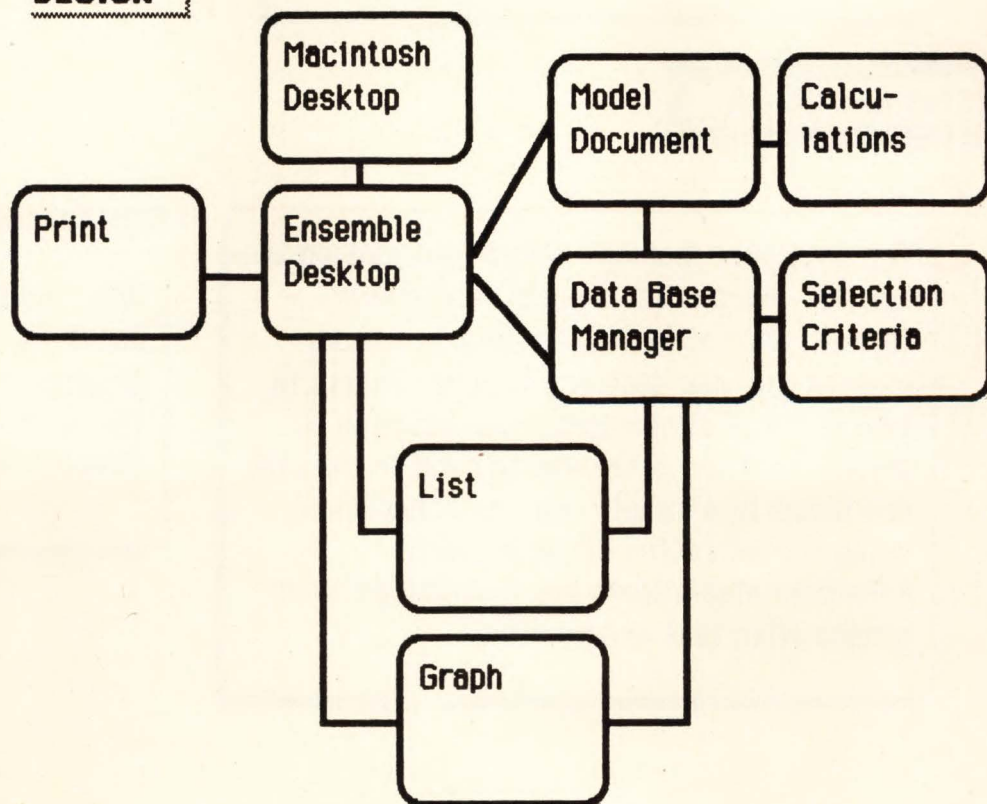
A Fully Integrated Product

Ensemble is the perfect productivity aide for information management; financial, production, or marketing report generation; graphing; decision analysis; developing page layouts for brochures; and mail/merge.

If you need productivity support in any one of these areas, Ensemble delivers. And for executives who demand the ability to move instantly and effortlessly between a variety of applications, Ensemble is the natural choice.

Ensemble -- Power At Your Command

The data base management function is the kernel of a series of satellite applications that are interactive with the data base. The interactivity of the Ensemble system design provides unparalleled power, allowing the user to process fixed or variable entries along with calculations, charts, tables, graphs, text and pictures. The user can also work with up to three files at the same time, connect them, or establish data flow from one file to the other.

**SYSTEM
DESIGN**

**Integrates text,
numbers, graphics**

Data Base Manager

The data base manager is the focal point for all operations on information stored in Ensemble. Text, numbers, and graphics are all capable of being stored either as separate files or as integrated ones. All fields, records, and files are treated as variable length. The only limiting factor is available space in RAM or on disk.

The Data Base provides full integration of text, numbers, and graphics.

List and Graph

The data base manager feeds information to the list, which displays data in tabular format, and to the Graph which produces elegant pie, bar, line and scatter charts in two or three dimensions. Information is culled from the data base to send to the List and Graph in a simple one-step operation using the Selection Criteria mode. Ensemble also allows you to highlight your graphs with text and pointers.

Data can be beautifully graphed in two or three dimensions

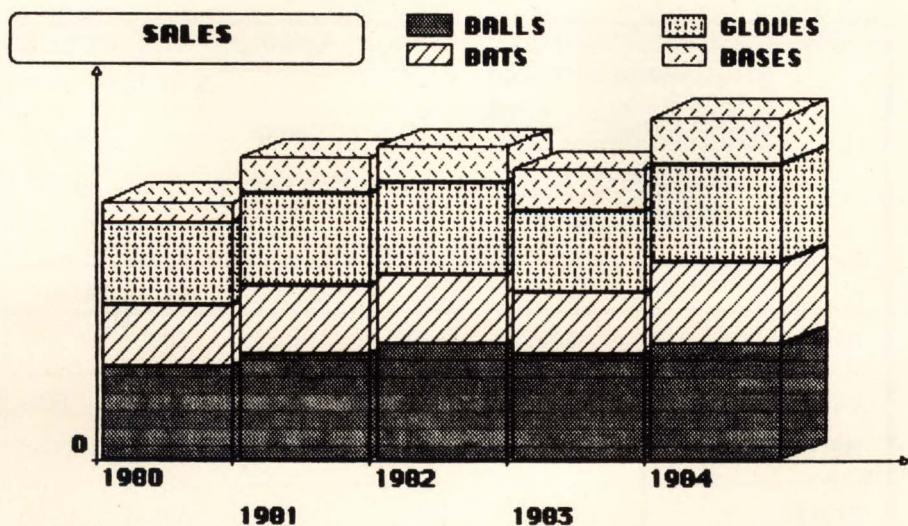
Model Document

In the Model Document mode, you define how records will be structured within files with MacPaint-like graphics and a built-in word processor. Ensemble lets you "draw" your documents in unlimited formats. You can set up, and instantly change, data, text, and picture fields. In fact, Ensemble was used to prepare this brochure.

The Model Document mode provides both the form for data storage and the layout for reports used by the system. A form can be any number of pages in length.

Draw your own documents and include images from MacWrite and MacPaint.

Ensemble created the graphic you see below and integrated it into this brochure...



Calculate and
connect in multiple fields

Selection Criteria

All information recorded can be sorted on several keys and quickly retrieved by using a combination of any criteria desired such as: equal to, greater than, less than, not equal to, between -- as well as others.

Ensemble offers a complete set of retrieval criteria.

Calculations

From the Model Document mode, you can set up interdependent fields, either within or between files, using the Calculation options that Ensemble provides. Simply call up the Calculation functions and select from a variety of mathematical, comparative, and conditional states that allow fields to be variable based on input or the state of other fields. This is the perfect feature for "what if" analyses, for generating invoices, bills of materials, and a multitude of other documents.

