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NOVEMBER 1, 1987
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## IBM-FUJITSU AFTERMATH: THE CODE WARS

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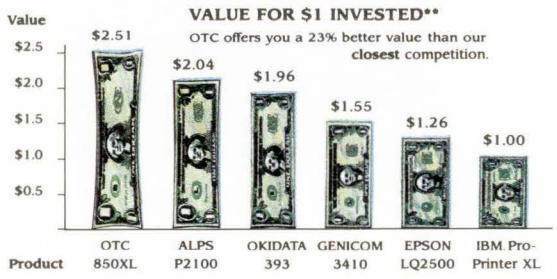


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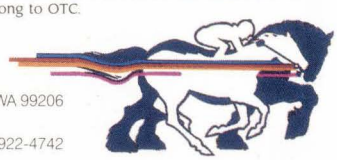

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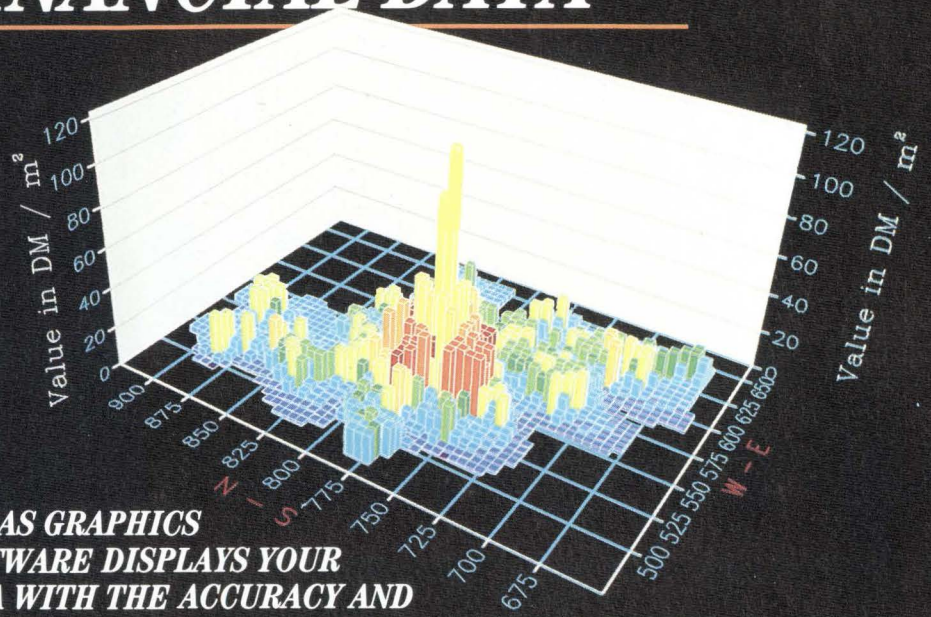


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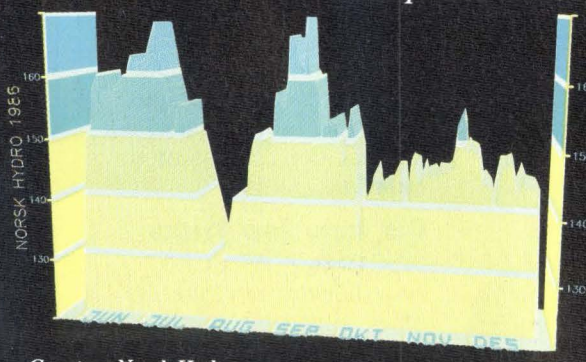


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# DATAMATION

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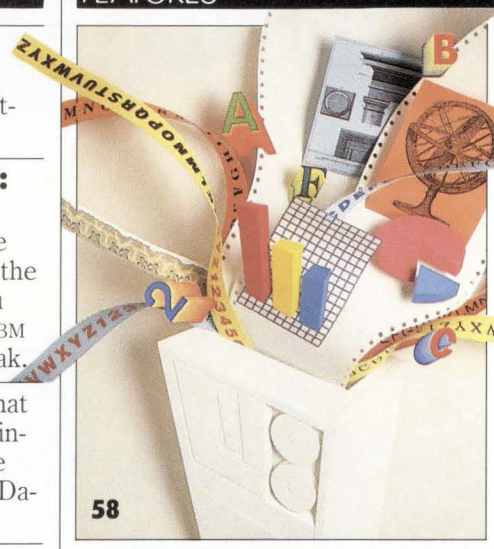


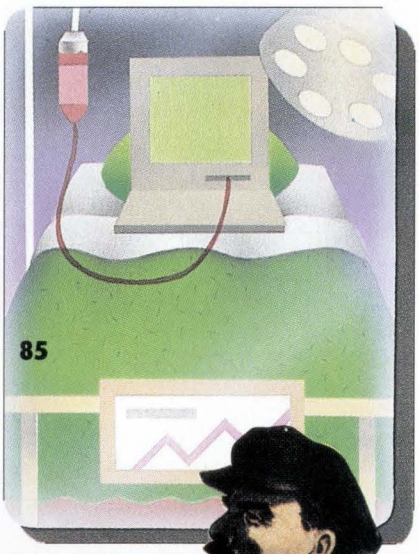

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# Editorial

## Speeding Toward 1988, Slouching Toward 1989

Economic forecasts no doubt are creeping into your IS budget planning sessions as your company prepares to do business in 1988 and beyond. The National Association of Business Economists predicts that the U.S. economy will continue to grow moderately next year and will fall into a recession in 1989.

Should such forecasts be barred from entry?

No, the ceos and cfos who ultimately approve IS budgets will insist. Why should investments in pcs, PBXs, database software, and maintenance be exempted from the tried-and-true methods of planning corporate outlays—especially since they now account for nearly 38% of all U.S. capital spending?

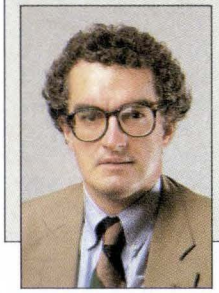
Maybe, says Cahners Publishing Co. economist Robert Stewart. "Spending on computers and communications should not be business-cycle driven," he says. "It should depend on secular, long-term trends." Stewart sees information technology as vital to U.S. companies' efforts to remain competitive and regain their edge in the global marketplace.

Then again, maybe not, say the IS execs who respond annually to the DATAMATION/Cowen & Co. surveys on mainframe, mini, micro, and communications purchases (the latest results will appear in our next issue). Since 1982, there's been a steady decline in the growth of hardware budgets at end-user sites. In the next three to five years, they expect annual budgets to increase only 7.8%—a number frighteningly close to the increases expected yearly in all capital spending.

Does the trend suggest that systems are simply becoming another type of equipment a company buys, the same as a fleet of trucks or an order for lathes?

We hope not. We want to believe the trend merely reflects the improvement in price/performance afforded by advances in technology. We want to interpret these spending patterns to mean that customers are spending more resources on software, especially applications that take advantage of 32-bit chips, 1Mb memories, and networking standards. And we want to think that today's IS execs, ceos, and cfos are smart enough not to lump systems investments in with capital spending outlays dictated by economic cycles.

