DATAMATION

OCTOBER 15, 1987
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A Blueprint for the New IS Pro

Departmental Computing: Distributing the Power

Desperately Seeking Software for the 9370

Plan for Your LAN

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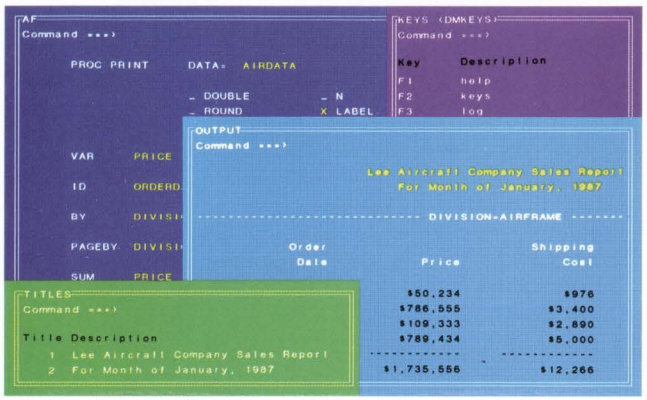

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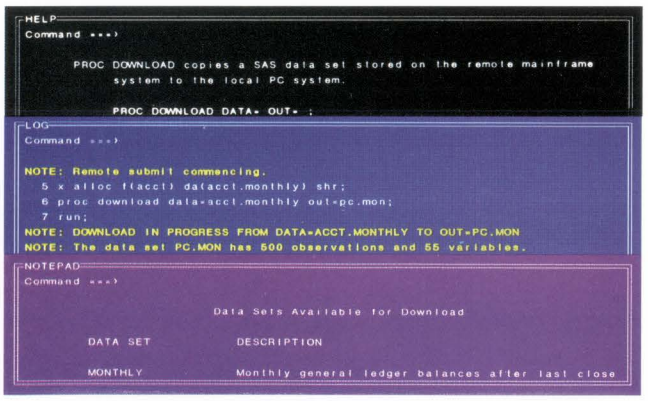

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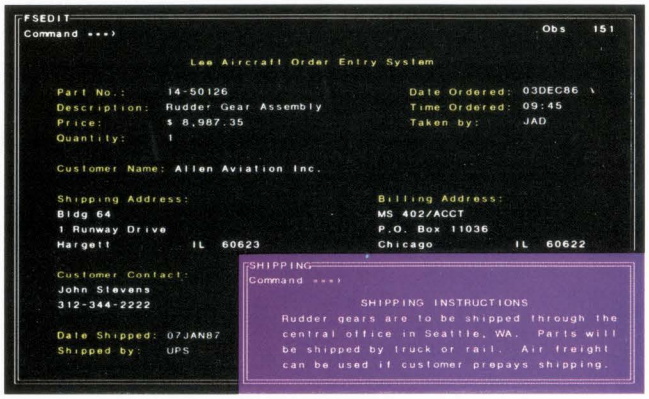

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Circle 3 on Reader Card

DATAMATION

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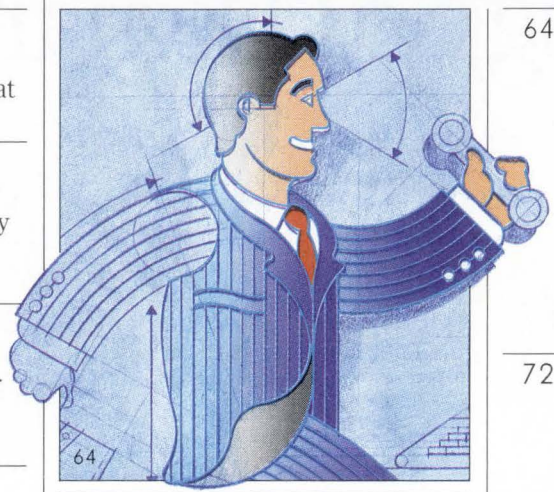

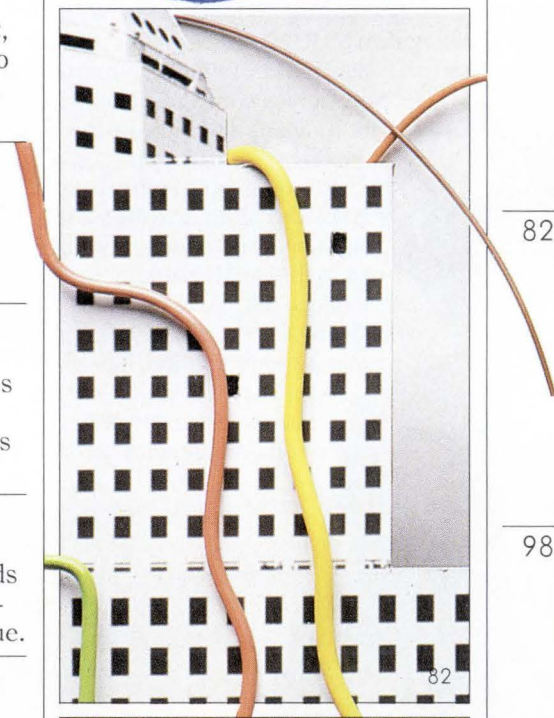

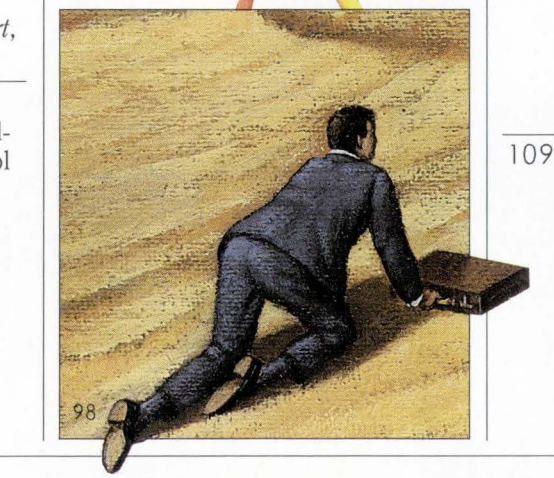

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ION

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Cover Illustration by Daniel Pelavin

OCTOBER 15, 1987
VOLUME 33
NUMBER 20
THIS ISSUE, 188,400 COPIES

1987 JESSE H. NEAL AWARD

Editorial

Justice Is Served But Not So Competition

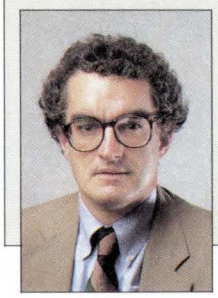
Customers of information technology and services have been dealt both a blow and a wild card in recent weeks—each in the name of competition. The blow came in the form of a U.S. district court ruling that limits the businesses regional Bell operating companies can enter. The one-eyed jack arrived from a more unlikely source—two arbitrators hired by IBM and Fujitsu to resolve their software copyright battle.

Why the BOCs can't manufacture equipment or pursue any other activity that free U.S. enterprises can is beyond us. In ruling last month that they couldn't offer long distance service and the like, Judge Harold H. Greene seemed to say he likes things as they were before the AT&T breakup: he's content to let Ameritech and the other BOCs be telephone companies—no more, but, unfortunately for their customers, a lot less.

The decision was hailed by several industry associations. For example, the Computer and Business Equipment Manufacturers Association, in Washington, D.C., says the decision reflects "a clear understanding of the need to preserve telecommunications competition." We think it merely protects some competitors. Perhaps such associations would do well to travel beyond the Potomac's lobbyist-lined banks to see how the rest of the world defines competition.

Now in the process of redefinition is competition in the mainframe arena, thanks largely to the rules and procedures (as well as penalty payments) ironed out last month by which Fujitsu and IBM can exchange data on mainframe operating systems. At first glance, the ruling seems to help users by enabling mainframe competitors such as Fujitsu to have access to IBM's designs. It's unclear, however, whether the security facilities where such data are to be exchanged are, in fact, feasible, or whether other IBM competitors will enjoy similar access.

These developments deserve your continued attention. If you, as customer of computer systems, want to ensure that you're getting the best possible solutions to your business problems at the best price, you ought to press for legislation or judicial action that will free the BOCs to serve you as best they can. Similarly, if you want to reap the full benefits of the mainframe competition implied in the arbitrators' ruling, you should see that the mechanisms set up for IBM and Fujitsu to exchange information are neither cumbersome nor closed to other vendors.



Tim Mead

TIM MEAD
EDITOR-IN-CHIEF

DATAMATION

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ABP ABC BPA

Letters

Secret No Longer

How gratifying to see coverage of the Pick operating system (July 15, p. 40). Edith D. Myers' illuminating article on Pick's performance in the Fortune 1000 market was long overdue.

As a leading training organization, JES & Associates Inc. has seen dozens of major companies using the Pick OS, among them Coca-Cola, Dow Chemical, Kodak, Lockheed, Sunkist, and Texaco.

For years, Pick was known as the "best kept secret" around; no longer. Thank you for letting the cat out of the bag.

JONATHAN E. SISK
JES & Associates Inc.
Irvine, California

Concept and Products

"IBM NetView Enhancements Stir Interest of MIS Shops" (Aug. 1, p. 19), was timely and relevant. It implied that NetView is today a lot of Fluff for the Future. Perhaps, but your perspective about NetView and Cincom's Net/Master is limited. NetView is two things. It is first a concept; second, it is a series of products.

As a concept, NetView is somewhat on target for IBM users. As a series of products, NetView is nothing new. The products that make up NetView are nothing new. Enhanced? Yes. But they are products that date back to the 1970s. Nor is NetView/PC even an IBM original. Avant Garde's Net/Command is merely one example of an implementation of NetView/PC.

Likewise, Cincom's Net/Master, mentioned in your article, fits well within the NetView concept. Rather than a "head-on competitor to NetView," Cincom views Net/Master as simply another "Focal Point" application that supports IBM's NetView concept. It's a cleaner, more productive, and efficient implementation of Netview than other older IBM products.

Nor had Cincom "bowed to IBM" when they announced support of NetView/PC. Rather, Cincom embraced NetView as an opportunity to support LANs and voice networks through a (de facto) standard. The world doesn't need another standard.

While NetView is an idea whose time has (finally) come, products like Net/Master will make it more feasible to implement. They will do this through a modern product set unavailable from IBM. IBM needs that reinforcement.

Competitive? No! Complementary? Yes!

THOM J. VOLLMAR
Marketing Product Manager
Cincom Systems Inc.
Cincinnati

Correction

Errors in the production process led to four photographs being miscaptioned in the Sept. 1 issue. We apologize for the mistakes. Here are the photographs with the correct captions.

Bruce Curry is director in charge, Computer Resources Dept., Peat, Marwick, Main and Co.

p. 17

Tosco Corp.'s Carl Peterson thinks NetView is "a repackaging of the existing products."

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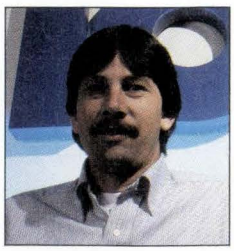

At Samaritan Health Services, Robert McCrory manages a network that carries voice and data among four Phoenix hospitals.

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A standards engineer at Hewlett-Packard, Trudy Reusser founded ANSI's OSI committee.

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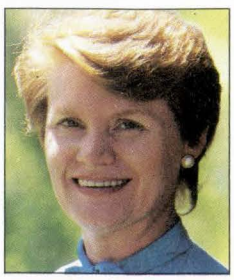

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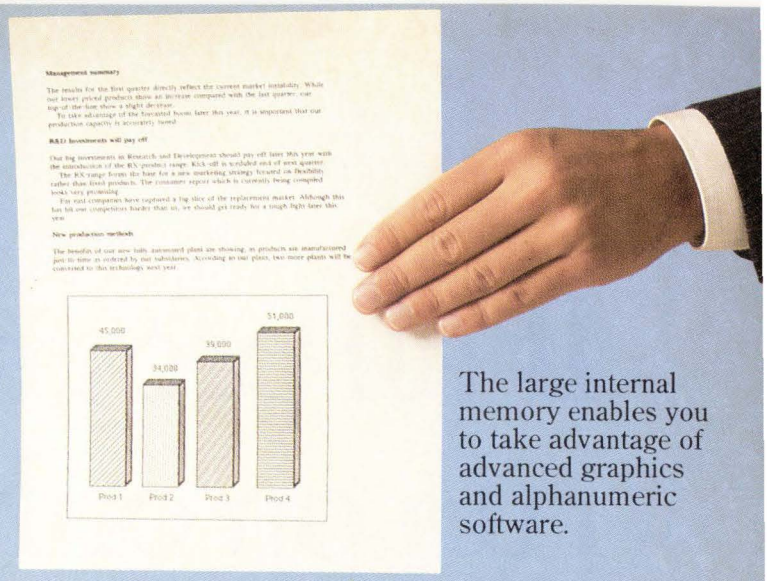

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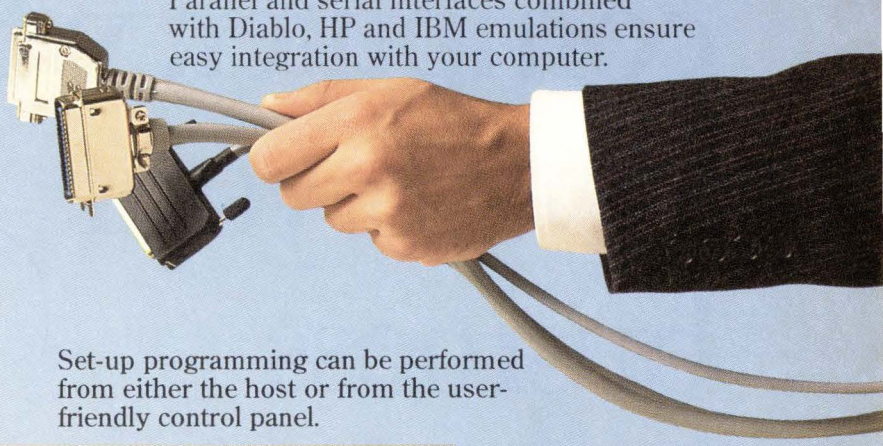

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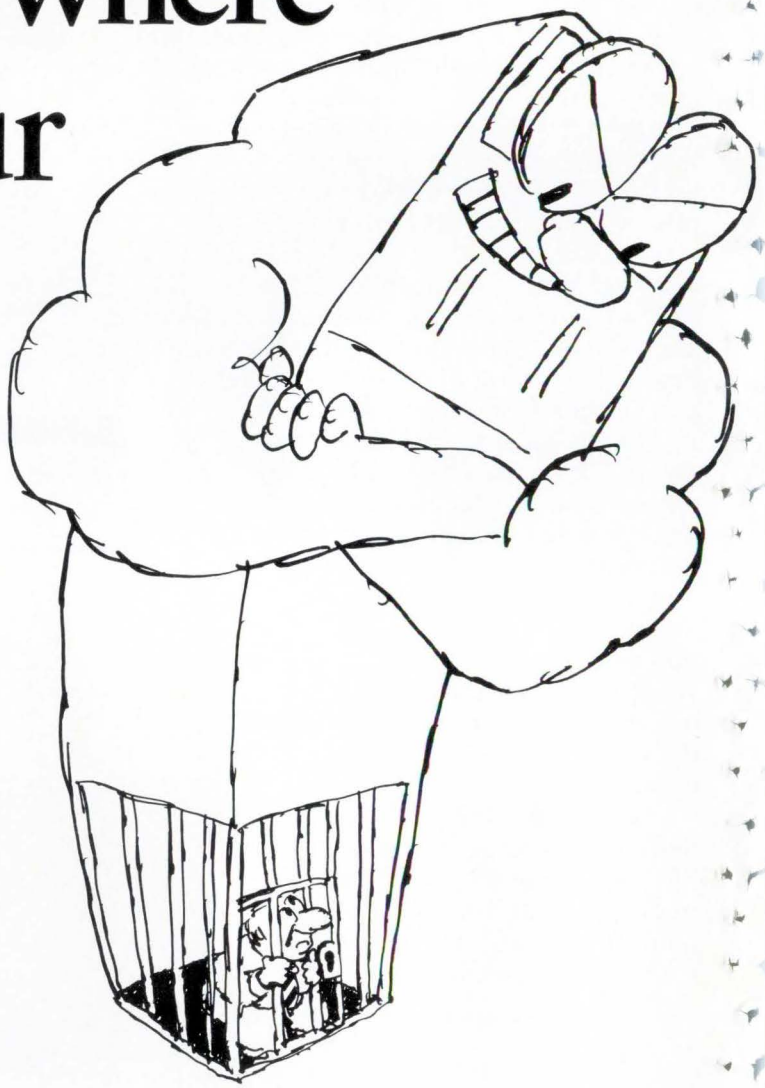
If all programs could run on only one kind of computer, where would your business be today?



No single computer — or computer company — can meet every user's needs. But, to keep from being locked into a single computer supplier, you need a variety of computers to choose from. It's even better if the computers you choose from are compatible, regardless of their makers.

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C&C Computers and Communications

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Look Ahead

SPIN-OFF BETS ON FDDI

MOUNTAIN VIEW, CALIF. -- The fiber digital data interface (FDDI) movement and its promise of 100Mbps communications speeds may be taking a step closer to commercial reality if a new spin-off company here has its way. Protocol Engines Inc. is developing a three-chip set to run FDDI and other protocols at 100Mbps and above. The company is a spin-off from Silicon Graphics Inc., where design work on the project started. SGI retains a minority stake in the company, which is currently forming an advisory panel drawn from other communications and computer vendors to establish definitions for the protocol engine and the chip set externals. The chip set would also accommodate Ethernet and token ring protocols at lower speeds and would handle addressing, routing, and other systems functions. The company hopes to have the engine adopted by ANSI's transport committee and by ISO as a solution for layers 3 and 4 of the OSI model.

ADLANTES SURFACES AT ALTOS

SAN JOSE -- Multiuser micro vendor Altos next month will take a stab at tying together MS/DOS- and Unix-based systems with a new suite of networking products called Altos Advanced Local Area Network Telecommunications Systems or AdLANtes. These include a pair of front-end communications processors and three software offerings supporting file server services and wide area protocols. Altos also will unveil its entry into the low-end MS/DOS-compatible pc market with an 80286-based PC AT-compatible system, the AWS 100.

IT'S JUST TALK NOW, BUT...

MAYNARD, MASS. -- Digital Equipment Corp. is beginning to talk publicly about adding security features and artificial intelligence to its DECnet and network management products. DEC's remarks suggest the company is one to two years away from embedding the capabilities into its local and wide area protocols.

TWO DOES GO INTO ONE

ROSELAND, N.J. -- By next spring, Automatic Data Processing Inc.'s Brokerage Services division expects to begin rolling out what it internally is calling its Universal Delivery System. UDS will be the culmination of an effort to integrate ADP's back office and front office brokerage processing activities, enabling users to make inquiries, via either dumb or intelligent terminals, of such front office services as quotes, as well as back office records and files. The idea, say ADP execs, is to have one terminal on each brokerage firm account executive's desk that will provide all necessary services. The effort will represent a confluence of ADP's now separate Brokerage Pro-

cessing System for the back office and the FS Partner system, which consists of systems from the previous acquisitions of GTE and Bunker Ramo's brokerage processing businesses. UDS, to be based on IBM 370 architecture, will consist of PS/2 models 50 through 80, as well as 9370s at client sites, and a three-branch controller configuration providing communications, office automation, and other integration-related support. It will support CICS and will most likely be linked to 4300 series machines at regional processing centers and then to ADP's mainframes.

COMMON DENOMINATOR

TOKYO -- Fourteen Japanese pc makers and software firms are attempting to bring standardization to Japanese language versions of IBM AT compatibles. Microsoft Japan is the key mover in a committee established to set specifications for the new class of bilingual machines, to be dubbed AX. The machines will run Intel 80286 or 80386 processors, and will have monitor resolutions equivalent to the PS/2, which is required in order to display ideographic characters.

AT&T ADDING 3Bs, CUTTING VAXs

MORRISTOWN, N.J. -- AT&T has been replacing DEC VAX 11/70s with its own 3B minis at several regional data centers as part of a major change taking place in its internal operations. The change also includes the eventual internal installation of perhaps thousands of the recently announced 630 multitasking graphics terminals. Stay tuned for details.

IS GETS HIT AT SOUTHLAND

DALLAS -- One of the losers in the $4 billion leveraged buyout of Southland Corp. will apparently be the convenience store retailer's information systems department, which will lose a good deal of funding due to cutbacks associated with the buyout. The cutbacks are necessary to offset the heavy debt load the company expects to carry in the leveraged buyout. Southland, which operates 7-Eleven convenience stores, is being taken private by its founders, the Thompson family, for $4 billion. The family decided to take the company private rather than succumb to a flurry of corporate raiders in August. According to officials in the information systems department, orders for new equipment will be reduced substantially until cash flow returns to more normal levels, which may not be for two years. The company has gone ahead with a purchase of 12 IBM PS/2s, however, but this represents a smaller number than originally planned. The company declined to provide specifics of other cutbacks.

(continued on p.12)

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Photo: Baxter Health Care Corp. data center, a CA-OPERA user.

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Look Ahead

PICK GETS COZY WITH OTHER OSs

IRVINE, CALIF. -- "Open architecture": it's a worn phrase, but one that keeps turning up with new contexts. Now it's being applied to the Pick OS world. Pick Systems Inc.'s next release of its OS, due out at the end of this month, is called Pick Open Architecture. Pick developers say it has been simplified so future releases will be able to run concurrently with (not simply under) other OSs, namely Unix and DOS.

A FIELD DAY FOR SERVICERS

FORT MYERS, FLA. -- The Association of Field Service Managers International (AFSMI), at the behest of the Eisenhower Foundation, will be sending a team of field service managers to the People's Republic of China in the spring of '88 as part of the foundation's people-to-people program. The program sends groups of experts in various fields to foreign countries to provide training. Fifteen U.S. computer service managers, selected by a team leader from AFSMI, will spend 30 days in China training their Chinese counterparts.

WANG READIES NEW VS UNITS

LOWELL, MASS. -- Wang Laboratories Inc. will respond this month to Digital's recent MicroVAX unveilings and repricings with a wholesale revamping of its low-range and midrange VS computer line. Products due out from Wang are replacements for the VS 5 through VS 65 models that target DEC's MicroVAX 2000 through 3600 machines. Company president Frederick A. Wang also plans to lift the veil around development and talk about microprocessor and multiprocessor implementations of the VS family.

ROUNDING OUT THE LINE

PALO ALTO -- With shipments of Hewlett-Packard's 930 and 950 Spectrum minicomputers ramping up, users are looking forward to other products designed to round out HP's mini line. First on the drawing board, say sources, is the 925, a RISC system expected to replace the current midrange HP 3000 Series 52. Expect the announcement toward the end of 1987 or in the first quarter of 1988.

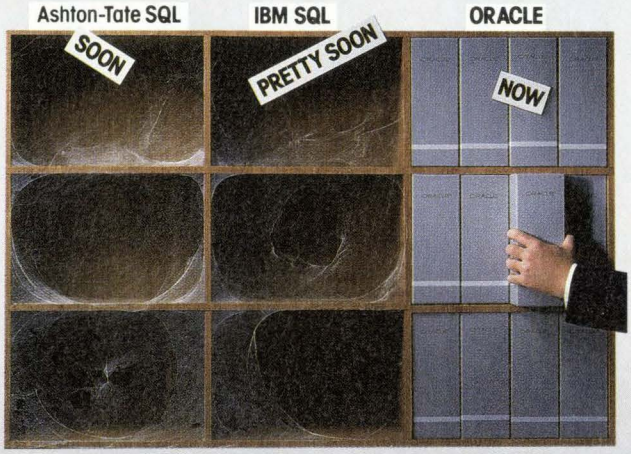
RUMORS AND RAW RANDOM DATA

Telecom capacity between Japan and the U.S. should be ample well into the next decade. That's the result of Japan's Ministry of Posts and Telecommunications giving up its attempts to limit the entry of new competitors to its de facto international telecom monopoly. . . . The word on the street is that parties interested in acquiring U.K. chip maker Inmos include Far Eastern firms such as South Korea's Samsung and Japan's Matsushita, Hitachi, and Fujitsu. No word yet on definite suitors, but keep your ear to the ground.

TRY ORACLE'S $1295 SQL DBMS FOR ONLY $199 TODAY. OR ORDER VAPORWARE.

If you're looking forward to OS/2 and the next generation of PC database management systems to enable you to build larger, higher-quality PC applications, you'll be interested to know that:

- Ashton-Tate has announced its intention to replace its outdated database technology with a SQL DBMS under OS/2, and
- IBM has announced its intention to offer SQL for OS/2 in its Extended Edition.



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City
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*PC ORACLE requires an "OS/2 ready" 286/386-based PC running DOS 3.1+ with 1MB extended memory (2MB is recommended) and a minimum 10MB hard disk drive.

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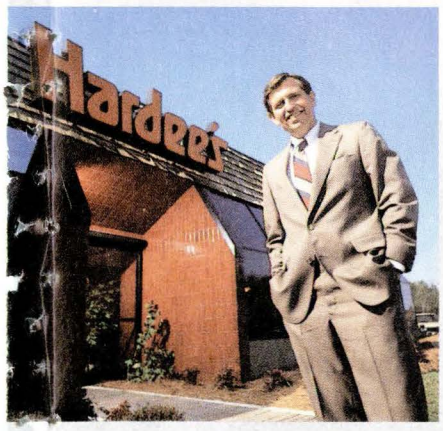

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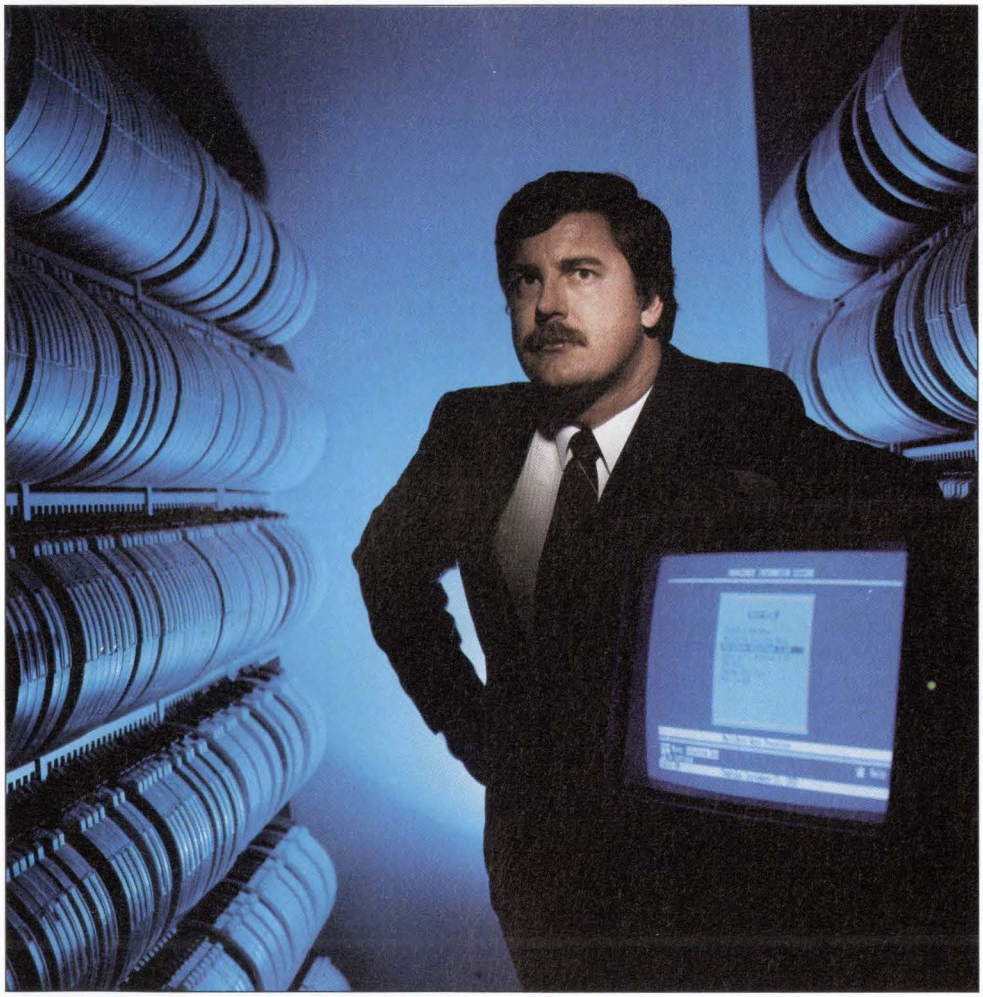
MAINFRAMES

Can Unisys Move Fast Enough To Retain 1100 User Loyalty?

Power-hungry Sperry users are questioning the price/performance of the mainframe line, but Unisys says the Super 90 and software improvements are on the way.



BAXTER HEALTH CARE CORP.'S GUFFEY: Report writers and 4GLs are limited in the Sperry world.

Photograph by David Strick/Onyx

BY JEFF MOAD

In the 16 months since Burroughs Corp. and Sperry Corp. became Unisys Corp., Sperry users have learned to give Unisys chairman and ceo W. Michael Blumenthal the benefit of the doubt.

That's because, for the most part, Blumenthal and Unisys have done what they said they were going to do: cut costs and rehabilitate the company's financial profile, act quickly to integrate Burroughs and Sperry management, and upgrade the mid-ranges of the Burroughs and Sperry mainframe computer lines with new products.

Now, Blumenthal and company are facing perhaps the most formidable post-merger challenge to their hard-earned credibility. Some high-end users of Sperry's aging mainframe line are becoming impatient for Unisys to deliver on another important promise: major performance upgrades for the flagship 1100 product.

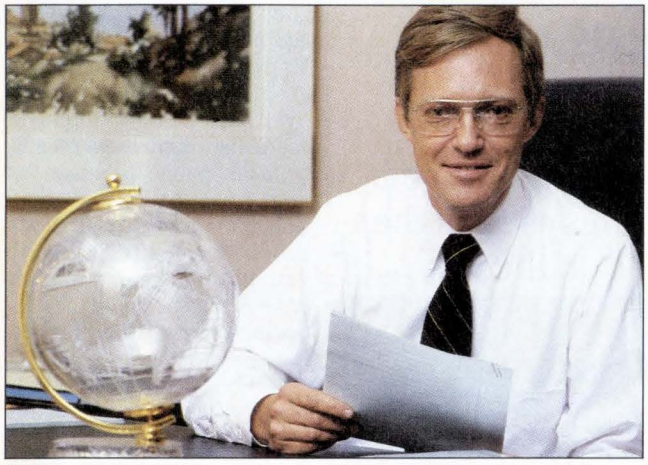
Many users say they are already strapped for performance from the top-of-the-line 1100/90 system, and Unisys has lost at least one major account in recent months due in some part to user concern over the 1100's upgrade schedule. Blumenthal recently made public promises of near-term 1100 upgrades. The question is, will those products come quickly enough and be significant enough to head off further defections in the Unisys mainframe customer base?

The problem is that while IBM and other mainframe vendors over the past few years have continued to push high-end performance and aggressively reduce prices, the 1100 has not kept pace.

"Basically," says Dave Hofeditz, manager of Sperry operations for Pacific Northwest Bell in Seattle, "we feel that the Sperry systems are not competitive from a price/performance point of view." Pacific Northwest Bell currently uses IBM and Amdahl mainframes in addition to a Sperry 1100/92, but the Bell operating company recently chose to become a single-vendor shop. The company hasn't decided which vendor to go with, but things don't look good for Unisys. "We'd like to have a single-image environment with one console, one operating system," says Hofeditz. "That's not possible right now with the 1100."

R&D Decisions Scored

In 1984, Sperry became a partner in ground-breaking wafer-scale integration semiconductor work at startup Trilogy Ltd., Cupertino, Calif. Sperry had hoped to base 1100 upgrades in the late 1980s on the Trilogy technology. When it failed to live up to expectations, Sperry was forced to fall back on an alternative plan—to use mainframe subsystems from Hitachi Ltd. in the follow-on product. That program—known internally as Super 90—is on



SPERRY'S LINDELOW: Upgrading the 1100 is most important to Unisys.

schedule, but won't be introduced until late 1988, with volume shipments expected to pick up in 1989.

That's too long of a wait for some users that already have decided to drop the 1100. Earlier this summer, the new Amadeus European airline reservations consortium, which includes Air France, Lufthansa, and others, elected to move away from the 1100 and instead buy $100 million worth of 3090s. The availability of reservations software developed by Texas Air for the 3090 had a lot to do with the decision. But according to Air France marketing automation development manager Claude Giaferri, doubts about the 1100's current and future performance played a role as well.

United Airlines is another user that has decided to move to IBM from Sperry. United already has moved two major applications from Sperry to IBM systems and expects to have completed the migration of office automation applications—internally called Unimatic—to IBM in another year-and-a-half.

Unisys is well aware of the challenges it faces at the 1100's high end. According to senior vice president Jan Lindelow, "There is nothing more important to the company right now" than upgrading the high end of the 1100. Lindelow doesn't deny that the 1100 has fallen behind in the performance race. "I won't argue that the 1100/90 will meet the 75MIPS level," he says, but adds that the 1100 will catch up to IBM by late 1988 or early 1989 when the Super 90 starts shipping. In the meantime, Unisys plans some software improvements to keep users happy.

Unisys Procedures Hailed

Among them is a project called Big Mipper that will tie together up to eight 1100/90s and allow them to share data storage devices and databases. It is slated to appear early next year. Also in the works is a performance boost planned for the transaction monitoring facility of the 1100 operating system; it is also due out next year. That should please airline and banking users of the 1100.

Lindelow says the combination of Sperry and Burroughs engineering talent and the application of Burroughs' more rigorous phase review program actually has accelerated the projected availability of some of those new 1100 products by three to six months.

Unisys' near-term plans to enhance the 1100 don't stop with new software products. In mid-September, Unisys quietly cut list prices and monthly maintenance tags on 1100/90 systems by between 20% and 30%, bringing the systems' price/performance closer into line with IBM's. "These price provisions should correct the perceived price/performance differential," Lindelow says.

Unisys also appears to be attempting to strengthen relationships with large key accounts where 1100 performance limitations may develop into a problem. One such large 1100 account is the Internal Revenue Service, which uses dual 1100 systems at each of its 10 service centers. The IRS currently is initiating what it calls a tax system redesign that could result in a switch in mainframe vendors. A source at the IRS reports that Unisys recently submitted an unsolicited interim bid to upgrade the 1100/84 systems at the IRS to 1100/92s at a generous discount. "I think they were trying to get a jump on what they perceived as a potential problem," says the source. The IRS is still evaluating the proposal.

Another longtime user of the 1100/90 that is concerned about 1100 price/performance is the Irvine, Calif.-based Edwards division of Baxter Health Care Corp. The division has been an 1100 user for eight years, but is now evaluating a switch to IBM or Digital Equipment Corp., according to technical services manager Rod Guffey. "The price/performance is not as good on the 1100/90," Guffey says, "and we're concerned that the availability of tools like report writers and fourth generation languages is limited in the Sperry world." Until now, the Edwards division has shied away from the cost of converting from the 1100, "but now we're looking at it again," says Guffey.

He and some other users say Unisys' Mapper fourth generation language is of limited usefulness on large mainframes such as the 1100/90. While Unisys has promised to move the Burroughs Linc 4GL over to the 1100, some users are pushing for the company to adopt an outside 4GL and relational DBMS for the 1100, just as it has done for its Unix and MS/DOS systems. Unisys reportedly is evaluating several such offerings, but hasn't selected one so far.

Gains in Installed Base

Of course, not every user that evaluates a conversion from the 1100 decides to do it. The vast majority—particularly government and Bell operating company 1100 users—tend to stay with the system and continue upgrad-

How the 1100 Line Stacks Up to IBM

	CPUs	MIPS	$/MIPS
IBM			
3090 600E	6	71	$173,000
3090 400E	4	53	169,000
3090 200E	2	31	158,000
3090 180E	1	17	170,000
3090 150E	1	10	193,000
3090 120E	1	7.5	187,000
Sperry			
1100/94 Model 2	4	26	215,000
1100/92 Model 2	2	15	203,000
1100/91 Model 2	1	7.5	280,000

Sources: DATAMATION, Annex Research

Photograph by Sal DiMarco/Black Star

ing. In fact, that upgrade activity among 1100/90 users hungry for more power actually has resulted in a healthy 1100/90 installed base growth in recent months. Market researcher Computer Intelligence, La Jolla, Calif., reports that the 1100/90 installed base has increased by about 18.5% since January, to nearly 400 systems. Analysts estimate that the 1100/90 will account for $1.4 billion in sales for Unisys this calendar year, or over 70% of its total mainframe business.

Some analysts are predicting, however, that 1100/90 shipments will flatten or begin to drop next year in the absence of a significant high-end performance boost.

According to Jim Ault of Creighton University, Omaha, who was recently named Sperry user group president, even if Unisys isn't able to fix its high-end 1100/90 performance problems right away, the company could ease some user dissatisfaction by giving 1100 users more new product planning information. Under Unisys, the amount of new hardware product given to users early has been much less than what Sperry had released. "Under Sperry," says Ault, "there had been an openness, and that was always one of the attractive things about being an 1100 user. Now they're much more restrictive, and some people are having trouble getting information they need for planning."

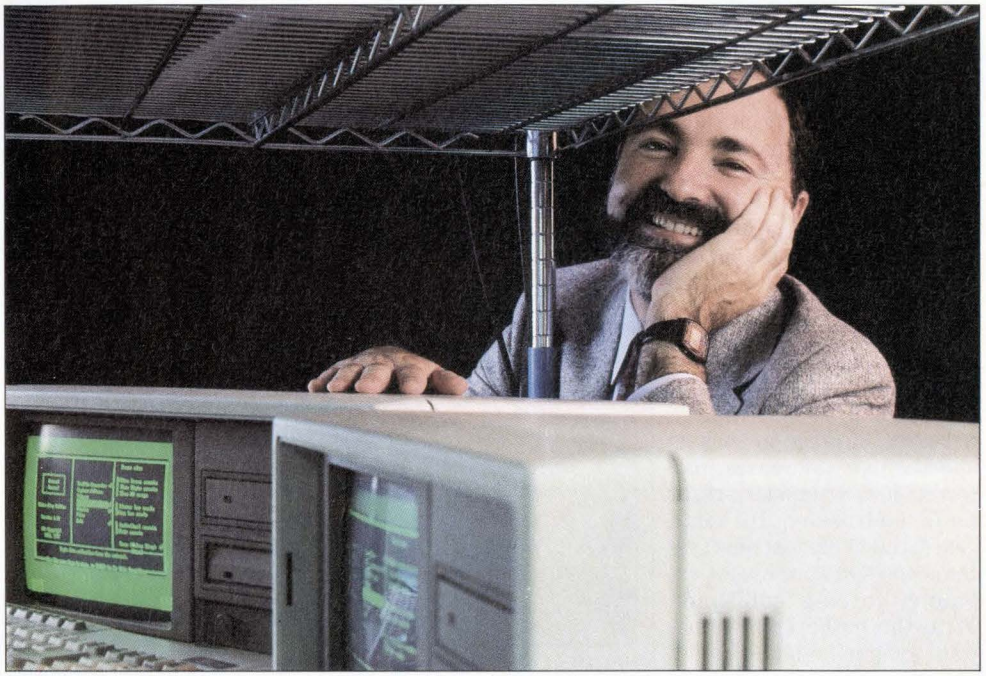
Unisys says that users of the 1100 are getting all the information they need for planning. Ault, however, says he plans to take his complaints to Unisys at the next Sperry user group meeting later this month. Ault believes that "Mr. Blumenthal means what he says about continuing to support the 1100, and I also believe he doesn't want to lose a single 1100 user if he can help it." ■

Photograph by Sharon Hall

COMMUNICATIONS

Practical Network Problems Commanding Users' Attention

The goal of network management notwithstanding, a market for protocol analysis tools has emerged to address day-to-day challenges in operating networks.



NETWORK GENERAL'S SAAL: Few realize how inefficiently networks function.

BY SUSAN KERR

The *Miami Herald* decides to take advantage of the remodeling of its facilities and install different cable for its IBM token ring local area networks; naturally, it wants to check whether the new network is running in tip-top shape. Meanwhile, up north in Chicago, United Airlines wants to tune up the remote booting of diskless IBM PCs running on some of its 27 token rings. These are simple and increasingly common occurrences for users of networks, but in both instances, when it actually came time to do the diagnostic work that would show the networks' condition, it wasn't to Big Blue that these companies' communications managers turned for help.

Instead, both used tools supplied by a small California startup that is one of a handful of companies in the small but growing niche of LAN protocol analyzers.

As LANs proliferate, so do troubles in installing and maintaining them. Yet, while industry pundits and dreamers conjure up visions of the perfect end-to-end network management solution, many communications users are busy trying to find ways to deal with today's problems. Some are turning to products that, although not technically classified as network management tools, help to analyze, fine-tune, debug, and simulate network functions.

"I believe most peoples' intuition on what's going on on a network is wrong," declares Harry Saal, founder and president of Network General Corp., the Sunnyvale, Calif.-based company that supplied its Sniffer product to the *Miami Herald* and to United. "For example, they'll notice the network's running slowly and they'll think 'I need a new server,' or 'I need a 386 rather than 286 system.' "

The Gray Areas in Networks

In many cases, diagnosis will turn up a faulty piece of equipment that readily can be fixed. This points up the misconception, Saal adds. While those with experience in the wide area network world are familiar with the fact that net-

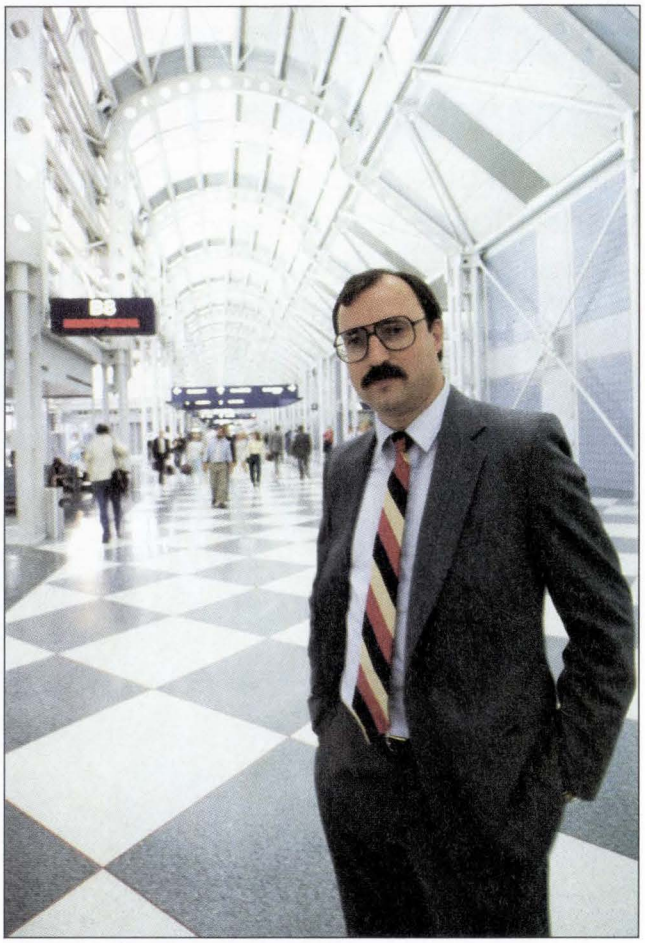
works may function in an inefficient manner, he says that few in the LAN world, particularly computer vendors now having to cope with LANs, realize this. In fact, many in the computer industry have the impression that either a LAN works or it doesn't. Tools that let users spot and improve mediocre performance are a relatively new phenomenon.

"It really is—particularly with the token ring—very difficult to have an accurate indication of loading and how clean data transmission is," concurs Richard Redding, manager of technical support and systems engineering at the *Miami Herald*. Using Network General's Sniffer, he says, "we were able to greatly simplify cabling and check traffic to make sure it was right."

LAN analysis tools capture network information such as specific byte addresses, patterns and character strings, or node addresses. In some cases, they help test new systems and software by, for example, forcing collisions. With the gathered information, systems administrators can ascertain problems and debug the network. Problems can range from bad hardware to a program that is sending out packets with too few bytes, which slows overall network speed.

While a popular use of analyzers is to figure out the best configuration for a new or growing network, some use the equipment a few times a month to get a network blueprint. At NASA Ames Research Center, Mountain View, Calif., science engineer Trevor Eisenman uses Excelan Inc.'s LANalyzer to check on an Ethernet network hooking up workstations that are tied into an Amdahl mainframe, which then acts as a gateway to a Cray supercomputer.

"If it's slow, it [the LANalyzer] tells us exactly what's going on," he says. "We use it to find out how many people are on the network and how long it takes to get a connection."



UNITED'S CAMP: There is no single solution to LAN problems.

Evolution of the Product

Although they're still specialty tools, protocol analyzers are beginning to find homes in companies with LANs of over 25 nodes. A few years ago, San Jose-based Excelan announced its first Ethernet analysis tool. It was priced at $50,000 and was used exclusively by network vendors and developers. Today, its best-selling LANalyzer product is a $9,500 PC controller board. The LANalyzer line of products currently debug Ethernet and Starlan networks, and Excelan will add the token ring network to the list next year.

Excelan also offers a version prepackaged in a Compaq portable for $19,500. Network General sells only prepackaged Compaq versions, priced between $19,000 and $24,000. It has separate products for Ethernet, Token Ring, and Arcnet, each at $19,000, as well as a dual Token Ring/Ethernet package, priced at $24,000. Another player, Hewlett-Packard, sells Ethernet and Starlan analyzers for $17,000. A Cupertino, Calif.-based startup, Eon Systems, is expected to enter the Ethernet market next year and, according to sources, is currently in an alpha test with Stanford University.

While these prices are still prohibitive to many end users, some heavy LAN users have begun to show interest. The number of end users buying Excelan's product has picked up dramatically, and today they account for 50% of sales, according to Subhash Bal, Excelan marketing vice president. Roughly 20% to 25% of Excelan's revenues are generated by the product line, putting sales in the first half of 1987 at approximately $4 million.

Excelan has new competition from Network General, which was formed last year by two Nestar Systems Inc. founders. A little more than 30% of the more than 100 Sniffers sold are going to end users, including IBM's own MIS department. The rest go to LAN vendors who use the products to test competitive networks or to service their customers.

Although the market figures for LAN analysis tools are small, the need for products that debug LANs isn't. Gary Kwok, manager of project consulting at Lanquest Group, a Santa Clara-based network consulting and services firm, says he gets "a flood of calls on networks going down and people who don't know how to analyze them." These diagnostic tools are useful only up to a point, cautions Kwok. "You have to be able to take the information and interpret it," he says.

And that's what keeps these products from network management status.

Role for Expert Systems

"Network management will come in three or four phases," comments Excelan's Bal. "This [the LANalyzer] is part of phase one." Successive phases will bring expert systems products that actually know how to react to data collected on network performance.

Thus, while the products can cut down on diagnostic

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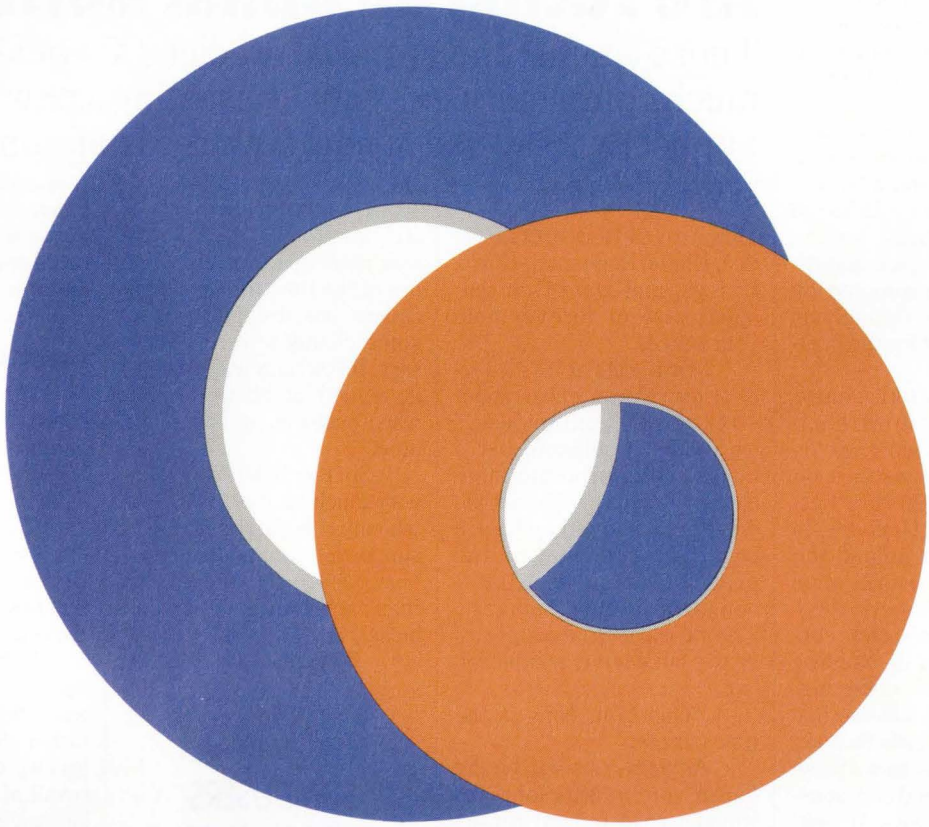

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time, people are still an important part of the loop. In the example where the Sniffer can diagnose that an application program is sending out packets that are too small, it is incapable of pinpointing the code in the program that is at fault.

That jibes with the vendors' emphasis on users with large networks and a fair degree of expertise. Although ease-of-use features, particularly menu-driven capabilities, are being promoted by the makers of LAN analysis tools, they're not for the faint-hearted.

Martin Suzuki, senior data communicatons engineer for Allied Bendix, Mountain View, Calif., uses the LANalyzer on an Ethernet network of almost 100 nodes. In one instance, it helped the company find a workstation sending out double packets. The workstation's sick controller board was causing problems for the whole network; it took a full day to find out the cause, recalls Suzuki.

As it stands now, these products are aimed only at users of local networks. At United Airlines, which relies on SNA as well as on protocols peculiar to the airline industry, there is no single solution right now. Says Bill Camp, United's LAN technical support manager, "We've developed quite a few of our own problem determination" packages. As to alerts that indicate problems, however, he believes, "There's a long way to go."

The priority today is making sure that individual networks are up and running correctly. United's 27 token rings have 400 nodes, and the airline's plans call for that number to grow. "Anytime you put up a network, you have to go through a tuning phase," Camp says. The protocol analyzers "highlight problems, which we then can fix." ■

LANGUAGES

Opponents of FORTRAN 8X Are Facing an Uphill Battle

Those against the proposal predict 8X would add too much complexity, essentially creating a new language. Supporters say use of new features is optional.

BY WILLIE SCHATZ

Memo to FORTRAN users from IBM, Digital Equipment Corp., Unisys, and Data General: speak now or forever hold your peace.

"On a scale of 10, the level of users' awareness about FORTRAN 8X is .5 or less," says Gary Robinson, DEC's manager of corporate standards. "I'm sure most people don't even know they have a chance to comment on the proposed changes. And I don't think a lot of them care. They'll care in a couple of years, but then it will be too late.

"This is it. Now is the time to vote."

Actually, this will be the fourth vote in 8X's long and winding road toward replacing FORTRAN 77. But it's the first time in 8X's 10-year journey that the masses will have a shot at it. The three previous votes took place in the American National Standards Institute's (ANSI) X3 committee and its X3J3 offshoot. Even the efforts of the previously mentioned Big Four weren't enough to prevent 8X from being released for a four-month public comment period, which is scheduled to begin Oct. 19. Those dissenters would have preferred not to let 8X out of X3's grasp until their objections had been incorporated into the public version. But they were outvoted, 30 to five.

"They were very smart to make 8X 100% backward compatible with 77," says Carl Burch, an X3J3 member who voted with the majority and a developer in the FORTRAN compiler project at Hewlett-Packard. "There was nothing taken out. The use of FORTRAN for new applications has dropped off, so some changes were necessary. If FORTRAN was going to do something about its software problem, it had to be now."

So the burden now is very much on the naysayers, who must generate a flood of supporting comments to convince X3J3 to see FORTRAN 8X their way. They know it won't be easy.

SOME USERS WORRY OVER THE EFFICIENCY OF NEW COMPLIERS.

"If we don't get 2,000 negative comments in the four-month period, we've lost," says Presley Smith, manager of development services for Convex Computer Corp., Richardson, Texas. The minisupercomputer maker is not a member of either X3 or X3J3, but has been among the most vocal of the opposition.

"We're not against changing FORTRAN 77," Smith insists. "We know the industry needs to do that. We just don't like some of the things that are in 8X. We think the proposed standard adds too much complexity to the language while still ignoring features requested by the public, such as bit data types and pointers."

Forceful Unisys Dissent

Other opposing vendors stress that the changes are so numerous and so vast that 8X becomes another language. That would make the FORTRAN 77 they knew and loved history. So they minced no words telling X3 about it in the final letter ballot before the release to the public.

"The difficulty with 8X lies not in the quality of the work that X3J3 has done but rather in the somewhat surprising observation that the result of X3J3's work is a new language and not a revision of FORTRAN," IBM says. DEC told X3 that publishing the proposed standard may jeopardize the past successes of FORTRAN in the committee's attempt to make several major changes to the language. Boeing Computer Services thought the standard deviated too far from FORTRAN 77. None of them, however, matched Unisys' sound and fury.