Profit Analysis					
PROFIT ANALYSIS		% of Net			
1984		Cost of Goods	0.25		
		Marketing Exp.	0.20		
	Q1	Q2	Q3	Q4	Total
Net Sales	5000.	3000.	3000.	7000.	18000.
Cost of Goods	1250.	750.	750.	1750.	4500.
Marketg. Exps.	1000.	600.	600.	1400.	3600.
Profit	2750.	1650.	1650.	3850.	9900.

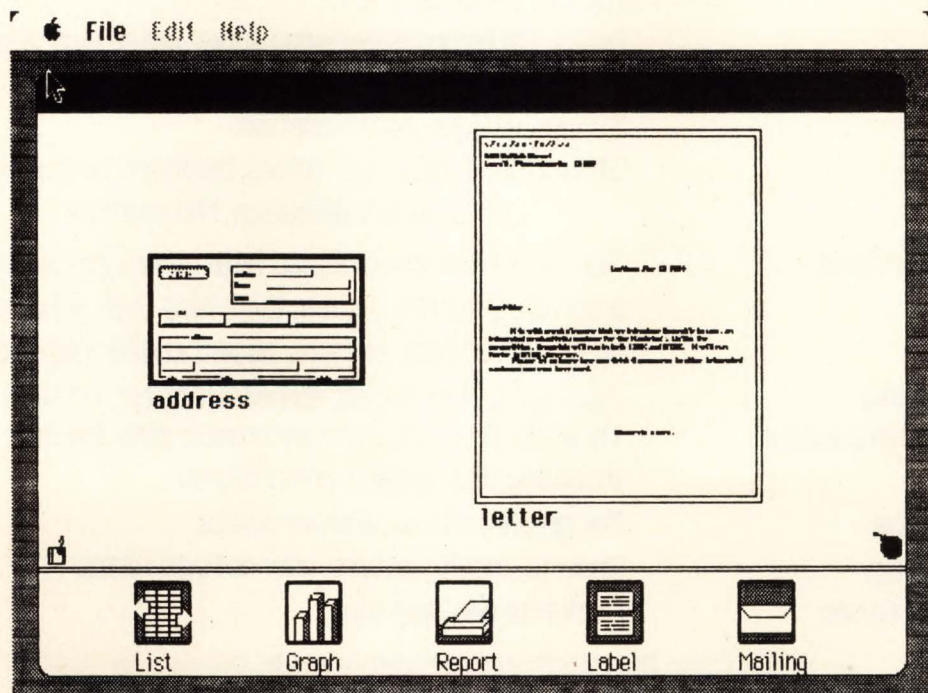
Unlimited
report capabilities

Reports

You can choose information in your files to be printed out on reports, labels, or any other kind of document which you can create using the features of the Model Document function. Generate personalized letters, bills, estimates, etc. Use one file as input and another as output to do a powerful mail/merge.

The report facility in Ensemble is full featured, flexible, and permits mail/merge.

Merge Letter and Address Files



View from the Ensemble Desktop

Technical Specifications

Capacity

Ensemble processes all its data on a variable length basis and sets practically no other limit aside from those inherent to the central memory or storage disk used. In a Macintosh configuration of 128K, approximately 20 to 30 K are available for use with the documents on line. One single document can alone take up all this space and divide it into any number of fields of any possible size (text or graphs). A file may take up an entire disk and the maximum number of data records depends only on their average length — usually from 1,500 to 2,000 address records on a 400 K disk.

Calculations Mathematical Functions

Any entry may be the result of a calculation.

Scientific: Trigonometric, exponential, logarithmic, absolute value, integer value.

Logical: AND, OR, NOT.

Dates: Differences between dates, dates plus or minus a number of days.

Strings: Length, concatenation.

Statistics: Totals, sub-totals, balances, averages, standard deviation, Min and Max.

Selections

Any field alone or combined with others can be used as a search criterion: greater than, less than, equal to, not equal to, between, present, absent and/or keywords.

Sorting Multiple Files

Ascending, descending, alpha/numerical, chronological. Three on-line files with automatic data transfer, including text, graphs, and pictures.

Graphs Editing Interfaces

Bar graphs, curves, and pie charts

Reports, labels, letters, user defined forms

MacWrite and MacPoint.

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HAYDEN
SOFTWARE

600 SUFFOLK STREET
LOWELL, MA 01854

PRODUCTS / SOFTWARE

PERFORMANCE TOOL FOR DASD

The new 3.1 version of FastDASD recommends volume reorganizations that place frequently accessed files close together. Priced at \$7,900, the tool features VSAM reporting, dual-density volume support, dynamic volume access, and production of a DF/DSS Jobstream. FastDASD supports all IBM/OS operating systems and 3330, 3350, and 3380 DASD and plug compatibles. Version 2.0 of Data Check Recovery, a data-recovery utility, incorporates new scanning and reporting features and supports all OS operating systems and all DASD types that use CKD architecture except the 2321 Data Cell. Price: \$9,500. Changetracker, an automatic change-

tracking system for load modules, supports all IBM OS operating systems. Priced at \$6,500, it records vital statistics and includes an optional narrative for describing the reason for a change.

Software Corp. of America, 360 Herndon Pkwy., Herndon, PA 22070. (703) 471-1545. **Circle 236**

DEVELOPER TOOL KIT

Developer Tool Kit includes three software products that enhance application development for IDMS users. Price: \$14,900. The products are On-line Test, which tests ADS/ONLINE dialogs and IDMS-DC Cobol and As-

sembler programs; Dictionary Module Editor, with which users can edit integrated data-dictionary modules; and Dictionary Migrator, a utility that simplifies migration of systems from the testing phase into production. The Developer Tool Kit will eventually include eight software components and will be sent to users at no additional cost.

DBMS, 1801 Mill St., Naperville, IL 60540. (312) 961-5700. **Circle 237**

Letter-quality printer: The Star SB-10 dot-matrix printer from Star Micronics, New York, NY, is IBM PC-compatible. Price: \$995. It prints letter-quality text at 60 characters per second and draft-quality text at 120 characters per second. **Circle 238**

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	VT102	CRT Terminal	1425.	140.	75.	50.
	VT220	CRT Terminal	1150.	110.	65.	45.
	VT240	CRT Terminal	1950.	185.	105.	70.
	VT241	CRT Terminal	2850.	270.	155.	100.
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	TI820KSR	Terminal Pkg.	1995.	190.	105.	75.
	TI850	Printer w/Tractor	575.	55.	30.	20.
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NORTHERN TELECOM 	NT6K90	Displayphone plus ...	1395.	135.	75.	50.
	NT6K00	Displayphone	1095.	105.	60.	40.
	NT6K55	Modem 212/A	525.	50.	30.	20.
C ITOH 	CIT101	Video Terminal	1095.	105.	60.	40.
	CIT414A	Graphics Terminal ...	1395.	135.	75.	50.
	CIT500	W/P Terminal	1995.	190.	105.	70.
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CIRCLE 56