There's a big difference between T1 trunks and trucks, LANs and lathes. Recognizing the difference is important to your company's future. Maybe it should spend big on systems in 1988. Maybe it should invest even more in 1989—regardless of a recession.



Tim Mead

TIM MEAD
EDITOR-IN-CHIEF

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# Letters

## Troubling Weaknesses

Jeff Moad's Behind the News article, "As AIDS Spreads, State Pc Systems Are Reaching Limits," (Aug. 15, p. 43) reported troubling weaknesses in the computerized information processing and transfer of AIDS and HIV test results. These primarily microcomputer-based systems reportedly have problems with operational security, confidentiality, and system loads. Yet the details suggest that there is a lesson to be learned from this.

Given the focus on security and confidentiality, the methods reported are curious. The AIDS Reporting System uses an "encoding device" called "Soundex," creating a key identifier from the patient's name, location, and date of birth. Soundex is a well-known algorithm for facilitating data searches, not for restricting access. Add to this the location and birth date of the patient, and one has all the information in a key value that a prospective intruder needs to invade someone's privacy without too much work. Yet the described systems avoid encryption techniques or even password protection of the data files. If confidentiality is an important factor, why use a key that is unnecessarily rich in information without benefit of an unrelated encryption technique?

We would make two inferences from this article. First, the article's attention to security and protection of privacy is disproportionate to the attention given these issues by the developers of any of the systems discussed. The security is, in fact, comparable to what would be applied to much less sensitive information: locking up the computer system and hoping that nobody will make a deliberate effort to learn what's in it.

Second, considering the techniques used (and those not used) and the solvable but still outstanding problems in these systems, we infer a cavalier treatment of software development. We'd guess that the test recording and reporting systems were developed in an end-user filing system like dBase or Clipper (which, incidentally, supplies Soundex as a language feature which any buyer of these products can apply without programming expertise). These environments do provide quick and easy data storage and reporting facilities, but they are very weak in the ways that the AIDS and HIV data systems are reportedly weak: procedural control, security, and efficiency. Moreover, it is typical for the "design" of systems with these tools to evolve "on the fly" because users let the environment define the problem rather than analyze it abstractly. To us, it is inconceivable that a competent analyst would perceive confidentiality as a serious concern and then develop a system in the ways described in your article. It is very conceivable that one would slap together a filing and reporting system in this manner, and then backpedal to cover security.

In summary, we read a story between the lines. You report that "privacy has been largely maintained" in a sensitive area of computerized information management, but give evidence that this is largely fortuitous. You describe a mandated nationwide system of confidential information transfer, but give evidence that the planning and coordination of this network is minimal. You report on systems strained by their load, but give evidence that they are handicapped by design. Those who worry about privacy and civil liberties in the information age will find no solace in your news.

STEPHEN MILLS
Director of Software Development
The Memory Bank Inc.
Salisbury, N.C.

## Portables

In your excellent story on portable computers ("Portable Possibilities," Aug. 15, p. 93), Connie Winkler notes that the best screen technology is gas plasma, "which has the highest resolution and, thus, greatest readability. But some portability is lost: plasma screens require an AC outlet."

Grid Systems Corp. manufactures laptop portables with plasma screens that don't require an AC outlet. Grid has been offering gas plasma screens on battery-powered laptop portables since the introduction of the GridCase in April 1985. In fact, Grid also has systems with both a plasma screen and internal hard disk.

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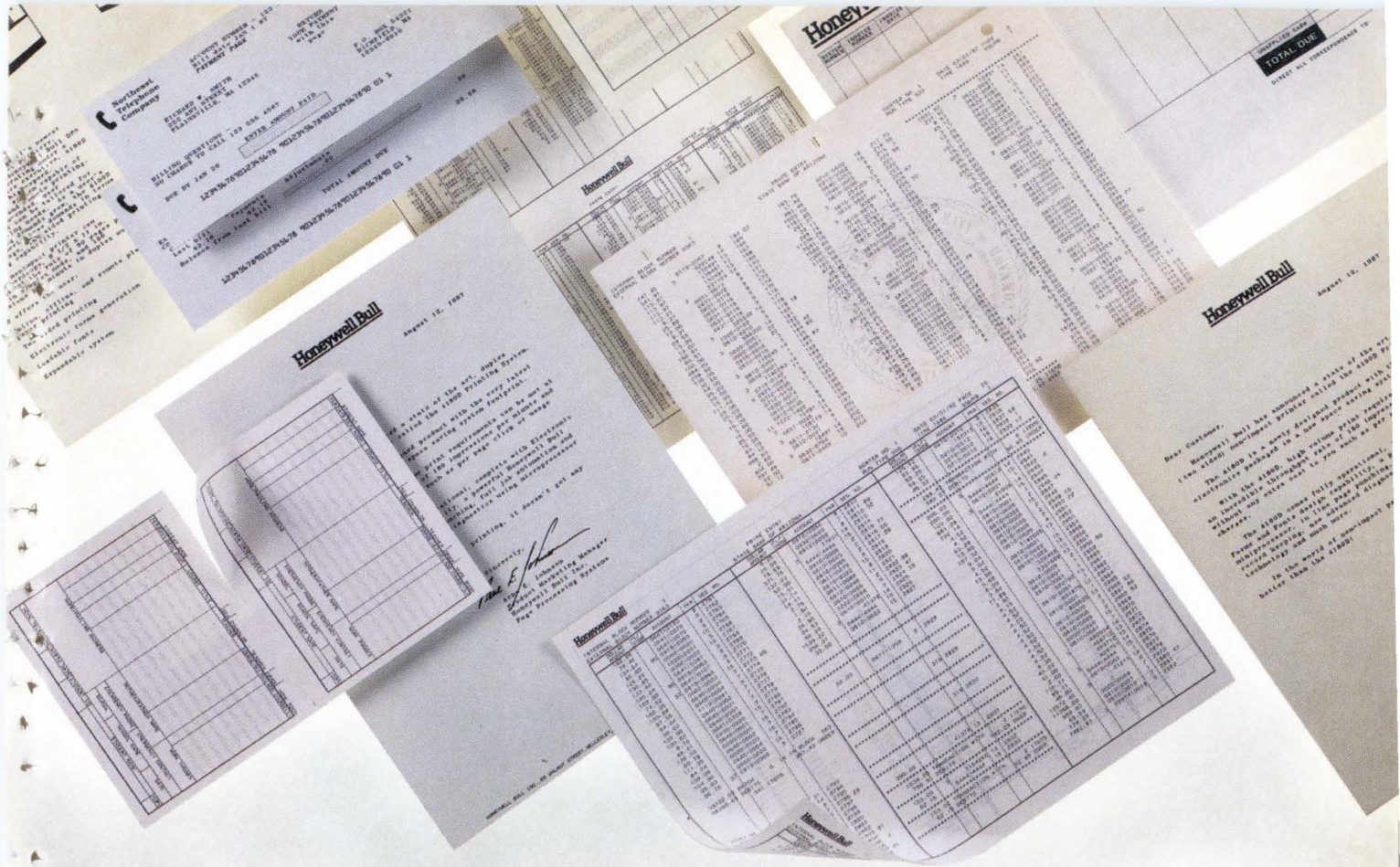
BARRY MARGERUM
Vice President, Marketing
Grid Systems Corp.
Fremont, Calif.