"We feel that the addition of the entire package of modern programming language features has warped the language nearly beyond recognition," the company wrote.

Them's fightin' words, boy. The pugilists are squaring off over such issues as the size of 8X (too large because it adds 33 new statements to FORTRAN 77 as well as many of

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the major constructs of Ada) and "decrementing" 14 statements (meaning they're candidates for removal in the next FORTRAN standard), including *common* and *equivalence*, two of the most widely used FORTRAN statements.

The Economic Implications

But what it really gets down to is money. Dataquest, the San Jose-based market research company, estimates that the 1986 market for technical computer systems (both hardware and software) reached $15.5 billion. It also estimates that 80% of engineers and scientists use FORTRAN in their work. Does any company with a significant number of lines of code in the user community want to face its stockholders and say they just kind of let that one slide?

"The people going public with their opposition don't want to spend the money to write new compilers," says X3J3 chairwoman Jeanne Adams, a consultant to the advanced methods group at the National Center for Atmospheric Research, Boulder, Colo. "It's that simple. We didn't do anything radical or unusual. It's not a huge language. All we did was develop the architecture. We didn't throw away anything. All of 77 is contained within 8X. If users don't want to use 8X, they don't have to. They can use the new features as they need them."

In taking it to the streets, the opposition has stressed the hardship 8X will inflict on their midrange users. The high-end users will escape the trials and tribulations of 8X because they don't have to worry about using the code over and over. The first time they run a FORTRAN program is the first time they get results. The low end will also be unaffected, since this segment can barely run 77 on a pc. They won't have a prayer with 8X.

According to DEC's Robinson, array processing is the most significant part of 8X. He claims that X3 began in 1984 with the intention of including array processing in 8X, but the committee totally missed the change in array processing technology two years ago. By not including it in 8X, users would be forced to continue with the old method of array processing. He would have X3J3 revise the array processing portion of 8X.

"Let's say our [midrange] class of users purchases our new FORTRAN compiler," says Robinson. "If we have to build up to the proposed 8X, all we'll hear is 'It could be faster if DEC does this.' Then we'll say, 'We're just following the standard.' And they'll say, 'What standard?' We're the ones who are going to take the heat.

"They could care less about a standard," he emphasizes. "They just want to know why their compiler doesn't run fast enough."

Retraining Effort Required

DEC and friends also claim that the complexity of 8X will require users' retraining and re-education. That leads to a short-term decrease in programmer productivity, which then takes us straight to the bottom line. If training is required for FORTRAN 77 programmers to understand a program that uses new features instead of traditional FORTRAN, wouldn't the programmers be better off trying to create a software blockbuster that's going to take the company into the economic stratosphere?

According to a Convex Computer Corp. paper on 8X, the X3 committee recommends that programmers convert existing programs to use methods from 8X and stop using the 14 decremented features. X3 further recommends that if programmers stop using the decremented features, then the features should be removed from a future FORTRAN standard. With thousands of FORTRAN programmers and millions and millions of lines of FORTRAN code, how will the decision be made that enough of that code has been converted to the new standard so that those 14 features can be removed? The concept is dangerous at best, Convex contends, and modifying existing

Travels and Travails of FORTRAN 8X

So, you wanna see democracy in action on the Constitution's 200th birthday? Check out FORTRAN 8X.

By the time this language becomes official, there will have been a letter ballot and a roll-call vote in the American National Standards Institute's (ANSI) X3J3 subcommittee and at least one vote by ANSI's X3 committee. All these yeas and nays were to decide whether 8X should be sent to the public for comment or not. And just because you voted one way on the letter ballot didn't mean you had to go the same way on the roll call. Cray Research said no on the letter ballot, then yes on the roll call. Data General voted affirmatively twice in X3J3, then changed its mind in the X3 contest.

This process hasn't quite taken two centuries, but it probably has seemed like it has to those involved. The 8X development cycle began in 1979, only a year after FORTRAN 77 was approved as an international standard. After numerous meetings, discussions, and a financial crisis that almost wiped out ANSI's X3J3 FORTRAN subcommittee, the preparation of the 8X draft standard began in 1982.

X3J3 dumped the original draft document the next year after concluding that it didn't present a clear picture of data types (including programmer-defined types, data objects, and the relationship of data to an executing program). That automatically meant a significant increase in the time it would take to complete FORTRAN 8X. The subcommittee spent 1984 deleting, revising, and editing 8X.

The first letter ballot was mailed in January 1986. A straw vote the previous November indicated that approval would be given for sending 8X to the first review committee. But someone must have flunked math. The ballot went down, 20 to 16 with one abstention. As X3J3 says, "some of the ballots suggested that the language was too large. Others did not agree with the style and editorial presentation of the document. [They still don't, as witnessed by the continuing controversy.] Requested deletions were all quite different, and it was apparent that further work must be done to resolve issues on the language content. The next three meetings were spent discussing deletions to the language and a reduced language was eventually adopted."

Whether that language is the one that will finally emerge as FORTRAN 8 whatever (they'll probably finish before they have to call it FORTRAN 9 something) is in the hands of that great foundation of democracy, the American people. And X3J3, as befits all administrative bodies within that form of government, must respond to every comment it receives.

In a similar dispute over COBOL 85, the subcommittee received 2,000 public responses. Those who would change FORTRAN 8X one more time hope to equal that number. With IBM, DEC, Unisys, Data General, and Convex Computer Corp. on their side, the odds may be in their favor despite the uphill battle.

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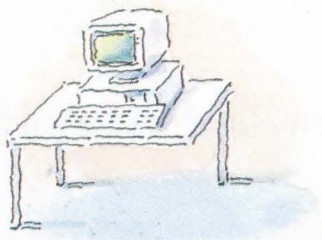

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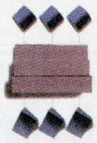

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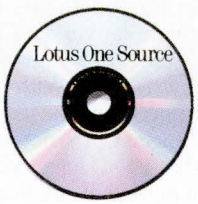

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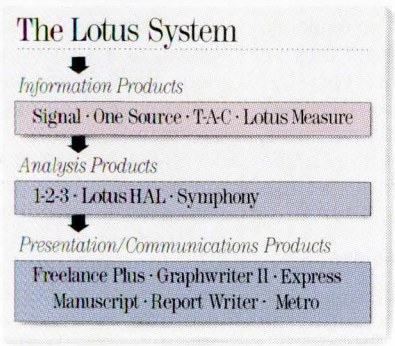

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programs to use the new constructs would be expensive since there is no one-to-one mapping between the old constructs and the new.

"My concern is how much efficiency I'd lose in the new compilers," says Lyle Meier, assistant manager of systems at Texaco's exploration and producing technology division in Houston. Meier's shop runs the gamut from Crays to VAXs.

"8X is a significant change in direction. I've never thought of FORTRAN as an object-oriented language, but I think that's what X3 tried to do. They missed some pieces, though," says Meier. "And since it's going to require significant training to go to 8X anyway, why not go to Ada? Ada certainly has the most significant backer in the industry. When the Defense Department says, 'Jump,' everyone says, 'How high, sir?' "

FORTRAN isn't Ada, however. Ada doesn't have thousands of users who have been using millions of lines of code for the last 30 years. The only similarity between the two may be the disputes surrounding each as it attempts to find its way in the big, bad standards world.

"The controversy about 8X isn't over array processing," X3J3 member Burch contends. "It's over software engineering improvement. That's where FORTRAN is falling down today.

"The compiler argument is totally untrue, at least in HP's case. And the opposition doesn't feel software improvement is necessary," says Burch. "There'd be a great deal less controversy if X3 had just gone with changes in hardware. But that wouldn't have done the job. And anytime you have this much money involved, you will have controversy."

Stay tuned, folks. They've only just begun. ■

MICROCOMPUTERS

Users Adopt Cautious Stance On Purchases of IBM's PS/2

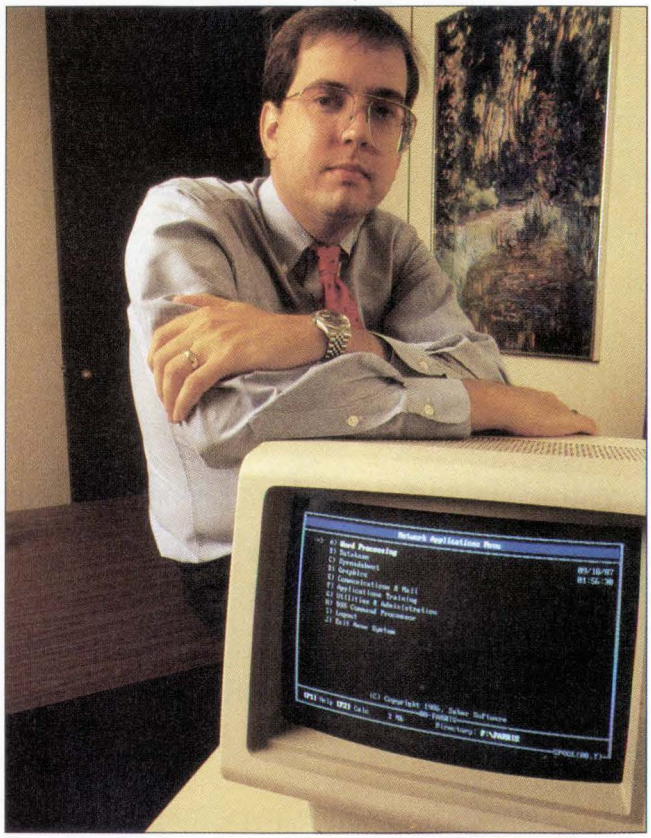
Adjustments to the new disk format as well as the availability of software have caused users to go slowly, but most see benefits with the new line of PCs.

BY ROBERT FRANCIS

If football is a game of inches, then the game that information center directors are playing as they cope with problems presented by the move to the 3½-inch disks that IBM's Personal System/2 requires is a game of 1¾ inches. It's also a game that, initially at least, may not be making anyone very happy, unless you count the manufacturers of external disk drives.

In addition to the problems inherent in changing to 3½-inch disks from 5¼-inch diskettes, many users feel a headache coming on due to the differing timetables offered by various vendors for the release of their software in the new format. With the variety of problems posed by the new format, it's not surprising that users have come up with a myriad of solutions.

One way in which managers are tackling the problem is to begin with a few of the new machines and gradually work them into the fabric of the corporation. That's the approach being taken at General Dynamics Corp.'s Fort Worth plant, where the company has integrated four of the PS/2 model 30 machines into its software engineering technology and tool development area. "We've only had the new machines for a couple of weeks, but so far it's not been much of a problem," says Mike Lloyd, supervisor of the software engineering technology and tool development section. "We made a little bit of a mistake in not getting enough of the [external] 5¼-inch drives," he explains. "But overall, I think they've shown that they're very fast machines with a lot of capability." Eventually, Lloyd notes, the company will replace most of its older IBM XT machines with the new PS/2s.



SOUTHLAND'S FARRIS is using PS/2s on a standalone basis.

Photograph by Holly Kuper

The Sampling Technique

Other companies are taking small bites of PS/2s in order to determine how the machines will work in future applications. Says an IS vice president at one major corporation who requested anonymity, "We've purchased 150 of the machines, which, for us, is a sparing commitment. We'll decide later if we want to put all our eggs in one basket."

That hesitation to commit fully to a new product is not unusual. "It's shown up in our tracking of sales of computers through retail stores," says JoeAnn Stahel, manager of market research at Store-Board Inc., a Dallas-based company that tracks pc sales through retail stores. "When a new product is introduced, and particularly one with a new technology that has to be

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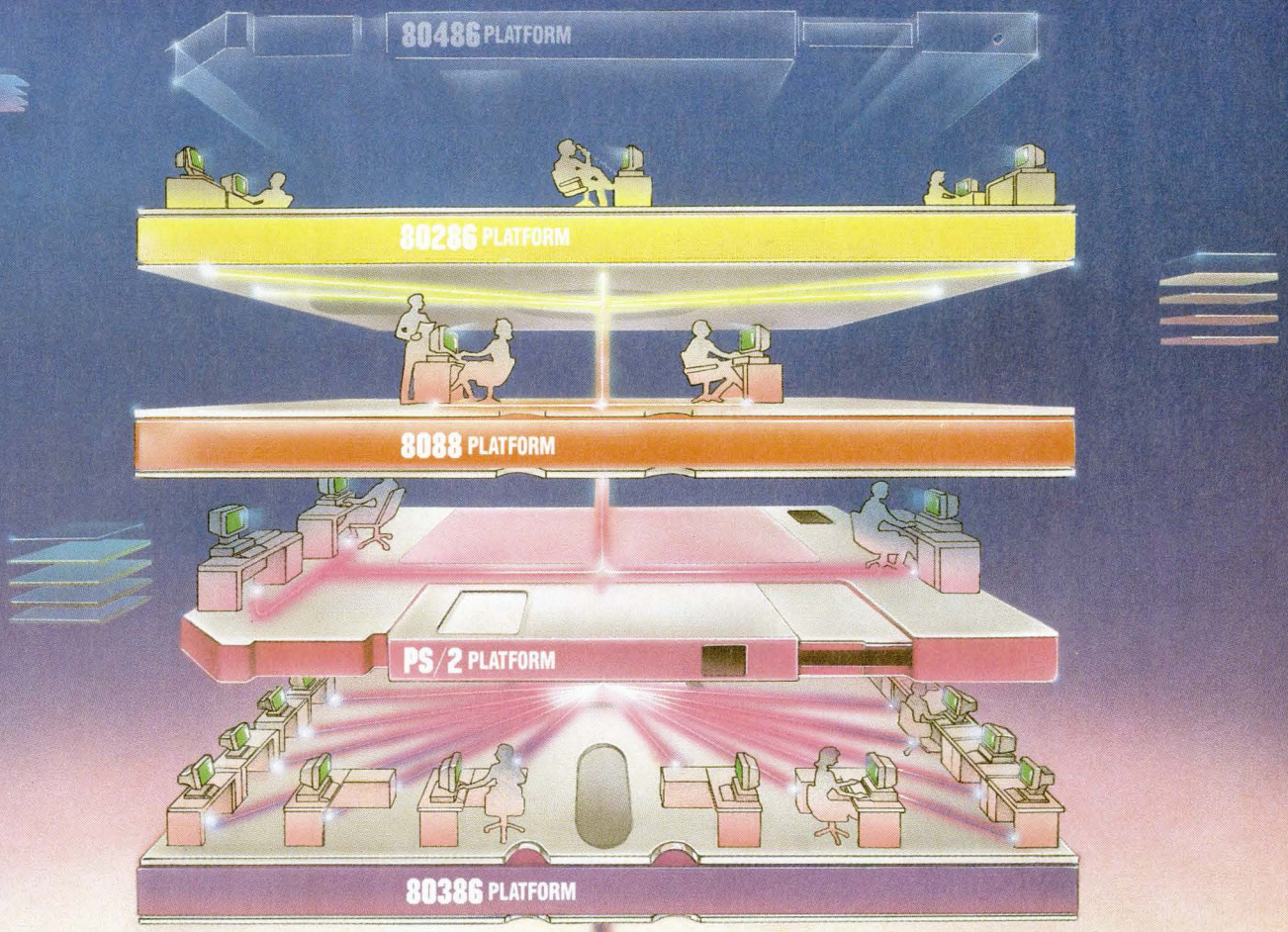

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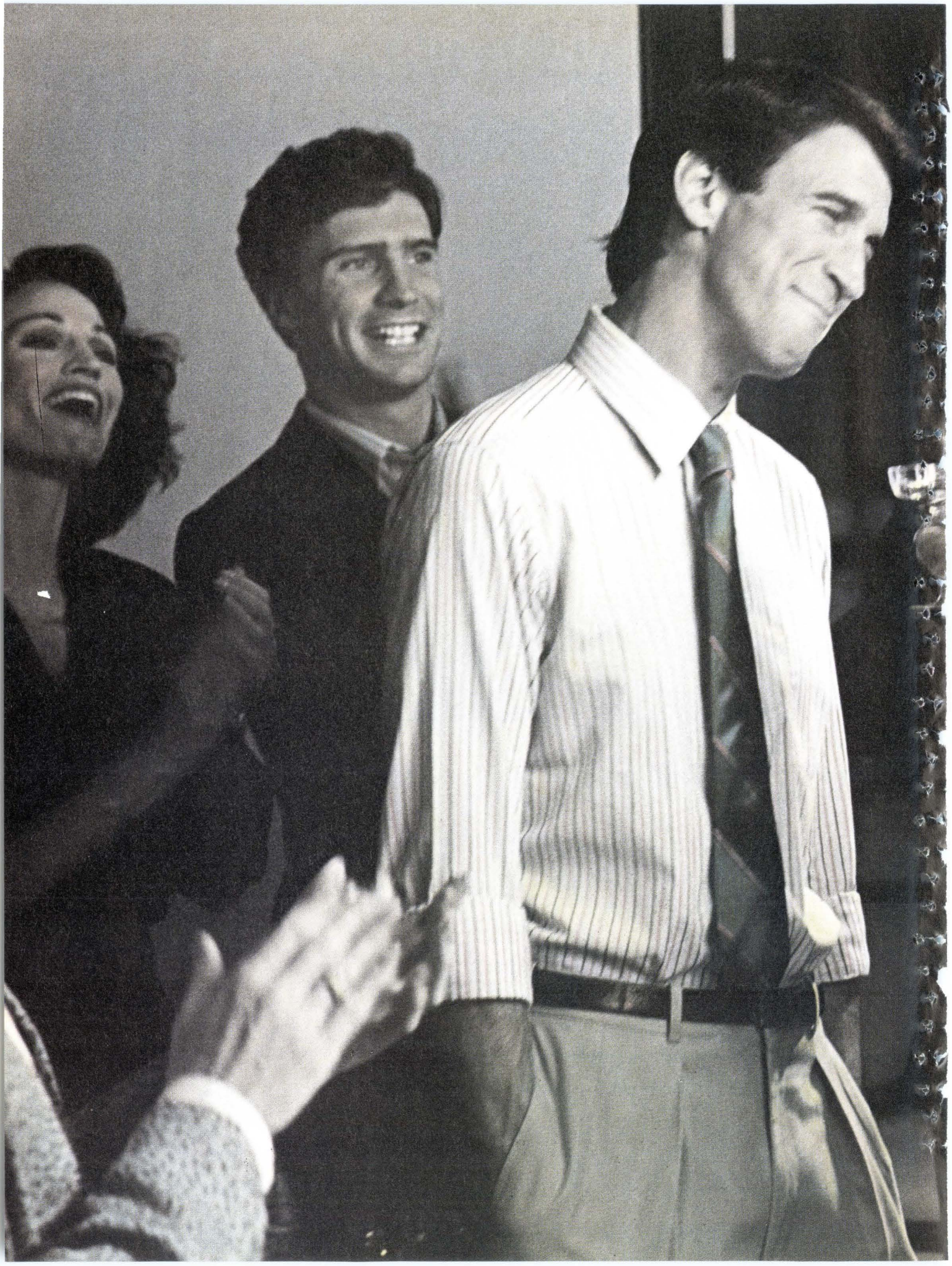

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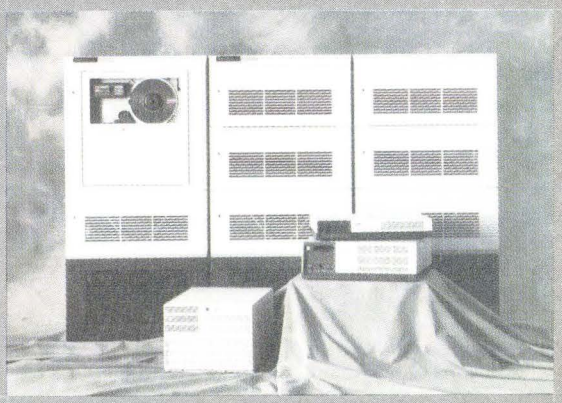

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worked into a system, there's going to be some decline in overall sales."

While the general tone among corporate buyers may be one of caution, the PS/2 is apparently doing well in particular areas. Most of the major airlines, for example, have selected PS/2 as the hardware platform for new enhancements to their computerized reservation systems and for subsequent new offerings in the areas of software, communications, and databases (see "PS/2 Flying High in Reservation Systems," Sept. 15, p. 24).

Meanwhile, for some IBM-compatible competitors, the new format has presented problems, not the least of which is IBM's reluctance to reveal details of its new technology, which makes legal duplication much harder. Furthermore, some say the new technology is not only a hardship for them, but for IBM customers as well. "They are operating under the FUD factor with us right now—fear, uncertainty, and doubt," says Graham Beachum, senior vp at Dell Computer Corp., Austin, Texas. Dell sells clones under the PC Limited brand name. "But IBM's strategy, whatever it is, is long range. They're looking into 1989 and beyond. So it's not surprising that customers are taking time to learn the new technology and so forth."

OS Software to Follow

The PS/2 line consists of 10 machines: the model 25; two configurations of the model 30; the model 50; two configurations of the model 60; and four configurations of the model 80. Prices range from $1,350 for the model 25 to $13,995 for the high-end model 80-311. All models were scheduled to be available by the end of the summer, except for the 80-111, which is due out in the fourth quarter, and the 80-311, which is due in the first quarter of '88. The availability of the other two model 80 machines was actually pushed up to June from July.

The standard edition of the new Operating System/2 for the machines is due to be available in the first quarter of 1988, and IBM has said it will announce the availability of the extended edition of OS/2 in the fourth quarter. Some observers believe that buyer hesitation can be partly attributed to the availability of this key software.

For some office managers, the immediate solution to the format problem is simply to avoid it altogether by keeping the new PS/2s in their own little network, not communicating with other computers. "We're using them on a standalone basis right now," says Jeff Farris, office automation manager for Southland Corp., Dallas.

In the future, when the company begins to purchase large numbers of computers for other projects, it may begin to deal with the format translation problem, but at present the company can learn to use the new computers and their formats without having to face the problem of two formats existing in one network.

IBM's diskette size may have caused some unwanted customer migration as well. One public relations company on the West Coast, which requested that its identity be withheld, was ready to purchase new equipment when the PS/2s were announced. After the announcement, they decided to take a bite out of Apple instead of Big Blue. "We knew we were going to have to make a big change anyway, so we decided to go with Apple for a variety of reasons, not just because of IBM's new format, but it helped us make the decision," says a manager involved in the decision. ■

STRATEGIES

Chip Makers Add To Product Lines

Micros, software, CASE, and AI are areas into which U.S. semiconductor manufacturers are delving.

INTEL'S SLAUGHTER: We're in a no-profit contest with Japan.

BY RALPH EMMETT CARLYLE

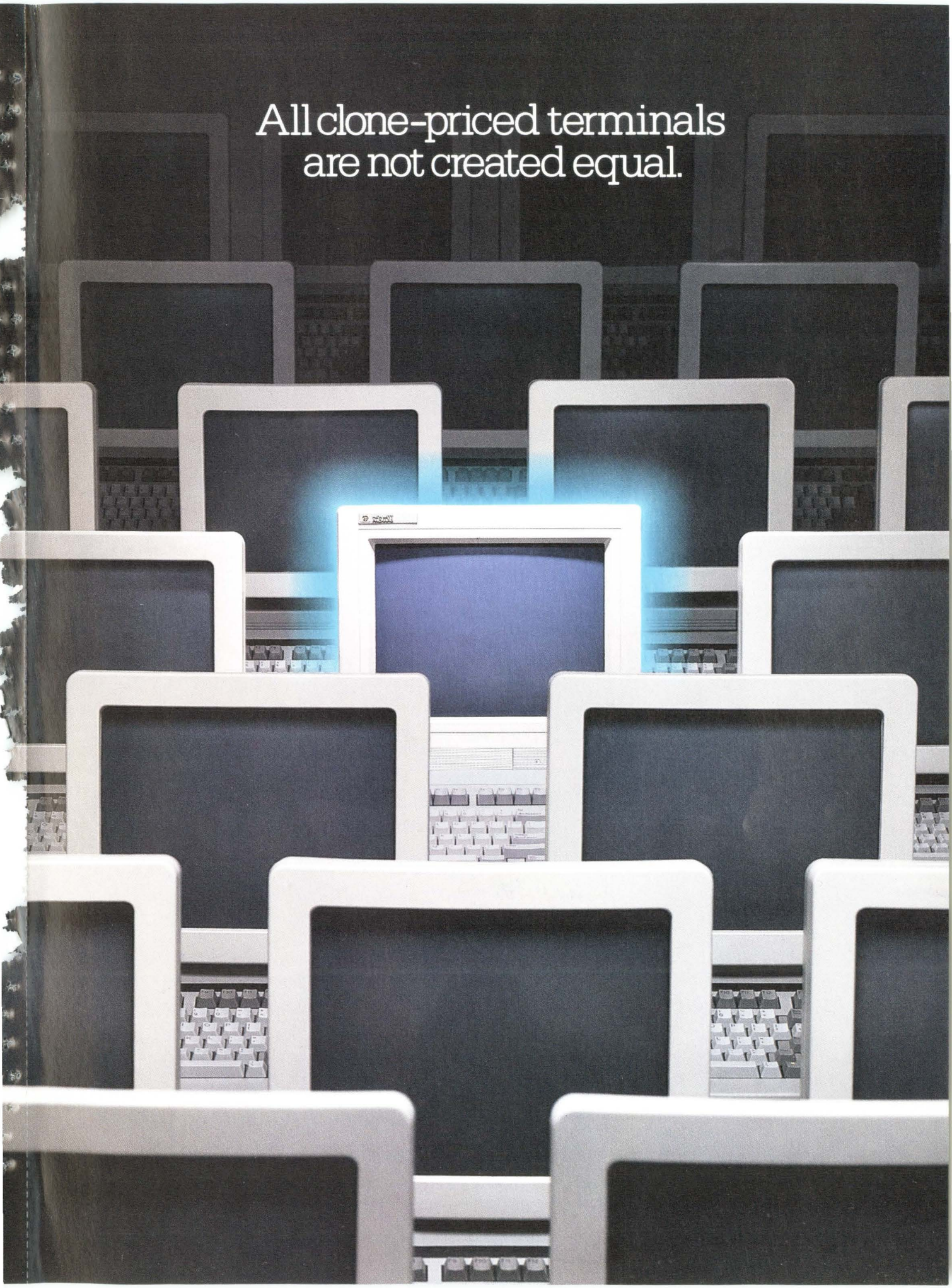
The word "proprietary" will be popping up a lot at Intel Corp. press conferences over the next nine months as the resurgent chip maker embarks on a new product blitz. The new strategy, if successful, will turn the Hillsboro, Ore.-based Intel into a predominantly systems company by 1991, as well as put it on a collision course with Digital Equipment Corp. Intel believes it has found a way to minimize its exposure to the violent cyclicity of the semiconductor business and to Japanese competitors.

"We're only interested in products we can run with for a long time without attracting competition," says Ed Slaughter, general manager of the Intel Development Organization (IDO), who is in charge of beginning new businesses for Intel. The company spent over $100 million to develop its 386 micro—an investment comparable with that made by computer companies developing a large-scale operating system.

"When you spend that kind of money, you don't want to sell your chip at $5 a pop," notes Slaughter, whose three IDO divisions are busy assembling a proprietary architecture around the 386 that could prove to be a potent weapon for Intel's biggest customer, IBM, to use in its battle with DEC to build corporate networks at large commercial sites.

Intel's Fastpath, a high-speed control unit that links mainframes to LANs, periph-

Photograph by Kristin Finnegan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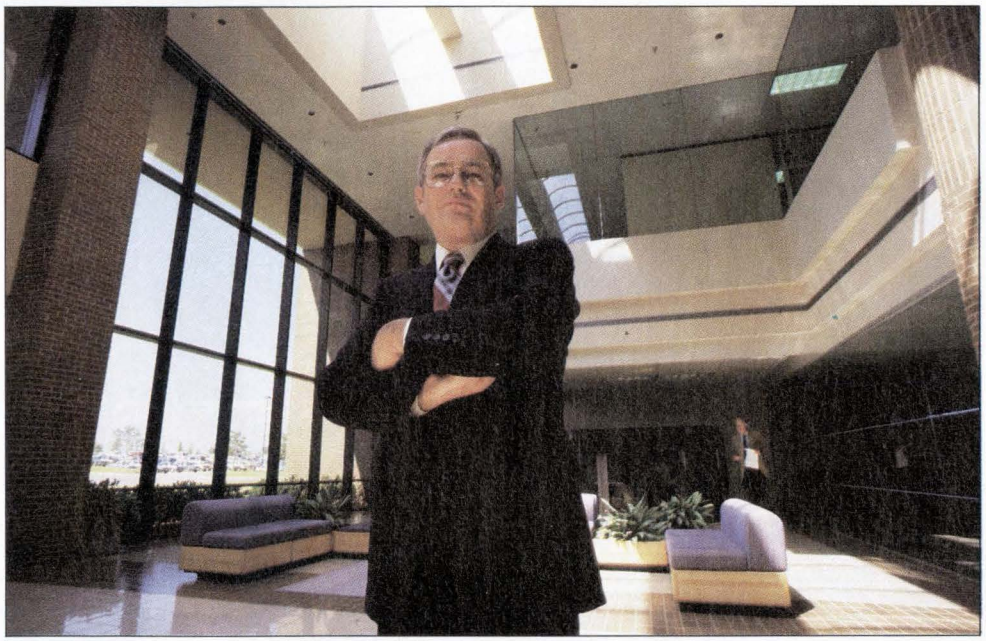
erals, and other hosts (such as the VAX), was the first product chosen by IBM for its Industry Marketing Assistance Program, and it has provided the chip maker with a useful entrée to the IS shops of large corporations. Extensions to this mainframe connectivity platform and related networking enhancements for the 386 will be among the new products in the coming months. Company sources add that a new version of Intel's supercomputer, the massively parallel Cube family, will emerge next year.

Intel isn't the only U.S. chip maker fleeing from the rising tide of Japanese competition in commodity markets. Motorola managed to eke out a profit last year by making sure that only 30% of its electronics business was in semiconductors, and it has a growing cellular switch business. This year, according to insiders, Santa Clara-based National Semiconductor Corp.'s IBM pcm mainframe marketing subsidiary, NAS, will add $600 million to its parent's sales, around two thirds of the expected contribution of its mainstream chip-making operation. The company also has a burgeoning business in supermarket point-of-sale terminals to help keep the wolf from the door.

TI Moves into Software

While these companies are attempting to broaden their product lines to balance losses in what Slaughter refers to as a "no-profit contest for market share with the Japanese," longtime leading U.S. chip maker Texas Instruments has something much more radical in mind. If Intel's goal is to seek the higher ground of a systems business, Dallas-based TI is intent on finding shelter from the storm in the software business—and, as with Intel, the ubiquitous IBM could play a pivotal role in its plans.

Since 1976, TI has developed what is generally regarded by experts as the largest single-image worldwide communications and computing network in the world. Single image refers to the fact that terminals on the TI net can gain access to multiple users simultaneously. This true blue SNA network of some 40,000 terminals, 400 minis, and 41 mainframes supports all of TI's business activities from product design and manufacture to marketing and support, according to John White, vp of Information Systems and Services and the man who oversees the network's operation from a master console in his office.



TI'S WHITE: A family of CASE tools is TI's "door opener" to the software business.

Today, TI is pumping millions of dollars a month into the creation of expert system and artificial intelligence software that is being embedded into the network to turn data into useful information and automate the semiconductor development process from design to the time when the customized chip reaches its destination. "We want to make sure that our chips have no shelf life before they wind up in a customer's board," explains White.

One spin-off from TI's pioneering efforts in AI has been a family of CASE tools that it says will enable typical MVS shops to reduce their applications development cycle time by a factor of five, and to bring about a sixfold increase in software development productivity. Early beta sites polled by DATAMATION, such as Amoco Oil of Chicago, have been very enthusiastic about the new software family, called Information Engineering Facility (IEF). White reveals that a new version of IEF for IBM's VM customers will be forthcoming, and doesn't discount the possibility that IBM—which has nothing comparable to IEF—may enter a joint marketing arrangement with the chip maker. IBM declines to comment.

White sees the new CASE family as TI's "door opener" to the software business. "We've never really marketed software before, and we've put together a fairly extensive marketing plan," he says. The TI executive stresses that the new software is a natural outgrowth of its internal MIS operation—of solving problems internally. "We're not trying to get out of the semiconductor business [which accounted for almost half of the company's $5 billion revenues last year], and we're not betting our future on AI, as some might believe," he says.

Getting Close to Customers

What White and Slaughter say they are trying to do with their new initiatives is to get close to their customers. "Chip making has always been a boom/bust affair and we've always been vulnerable to these cycles," White explains, "but real exposure comes with distance from the customer."

Such "distance" has been a big feature of the typical adversarial relationship that has existed in the past between semiconductor companies and their customers. "The independent chip makers have been arrogant and shortsighted," says Steve Nickle, a director at Chicago-based Technomics, a research firm specializing in the semiconductor business.

Photograph by Holly Kuper

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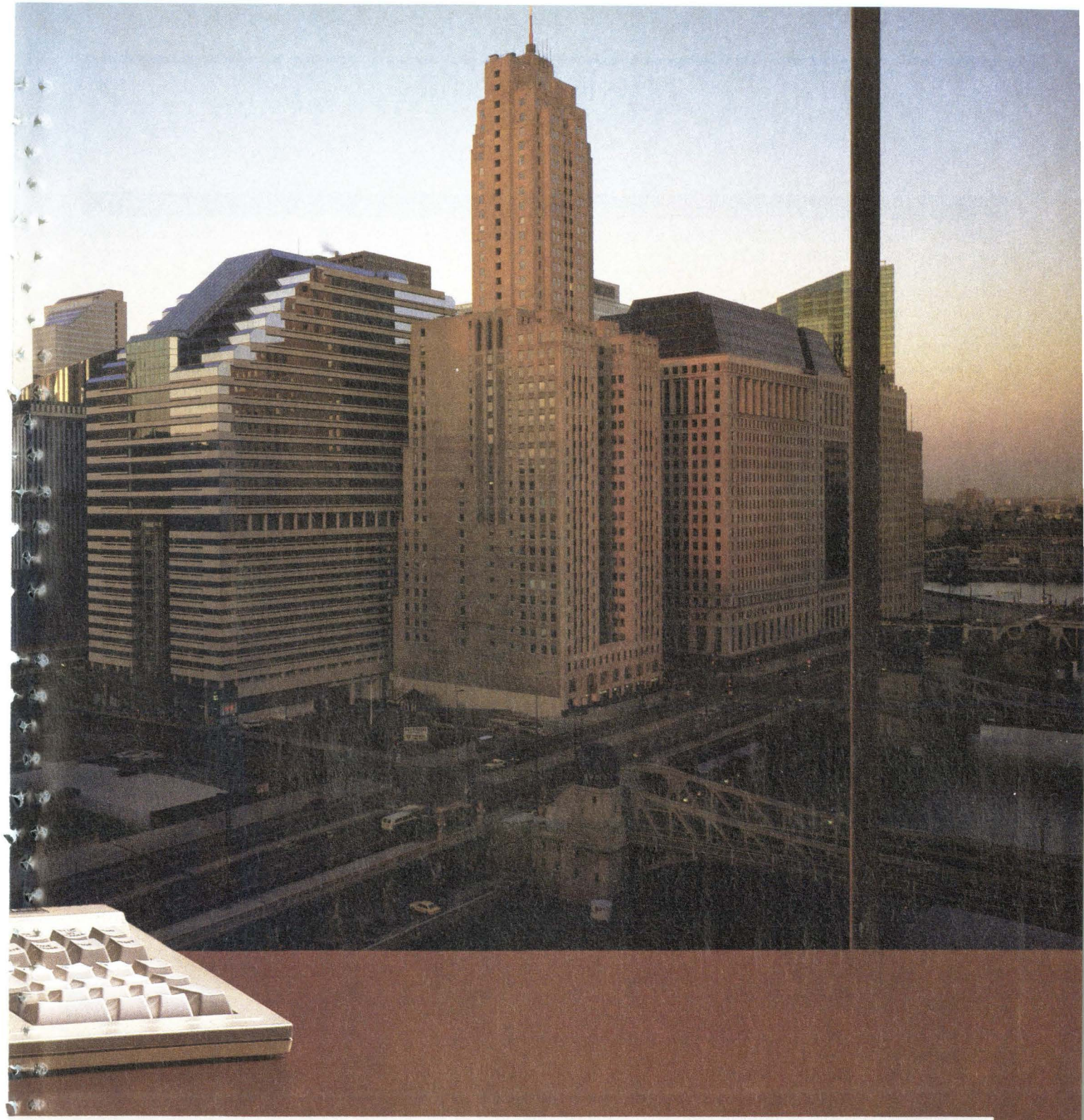

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"They've had an inside-out philosophy of not caring what their customers thought, but that's changing with the evolution from commodity to customized chips."

"Customers now need to know more about the superchips that are used in their proprietary designs. Even how to design and build them themselves," says Nickle. "Today's semiconductor customer increasingly is a partner."

What IBM, as Intel's biggest customer, needs, says Slaughter, is to pass along the burden of hardware systems integration so that it can concentrate on the "more profitable" business of selling software and business solutions. "Our customers," points out Slaughter, "oems, vars, computer vendors, etc.—were the high-level integrators until pressure from their own end users forced them to concentrate more on software."

Intel's future direction is perhaps best seen in a little-known military network it designed and installed in a remote part of Arizona. This 2,000-node turnkey solution of micros and controllers at Fort Huachuca uses Ethernet and Intel's Opennet networking software.

The residue of experience that Intel gains from such systems integration challenges is being plowed back into the company's 486 development program. The promise here, insiders say, is of a whole LAN on a chip by 1991, when Intel could be at $3 billion in sales with 50% coming from its systems business. Intel executives expect to reach some $1.8 billion in sales at year's end, $450 million of that coming from systems.

Efforts to Diversify Fail

Just how well equipped the chip makers are to succeed outside their own realms, or whether they have either the critical mass or funds to finance such ambitious plans, are open questions, according to Technomics' Nickle. He says he is mindful of National Semiconductor's efforts in the late 1970s and early '80s to build its own IBM pcm mainframe line. The venture, which collapsed in early 1983, climaxing in a $9 million write-off of mainframe inventory, made little money or sense.

"Integration at higher levels is much more likely to succeed if it is a natural outgrowth of the company's business, or—even better—of its internal MIS operation," Nickle argues. Intel's Fastpath was a solution developed for the company's two electronic mail networks—one DEC VAX based, the other IBM mainframe based—to talk to each other. By the same token, the company's enormous consumption of scientific computing (Crays, VAXs, large IBM mainframes) created the environment that helped spawn the Cube family of supercomputers.

"Increasingly," observes Dale Kutnick, research director at the Gartner Group, Stamford, Conn., "the competition between chip makers to get close to customers will revolve around the strategic use of their net-

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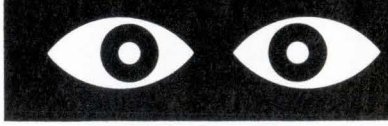

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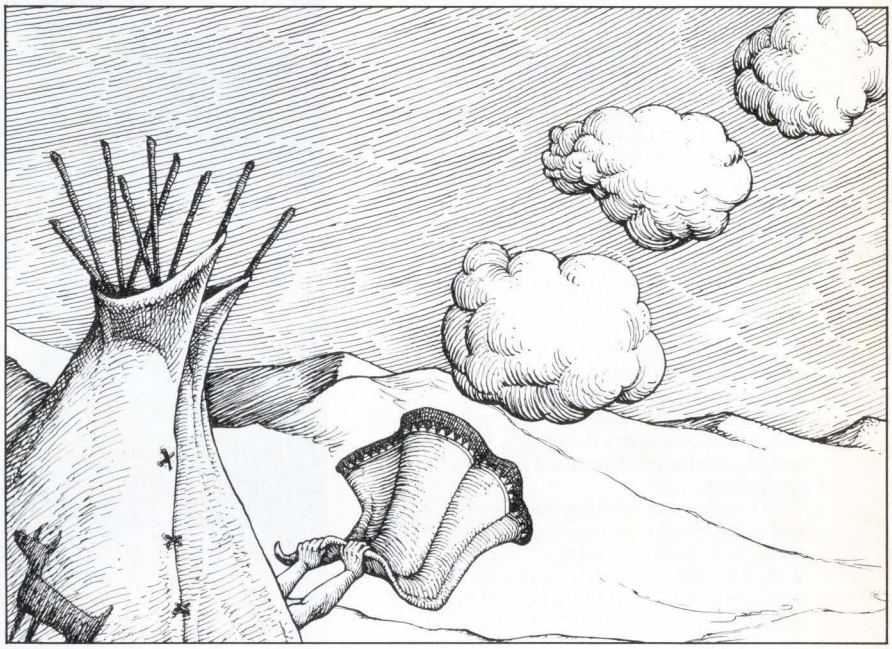

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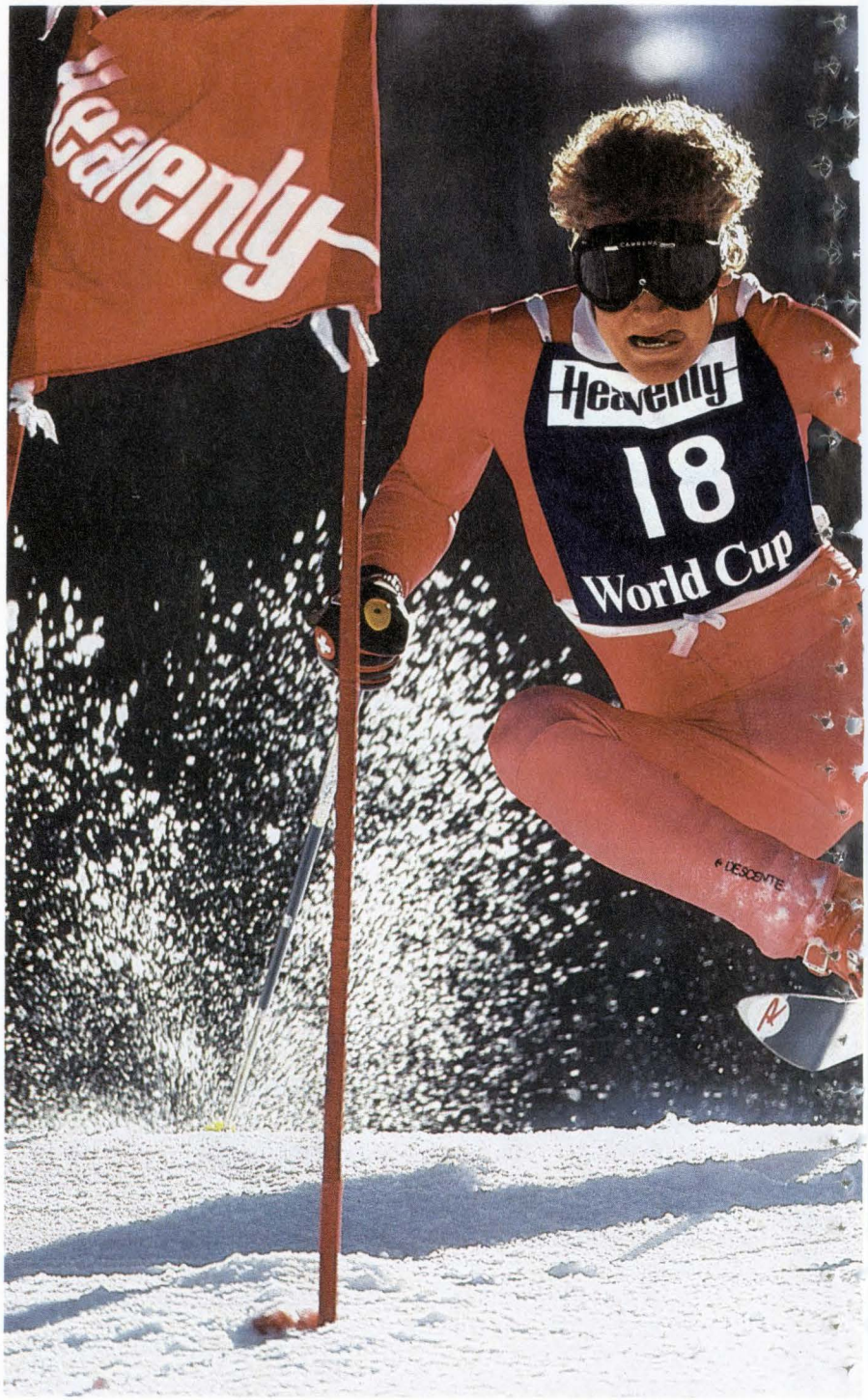

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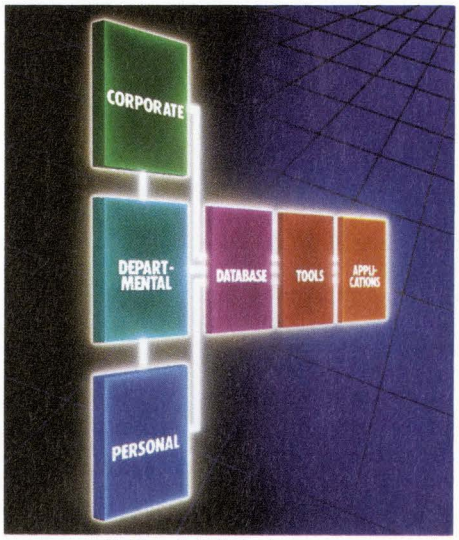

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works and internal dp operations."

Kutnick warns that the chip makers will not be able to go after the new markets for systems, customized chips, or AI at their leisure. "Some of these markets, though potentially huge, have been slow to mature, especially AI and CASE," he says. The Japanese seemingly are at a disadvantage against U.S. competition in providing application-specific integrated circuits (or ASICs) to the West, due to barriers in language, culture, geographic distance, and so on. But they have made huge strides in design automation, experts say, and are beginning to locate their factories and chip foundries in the U.S.

"In addition," he says, "the Japanese have the huge revenues from the memory chip business to plow back into these efforts."

Nickle says that 10 years ago a company could build a chip factory for between $15 million and $20 million. "Today," he says, "it takes 10 times that to build a world-class fabrication facility at submicron levels. By the mid-1990s, when X-ray lithography will be used to fabricate semiconductors, the cost could be $1 billion." The question, according to Nickle, is, "Can a U.S. semiconductor company invest at these levels without being in the commodity IC business?"

Logic Circuits Are the Answer

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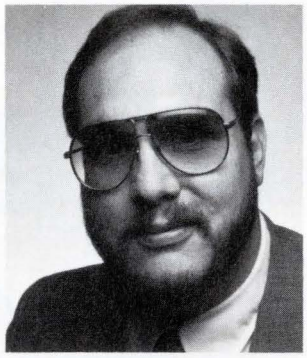

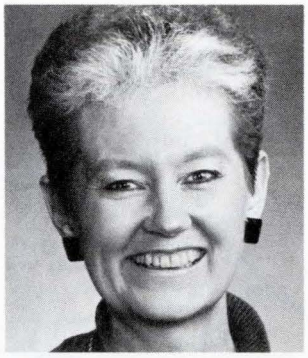

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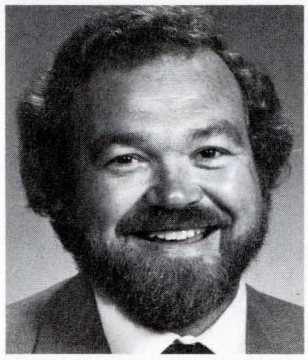

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million in five years through its ASIC business, and has never sold commodity products. "The answer, " says advanced silicon and software technologies vice president Keith Lobo, "is to build a medium-volume fabrication line that is oriented to logic circuits and custom micros, and any one of a number of less volume-intensive applications." Lobo says that such facilities can be built for "tens of millions" of dollars. He says that revenues to fund future growth come from a complex array of custom engineering services, including advanced software.

"What's more," he says with an eye to the Japanese, "these services are highly specialized and difficult for competitors to duplicate."

Lobo believes that a company needn't be in the $1 billion range or over to succeed in the ASIC business. "The key," he feels, "is to achieve a sustainable level of business and keep costs under control."

Irrespective of Lobo's optimism, many experts believe that as the larger chip makers fight for control of the ASIC business, startups and smaller-scale operations will have to grow into complete semiconductor houses to be viable.

In any event, TI and Intel are keeping their options open. TI, one of the few remaining U.S. chip makers in the dynamic RAM business, has said that the Japanese won't drive it out of the commodity marketplace. Intel says it is making a stand in the EPROM memory business. "I think the Japanese are very nervous today," says Intel's Slaughter. "Their strategy is to outlast U.S. companies. But some of us are still here; and now they have the Koreans breathing down their necks and waiting to take away the low-cost producer crown in commodity chips."■

VERTICAL MARKETS

A U.S. Banker in Singapore: Playing It Safe with Big Blue

Charles Berntson of Chase is finding out what it takes to run a computer operation abroad, including linking branches under IBM's 4300 architecture.

BY ROBERT POE

An information systems manager assigned to the Asian operation of a U.S. bank faces unique challenges due both to the less mature technological level of his working environment and to the dynamic growth of the regional economies. Despite different ways of doing things, however, the game he is playing is the same as it was back home: find the best way to use computers to gain a competitive edge.

One of the biggest differences Charles E. Berntson, manager of the operations and systems group of Chase Manhattan, Singapore, finds between working in the U.S. and Asia is that his choice of hardware is restricted. "You tend to do a lot more work on IBM here," he observes. "In New York, you have a whole host of systems in the same building. But it's tough to bring in [to Singapore] a piece of hardware you may have been using in New York."

One reason is the level of support available. "Even with Digital Equipment Corp. and Wang, the quality of service [worldwide] doesn't compare with IBM," Berntson states, adding that support by Japanese computer makers is also weak, except in the major markets. Another factor is familiarity. "Not only is it difficult to get servicing [for some hardware], there's also a problem getting programmers," Berntson says.

"Generally, everyone here has IBM experience. If you want to do anything else you run into trouble." In response to such local realities, Chase Manhattan has generally stuck with IBM hardware in Asia. Recently, it also decided to standardize its hardware and software infrastructure throughout Asia into what it calls an Area Information Management System, or AIMS, based on the IBM 4300 series architecture. "Each branch is taking a part of the [software] infrastructure and rewriting it to run off the same system," explains Berntson.

Duplication of Effort

The new approach should offer several benefits. All future development will be done on IBM 4300s, and "any branch developing a system will have to look at the needs of the other branches." Duplication of effort will be decreased, so it will be possible to reduce in-country development teams, Berntson claims.

Though regional standardization may be desirable or even necessary in Asia, it can be a disadvantage when

Illustration by Beata Szpura

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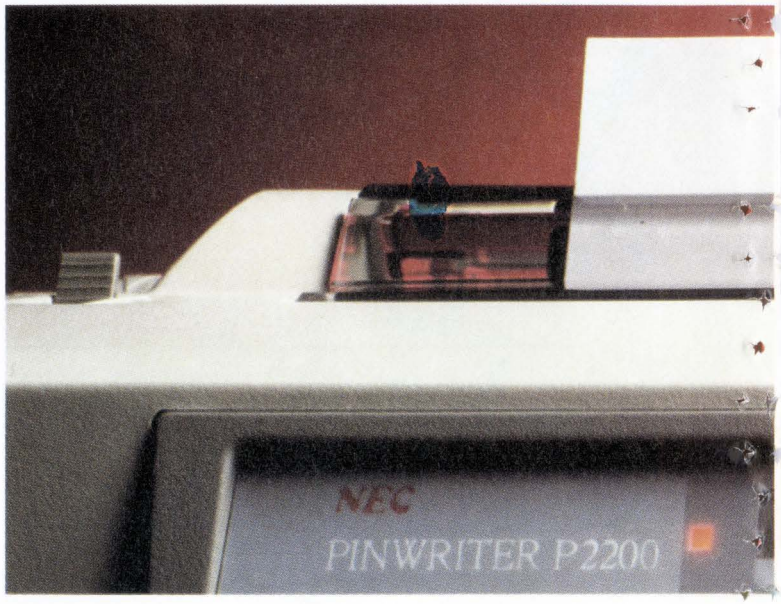

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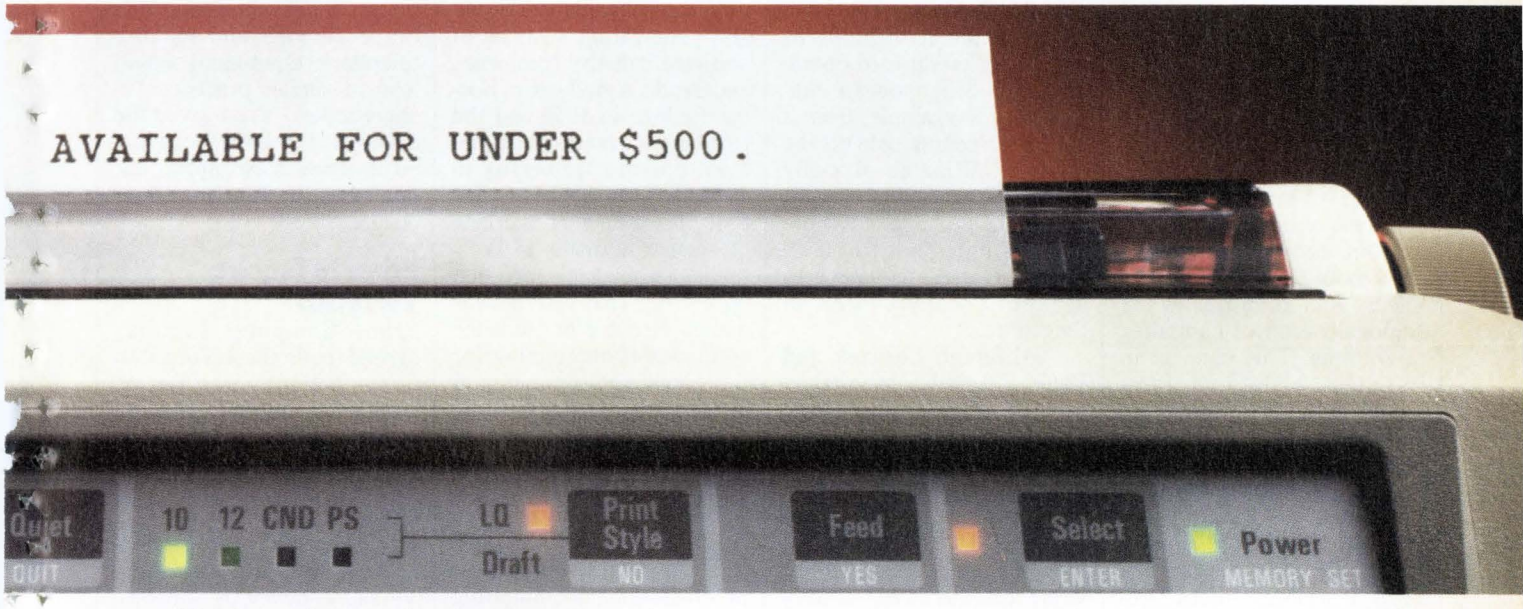

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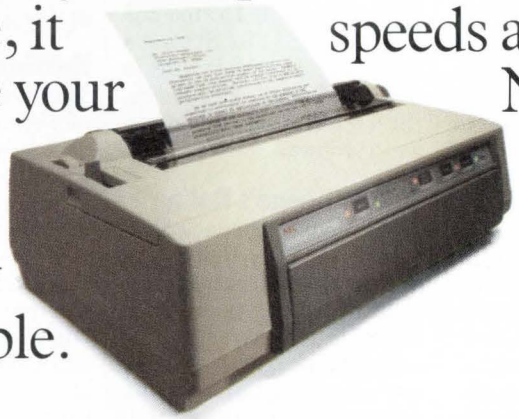

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trying to coordinate with the home office. Because systems to support new financial products are developed in New York on such a variety of hardware, many of them must be converted, or migrated, to the more limited local systems before they can be used in Asia. As a result, while "in the past there was lots of migration, we're trying to get away from depending on New York for development," Berntson asserts.