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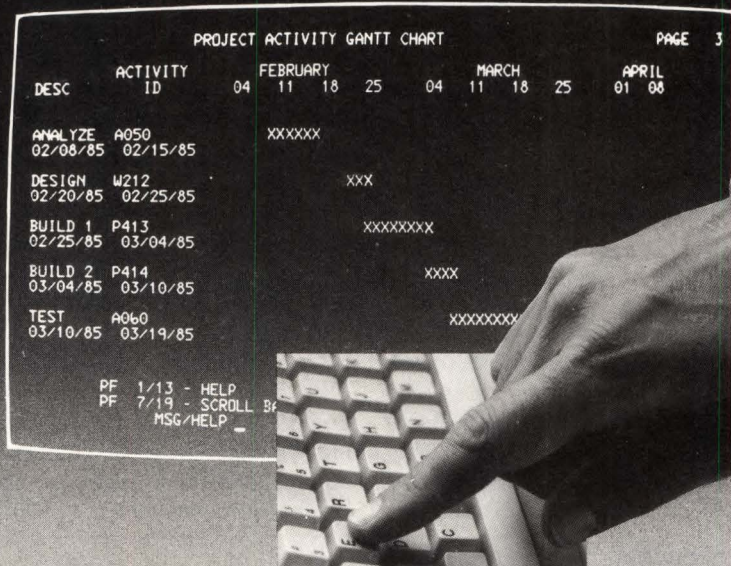
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CIRCLE 58

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Want to contact *Computer Decisions*? Address correspondence to: Editor, *Computer Decisions*, 10 Mulholland Dr., Hasbrouck Heights, NJ 07604.

PRODUCTION DICTIONARY

Release 2.0 of Product, a systems utility that maintains an on-line production dictionary, now offers users more individualized access and control. Price: \$8,750. Users can define and verify their own job networks within the dictionary database rather than the entire database. Another option allows users to delete all jobs sharing the same control statement.

Triangle Software, 4340 Stevens Creek Rd., Suite 275, San Jose, CA 95129.

(408) 554-8121.

Circle 242

FORTRAN CONVERSION

Fact (Fortran Automatic Conversion Tool) translates and documents Fortran programs from one computer to

another and from one dialect to another. Price: \$4,000 to \$6,000. Conversion tools are currently available for VAX-11 to Data General Fortran 77, HP-UX Fortran/9000, Apollo Fortran, Gould Fortran 77, IBM PC Professional Fortran, and Microsoft Fortran; IBM Fortran IV to HP-UX Fortran/9000; and Data General Fortran 5 to Data General Fortran 77.

Softool Corp., 340 S. Kellogg Ave., Goleta, CA 93117.

(805) 964-0560.

Circle 243

GCOS 7 SYSTEM FOR DPS 7

The GCOS 7 operating system for Honeywell DPS 7 medium-scale computers includes components for multitasking, virtual memory, diagnostics, resource allocation, CPU dispatching, and load balancing. The monthly license fee for GCOS 7 basic

system is \$1,121. The system also features database management, query and transaction processor, data dictionary, full-screen editor, and networking products. GCOS 7 can be used in centralized, distributed, interactive, and batch environments.

Honeywell, 200 Smith St., Waltham, MA 02154.

(617) 895-3247.

Circle 244

PROGRAM GENERATOR

Enable, a program-generation tool compatible with Nonstop II and Nonstop TXP systems, can now generate programs that can access many different database files simultaneously. Price: \$1,500 per processor. Enable-generated programs can also link different parts of a database.

Tandem Computers, 19333 Vallico Pkwy., Cupertino, CA 95014.

(408) 725-6000.

Circle 245

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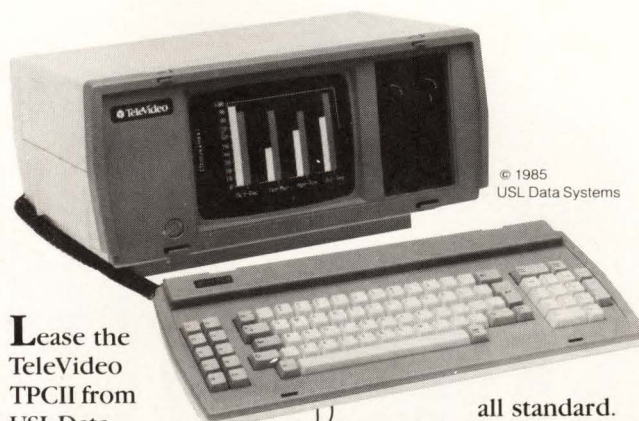
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CIRCLE 59

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CHART-MAKING SOFTWARE

GSS-Plottalk produces high-quality charts on microcomputers running MS-DOS, PC-DOS, or Bell Labs' Unix operating systems. Priced at \$150, the package uses GSS-Drivers to achieve

I/O independence, features automatic layout, and produces major data-representation chart types, including horizontal and vertical bar, pie, line, stair, and scatter charts, and text.

Graphic Software Systems, 25117 S.W. Pkwy. Wilsonville, OR 97070. (503) 682-1601. Circle 246

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CICS FOR IBM XT/370

MicroCICS for the IBM PC XT/370 allows programmers to enter, compile, test, and debug IBM's CICS programs without accessing the mainframe until their completed code is ready to be uploaded. The package, which costs \$4,495, features entry, editing, and compilation of command-level CICS source programs; on-line screen generation and automatic creation of basic mapping-support maps; creation and maintenance of test-data files; program execution and testing; debugging aids; and host communications.

Unicorn Systems, 3807 Wilshire Blvd., Los Angeles, CA 90010. (213) 380-6974. Circle 247

SCREENFORM ENHANCEMENT

Release 4.0.1 of Screenform, the screen-design aid for IBM 3270 terminals, creates and maintains TSO, CICS, and IMS screen formats. Price: \$5,000 and up. The new release adds MVS/XA and ISPF support, field-level definition, online macro and copylib generation, and a generalized application interface.

Boole & Babbage Inc., 510 Oakmead Pkwy., Sunnyvale, CA 94086. (408) 735-9550. Circle 248

SUPPORT FOR VM/CMS USERS

With Release 3.0 of CA-RAPS, a remote-access power-support system, VM/CMS users can select, display, and manipulate entries in VM/SP spool queues as well as POWER/VSE spool-queue entries residing in guest DOS/VS(E) systems. CA-RAPS is priced at \$4,500 for a three-year lease for DOS/VS(E).

Computer Assoc. Int'l., 125 Jericho Turnpike, Jericho, NY 11753. (516) 333-6700. Circle 249

UNIX-BASED PACKAGE

Word/Math integrated word-processing and spreadsheet software runs on the IBM PC Interactive Executive (OX) Unix-based operating system. Text entry, editing, and arithmetic are accessed from an English-language command panel. IBM IX Integrated Word/Math costs \$600 and runs under PC IX on the IBM PC XT, IBM PC XT/370, IBM PC AT, and IBM PCs with the IBM PC expansion unit.