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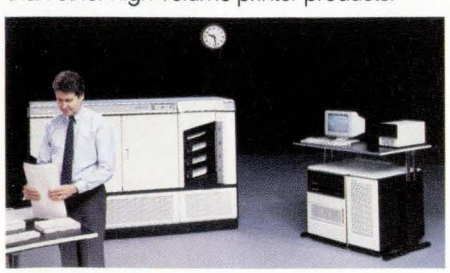

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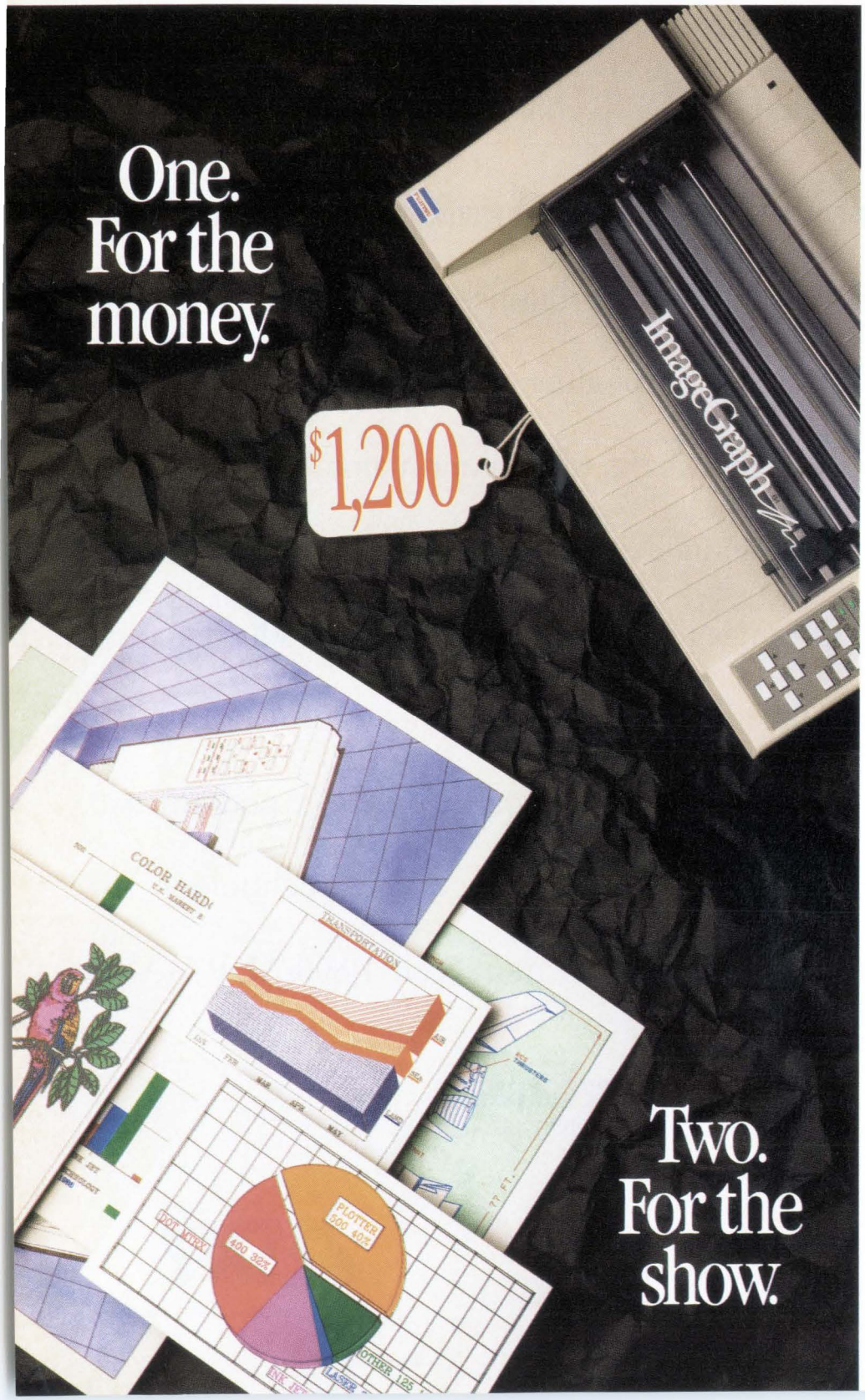


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**Circle 7 on Reader Card**

# Look Ahead

**CASH CREDITS FOR SOFTWARE**

SAN FRANCISCO -- IBM officials let fly with some news at the recent GUIDE meeting of top IBM users here. First, IBM vice president Carl J. Conti told large systems users that, as part of IBM's new graduated pricing program, the company intends to provide a level of cash credit for users upgrading to new versions of existing program products. Then, vice president Edward H. Lucente revealed a new automated IBM service to help users determine where they should make information systems investments and calculate what the return will be. The program, which is called the IS Investment Strategy and is based on IBM software, analyzes a user's current applications and business goals, compares the user's goals and spending with the competition, and identifies potential new IS investment areas and predicts the impact of that investment on corporate ROE and earnings per share. Lucente says IBM has completed studies for several large customers and plans to offer the service to "all of our large customers."

**THE PROOF IN THE PUDDING**

LONDON -- Ositop, the European users association dedicated to promoting open communications standards, is planning three pilot projects for 1988 that it hopes will prove that open standards work. The first pilot project will connect systems at the French Finance Ministry, the U.K. Department of Trade and Industry, and the European Commission. The second pilot project will focus on electronic exchange of data between banking and insurance companies and the third pilot project will involve graphic data exchange for the aerospace industry.

**CHALLENGING SUN'S FIGURES**

MOUNTAIN VIEW, CALIF. -- Perhaps not surprisingly, the lofty performance figures claimed by Sun Microsystems Inc. earlier this year for its new Sparc reduced instruction set chip set are coming under attack. Sun has said Sparc, which it is trying to sell as a commercial standard, churns along at 10MIPS or, in double-precision floating point intensive scientific applications, at about 1.1MFLOPS--slightly faster than a Digital Equipment Corp. VAX 8800. Industry sources, however, report that a battery of tests recently performed at Bell Core and elsewhere rate Sparc at no better than 7MIPS and below even the VAX 8700 in floating point. Sun marketing director John Hime called the Sparc performance reports a "smear campaign" and stood behind Sun's announced benchmarks. In fact, he said, "Since the software is more stable, it's probably better than that now."

# Look Ahead

**LIMITED APPEAL**

BOSTON -- IBM's new 370-compatible mini, the 9370, has been tagged the "VAX killer," but, according to the latest DATAMATION mini/micro survey (appearing next issue), it's hardly that. Only IBM's very largest customers, including United Airlines and Chrysler, are interested in the new computer at present, and the survey shows that only one out of eight evaluating the machine currently has plans to buy it. The main reason: the 9370 is too pricey at present. But interest is expected to pick up next year.