In some cases there may be no choice, however. Especially with some of the new financial products such as Future Rate Agreements, or FRAs, "there is a real demand to bring these new systems up quickly," states Berntson.

One of the most promising but sensitive strategic choices for banks operating in Pacific Rim countries is the regionalization of computer operations. This concept in its most ambitious form would involve consolidating the computer centers of branches in smaller countries such as Thailand, Malaysia, Indonesia, and Taiwan into a regional center, probably in Hong Kong or Singapore. Such a strategy offers both advantages and difficulties to those who try it. "Data center costs are escalating, development costs are going up in geometric proportion," observes Berntson.

Proponents of regionalization claim that bringing all systems development, and even much of the operations side, onto one site would decrease overlap, increase efficiency, and bring telecommunications costs down.

Regionalization's Downside

Regionalization brings problems as well, however. Job security for information systems workers in local branches, who are often represented by strong unions, can become an explosive issue.

Furthermore, Asian governments are becoming more sophisticated and sensitive about the contribution that foreign companies make to the local economy, and may object to moves that would decrease high-tech employment within their borders. It is government regulation, in fact, that may make tiny Singapore the most logical site to locate a regional computer center, because of its laws controlling the export of data about individuals. The laws would make it difficult to administer credit card operations for Singaporean customers, for example, from a computer center outside the country. Although officially the laws are meant to prevent misuse of personal data, observers note that the laws also can force a company to set up a data center in Singapore.

Although Citibank and Bank of America have taken steps toward regionalizing their Asian computer operations, Chase Manhattan says it is holding off on such a move, at least for now. "We decided to look at regional data centers, but they weren't very cost-effective," states George Batejan, Chase's Asia/Pacific area manager for advanced technology. "The savings in data centers would be offset by telecom costs." According to Batejan, a data link between Indonesia and Singapore costs $220,000 per year, compared with an average of $35,000 per year for links in Europe, in addition to which IS salaries are lower in Asia than in Europe.

Whatever obstacles they may face in trying to pull their Asian computer operations closer together, it's clear that the big U.S. banks see IS strategy as a crucial competitive tool during the dramatic growth of the region over the next decade or so. Those who lay their plans best will reap the sweetest rewards. ■

BENCHMARKS

Thomas J. Lawton

Funeral services were held recently for Thomas J. Lawton, founder, publisher, and editor of the monthly newsletter *Computer Services Report*, Belmont, Mass., which analyzes the financial performance and operations of computer software and services companies. Lawton, 52, died Sept. 12 after a brief illness. He was a contributor to DATAMATION and a trusted advisor to many of the magazine's editors, known for his acerbic wit and penetrating analysis of software industry companies and trends. A graduate of Boston College in 1956 and the recipient of a master's degree from Harvard University in 1959, Lawton began his career that same year, working at such companies as Westinghouse, Sylvania, and RCA until 1962. That year he was named director of guidance computer programming for the Apollo space program at MIT's Instrumentation Laboratory. In 1966, Lawton joined the faculty of Harvard Medical School, where for three years he was involved with the use of electronic systems in clinical pediatrics. Later, he joined Computing and Software Inc. as manager of that firm's New England operations. He left in 1973 to become vice president of planning for Keane Inc., Boston. He founded *Computer Services Report* in 1981. At the time of his death, Lawton was a director of BGS Systems Inc., Waltham, Mass. He is survived by his wife, Nancy, three sons, two daughters, and a brother.

Judge Greene's Ruling

AT&T less of a monopoly than the seven Baby Bells? Can such a thing be possible? Yes, says U.S. District Court Judge Harold H. Greene in his latest ruling on the interminable legal wrangling between the parent and its former children. Greene took 223 pages to say that the Baby Bells could transmit electronic information services over their networks and that the companies no longer had to seek a special waiver from the court to enter nontelecommunications businesses. But he wouldn't let the Baby Bells do what they were dying to do. Stressing their anticompetitive history when they were part of the Bell system, Greene says that removing the consent decree's restrictions on providing long distance service and making telephone equipment would lead to similar practices "in short order." AT&T loved the decision. The Baby Bells hated it. They may appeal, but don't bet the ranch on their chances.

Prime to Acquire VersaCAD

Prime Computer Inc. has agreed to purchase VersaCAD Corp., a Huntington Beach, Calif., developer of design software, to enter the low-end computer aided design market. The price of the purchase, which is subject to approval by VersaCAD stockholders, was not disclosed. VersaCAD develops software for IBM and compatible PCs and Unix-based workstations. The proposed acquisition is the first by Prime since the Natick, Mass., company raised $350 million for acquisitions in a debt offering earlier this year.

X-Windows Consortium

The Massachusetts Institute of Technology formed an industry-funded consortium to continue development of X-Windows, the graphics-oriented window manager. Developed under the auspices of the school's Laboratory for Computer Science, X-Windows has been embraced by workstation vendors including IBM, Digital Equipment Corp., Apollo Computer Inc., and Sun Microsystems Inc. ■

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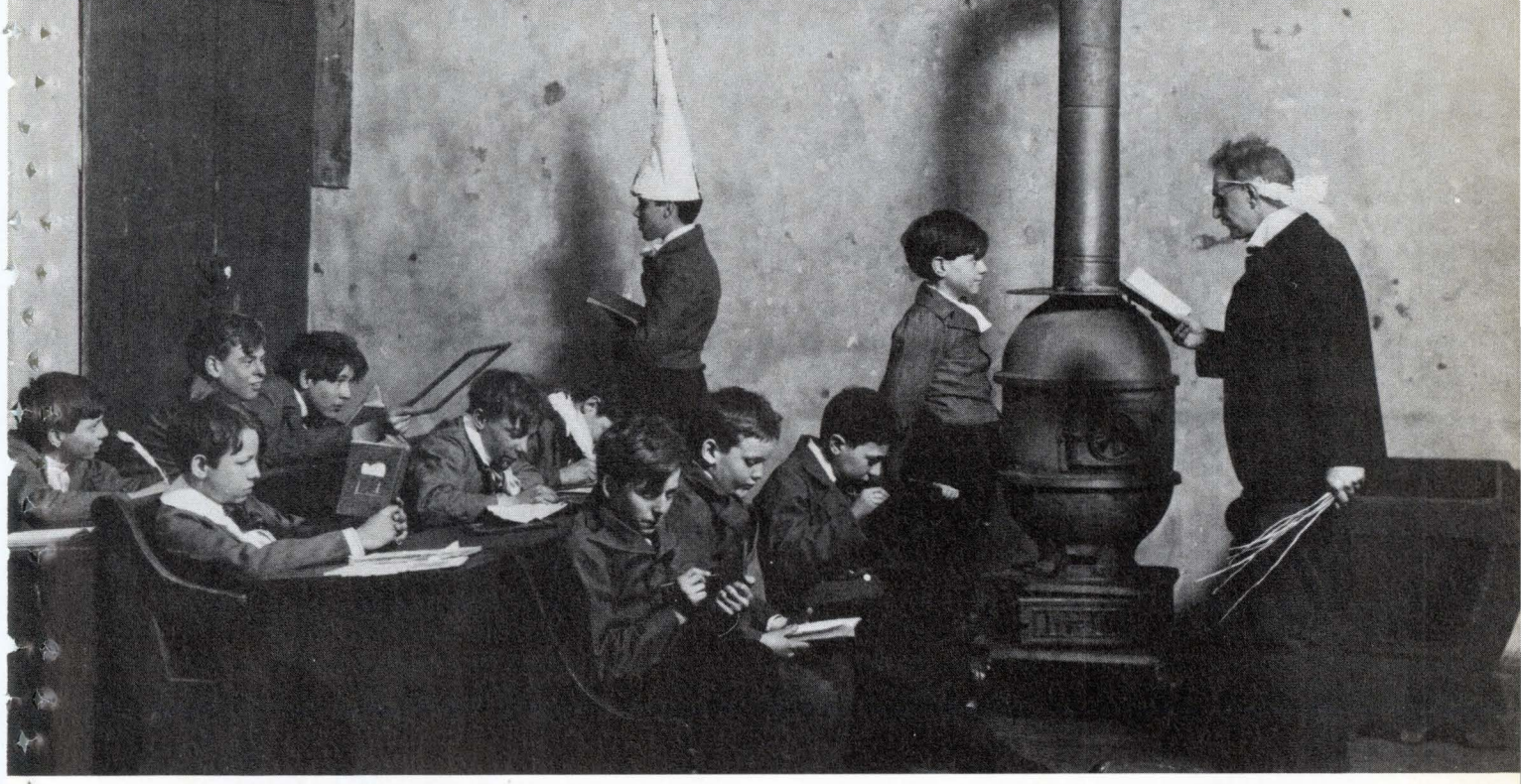

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Behind the News

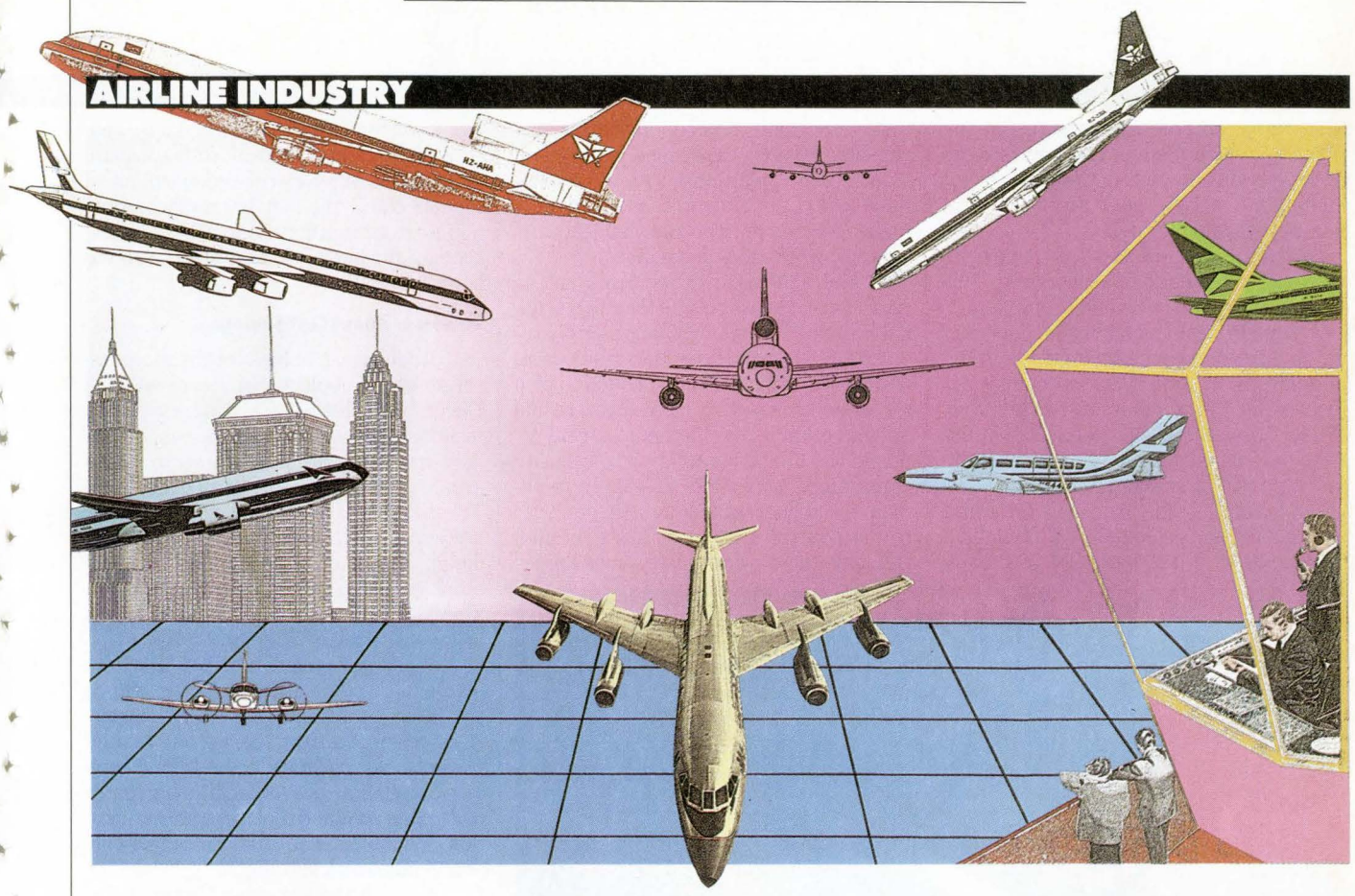


Illustration by Marc Yankus

Airline Control System Dogged by Upgrade Delays

Despite problems, the National Airspace System is seen by the FAA, the airlines, and others as the best hope for improving the control system.

BY GARY McWILLIAMS

To travelers grappling with chronic flight delays, to overworked air traffic controllers, and to airlines with escalating fuel bills, the U.S. government offers the National Airspace System (NAS) Plan.

The plan is an unprecedented overhaul of the air traffic control system. First proposed in 1981 as an 11-year, $10 billion program, the NAS Plan calls for a completely new complement of computers, software, radar, and communications systems in order to reduce air travel costs and to increase safety.

Yet, six years into the program, substantial benefits are still eight to 10 years away. Miscalculations during planning stages, development delays, and allegations of intentional underfunding dog the program. Further, potential savings that once promised a 10-to-one return on investment are now termed "marginal" as total costs of the program have ballooned to more than $16 billion, from the original $10 billion.

Despite its shortcomings, the overhaul of the airline control system as envisioned by the plan is more necessary than ever. "The realization that the old system has to be upgraded and replaced is evident in public and administration attitudes," says Martin T. Pozesky, the Federal Aviation Administration's deputy associate administrator responsible for managing the program. "There isn't much sentiment to scale back the NAS Plan. It isn't just a cost/benefit issue; the vital roles are capacity and safety."

In Pozesky's view, the NAS Plan is better managed and closer to providing real benefits than at any time in its history. More important, the antiquated computers now controlling the nation's skies cannot be easily maintained nor readily replaced. Like politics in Washington, D.C., the NAS Plan has become the only game in town when it comes to modernizing air traffic control.

Indeed, the program is staunchly supported by the airlines, which stand to benefit from anticipated fuel savings. The air traffic controllers union is indifferent provided no jobs are lost, and travelers have no other hope for relief from chronic flight delays. Echoing the view of many, John O'Brien, director of engineering and air safety for the Washington, D.C.-based Airline Pilots Association, says, "From our perspective, we don't see a better way of doing it."

GAO May Look at Alternatives

Such views don't translate into 100% approval ratings, however. Congress, which some say is in line for blame for underfunding the plan, is becoming increasingly vocal about progress. The General Accounting Office is suggesting a look at alternatives to a next generation traffic control system in light of a lower-

than-expected cost savings. Yet, at the point by which many NAS projects were to have been completed, Congress is not inclined to accept new proposals that would entail further delays.

"In the past, the message from Congress was we needed more testing. This year the thrust is we need to move faster," says Pozesky. The urgency is aptly demonstrated by a sharp increase in the pending fiscal 1988 NAS Plan budget approved by the administration, he says. While Congress hasn't yet acted on the request, Pozesky is "optimistic" that the increase will be sustained.

Nevertheless, progress on some fronts has been achieved. A $200 million replacement of 1960-era IBM 360 mainframes at the nation's key air tracking centers will be completed by mid-1988. The new IBM 3083 computers will relieve constraints on flight plan storage and promise to reduce equipment failures associated with the older computers.

The costs of NAS may far outweigh its savings to the airlines and the government, warns GAO.

While the FAA says there have never been any air mishaps associated with computer breakdowns, the failures divert controller attention from normal duties. Backup systems are slow to respond to information requests and controllers often must reenter key flight data when a failure in the primary system occurs.

Redundancy in the 3083s and successor systems should eliminate such failures. However, John F. Thornton, national coordinator for the National Air Traffic Controllers Association, the three-month-old controllers' union that replaces PATCO, expresses skepticism: "Controllers in the last six to seven years have lost confidence in the FAA's equipment. We'll have to be shown it [the new system] works to believe it."

The IBM 360 replacements are as much as two years behind the FAA's original schedule, which has been sharply revised because of delays that result from underestimating the time needed to plan the project, as well as from software and documentation development snags. Proposed as an interim solution to capacity constraints, the 3083s are likely to remain the cornerstones of the nation's air traffic control system at least through the mid-1990s—some five years longer than originally expected.

The core tracking and flight processing software used on the 360s is being carried over to the newer 3083s. Written in the 1960s in Basic Assembly Language and Jovial, a Department of Defense high-level language, the FAA contracted with IBM to rehost the existing software on the 3083s. New flight processing and tracking software written in Ada won't be available until the mid-1990s, when the next generation traffic control computers are rolled out.

Following the interim phase with the 3083s, the NAS Plan calls for an entirely new generation of distributed computers and tracking software. But critics say these next generation systems are as much as eight years behind schedule. Advanced software to automate flight control is further away. These delays, analysts say, are also a result of inadequate planning. Computer-related portions of the NAS plan—the IBM 360 replacements and next generation control systems—account for nearly a third of the $16 billion total cost.

Questions About Cost Savings

Additional troubles for the modernization effort could be in store with the December release of a congressionally mandated cost/benefit analysis of the Advanced Automation System (AAS) project, which is a part of the NAS Plan. The project calls for a complete set of new computers and software tied to new digital communications equipment and radar gear. AAS costs, once estimated at $2.5 billion, have risen to nearly $5 billion in latest estimates.

When proposed in 1981, the NAS plan projected savings of $26 billion to the government and $37 billion to airlines, much of it from the AAS and related projects. Savings were to be gained from a consolidation of FAA facilities, greater controller productivity through automation, and lower airline fuel and repair bills due to more efficient flight.

Now, however, the General Accounting Office believes savings will be "minimal." Carl R. Palmer, an associate director in the GAO's Information Management and Technology Division, says the delays have had the greatest impact on those projects predicted to contribute the most to cost savings.

AAS's automated en route air traffic control system, software that projects flight locations up to a half hour away and helps pilots to choose the most economical routes, won't be available until after the year 2000, according to Palmer. The system's most advanced element, automating decision-making during flight, increasingly is being questioned, he says. "There is a growing realization that we probably will not turn over the entire process to a computer."

Of the AAS project part of the NAS Plan, Palmer says, "We've said to Congress, 'Don't buy this because you think it will save you billions and billions of dollars. It is not likely to be more than an even trade at best.' " The GAO also challenges many of the FAA's estimates of potential savings to the airlines. In response to GAO criticisms, Congress last year requested a new cost/benefit analysis of the AAS as part of its fiscal 1987 budget authorization.

Photograph by T. Sobolik/Black Star

Pozesky disputes the GAO's assertion, estimating the new analysis will show the AAS to be "quite beneficial." Moreover, he says the NAS Plan offers a nearly two-to-one ratio of savings to overall costs. "There is much more emphasis today on capacity [increases] and safety," he says, "but the savings are still there for the NAS Plan as a whole."

As a result of the delays, the FAA last year appointed Pozesky to manage the plan and replaced the AAS program head with a new manager. More recently, it accelerated the selection of a contractor to design the $5 billion AAS project. The FAA has narrowed its selection to either IBM Federal Systems Division, Bethesda, Md., or Hughes Aircraft, Fullerton, Calif. As part of the speedup, the FAA issued each a request for proposals. Originally, they were to submit detailed design plans for the project, but the FAA decided to make its decision based on preliminary designs in order to speed up the project.

While conceding that replacements for aging computers and communications systems are necessary, GAO officials have zeroed in on the scope and price tag of the AAS in its recent reports. The GAO has not suggested that the AAS project be dropped, but according to GAO's Palmer, the GAO has strongly suggested that Congress consider alternatives in order to bring the cost down. "We're saying, since the [AAS] project has risen to $5 billion and is closer to a one-to-one cost/savings ratio, how about lowering the cost?" explains Palmer.

Congress Requires Some Testing

The GAO also repeatedly has called for additional testing of prototypes in advance of releasing production contracts. Congress rejected the GAO's recommendation for additional testing of the IBM 3083 computers but, as pressure for action rises, it is demanding additional guarantees. Fiscal 1988 appropriations bills, for instance, will require the GAO's call for additional testing of new controller workstations, according to congressional staff members.

Airline trade groups say that such testing will cause further delays in replacing the out-of-date equipment that is in use today. For example, the GAO's prodding for additional testing of controller workstations will add two years to initial delivery of the new air traffic controller displays. Previously slated for implementation in 1991, the first displays

The Parts of the NAS Plan, and Where the Work is Going

The National Airspace System Plan consists of some 150 individual projects that, taken together, promise to replace all existing air tracking and ground safety systems as well as to introduce major new safety and productivity enhancements.

Of the 150 individual projects measured by the General Accounting Office, 11 are considered to be major systems because of their cost and importance. The 11 cumulatively are estimated to cost some $11 billion. They are the following:

Advanced Automation System (AAS). The $5 billion AAS project calls for new distributed computers, controller displays, and flight tracking software to be installed in 20 air tracking centers across the nation. IBM and Hughes Aircraft are competing to supply the design. Initial systems have been delayed until 1993 because of design changes and requirements for additional testing.

IBM 360 Replacement Project. IBM 3083 mainframes will replace IBM 360/50 and 360/65 mainframes at 20 FAA en route air tracking centers. The project is slated to be completed by mid-1988. Installations have been stalled by planning snafus and software development and documentation delays.

Voice Switching and Control System. This project will retire existing leased line communications among tracking centers and radio communications with aircraft that use a digital switching and communications system. AT&T is developing a prototype; a product contract is slated to be awarded in 1989. Estimated cost is $500 million.

Central Weather Processor. This was planned to develop new automated weather tracking and information disseminating; the FAA now is moving toward using private weather forecasting services. A cost estimate is not available.

Flight Service Automation System. This was designed to automate the filing of flight plans by small, so-called general aviation aircraft as well as to provide weather and flight information to their pilots. The initial phase of the project was delayed three years and the second phase was dropped last year. The project is being developed by E-Systems Inc., Dallas, with completion expected by 1992. The estimated cost is $500 million.

Long-Range Radar. This project proposes using solid-state radars in place of aging vacuum tube-type radars at en route tracking systems. The project has fallen about two years behind due to problems in coordinating budgets with the Air Force. Contract award is due next year. Deliveries are expected to run from 1992 to 1994. The estimated cost is $373 million.

Automated Weather Observation System. This system was designed to obtain weather data from automated sensors and to provide information to pilots using computer-generated voice systems. The project is two years behind schedule because of delays in developing sensors that meet FAA requirements. Contractor is Amex Corp., Compton, Calif. Its estimated cost is $1.5 billion.

Microwave Landing System. This would provide pilot guidance to airport runways. Hardware and software delays pushed back initial implementation by about two years. Hazeltine Corp., Commack, N.Y., was awarded the projection contract in 1983. The estimated cost is $1.5 billion.

Mode S Radar Beacon System. This provides surveillance and communications between controllers and pilots. The contract for initial units was awarded to a Westinghouse/Unisys joint venture in 1985, but was delayed about a year as a result of software that did not meet FAA requirements. Implementation will run from 1989 to 1992. Estimated cost is $574 million.

Radio Microwave Link. This will replace a system now used to transmit radar data among FAA sites with modern communication equipment supporting voice and data communications. Awarded to AT&T in 1985, the contract was delayed a year due to budget deferrals, according to the House Aviation Subcommittee. The estimated cost is $283 million.

Terminal Radar Program. This was included in the program in 1986 as a result of a St. Louis airline disaster blamed on wind shear. Competing for the design contract are Raytheon Co. and Unisys. The estimated is cost $560 million. The U.S. Senate in September cut a fiscal 1988 funding request for the program from $130 million to $10 million in a dispute with the FAA over budget needs.

now will be installed in 1993, says Raymond J. Hilton, air traffic management director for the Air Transport Association, a Washington, D.C.-based airline trade group.

"On the one hand, the GAO has criticized the FAA for being off schedule. Yet look at what they do," he complains. The requests "present a big problem for the FAA and the users [airlines]. Users are behind what the FAA is doing and want it to proceed. We want them to be left alone" from demands for more testing, Hilton says.

The GAO's position that AAS costs no longer offset government operational expenditures is a separate issue from potential savings to the airlines, says Hilton. "The FAA's direct costs are $3 billion to $5 billion [a year]. The airlines' fuel bill is $10 billion a year. On top of that we have equipment and labor costs; each is another $10 billion. Where are the savings? You tell me."

Hilton also blames chronic underfunding of the FAA for some delays. Although a trust fund established in 1970 to finance improvements is bulging with $5.5 billion, the money is untouched by a deficit-conscious administration and Congress, he says. "The FAA doesn't have the funding it needs and can't ask for the funds it needs," Hilton says.

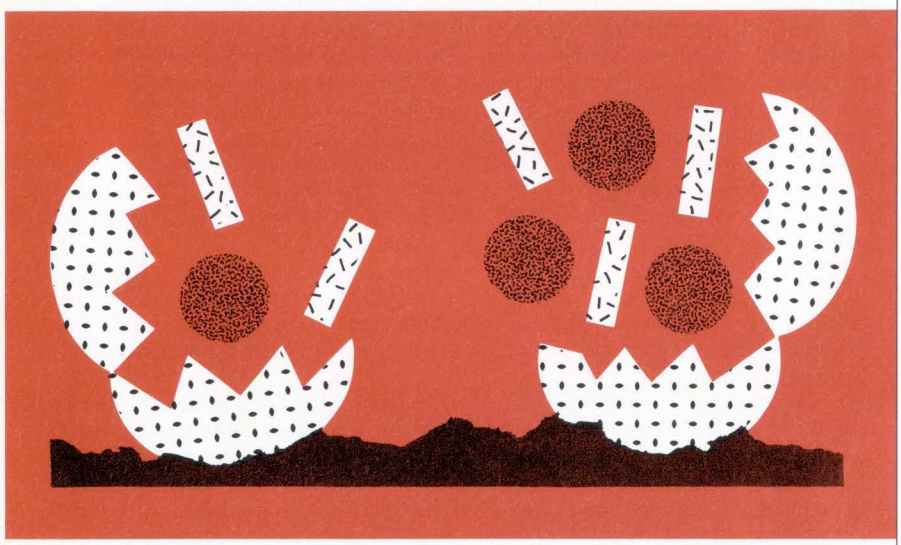
By leaving the trust fund surplus untouched, the money reduces the nation's $160 billion deficit. The trust fund comes from an 8% tax on airline tickets and levies on cargo and aviation fuel. The surplus is growing at $1.2 billion annually while funding for the long-needed modernization is held up, says Hilton. "The [NAS] plan at the outset had a [higher] funding profile," he notes. "That profile has been tailored to meet the administration's demands for reduced spending."

While appropriations have not followed the plan laid out initially by the FAA, neither FAA officials nor congressional critics such as Sen. Frank R. Lautenberg (D-N.J.) accept the industry's view. A Lautenberg aide says the lower amount allocated has more to do with the delays encountered. The large outlays for equipment and production have not been required in many cases because the programs were and remain far from production, he maintains.

Trust Fund Spending Criticized

The FAA's Pozesky also says funding has not been an issue. "To date," he says, "we've gotten very significant support of our funding requests. I've not felt inhibited in any way. The administration has asked for a 68% increase in funding for the NAS Plan in fiscal 1988. A 70% increase is unheard of in this day and age. I haven't felt constrained."

Moreover, the House of Representatives earlier this year proposed a bill that would reduce the surplus in the aviation trust fund to about $1 billion by 1992. While the bill includes some acceleration of NAS Plan spending, it's debatable whether that increase will accelerate the existing schedules.



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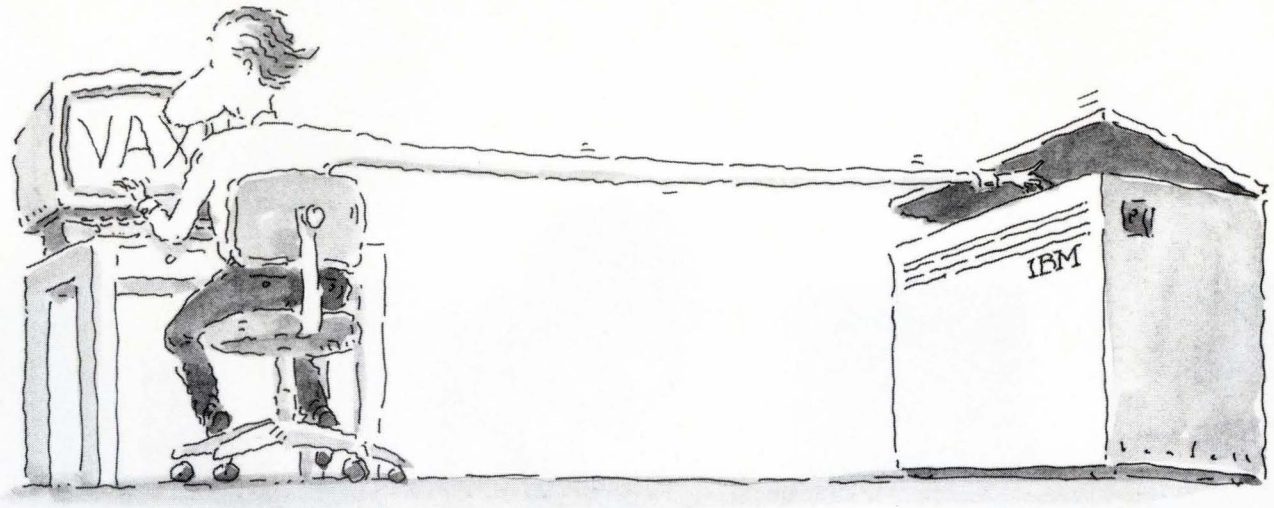

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Pozesky says the FAA anticipates no further slippage in the AAS project, but he adds that the complexity of the project makes guarantees impossible. "This is the largest software undertaking ever done. The reliability of the software has to be equivalent to that of the hardware. We are not being naive about the difficulty of this task. There are a lot of hurdles to overcome to meet those schedules." The present timetable calls for deliveries to begin in 1993 and to continue through 1998.

While the FAA says safety enhancements have been achieved through the NAS Plan, there are other enhancements that have been postponed because of the NAS Plan delays and early management decisions. For instance, the FAA developed a package that alerts pilots flying without radar of potential collisions with aircraft that do have radar. Initially developed for the IBM 360s, the package proved too onerous to be accommodated by them and is now being rewritten for the 3083s.

Deemed too important to wait for the 3083s when it was initially proposed, it won't be available nationwide until after all the 3083s are operational next year. Called Conflict Alert/Mode C Intruder, the software has been running at an FAA center in Fort Worth since last year. Fort Worth has the sole 360 considered to have enough capacity to support the package.

Michael E. Perie, the FAA's System Development Division manager, says the package fell victim to the increased traffic loads that followed airline deregulation. Capacity was constrained by heavier flight processing loads, he says.

Flight Delays Not Tied to Computers

Although the IBM 3083s and follow-on AAS computers are expected to enhance reliability, there is little cause to blame flight delays on the aged 360 computers. The FAA, which compiles statistics on computer failures and flight delays, attributes few delays to computer equipment problems.

Of the 43,000 delays logged in the month of June, only 3% were caused by NAS equipment failures that occurred for less than a minute, according to an FAA spokesman. In addition, there were 21 equipment failures that lasted more than a minute and contributed to delays.

It is the weather that gets most of the blame. The FAA estimates that two thirds of all delays are weather-related. The reason the NAS Plan has the backing of the airline industry is summed up by the Airline Pilots Association's O'Brien: "Weather we can do very little about; equipment failures we can."

Even amid the delays associated with the NAS Plan, some in the FAA see a silver lining. "I think the delays have had a benefit," says Perie, who's responsible for software development associated with the 360 replacement and AAS. "They've allowed us, because of the growth [of air traffic], to reassess the architecture." Perie declines to cite specif-

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ic instances when the delays contributed to NAS Plan changes.

Curiously, the FAA no longer counts project delays prior to a 1984 NAS Plan revision in which new schedules were set. By such measures, the 3083s are only six months behind schedule, but even that delay is not always perceived. In March, Art Simolunas, the FAA's manager overseeing the 3083 installments boasted, "We are right on schedule. Everything is looking good."

Perie acknowledges that delays at the early stages of both the 360 replacement and AAS programs were in part due to miscalculations of the project's scope. "The job is devilishly complex," he says. "We did indeed underestimate the complexity of the job."

Even so, the IBM 3083s so far have performed better than expected, he says. Air traffic loads that once strained smaller IBM 360s to 80% of maximum capacity drive the newer systems at less than 20%, says Jesse Federo, assistant automation manager at the FAA's Boston center, which recently began testing the 3083 with live traffic.

Moreover, Pozesky says the added hardware is improving operations significantly: "We don't see a software or hardware problem well into the '90s in terms of capacity. The software has been stable and is being configuration managed [tailored to the 3083s]."

With the increasing public attention on equipment upgrades, the FAA is looking at ways of making future upgrades easier to achieve. FAA's Pozesky believes there will have to be significant changes in the process before major improvements can be made easier.

"We exist in an environment where the rate of change of technology is an order of magnitude faster than it was 10 years ago," says Pozesky. "If we only get a large influx of operating equipment every 10 to 15 years, it will be impossible for the government to keep up with the latest technology."

Since government procurement cycles take from 10 to 12 years, the likelihood of always falling behind the technology curve is great, Pozesky says. One answer, he believes, may be to lease major equipment needs, putting the burden of installing upgrades on private suppliers: "It costs more to lease than to buy. But if we wait 20 to 25 years to replenish technology we will never be up to the current levels of technology. It's a real dilemma and I don't know how to solve it." ■

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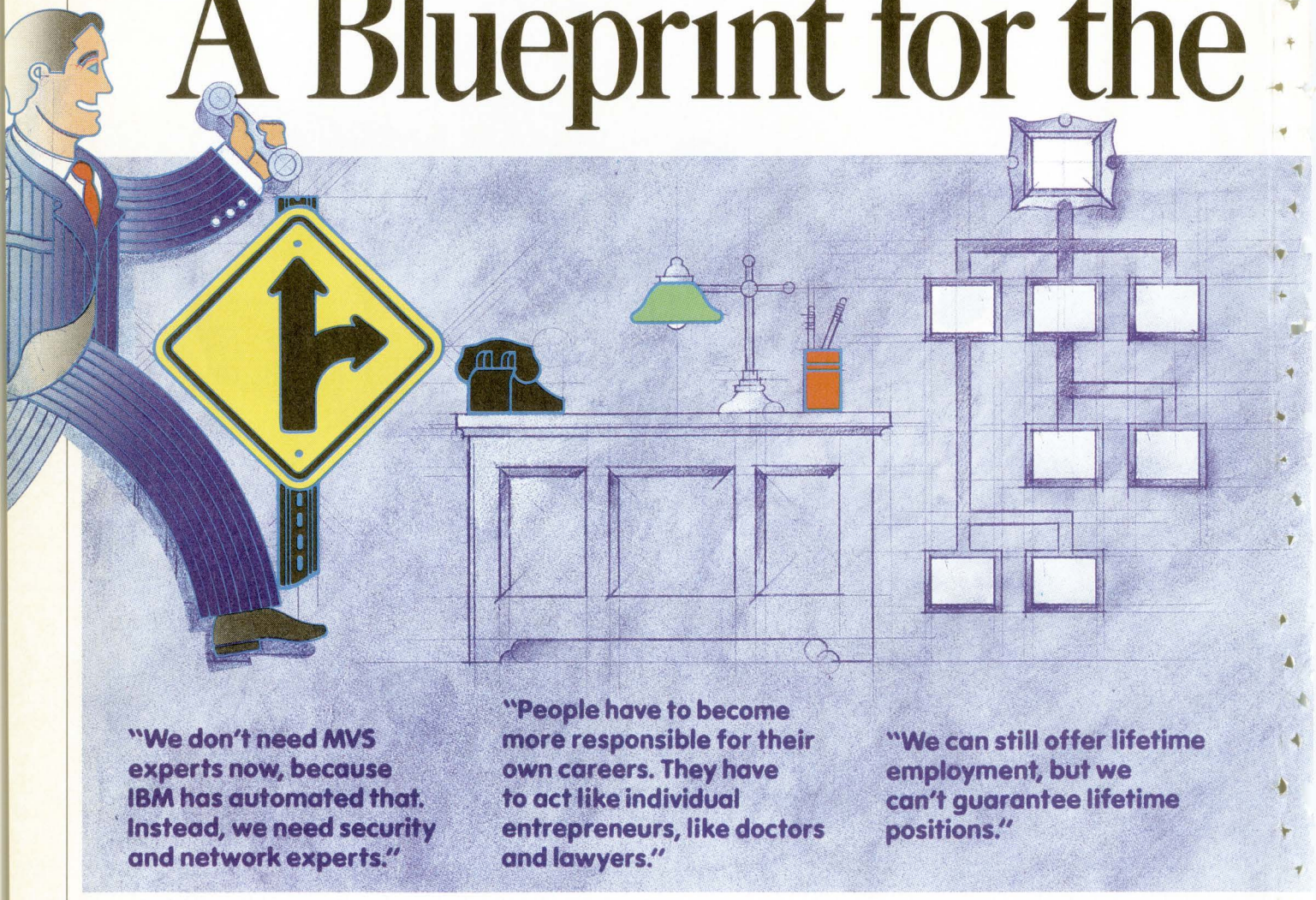


"We don't need MVS experts now, because IBM has automated that. Instead, we need security and network experts."

"People have to become more responsible for their own careers. They have to act like individual entrepreneurs, like doctors and lawyers."

"We can still offer lifetime employment, but we can't guarantee lifetime positions."

A recent survey of Fortune 1000 executives indicates that as information technology becomes increasingly decentralized, the ability to adapt to new professional roles will displace sheer technical talent as the key to career success for IS practitioners. Adaptability, the ability to direct one's own career, and solid business skills are emerging as critical success factors.

BY CURT HARTOG AND ROBERT A. ROUSE

To maintain their power and dominion, information systems pros are going to have to follow a new blueprint for success. While companies are slashing budgets in an effort to become leaner and meaner, end users are increasingly gaining control of applications and systems software. Corporations are responding by decentralizing their large IS staffs.

At the Center for the Study of Data Processing at Washington University in St. Louis, we conducted a national survey of 50 IS leaders—Fortune 1000 vice presidents, directors, and managers—to find out how they are adapting to the changing, decentralized IS environment (see "Sizing Up Your Staff").

As we talked with IS executives and examined the numbers from the survey, four themes stood out:

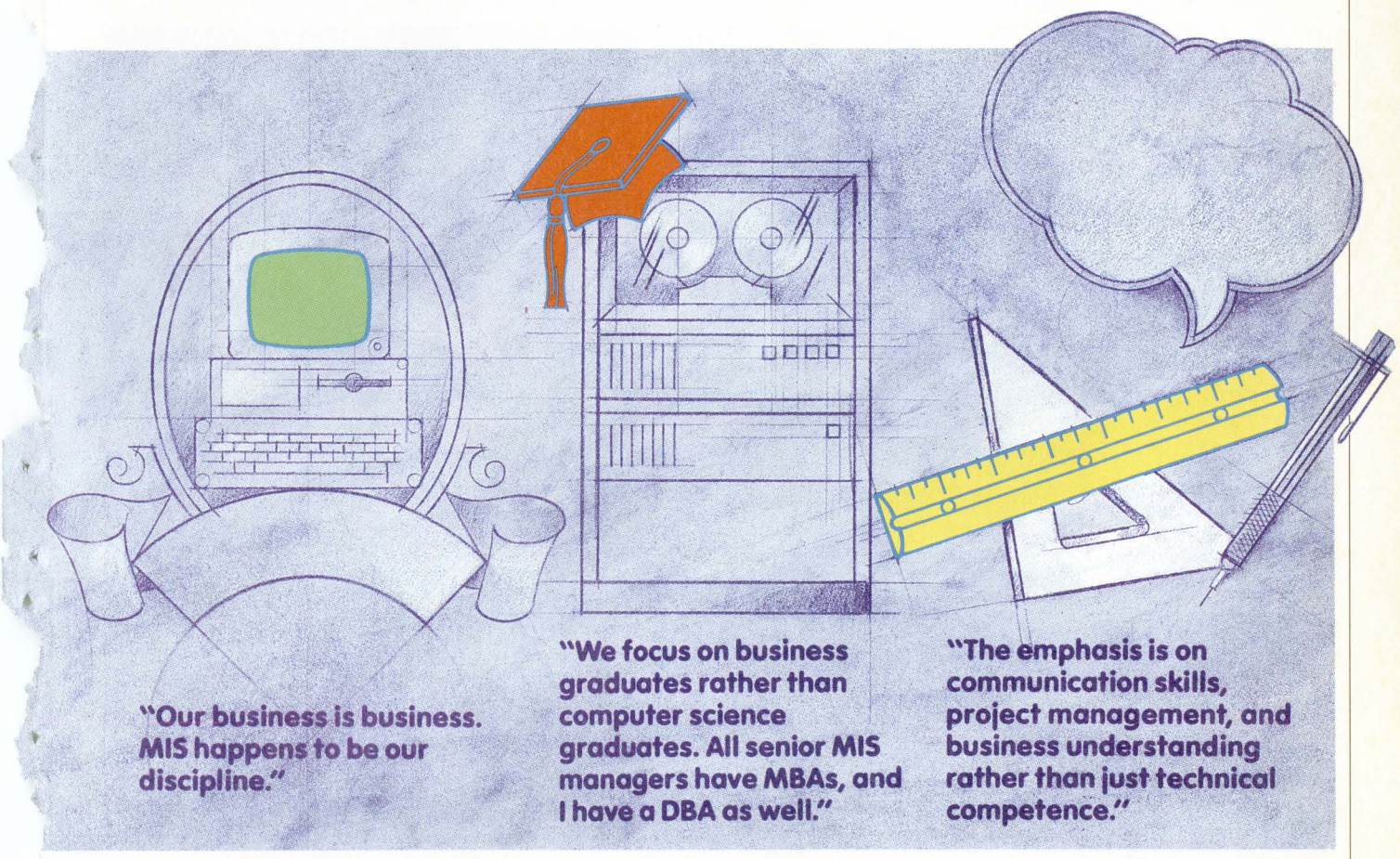
- IS jobs are undergoing fundamental changes,
- IS jobs increasingly are at risk,
- IS organizations are becoming more business oriented, and
- the responsibility for IS career development is falling increasingly upon the individual.

As IS professionals struggle to forge new identities in this changing environment (see "Battling for New Roles," Oct. 15, 1986, p. 82), adaptability, the ability to direct one's own career, and solid business skills are emerging as essential assets for survival. The ability to adapt to new professional roles is displacing sheer technical talent as the key to career success for IS executives and staffs.

For many in IS, early retirement and layoffs are sources of concern. For some, recent changes threaten their status as keepers of the technical flame. Unwilling to take seriously the growing dispersion and redefinition of information technology, they hold fast to skills that are becoming obsolete. Increasingly, they are becoming professionals at risk.

Herbert N. McCauley, vp of information management at Harris Corp. in

New IS Professional



"Our business is business. MIS happens to be our discipline."

"We focus on business graduates rather than computer science graduates. All senior MIS managers have MBAs, and I have a DBA as well."

"The emphasis is on communication skills, project management, and business understanding rather than just technical competence."

Melbourne, Fla., observes growing resistance to change among IS practitioners. McCauley heads up the computer vendor's IS operation, which has an $80 million budget and a staff of 550. He feels that, despite increasing pressure to redefine their jobs, some IS professionals are clinging to technical skills that are no longer relevant. "We don't need MVS experts now," he explains, "because IBM has automated that. Instead, we need security and network experts."

MIS director Gerry Meier manages an IS staff of 55 and a budget of $4 million for Angelica Corp., a St. Louis uniform manufacturer. He believes that "some MIS people are finding it difficult to accept change because they identify themselves with existing technologies or procedures and have trouble letting go when a better product becomes available."

Becoming Outdated

Making the discovery that hard-won knowledge is now obsolete isn't easy for many dpers. Long the gurus of technology, some IS professionals are finding their own technical expertise lacking. Of the directors who responded to our survey, 12% indicated that the skills of their staffs were becoming outdated.

What used to be an IS monopoly is becoming a competitive information services market—both inside and outside the corporation—and customers are finding that they can avoid the IS backlog by shopping elsewhere. Savvy end users, frustrated by MIS procedures and services that they find too slow or too rigid, are taking IS matters into their own hands. Alternatives to slow IS applications development, such as improved off-the-shelf software and computer aided software engineering, are growing increasingly attractive.

A measure of the decentralization that is occurring is the movement of computing people and dollars outside of IS. Significantly, our respondents identified on average only 64% of the dollars spent on computing as direct IS budget items, a rough but startling indicator of change, especially when coupled with the fact that 18% of their IS staffs are working outside the department to support end-user computing. As budgetary control of computing slips away from the IS department, changes in IS roles will become more pronounced.

As technology moves out into the business functions, business concerns become more important to IS. Traditionally, IS priorities have placed the management of information technology first, and the management of people second. Too often, business has been a distant third. But IS executives are rethinking their priorities, as increased competition forces them to recognize the importance of a business orientation (see "Business Focus Is Key to Success," July 15, p. 47).

More than half of our survey respondents indicated that they are or would be requiring professionals who work for them to develop advanced business skills. As Ed Tenholder, vice president of national delivery systems at Blue

Illustration by Daniel Pelavin

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This conference is the most information-packed, valuable and focused I have ever attended. Almost too much input to process! Keep up the good work." Claudia Deaton-Glover, Computer Security Analyst, General Services Administration

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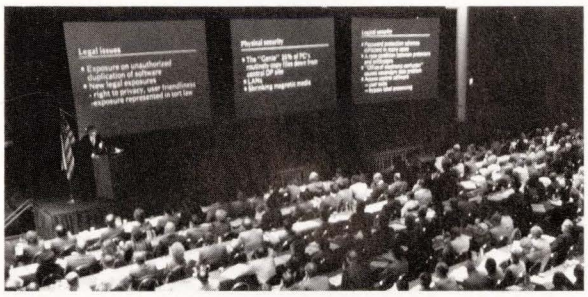
WORKSHOP PROGRAM

1. Developing & Implementing a Successful Data Security Policy
2. New Security Strategies for Computers & Networks
3. Developing a Data Processing Security Manual
4. Tying Access Control into Overall DP Security
5. ACF2, Part I: An Introduction
6. Computers and Your Legal Liability
7. Principles of Secure Operating Systems
8. AT&T's Security Compliance Program
9. State-of-the-Art Facility Design
10. Planning the Organization's Recovery: Not Just DP
11. Information Classification
12. A "Single-Point Security Approach for the LAN
13. Administrative Policies and Standards for Access Control Systems
14. Building Security into the Application Development Process
15. RACF, Part I: An Introduction
16. VAX/VMS Security Techniques
17. Software Sabotage — Viruses, Trojan Horses, & Logic Bombs
18. Recent Developments in Database Security
19. Auditing Data Security — "Win-Win" for the Auditor & Auditee
20. End-User Responsibilities in a Recovery Operation
21. On Making Data Security a "Standard Operating Procedure
22. Communications Security in the Information Age
23. Managing Dial-Up Access
24. An Overview of Risk Management Tools
25. CA-Top Secret, Part I: An Introduction
26. Security and Audit Considerations in the DB2 Environment
27. MVS Systems Programming "Secrets": Loopholes and Safeguards
28. Security Standards for the Civil & Private Sectors
29. The Impact of International Terrorism on Information Security
30. How to Choose a Disaster Recovery Services Vendor
31. Career Planning for Information Systems Security Officers
32. PC Security: A Primer
33. Applying Policies and Procedures in a Small Systems Environment
34. Computer Crime Legislation
35. ACF2, Part II: Advanced Topics
36. Ethernet Security
37. The State-of-the-Art in Information Security Technology
38. Computer Security in the Academic Environment
39. A Case Study in Data Center Design & Relocation
40. Strategies for Negotiating a Disaster Recovery Backup Contract
41. Lessons Learned, and Other "Pearls, from a Veteran DSO
42. Security in Open Systems Interconnection (OSI) Networks
43. Decentralization of Computer Security Management
44. Implementing a Microcomputer Security Program
45. RACF, Part II: Advanced Topics
46. Wang System Security
47. Audit, Control, and Security of MVS System Software
48. Advanced Security Awareness Techniques
49. Personnel Security — Pre- & Post-Employment Safeguards
50. Planning and Executing a Mock Disaster Drill
51. A Comprehensive Information Protection Program
52. Securing the Micro-to-Mainframe Link
53. New Issues & Technologies in the Banking Industry
54. Passwords & Encryption — The Heart of Effective Security
55. CA-Top Secret, Part II: Advanced Topics
56. DECnet Security
57. AI: Using an Expert System for Data Security
58. Developing Awareness of Computer Ethics
59. New Audit Tools & Techniques
60. Conducting the Largest-Ever Disaster Recovery Test



OPTIONAL SEMINARS

You can attend one or two of the optional full-day seminars offered Sunday and Thursday, November 8th and 12th:

1. Introduction to Computer Security
2. Computer Security Basics for the Business Professional
3. How to Become a More Effective Data Security Officer
4. A Blueprint for Establishing Security Policies, Standards, & Guidelines
5. How to Conduct a Security Review of the DP Function
6. Introduction to Communications Security
7. Workstation Security
8. Computer Crime Investigation: A Practical Approach
9. Network Security in a Digital Environment
10. EDP Disaster Recovery Planning
11. Building Information Security Awareness
12. Computer Security for the Auditor

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CSI, established in 1974, is a full-service membership organization dedicated to helping its more than 3,000 members safeguard their information assets. Services include the bimonthly newsletter *Computer Security*; the Annual *Computer Security Buyers Guide*; a "Hot Line" telephone referral service. CSI also sponsors the Summer IBM/DEC Users Computer Security Conference.

CSI publishes the semiannual *Computer Security Journal* and the 500+ page *Computer Security Handbook*. CSI offers in-house training courses as well as a full program of regional public seminars throughout the U.S. and Canada.

ACTION

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One of the conferees indicated that this is the 'Cadillac' of security conferences. I would agree completely with that assessment." Richard F. Perry, Mgr. Internal Auditing, State Mutual Life Assurance Co.

A necessity for security professionals." John Miller, Security Admin., General Dynamics

Best forum on computer security I have attended." Bruce Goldstone, Mgr. Data Security, Databank Systems Limited

Conference format allows maximum interchange between attendees. I've never failed to bring home one or more ideas or solutions that more than covers the time/expense investment." Nicholas M. Saxonis, Fac. Services Off., New England Mutual Life Ins. Co.

You are providing a valuable service to the data security profession. So many conferences are narrow in scope. Yours is a truly global approach. Keep up the good work." William Faller, Systems Officer, City Trust

It's one of, if not the best conference that enables representatives from government, industry & education to gather & exchange ideas and goals." Leon Cooper, Computer Security Spec.,

Outstanding! Offered an excellent forum for both gathering and exchanging ideas. Well worth the trip. A must for anyone interested in data security." Vincent J. Spagnolo, EDP Audit Mgr., M/A-Com, Inc.