IBM, contact local sales office.

Circle 251

ONLINE PACKAGE

A new online version of the Fixed Assets Management Software Package runs in IBM OS/DOS environments.

Price: \$45,600 for the DOS version and \$47,700 for the OS version. It features real-time editing and updating of the Asset Master File and lets users add to, update, and inquire about files.

Software International, 1 Tech Dr., Andover, MA 01810.
(617) 685-1400.

Circle 252

SOFTWARE EDITOR

Action Diagrammer is a program-design tool that represents the commands of a software program as a hierarchy of bracketed blocks to encourage structured thinking. Price: \$495. Action Diagrammer runs on the IBM PC and compatibles and provides control-structure syntax in many fourth-generation languages.

Database Design Inc., 2020 Hogback Rd., Ann Arbor, MI 48104.
(313) 971-5363.

Circle 253

PRODUCTIVITY TOOLS

Environment 5 productivity tools enhance APPGEN, a fourth-generation application-development tool for business-application software. Price: \$1,200 for two- to 16-user systems. Three tools form the core of Environment 5: Screen Painter, Automated Quality Assurance (Auto QA), and ISIS Integration Language. Screen Painter allows a developer to build screens, menus, and reports in real time. Auto QA automates the ongoing quality-assurance process for APPGEN business applications. Price: \$1,000 per machine. ISIS Integration Language allows APPGEN users to access all third-party applications and productivity tools that comply with the ISIS standard. Price: \$600 for two- to 16-user systems.

Software Express, 2925 Briarpark Dr., Houston, TX 77042.
(713) 974-2298.

Circle 256

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CIRCLE 61

LAN GATEWAY

The Netpath series of SNA and BSC gateways provides communications features for multiple personal computers on local-area networks with a variety of IBM hosts. Price: \$2,000.

The software, which is loaded into the personal computer, permits 32 concurrent-host communication sessions through emulation of 3270, 3770, and 3780/2780 controllers and attached devices. One gateway can support multiple users sharing a modem and common phone lines. Users

can access different host data in remote-job-entry and interactive modes. Netpath also supports micro-to-mainframe communications in both MS-DOS and Unix environments. It requires an IBM PC running PC-DOS or MS-DOS with one diskette drive, 128 Kbytes of memory, and Pathway Design's communications adapter. **Pathway Design Inc.**, 177 Worcester St., Wellesley, MA 02181 (617) 237-7722. **Circle 200**

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CIRCLE 62

INTEGRATED PACKAGE

An integrated software package for business professionals, TymiV, runs on MS-DOS, PC-DOS, and Bell Labs' Unix System V. Anthology is the basic TymiV package consisting of Tym/Writer (word processing, editing, and formatting), Tym/Calc (financial modeling), and Tym/File (database management). Anthology (Execu/BUS, Tym/Writer, Tym/Calc, and Tym/File) costs \$495. Six, a relational database program for more sophisticated applications, costs \$395. The TymiV series includes word processing, spreadsheet analysis, database management, and special applications such as plotting, report writing, and financial management.

Infotym, 20705 Valley Green Dr., Cupertino, CA 95014. (408) 446-7406. **Circle 201**

ORGANIZE FILES

Easypath software organizes files into groups and runs programs from any subdirectory. It uses DOS' hierarchical subdirectory structure to eliminate storing multiple copies of special files or copying files back and forth. Price: \$100. Easypath comes with pre-defined specifications for most major programs and requires PC-DOS or MS-DOS 2.0 or higher.

Polygon Software Corp., 363 Seventh Ave., New York, NY 10001. (212) 563-5858. **Circle 202**

MAINTENANCE MANAGEMENT

Preventive Maintenance System (PMS) automates plant- and facility-maintenance management. Price: \$12,000 to \$25,000. Running on Data General/One, the IBM PC, or the AT&T personal computer, PMS can be used to monitor equipment inventory and maintenance calls, schedule preventive maintenance, and process work orders.

Asterisk Systems Group Inc., 2649 Yellow Springs Rd., Malvern, PA 19355.
(215) 296-4166. **Circle 203**

SPREADSHEET AID

Baler makes Visicalc and Lotus 1-2-3 faster to use by converting the spreadsheet templates into compiled Basic language programs. Priced at \$225,

the package features cell attributes, windows and titles, iteration, optimization, keystroke sequences, and non-destructive formula override. Baler operates on MS-DOS micros and requires either an IBM Basic Compiler and Assembler or a Microsoft Business Basic Compiler.

Brubaker & Associates Inc., 116 W. Main St., Delphi, IN 46923.
(317) 564-2584. **Circle 204**

IBM PC PAINT

PC Paint, a mouse-based color-graphics program available for the IBM PC, PC XT, PC AT, and compatibles, can be used to create pictures and enhance graphs and charts. Price: \$99. Pictures can be printed on a dot-matrix or color inkjet printer through a screen-dump interface. PC Paint and Mouse Systems' optical PC Mouse are available at \$220 as a spe-

cial introductory offer.

Mouse Systems, 2336H Walsh Ave., Santa Clara, CA 95051.
(408) 988-0211. **Circle 205**

Express enhancements: Both cpu use and memory-paging requirements have been slashed in Express, the database management system from Management Decision Systems (Waltham, MA). Price: \$85,000. Improvements include full-screen data entry and editing and integrated forecasting.

Circle 206

Color monitor: The 2120 Color Monitor from Sumicom Inc., Tustin, CA, is compatible with the IBM PC. The 12-inch monitor provides 640 x 200 pixels resolution and 16-color graphics. Price: \$500. The 80-column x 25-line format displays up to 2,000 characters.

Circle 207

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CIRCLE 64

M I C R O S P L U S

FULL-SCREEN LAP COMPUTER

Model IS-11C, an enhanced version of Sord's IS-11 briefcase-sized lap computer, features a 25-by-80-character LCD display, 80 Kbytes RAM, 72 Kbytes ROM, resident software, and an RS-232C standard port. Price: \$1,495.

Sord Computer of America Inc., 645
Fifth Ave., New York, NY 10022.
(212) 759-0140. **Circle 208**

MULTI-TASKING FOR IBM PC

The concurrent PC-DOS operating system for the IBM PC runs up to four PC-DOS or CP/M application programs at a time. Price: \$295. A menu guides users through the system's resources and applications, and a free-form screen allows users to create their own menus and special commands. Other features include data communications, windows, and several productivity tools.