**BATTLE CRY IN MODEM MARKET**

SUNNYVALE, CALIF. -- Cermetek expects to fire the next shot in the apparent pricing war that's erupted in the 9,600bps modem market. A spokesman for the Sunnyvale-based firm indicates the fighting will intensify at Comdex later this week. In addition to five new models of V.32, Cermetek plans to announce a price drop in its original V.32 model. This comes as a counterattack to the price slashing that Universal Data Systems began in late September, when the Huntsville, Ala., subsidiary of Motorola cut the price of its CCITT-compliant V.32 modem to $1,595 from $2,495--a 36% drop. The spokesman for Cermetek admits that the West Coast manufacturer "will make its price more competitive," but doesn't expect to "go as low as" Universal Data's $1,595. He hints that Concord Data's $1,795 price is closer to the mark.

**LOTUS READIES OS/2 LANGUAGE**

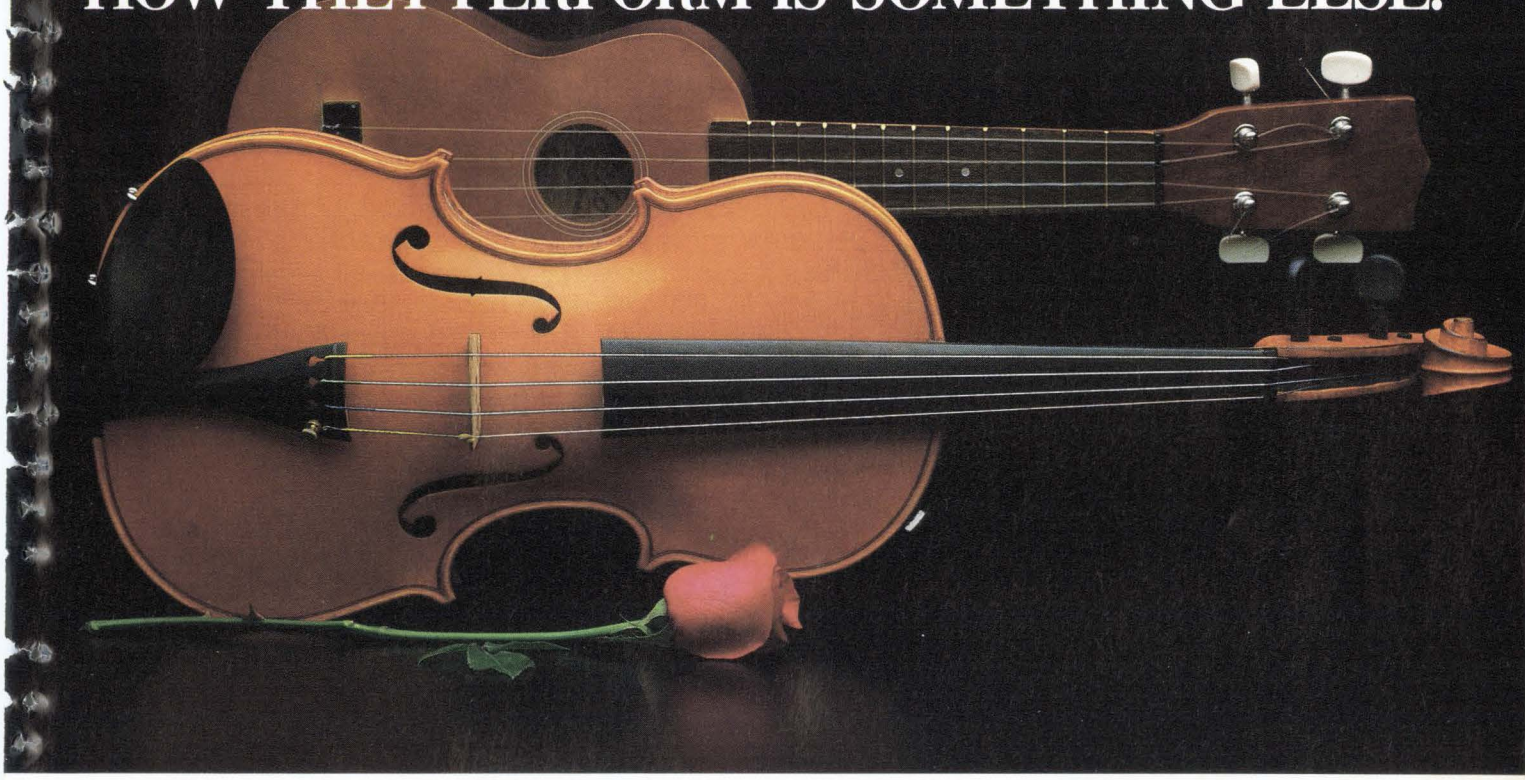
CAMBRIDGE, MASS. -- Lotus Development Corp. plans next year to release an applications development language for OS/2 environments built on top of a set of database, spreadsheet, graphics, and document packages. The Lotus Extended Development Facility will enable users to build or modify applications using all or portions of the four applications. The development of the Lotus Extended Development Facility is concurrent with an OS/2 relational database and the company's forthcoming graphics version of 1-2-3 and Manuscript document processor.

**RPG II'S HEART BEATS FOR SAA**

RYE BROOK, N.Y. -- IBM is adding RPG II, the mainstay development language of its System/36 family, to the Systems Application Architecture set of languages supported across its systems lines. Initially, the SAA embrace will begin RPG II applications running on the forthcoming version of OS/2 Extended Edition. The implementation promises a migration path to the lower-cost PS/2 systems as well as to the System/3X follow-on that has been code-named Silverlake.

(continued on p.12)

# MOST DBMS PRODUCTS ARE BUILT ALONG THE SAME LINES.
# HOW THEY PERFORM IS SOMETHING ELSE.



When you first look at relational DBMS products, the similarities are obvious. They're all built around SQL. Most include 4GL tools. They all have an impressive range of features and functions. And they all claim to deliver performance.

But once you get your hands on these products, the differences are dramatic. It's the craftsmanship in designing, building, and assembling quality components that differentiates a master's instrument from a beginner's.

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# Look Ahead

**THUMBS UP FOR TANDEM DBMS**

CUPERTINO, CALIF. -- The early word is positive on Tandem Computers Inc.'s new NonStop SQL distributed relational database. Pittsburgh-based Allegheny Ludlum Corp., has decided to replace an IBM host mainframe with multiple Tandem VLX processors linked to NonStop SQL. The new system will tie together eight distributed sites. Another early user is also a new Tandem third-party software developer. SysCorp, Pittsburgh, is moving its maintenance management applications from Wang hardware to the Tandem NonStop SQL environment and is using a NonStop SQL, 3-TXP system internally for new software development. SysCorp officials say a few early bugs in the new RDBMS have been fixed, and the system is meeting expectations.