A Blueprint for The New IS Professional

Cross and Blue Shield of Missouri, put it, "Our business is health care. MIS happens to be our discipline."

In some firms, the business perspective is quite emphatic. One executive surveyed wrote, "We focus on business graduates rather than computer science graduates. All senior MIS managers have MBAs, and I have a DBA [doctorate of business administration] as well.

"I look for communications skills even at the college trainee level. We've sent four MIS managers through executive MBA programs and have sent others to executive writing and interpersonal relations courses."

Another MIS director commented, "The emphasis is on communication skills, project management, and business understanding rather than just technical competence."

New Marketing Orientation

Marketing is an increasingly valuable business skill for those in IS to acquire. One IS executive who believes in a marketing orientation is Tenholder's boss, William Skowyra, senior vice president of Blue Cross and Blue Shield of Missouri (see "The MIS Marketeer"). Overseeing an IS budget of $22 million and a staff of 300 for the health care insurer, Skowyra has turned much of his resources to marketing policies. "We recognized that the customer was always right but that the end user wasn't always right," he explains. "We recognized who the real customer was."

The designers of information services will be brought into closer contact with customer needs as competitive pressures shift the nation toward a service economy. As those same customers become more computer savvy, telling them that something can't be done will become more difficult. Technical skills must be informed by an awareness of customers and markets, and IS professionals must not ignore the marketplace.

In this changing environment, who will acclimate the IS staff to this brave new world of business competition? As the old career track—from programmer to analyst to project leader—disappears, the responsibility of acquiring the necessary business skills and attitudes falls on the shoulders of the IS practitioner.

An overwhelming majority of respondents—87%—agreed that individuals are taking greater responsibility for their own careers. Interestingly, a large number of respondents—35 out of 46—also indicated that their companies support some form of career planning, a complementary, not contradictory, phenomenon. Companies no longer guide the individual at each step, but they do provide the map for planning the trip.

Harris's McCauley sums up: "People have to become much more responsible for their own careers. They have to act like individual entrepreneurs, like doctors and lawyers. We can provide the support in the form of training and education, but they have to chart the directions. I tell people we can still offer lifetime employment, but we can't guarantee lifetime positions."

The dynamics that drive businesses are having an increasing effect upon IS and its practitioners. As the competitive pressures and technological developments that are reshaping businesses also reshape the IS profession, adaptability, versatility, and self-reliance will become the IS professional's greatest assets. ■

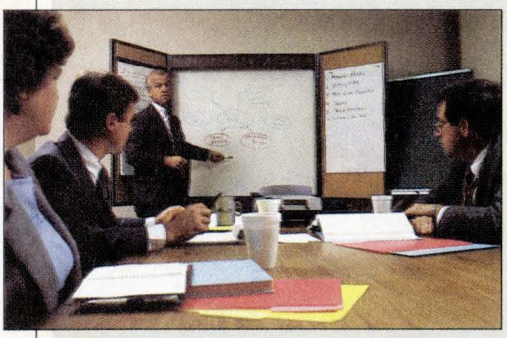
A frequent contributor to DATAMATION, Curt Hartog is an assistant director of the Center for the Study of Data Processing (CSDP) at Washington University in St. Louis. Robert A. Rouse is the associate director of the CSDP and the director of the newly formed Center for Intelligent Computer Systems, also at Washington University.

The MIS Marketeer

William Skowyra's management orientation at Blue Cross and Blue Shield of Missouri in St. Louis exemplifies the marriage of information technology and business.

As senior vice president of IS, he oversees a budget of $22 million and a staff of 300. He is credited with transforming a traditionally overloaded, fragmented dp shop into an aggressive marketing organization that uses technology as a vehicle for selling services to other Blue Cross and Blue Shield plans, as well as to national accounts.

In the early '80s when he was running the data center, Skowyra recognized the importance of servicing customer needs. Striving to draw in new business for the insurance conglomerate through improved customer service, he implemented a program that would consolidate claims processing on large, geographically dispersed accounts by using a single control plan. The plan enabled local Blue Cross and Blue Shield organizations to continue to provide the primary customer contact.



Blue Cross and Blue Shield's William Skowyra.

Eliminated were the customary delays that had occurred when information—in the form of data cards—was exchanged among participating plans. Also eliminated were business procedures that had become redundant, inefficient, or likely to alienate customers. Skowyra's innovations helped the company to retain a major account, while at the same time quickly elevating him to the top spot in the information systems realm.

Skowyra succeeded largely because he insisted that IS was a *business* function like any other department. As he puts it, "We didn't learn to say no. We learned to say yes." To turn his organization around, he began at the top, sending his four directors and, later, their functional managers to seminars on the health care industry. He also encouraged them to find customers and sell them policies.

Today, Skowyra's directors, like vp Ed Tenholder, spend as much as 40% of their time marketing Blue Cross and Blue Shield products and services. Skowyra practices what he preaches. By his own estimate, he spends 90% of his time marketing.

At a time when Blue Cross and Blue Shield is cutting staff, Skowyra's organization is growing. Tenholder will soon be adding marketing professionals to provide customer service and support. This blurring of organizational functions and the melding of professional objectives is eloquent testimony to the expanding potential of IS.

Sizing Up Your Staff

The Center for the Study of Data Processing at Washington University conducted a national survey of 50 IS execs on how they and their staffs are adapting to the changing IS environment. The following is a breakdown of the responses from the Fortune 1000 vps, directors, and managers.

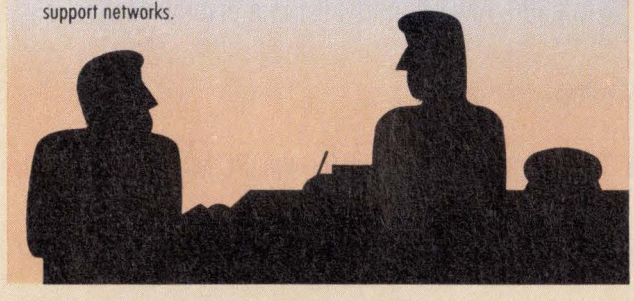
Career Guidance

87% report that their staffs are assuming increased responsibility for their own careers.

76% report that their companies are providing career planning for individuals.

61% report that their IS professionals are developing an entrepreneurial attitude.

78% report that IS professionals are building personal/professional support networks.



Skills

12% report that their staffs' skills are outdated.

70% report that their staffs' skills are up to date.

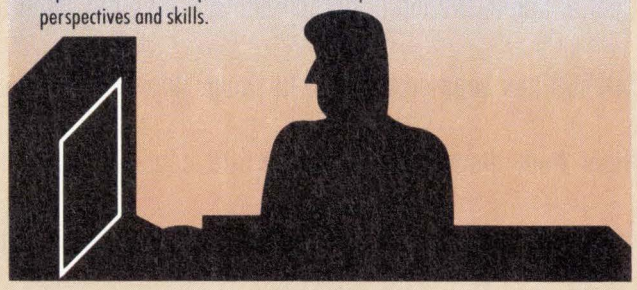
83% plan to retrain staff members.

80% plan to upgrade the basic business skills of their staffs.

52% plan to develop advanced business skills in their staffs.

83% report that their companies support development of business perspectives and skills.

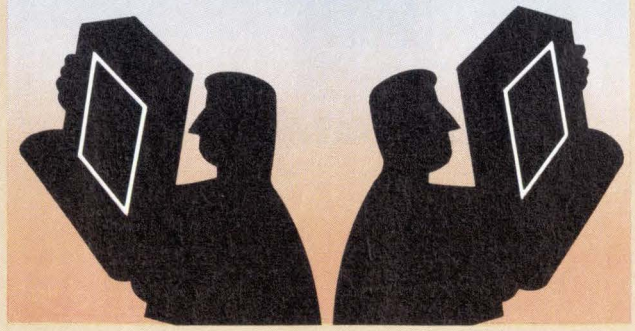
56% report that their companies reward development of business perspectives and skills.



Decentralization

18% report IS staff work outside the IS shop to support departmental computing.

64% of total computing dollars are spent on direct IS budget items.



Jobs at Risk

11% report frozen IS staff salaries.

36% report layoffs or early retirement of IS employees.

30% report IS jobs have been eliminated or left vacant.

SIEMENS

Powerful as a mainframe, easy to use as a PC. Siemens MX 500.

The MX 500 is a new class of computer from Siemens, the departmental computer. It is the natural extension of the smaller SINIX*-based PC-MX 2 personal computer, one of Europe's most successful multi-user computer systems. The MX 500 provides companies with the perfect system for distributed data processing or for stand-alone operation in both central administration and regional or branch offices. Powerful as a mainframe, yet easy to operate as a PC, the MX 500 is extendible by modules to cover from 10 or 20 to more than 30 workstations. And thanks to its multiprocessor technology, every user thinks he has the MX 500 to himself.

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Want to know more about the MX 500? Visit our stand at the CeBiT fair or drop a line to: Siemens AG, Info-service 133/Z145, Postfach 156, D-8510 Fürth, Federal Republic of Germany.

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SIEMENS MX 500

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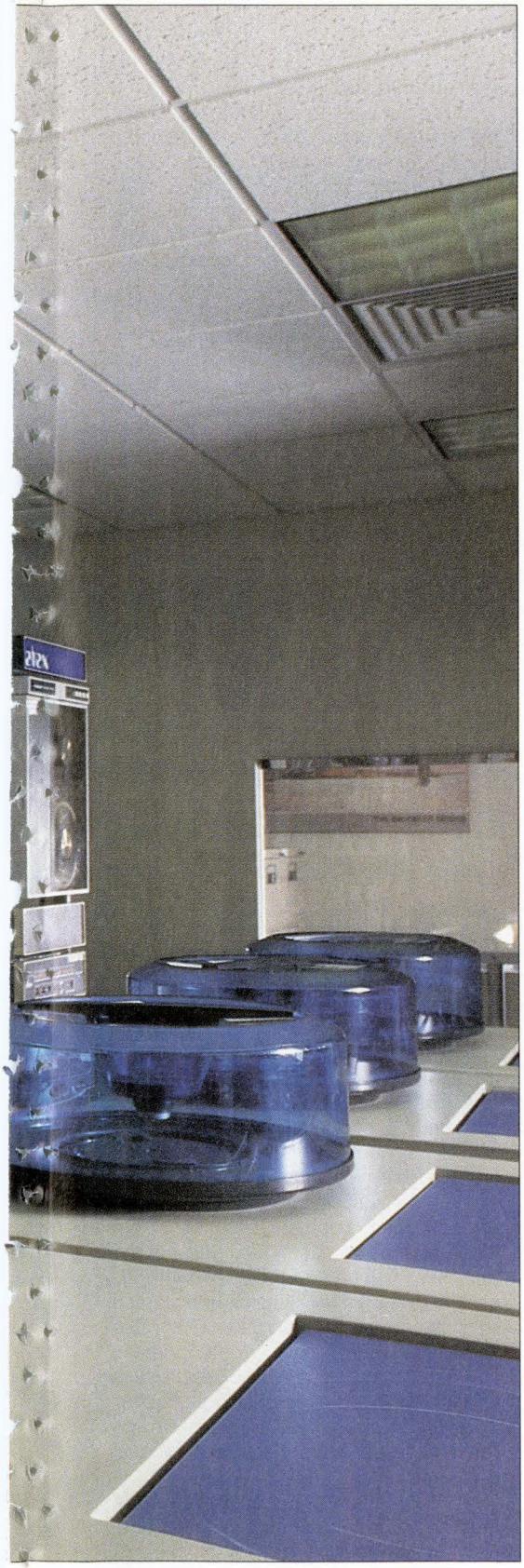


Information systems chiefs in small- to average-sized IS shops face a series of sticky personnel problems that their counterparts in large companies don't have to confront. To be competitive with these big boys with big clout, IS managers should provide their staffs with personalized job opportunities and special rewards. Informal team structures can ensure that this more personal approach works. This flexible approach can help you retain and reward your valuable IS professionals.

Managing Your IS Pros

BY FREDERIC G. WITHINGTON

If you are an information systems manager in a small- to average-sized shop, it is likely you face special personnel problems that your counterparts in larger IS organizations don't have to cope with. In fact, the size of an IS department has a direct bearing on such critical issues as salary levels, promotional opportunities, retraining, motivating, and replacing employees. The professional jealousies that crop up in many companies are also usually magnified in smaller shops, which can't command the clout that bigger computer operations naturally carry.

Through my work over the last 30 years with clients of all sizes, I have observed many managers who have directly confronted these special personnel concerns. Experience shows that there are six specific problems that arise in managing systems professionals in small- to average-sized IS operations. I will describe them and then explain some good solutions for each.

While the actions recommended are not novel, they are often overlooked by IS managers who frequently are too preoccupied with technology and user demands. Flexibility within the organization and within the management structure itself is often the key to clearing up these particular personnel trouble spots.

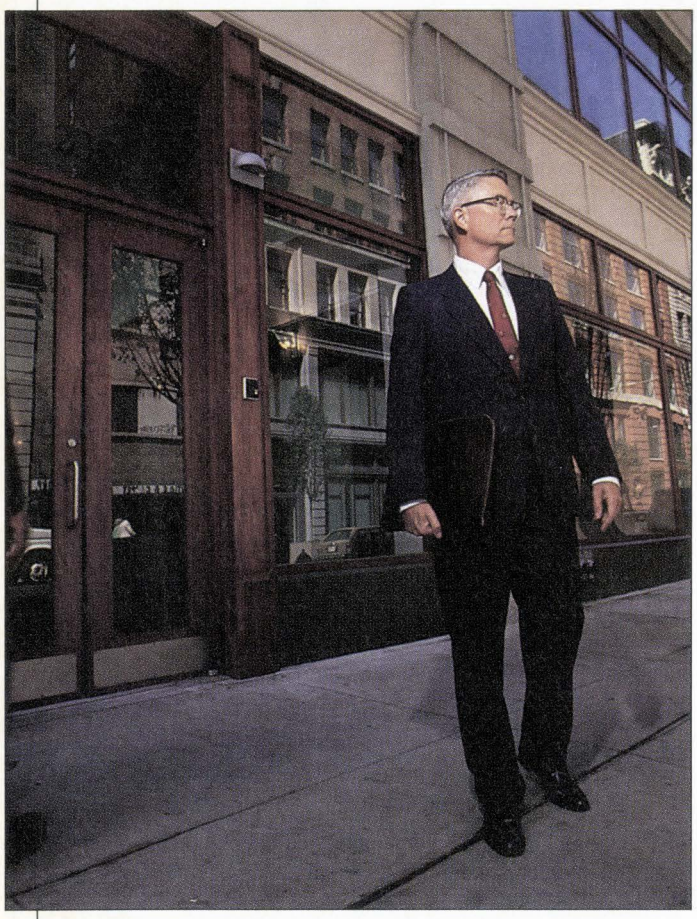
The six problems faced by managers in smaller IS shops are the following:

- chronic salary disadvantage,
- the lack of promotion opportunity,
- technical obsolescence of the staff,
- employees who lack the ability to adapt to changing roles and the consequent need to remove such people,

Photograph by Bill Kelly

- the lack of challenging work, and
- the jealousy of nonsystems personnel.

The salary discrepancies between large and small IS operations are a continuing dilemma for information systems chiefs. Vendors and very large user shops usually can offer considerably more money to IS professionals than smaller departments can. The salaries are particularly enticing for specialists such as network managers, whose abilities are in real demand in today's systems world.



This problem affects recruiting, because prospective employees already will have read full-page ads from big companies capable of doling out salaries that smaller outfits simply can't match. Salaries are an even bigger issue in terms of retaining an IS staffer who has developed marketable skills. Large IS organizations, particularly ones that handle lucrative government contracts, often have panicky expansions. This ballooning of the IS work force results in greatly inflated salary offers that can entice even the most contented employee.

Software vendors that hire systems professionals as their primary production employees also constitute a palpable threat to the smaller IS operation. These software companies are more likely to tout top prices for high performers—prices that managers in user companies who are less systems oriented can't compete with on a dollar-for-dollar basis.

Retaining experienced IS personnel is particularly tough in the information systems industry, where headhunters are constantly on the lookout for good systems people. The professional grapevine also flourishes in our industry, and word about high salaries gets around fast.

The best way you can deal with the salary disadvantage is to offer intangible compensations that larger organizations can't provide. Sometimes small can be beautiful because it cuts down on bureaucracy. The small projects found in small information systems divisions can be carried out by small teams. That means that the team members can be whatever they want to be, regardless of job description or formal plan. The result of this approach is opportunity for growth, combined with the security of peer support.

The IS staffers in a smaller department can have complete responsibility for a technical or departmental niche. They can be in charge of an application system, or they can handle service to a user department or a type of system program. They can also customize their own job style. They can pursue their education and have flexible working hours as well as a flexible work site, operating out of their homes if they choose. They can also tailor their job mix.

There are other nonmonetary rewards you can offer, like compensatory time and awards that are handed out at recognition celebrations. Contrary to popular belief, people do respond to "empty" honors, especially when a little levity is involved.

It's not easy to apply these intangible benefits fairly. Many well-meaning employees may sooner or later abuse these special freedoms. Even if they don't, accusations of favoritism are likely to arise. A sensitive manager can handle this. Remember, it's better to make a few mistakes than not to try.

Small shops have small projects that can be managed informally. Such loosely structured approaches almost always work. The fact that project structures are informal, however, should not mean that they are uncontrolled. Budgets, milestones, and time cards must still be rigorously observed.

The lack of promotion opportunity is the second problem area that IS managers in smaller departments must deal with. While systems professionals usually rise relatively rapidly, the road to advancement soon levels off in smaller organizations. Since smaller IS operations have only a few dozen systems professionals at most, they don't require more than a few managers. Also, most organizations don't pay top systems pros as much as they pay their senior line managers, effectively capping salary increases for IS personnel in smaller shops.

MANY IS PROS "TOP OUT" BETWEEN 35 AND 40.

As a result, systems professionals often "top out" between the ages of 35 to 40. This is the point at which they realize that there will be no further promotions except to fill positions already occupied by relatively young people. They also know that their wages won't increase any faster than the salaries of employees in the company's executive ranks. After a fast early rise, these IS professionals can become prey to serious motivational problems.

One effective—though painful—solution is to transfer senior systems people into line jobs at the same level. In marketing, product development, and manufacturing, systems people have room to grow and can often apply their systems skills to nontechnical areas. And

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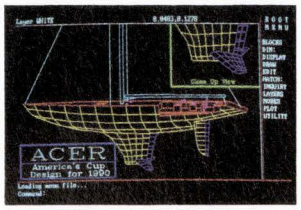

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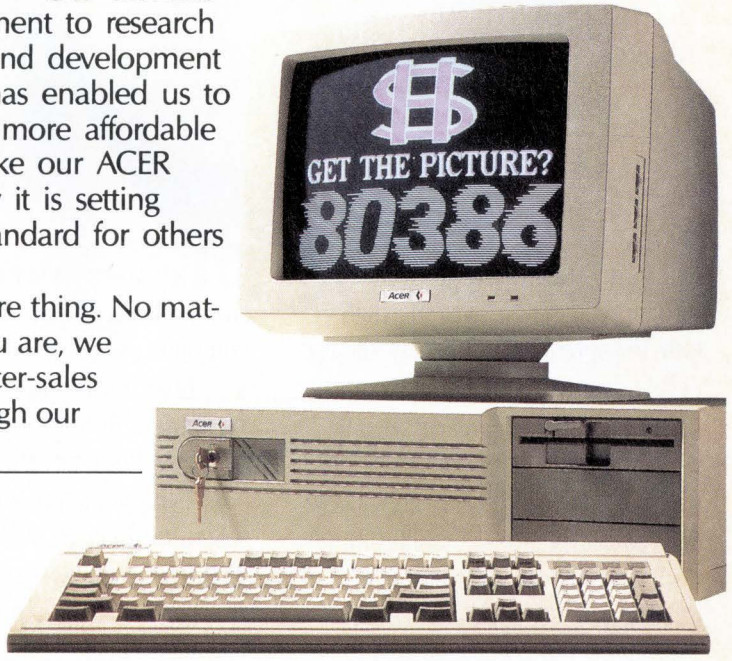

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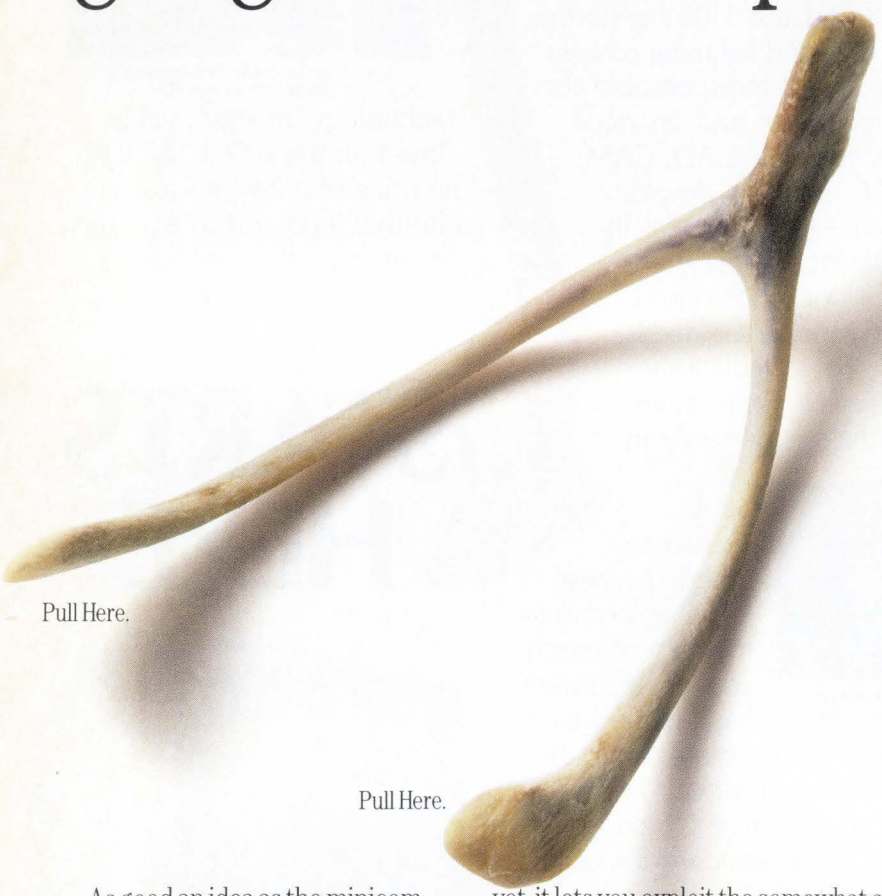

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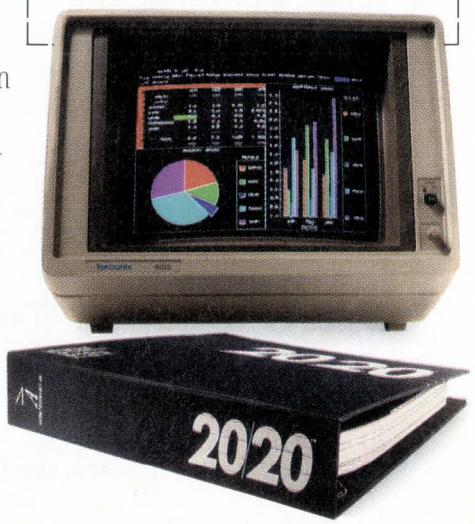

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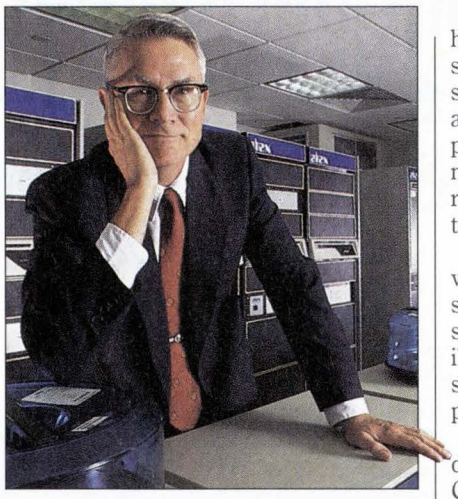
if they've already worked with the user department, they may be well qualified for the switch. What's more, the department will probably welcome them because of their expertise.

The painful part of this process is that the IS operation loses the best and most productive workers just at the point of their greatest value. This process also can make a bad turnover situation worse. Nevertheless, over the long run, a transfer policy usually does more good than harm. There is also an inherent escape clause in this policy. Information systems staffers who don't like working in the line departments can move back to IS with the understanding that their future promotion opportunities are limited.

If this movement to the field is mandatory, it's easier for systems management to accept the inevitable. This also



4GLS MEAN THAT COMPUTING PROS MUST HOLD USERS' HANDS.

sends a clear signal to systems professionals that they haven't reached a dead end in their careers. The Ralston-Purina Co. in St. Louis is one company that's made these swapping schemes a matter of policy.

The intangible benefits already described may also provide enough compensation to the experienced systems worker. Indeed, there are many IS professionals who are content with the quality of their jobs and have accepted the declining advancement rate.

Keeping Up to Date Is Essential

Those IS staffers who stay in the systems operation must upgrade their skills continually or risk becoming obsolete. Because the skills needed are often the ones that are new to the organization, this training cannot be done entirely on the job. Whereas vendors and large user shops have internal training specialists who can reach out as needed to outside sources to organize programs for the staff, it's difficult for smaller departments to support such formal programs.

This training is nevertheless essential. If it's neglected, both the morale of the staff and, ultimately, the usefulness of IS to the company will suffer. Fortunately, there are a variety of training resources for you to draw upon, including seminars, books, and video presentations. Most colleges and universities have continuing education programs, some of them very useful for information systems pros. The professional societies also deem retraining to be one of their primary responsibilities. So even the management of a small systems shop really has no excuse for failing to upgrade the technical skills of its staff.

While you may be uncertain about which resources are best, one way to resolve it is to let your technical troops seek out their own training tools. Luckily, most IS staffers want to learn new skills and want to help develop needed programs.

The manager of the 20-member IS department at Arthur D. Little Inc. in Cambridge, Mass., simply encourages his people to attend professional society meetings where they can find out about the best training sources. He then negotiates an individual program with each person, keeping the total expenditure of time and money within budget. He also makes sure that the training meets the overall needs of his company.

Once people have learned one set of skills, they may believe that they remain

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qualified to do new kinds of work, even though they aren't. Other IS employees, spoiled by the intangible benefits of their jobs, gradually may begin to abuse their privileges and become unwilling to accept any criticism. Employees who don't want to be retrained must be removed from your organization.

Some systems staffers may be unable to adapt to a changing organizational culture. For instance, competent production programmers, accustomed to working alone, are sometimes unable to perform the user-assistance roles that

STAFFERS IN THE SYSTEMS OPERATION MUST UP-GRADE THEIR SKILLS.

the move from batch to user-driven systems requires of them. This slow deterioration of competence can occur in any organization, but it is particularly severe in systems work because of the rapid pace of change.

Unable to do the work that needs to be done, these obsolete professionals often become idle, especially if they're part of informal project teams. Workers who are more productive resent this behavior and the manager who tolerates it, which eventually poisons staff morale. It's clear that these people must also be removed from the IS department—and quickly.

That removal process, however, is not easy. These people have done nothing directly wrong. They have demonstrated competence and loyalty, sometimes over many years. Furthermore, these people are usually older and there are well-established laws against age discrimination.

If you have to remove an otherwise competent employee, you should seek help from the company's personnel department, or from consultants. It's tricky to be fair to the people and fair to the firm, while minimizing harm to everyone's morale.

The personnel expert's first recommendation usually will be to transfer the employee to another job outside IS where he or she can be more productive and not suffer a loss of status. If such a position can be found, fine. Then the personnel specialist can take on the job of convincing the employee that the move is desirable. If no appropriate job can be found, the person must be fired.

Fairness Should Always Be Maintained

You should resort to dismissal only after repeated efforts have been made to counsel the employee and after outplacement services and generous compensation have been provided. Because of the impression it makes on the other workers, fairness to a loyal employee is always in the company's best interest, even if the law does not require it. Employees don't like to see years of service rewarded by abrupt termination, even if they agree that the person is no longer productive.

Some IS workers may have a hard time being productive if they feel their jobs are not challenging. The most interesting work for systems professionals is developing new, state-of-the-art systems. This is what they are trained to do and what they enjoy most. Unfortunately, most IS departments are well established and have little new systems work to do. Surveys indicate that usually only about 10% to 30% of staff time is spent on new systems. The rest of the time is spent modifying and maintaining old systems and moving these systems to new operating environments.

Today, this situation is going from bad to worse. Because of the trend toward fourth generation languages and end-user programming, IS professionals end up becoming trainers and hand-holders for end users. Sometimes they are actually little more than police officers of data definitions and integrity standards, and explainers of why widget A can't talk to gadget B. Few IS pros find this kind of work as stimulating as the development of new systems.

One solution is to find new ways to instill organizational pride in your IS people. They should be made to feel just as proud of the contributions they make to the company as they feel about their technical accomplishments.

One way to do this is by adjusting

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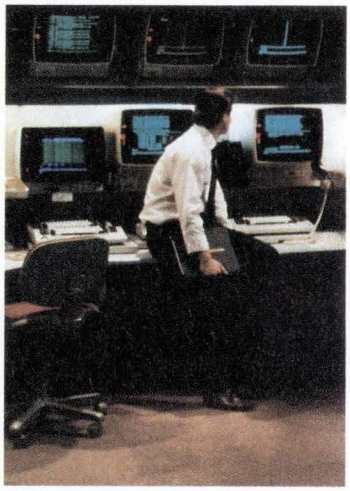

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the reward system. You can, for example, provide extra pay and benefits for less pleasant work, or you can involve end users in salary reviews. But it's also very important to expose your IS staff to the line work they are intended to support. They should be sent out of their ivory tower in the IS department and into the field—into the factories, the sales offices, and the warehouses—where the company's work is actually done.

Your IS team should talk to production employees, and maybe even to actual customers. While formal visits are of some help, it is better if you set up some short tours of duty. During these stints, the IS employees actually do production work for a while.

Some companies make these tours of duty a matter of policy. Avis Inc., the Garden City, N.Y.-based rental car firm, requires all newly hired employees to stand behind a counter for two weeks renting and checking in automobiles before they start their professional work.

Justification Will Become Apparent

While your IS people may grumble at first, eventually they will come to accept the tours of duty because they will understand the reasoning behind them. They learn to empathize with the people their systems support, and, invariably, they are glad they had the experience. While these field sojourns interrupt the IS work of staffers and are therefore an added cost factor, all the organizations that I know of that use this field familiarization method think the cost is justified.

When the IS workers are on the job, it's also a good idea to have them associate with people from the end-user departments. At the very least, they should interview the people who will be using their systems, and communicate with end users in project teams. In fact, one medical products manufacturer, Baxter Travenol Laboratories in Chicago, always appoints user representatives to head project teams when applications systems are being developed.

If you take this approach all the way, then the entire IS operation could be entirely disbanded, with all your staff being parceled out to end-user departments. New York-based Citicorp's widely publicized Project Paradise is an example of this. While most organizations find, as Citicorp did, that some part of the systems organization should remain centrally located, a hybrid of user-based and central teams can exist amicably and effectively, provided every group has at least eight to 10 members.

As discussed above, there are motivational reasons for IS to build closer ties with the corporation. A pragmatic reason for those end-user links is to try to avoid, or at least temper, the feelings of jealousy that nonsystem employees often have toward the information systems staff. These outside workers see new systems professionals being hired at higher salaries and put on faster promotion tracks. They may also believe that IS personnel have more pleasant jobs.

The best way to ameliorate this problem is to provide good service to users. If most of the end users can see that the systems professionals are providing really useful systems, they just might admit that the pampering is justified. Keeping track of and publicizing IS department successes can also help here. But the real key is keeping your staff in close contact with your company's users. If these line people come to know the particular IS people who have accomplished the good work, then they may be willing to concede that at least their particular friends really deserve the rewards they receive.

Close contact between IS personnel and the field folks they serve is already happening in many companies. The proliferation of 4GLs, spreadsheets, and pc networks creates the opportunity for your IS staff to get involved with end users. The IS professional who helps an end user accomplish something exciting becomes a valued friend.

If you manage a smaller IS shop, your strategy should be to take advantage of its size. You should nurture the structures that lead to job diversity. You should make flexibility and end-user communication the hallmarks of your operation. By building these into your organization, your attitude toward training and advancement, and into the dealings you have with others in your corporation, you can develop a flourishing, effective information systems force capable of giving larger companies a run for their money and for their IS workers. ■

DATAMATION advisory board member Frederic G. Withington is a 34-year industry veteran who spent 27 of those years as a top consultant with Arthur D. Little Inc. in Cambridge, Mass.

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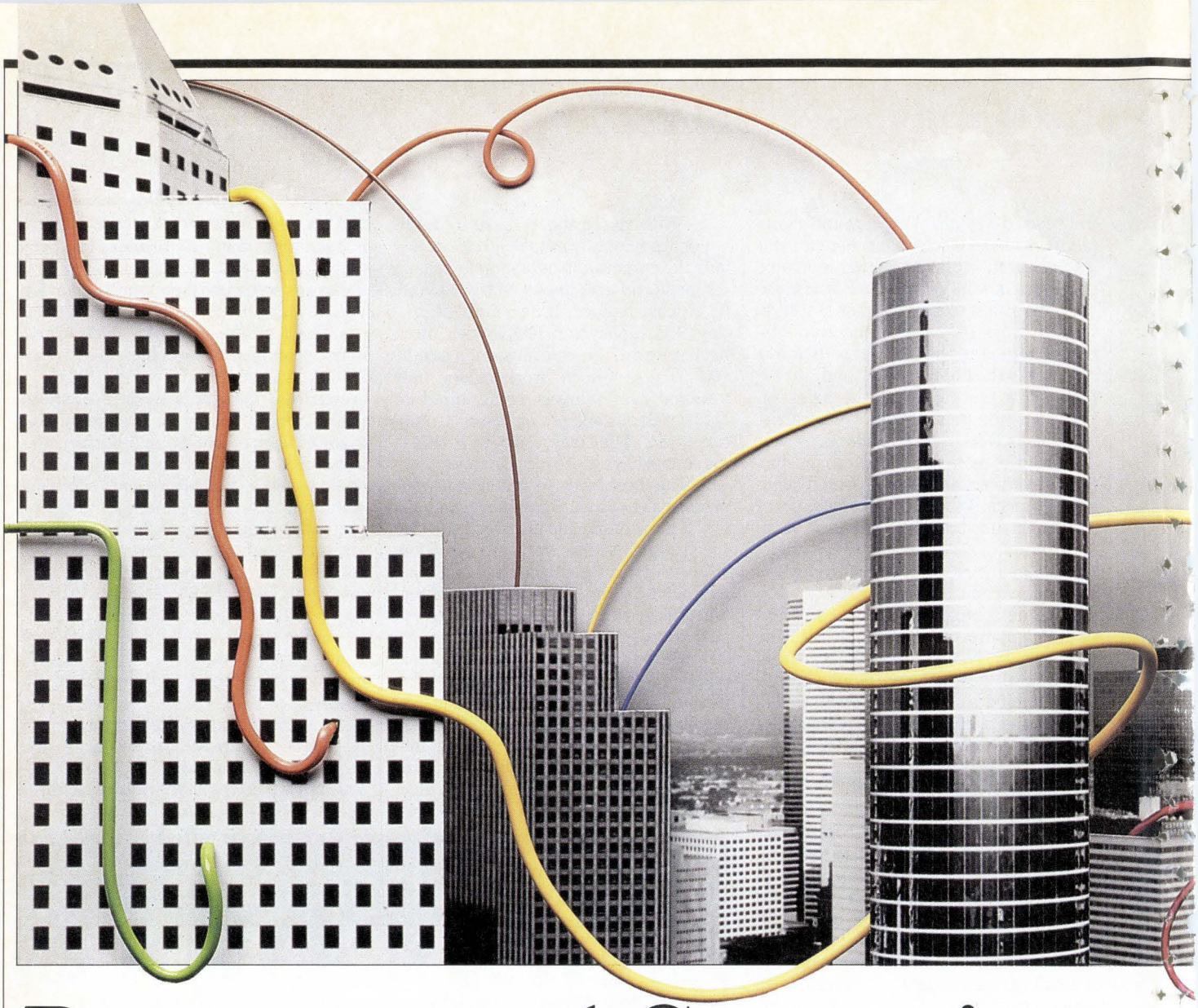

Departmental Computing:

BY ALAN SEWELL

Decentralization of the information systems function from headquarters to the field can provide better information management service to the branch and department units that are directly involved in producing, marketing, and supporting your company's product. Those units gain direct control over their own systems and data—control that enables them to access information faster and to maintain their data more accurately.

This control, however, can end up causing chaos at the the corporate and departmental levels as the responsibility for implementing IS procedures shifts to the local units. Thus, how well you manage that sensitive shift will determine whether the departmental computing effort succeeds or fails.

Distributing computing power out to multiple sites has definite advantages, especially for users. Since each departmental system can be tailored to meet local processing needs, users are able to enter, access, and report their data more effectively. Regional marketing managers, for example, who may have had difficulty getting timely information from headquarters, are able to receive from their branch computers daily reports on sales versus targets for their territories. Department managers, who once had to go through the corporate system, are able to run reports on demand specifically designed for their operations.

But none of the substantial improvements in user satisfaction can be achieved unless you integrate the flow of data between the departmental and corporate systems. At the same time, you must also make sure that there are uniform policies for every system. To ensure this integration and uniformity, there must be proper communication, the key to successful decentralization.

You must make sure that corporate and departmental staff develop a system for communicating about crucial information system procedures. Working together, they must establish software development timetables and long-term systems development goals, coordinate new software releases, develop documentation and training materials, troubleshoot, and, most important, they must monitor the daily flow of data between the distributed and the central corporate systems. The following guidelines will help you improve the independent IS operations, making sure that those critical dataflows and policies are consistent

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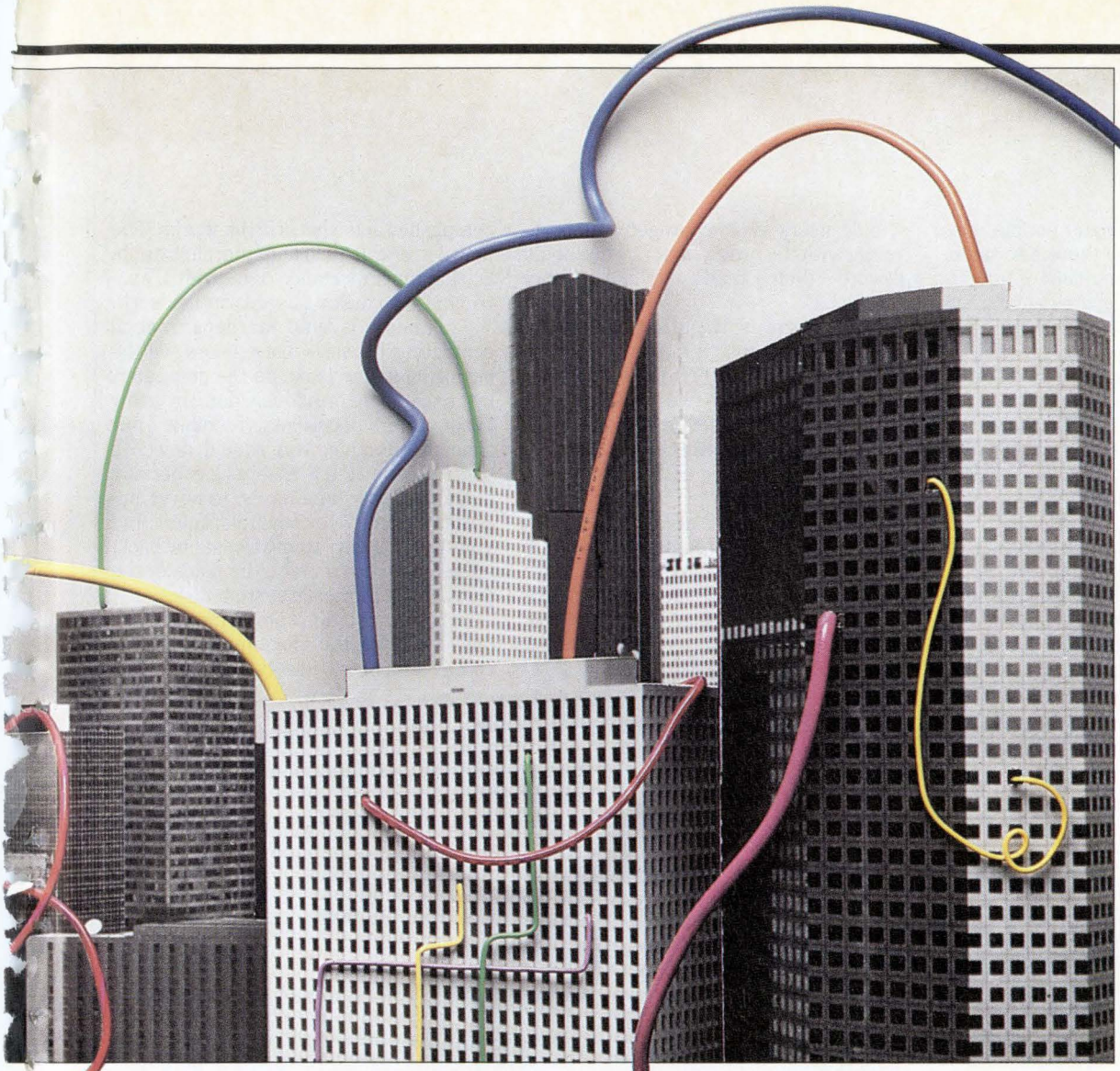


Shifting computing power out to the branches and divisions can benefit both end users and the central IS staff, but if the effort isn't well managed, anarchy can break out. To avoid computing chaos, IS execs who need to keep a large number of systems functioning smoothly should follow a number of essential steps. The first thing to do is integrate the flow of data between departmental and corporate machines, making sure there are uniform policies for all systems. There also must be proper communication, which is the key to any successful departmental computing campaign.

Distributing the Power

throughout your company.

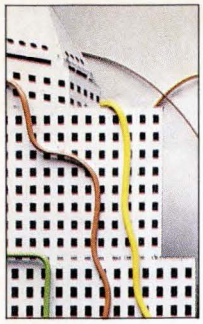
First of all, IS personnel in the branches must be trained to communicate with headquarters to resolve any procedural questions. Anarchy will result if each branch or department is allowed to use its system to improvise its own IS policy. This is particularly important in such areas as product pricing and inventory.

Likewise, regional staff must know when to update the data in their systems and when to communicate that information to headquarters. Distributed processing enables a large number of users to control the data germane to their operations—data such as master files, pricing tables, bills of material, and payroll tax tables. These data must be consistent between central and distributed files.

To ensure that consistency, one person in each department should act as the systems operator, maintaining critical control files and talking with headquarters to clarify procedural issues (see "Four Rules of Ddp You Can't Break," May 15, p. 105). This person must understand the hardware and software and be knowledgeable about the operations of the department, assisting the IS manager when problems occur.

Make sure that all computer operation policy changes are channeled through the operator. The more responsibility this person can handle, the less time you and your programmers will have to spend on routine operating glitches.

At the corporate level, you should assign responsibility for communicating with the departments to as few people as possible, and you should ensure that



those people have a thorough understanding of how the departmental systems work. These people should be the first points of contact when the departments have questions on operating methods or when they want changes on system data that may affect the entire organization. These point people should be encouraged to talk directly with you if they need more information about the way a policy or a data change should be implemented on the system.

After controlling the flow of policy and procedural communication between corporate headquarters and the various branches, you'll be better able to focus your IS department on systems development issues such as resolving problems and implementing requests for enhancements.

Tracking User Problems

One essential communication tool is a User Problem Reporting (UPR) system, which provides a method of tracking and responding to user problem reports or requests for enhancements. Once you splinter operations away from the central site and once departmental users find out what their systems can actually do for them, you'll face a large increase in the volume of data being processed. Processing problems will also mushroom accordingly. The UPR system can help you deal with the rising number of requests for enhancements from users.

A UPR system can be implemented via a pc database program or it can be written from scratch on a minicomputer or mainframe in about two days. While the system need not be fancy, it should contain the following data elements: the location where the problem or request for enhancement originated, the name of the person requesting the enhancement, a thorough description of the problem or request for enhancement, the priority the enhancement is assigned, the scheduled completion date, the scheduled software release number, a description of the proposed resolution, and an estimate of the amount of time or money needed to correct the problem or to implement the upgrade. These final items are filled out by the IS department after the UPR is received from the user.

Departmental users complete the problem description on a UPR form, which is then sent to the IS department where it is logged in the database. Only in cases requiring immediate attention should users be encouraged to talk directly with the programmers who should devote their time to high-priority problems.

At Fellowes Manufacturing in Itasca, Ill., we currently support five branch and various departmental systems at headquarters with five programmers who receive up to 20 requests for enhancements per month. On a monthly basis, the programming staff satisfies 50% of all those requests.

The UPRs, which are evaluated each week or month by a committee of users or information systems personnel, are assigned priorities. Some may be scheduled, some may be rejected on the grounds of cost, and others may be put on hold for an indefinite period if resources aren't currently available.

The UPR system ensures that every problem or request for enhancement is responded to, even if it's turned down. Users receive copies of their forms after they've been evaluated. An open UPR log, showing priorities and scheduled completion dates, can be given to them every month. This keeps users up to date on what's being done about the problem or enhancement.

A monthly newsletter can be another good communication tool, alerting users and managers to procedural and policy changes and other key issues. It should provide news on projects and development plans, giving a broad, positive perspective on what has already been accomplished and what is in the works. The newsletter can build staff morale by publicizing the importance of individual contributions to making user systems work.

Training is vital for departmental computing because many users will be performing new tasks on the computer, tasks that were previously done by a few headquarters specialists. To make your training effective, you should devise a plan to handle it. It is essential, especially in training first-time users, to cover important operations several times. And you should always train at least one backup person who can take the place of the primary user for each system task.

Documentation complements training. Most of the documentation that comes with outside software, while useful for systems analysts, is often too complex for the end user. So you should consider writing your own documentation that can be packaged in a concise cookbook format that combines technical information with descriptions of the policies used in your business.

Use a topical presentation with headings like "Entering an Order," "Maintaining the Customer Master File," and "Maintaining Pricing Tables." Concentrate on the fundamental processes and include one- or two-page checklists for things like "The 10 Steps Required To Run a Payroll Update."

After establishing the right communication, training, and documentation, you will want to have your IS department

Putting Out the Political Fires

In decentralizing information systems functions out to the field you may become embroiled in heated policy discussions. That heat is generated by the strong current of antagonism that often runs between corporate headquarters and the operating units. The level of antagonism is generally directly proportional to the department's geographic distance from headquarters.

The headquarters staff may regard the remote sites as "country cousins" who can be be blamed for every mistake that's made. The field forces, on the other hand, may view the corporate staff as irrelevant entities at best and, at worst, as obstacles to effective IS operations.

An IS manager must be able to overcome this atmosphere of antagonism. Once again, communication is the key. From the very start, you must establish clear channels of communication, strengthening them at every opportunity. Avoid finger pointing by creating distinct lines of responsibility for operators at both the corporate and departmental levels. Also get departmental IS operators actively involved in new policies by asking for their ideas well before decisions are made. You should also make these point people sign off when new policies or procedures are implemented or when enhancements are made to their satisfaction.

Make an extra effort to educate departmental locations on the impact their operations have on the overall corporate system. A newsletter distributed to all IS personnel is a good way to do this. A newsletter can also make information systems operators at headquarters aware that the accuracy of data processing on the distributed systems depends in large part on the quality of communication from the corporate level.

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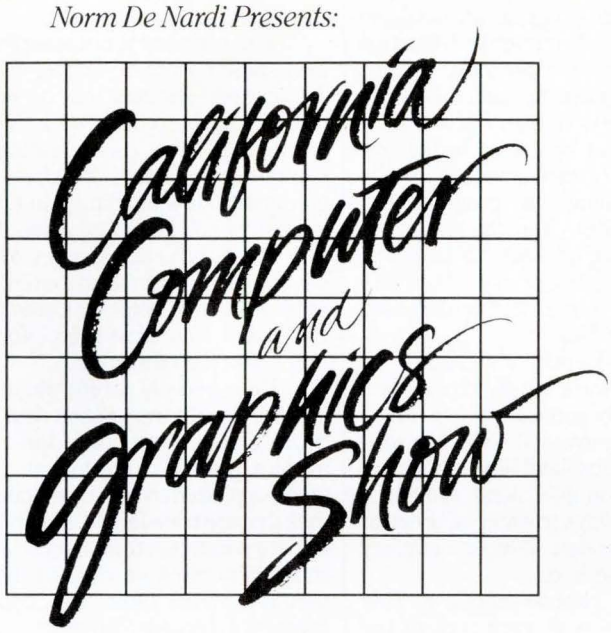

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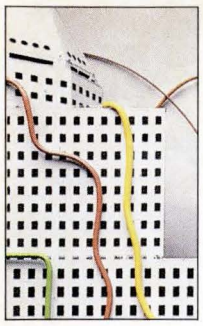

zero in on priority projects. That's not easy in the hectic information systems environment of today, where there's always pressure to disperse resources among many projects and problems. This fragmentation process will accelerate once you decentralize, so you must keep your programming resources focused on those projects that will be the most beneficial to your organization.

Avoid the temptation to send your programmers scurrying about on several projects simultaneously. Use the UPR system to identify the priority projects, and make sure your programmers stay on them. While you obviously must handle emergencies and problem fixes, you do want to minimize them so that you can get on with the important work at hand.

You should also apply your programming resources wisely in fixing processing problems. While you must clean out the bad data resulting from a processing error immediately, it may be advisable to wait until you have clear evidence that the problem will repeat itself before you pull programmers off a priority project to do an in-depth analysis of the new problem's cause.

Maintaining a large number of departmental systems magnifies the need to control software design and releases. All departments and IS headquarters must be using the same software release, and all software must be designed with decentralization in mind. This can be accomplished by using the techniques that successful software vendors use to design and support software for many customers.

Specifications Are Essential

The essential element in designing decentralized software is first to write a detailed functional specification for users to examine and approve before programming begins. The specification should describe report layouts, screens, and processes. If you're purchasing software from an outside vendor, go ahead and write the functional specs, which can then be used to evaluate the packages you're looking at. It is much easier to determine how well each package will fit your business if you can compare it to a written specification.

The vital step in software release control is to log, via a word processor or database, every program and data structure modification and to cross-reference these within the file. You may want to reference the UPR log by software release number and program and database changes by date. Printing the UPRs that have been assigned a particular release number will generate documentation that informs users of every problem fix and enhancement contained in that release. Software release tapes can then be built by searching the program/data change log by date—from the time of the last release to the present. This ensures that every program or data structure modified in the interval between releases gets put on the tapes.

A major criterion in designing or purchasing software for distributed systems is reliability and ease of use. Many problems can be avoided if you use software that provides flexibility only where needed. For example, don't provide a dozen or more ways to enter an order or run a payroll update if your company uses only one method.

Having to choose among a wide number of options at each step of the data entry and updating process confuses users, wastes time, and causes errors. Wherever possible, let your software anticipate the options the users need, then automatically select the correct option, so that departmental users can enter data by making the minimum number of decisions and keystrokes. Fewer decisions means fewer operator errors.

If you're using third-party software you may want to modify it. Outside software, which is written to satisfy a wide range of businesses, usually offers many choices for every data entry and processing function. So, trim down those options, retaining only the ones that meet the requirements of your company.

Distributed processing will probably require you to periodically transfer data between the departmental and corporate systems. Usually, master files such as customer or employee lists or tax tables get downloaded to the distributed systems, while transaction files such as orders and invoices, employee labor distributions, and inventory receipts get uploaded into the corporate system so that consolidated sales, payroll, and inventory reports can be run.

Communication Is Critical

Controlling communication between people is the key to ensuring the accuracy of master file data that's common to the corporate and distributed systems. Every addition, change, or deletion of a master file item made by off-site personnel must be communicated to the users controlling these items on the corporate system, and vice versa.

You may find it necessary to download some corporate master files to the distributed systems on a weekly or monthly basis to ensure that all the departmental sites are operating from a common, up-to-date database. But if automatic downloading isn't feasible, interpersonal communication becomes even more critical. Changes originating on any one of the distributed systems must always be communicated to corporate users who must then inform every other distributed system.

Be especially careful about controlling the flow of transaction data from the departmental systems to the corporate system. To ensure accuracy, you must set up a procedure for cross-checking all data that are transferred and updated into the corporate system against audit trail totals generated on each of the departmental systems. Otherwise, data such as inventory records, invoices, or orders may not be transferred at some point, resulting in an uproar when the corporate system is eventually found to be missing sales or inventory transactions that originated on the departmental system. Provide as much verification as is needed for department and corporate IS personnel to make sure that every transaction that originates on a local system actually gets transferred and updated into the corporate system.

Communication, documentation, training, software development and release control, and verification of data are all important for any information processing mode. But the more decentralized your IS operation becomes, the more crucial it is to apply these techniques consistently. That, in fact, is the only way you can hope to keep a large number of systems interacting with each other and functioning smoothly.

Making information more readily and easily available to many people in your organization is what departmental computing is all about. If you take an active role in managing the departmental computing effort in your company, then the operating units that want better access to data critical to their jobs will be well satisfied. And the corporate staff, who want the integrity of data and policies maintained throughout the company, will also be content that you've done a good job. ■

Alan Sewell is project manager for branch systems development at Fellowes Manufacturing in Itasca, Ill.