Digital Research, 160 Central Ave.,
Pacific Grove, CA 93950.
(408) 649-3896. **Circle 209**

RELATIONAL DBMS

Foxbase II, a relational database management system, is compatible with dBase II. It compiles program language into a simplified code, allowing more memory space. Foxbase II uses virtual storage to ensure that frequently referenced programs are retained in memory in compiled form. It permits up to 48 fields-per-record and comes with an online manual/help facility. Foxbase II runs on the IBM PC and PC XT. It requires 192 Kbytes of memory and one double-sided disk drive. The Development version includes the Foxbase II program, Foxhelp online help facility, and Foxcomp compiler. Prices are \$395 for MS-DOS and \$995 for AOS/VS. The Runtime ver-

sion includes the entire Development version and Foxrun. The Runtime version costs \$695 for MS-DOS; \$1,995 for AOS/VS.

Fox Software Inc., 13330 Bishop Rd.,
Bowling Green, OH 43402. (419) 354-3981.

Circle 210

16-BIT SYSTEM PACKS

Three software programs are available for 16-bit systems running CP/M-86 and MS-DOS. Magicprint gives 60 formatting options to word processors such as Wordstar, Electric Pencil, and Magic Wang. Price: \$195. Magicbind is a file-merging program. Price: \$250. Magicindex compiles indexes and tables of contents. Price: \$150. A version of Magicindex that includes features of Magicbind and Magicprint is \$295.

Computer Editype Systems, 509 Cathedral Parkway, 10A, New York, NY 10025.

(212) 222-8148.

Circle 211

GRAPHICS SOFTWARE

Smarterm 125 graphics terminal-emulation software lets IBM PCs link up with mainframe graphics-software packages. The graphics capabilities of the IBM PC emulate DEC's VT 125 terminal. Price: \$295. The program also enables the IBM PC to be used as a VT100, VT101, VT102, or VT52 alphanumeric terminal. With Smarterm 125 in VT125 graphics mode, the IBM PC user can run most popular mainframe graphics-software packages. Smarterm 125 has a built-in file-transfer function that lets the user capture data being sent to the terminal into a disk file. It then lets users transfer either ASCII or binary files to the host computer system without special host software. Smarterm runs under PC-DOS version 2.0 or later.

Persoft Inc., 2740 Ski Lane, Madison, WI 53713.

(608) 273-6000.

Circle 212

EMULATOR SOFTWARE

Cleo 3780Plus Software provides high-speed computer-to-computer file transfer for IBM mainframes that don't support remote 3270 clusters. Prices range from \$500 to \$1,500. The 3780Plus supports the IBM 3780 and 2780 BSC protocols, transmits or receives text or binary files at high speeds, and runs synchronous modems up to 19.2K baud. As a 3780 emulator, it features transparent mode, space compression, device selection, printer-forms control, and spooling. Software is available for the IBM PC and Hewlett-Packard 150s. **Cleo Software**, 461 North Mulford, Rockford, IL 61107. (815) 397-8110. **Circle 219**

NETWORK BRIDGE

The Net/One Local Bridge interconnects multiple Net/One communications systems in the same geographic location. It allows connections between frequency channels on broadband networks. Price: \$9,850. Local Bridge software costs \$1,000 per bridge. Information is forwarded from network to network or from channel to channel on a per-packet basis at over 1,000 packets per second. An internetwork bootload feature allows Network Interface Units (NIUs) to any network to be downloaded through local bridges by a single download server.

Ungermann-Bass Inc., 2560 Mission College Blvd., Santa Clara, CA 95050. (408) 496-0111. **Circle 220**

NETWORK MANAGEMENT

Digilog Modem Diagnostic Test System (MDTS) adds intelligent capabilities to any vendor's modem (any 4-wire, leased-line modem that oper-

ates in the range of 1,200 to 9,600 bps). Price: from \$3,990 to \$15,975, depending upon network configuration. MDTS includes digital and analog loopbacks, bit-error-rate tests, polling tests, analog-level measurements, and self tests. It also provides an automatic-disconnect feature for con-

trolling a "streaming" modem or terminal. MDTS is controlled by an IBM PC plus Digilog's MDTS software.

Digilog, Network Control Div., 1370 Welsh Rd., Montgomeryville, PA 18936. (215) 628-4530. **Circle 221**



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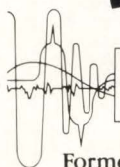
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CIRCLE 65

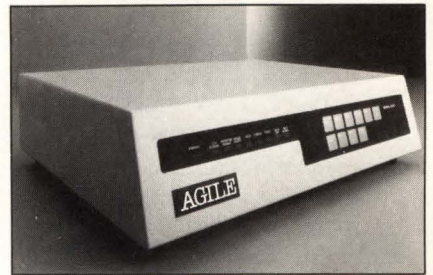
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The DMS 200 network master man-
ages multi-user applications on Hinet
local-area networks. Price with a 20-
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ware options to support CP/M-80 or
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systems, and features a 5¼-inch half-
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floppy disk with 64 Kbytes of RAM.
The data-transfer rate on disk is 250
Kbps. Input/output ports include
three RS-232C serial-communications
ports, one RS-422 high-speed network
port, and a Centronics-compatible par-
allel printer port.

**Digital Microsystems Inc., 1840 Em-
barcadero, Oakland, CA 94606.**
(415) 261-1034.

Circle 222



tronics-type parallel interface, comes
equipped with either a 2-Kbyte or
4-Kbyte buffer, an extended-attribute
buffer for APL applications, and inter-
nal diagnostics.

**Agile, 4041 Pike Lane, Concord, CA
94520.**

(415) 825-9220.

Circle 224

VERSATILE MODEM

Multimodem 224 operates at 2,400,
1,200, or 300 bits per second (bps).
Priced at \$795, it can operate in either
asynchronous or synchronous mode
over either dialup or two-wire leased



lines. Other features include auto-dial,
auto-answer, compatibility with Hayes
commands, call-progress detection,
and phone-number memory.

**Multi-Tech Systems Inc., 82 Second
Ave. S.E., New Brighton, MN 55112.**
(612) 631-3550.

Circle 225

PROTOCOL CONVERSION

The MC 800 protocol converter lets
up to 24 asynchronous ASCII devices
communicate with an IBM host com-
puter or compatible using either SNA/
SDLC or BSC protocols. Prices start at
\$3,600 for five ports. The MC 800 ap-
pears to the host computer or compati-
ble using an IBM 3274 or 3276 com-
munications controller with IBM
3278/3279 terminals attached. Full-
screen mapping is performed by MC
800, and it handles five to 24 ASCII
ports. The MC 800 supports all stan-
dard asynchronous baud rates up to
19.2K baud.

**Innovative Electronics, 4714 NW
165th St., Miami, FL 33014.**
(305) 624-1644.

Circle 223

PRINTER/PLOTTER CONVERTER

The Agile 6287 protocol converter al-
lows IBM 3274/76 controllers to inter-
face with a wide variety of printers and
plotters. Price: \$1,595. The convert-
er, which supports both the RS-232C
serial interface, and the standard Cen-

Methodologies: A free color bro-
chure describes how methodologies
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tive Systems Development Methodol-
ogy, which provides online guidance in
building application systems; SDM/
Maintenance, a methodology for pro-
duction support; and Estiplan, an auto-
mated estimating system for the IBM
PC. Write: AGS Management Sys-
tems, Dept. MS, 880 First Ave., King
of Prussia, PA 19406.