**PS/2 GRAPHICS BY METHEUS**

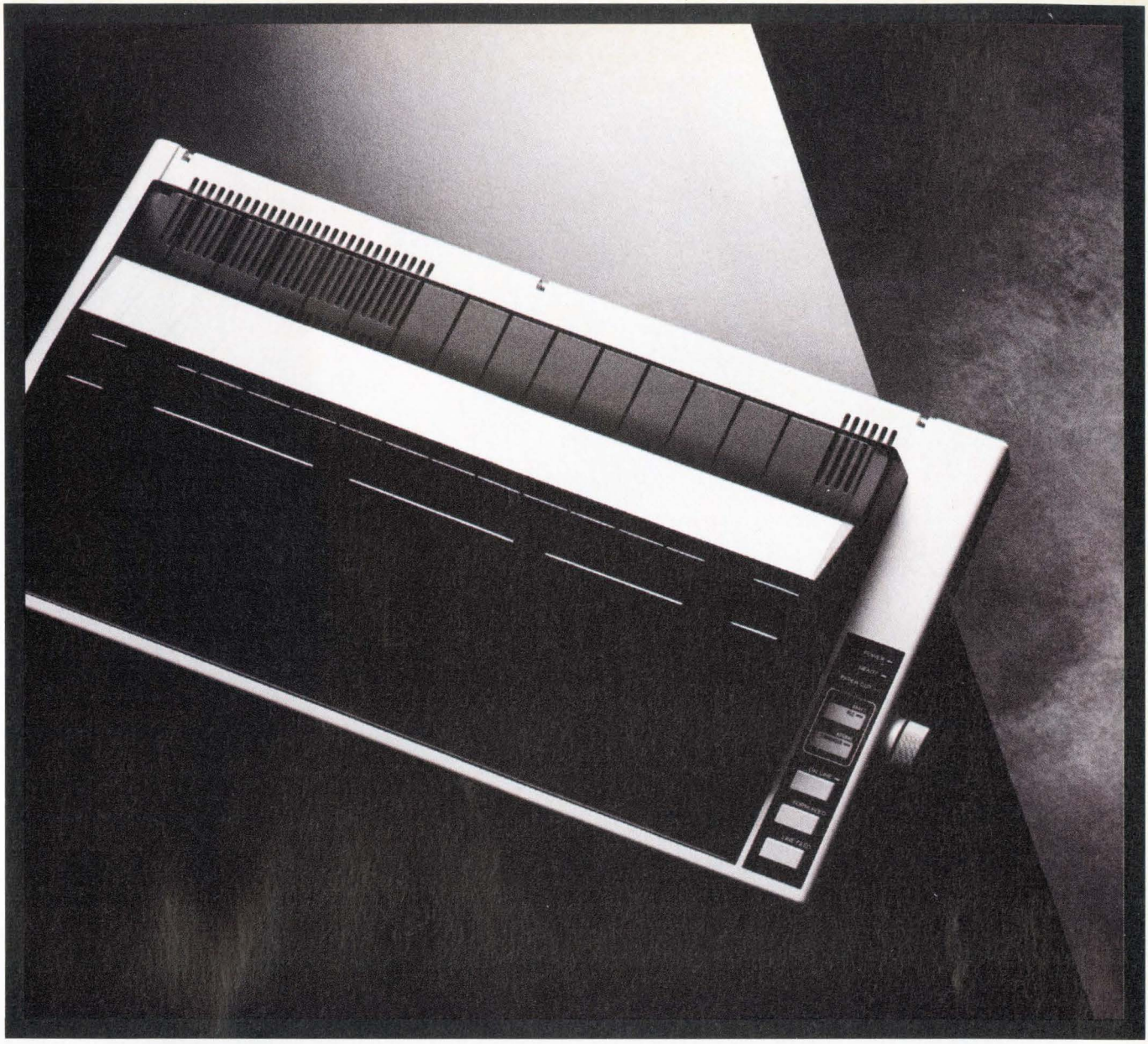
PORTLAND, ORE. -- CAD pioneer Metheus Corp. is about to try to parlay its graphics expertise into new business in the PS/2 market. Later this month, Metheus will unveil its Ultra-Graphics Accelerator card for the PS/2, a high-performance answer to the new VGA graphics card from IBM. The Ultra-Graphics Accelerator card will support 1,054-by-768-pixel resolution, sport a proprietary chip set, and be priced at $1,395.

**CHALK ONE UP FOR STELLAR**

BETHESDA, MD. -- The first battle in the war between makers of the new technical superworkstations has been fought and apparently won by Stellar Computer Inc., which beat out Dana Computer Corp. on a bid to supply the National Institutes of Health with four workstations. Sources at the NIH's computer research technology division say Stellar was selected because of its superior graphics and bandwidth. The machines will be used in molecular modeling and molecular mechanics applications. NIH doesn't expect to take delivery of the first systems until next spring.

**RUMORS AND RAW RANDOM DATA**

Hewlett-Packard is poised for substantial CIM sales in China following the recent signing of an independent software vendor agreement with Shanghai Metallurgical & Mining Machine Manufactory, a unit of the government Ministry of Machine Building Industry. The unit will resell HP software for HP 3000 series minicomputers now being assembled in Beijing from imported components. . . . Don't be surprised to hear that SPSS Graphics will be available for Unix users as early as the first quarter of next year. Already operating in CMS, VMS, and MVS environments, the mainframe and mini graphics package from Chicago-based SPSS Inc. will soon help out Unix users, who, says a spokesperson, "are desperately seeking application software."