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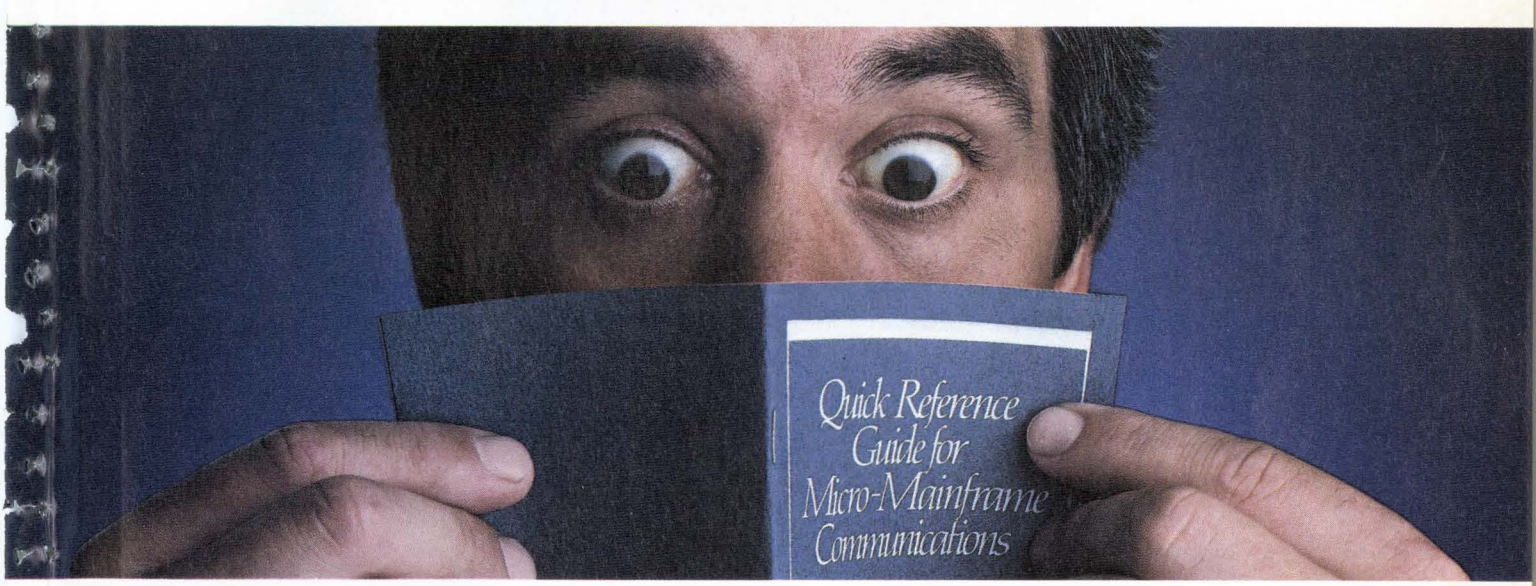

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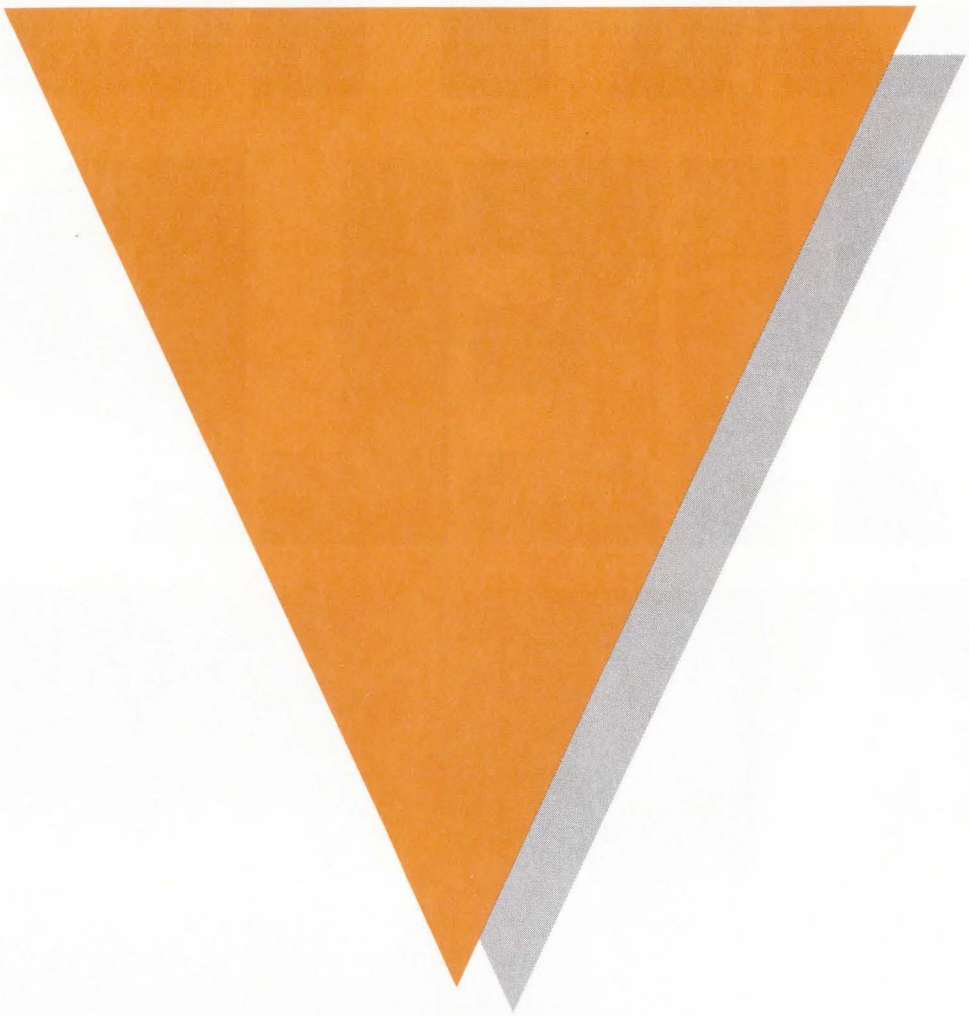

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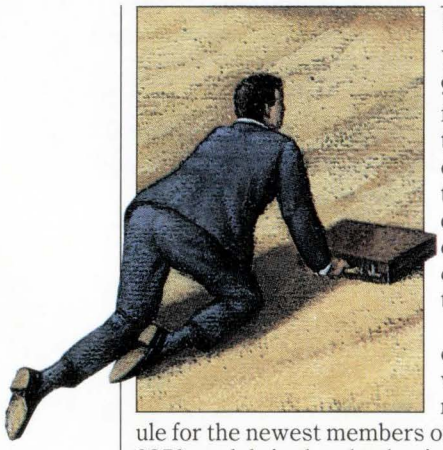
If IBM wants to move its new 9370 family of machines out the door and into small- to medium-sized IS shops, then it will have to beef up the applications software menu for these systems. This software shortage has not been a problem for the larger, early customers, who have the resources and know-how to write their own programs for their 9370s. That clearly won't be a solution, however, for the smaller companies that Big Blue hopes to woo down the distributed processing path with the machine. To secure those software solutions, IBM has reportedly launched some internal development efforts and some links with third-party software vendors and value-added resellers.

Desperately Seeking Software for the IBM 9370



BY MARY JO FOLEY

When it comes to applications software for the IBM 9370, companies are finding that it's a do-it-yourself affair. That's the pragmatic approach being adopted by the larger Fortune 500 firms that are the earliest users of the supermini. IBM, however, has primarily targeted the 9370 for the smaller shops. It's these small- to medium-sized operations, just starting down the distributed processing and departmental computing path, that clearly will not be satisfied with IBM's limited applications software menu for the 9370.

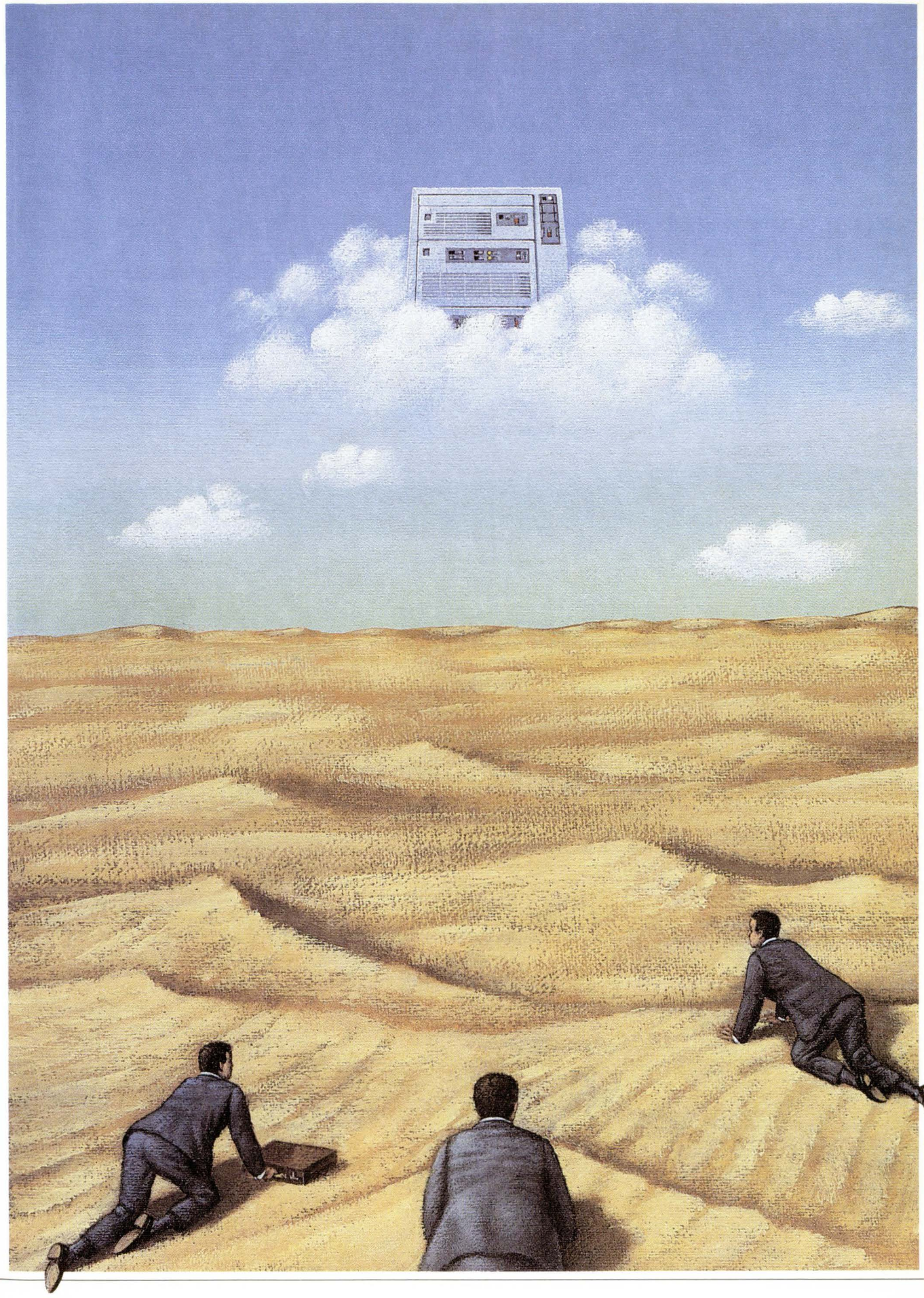
IBM needs to woo those small- and medium-sized customers to stay on track with its own timetable, which calls for tens of thousands of 9370s to be shipped next year. Hardware deliveries are certainly on schedule for the newest members of the System/370 family. General availability of all four 9370 models is slated to begin this month.

Through its pilot and early support programs, IBM has, to date, delivered and installed approximately 200 systems worldwide. Most of those installations, however, have been at larger companies, which have the resources and know-how to write their own 9370 software.

Those homegrown ways aren't as necessary in VSE environments, where there's an existing base of applications software. They're much more essential, though, in the VM world. In fact, 9370 customers who run VM currently have very few software options from which to choose.

This software shortage is, to some extent, a matter of timing. For many users—as well as for IBM—it's still early in the 9370 game. One of those early users, Texaco Inc. in Houston, is running IBM's Professional Office System (Profs) package under VM on its one 9370. So far, the only application on the machine is electronic mail. Edward McDonald, manager of Texaco's Information Processing Division, explains that applications will grow as the company takes delivery over the next 18 months of 10 to 15 more machines. IBM's Graphical Data Display Manager will probably be Texaco's next package purchase.

The software situation may not prove too tough for Texaco because "we really aren't a heavy VM user," McDonald explains. "Most of our work to date has been MVS/TSO based." In fact, Texaco originally planned to purchase 4381s, rather than



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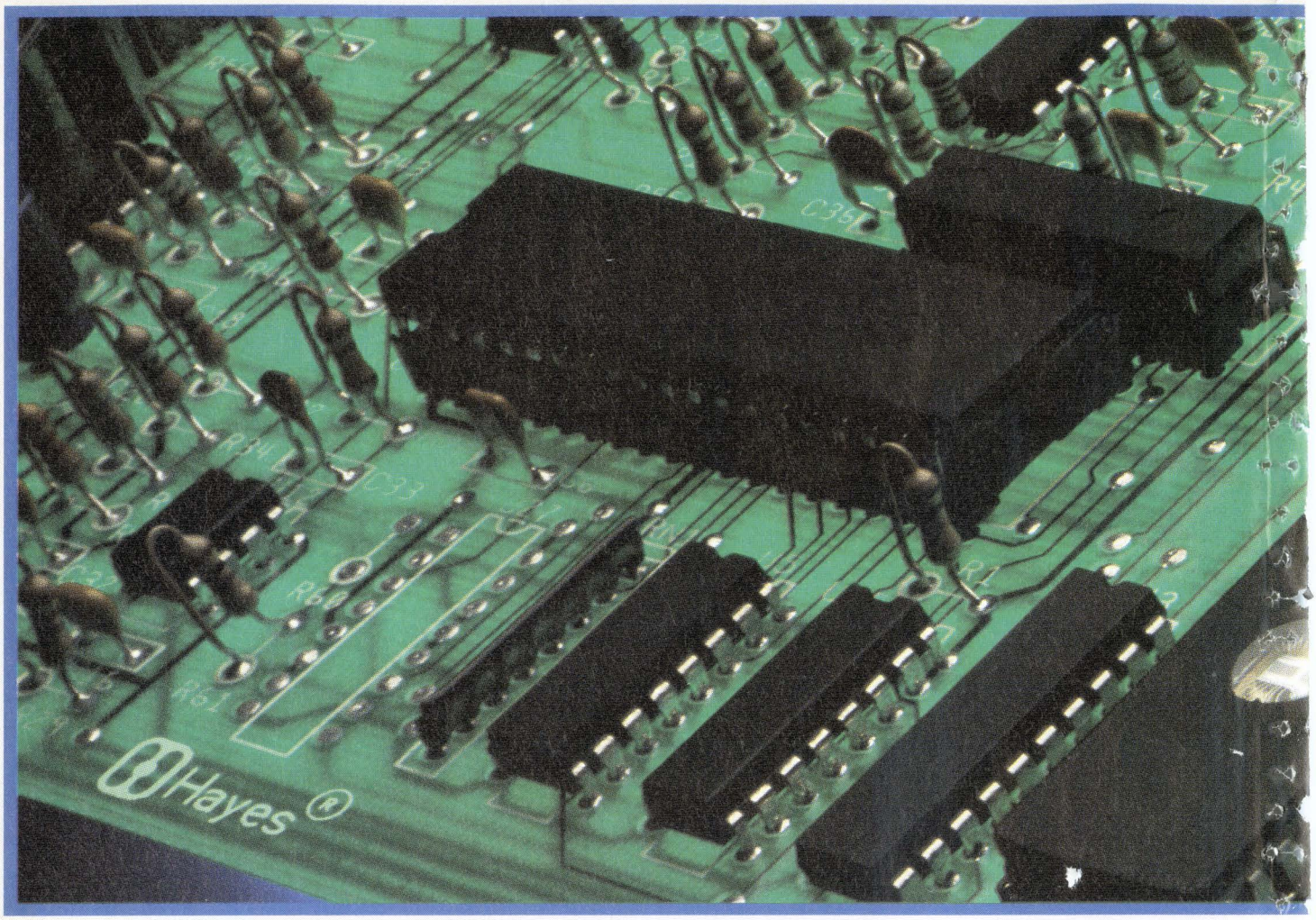


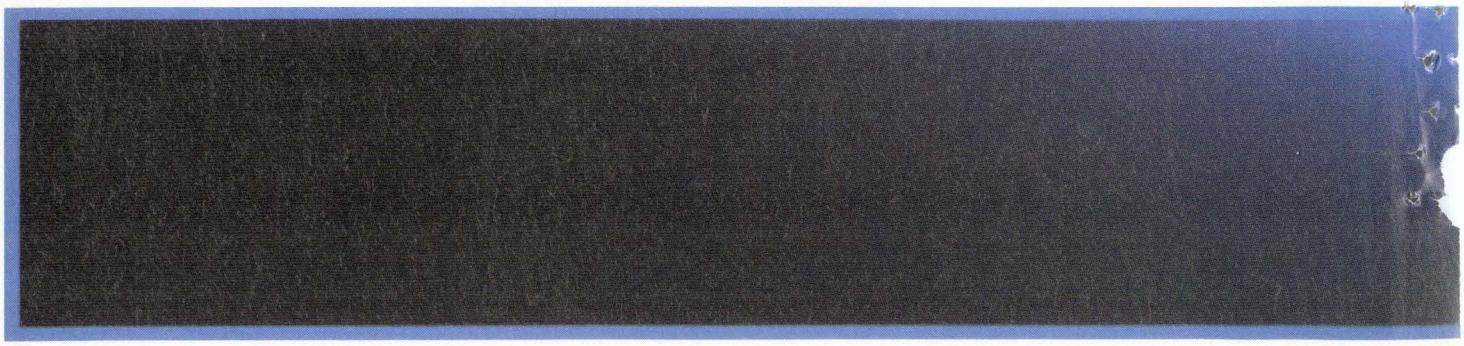
Hayes Microcomputer Products, Inc., is one of the premier successes in the electronics world. Hayes pioneered the personal computer modem a decade ago and still continues as the industry leader. The company's rapid growth, however, has brought about its own set of growth needs. To help manage its expanding business Hayes needed flexible applications software. So they selected systems from Management Science America, Inc.

"The foremost reason we selected MSA was that the company is stable, with software on the market that offers tried and true solutions," comments Ken Voelker, Director of Hayes Information Management Group.

MSA's Manufacturing System provides Hayes the solution they wanted for integrating information in three key areas. Inventory Control has enabled Hayes to reduce warehousing, insurance and carrying costs, and free up capital for non-inventory investments. Material Requirements Planning saves Hayes significant time and money by generating requisitions automatically and sending them directly to Purchasing, providing buyers with more lead time to negotiate. And, because the Order Processing System has visibility into both inventory and manufacturing schedules, Hayes can take customer orders and make timely delivery.

Hayes views its relationship with MSA as a long term partnership. Adds Voelker, "We use MSA's Financial and Human Resource Systems as well as the Manufacturing System. We have an ongoing commitment from MSA and are confident we can depend on them for additional systems to meet our needs."

Connecting with MSA Software was a smart move for Hayes. It can be for your company, too. Call Robert Carpenter at (404) 239-2000.



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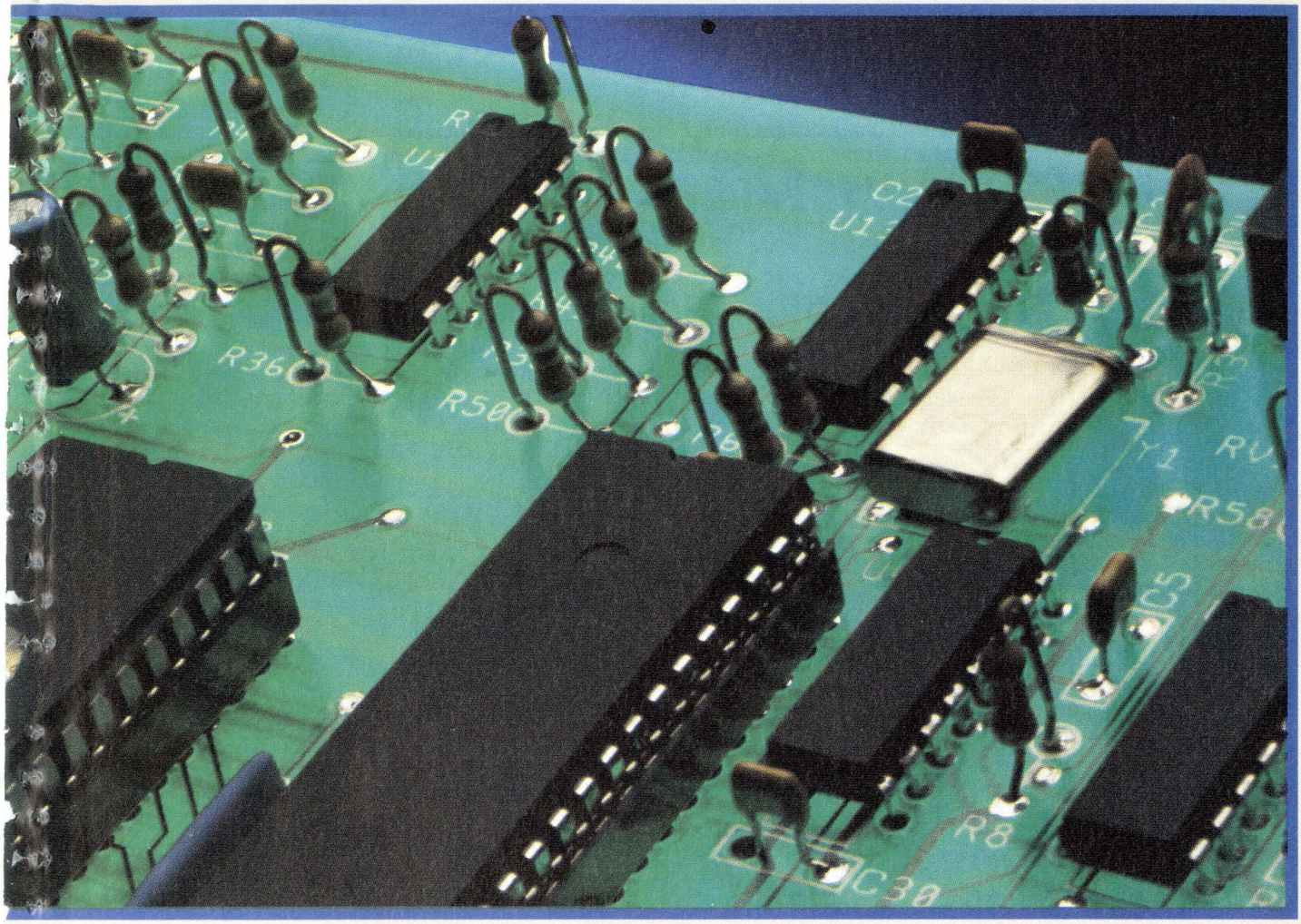

MSA The Software Company

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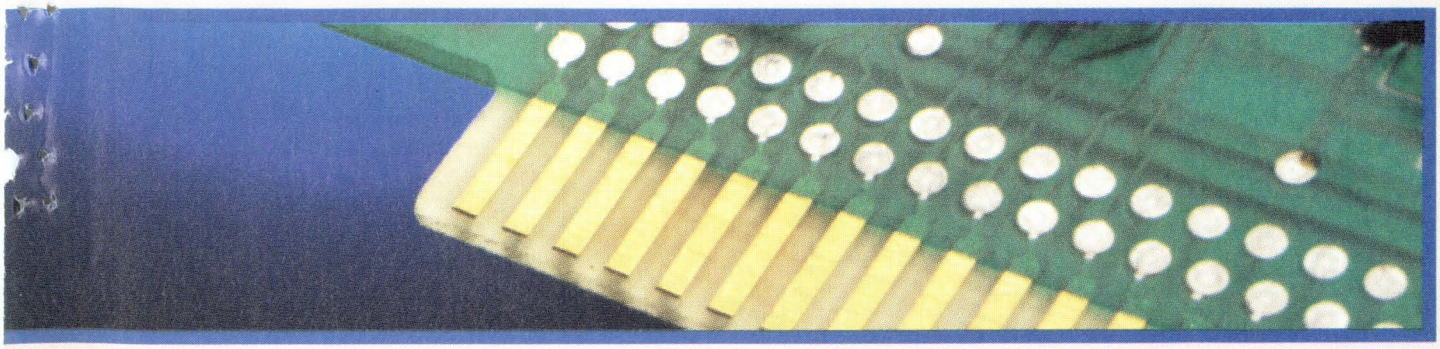


9370s, for just that reason.

Another large company, the Nielsen Clearinghouse in Clinton, Iowa, decided to develop their own software for their two 9370s, which are being used as automated front ends for its coupon redemption system. "We're just using the standard [VM] product and are writing all the application code ourselves," declares Nielsen Clearinghouse vice president James Jeremias.

The coupon redemption system, the front end of which is known as Project Leapfrog, will be installed at the company's nine data entry sites throughout Mexico. The 9370s will be used as file servers connected to PCs via IBM token ring networks. Nine or more 9370s will eventually be used in the system. Jeremias expects the setup to increase both the speed and quality of the coupon editing and validation process.

Nielsen's vendor choice boiled down to IBM and Digital Equipment Corp. IBM won out in the end because of its strong reputation for service and because of its competitive pricing. "We saw the 9370 as a cost-effective means to create a distributed system," sums up Jeremias.

Writing from Scratch

GTE Data Services Inc. (GTEDS) in Tampa, Fla., is also using the 9370 in a distributed system that it's building and running for TCOM Systems Inc., an electronic mail vendor in Washington, D.C. GTEDS, which has 26 IBM 9370s, is using one of the superminis in its own software development laboratory in Tampa.

Like Nielsen Clearinghouse, GTE Data Services is also writing from scratch most of the VSE-based software for its 9370 project. Sheldon Danto, GTEDS's business manager on the project, reports that so far 144 applications have been developed as part of TCOM's High Priority Mail system. These applications, according to Danto, "commingle IBM software with some third-party software [and] with our own applications."

This hybrid software, Danto explains, can handle a wide range of electronic mail functions. It can facilitate the composition of free-formatted information into formatted letters, transmitting this data to regional operating centers. It can also initiate the printing of that information on high-quality laser printers. TCOM's electronic mail system, designed by GTEDS, was scheduled to be operational last month.

Why did GTE Data Services go with the 9370s, which require so much custom software work? Apparently, the company knew exactly what it was doing and had the resources and wherewithal to do it. "Before we chose IBM, we looked to see what [9370] tools and software were available and what we'd have to develop," says Danto. It was clear that the company couldn't go to third-party software houses to get software for machines that hadn't even hit the market when TCOM issued its original request for proposals a year ago. "We couldn't just call up XYZ company and ask them what they had available" in the way of software for the 9370s, says Danto.

During that early stage, IBM was still in the developing and cataloguing mode. Nonetheless, Danto points out, GTEDS "managed to develop certain software even before the product [the 9370] was available to us." He adds that now even "IBM is coming back and asking us how we're doing things."

Whether or not smaller companies with less clout and resources than GTEDS can achieve the same kind of success in their applications software efforts remains to be seen. The lack of an applications portfolio for the 9370 may be a substantial drawback for medium- and small-sized firms approaching IBM for the first time in search of departmental computing solutions.

IBM maintains that its 9370 software strategy is simple. Others think it is simply not defined. VSE and VM are IBM's operating systems of choice for the line. As with other System/370 computers, various models of the 9370 are able to run IBM's VSE, VM, MVS, the Unix derivative IX/370, and a version of Pick available from The Ultimate Corp., East Hanover, N.J. As a result, software that runs on its 3090 and 4300 series mainframes is completely portable to the 9370 environment, according to IBM.

The computer giant also claims that there should be no lag time between hardware and software availability—a perennial problem that haunts most vendors when they introduce new lines. At the same time, however, IBM also has acknowledged that it will need to expand the type and quantity of applications beyond what's currently available for the other System/370 machines if it hopes to sell 9370s to smaller users. In fact, one of the primary charges of its newly formed Applications Systems Division will be to beef up its software offerings for all of its midrange processors, including the 9370s.

In its product literature, IBM calls the 9370 "a fully integrated hardware and software solution for your computing needs . . . interactive or batch, commercial or computer intensive, cooperative, or standalone." Yet IBM's initial failure to make adequate communications facilities available for the machines stood in direct contrast to this marketing message.

Even after IBM's slew of connectivity announcements last summer, "a key

FIGURE 1 Price/Performance of the 9370 and the VAX

(*$ THOUSANDS)

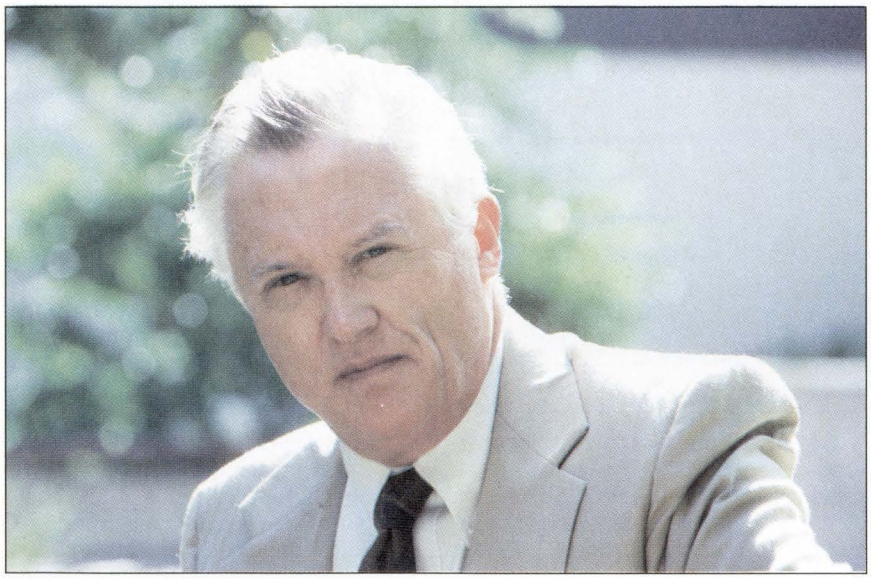
SYSTEM	MIPS	PRICE* (MIN. CONFIG.)	PRICE* PER MIPS (MIN. CONFIG.)	PRICE* PER MIPS (PROC. + 2MB)
9370-90	2.9	190	66	60
9370-60	1.5	93	64	54
9370-40	0.6	65	108	83
9370-20	0.5	31	62	52
VAX 8800	9.6	836	87	74
VAX 8700	6.0	546	91	75
VAX 8550	6.0	446	74	62
VAX 8530	4.0	303	76	58
VAX 8350	2.0	100	50	21
VAX 8250	1.2	68	57	28
uVAX-II	0.9	29	32	19

9370 MIPS and VAX MIPS are derived from vendor statements on performance of their own products and are not necessarily comparable.

Price/Performance for Proc. + 2MB of memory is not an offered configuration but is used for processor-only price/performance comparisons.

Source: Gartner Group Inc.

TEXACO'S McDONALD: He doesn't foresee difficulties, because "we aren't a heavy VM user."



NIELSEN CLEARINGHOUSE'S JEREMIAS: "We're writing all the application code ourselves."

Photographs by Janice Rubin/Black Star (top); Michael Minardi (bottom)

missing element is still VM/CICS," points out Kimball Brown, an analyst with Dataquest Inc., San Jose. IBM, which has promised VM/CICS for the end of the year, has left users with no alternative other than running CICS via VSE, an option "that gets expensive for distributed applications," Brown notes.

Is 9370 Ddp Possible?

Whether or not true distributed processing is possible in the 9370 environment is still another question. Gig Graham, an analyst with the Gartner Group, Stamford, Conn., says that "nothing's happened yet that would enable the [9370] machines to run new types of applications," especially distributed ones. This distributed processing turf has already been claimed by DEC with its VAX family, which has a proven track record running departmental applications.

Similar distributed applications "for the 9370 are still years away," claims Graham. Until then, "IBM is probably just going to bring its existing 370 applications down to the 9370," he predicts.

The total number of System/370 packages available from IBM and third-party vendors is unknown. What is known is that there are far more VSE-based applications than VM-based ones. This particular VM software shortage could prove deadly if, as Dataquest's Brown suggests, IBM ultimately intends to make VM the primary operating system for all of its hardware, microcomputers through mainframes.

A year ago, at the same time that it orchestrated its initial 9370 announcement, IBM also introduced some communications, graphics, and other enhancements to VM release 5. It also debuted seven new optional VM applications: ACF/VTAM, NetView, QMF/VM, AS, VSE/VSAM, ACF/NCP, and the Profs Note Maintenance Facility.

What IBM is doing beyond this in terms of specific 9370 applications development remains a secret. It's a sure bet, however, that Big Blue will be fortifying its office automation and factory automation offerings, since these are two of its main application areas for the 9370. In addition, most industry watchers agree that a few vertical niches, especially banking/finance, automotive, and retail, are ripe for cultivation by IBM. The company could pursue those niche opportunities through internal development efforts, primarily in the form of SolutionPacs (packaged offerings of hardware, software, services, and training), or through third-party marketing pacts.

Tari Schreiner, vp of the System Products Division of Computer Associates International Inc., a Garden City, N.Y., vendor of IBM software tools and applications, believes that IBM is currently in the process of assembling specific SolutionPacs, "enabling it to be a one-stop shopping place for hardware and software."

Schreiner says that IBM is also relying on its growing pool of third-party vendors and value-added resellers "to provide solutions for any and all marketplaces." As part of this trend, IBM can be expected to continue to encourage partners through its Marketing Assistance Program, Industry Marketing Assistance Program, and other reseller arrangements.

One of the first of these arrangements applicable to the 9370 occurred in late April, when IBM and Lotus Development Corp., Cambridge, Mass., finalized a deal to develop a 370 version of the popular 1-2-3 spreadsheet. Some industry analysts and software vendors have questioned the value of such a 370 product. Not, however, Patrick McGraw, an International Data Corp., Framingham, Mass., research consultant who reports that "several users have told us that Lotus 1-2-3 was one of the main reasons for

their ordering 9370s."

In another new twist, IBM is recruiting vendors that are experts in what Computer Associates' Schreiner calls the "oem conversion marketplace." According to Schreiner, IBM has a total of 96 agreements with companies of this type. The deals call for the firms to modify vertical packages running on IBM 4300s and other systems from companies such as DEC, Data General, Prime Computer, and Wang Laboratories to run on 9370 machines.

As expected, mum's the word at IBM on any of these new software twists and turns. But one of Schreiner's gang of 96 has recently surfaced: Pick value-added dealer The Ultimate Corp. A little more than a month ago, IBM and Ultimate were expected to put the finishing touches on an agreement under which Ultimate will resell nearly 1,000 IBM 9370s each year for the next few years.

Ultimate will outfit the systems with its version of the Pick operating system, complete with its proprietary relational database management system. It will then distribute the souped-up systems through its own dealer network, which comprises 140 outlets worldwide. Ultimate's installed base of 6,000 machines includes systems from DEC, Honeywell Bull, and IBM. Its dealers provide applications ranging from energy management to hotel management.

The New Jersey company claims to have orders for 60 IBM 9370s. It anticipates that it will finish migrating its Pick system to the machines this month. Work began back in January when it received two 9370s as part of IBM's early support program.

"Traditionally, IBM hasn't been very good about dealing with vars," admits an Ultimate spokesperson. That tradition has been overturned with the 9370 deal, says the spokesperson. "High-level IBM executives have been out to see us. Even though IBM is the biggest computer marketing organization in the world, we're better equipped to sell to the small and midsize markets this machine is targeted at."

As expected, the independent software vendors are also paying a lot of attention to the 9370. Most seem to be treating the line as a welcome extension of the System/370 family, but one requiring little fanfare from a software standpoint. Others, such as Applied Data Research Inc. (ADR), a Princeton, N.J., subsidiary of Ameritech Inc., have made formal announcements that their existing products are fully operational on the 9370 family.

GTE'S DANTO: "IBM is coming to ask us how we're doing things."

ADR Claims Five Major 9370 Orders

ADR's claim is well substantiated. Last May, it received an IBM 9370 Model 60 under IBM's early support program. In late August, it completed "certification" of its Ideal and Datacom DB tools, as well as other database management and software tools. By that time, the software company already had five major orders in hand for its 9370 versions, according to ADR chief operating officer William Clifford. One of those customers is Triad Systems Corp., a Sunnyvale, Calif., company that sells hardware and software to special industry segments. Triad is using Ideal and Datacom DB to build a 9370 VSE-based warehouse management system for the automotive parts market.

Clifford acknowledges that ADR "did have to streamline some of our installation procedures" in order to get its VM-based packages to run on the 9370. "But we suspect that there will be other software companies that will need to downsize or streamline their [entire] products." The need for such retrofitting strongly suggests that not all System/370 applications are truly portable to the 9370 superminicomputer, as Clifford points out.

A spokesperson for Cullinet Software Inc., Westwood, Mass., echoes Clifford's concern. While Cullinet's various database, manufacturing, and other IBM mainframe packages already operate under VM, "a glitch may come in trying to run them on the smaller [9370] models that don't have the same processing power," the Cullinet spokesperson says. The company has yet to take IBM up on its offer to select users and developers to test run their applications on 9370s installed at its Dallas-based data center. Cullinet, according to the spokesperson, hasn't yet felt any 9370 demand from its customers.

Meanwhile, Computer Associates has decided to update several of its applications to take advantage of the operating system enhancements that IBM announced in conjunction with the 9370s last October. Currently, says Computer Associates vp Schreiner, "We are speaking with companies and end users who are creating specialized systems about supplying them with a number of necessary software pieces."

Indeed, many smaller companies, unable to go the do-it-yourself route, will probably be needing some of those "software pieces" if they are to take full advantage of the distributed computing power IBM is touting for its fledgling 9370 family. ■

Mary Jo Foley is a business and technical writer based in Washington, D.C.

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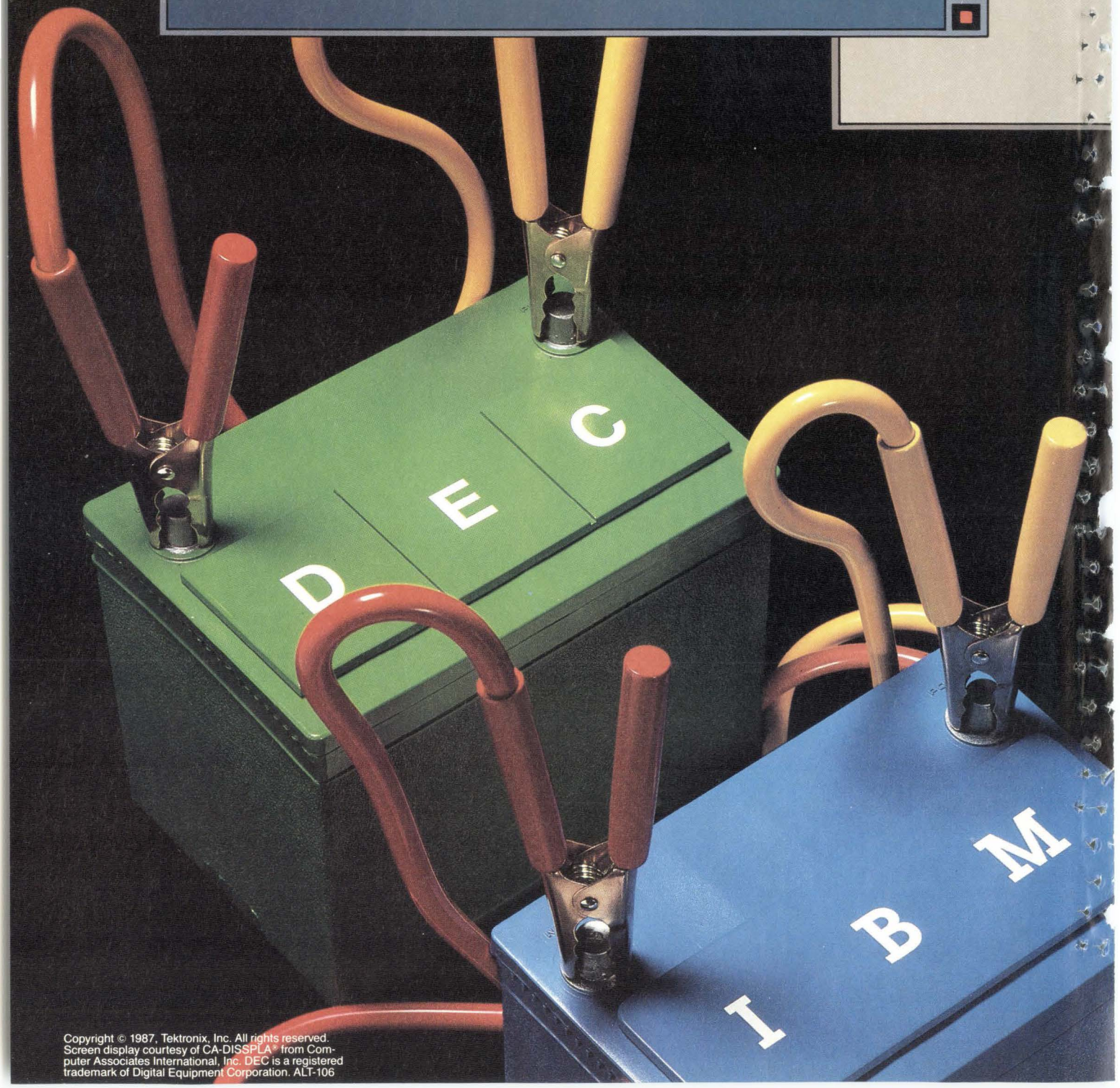

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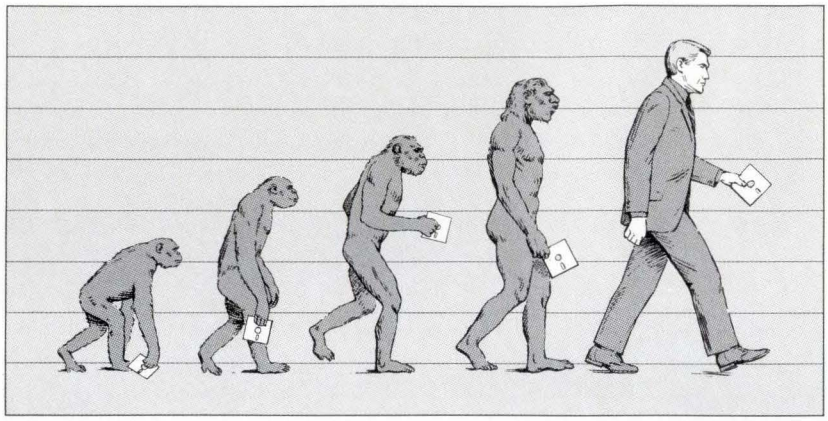

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Novell, Inc., manufacturer of the NetWare® operating system, has taken the first step in providing data protection for your company. Now you can create fault tolerant systems from affordable, off-the-shelf components. Novell's System Fault Tolerant (SFT™) NetWare, coupled with an uninterruptible power supply, can protect LANs from virtually all system failures.

What It Does

NetWare fault tolerance can be divided into two categories; software-based protection and hardware-based protection. Because Novell feels so strongly about the fundamental need for data protection, fault tolerance is included in all NetWare to some degree. Advanced NetWare 286 v2.1 contains features ensuring that files can be read after they are written, and redundant copies of directories are routinely made.

HOT FIX,™ another standard fault tolerance feature on the v2.1 release, detects disk media errors before data is sent to a flawed area. What might have been sent to a bad spot, then garbled, is saved to a designated "safe" spot by NetWare's HOT FIX feature.

SFT Level II fortifies system integrity further by adding hardware duplication. Level II backs up your system's entire hardware channel with another identical channel. Thus, if a component, such as the hard disk, fails on the main channel, the reserve automatically takes over operation. And no data is lost.

Level II also automatically copies all data to both hard disks, so that data can be recalled from the backup in case of any kind of recall problem on the original disk.

The TTS Option

SFT NetWare Level II also offers, as an option, the Transaction Tracking Service. TTS acts as a vanguard to database integrity by guaranteeing that all transactions are completed before allowing the application to advance.

For instance, if you are operating a database and the power goes out, bringing down your workstation, chances are you will get caught in the middle of a transaction. When you resume operation, you have to go back and find where you were, and hope that the database is still intact.

Imagine how complex this gets when a network goes down: ten to twenty people are working on the same database, all at different stages, when it goes down. Trying to reconstruct all transactions within this database could take days. And your database could still be corrupt after all that work.

TTS does not allow this to happen. If a transaction is interrupted before completion, TTS brings the application back to the end of the last completed transaction, and begins the incomplete transaction over again. Nothing is ever left out.

Natural Selection

Offering such important benefits, it would seem that the SFT Level II operating system would be a natural selection for almost any business. Of course, not everyone is going to agree.

But there are others who appreciate how important an edge can be in this competitive world; they know that a difference of just 10% can mean the distinction between pinstripe and primate.

And these are the people who will appreciate SFT NetWare—they don't need to hear bells and whistles to see the advantage their company gains from secure data and near non-stop processing.

For literature and more information on Novell's System Fault Tolerant NetWare, call 1-800-LANKIND.

For more information, call from your modem 1-800-444-4472 (300-1200 baud, 8 bit, no parity, 1 stop bit) and enter the access code NVLRSFT2 when prompted.

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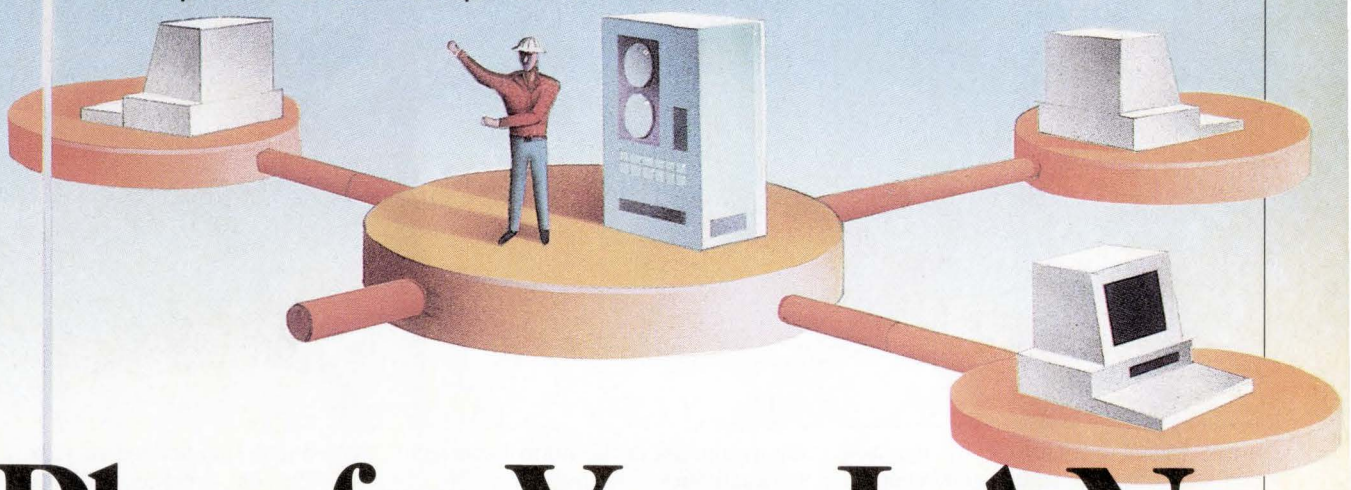
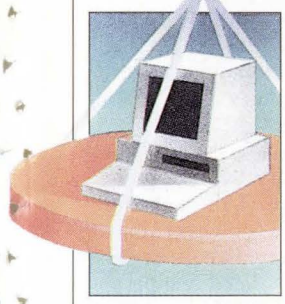
In this first of a two-part article, 10 steps are recommended for companies planning to implement local area networks. During this crucial planning phase, organizations should understand the communications boundaries and the information management and security objectives of their firms. Those objectives call for flexible LAN solutions.



Plan for Your LAN



BY MARTIN PYYKKONEN

Taking control of a local area network (LAN) before it's installed is a crucial—if often neglected—practice. But be warned: as LANs become both more complex and increasingly integral to a company's ability to do business, inadequate planning will almost surely lead to big problems down the road.

By weighing end users' needs against the constraints and goals of the organization early on, the benefits of LANs can be yours (see "Master Plan for LANs," Nov. 15, 1986, p. 91). It's important to remember that although the theory behind planning a LAN may seem reasonably straightforward, there's no getting around the fact that careful research, design, and execution are all requisites for success.

An examination of the many end-user consulting jobs conducted by Arthur D. Little Inc., Cambridge, Mass., reveals 10 strategic steps to picking the right LAN. While the importance of each step varies depending on the potential user, in total they represent the essential considerations.

Understand local versus nonlocal communications boundaries. At a minimum, a LAN should be planned and designed so that 70% of the information flow is contained within the network and only 30% crosses the network boundaries. Efficiency of the network's scope increases further if the ratio can be pushed to 80% local versus 20% nonlocal.

It often proves impossible to put this into practice, however. The ratio of information flow is a difficult notion to quantify, and communications boundaries may not directly track organizational boundaries. If a 70% to 30% boundary cannot be defined, then it will be necessary to plan a LAN on the basis of local geography. This means that defining the network on the basis of single or multiple LANs per floor of a building will depend on such factors as the terminal population to be served and the location of centralized resources that are to be shared.

Go with a flexible solution that can accommodate changes. Even the most accurate and elegant networking solution for today's needs is likely to become less than ideal when faced with modifications in the end-user environment. In most offices today, as many as 30% of all terminals are moved and modified each year. A flexible LAN is necessary to accommodate these changes on an ongoing basis without severely disrupting business activities.

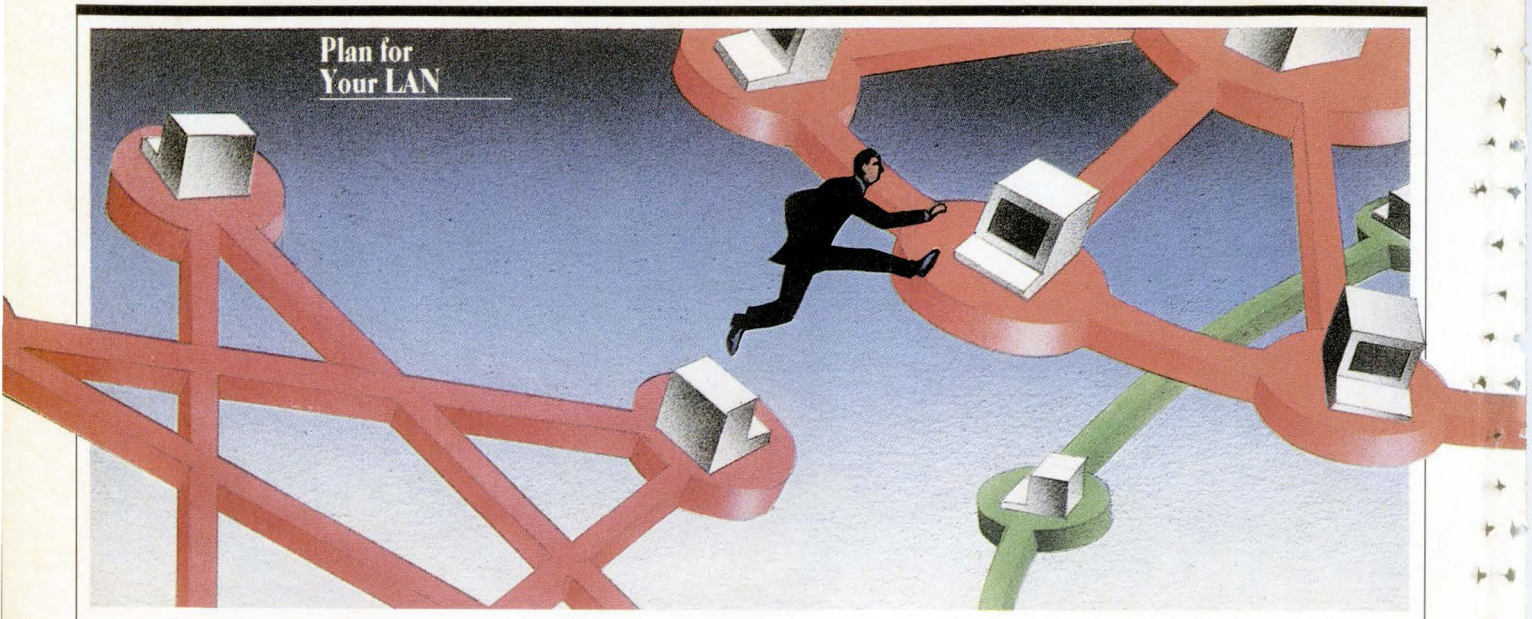
Understand information management and security objectives and limitations. Each end-user organization knows implicitly the general requirements for the optimum level of centralized information management as compared with the less structured and less secure conditions that accompany broader distribution and control. A LAN, if properly specified, can make information management at a network level more secure and, at the same time, acceptable to the user population.