Circle 226

PROTOCOL CONVERTER

The PDS 350/525 protocol converter for IBM Systems/34, /36, and /38 has a 5¼-inch diskette drive and incorporates 4, 8, 12, or 16 asynchronous ports. Price: from \$4,750 to \$12,500. **Pearle GSD Ltd.**, 600 South Dearborn, Chicago, IL 60605. (312) 461-0860. **Circle 227**

SHORT-HAUL MODEM

Astrocom SH56S is a low-cost modem transmitting synchronous data at speeds of either 28,000 or 56,000 bps over distances of up to 3 miles and 2.25 miles, respectively, over standard twisted-pair. SH56S features an optional V.35 interface, LED indicators, point-to-point or multipoint network configurations, stand-alone or nested circuit-card design, and self-testing diagnostics. The RS-232 interface is \$730; circuit card is \$540. The V.35 interface is \$822; circuit card is \$632. **Astrocom Corp.**, 120 W. Plato Blvd., St. Paul, MN 55101. (612) 227-8651. **Circle 228**

2,400-BPS MODEMS

The Microcom 2,400-bps series of error-correcting dial modems provides full-duplex data communications over dialup lines. These modems are CCITT V.22 bisynchronous and offer full-featured auto-dial and auto-answer functions. The ZX/1200 (\$700) and the ZX/2400 (\$1,000) modems offer error-free transmission combined with Hayes compatibility. The SX/2400 (\$1,000) allows a user to run one data speed over the telephone line and another over the terminal/personal computer-to-modem connection. The Era 2 2400 (\$800) is a 2,400-bps in-board modem that gives IBM PC users 100 percent accurate data transfer as well as easy-to-use software. The PC/

2400 (\$900) is a stand-alone modem bundled with software for the IBM PC. The Microcom software included with the PC/2400 provides users with the same benefits of the Era 2.

Microcom, 1400A Providence Hwy., Norwood, MA 02062. (617) 762-9310. **Circle 229**

Relational DBMS: The Unify Relational Database Management System is available on the Series 2000 family of desk-top computers from Four-Phase Systems, Cupertino, CA. Price: \$2,000. It interfaces with other software packages that run on the Unix-based Model 260. **Circle 255**

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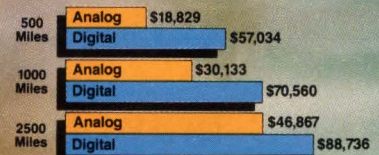
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CM/CD/2-26

DUAL FEEDER

The lightweight 16-pound Exxon Dual Sheet and Envelope Feeder for the Exxon 935 and 950 impact printers automatically feeds paper and envelopes during printing. Price: \$2,395. Paper trays accommodate paper sizes ranging from 7 to 11.7 inches wide and up to 14 inches long. Features include paper-path error detection and automatic collation.

Exxon Office Systems Co., 777 Long Ridge Rd., Stamford, CT 06902. (215) 363-3201. **Circle 230**

DISK READER

The Baber Multidisk Reader Model 8261 has expanded its floppy-disk reading feature to include the Decmate II, Rainbow, Lanier Mul-

tiplus, and other word processors. Price: \$7,495. Model 8261 can read single-, double-, and quad-density 5¼-inch and 8-inch floppy disks. Model 8260 permits individual and multiple file transfers.

Baber Inc., 3 Northern Blvd., Amherst, NH 03031. (603) 673-9277. **Circle 231**

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Parcel Manifest System 800 (PMS 800) helps cut the expense and labor of postage meters, parcel registers, and air bills. Price: \$4,995. Automatic

weighing and zone-and-rate selection features eliminate manual referrals. PMS 800 has an 8-bit microcomputer and 64-Kbyte memory, expandable to 128 Kbytes. Software, scale, printer, and documentation is included and all UPS functions are standard. Optional features include USPS first-class letter and parcels, third- and fourth-class parcel post, departmental accounting, label printer, and document printer.

Tandata Corp., 6846 South Canton, Tulsa, OK 74136. (918) 492-3223. **Circle 232**

FILE CONVERTER

Textway converts files from Lanier's No-Problem and Typemaster word processors for use on the Lanier Business Processor. Price: \$695. No-Problem embedded commands, format settings, and data are converted by the Lanier Business Processor so no clean-up or retyping is necessary. Textway is menu-driven, and conversion occurs at 400 wpm. Textway consists of a hard-sector disk-interface board for the Business Processor and a special utility program.

Lanier Business Products, 1700 Chantilly Dr. N.E., Atlanta, GA 30324. (404) 329-8000. **Circle 233**

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CIRCLE 67

OPTICAL PAGE READER

The Imager 1010 enters data from typewriters into word processors and computers without retyping. Priced at under \$11,000, the software-driven desk-top recognizes two typestyles and features automatic paper feed, variable throughput speed, and communications port. Model 1000, with more advanced features, recognizes 15 typestyles and costs about \$16,500.

HiTech Canada Ltd., 36 Bentley Ave., Nepean, Ontario, Canada K2E 6T8. (613) 727-1400. **Circle 234**

COMPACT FEEDERS

Paperpro single-bin, snap-on sheet feeders are compatible with most low-end printers and come in two versions. Both models weigh only 3 pounds, hold up to 80 sheets of paper, and retail for less than \$400. The Paperpro RS-33 operates on a fixed cycle of platen motion, using a standard 15-inch form-length setting for paper sizes up to 11.75 inches in diameter. It has an automatic feed mechanism and no special software or printer PROM is required. The Paperpro RS-22 has automatic feeding.

Rutishauser of America, 10245 Brockwood Rd., Dallas, TX 75238.
(214) 343-9154. **Circle 235**

DUAL PAGE READER

The Alpha Word Series 80 Model D Pagereader has a dual interface, so it can be entered into two dissimilar host devices. Price: \$14,990. These host devices may be computers, word processors, or peripherals. Each may have a different interface and require different codes and formats. A dual output port and plug-in module provides the electronics to route data with the correct interface and code. The cost of the dual-port option is \$2,000. To input two identical devices, all you need is an A/B switch.