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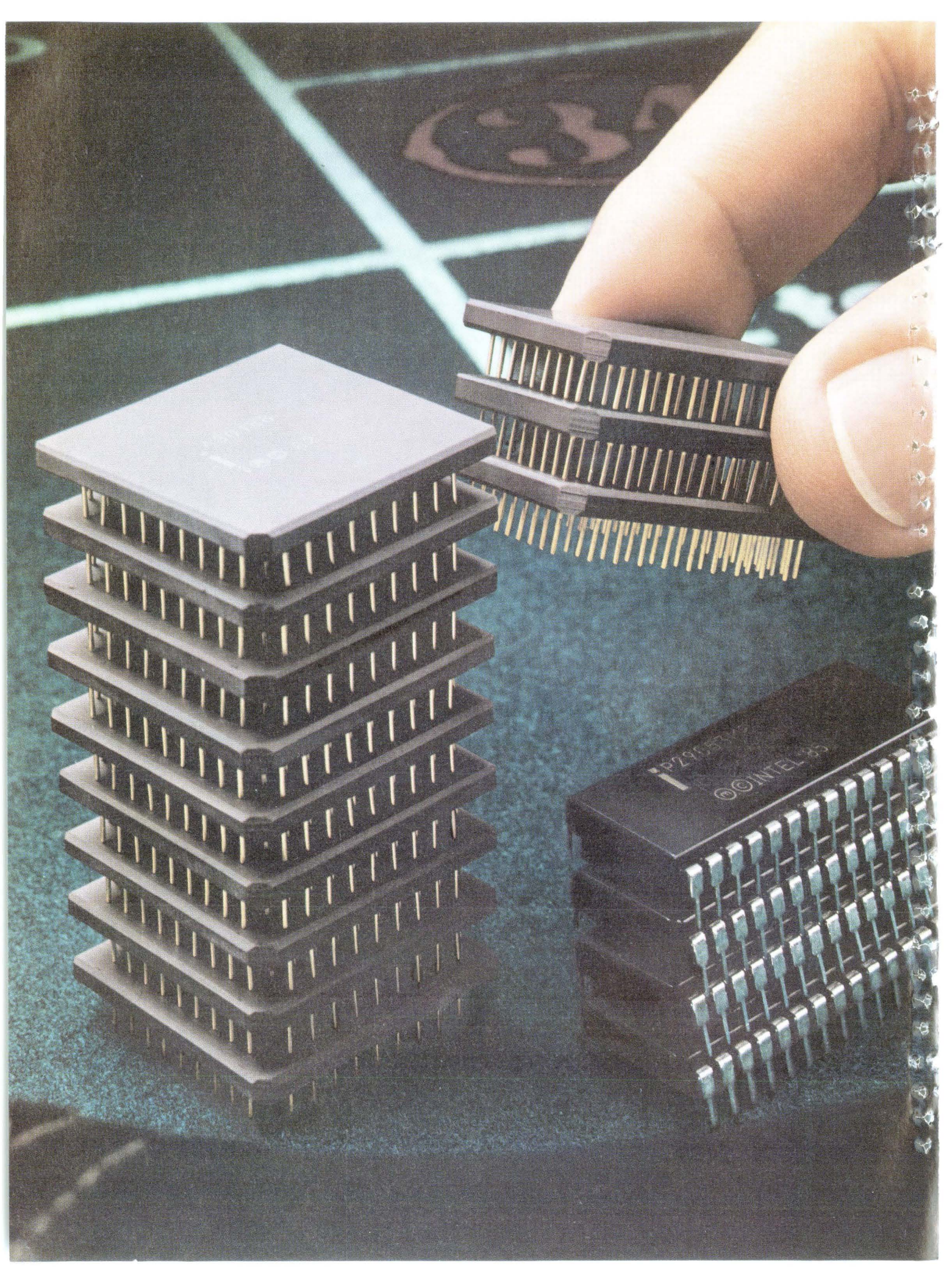
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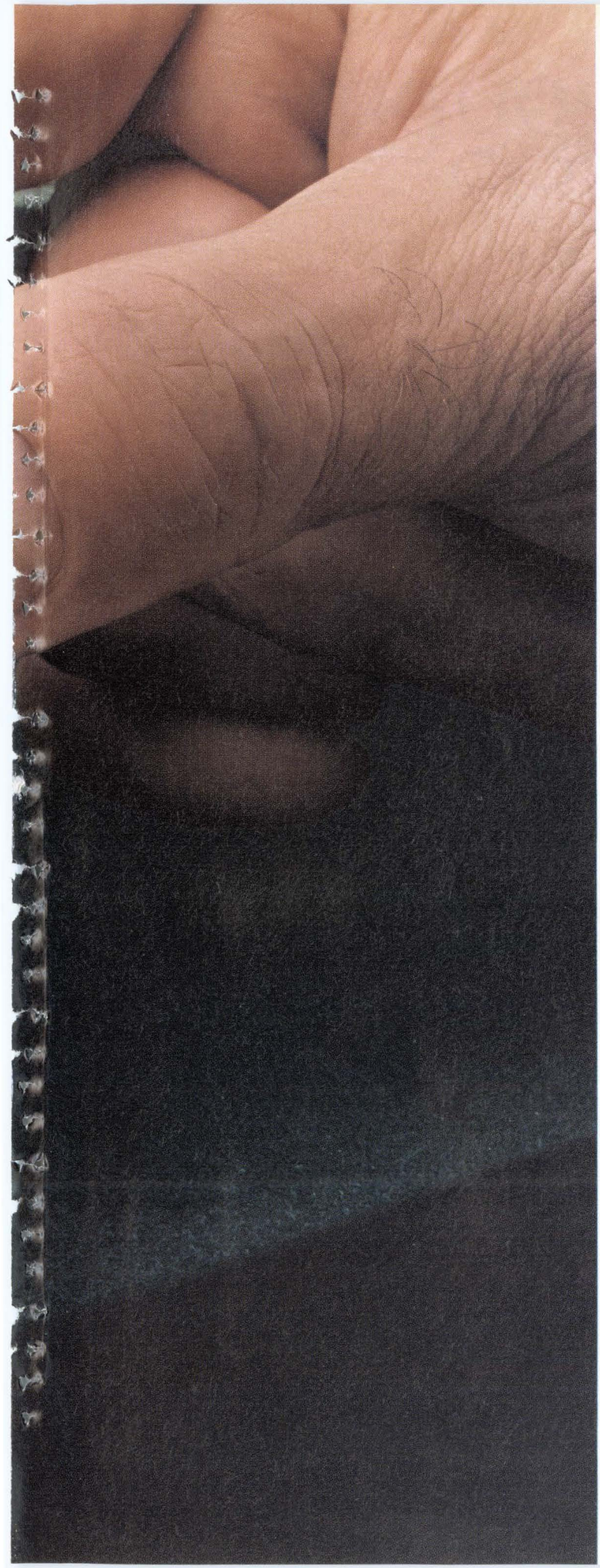

# Three years ago Intel was so excited about ISDN, they bet their chips on it.

In 1984, the technology for ISDN wasn't yet available. And Intel's customer application of ISDN, through Mountain Bell —a US WEST Company—and AT&T Network Systems, wasn't even slated to begin until February, 1987.

But one of the world's leading microchip manufacturers saw the potential of ISDN to link its offices in California, Oregon and Arizona at higher levels and economies of integration. To handle data traffic from a variety of networks and computers at each site.

So Intel, which already supported ISDN as an industry standard with a special set of semiconductor chips, decided to emulate ISDN on its existing networks, and made an early corporate commitment to migrate towards ISDN.

Today, that commitment is paying off. In field trials, Intel has been sending voice and data simultaneously over ordinary Mountain Bell telephone lines using the AT&T 5ESS™ digital switch to support PC networking and provide fast file transfer between the company's ETHERNET local area networks.

"Combining the bulk of our voice and data traffic on the same twisted pair wiring will save us considerable money because we do not need to run coax cable through the plenums, buildings and corridors," said Don Melvin, Intel corporate telecommunications manager.

"The ISDN network we're building today will allow us to integrate voice and data, not only in our T1 network, but also in our digital switches right to the desk, and extend switched data routes to the computer host," he added.

"We need to have the global digital connectivity end-to-end which ISDN brings us, and we want to be able to make use of its shared bandwidth on demand without having to do manual patching."

As we did for chipmaker Intel, AT&T and your telephone company can help your business cash in on the networking and cost efficiencies of ISDN. To learn more, write on your business letterhead to: AT&T Network Systems, P.O. Box 1278, Room 3168, Morristown, N.J. 07960-1278.

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**Serves 250. Electronic Mail.**

Blend together your favorite combination of LANs with Banyan BNS and DTS network servers. Season liberally with Banyan electronic mail service and allow network productivity to rise.

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For best results, start with a piping hot company. Select a fresh local area network and fold in VINES/286 software. As company expands, garnish with additional Banyan servers and toss lightly.

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IBM-FUJITSU AFTERMATH: THE CODE WARS

# Users See Competition as Chief Benefit of Arbitration Ruling

## Though the IBM-Fujitsu settlement does hold the promise of new choices, most say the commitment to IBM will not be easily shaken.