Individuals often perceive "holding information" as holding power or authority in the organization. Organizational politics therefore can get in the way of the LAN advantage as many pc users believe they can build their own information empires.

The information security issue usually involves policies of internal access between several departments within a company and the extent to which highly proprietary or sensitive data must be protected. A LAN is certainly not the solution by itself, but it can be one more component of the solution to internal information security. Of course, the security of information from external access is critical as well, but that is generally beyond the scope of a LAN.

Analyze the costs and benefits of installing several small LANs versus a few big LANs. It is hard to generalize whether a large number of LANs with fewer users per LAN is better or worse than a smaller number of LANs with a higher concentration of users per LAN. A conservative approach that many organizations find most comfortable is a compromise. The most successful decision is typically that which is consistent with the organizational boundary considerations outlined in step one.

Ascertain end-user applications



needs. Planning a LAN for an organization's benefit must address end-user application needs and cannot be simply an academic exercise in architectural design of a network topology. The most significant end-user activity that typically needs to be addressed is that of file transfers. Characteristics, including average file size, transfer frequency, peak activity periods, and source and destination points within and beyond the LAN boundaries must be accumulated on a network basis in order to choose the most efficient LAN solution.

Get a fix on access and response time requirements. In some applications, users can tolerate random network contention when trying to gain access to the LAN. Those who require real-time information, however, will need to be guaranteed network access within a short period of time after requesting it. A network's access protocol must be selected (for example, statistical/probabilistic versus token passing) that is consistent with individuals' requirements and the total volume of users.

Determine the impact of resource sharing. The first justification for sharing resources over a network is that the peripheral devices are too expensive to be purchased individually for a large number of users. Examples of such peripheral resources include optical disk storage and high-quality printers. Other resources that can be shared efficiently include mainframe storage/processing, licensed software database packages, and internal archival database storage (for example, historical data on cost/volume trends in office or factory environments).

The benefits of resource sharing can be quantified and are usually substantial. But beware of the danger that can come from spreading these resources too thin. Frequent user requests for these resources can lead to a lack of available resources in the normal course of work activities.

Assess the availability and the limitations of network software. Gone are the days when LANs were differentiated solely by type of transmission media, such as twisted pair or coaxial cable, and network access protocols. While these should still be considered in any comprehensive plan, a more important distinction is derived from the availability of appropriate software for network applications (see "Group Productivity Software," Dec. 15, 1986, p. 79).

Users with high-end application needs, for example, should check for the availability of TCP/IP in order to realize a high-performance advantage. Another important example of software-based differentiation is network management, which includes the ability to gather statistical performance data and generate reports. Among those important functions that directly affect end users are file locking and restricted access.

INADEQUATE PLANNING WILL CAUSE PROBLEMS.

Software performance increasingly will be the key differentiation factor in the near future, particularly as a result of the distinctions between OSI and non-OSI-compatible software.

Estimate bandwidth requirements in an aggregate sense and as a function of daily peak periods. If possible, end-user applications requirements should be collected and summarized to yield a perspective on average total bandwidth requirements. From this, an appropriate mix of number of data channels and individual channel speeds can be selected.

Often, peak periods will exceed the average bandwidth requirements. A typical example is the downloading and uploading of large working files at the beginning and end of the workday. In the office, this would apply to a LAN configured as a program development center, while in the office or factory it would include CAD/CAM work centers.

Most of the available LANs will not be economical if they are overdesigned for peak period activity. The declining price of fiber-optic LANs, however, may make it possible within two years to design networks that are priced comparably to today's networks and also provide high bandwidth available "on demand" during peak periods (see "Standards: The New Fiber Diet," March 15, 1987, p. 60).

Ascertain support and maintenance needs. As would be expected, the application scope and management complexity of any network increases proportionally. Far too frequently, users fail to understand the internal staffing requirements that will be required to maintain the network after initial installation, and, by default, become too reliant on third-party maintenance and support contracts.

For information on putting LAN plans to work, see the next issue (Nov. 1) for the second part of this article.

Martin Pyykkonen is a senior consultant specializing in data communications with Arthur D. Little Inc., Cambridge, Mass.

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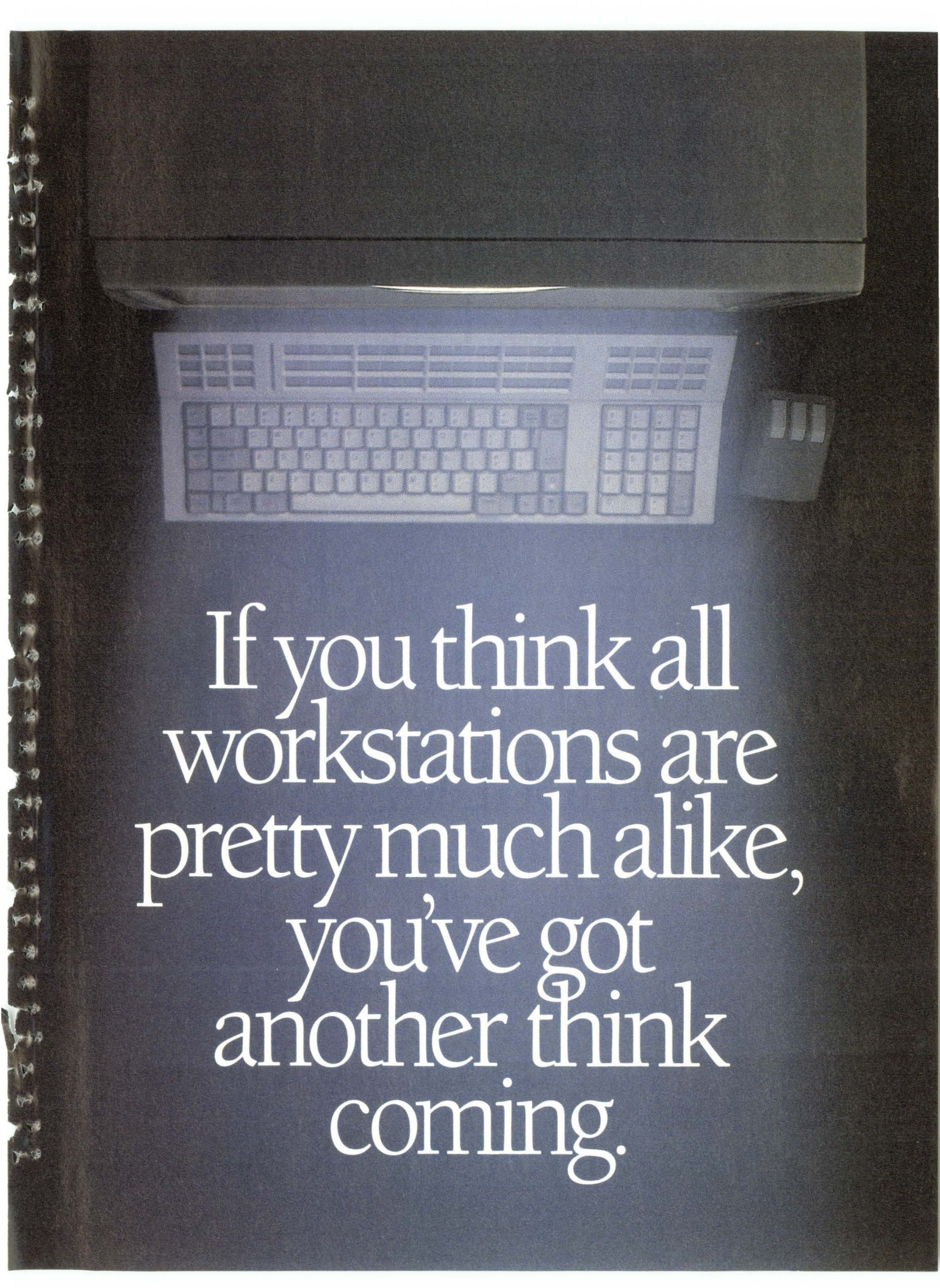
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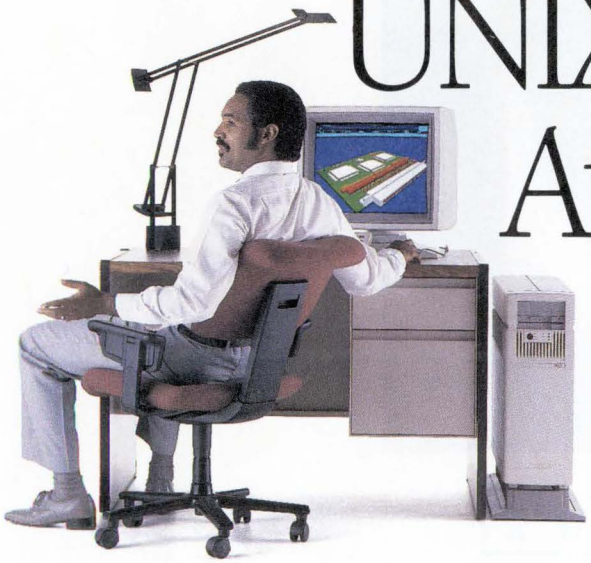

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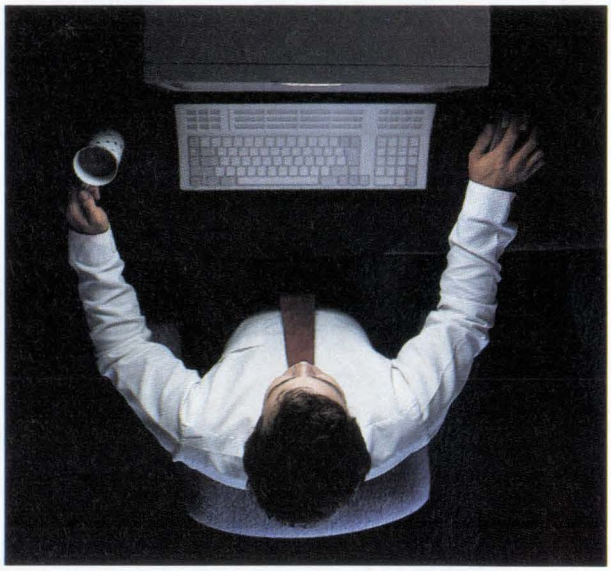
CPU	Five MIPS CPU					
RAM	8 – 16 MB*		16 – 80 MB		16 MB	16 – 80 MB
Graphics Image	GS 32 colors/4096 25,000 vectors/sec	GX 512 colors/16 million 100,000 vectors/sec Double Buffered		GZ 512 colors/16 million 100,000 vectors/sec Double Buffered	N/A	
Processor	80186 1/2 MB memory Asynchronous SCSI 1.2 MB/sec		80386 2 MB memory Synchronous SCSI 4 MB/sec		80186 1/2 MB memory Asynchronous SCSI 1.2 MB/sec	80386 2 MB memory Synchronous SCSI 4 MB/sec
Disk	*156 (up to 7 x 156)					
Floating-Point Engine	N/A			Pipelined, double-precision FPE, 8 MB memory, 1 MB writable control store, 22 double precision megaflops processor	N/A	Optional
VME Card	N/A	Optional Card Adapter				
Operating System	UNIX System V.3					
Networking	IEEE 802.3 (Ethernet) with XNS, TCP/IP					
Network File Access	NFS, RFS (Optional)					
Windowing	Environ V (Standard) and X Windows (Optional)				N/A	

*32C models come with standard 6 MB memory and an 80 MB internal disk drive.



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Circle 49 on Reader Card

Real Time

OFF-LINE

ONE OF THE MORE innovative and interesting products introduced this fall is a small, handheld optical character recognition (OCR) device; its price and ease of use could very well make OCR technology available to any pc user. The product, the TransImage 1000, was introduced at this year's Pc Expo in New York by a Sunnyvale, Calif.-based startup called TransImage.

OCR devices have been kicking around since the 1960s. But, says Frederick Snow, president of TransImage, "The technology has been one of those areas that has never lived up to its promise . . . text input is pretty much the only area that remains unautomated." Snow says his company's initial product will address the "keyboard/input bottleneck."

TransImage has not reinvented the wheel with its system. The machine basically has the same capabilities as the desktop, omnifont (multifont) OCR devices offered by such vendors as Kurzweil and Palantir. However, their devices sell for $10,000 and up, while the TransImage 1000 is priced at $2,595.

The TransImage 1000 reads fully formed characters from fixed pitch, proportionally spaced, typeset, typewritten, near-letter-quality, and laser-generated documents. It is capable of reading type sizes that are between eight and 14 points. The slim, lightweight design of the reader allows users to scan text from bound books.

The complete system consists of the handheld scanner, a microprocessor board, and system software. It is designed for use with the IBM PC, XT, AT, PS/2 Model 30, and compatibles. The scanner has six function buttons that act as macros and can be set to act as any key or combination of keys. The scanner works interactively with the keyboard.

The company is targeting desktop publishing as a prime market for the TransImage 1000. The device will allow users to do electronic cut and paste. TransImage claims that a nontypist will see an eight-to-one improvement in his or her text input speed using the handheld scanner.

TransImage is marketing the scanner through vars and is also offering the board separately. The board can be used with other vendors' handheld or page readers.

HARDWARE

Hewlett-Packard Expands Microcomputer Line

Rolls out new Vectra pcs, workstation terminals, and portables.

BY THERESA BARRY

Hewlett-Packard has expanded its commercial microcomputer workstation family by introducing terminals for non-HP environments, as well as additional HP terminals, two new portables, and three new series of pcs.

The HP 700 display terminals are for IBM, Digital, and general purpose ASCII environments. All have 14-inch diagonal screens (amber or green) with tilt-and-swivel monitors and adjustable keyboards.

The HP 700/41 is ASCII compatible and, priced at $375, is an entry-level terminal. It's compatible with terminals by Wyse, TeleVideo, ADDS, Lear Siegler, Qume, and Hazeltine. The keyboard has 58 programmable keys and 16 function keys. The 700/22 is compatible with Digital's VT220, VT100, and VT52 terminals and others following the ANSI 3.64 protocol. It has a four-page memory display, and the keyboard has 106 keys and twice as many programmable keys as Digital's, according to HP. It's priced at $575. The 700/71 is compatible with the IBM 3191 Model A or B in a 3270 Information Display Systems environment. HP claims the half-dot shift and larger screen of the 71 make it more readable than the IBM counterpart. The keyboard has 122 keys or 102 keys, in the same arrangement as IBM's. The price is $695. The 700/92 and 700/94 are for HP computing environments, and replace the HP 2392A and 2394A. They're priced at $895 and $1,095, respectively.

The HP Portable Vectra CS and the HP Portable Vectra CS Model 20 are the company's two new portable pcs. Both are based on an Intel 8086-compatible CMOS microprocessor. The Vectra CS is battery-powered and offers four internal I/O slots and two 1.44MB flexible disk drives. A battery charge runs for 10 hours and a fuel gauge indicates the remaining charge. The CS Model 20 has a 20MB hard disk and 1.44MB flexible disk drive. While both come standard with 640KB of memory, up to 6MB of RAM can be added to the CS, and up to 4MB to the hard disk model. Each has a removable, 12-inch diagonal liquid crystal display, based on supertwist technology. A full-sized, IBM PC AT- and PS/2-compatible keyboard features 92 keys and 12 function keys. The Vectra CS is priced at $2,495, and the CS Model 20, available by year-end or early '88, is $3,595.

Also new from HP are the Vectra CS line of 8086-compatible, entry-level desktop micros. Six models all include

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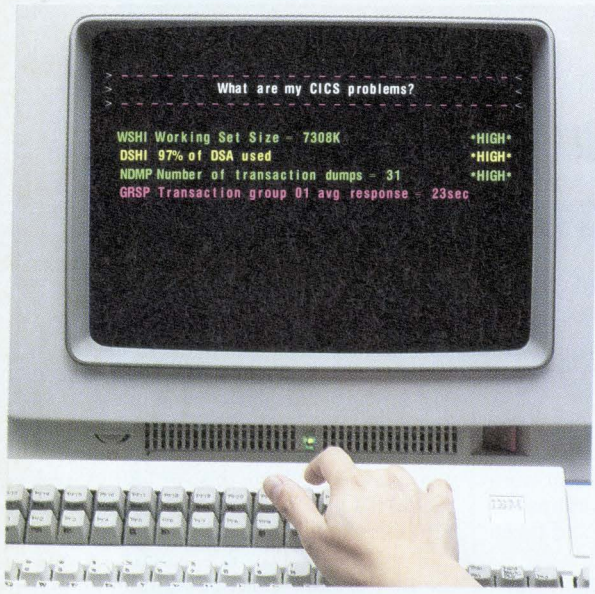
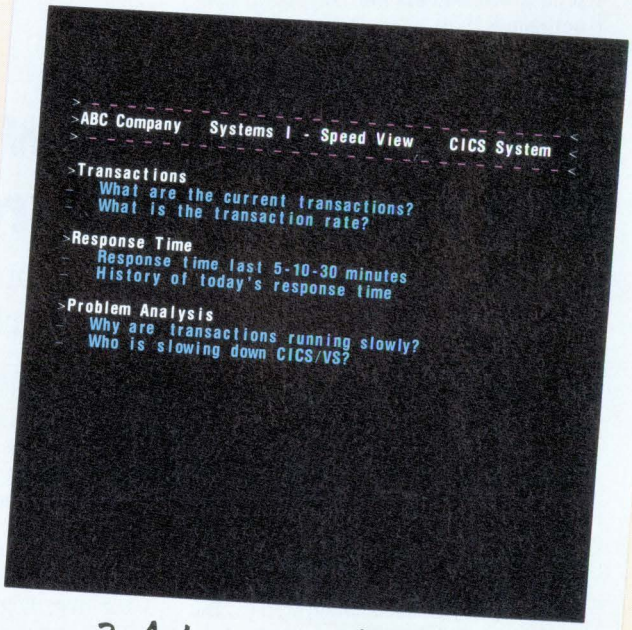


1. Identify a potential problem with Exception Analysis.



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Circle 50 on Reader Card

built-in RS232C and parallel ports and flexible disk controllers. All provide 640KB of RAM and range from a single flexible disk drive capacity to a flexible disk/hard disk model with an EGA. Prices range from $1,195 to $1,895.

The HP Vectra ES and ES/12 pcs are desktop systems based on the Intel 80286 microprocessor and are enhanced versions of the original Vectra pc. The ES is available in four models, all with built-in RS232C and parallel ports and both flexible and hard disk controllers. Prices range from $2,595 to $2,795. The ES/12 is available in seven models with the

same features. Models range in price from $2,995 to $4,195.

The HP Vectra RS series is the most powerful and expandable of the Vectra family. The units are floor-standing and are based on the Intel 80386 microprocessor. The RS/16 is available in one model, which has 1MB of RAM with 384KB reserved for system memory. It also has one 1.2MB flexible disk drive and one 40MB hard disk drive. The price is $6,495. The RS/20 is available in four models, ranging from the Model 40 with 1MB of RAM, one 5¼-inch 1.2MB flexible drive, and one 40MB hard disk drive, to the Model 300, which has 2MB of RAM, one 5¼-inch 1.2MB flexible disk drive, and one 310MB hard disk drive. Prices range from $6,495 to $11,995. All RS models will be available first quarter of '88. HEWLETT-PACKARD CO., Cupertino, Calif. CIRCLE **250**

Microsupercomputer

Single-board coprocessors for AT unveiled by Mercury.

Mercury Computer Systems has introduced the MC3200 Series of single-board, high-speed coprocessors for the IBM PC AT and compatibles. Available now is the MC3200, a 10MIPS processor that the vendor claims executes vector and scalar operations at 20MFLOPS for applications like simulation, modeling, signal processing, and image processing. A VME-compatible board is slated for availability later this year.

Mercury claims the architecture of the MC3200 is from five to 20 times faster than an 80386 in combination with an 80287 numeric coprocessor. When used with Mercury's C math library and scientific algorithm library for scalar and vector processing, the MC3200 performs at 10MFLOPS to 20MFLOPS. (The VME implementation can be used for parallel processing, says Mercury.)

A software development environment includes C and Fortran compilers, an assembler, an interactive debugger, a scientific algorithm library, and a driver/executive. The software is priced at $8,500. The MC3200 with 2MB of DRAM is $8,000, and the VME version is $2,000 more. MERCURY COMPUTER SYSTEMS INC., Lowell, Mass. CIRCLE **251**

PostScript Printer

AST also offers add-on PostScript board for previous printers.

The TurboLaser/PS from AST is a Ricoh engine-based laser printer that prints at 8ppm and provides 300dpi resolution. The $3,995 printer, geared toward desktop publishing applications, has a PostScript controller, which includes an AppleTalk port for Apple Macintosh users. AST is offering 35 fonts, all resident in ROM on the controller board.

The 12.5MHz PostScript controller board incorporates a 68000 microprocessor, 3MB of RAM, and 1MB of ROM. The input and output trays hold 250 sheets each, and the total life expectancy of the printer is 600,000 pages. The TurboLaser works with the IBM PC, XT, AT, and compatibles, and all Apple Macintosh and Digital computers.

The add-on PostScript board, which upgrades current TurboLaser printers, is priced at $1,995. AST RESEARCH INC., Irvine, Calif. CIRCLE **252**

14.4Kbps Modem

Emulex enters end-user market with new high-speed modems.

Emulex has announced the Performance 1000/14.4, a 14.4Kbps, full-duplex, leased-line modem. It is the first in a planned series of end-user data communication products for the company.

Emulex says it's hoping to replace 9,600bps modems with its product. It has produced a new design for the series, incorporating VLSI CMOS technology and a proprietary new chip. The modem has a footprint of 8½ by 11 inches and a height of 2½ inches. The Performance 1000 provides menu-driven operation through a 16-character liquid crystal display. The remote Performance 1000 can be configured and tested through the local modem's front panel without operator intervention at the far end, says Emulex, and the speed can be configured up or down according to line conditions. Trellis-coded modulation is used for a high error-correction rate and the fallback rate is extended to 12Kbps and 9,600bps as required. A third fallback rate of 4,800bps is also supported.

The price is $1,795. EMULEX CORP., Costa Mesa, Calif. CIRCLE **253**

Display Station

Epsilon has new system for desktop publishing and CAD.

The Superview 1280 full-page display system combines a 19-inch 1,280-by-960dpi monochrome monitor and a controller with CGA emulation that is compatible with popular word processing and spreadsheet applications. It contains drivers for compatibility with GEM, Microsoft Windows, Autocad, Xerox Ventura Publisher, and the Aldus Pagemaker.

The complete display system, including monitor, controller, cables, and installation utilities, is priced at $2,395. EPSILON GRAPHICS SYSTEMS, Santa Ana, Calif. CIRCLE **256**

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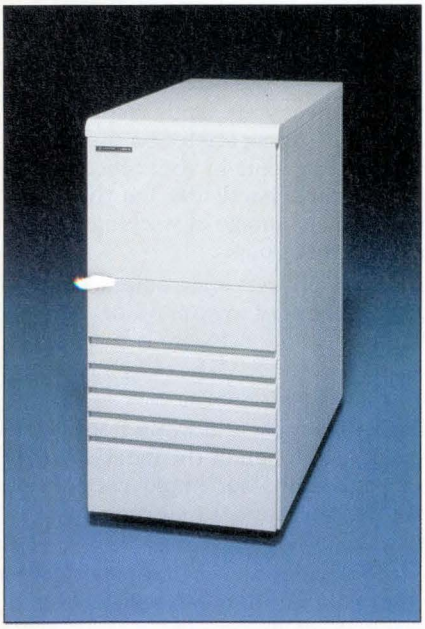
Unix Supermini

Harris adds entry-level system to HCX Series.

The HCX-5 is Harris Corp.'s newest member of the HCX Series of Unix-based superminicomputers, joining the HCX-7 and HCX-9 systems. The new system was designed for transaction processing, database management, scientific computing, and CAE applications, says Harris.

The new machine has a 32-bit processor that performs at 5MIPS. The I/O subsystem uses a 40MBps VMEbus, called the Harris VME (HVMS). Harris says the HVMS is fully compatible with standard VME hardware, and that it can accommodate a Harris-designed disk controller to further boost I/O performance.



The HCX-5 is object-code compatible with other HCX members. Harris says it can serve as a departmental computer linked to pcs, terminals, and engineering workstations; as a file server; or as a gateway to other superminis and mainframes. Up to 128 users can be supported. The new Unix-based supermini supports Ethernet LANS, NFS, Unix remote functions, X.25 wide area networks, DARPA Internet protocols, and IBM BSC and SNA. Both AT&T's Unix System V.2 and Berkeley 4.2 BSD environments can be accessed.

The basic system, including a proprietary 32-bit processor, eight-slot HVMS, 4MB of memory, console processor with crt and modem for remote maintenance, asynchronous I/O controller, synchronous I/O adapter with eight RS232C ports, a 32-user HCX/UX Unix license, and a C compiler, is priced at $124,500. Shipments began this month. HARRIS CORP., Computer Systems Div., Fort Lauderdale, Fla. CIRCLE **254**

Laser Printer

Talaris offers new printer designed for multiuser environment.

The Talaris 1590 is the first based on the company's new controller, called the Talaris 1590 Printstation Control System (PCS), which is designed for the multiuser environment.

The PCS has two processors: a Texas Instruments Graphics System Processor (TI34010) for raster image processing, and a National Semiconductor 32016, which manages I/O and interprets commands. Memory can be expanded from 3MB to 5.5MB. The printstation uses Talaris's Extended Command Language and has extensions to support emula-

tions, page description languages, and graphics. The architecture also uses the ANSI Small Computer Systems Interface (SCSI), which permits the printstation to accept data from host networks at 1.5MBps. An RS232C and RS422 interface and a Dataproducts parallel port are also featured. A Centronics interface is optional.

The 1590 Printstation prints at 15ppm, says Talaris, and comes standard with 40 fonts stored in ROM, all of which can be printed in both portrait and landscape. The engine is a Ricoh LP4150. The price is $8,490. TALARIS SYSTEMS INC., San Diego. CIRCLE **255**

Monitor

Mitsubishi Electronics introduces VGA-compatible model.

The XC-1429C from Mitsubishi Electronics is a fine-dot-pitch IBM PS/2 VGA-compatible monitor. It features a 14-inch screen with a .28mm fine-dot-pitch crt and horizontal scanning frequency of 31.5KHz. Resolution is up to 640 by 480 pixels, with a vertical scanning frequency of 60Hz or 70Hz. Mitsubishi claims the XC-1429C can display infinite colors. An RGB analog video input signal is offered and a tilt-and-swivel base is optional. The monitor costs $685. MITSUBISHI ELECTRONICS, Torrance, Calif. CIRCLE **257**

Color Printer

Tektronix offers a new 300dpi printer and a color output system.

Tektronix has unveiled a 300 dots-per-inch thermal wax color printer, the 4693D Color Image Printer, which it says is based on a new dithering algorithm for which the company has a patent pending. The printer offers full-sized images, printed from a palette of more than 16 million colors. Using an 8-bit parallel interface, the 4693D can offload images in six seconds, with a production time of 90 seconds for the first copy, and 60 seconds for subsequent copies.

A built-in frame buffer with 4MB to 12MB of memory can store as many as three images, freeing the graphics system for computing activities. A high-speed, multitasking Motorola 68020 microprocessor accepts up to 2,048 pixels by 1,536 pixels by 24 bits per pixel of image data from the graphics system at 800KBps, or up to 3,198 pixels by 2,440 pixels at lower color depth. Image processing takes place in the specialized printer rather than in the host computer or workstation, freeing the host and permitting faster data transmission to the printer.

By using a four-channel multiplexor, up to four terminals, workstations, hosts, or personal computers can be connected to the printer simultaneously. All Tektronix graphics terminals and workstations are compatible with the 4693D color printer and device drivers are available for Sun workstations and IBM ATs.

The 4693DS Color Output System, a companion product, consists of the 4693D and a Tektronix 4510A Rasterizer. It was developed primarily for the business presentation graphics market. The system produces 300 dots-per-inch output suitable for business presentations and reports.

The 4693D Color Image Printer is priced at $7,995; the 4693DS Color Output System costs $12,995. TEKTRONIX INC., Wilsonville, Ore. CIRCLE **268**

Printer Racing News

OTC Volume I, Issue #1

Announcing OTC's Triple Crown of American Thoroughbreds!

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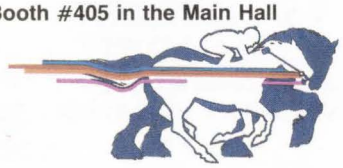

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Circle 52 on Reader Card

Who says you have to pay extra to get an ASCII terminal equipped with these three letters?

Introducing the new family of IBM 3151 ASCII displays.

Now you can have the most versatile ASCII terminals IBM has ever made, for the lowest price IBM has ever offered. Our new 3151 family gives you more functions, and greater compatibility with more ASCII host system computers, for single unit purchase prices starting at less than $400* per terminal.

Three models and up to 16 emulations make them flexible.

The entry level Model 110 comes with 10 non-IBM emulations built in, and provides an 84-key keyboard with 12 definable function keys.

The full-function Models 310 and 410 come with 11 emulations, and are easily capable of more (such as DEC VT220/100/52™ and WYSE WY-50/50+™) by simply adding a new low-cost, slimline cartridge.

Their 102-key keyboards, equipped with up to 36 definable function keys, are also recappable, so you can adapt them to fit just about any program.

We worked harder to make them easier to use.

Besides being designed for compatibility with other computers, IBM's new ASCII terminals are more compatible with people.

New 14″ flat screen displays provide a non-glare viewing surface and smooth scrolling. Our 310 and 410 models also offer a choice of 80 or 132 column displays, with crisp character resolution, in green or amber-gold.

What's more, we built the logic into the monitors, making all three models more compact and more reliable.

However, the most important feature of our new displays isn't on the screen, but above it: the IBM name. IBM provides not only a choice of a one or three year warranty, but a tradition of quality, service and support.

It's no wonder these three letters have come to symbolize so much to so many people. And at these prices, they'll be even more in demand. For additional information, contact your IBM Marketing Representative, or call 1-800-IBM-2468 for a supplier near you.

Model 310 *Model 410* *Model 110*

*Prices subject to change without notice.

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Circle 53 on Reader Card

UPDATES

THE BEST SOFTWARE SOLUTION is no solution at all for the MIS shop that can't afford the price of the product. Likewise, if a department within a large organization needs just one module in a multimodule software program, chances are that that department will have to compromise and purchase a less expensive alternative. In response to these common user woes, Project Software and Development Inc. (PSDI), Cambridge, Mass., has introduced a new pricing strategy, which they are calling user-based pricing.

PSDI is a leading provider of mainframe- and minicomputer-based project management software. Previously, a configuration of the company's Project/2 mainframe/minicomputer package, with Oracle's relational database and a Digital Equipment Corp. MicroVAX, was priced at $260,000, and it allowed for an unlimited number of users. The turnkey package that PSDI is now offering makes this all available for $99,000—a savings of 60%. The difference is that the new package allows for only two concurrent users.

PSDI's vp of operations, Bill Sawyer, says the new pricing strategy came about as a byproduct of a marketing survey the company conducted earlier this year. The survey revealed that customers wanted a system that was adaptable, customizable, and easy to use, as well as one that could be interfaced to other programs and that contained a relational database.

In order to provide all these capabilities to smaller users or departmental sites, says Sawyer, the product had to be priced differently. "The only tailoring of the product was limiting the access" of concurrent users to the program, according to Sawyer. Project/2's accounting system, which identified users by way of a password system, is now overlaid with an additional structure that allows access only to certain users. Additional users can gain access for $10,000 per user, but the price will not exceed the original $260,000 price tag.

Sawyer adds that the combination of PSDI's high-ticket software and DEC's low-cost MicroVAX also contributed to the creation of the company's latest pricing strategy.

SOFTWARE

Bestinfo's Document Management System is a high-end, pc-based electronic publishing system.

Bestinfo Adds High-End Text Publishing System

Document Management System is the company's first high-end product.

BY THERESA BARRY

Bestinfo Inc., developer of Superpage, the desktop publishing package, has come out with its first high-end, pc-based electronic publishing system, the Document Management System (DMS), which includes a new software package as well as four workstations.

DMS software provides sophisticated pagination techniques for placement of floating pictures, tables, and footnotes on multicolumn pages. Up to 10 back pages can be altered automatically to accommodate bad page breaks. Straddle heads and balanced columns are supported. Automatic numbering of sections, pictures, and footnotes is included, as are drawing tools that allow users to access drawn or scanned objects and insert them into documents. A feature called Tablemaster allows for the importation of tables from spreadsheets, databases, and word processors into a DMS document. The company claims that DMS can automatically size the imported table, convert the typographic format, add rules and boxes, and produce multiple page tables with repeated heads.

DMS software ranges in price between $595 and $8,000. It runs on the IBM XT, AT, or compatible and the Compaq Deskpro 386 or compatible. The workstations are the Writer's, the Editor's, the Illustrator's, and Production versions. Hardware/software prices range between $4,000 and $17,000. DMS supports Novell's NetWare LAN. BESTINFO INC., Media, Pa. CIRCLE **258**

Graphics Development

Lifeboat unveils tool kit for C programmers.

The Advantage Graphics library of graphics tools is for programmers working in the C language. Lifeboat says the product bridges low-level graphics, primitive libraries, and prepackaged windows managers to speed up application development. The graphics capabilities offered, says the vendor, are similar to those used on the Apple Macintosh and Sun and Apollo workstations.

Offered with Advantage Graphics is Advantage Plot, which provides support for Hewlett-Packard, Houston Instruments, and popular IBM Pen Plotters, as

well as other HPGL language-compatible output devices. Both direct plotter output and spooled plotter operations are supported.

Advantage Graphics supports the IBM PS/2 models 30, 50, 60, and 80 and the IBM PC, XT, AT, and compatibles. Supported graphics include IBM's VGA and MCGA, Video 7 Vega Deluxe, and Tseng Labs EVA/480. Supported C compilers include Lattice C, Microsoft C, and Borland Turbo C. The price for Advantage Graphics is $250. LIFEBOAT ASSOCIATES, Tarrytown, N.Y. CIRCLE **261**

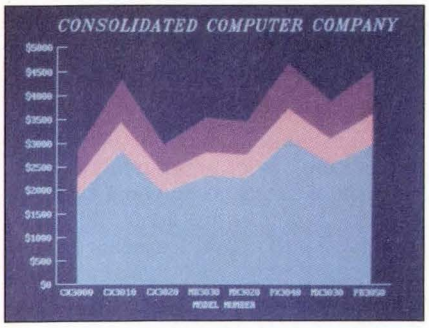
Graphics Package

Microrim rolls out business graphics for database users.

DB Graphics is geared specifically for users of Ashton-Tate's dBase, Microrim R:Base, and other database programs. According to Microrim, the package reads data from those databases directly. DB Graphics can also be used as a standalone graphics package.

DB Graphics has a selection of eight graph types, including pie, bar, high/low, scatter, area, mixed, column, and line. Seven text fonts, up to 16 simultaneous colors, dozens of format sizes, hundreds of combinations of textures and patterns, and more than 40 mathematical, trigonometric, logical, and financial operations are offered. Users can sort and group fields, create new variables for graphing, and use conditional operators to select data needed for a graph. Up to 32 windows of split-screen displays for side-by-side comparisons are possible, and manual or automatic slide show presentations are possible.

The program, which uses the



Graphics Software Systems CGI and VDI device drives, is compatible with the VGA, MGA, CGA, EGA, MDA, and Hercules display controllers. Microrim says it supports most popular plotters, graphic printers, camera systems, and laser printers. DB Graphics operates on the IBM PS/2, PC, XT, AT, and compatibles with MS/DOS 2.0 or higher for single users and MS/DOS 3.1 for LANs. It is certified for IBM Token Ring and PC Network; 3Com Etherlink, Etherlink Plus, and Token Link Plus; and Ungermann-Bass Net/One. The price is $295. MICRORIM, Redmond, Wash. CIRCLE **259**

Micro-Mainframe Link

OBS makes a native VTAM version of existing product.

Excellink/Host-V from OBS Software is a native VTAM version of Excellink, the vendor's micro-to-mainframe system for IBM mainframes and PCs and compatibles. It includes the Host Application Programming Language (HAPL), an environment for developing and running applications on the host. OBS says HAPL works cooperatively with pc-based Excellink scripts to deliver integrated, unattended operation. Through automation, users can access features of Excellink/Host-V such as the JES interface to submit, control, check status, and retrieve output from batch jobs; the utility interface to locate, rename, and view contents of host datasets; the full-screen edit interface to create, display, modify, and select from host files or job output; and the session passthru option to access other VTAM applications from within an Excellink/Host-V session. Excellink/Host-V costs $12,500 for up to 25 users. The JES2/3 interface is priced at $2,500, and the session passthru, full-screen edit, and HAPL options are $5,000 each. OBS SOFTWARE, San Francisco. CIRCLE **260**

DB2 Course

Self-study course on IBM's relational DBMS is offered.

Science Research Associates (SRA), a subsidiary of IBM, has released two self-study courses on IBM's DB2 RDBMS.

"DB2 Concepts and Facilities," an eight-hour course designed for users with a basic understanding of computing concepts, uses text, computer aided instruction, videotape, and a personal reference guide to present an overview of DB2 and related operating environments and utilities. Techniques for accessing data using SQL are discussed. It is available under license for $695 for a 60-day plan and $1,260 for a 12-month plan.

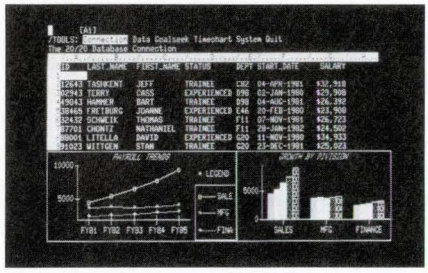
"DB2 Application Programming" is a 10- to 12-hour course for application programmers with skill in COBOL, PL/1, Assembler, or FORTRAN, and knowledge of programming application fundamentals. A two-volume reference guide explains the basics of coding, preparing, and executing programs under DB2. It costs $1,250 under license for a 12-month period. SCIENCE RESEARCH ASSOCIATES INC., Chicago. CIRCLE **264**

Interface Package

Access bridges its 20/20 spreadsheet and VAX databases.

The 20/20 Database Connection from Access Technology was designed to provide a bridge between the vendor's 20/20 spreadsheet on VAX and VAX databases. Access claims that users do not need to know a query language to retrieve database information and bring it into 20/20 for analysis.

Users access the Database Connec-



tion from within 20/20 using the /Tools command. Access says that users can build and execute database queries through spreadsheet-style commands. Windows display the available database files and fields; users need not exit 20/20. With the menus and selection windows, users can retrieve detailed or summarized data or, using the expert mode, create queries directly, without menus. The product can be used with VAX Datatrieve, Rdb/VMS, and DBMS databases. RMS files can be accessed through the Datatrieve interface. The price ranges from $600 on the MicroVAX 2000 to $5,000 on the VAX 8800. ACCESS TECHNOLOGY INC., South Natick, Mass. CIRCLE **262**

Investment Package

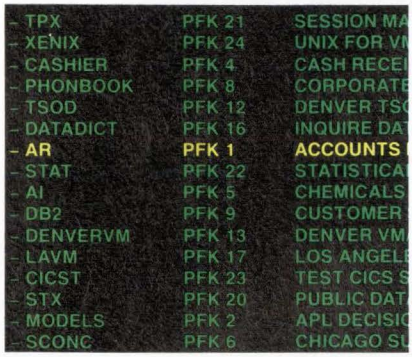
Creates simulation of the American Stock Exchange.

Blue Chip Software and the American Stock Exchange have created the micro-based American Investor program for IBM PCs and compatibles. The $149.95 package consists of a portfolio of 48 companies with options or equities listed on

The Preferred Approach to Network and Terminal Productivity

Duquesne Systems' Network and Terminal Products are installed in over 1,000 sites worldwide. When integrated, they make your network even easier to access and manage.

With TPX and Network Access, you can provide application access services that best meet the needs of your users. TPX efficiently provides multiple session management for users who need this facility.



For users who don't require session management, full security and menu services can be provided by Network Access. TPX and Network Access sessions may even be combined in the same menu. Efficient access in multiple CPU environments can be provided by the Affinity feature of both TPX and Network Access.

By giving the TPX user a session with STX, the ACL (Automated Conversation Language) feature of TPX can be programmed to connect to and access an external data network, perform a retrieval, journal the results, and then disconnect—all initiated with a single keystroke.

BEFORE

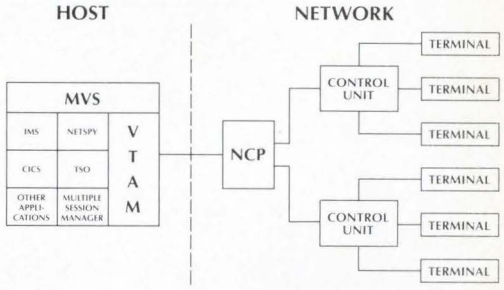
AFTER

If several STX sessions are made available to the TPX user, then X.25 session management can take place. Imagine a stockbroker with one terminal who looks up a stock quote on one application, then switches to an order entry system to buy or sell the stock.

Financial Services
Econometric Data
Electronic Mail

Medical Data Bases
Chemical Abstracts
Research and Development

Legal Data Bases
News Wires
Stock and Bond Retrieval



When using a multiple session manager such as TPX, you can access many different applications from one terminal. NetSpy has interfaces to TPX to measure true "end-to-end" response time. This information is not available from any other source.

Find out how TPX, Network Access, STX, and NetSpy can make your network environment more productive. Call us today to arrange a free, 30-day trial.

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Circle 89 on Reader Card

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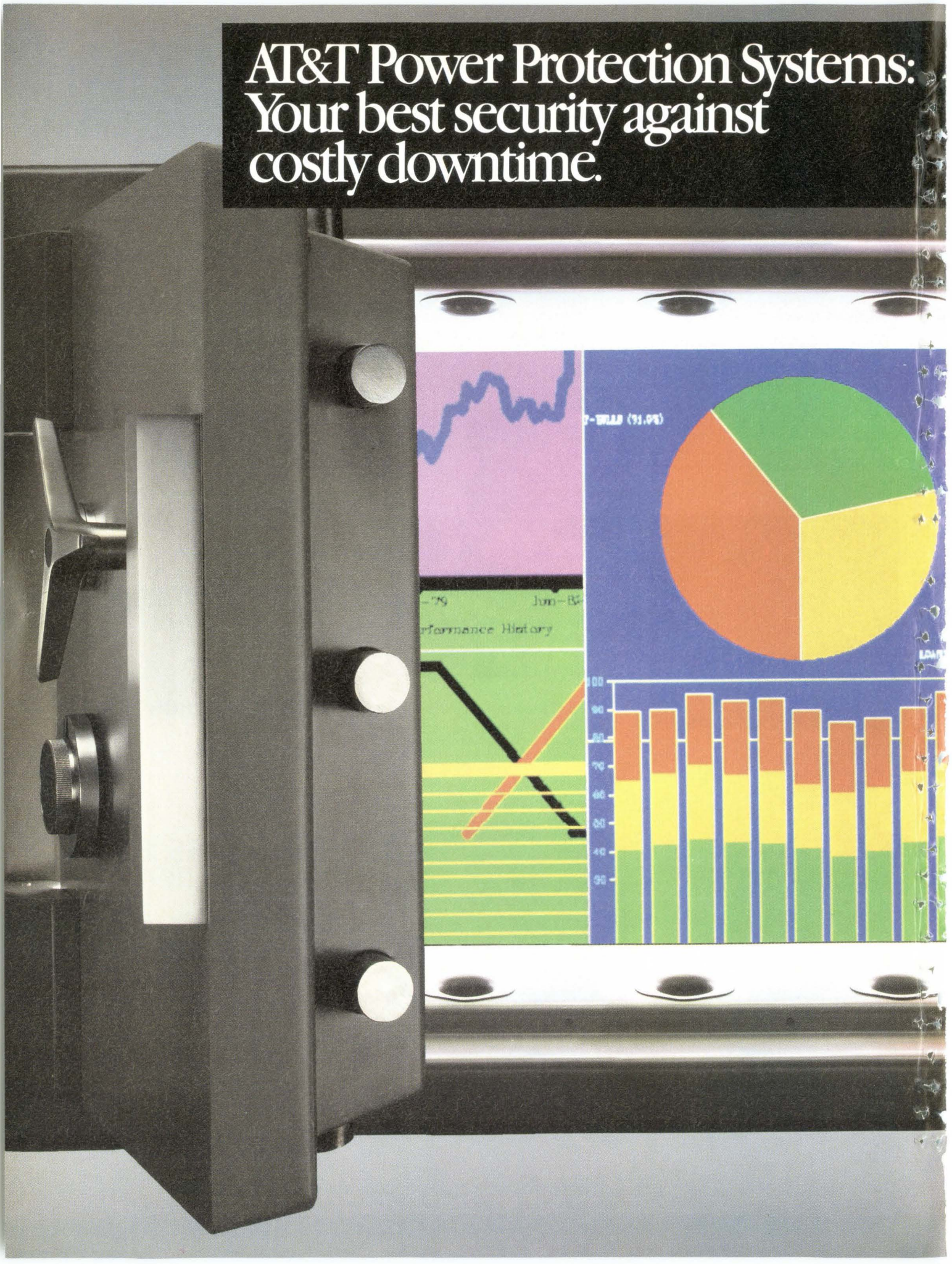

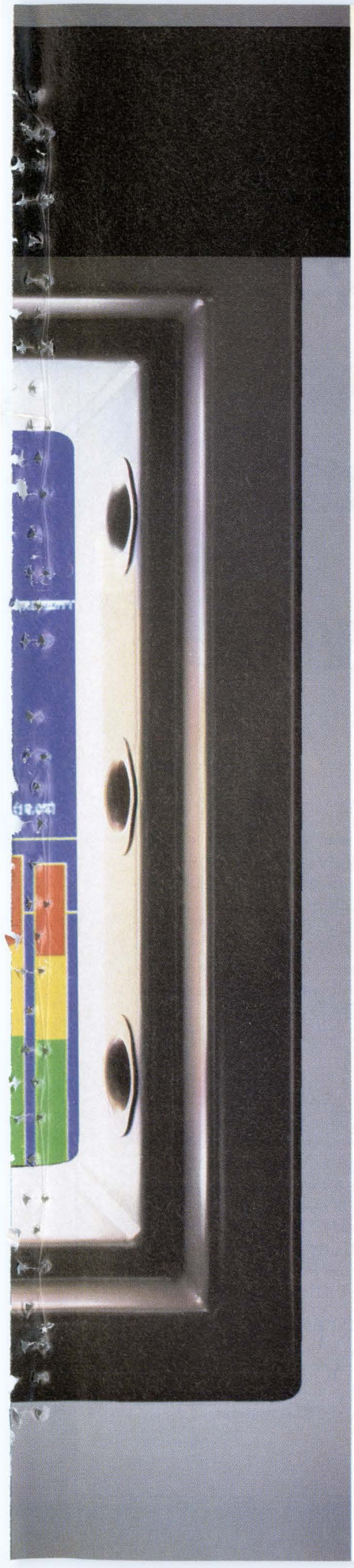

Eliminate the cause of up to 50% of your computer downtime: power disturbances.

Power disturbances, brief and imperceptible, cause very visible data loss, data errors, and equipment damage, all resulting in costly downtime.

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Why specify AT&T's power protection equipment over that of other manufacturers? Because AT&T has an unmatched 50 years of experience in manufacturing power equipment. And, because AT&T also designs and manufactures computers, we have a unique understanding of what should go into a superior power protection product.

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AT&T UPS and PLC power protection systems are easy to install, need no operator, and require no scheduled maintenance.

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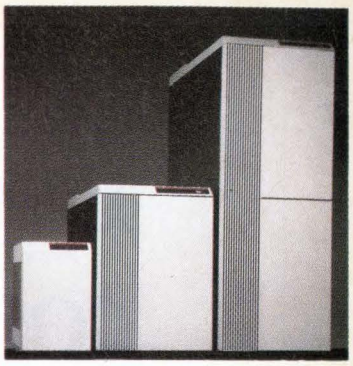

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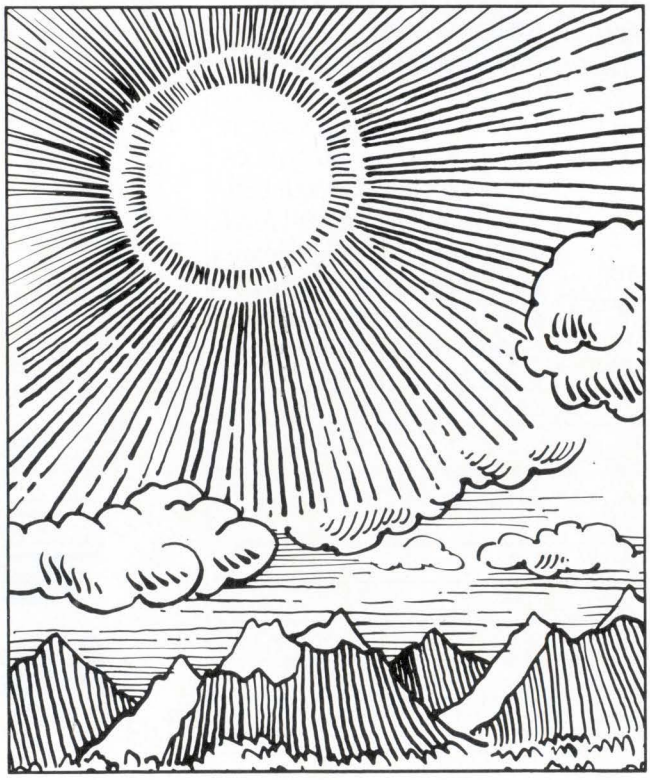

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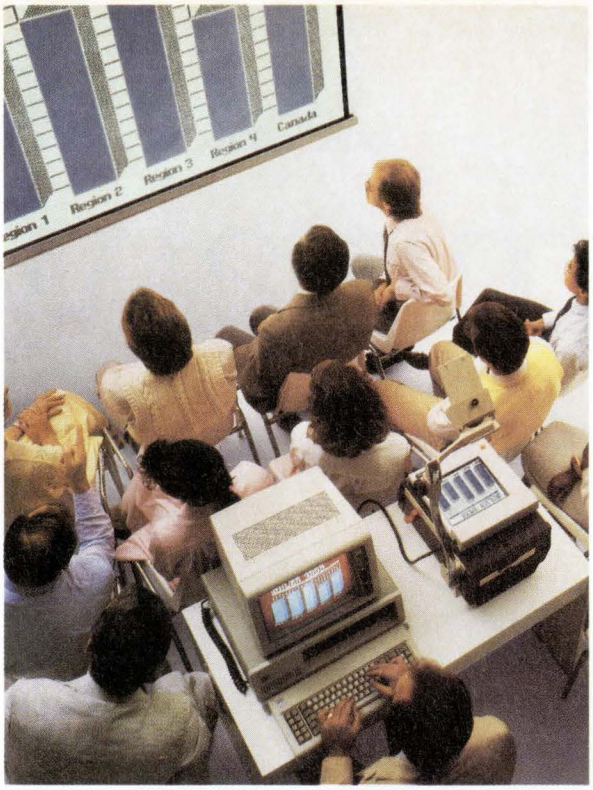

The KODAK DATASHOW™ System for projection of PC images.

Imitations come and go, but the original from Kodak continues to lead in quality and convenience.

Used with an overhead projector, the Datashow system converts your PC into an interactive, big-screen presentation tool, free of image distortion found in others.

And, unlike some, it permits simultaneous display of real-time images on the PC monitor and projection screen.

This Kodak system also lets you manage presentations with exclusive, multi-use software, wireless remote control, and, new from Kodak, additional software for remote control of application programs like Lotus 1-2-3.

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This portable system is easy to interface with IBM PCs and 100% compatibles, or with Apple II computers using our simple external adapter.

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Link
The terminal wi

One smart terminal outsmarts the rest. The Link MC_{10}.™ The "Modular Concept" terminal.

The only terminal that lets you unplug the ASCII keyboard. Plug in the ANSI keyboard. And completely change both your emulation and keyboard.

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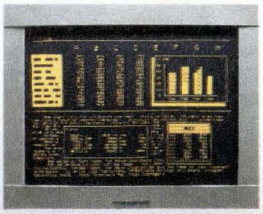
What's more, these features are seen on a flat, high resolution 14" screen. In your choice of 3 colors.

You even get tilt and swivel. Plus an optional arm. There's no other terminal like it. Anywhere. At any price.

Unlike other terminal manufacturers, we don't build and sell computers.



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We concentrate on terminals. We build them tough for tough customers like you.