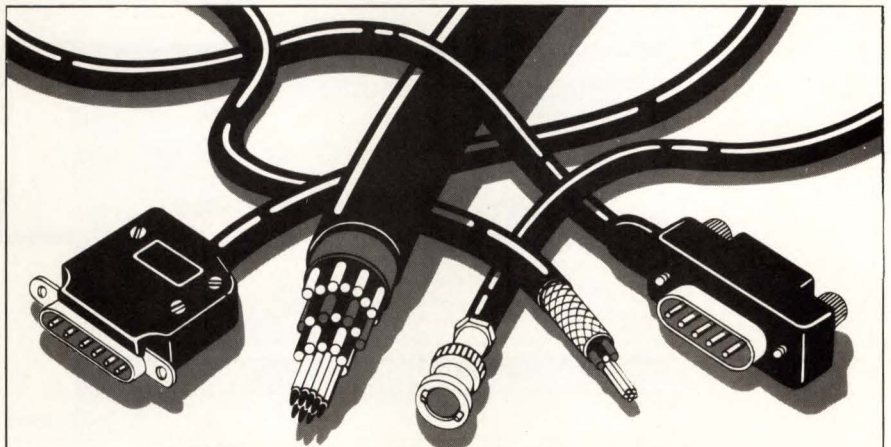
Compuscan, 81 Two Bridges Rd., Fairfield, NJ 07006.
(201) 575-0500. **Circle 250**

CAR SYSTEM

A computer-assisted retrieval (CAR) system, Mincar, incorporates the Minolta RP 505 reader/printer, DEC computers ranging from the PDP-11 micro to the VAX, Mincar software, and optional computer peripherals. Price ranges from \$25,000 to

\$200,000 according to additional equipment purchased. Mincar allows for both data entry into the computer and automatic retrieval of data on the Minolta RP 505 plain-paper reader-printer. Features include Mincar's ability to communicate with office-automation systems like DEC's All-in-

1. DEC users won't need to purchase the entire Mincar system. For example, a VAX user needs only Mincar software and the micrographics components to acquire a CAR capability. **Minolta Corp.**, 101 Williams Dr., Ramsey, NJ 07446.
(201) 825-4000. **Circle 254**



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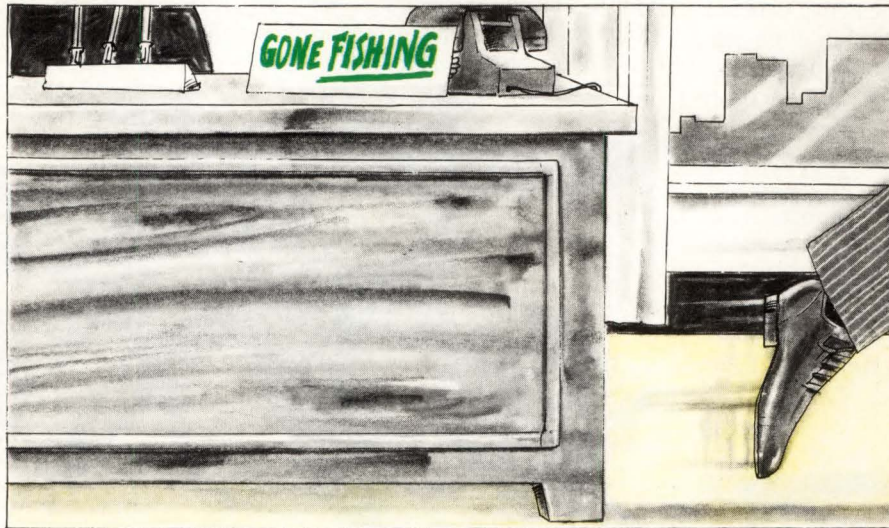


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YOUR CAREER

by Mary Miles, New England Editor



THE CASE OF THE MISSING BOSS

A boss is supposed to be dependable and strong; a leader who oversees projects and intercepts disaster. But there's another kind of boss—the absentee boss—whose neglect and indecisiveness is an albatross, weighing down productivity and creating interoffice chaos.

There are two types of missing managers. The "hyperactive," fleet-footed boss is a blur of movement, zipping to meeting to luncheon to meeting, in an effort to sidestep work. The other type of boss is "there but not there." This "passive" manager stays in the office but finds subtle ways to shed his or her responsibilities.

The reasons why different executives become "missing managers" and the ways they accomplish this vary tremendously. But all absentee executives share one characteristic: the ability to shirk their commitments and responsibilities. Many go to extraordinary lengths to do so.

Some hyperactive managers have

what psychologists call "the dramatic personality." They are usually aggressive, flamboyant, egocentric, impulsive, adventuresome, uninhibited, and creative. Typically, they are so intent on proving how busy and brilliant they are that their subordinates rarely see them. These managers are rarely in the office—they're always busy organizing a new task force, presenting hot ideas to upper management, fulfilling yet another speaking engagement, winging off to London to start a branch location, attending conferences. . . .

When Dick Virunurm, an Atlanta-based education and government consultant for the Burroughs Corp., Detroit, describes the absentee boss, he speaks from experience. "In my line of work I see many 'hyperactive' absentee managers," he says. "This syndrome is particularly common among smart young fast-trackers. Exceptionally bright whiz kids can either successfully use their brilliance or kill their careers with it. It's so easy to lose your perspec-

tive. The showmanship—all that running around with fantastic plans—may make an impression on superiors or peers outside the department, but subordinates won't be impressed with glamour—they need leadership to get the job done."

It's not uncommon for hyperactive bosses to be totally unaware that they're neglecting their responsibilities, says Virunurm. But there are warning signs for managers who suspect they have similar tendencies: "First you begin to notice that you're not hitting the deadlines like you used to," says Virunurm. "Then you find that your subordinates don't come to you with their problems anymore. A most ominous sign is when you realize your superiors are bypassing you to go directly to your subordinates for decisions and action."

What happens when a hyperactive manager is away on a jaunt? Most likely, his or her subordinates take over the neglected duties. If no one assumes

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leadership, chaos may result. If subordinates vie for power, infighting can occur. Then there's added confusion when the lines of authority become muddled each time the hyperactive boss reappears to regain command. The returning manager will barge through the office, changing procedures and interrupting the work that has progressed in his or her absence. Because these bosses are away so often, they have lost sight of long-term objectives and tend to concentrate on trivialities. They often nitpick endlessly until they become distracted or get the urge to travel once again.

Another characteristic of the hyperactive boss is an inability to successfully delegate responsibilities. These managers are so tied up in ego, ideas, and motion—that they have little time or energy to devote to mentorship. “Most hyper bosses are very insecure,” says Virunurm. “When managers are frequently absent, it becomes difficult for them to define work goals or recognize problems. Productivity and morale suffer as the manager’s problems spiral throughout the department. Ultimately, these problems can affect the entire organization.”

Passive bosses also have trouble delegating and assigning tasks. Although they tend to stick close to the office, their doors remain closed as they agonize over charts, lists, and trivia. And if their doors are open, it’s probably because they’re away from their desks socializing or involved in an insignificant task. Because of this absorption with minutiae, they seldom accomplish any substantial projects. And when it’s time for decisions to be made, they’re nowhere to be found. Passive bosses are so reluctant to commit to any form of action that eventually their authority and credibility wither away.