BY JEFF MOAD

There are those who think that, once all the dust settles, a winner eventually will emerge from the recently resolved IBM-Fujitsu software dispute.

It won't necessarily be Fujitsu, which probably will be forced to pay IBM hundreds of millions of dollars for access to systems software source code and for immunity from alleged past indiscretions. Nor will it necessarily be IBM, which will be required to make available to Fujitsu certain proprietary source code that today it doesn't license even to its customers, much less competitors.

The winners, say some observers—including the arbitrators—will be the users of IBM and compatible large systems who, because of the deal, will begin to benefit from something new in the IBM systems software market: competition.

As a result of the arbitrated settlement of the five-year-old dispute, not only will Fujitsu be free from IBM legal threats to its existing OSIV/F4 mainframe operating system, but Fujitsu also will receive limited access to IBM source code for ongoing product development over a five-to-10-year period. On top of this, Fujitsu for the first time is free to license its systems software to users of IBM mainframe hardware.

"The order," according to the authors of the historic settlement, arbitrators John L. Jones and Robert H. Mnookin, "will foster competition with respect to IBM-compatible mainframe operating system software." Specifically, they said, users would now be able to "maximize performance and economy by assembling mainframe data processing systems based on a multivendor approach to the purchase and licensing of software products."

Users contacted by DATAMATION say it would be great if that happened, but they aren't holding their breath or counting the days until they can buy a Fujitsu version of MVS/XA or ACF/VTAM. First, they would have to be shown that a vendor other than IBM could produce and service reliable, compatible operating system software. Then they would have to be sure Fujitsu could keep up with the future twists and turns of MVS/XA and other key IBM program products. Even then, most IBM customers would be wary of a compatible OS that wasn't blue.

"We would hope some people would buy it [compatible software from Fujitsu], if that would increase competition in the market," says John F. Link, IS director for Sun Co. Inc. of Radnor, Pa., and an IBM user. "But it is very unlikely that we would. In our case, you're dealing with a 20-year alliance with IBM and millions of dollars worth of applications. We're not going to threaten that."

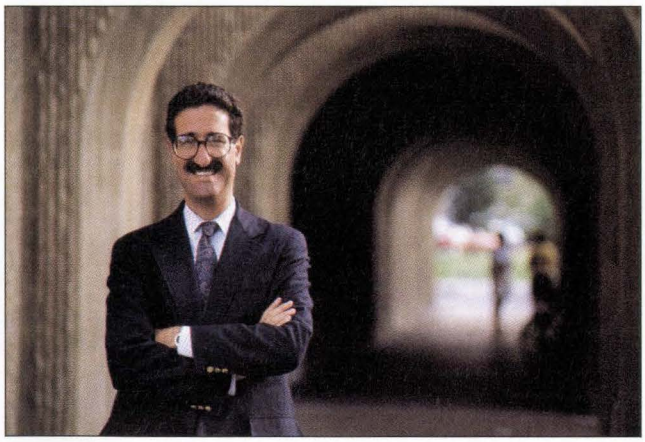
Nonetheless, Link and other users say the IBM systems software market could use some competition. Since 1980, users have seen price tags on basic IBM systems software products increase at an annual compounded growth rate of nearly 28%, according to Phoenix-based Annex Research Inc. An IBM customer who in 1980 paid $251,000 for a typical system software suite consisting of MVS/SP, XA Data Facility, DF Sort, NCP, and other programs, in 1987 paid $1.5 million for the same products.

"We're concerned about the rate of growth in software costs," says Daniel Cavanagh, senior vice president for Metropolitan Life Insurance Co. in New York. Last year, Metropolitan Life wanted to add a 3090 180E to the 3090 200 it already had installed in its data center. Instead, the company was forced to replace the 3090 200 with a three-processor 3090 300E in order to avoid having to pay the system software licensing fees twice. "Before, operating systems software costs were incidental," according to Cavanagh. "Now, it's something we worry about more and more. We'd like to see some competition there."

The IBM-Fujitsu agreement opens the door for that competition, says Annex Research president Bob Djurdjevic. "There have been two key barriers to Fujitsu becoming a factor in IBM-compatible systems software," says Djurdjevic. "The first is the traditional inability of many Japanese companies to do the kind of creative work necessary in software development. And the second is the legal barrier. The settlement means you can buy your way around the legal barrier."

Djurdjevic believes Fujitsu is determined to make good use of its newest investment by developing more IBM-compatible systems software. "It would have been easy for them [Fujitsu] to fold up their tent in June of 1985 and go away. Clearly, they weren't ready to do that," says Djurdjevic, adding, "IBM wins in the short run because it's going to get a lot of money. But Fujitsu wins in the long run. I expect before too long there will be a line in front of IBM's door consisting of other companies wanting similar access to IBM source code."

Not everyone sees it that way, however. Plug-compatible mainframe hardware



ARBITRATOR MNOOKIN: The decision will foster competition.

Photograph by Sharon Hall

vendor National Advanced Systems in Santa Clara, for one, has no plans to line up to pay IBM for access to its source code, says senior vice president David Turner. "I wish the deal Fujitsu has signed would lead to increased competition in system software. I would be up in the stands cheering. But I just don't see it." According to arbitrator Mnookin, there's nothing in the settlement order that would require IBM to make a similar deal—source code access for pay—with any other company.

### Source Code Not a Necessity

Other companies in the IBM-compatible systems software business say they don't need access to IBM source code. According to Ann Hardy, president of Key Logic Inc., Cupertino, Calif., which is developing a transaction add-on facility for MVS, "We don't need [IBM] source code because we're not trying to look like or replace MVS. All we need is access to MVS interfaces, and IBM is publishing that."

Officials at Amdahl Corp., Sunnyvale, Calif., had a similar message. Amdahl, which is developing the Aspen transaction-oriented compatible operating system, only needs the IBM interface information currently in the public domain, says a spokesman. Amdahl doesn't expect to benefit from Fujitsu's access to IBM source code.

There are several problems with viewing the IBM-Fujitsu settlement as opening the door to a new era of compatible systems software competition. For one, it's still not clear exactly what IBM source code Fujitsu will get to use in its future product development. This will depend on the set of instructions that the arbitrators are currently in the process of drafting. Mnookin declines to tell DATAMATION what guidelines the instructions will be based on and would say only that they will allow Fujitsu to develop and maintain IBM-compatible operating system software.

There are also a couple of potentially major loopholes in the settlement as it's been discussed publicly so far. First, the arbitrators plan to supplement their order with a list of safeguards to prevent the use of one company's source code in the development of hardware by the other company. Perhaps more significant, the settlement order says either company can refuse to hand over source code to the other if that code "represent[s] fundamental and extraordinary software advances." Whether or not any particular piece of software represents such an extraordinary advance would be determined by an independent official.