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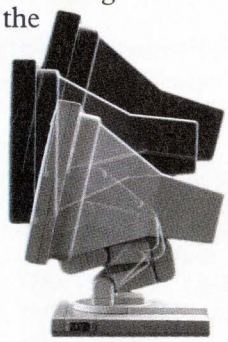

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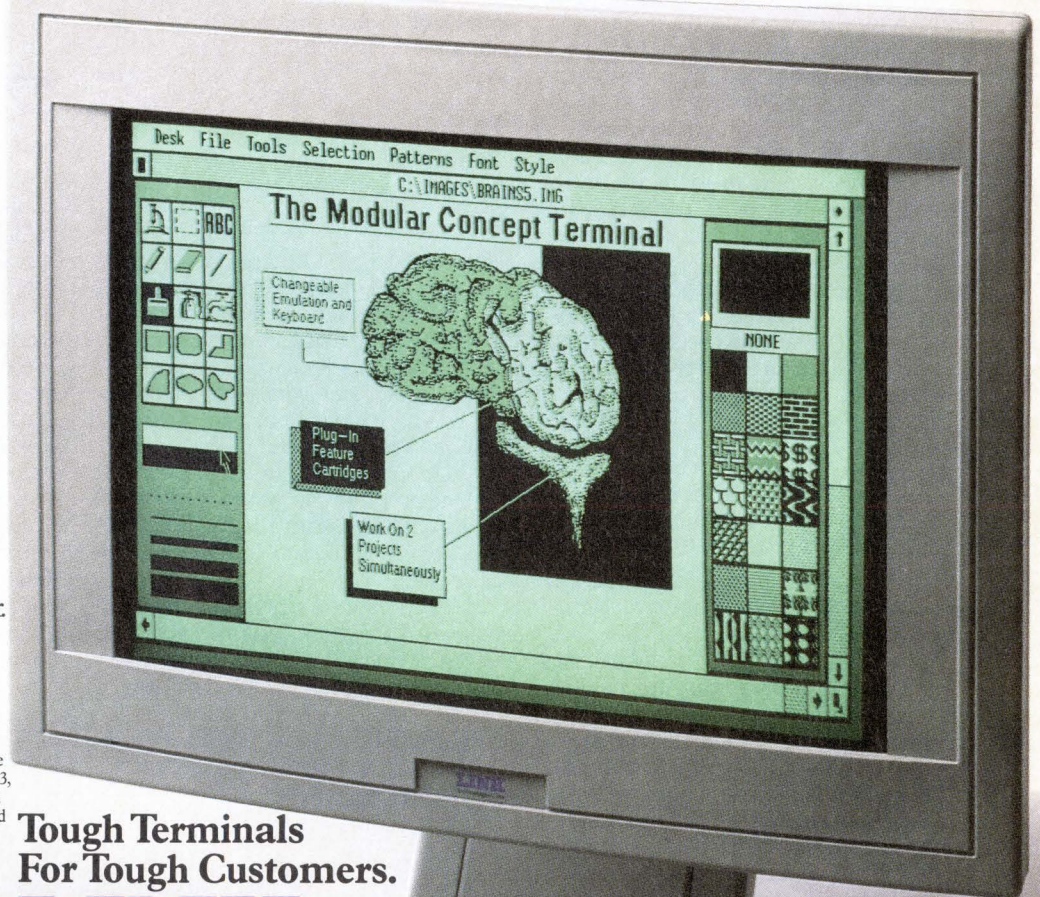

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the American Stock Exchange and/or the New York Stock Exchange, as well as Amex's Major Market Index Option. The Major Market Index lists 20 blue chip stocks listed on the New York exchange, 16 of which are in the Dow Jones Industrial Average.

The program allows investors to trade both options and equities on a daily basis over a nine-month period. Users are able to perform the following tasks with American Investor: review stock and option prices, major index movements, and newspaper reports; research background information on companies; perform technical analyses by plotting moving averages, trading bands, etc.; buy stocks; and close out all or part of a position, set limits and stop orders, and review the portfolio. BRITANNICA SOFTWARE, Blue Chip Software Division, San Francisco. CIRCLE **267**

RDBMS for Macs

Nantucket ships dBase-compatible relational database manager.

McMax is a relational database management system for the Apple Macintosh family of microcomputers.

The RDBMS can create databases, manipulate structured data from multiple files, and produce customized reports. Nantucket claims McMax can handle database files up to 63MB and that the files conform to the structure and format of Ashton-Tate dBase files. Ten separate database files can be opened simultaneously and report forms and labels created by McMax are compatible with one another. Each record is stored sequentially with a fixed record length. Records can store up to 32KB and can contain 2,000 fields of up to 255 characters or 63 numbers each. McMax supports Microsoft format.

McMax is available now. It costs $295. McMax requires a Macintosh with 512KB of RAM and a hard disk drive or dual floppies. NANTUCKET CORP., Los Angeles. CIRCLE **263**

Mac Maps

MicroMaps creates new mapping programming for Macintosh.

MacAtlas Professional Version from MicroMaps is a $199 program that provides a clip art collection containing over 60 maps showing country borders, and U.S. state and county borders. All maps are PICT format, which makes them compatible with PageMaker; Ready,Set,Go!; CricketDraw; MacDraw; MacDraft; MacPlot; and other page makeup software. According to MicroMaps, the output can be generated using a variety of plotters, laser printers, and slide makers. An Apple MacPlus is recommended to run the software. MICROMAPS, Lambertville, N.J. CIRCLE **265**

Equipment Management Program

The Constellation Corp. unveils its first commercial product.

Antares: Office Equipment Management, is designed to aid professional offices in managing and tracking their office equipment and computers. The program keeps track of who is responsible for the equipment, what equipment there is, where it's located, and when and where it was purchased.

Up to 32,000 items can be tracked, and the program can generate reports. A PC or compatible with 128KB of RAM available for the program is required. The price is $89.

According to TCC, it will introduce two more programs later this year—Altair: Computer Property Management, and Capella: Document Control Management. THE CONSTELLATION CORP., Newark, Calif. CIRCLE **266**

Software Tester

Cinnabar rolls out a product for testing applications.

Cinnabar Software's Check*Mate is a tool that aids in the testing of applications such as on-line databases and e-mail systems, public and private data networks, multiuser minicomputer applications software, and asynchronous interfaces to network components including protocol converters and X.25 PADs.

Running on IBM PCs and compatibles, the software can be used to develop and run regression, performance, and stress test scripts written in Microsoft C. Cinnabar claims Check*Mate is capable of running large groups of test scripts unattended. A built-in log system reports and summarizes all test results. One of the features of the product that helps detect software defects is a "pause" feature, which allows the operator to stop a test and proceed through the execution of the test one step at a time. A trace facility records all communications traffic for later use in error diagnosis and troubleshooting. Cinnabar claims users can exit the software without interrupting the testing process.

Check*Mate is available now for $2,995, which includes six months of telephone support. CINNABAR SOFTWARE, Austin, Texas. CIRCLE **270**

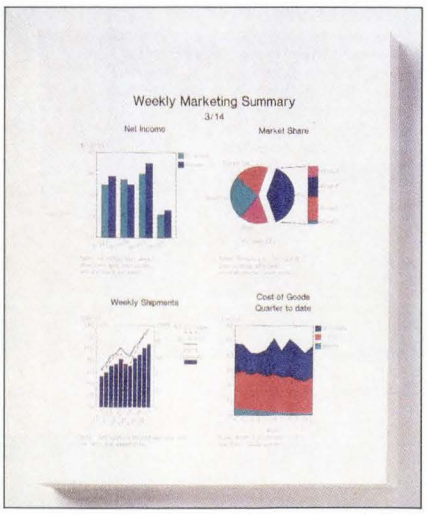
Graph Program Update

Lotus unveils a new version of its Graphwriter.

Graphwriter II is an updated version of Lotus's pc tool for producing and automatically updating charts created from spreadsheets, such as 1-2-3, or databases, such as dBase.

Major enhancements that Lotus is claiming are direct links to any data source; a new user interface using a 1-2-3 menu and command structure; automatic updating and output of charts; more control of chart style and a wider variety of charts; the ability to place multiple charts on a page and to view and select data from the data source; and improved chart formats, file handling, and output options.

Graphwriter II can update up to 100 charts, and users can print or preview them automatically from a list of chart files. The batch production of charts can



be activated with one command directly from the DOS prompt, says Lotus. The package requires an IBM XT, AT, 3270 PC, PS/2, or compatible with 512KB of memory and a hard disk. A Hercules monochrome adapter, or an IBM CGA, EGA, VGA, or Multi-Color Graphics Array, is also required. Graphwriter II costs $495 and it is available now. LOTUS DEVELOPMENT CORP., Cambridge, Mass. CIRCLE **271**

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PEOPLE

Trying to Maintain A Breakneck Pace

Bridge's Judith Estrin is gearing up an already hectic work schedule to take on her latest challenge—the acquisition of 3Com.

BY SUSAN KERR

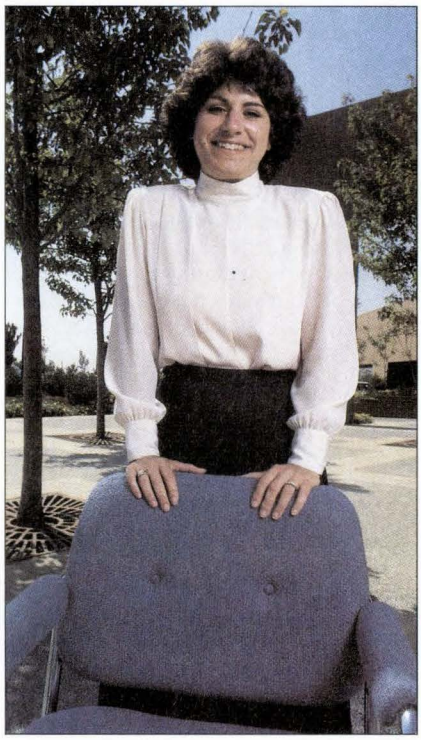
"It's really kind of pathetic," Judith Estrin laughingly admits when asked to name any activities she consistently pursues outside of her job as executive vice president of Bridge Communications Inc., Mountain View, Calif. "This job is all consuming, there's no doubt about that."

Chances are, it's going to become even more so. Estrin, 32, who is cofounder of the networking company, has had her hands full the last few years, from serving as acting vice president of sales to keeping an eye on Bridge's technical development projects. Yet, if Bridge's planned merger with fellow LAN vendor 3Com Co., Santa Clara, goes through as planned this month, she may find her work load increased. Estrin is expected to become head honcho (although titled 3Com senior vp) of Bridge after the merger, which will make Bridge a subsidiary of 3Com while still retaining its own identity.

Given Estrin's background, the drive to succeed is hardly surprising, but the route it has taken is. Once a technical purist, she recalls a time "when I couldn't imagine not designing, writing code." Now, Estrin finds herself with operational responsibilities for a company with over $50 million in revenue.

The joke in Estrin's family is that, because she is the only member without a doctorate, she's the black sheep. Her father is the chairman of the computer science department at the University of California at Los Angeles, and her mother, with a PhD in electrical engineering, heads UCLA Extension's department of engineering and science. Estrin has two sisters; one is a medical doctor, the other is a computer scientist.

Estrin received her BS degree in math and computer science from UCLA and an MSEE from Stanford University. "I jokingly tell my father that one day I'll go back for a PhD so he'll be proud of me," she says. Ironically, one of Estrin's Stanford lecturers was Bob Metcalfe, principle designer of Ethernet, and the founder and current senior technology vice president of 3Com.



BRIDGE'S ESTRIN: "I never wanted to be involved again with a product that doesn't sell."

Close ties to coworkers is nothing new for Estrin. After a lengthy relationship, she married fellow Bridge cofounder and president William Carrico earlier this year. The two met while working at Zilog Inc., in Cupertino, Calif., where they were responsible for the Z-Net local area network.

It's a good guess that neither is a candidate for a "romantic of the year" award. The couple picked their wedding date just a few weeks before the actual Sunday ceremony was held. Getting around each other's work schedule was the biggest part of the problem, says Estrin. As for the honeymoon, "We took Monday off," she says.

Given the nature of her parents' relationship, there's nothing novel to Estrin about working with her husband. "I'm much more likely to bring business home than bring the relationship to work," she says. But, by virtue of the 3Com deal, their partnership is taking a new twist. If, as expected, Carrico becomes president and chief operating officer of 3Com, he'll spend most of his time at 3Com's Santa Clara site. Estrin recollects that this will be the first time in years that the two won't have offices down the hall from each other.

The couple tends to talk about work even while at home, she says, though her schedule doesn't leave much time for conversation. In addition to working an average of 12 hours a day, she works all day Sunday and half of Saturday. Up until now, she has spent two thirds of her time on the road visiting customers and Bridge sales offices. Carrico tends to stay home more often.

It was her four-year stint at Zilog that first gave Estrin the business bug that she now fully enjoys. When her bosses, Ralph Ungermann and Charlie Bass left Zilog to form Ungermann-Bass Inc., that left management gaps and opportunities she had never even considered. Within a couple of months, Estrin found herself managing 30 people at Zilog—and liking it.

Z-Net flopped and that taught her another lesson: the importance of marketing. Z-Net's failure was not due to poor technology, she declares. "I decided I never wanted to be involved again with a product that doesn't sell."

In between Zilog and Bridge, Estrin spent six unhappy months at Ungermann-Bass. Her decision to leave to form a competing company was not welcomed by her former employers, and a frequently vocal and unpleasant rivalry still exists between the two companies.

The merger with 3Com gives Bridge at least a financial leg up on Ungermann-Bass. Yet, while Estrin appreciates the strength that could emerge from combining the two LAN companies, as well as her potentially more powerful role, she also clings to the Bridge identity. Much hard work has gone into Bridge since it was formed six years ago.

The day after the 3Com merger was announced was a Saturday, Estrin recalls. And what did she unconsciously put on when she got dressed? A Bridge T-shirt. ■

BOOKS

Conquering the Competition

THE INFORMATION WEAPON: WINNING CUSTOMERS AND MARKETS WITH TECHNOLOGY
by William R. Synnott, John Wiley & Sons, New York (1987, 334 pp., $29.95).

THE INFORMATION EDGE
by N. Dean Meyer and Mary E. Boone, McGraw-Hill, New York (1987, 333 pp., $24.95).

BY JAMES COLLINS

We have gone from the Stone Age to the Bronze Age to the Iron Age to the Agricultural Age, and now, having passed successfully through the Industrial Age, we are in the Information Age. Top executives are being bombarded with advice on how to support their information management so that they can use their information resources to provide information weapons that will give their businesses an edge on the competition.

Two new books have recently jumped on the bandwagon in the competitiveness campaign: *The Information Weapon* by William R. Synnott and *The Information Edge* by N. Dean Meyer and Mary E. Boone.

Bill Synnott's book is a well-constructed treatise aptly subtitled "Winning Customers and Markets with Technology." A staunch advocate of the chief information officer's importance at the top level of management, Synnott is a former director of IS and services at the Bank of Boston. He is currently the senior director of the Yankee Group, the Boston-based consulting house.

Synnott provides an interesting manual on how to put information technology to work to beat the competition. He writes, "This book is not a technical treatise, it is a management book. It deals with the application of information technology from a management perspective, equally useful to ceos, CIOs, and to anyone bent on using technology as a growth and profitability lever."

Synnott reminds us that we are no longer an industrial society, we are an information society, and one that is growing rapidly. He points out that in 1985 the information industry made up 3.3% of the gross national product, about the same amount as the auto industry. He predicts that in 1995 the information industry will constitute 6% of the gross national product, making it the largest single industry in the world. Service industries now account for nearly 70% of the gross national product, and nine out of 10 jobs created between now and 1995 are expected to be in services.

In Synnott's view, personal computers represent the most phenomenal productivity potential yet invented for managers. Thus far, middle management and professionals have been the largest users, though the number of senior managers directly using pcs is growing.

Synnott does not attempt to solve the centralization versus decentralization issue. He disposes of it quickly, reminding us that no universally approved arrangement has ever been found, primarily because the driving issues are not technical or economic, they are political. He does point out that the

BY 1995, THE INFORMATION INDUSTRY WILL MAKE UP 6% OF THE GNP.

decentralization trend is being fueled by low-cost computing, more computer literate managers, and the desire to use technology as a competitive strategy. Many companies are seeking arrangements that combine the advantages of centralization and decentralization without the disadvantages of either. Distributed processing, when characterized by information resources that are dispersed around the firm but are under the central guidance of the chief information officer, represents such an arrangement.

Synnott is convinced that the enormous power of technology as a strategic weapon is just beginning to dawn on most senior managers. The technology is here, he reminds us, and ultimately the success of every major business enterprise will be information driven. For ceos and CIOs, and all those aspiring to become either one, it is a book well worth reading.

Hoping to reach the same audience, *The Information Edge*, by N. Dean Meyer and Mary E. Boone, is a study of the values and benefits of office automation. It is written in business terms rather than technical terms, in the hope that it will reach executives, managers, and users of computers at all levels of the organization. Without the active involvement of executives and line managers, there is little chance of finding strategic opportunities for office automation.

Meyer and Boone distinguish OA from IS in several ways. OA provides tools to individuals and groups of users who then operate the tools themselves. IS, by contrast, operates a centralized resource on behalf of the entire organization. Furthermore, OA applies to unstructured knowledge work, while IS processes routine, well-structured transactions. OA tools work with data that belong to the users, while IS processes organizational data. If an information service is interactive, operated by and at the discretion of a user, it is here considered part of the domain of OA. Access to IS data is considered one of the many tools of OA.

The authors concentrate on investigating the value-added aspects of using information tools and have assembled information on more than 60 case studies in which value-added benefits were measured. Instead of thinking in terms of replacing people with computers, the authors concentrate on the advantages of applying tools to make people more effective.

Projecting cost savings and a good return on investment has forever been the method of presenting requests for capital appropriations and obtaining approval for significant capital investments. The authors propose an approach to quantifying the normally unquantifiable (or what is quantifiable only with great difficulty) results of the value-added benefits of automating the activities of office and managerial personnel.

Determining how many pieces of paper were handled may or may not be a useful criterion: how well or effectively the tasks were handled is the more useful. A restructuring of personnel may not be what's needed; more effective operations and decisions that result in improved service and increased business may more likely be the desired goal. If your competitor does this and you don't, or if it does it better and first, you may end up joining the buggy whip factory.

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*IDC 1986 U.S. Terminal Census.

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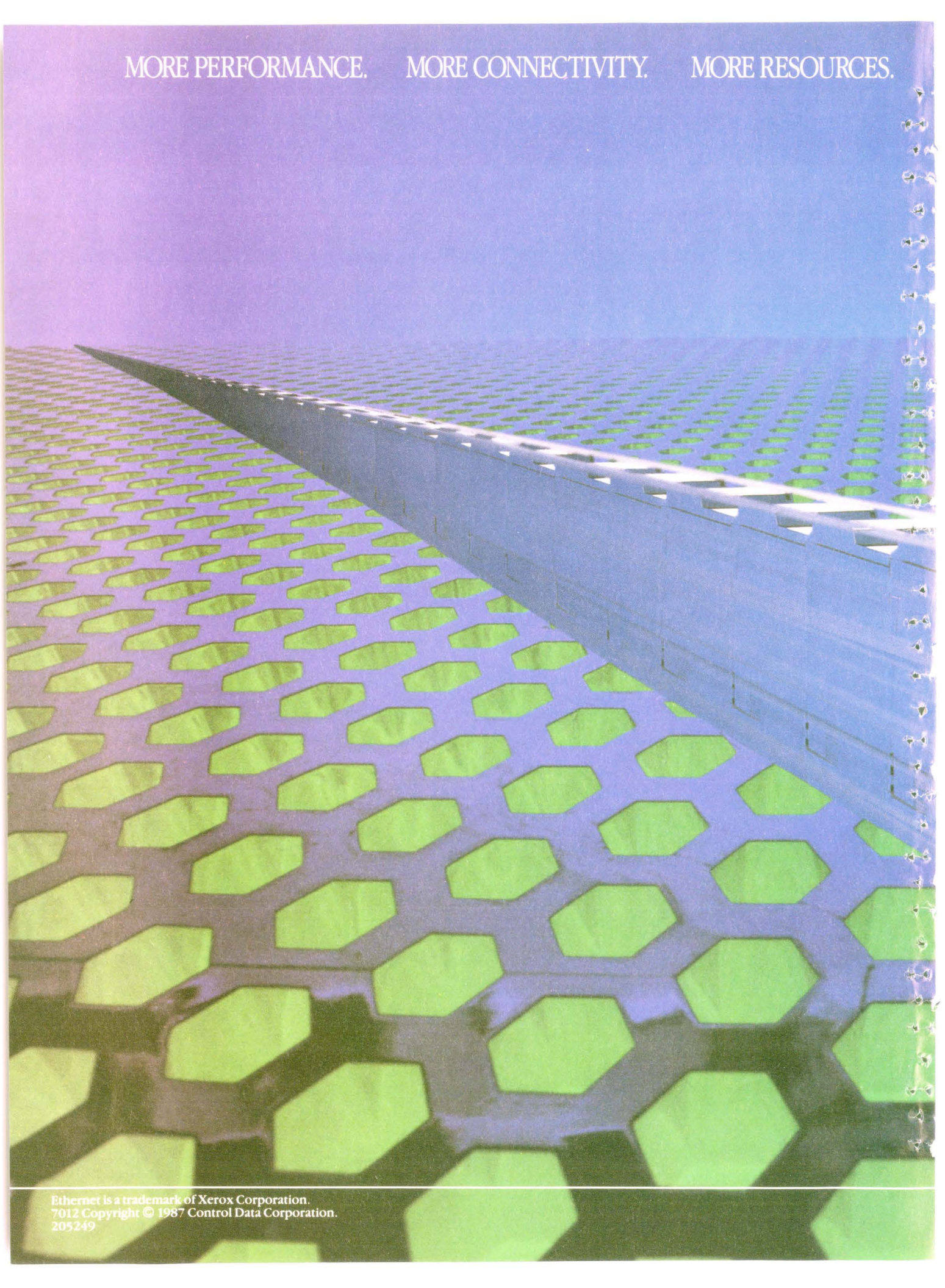

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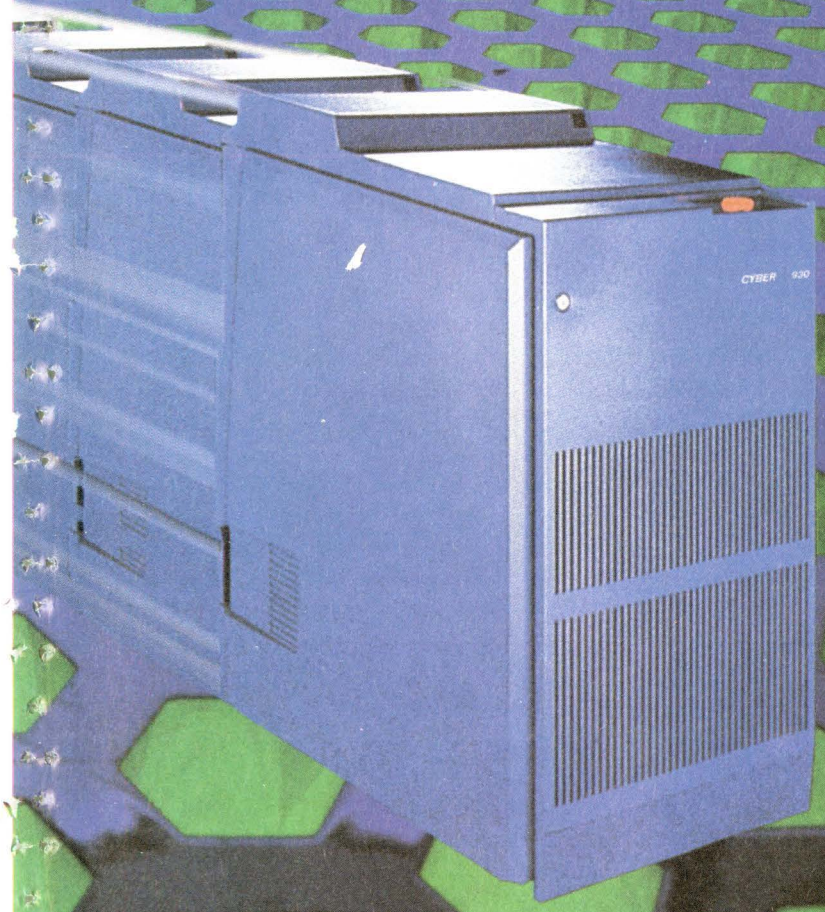

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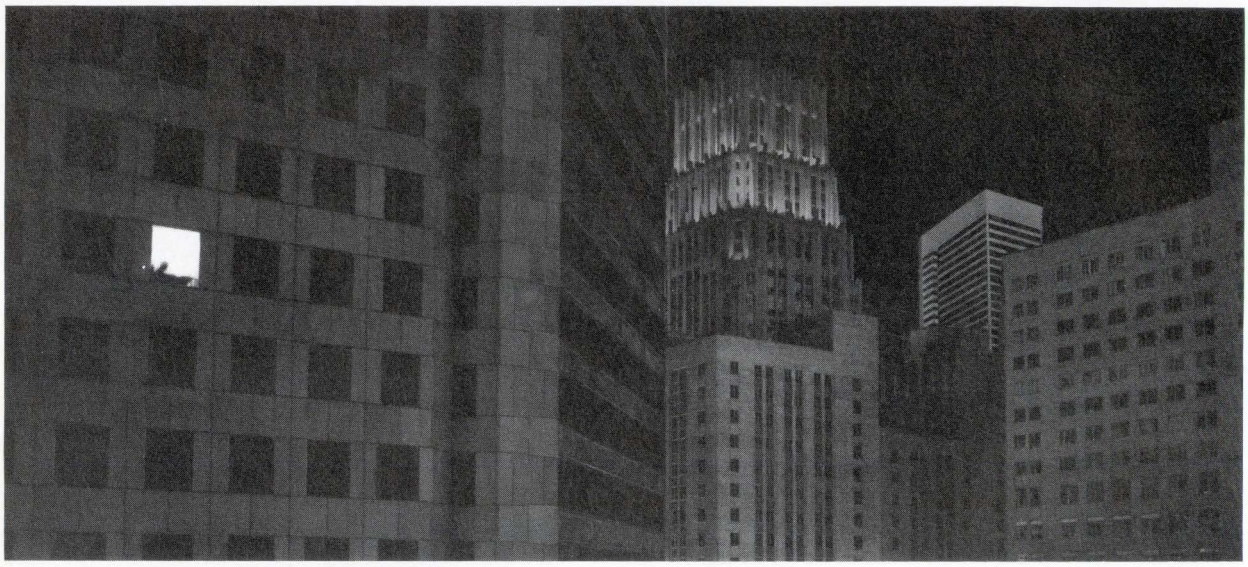

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A value-added focus maintains top management interest and ensures its support by delivering long- and short-term payoffs. OA may be credited with increased sales, improved margins, better inventory decisions, optimizing the product mix, getting new products to the market sooner, or identifying new products or market opportunities. When office automation brings in additional revenues, the benefits are measurable.

There are, however, some interesting financial gyrations in the cost avoidance and sales improvement evaluations found throughout the 60 case studies. The authors' idea is to have the estimate of improved results made by the most knowledgeable and experienced person involved, usually the executive justifying his proposal for OA. These efforts are then quantified and extended. Having watched a number of executives justify their proposed expenditures over the years, however, I have some qualms about the sumptuous projection of the return on investment. In some situations, this would be akin to sending the fox to guard the henhouse.

Nevertheless, OA is clearly a bet on which progressive executives who understand the importance of gaining an information edge will place their money. But with all the burgeoning enthusiasm these days for the increased role of information managers in top management planning and operations, I'm wary of overselling the information resource as a way of giving the old competitive edge a sharpening. Some information weapons are going to be oversold, and when they do not produce spectacular results, the ceos who allocated the money are going to feel that they have been had.

I'm concerned that these corporate heads will lose faith in their IS resources and be disinclined to support future information management. Investment in new systems and equipment still must be carefully evaluated, with the risks presented as carefully as the potential benefits, as with the planning and allocation of any available resources. Overselling the so-called competitive edge can have a boomerang effect. ■

James Collins was vp of corporate staff when he retired in 1985 from Johnson & Johnson, New Brunswick, N.J. A contributor to DATAMATION, Collins was a panel participant in DATAMATION's roundtable of industry veterans ("Today's View from the Top," Sept. 15, p. 48).

READERS' FORUM

Software Development: Team Tactics

Whether the task at hand is winning the World Series, putting a man on the moon, or developing a software program, the key to success is the presence of a solid team of people who work together. When it comes to successful software development, the value of team spirit can't be overstated.

Many sports fans, including myself, have never managed a team, yet we become enthusiastic critics of coaches and managers. Known as Monday-morning quarterbacks, we readily give our version of what the coach should have done to win. In keeping with this tradition, I offer the following strategies I learned during my 14 years building computer systems. I believe these strategies will help software managers greatly increase the efficiency of software engineering.

Software development is a time for creative thinking. During development, software is in a state of radical change. While the software evolves, the team of artists must work together toward a solution that will satisfy the needs of the sponsor. Essential to this process is the sharing of ideas and differing points of view.

Everyone working on a software development project—from the program manager to the lowest-level worker—needs to be recognized as a team member contributing to the common goal of building a quality product within constraints set forth by the sponsor. One of the important responsibilities of the manager is to integrate the team. Each team member needs an identity and purpose that should be known to the whole team.

It's imperative that the manager prevents people from becoming so involved in their particular task that they lose sight of the overall system. Very early in the development stage, people need to become aware of how the major pieces fit together and interact and, most important of all, who is building each module.

The "top down" method can help give everybody the big picture. I think the top down approach is an orderly, commonsense way to write good, functional code efficiently. This approach dictates that the highest-level modules be identified and created first. Although they won't do anything initially, they provide a purpose, as well as parameters for input and output.

Integrating the software team can be a difficult task. The manager may have people spread over a large facility performing diverse activities and working different shifts. The importance of meetings cannot be overstated. Whether they are formal presentations or informal gatherings, whenever the team is assembled it is an opportunity for the manager to encourage workers to learn how they fit into the overall plan. Meetings do not always have to be for official business. Luncheons and social gatherings do not necessarily have to be business-related. People simply getting together to have fun is important in building a unified team.

It's clearly the software manager's responsibility to keep communication channels open, but everyone on a software project shares the responsibility of communication. An unselfish attitude when it comes to sharing information is crucial. Not sharing information can be very costly in terms of delaying a development effort.

When I first started programming, a good programmer was one who could write programs so that no one could figure out what they did. Today, the opposite is true. A good programmer must produce code that can be understood easily and that keeps interface people well informed. Sharing information will help avoid duplication of effort, particularly the subroutines that often are written several times by different people because no one knew what the other guy was doing.

Efficient software development needs just a few basic components: teamwork, communication, an openness to creative thinking, and the freedom to make mistakes.

In mathematics, the whole is equal to the sum of its parts. In software development, the value of an integrated team working in a creative atmosphere is far greater than the sum of its individual players.

ROBERT C. ROGERS
Software Engineer
Charles Stark Draper Laboratory
Cambridge, Mass.

If you'd like to share your opinions, gripes, or experiences with other readers, send them to the Forum Editor, DATAMATION, 249 W. 17th St., New York, NY 10011. We welcome essays, poems, humorous pieces, and short stories.

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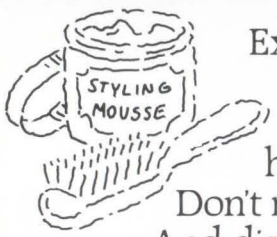

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CALENDAR

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Conference on Departmental Computing.
Oct. 29-30, St. Louis. Contact Donna Skaggs, CSDP, Washington University, Campus Box 1141, 1 Brookings Dr., St. Louis, MO 63130, (314) 889-5380.

ICCC '88 (International Conference on Computer Communication).
Oct. 30 - Nov. 3, Tel Aviv. Contact Jehuda Kella, 9th International Conference on Computer Communication, P.O. Box 50006, Tel Aviv, 61500, Israel, 03-654571.

NOVEMBER

COMDEX/Fall.
Nov. 2-6, Las Vegas. Contact Richard Schwab, The Interface Group Inc., 300 First Ave., Needham, MA 02194, (617) 449-6600.

International Conference on the Entity-Relationship Approach.
Nov. 9-11, New York. Contact Kathi Davis, Dept. of Computer Science, Northern Illinois University, De Kalb, IL 60115, (815) 753-6945.

5th Annual Conference of the Office Automation Society International.
Nov. 10-14, Atlantic City. Contact the Office Automation Society International, 15269 Mimosa, Suite B, Dumfries, VA 22026, (703) 821-6650.

International Hard Copy Supplies Conference.
Nov. 18-20, Amsterdam, The Netherlands. Contact Jean O'Toole, CAP International, One Snow Rd., Marshfield, MA 02050, (617) 837-1341.

DECEMBER

Unicom 1 - NATA '87 (North American Telecommunications Association Exhibition).
Dec. 2-4, Dallas. Contact Karen Palermo, 2000 M St. NW, Suite 550, Washington, DC 20036, (202) 296-9800.

Dexpo West '87 (DEC-Compatible Exposition).
Dec. 8-10, Anaheim, Calif. Contact Susan Werlinich, Expoconsul International Inc., 3 Independence Way, Princeton, NJ 08540, (609) 987-9400.

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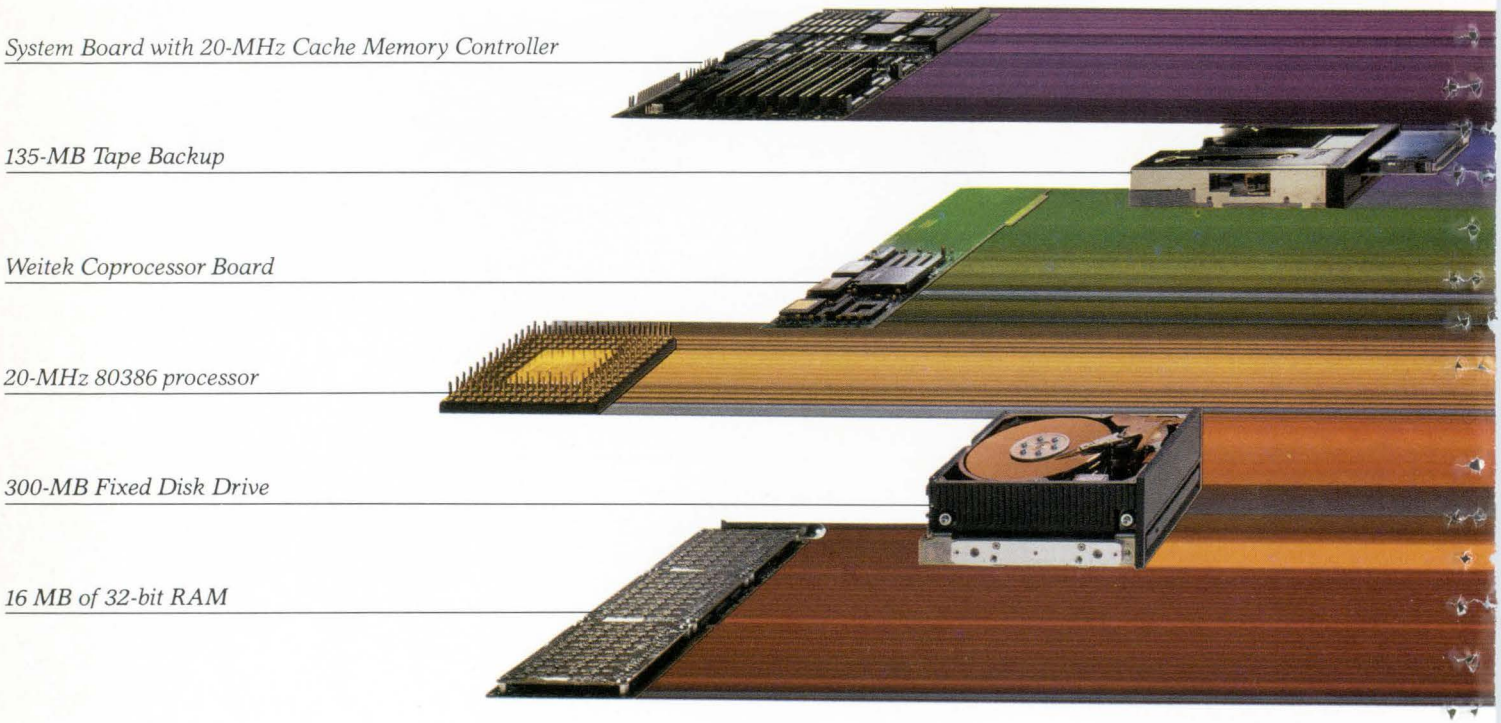

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how to get to 20 MHz, most out of 20 MHz.

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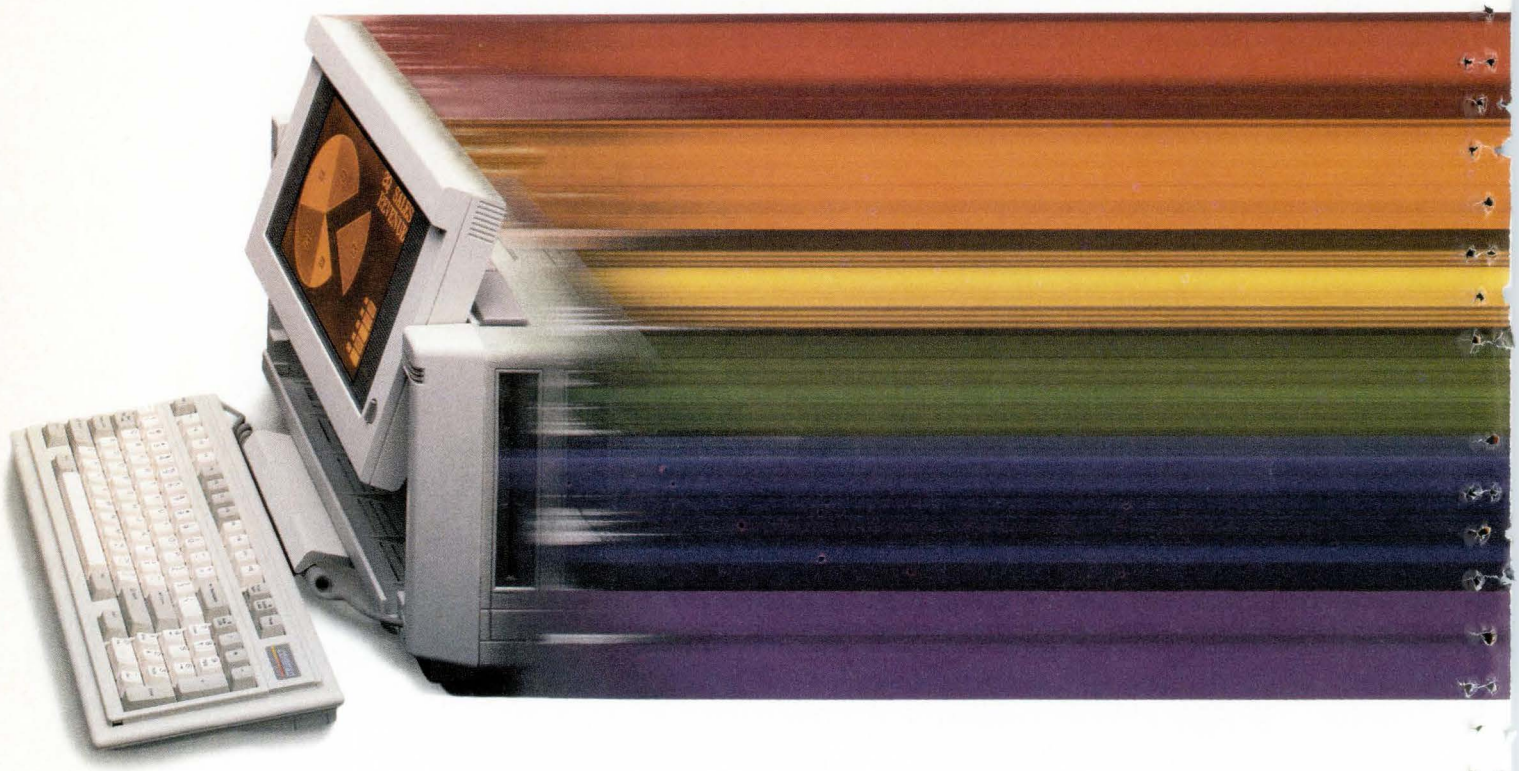

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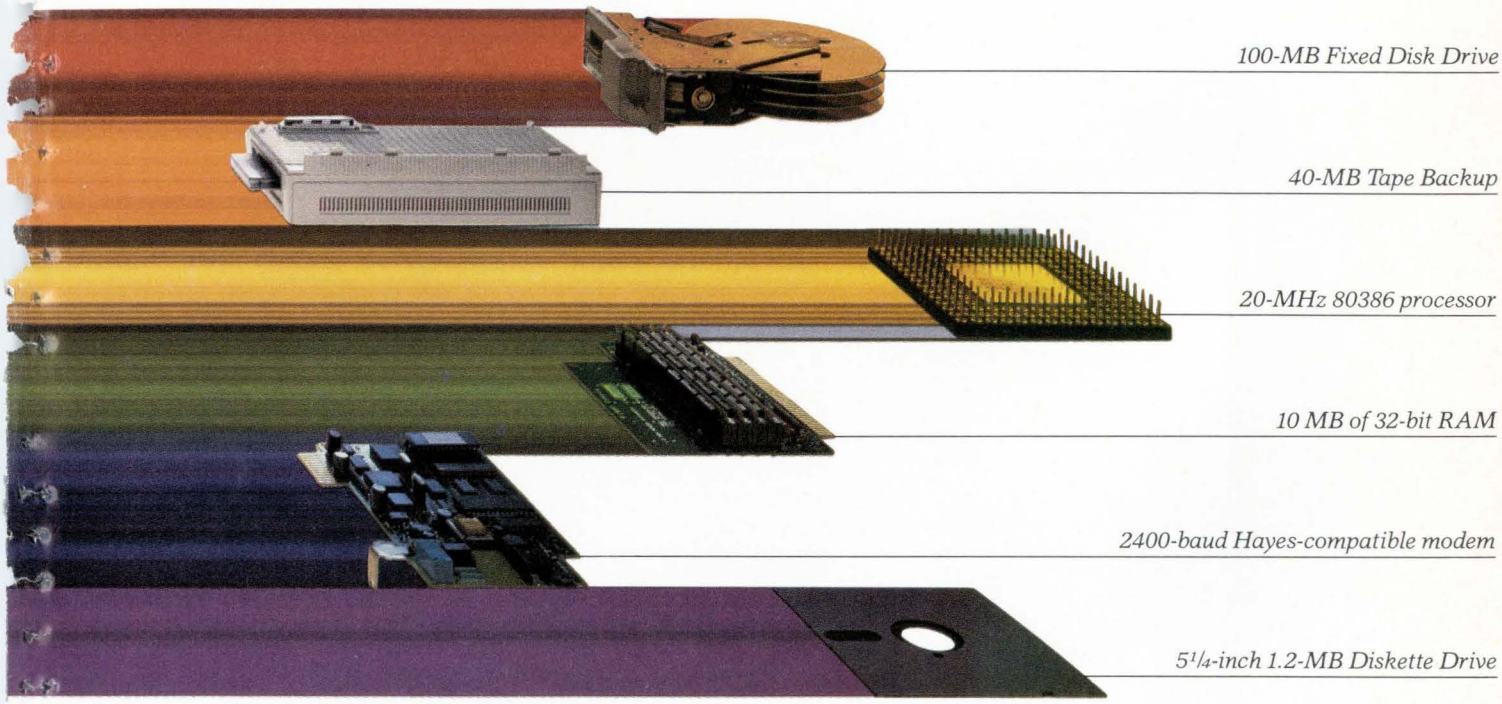
to introduce a 386 portable PC. expected all this.



applications is increased even more when you add an optional 20-MHz 80387 coprocessor.

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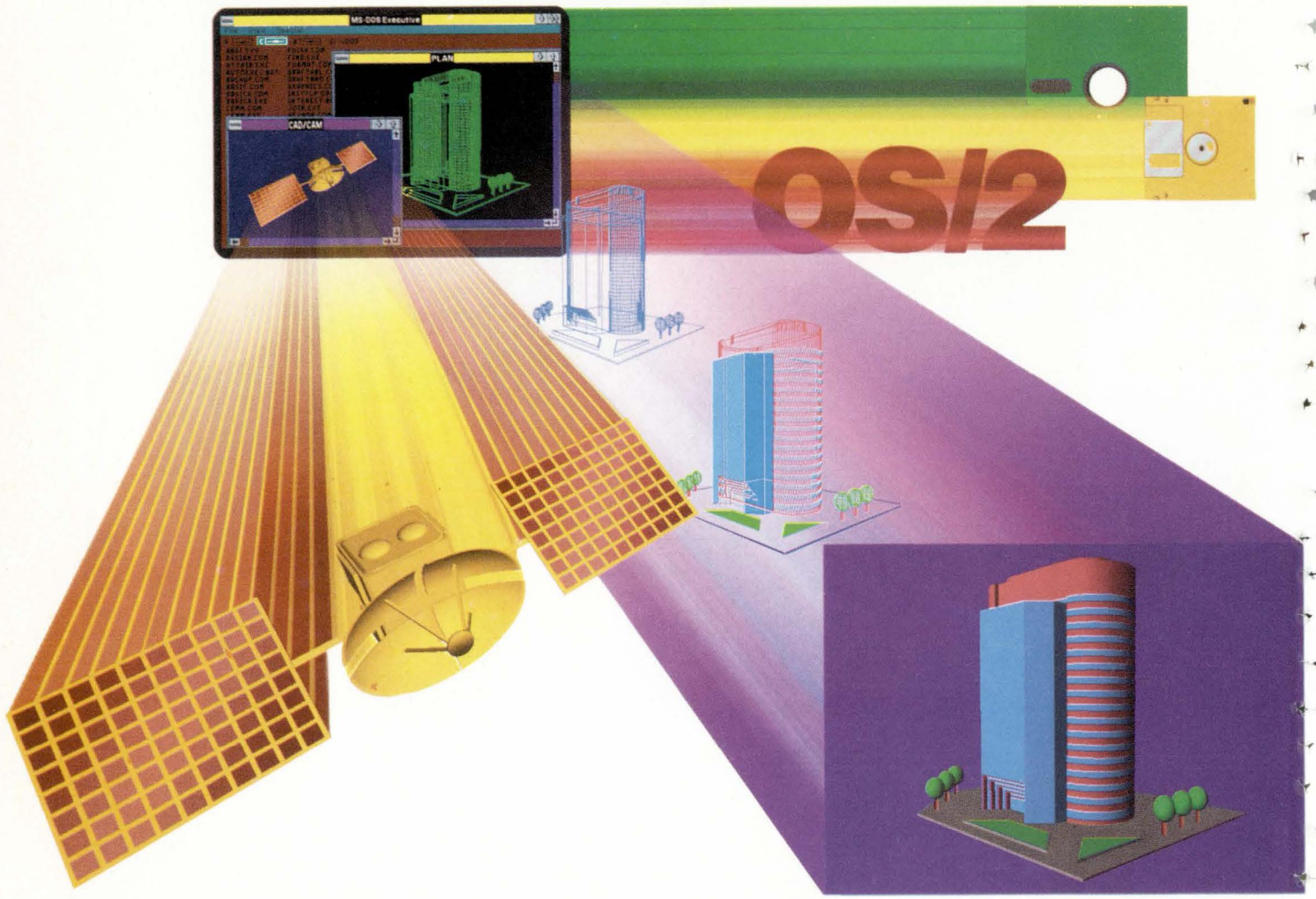

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DATAMATION 1986 Subject Index

Vol. 32, Numbers 1–24

Note:
This subject index to the articles and news stories published in DATAMATION during 1986 would customarily have been published early in 1987. Production requirements, however, prevented our doing so. In the future, DATAMATION subject indexes are planned to appear early each year.

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FEA - Features
INT - International
NIP - News In Perspective
OEM - Oem Edition
PPL - People

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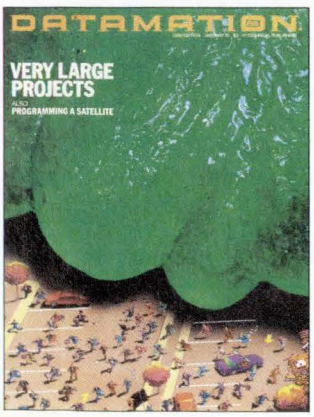

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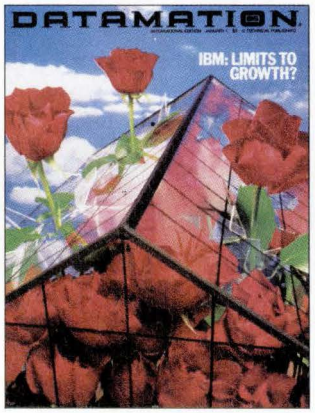

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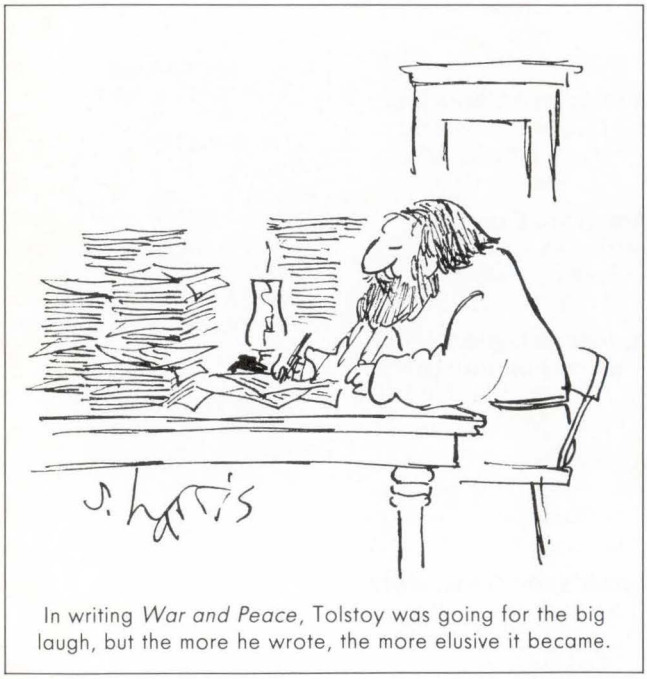
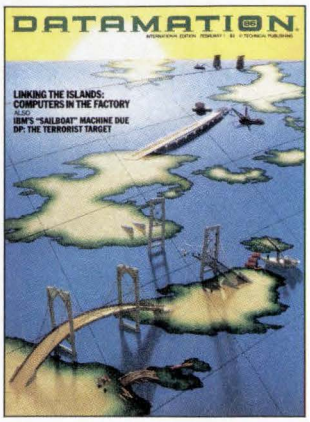


In writing *War and Peace*, Tolstoy was going for the big laugh, but the more he wrote, the more elusive it became.



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McDonald's will use ISDN to send voice, data and video over ordinary telephone lines simultaneously. An AT&T 5ESS™ switch at Illinois Bell will support digital phones, integrated voice/data terminals, facsimile, voice mail, host access and modem pooling, giving McDonald's a real competitive advantage in its data networking capabilities.

"In business language, this means we're going to do an even better job for the 30 million customers that we serve every day," said Bonnie Kos, McDonald's Vice President of Facilities and Systems.

"ISDN provides an information outlet to every workstation, thereby eliminating time-consuming and costly wiring, as well as enhancing messaging and network control capability."

Thanks to ISDN, McDonald's will enjoy better customer service, more current market information, better tracking of product promotions, more efficient inventory control, and reduced administrative workloads.

Ultimately, higher level applications of ISDN on the public switched network will replace most of the company's myriad networks, linking all its offices and restaurants around the world.

As we are doing for McDonald's, AT&T and your telephone company can help your business realize the networking efficiencies and cost savings of ISDN. To find out all that ISDN can do for you, write on your business letterhead to: AT&T Network Systems, P.O. Box 1278, Room 2968, Morristown, N.J. 07960-1278.