To compensate for this lack of leadership, other employees may take over for the passive boss. Even when these

replacements are not the most logical candidates to pinch-hit, most passive managers are pleased to be relieved of tough decisions; they’d rather be seen as good guys—or not seen at all.

Cheryl Lieberman, senior project director at Goodmeasure Inc., a Cambridge, MA, consultancy, says, “Unlike hyperactive managers, who run around and are highly visible but don’t accomplish much, passive bosses are stationary. They may chit-chat around the water cooler or they may be reclusive and distant. But one thing that passive bosses have in common is that they’ve ceased to believe in their abilities. They’ve lost control over their own destinies—they’re almost ‘retired on the job.’ They have very little opportunity and very little power—they’re stuck.”

Some managers are so busy just holding their department together that they have little opportunity to keep informed on organizational changes and new technologies. Both Lieberman and Virunurm believe the corporate structure is responsible for this dilemma. “In MIS/dp, in particular, many talented managers get left behind,” says Virunurm. “The organization doesn’t press them to keep informed on general information because they are so vital to daily dp operations. They become the high priests of the black box. Before long, they become antiquated and resistant to change. They’re experts one day and dinosaurs the next.”

These specialists are rewarded by being promoted up and out of the mainstream into jobs that are either dead ends or don’t truly suit their interests and abilities. Or they may be promoted into jobs demanding skills and responsibilities that they’re unprepared for, says Lieberman.

If you detect a bit of yourself in the descriptions of either the hyperactive or the passive boss, it’s not too late to break bad habits. If your job itself is

Lines of authority become muddled each time the hyperactive boss reappears to regain command.

causing avoidance behavior, Lieberman suggests that you “think hard about how your job is designed. Does your organization have career paths that let you keep growing by moving laterally or upward? Is there a suitable position that will offer you challenges, learning opportunities, and responsibilities within your capacities?” You may have to seek the help of a career counselor or mentor, look for a more fulfilling position within the organization, or leave the organization entirely.

If the only solution seems to be leaving the organization, hyperactive and passive bosses should seek out corporations that offer clear-cut career objectives that will help them stay on the right track. “Absentee managers develop a survivalist mentality that leads to confusion about goals and priorities, says Lieberman. Without a strong organizational structure, managers can easily lose themselves to superactivity or immobility—or anything else that will help them avoid their duties.

Is there any hope for those who are hit hardest by the missing manager: the subordinates? Although Virunurm is doubtful about whether a subordinate can turn a missing boss into a productive one, he does offer a suggestion: “The worst strategy is to proceed willy-nilly without consulting your boss. The entire department should meet to list the problems the boss’s absence is causing. But be diplomatic—avoid making accusations.”

To be a strong and supportive manager, you need critical organizational support and the ability to chart your own career. As Cheryl Lieberman says, “When managers are in jobs in which they have confidence, opportunity, and the power to accomplish their goals, the results are amazing.” □

“Passive managers seem to have lost control over their own destiny—they’re almost ‘retired on the job’.”

Lieberman, Goodmeasure Inc.

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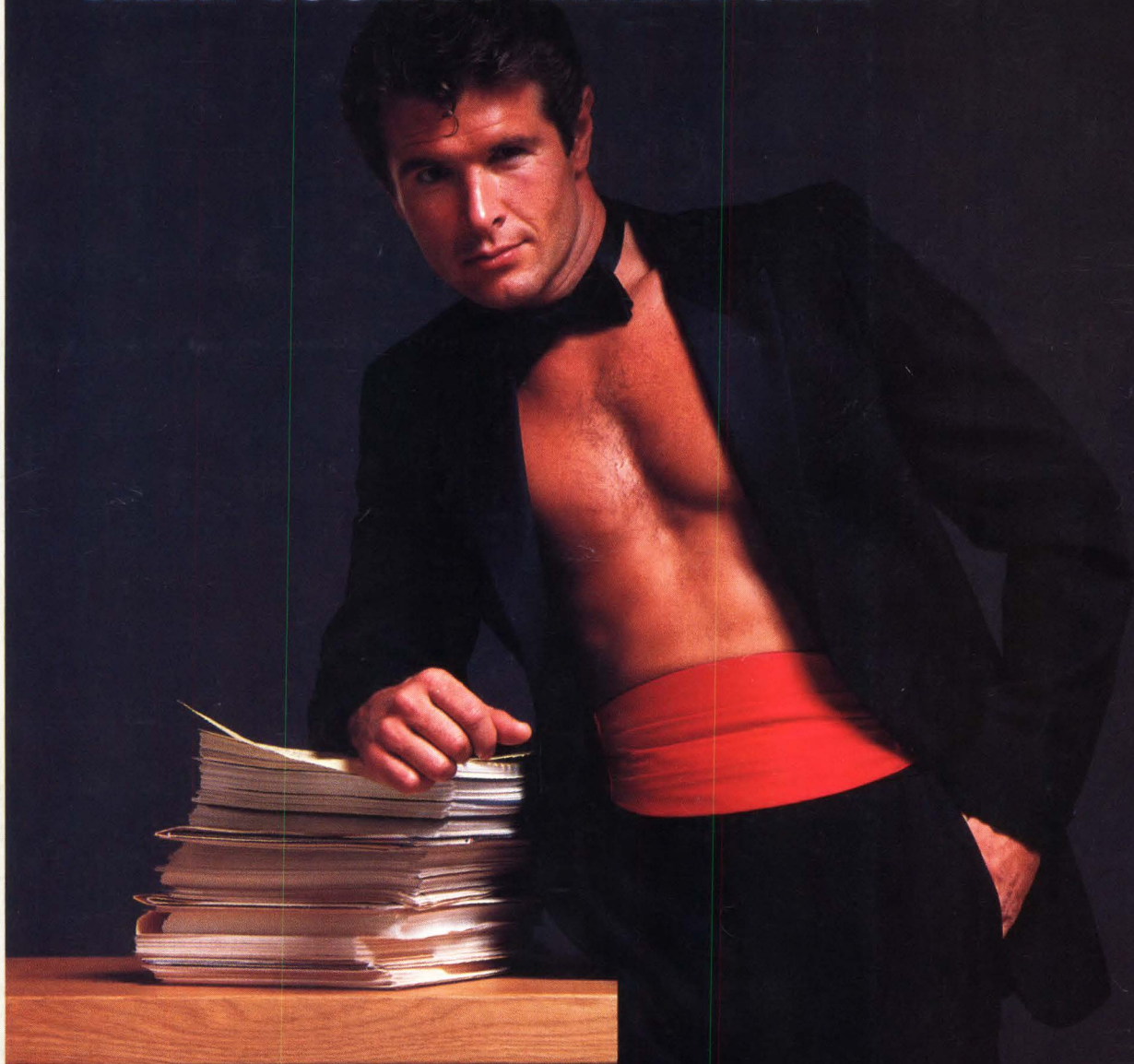
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