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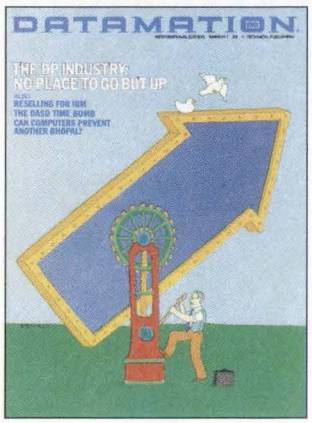

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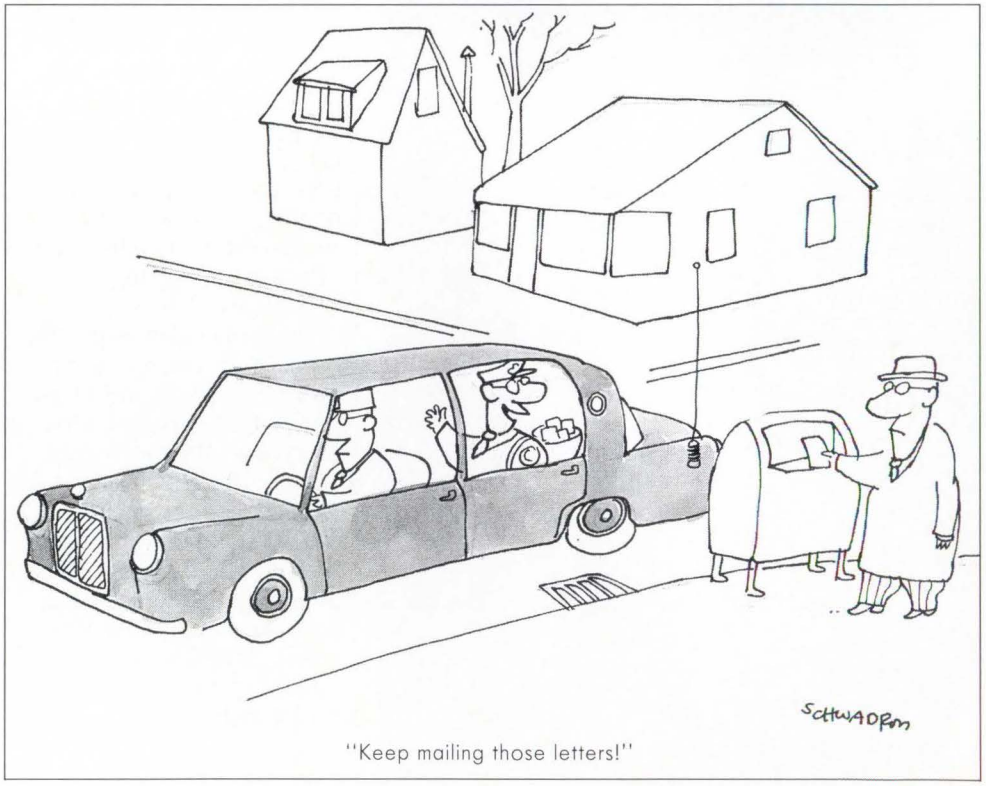

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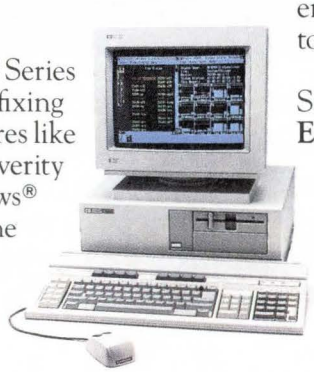

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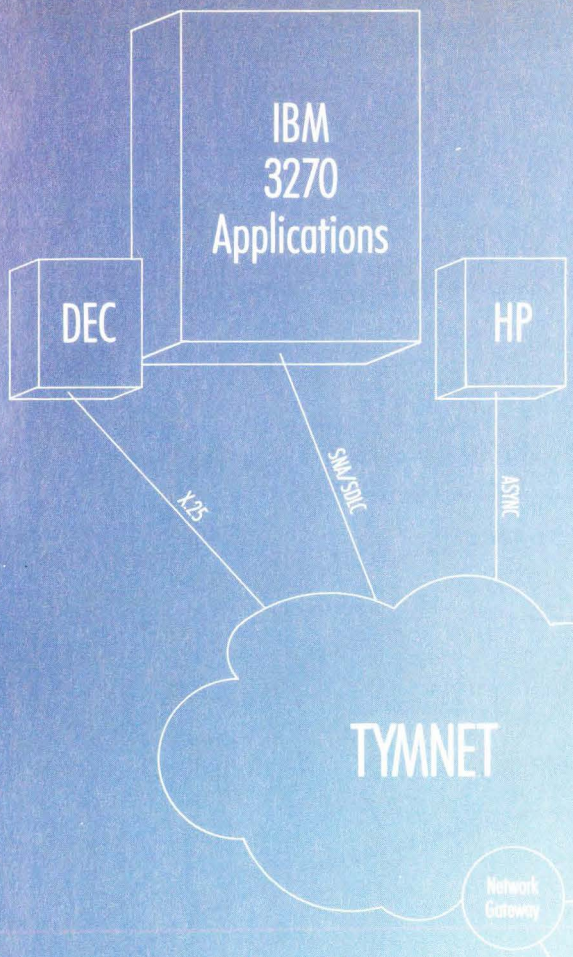

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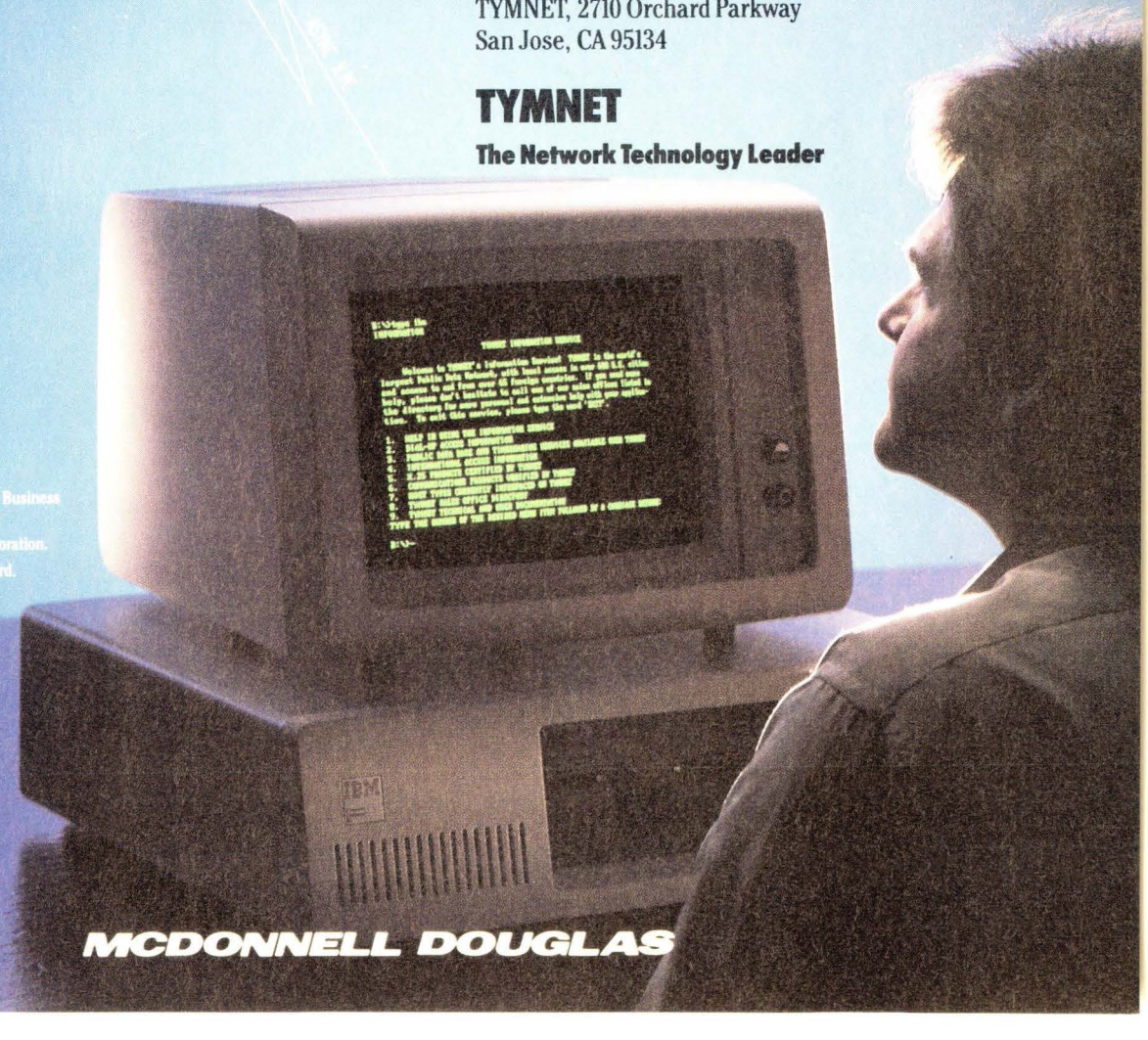

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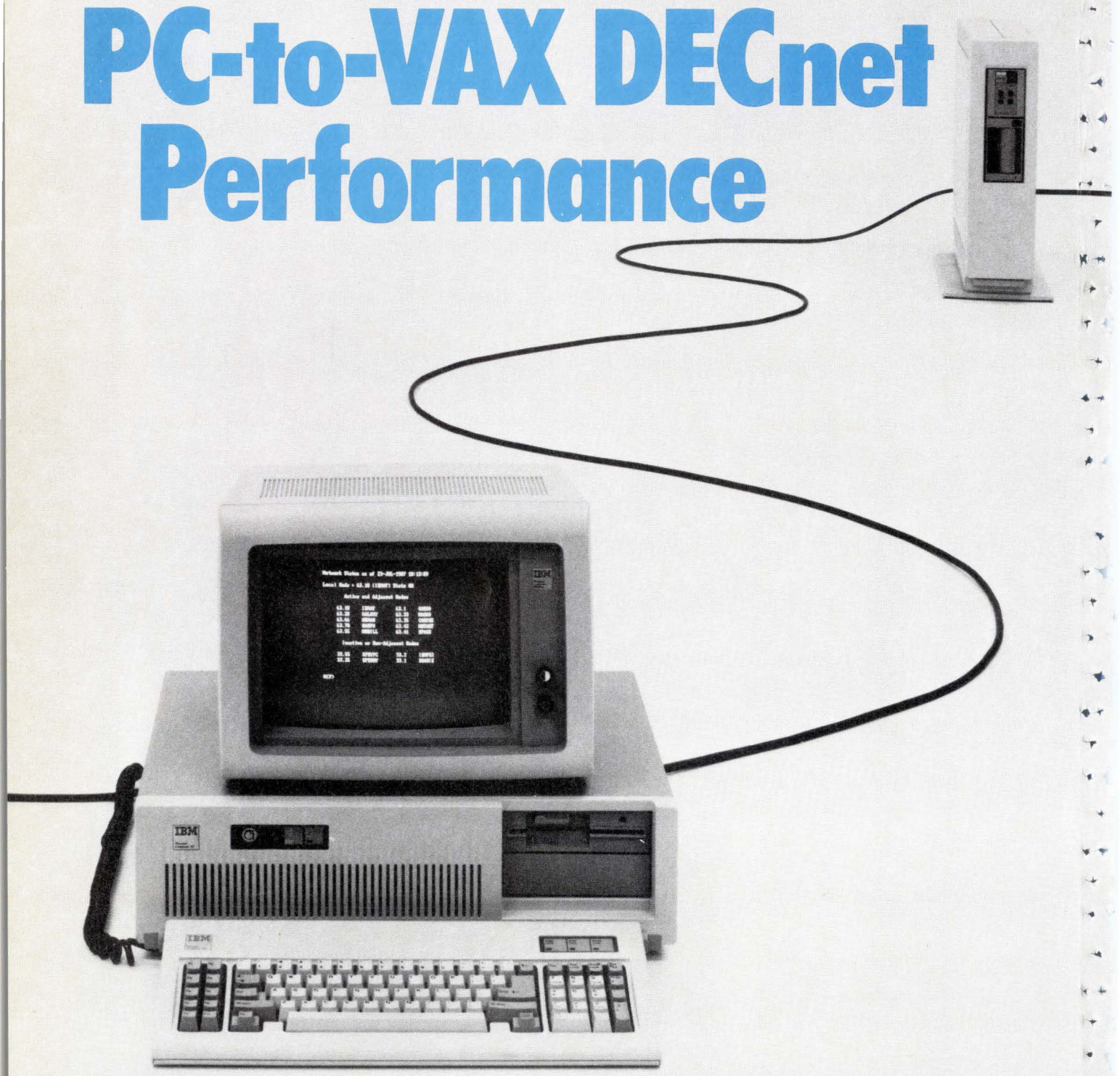

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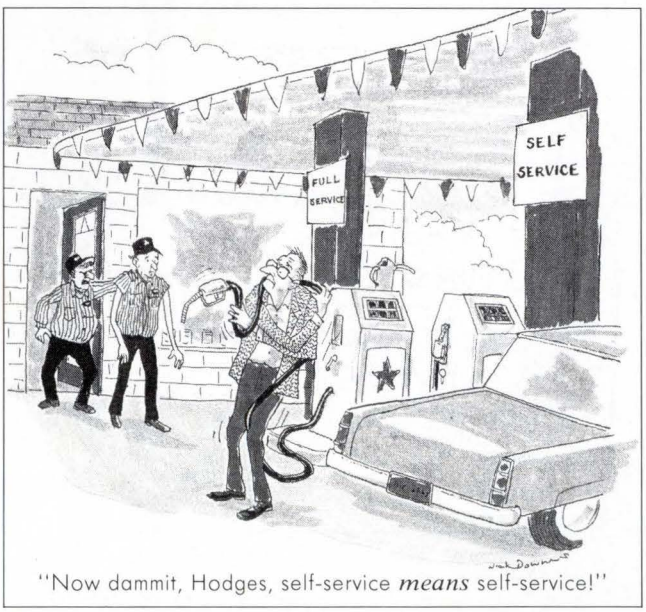

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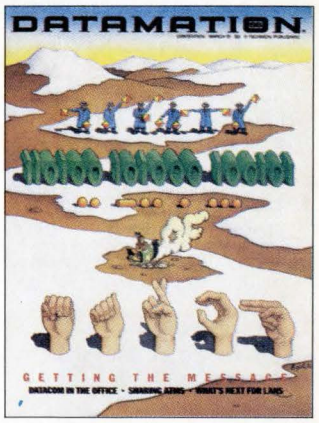

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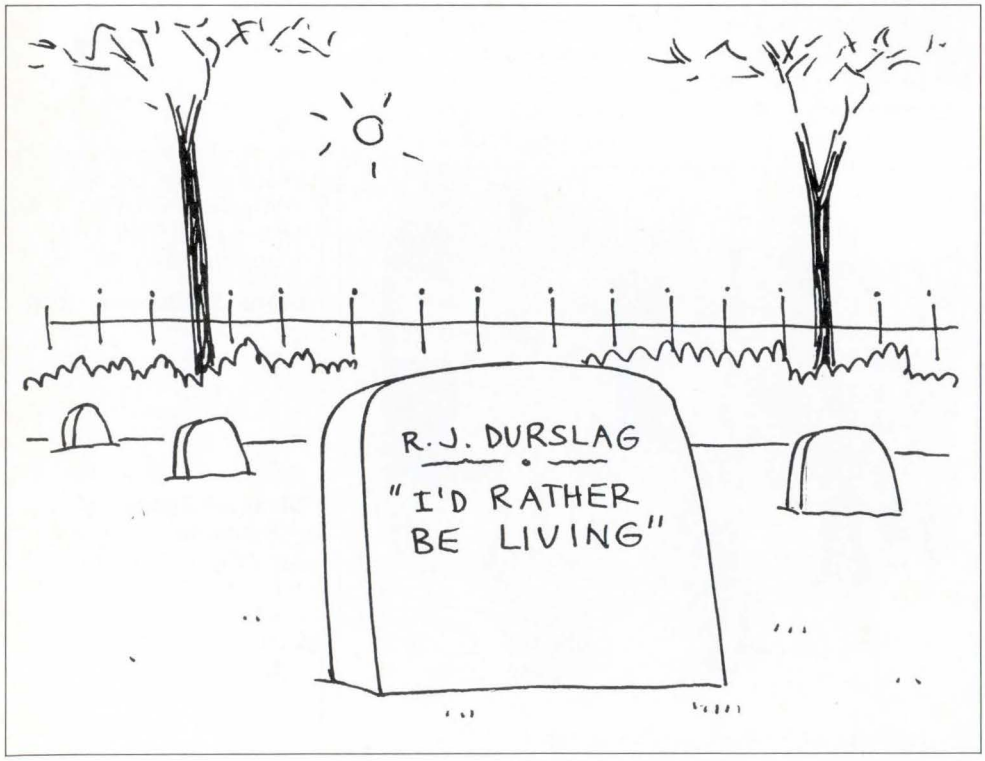

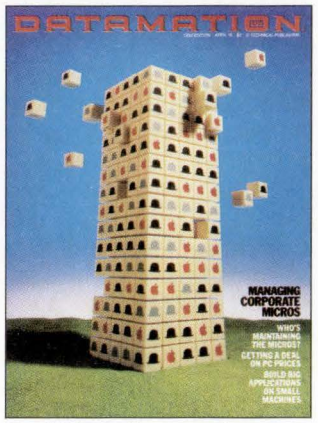

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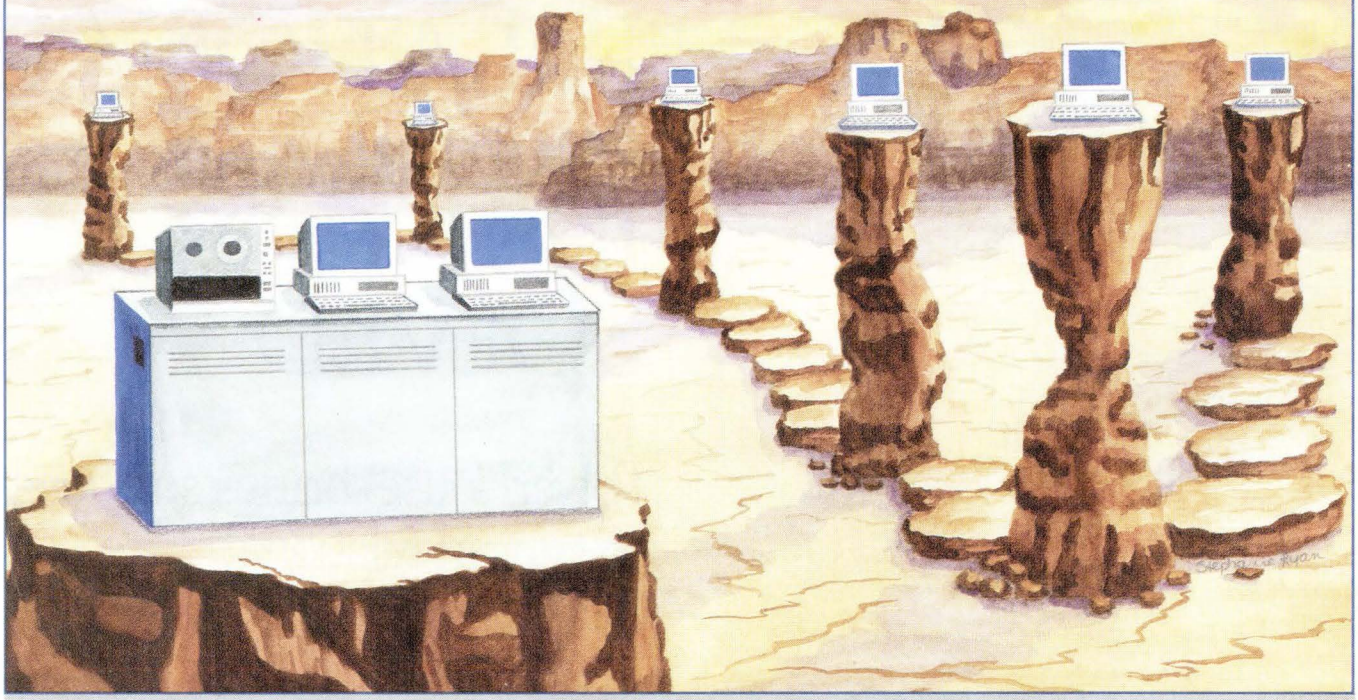

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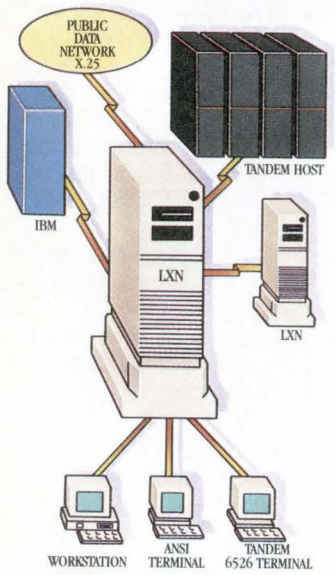

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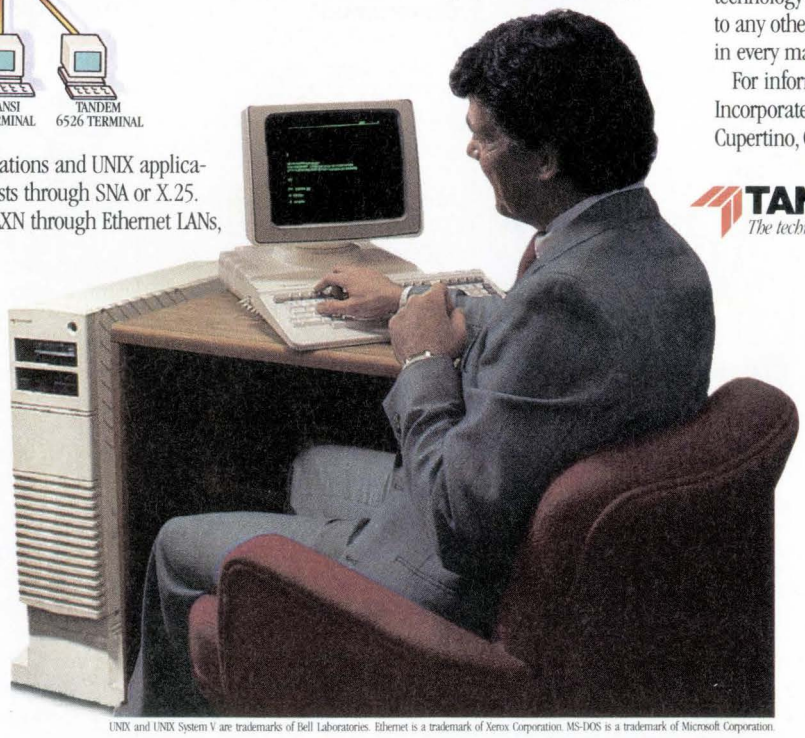

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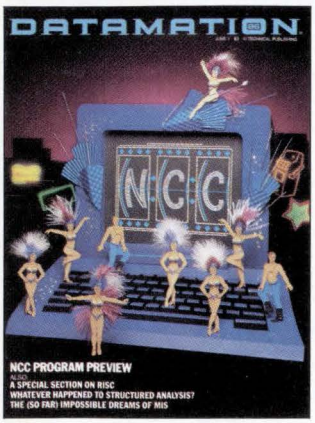

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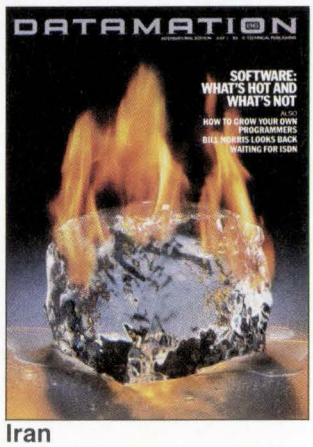

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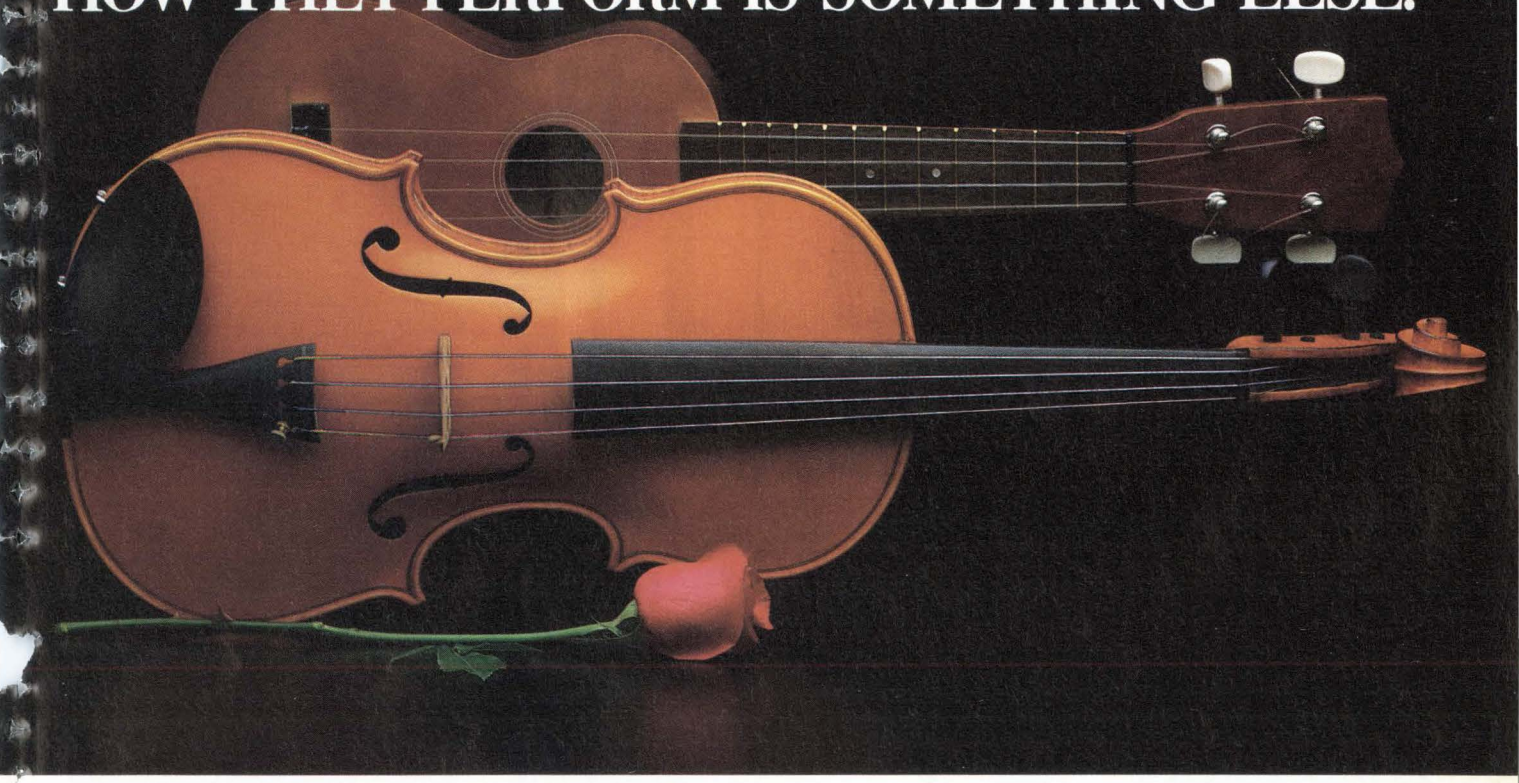

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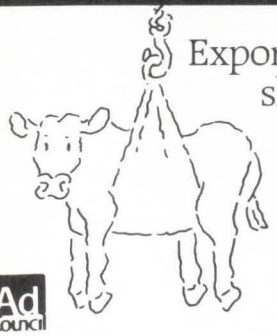

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"It's there, the systems exist. It's easy to integrate. It's not very expensive—less now than when we installed it. And it fits the needs of a very broad user base," he says.

Dow Jones News/Retrieval is an online information service of Dow Jones & Company, Inc., publisher of *The Wall Street Journal*. It offers over 40 business and financial databases, including exclusive online access to the full text of *The Wall Street Journal*.

Capone remembers, "We experimented with various means of dial-up connections, but they were not convincing."

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"You're looking smarter than ever, JCPenney," is more than advertising, it's how users throughout the company view their MIS department, and the EIS they've created. Dow Jones is a major reason it rates above average.

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"It wasn't very difficult at the time," Capone says. "Today it would be even simpler."

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Capone uses the service daily as a kind of executive security blanket. "I take a few minutes in the morning to look at the headlines and make sure I'm well informed. It really starts the day off right."

But what do others outside of MIS think of the decision to bring Dow Jones News/Retrieval inside?

JCPenney's CFO, Bob Northam, agrees wholeheartedly: "It's very timely and simple to use. In meetings, I can easily call up figures for immediate on-the-spot analysis."

Al Lynch, Director of Planning and Research, calls it ". . .one of the most powerful tools in our system. Thank goodness for the corporate insider trading data. It showed us some things that influenced a major deal. It can pay for itself very quickly."

Heather May, a coordinator for new business activities in Lynch's department, uses Dow Jones News/Retrieval because ". . .I believe in gut reaction. When my instincts say 'go to Dow Jones,' that's where I go. It sounds like habit, but there's a reason it became habit: I've found it works."

"It's a definite necessity," says Raul Consunji, a financial analyst at the company. "There's a lot of credibility in the name 'Dow Jones,' and no way to get along on the job without it."

Holly Clemente, manager of the Investor Relations Department adds, "This is a great way to obtain information quickly. Without it, everything would be done manually, and that shouldn't be the case in this day and age."

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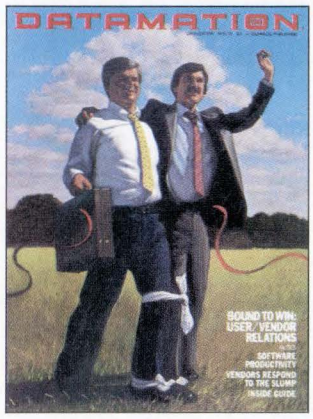

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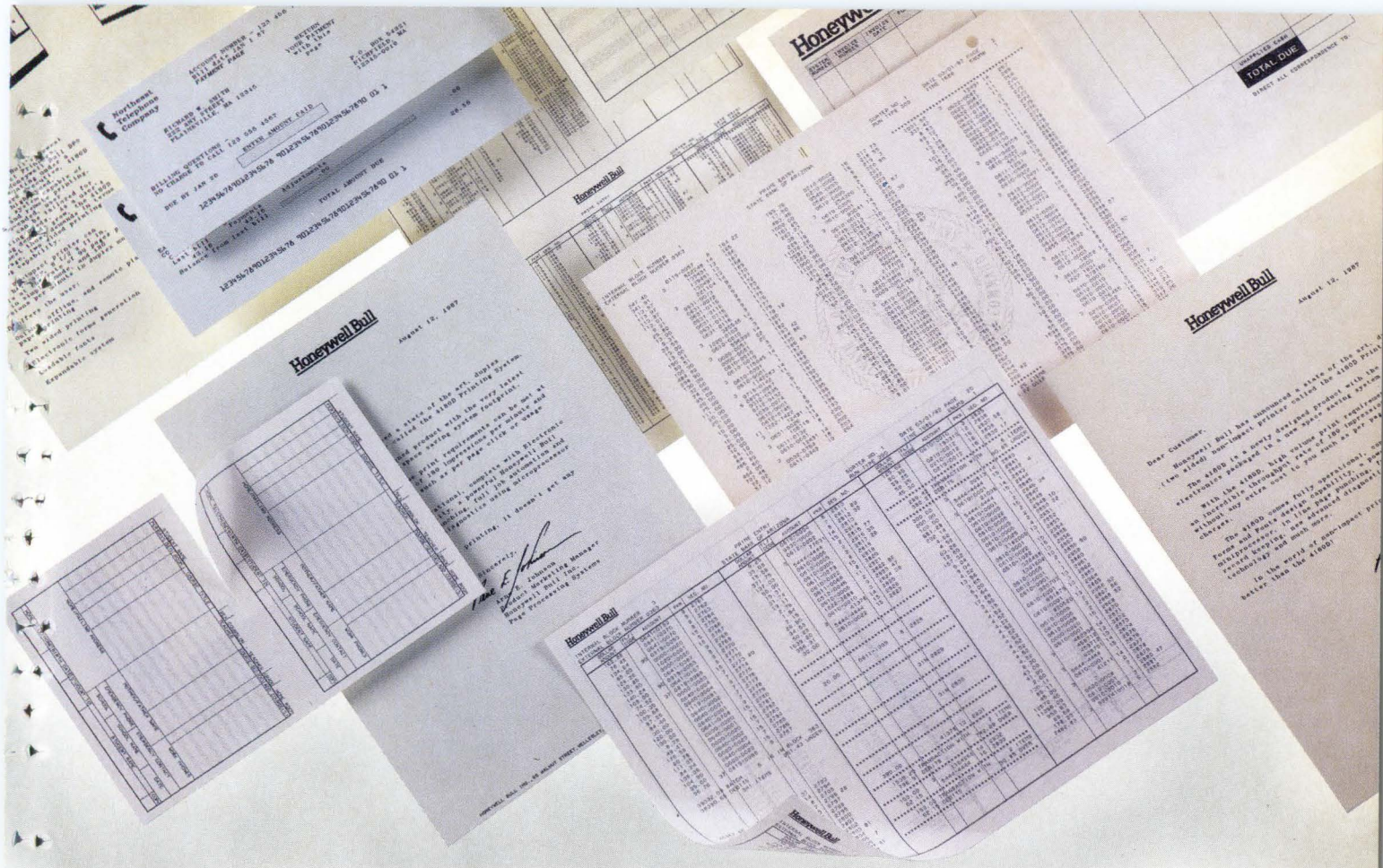

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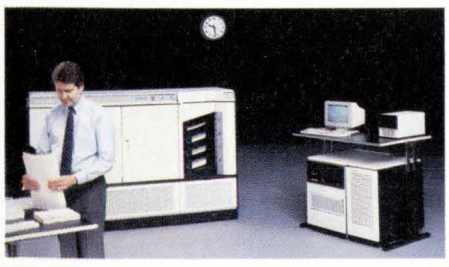

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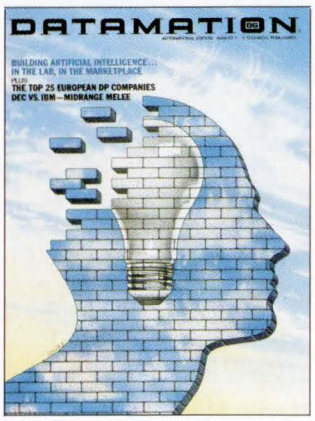

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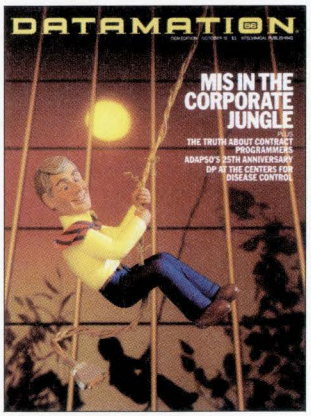

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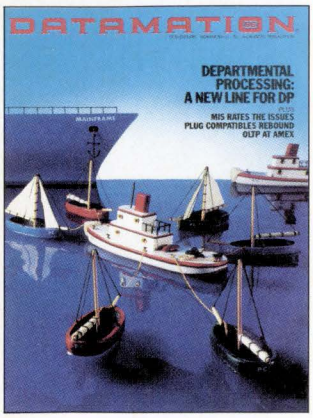

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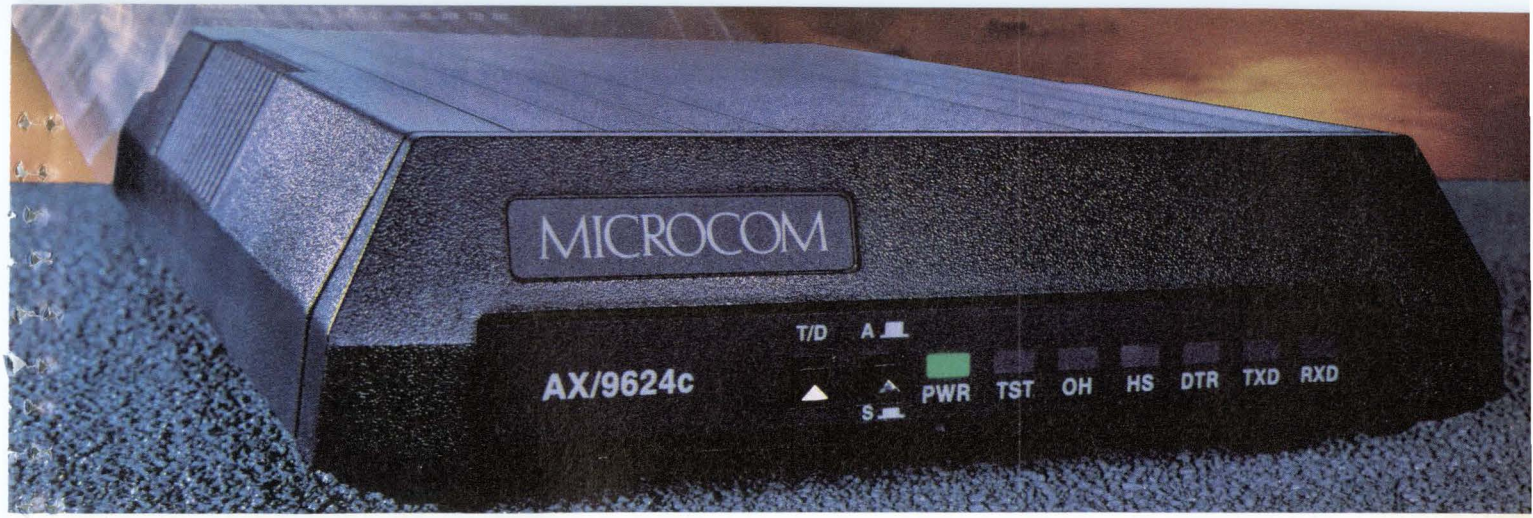
"That's interesting, John. How about you, Steve. What does your wife do for a living?"



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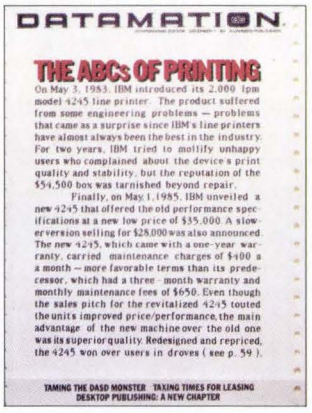
DATAMATION

THE ABCs OF PRINTING

On May 3, 1983, IBM introduced its 2,000 lpm model 4245 line printer. The product suffered from some engineering problems — problems that came as a surprise since IBM's line printers have almost always been the best in the industry. For two years, IBM tried to mollify unhappy users who complained about the device's print quality and stability, but the reputation of the $54,500 box was tarnished beyond repair.

Finally, on May 1, 1985, IBM unveiled a new 4245 that offered the old performance specifications at a new low price of $35,000. A slower version selling for $28,000 was also announced. The new 4245, which came with a one-year warranty, carried maintenance charges of $400 a month — more favorable terms than its predecessor, which had a three-month warranty and monthly maintenance fees of $650. Even though the sales pitch for the revitalized 4245 touted the unit's improved price/performance, the main advantage of the new machine over the old one was its superior quality. Redesigned and repriced, the 4245 won over users in droves (see p. 59).

TAMING THE DASD MONSTER TAXING TIMES FOR LEASING
DESKTOP PUBLISHING: A NEW CHAPTER

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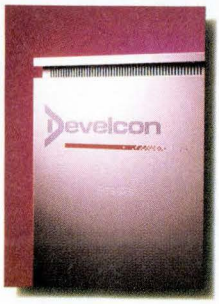

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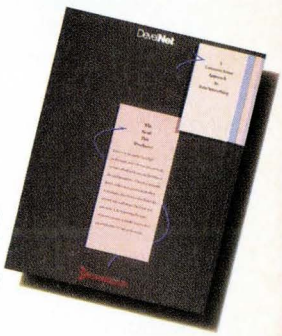

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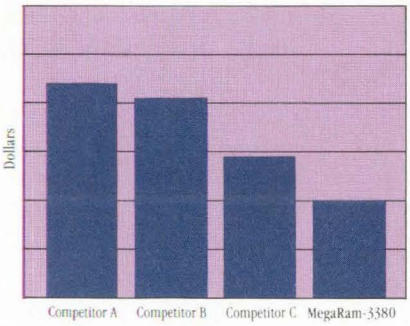

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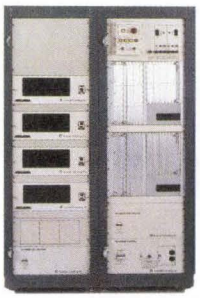

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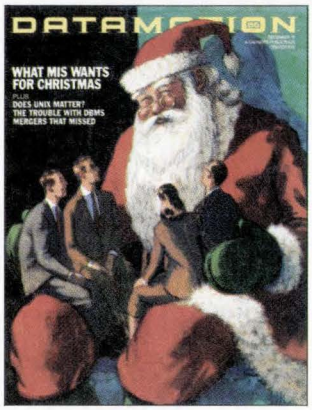

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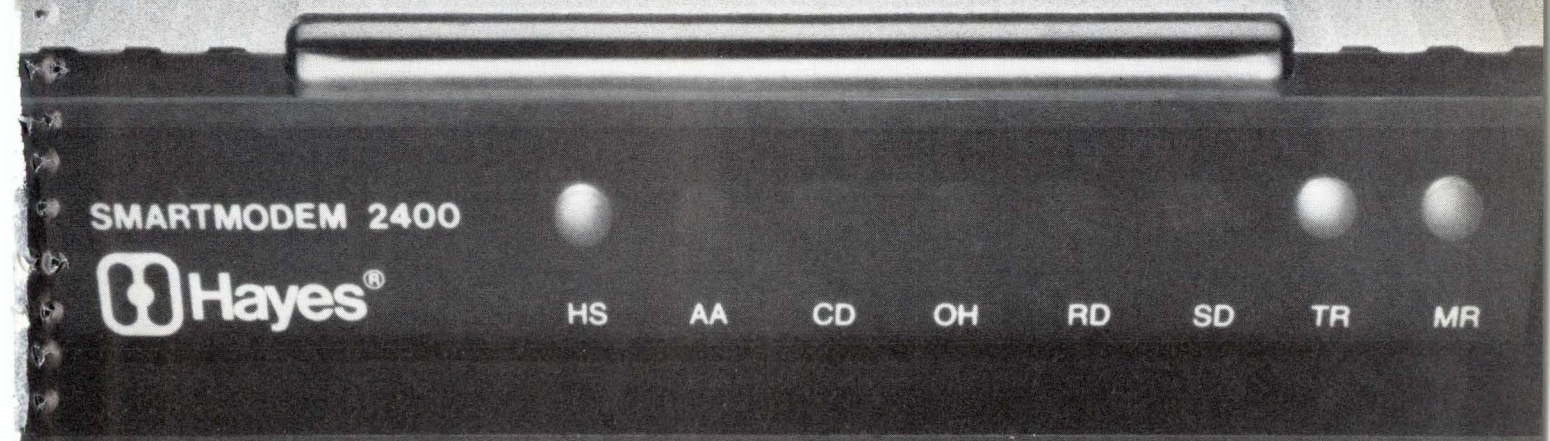

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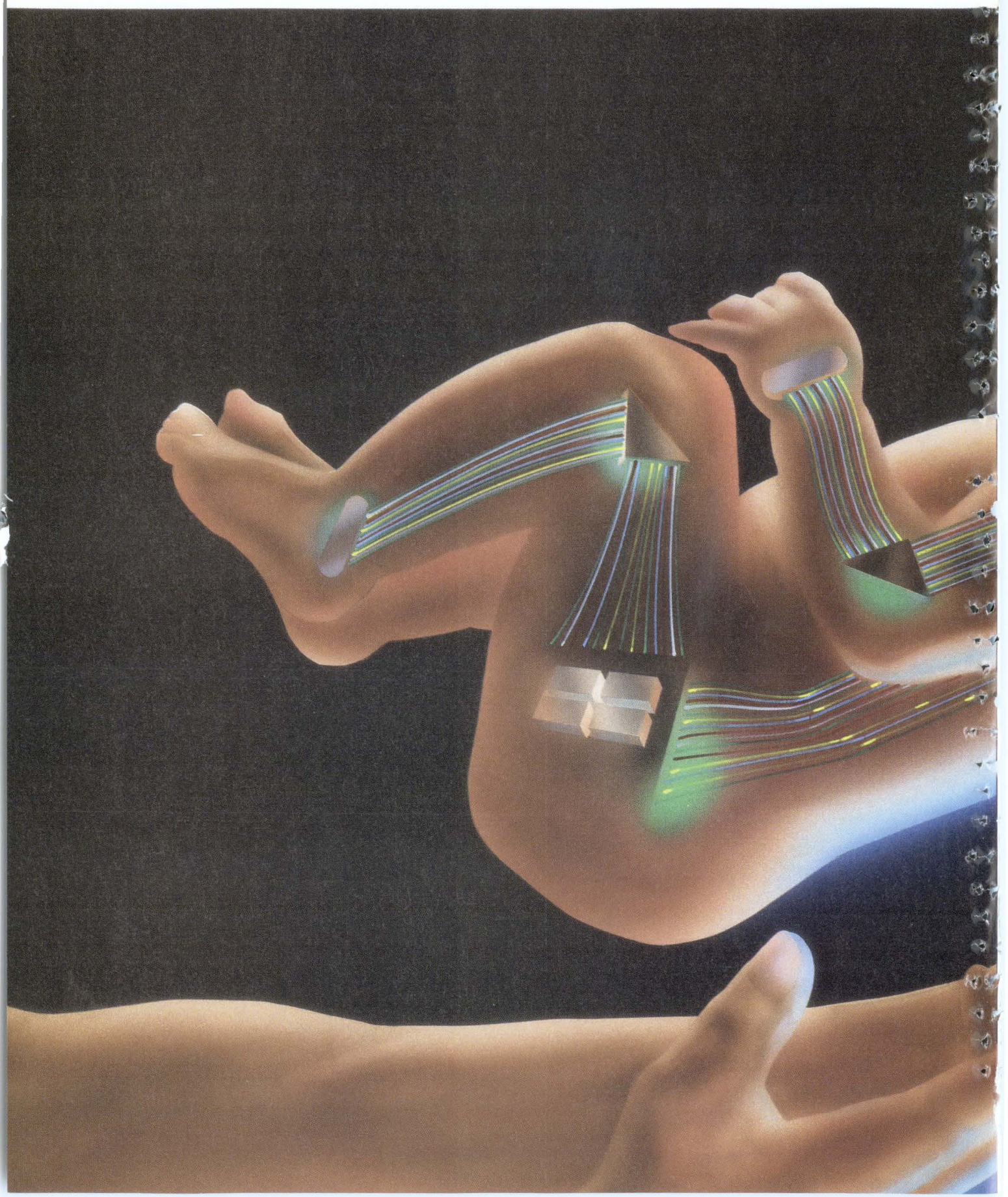

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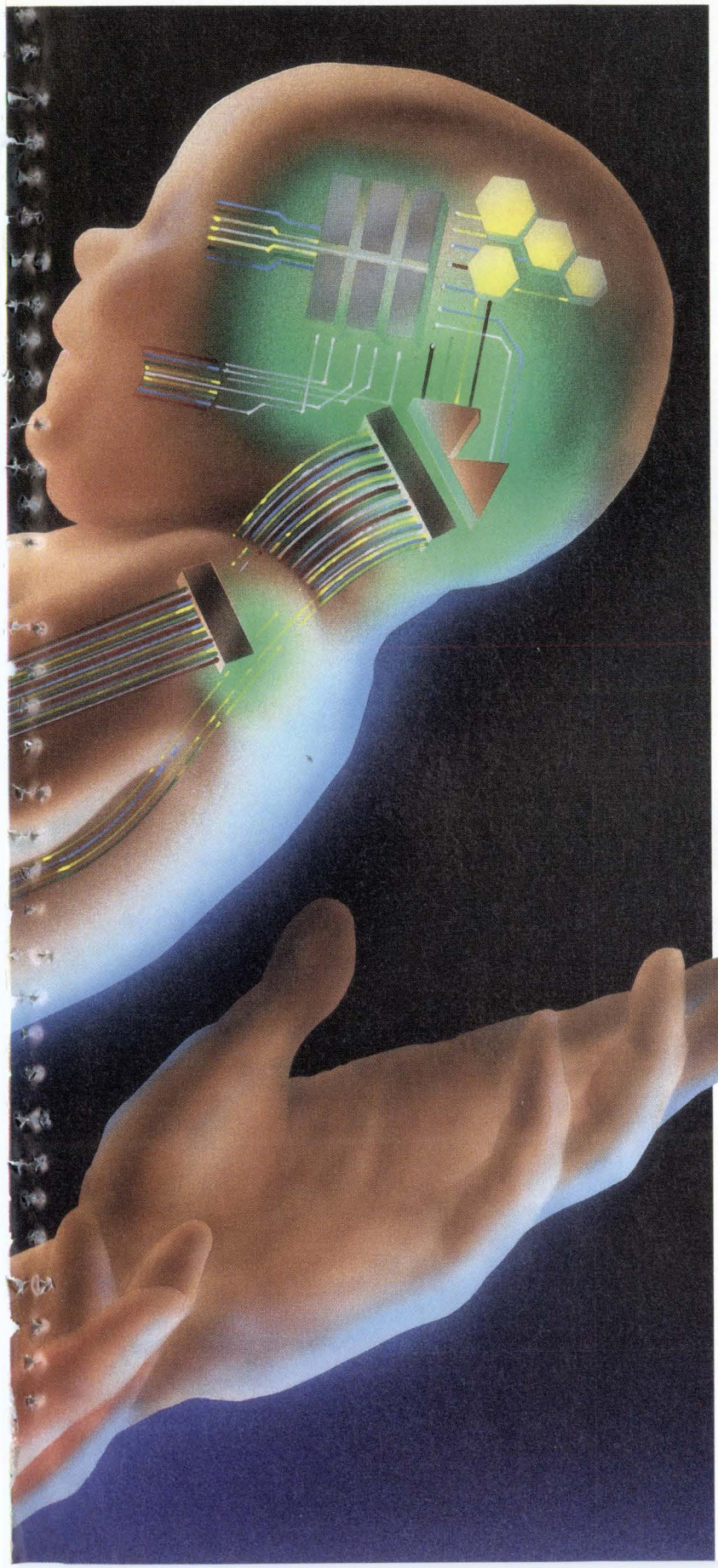

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Career Opportunities

1987 Editorial Calendar and Planning Guide

Issue Date	Recruitment Deadline	Editorial Emphasis
Nov. 1	Oct. 13	Printers
Nov. 15	Oct. 26	Mini/Micro Survey
Dec. 1	Nov. 12	PBX Breakthroughs
Dec. 15	Nov. 30	Systems Software

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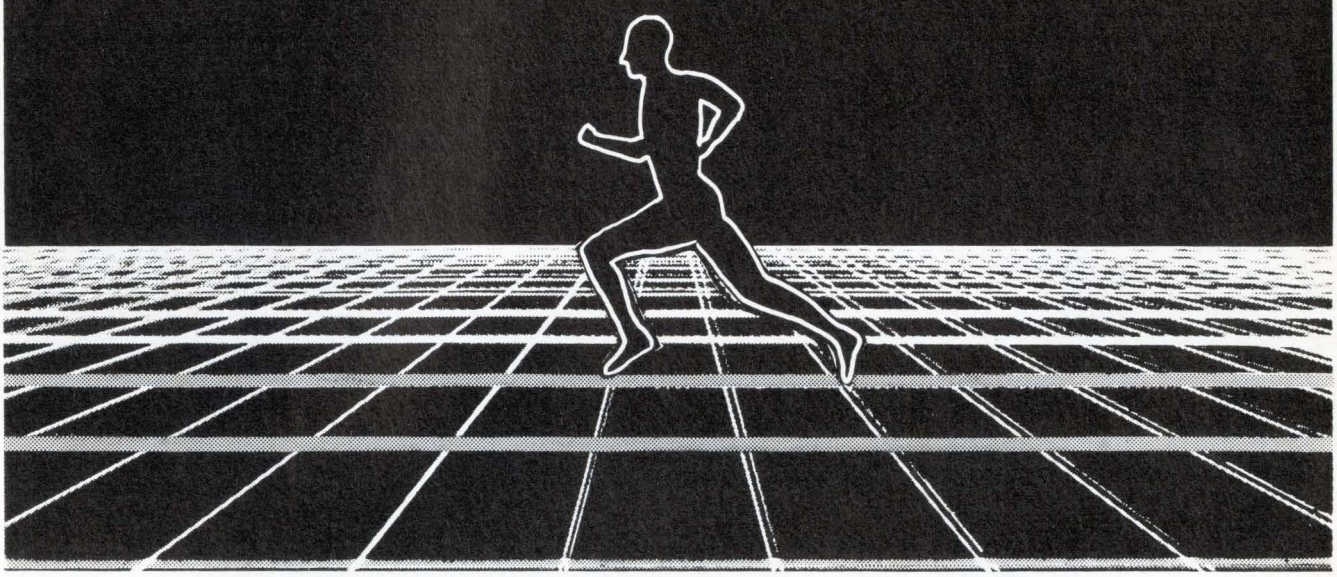

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- OSS Interfaces
- Application Processor Features/ Intelligent Network

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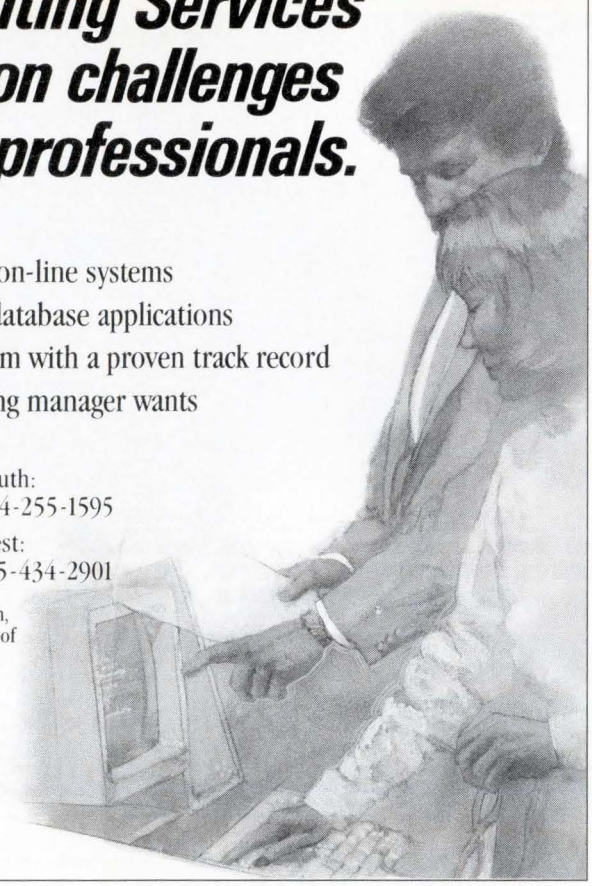

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POSITION DESIRED

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Present or Most Recent Position From: To: Title:

Duties and Accomplishments: Industry of Current Employer:

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_____

_____

Reason for Change: _____

PREVIOUS POSITION:

Job Title: _____

Employer: _____ From: _____ To: _____ City: _____ State: _____

Division: _____ Type of Industry: _____ Salary: _____

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Date Available

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