Some users see another potential problem. The arbitrators' order may give Fujitsu access to IBM source code for five to 10 years, but what happens after that? "IBM has given them a window, but it's of limited duration," says Sun Co.'s Link. "We've been led to believe that there's a lot of work being done by IBM on system software at Santa Teresa [research facility in San Jose], and we expect to see several major changes in MVS over the next few years. I'm not sure they [Fujitsu] will be able to keep up." Some observers call the follow-on version of the operating system MVS/XB and expect it to accommodate larger multiprocessor configurations and expanded addressing.

According to an executive at one compatible hardware vendor, who asked not to be identified, "Who's kidding whom? XB is coming, and who's going to do business with Fujitsu knowing that? Fujitsu simply had a lot of software out in the field that was contaminated by IBM's legal challenge, and this agreement removes the threat of that contamination and gives Fujitsu time to figure out what to do next." Some feel Fujitsu will use the five-to-10-year period set aside by the agreement to move its OSIV/F4 operating system gradually away from IBM compatibility.

### Fujitsu Users Heartened

Meanwhile, the settlement has given many of the 1,500 users of the Fujitsu operating system—mostly in Asia and parts of South America and Europe—reason to breathe a bit easier.

According to Fujitsu user Takahiro Miura, managing director of Nippon Oil Information Systems in Tokyo, "I feel the arbitration conclusion is relatively fair and good for Fujitsu's users. We are very glad for this judgment. It maintains compatibility between Fujitsu and IBM operating systems, so it is very helpful because we will have a chance to choose between Fujitsu and IBM hardware and software."

Another advantage of the agreement, according to Yusuke Hara, director of K-Lines Information Systems, Tokyo, is that "Fujitsu engineers can approach IBM much more frankly and openly than before." Hara, however, has one concern: "If Fujitsu pays something to IBM, I hope it does not increase the cost of the OS and become a burden to the user." ■

## Details of the Ruling

The recently announced IBM-Fujitsu settlement resolves a five-year dispute between the two companies. The dispute was based on IBM's charge that Fujitsu's 11-year-old OSIV/F4 operating system illegally borrows from IBM intellectual property, namely its MVS operating system and other programs. IBM and Fujitsu attempted to settle their differences with a 1983 out-of-court agreement. That agreement fell through in 1985, but it required the two companies to submit any new problems to a panel approved by the American Arbitration Association. The two-man panel met in December 1985, and, just over two years later, it arrived at the settlement order which, among other things, says the following:

- Fujitsu will purchase a paid-up license covering over 900 IBM programs and resolving disputes over software already released by Fujitsu. How much Fujitsu will pay for the license will be determined by the arbitrators, but the amount is expected to be in the hundreds of millions of dollars. The arbitrators called the size of the payment "very substantial."
- An ongoing Secured Facility Regime will be set up to allow transfer of certain source code between the two companies for five to 10 years. If either company wants to see the other's source code, it would set up a secured facility, administered by an independent expert. The arbitrators will issue instructions dictating what source code can be transferred and how much the receiving company will have to pay to license that source code. IBM has said it doesn't plan to ask for access to Fujitsu source code through the Secured Facility Regime, although, under the agreement, IBM could get a look at new Fujitsu software as soon as it is made available to Fujitsu customers.
- Fujitsu was not found to have acted improperly.
- The arbitrators will continue to oversee the IBM-Fujitsu relationship for 15 years.

# Software Firms Plan Campaign To Obtain IBM Source Code

## ADAPSO members express resentment that Fujitsu will be allowed access to programming materials. But will the trade group convince IBM to relent on its policy?

BY DAVID R. BROUSELL

They call themselves "independent" software companies. But considering the implications of IBM's object code only (OCO) policy, the identification is almost certainly a misnomer if not a contradiction. In truth, the relationship between IBM and the so-called independent software industry has always been a dependent one: they depend on Big Blue.

The recently announced IBM/Fujitsu arbitration decision has spurred the independents to argue with greater force than ever that Big Blue should make its source code available to them, an argument that is redolent with dependency.

Ever since IBM's February 1983 announcement that it would restrict access to source code on selected program products, the third-party software vendors, represented by the Computer Software and Services Industry Association (ADAPSO), have voiced opposition to the policy on the grounds that source code restriction would make it more difficult, if not impossible, for the development of products that could compete against IBM products. In essence, their argument went, IBM's OCO policy not only restricted source code but also inhibited competition and the free market.

Late in October, ADAPSO was expected to take the first step in an information campaign to publicly state its views on the arbitration decision, IBM's source code policy, and what ADAPSO claims is the company's unfair bundling of software products. The most recent evidence of those alleged bundling tactics is the combination of database and communications managers in the new OS/2 extended edition operating system for the PS/2 family of personal computers.

Frustrated by several years of negotiations that have produced little but what ADAPSO chairman Jay N. Goldberg now calls "window dressing," ADAPSO is incensed that IBM would provide a Japanese firm—in a "voluntary proceeding"—with source code that it refuses to give to American companies.

Although Goldberg, in a speech during the association's recent annual meeting last month in Colorado Springs, said ADAPSO would consider suing IBM only as a last resort, he expressed a certain degree of pessimism. "I'm not hopeful we won't have to escalate the conflict," he tells DATAMATION. Before that happens, though, there is a long list of other steps that ADAPSO will take to get its point across to IBM, which refuses to discuss the arbitration proceeding and denies any allegations of unfair bundling.

### Letter to Chairman Akers

First, Goldberg was expected to write a letter to IBM chairman John Akers requesting a reconsideration of IBM's refusal to supply source code. Goldberg says he hopes Akers will respond, and respond positively.

But ADAPSO will not hold its collective breath and will continue to pursue other options. These include presentations to congressional committees, the Justice Department, the Federal Trade Commission, the European Economic Community, and the state attorneys general; action to enforce the 1956 Consent Decree; stockholder applications; a broad public information campaign, especially including contact with IBM's customer base and the user community; efforts to have the Information Age Commission bill reintroduced; and legal, evidentiary, and financial support to litigants against IBM.

Of course, the OCO issue, is only one area in the battleground facing ADAPSO members and IBM. One older concern, recently reinvigorated by the announcement of OS/2 extended edition, is what the software companies characterize as the "bundling" of

Photograph by Giorgio Palmisano

**ADAPSO'S GOLDBERG: Recent high-level talks with IBM have been little but "window dressing."**

certain software products by IBM. The term bundling has been traditionally used to describe IBM's combination of hardware and operating systems under one price prior to 1969, the year Big Blue unbundled and began pricing them separately. In the early 1980s, the issue centered on the SSX operating system for the Series/1, but it has grown to now include OS/2 extended edition and, to a lesser extent, IBM's SolutionPac applications software. IBM has consistently denied these allegations and has said that, in the case of OS/2 and the SolutionPacs, the various products involved are available separately.

ADAPSO leaders think they can negotiate a resolution to the issues. The idea of using an arbitration mechanism, although not specifically mentioned in Colorado, is not a new idea. Certain ADAPSO members had suggested using this approach more than a year ago (see "Coming of Age," Oct. 15, 1986, p. 66).

**IBM BELIEVES COMPUTING PROS ARE PLEASED WITH THE OCO RULE.**

Goldberg says ADAPSO would not refuse to discuss compensation to IBM for access to source code. Nevertheless, getting IBM to reconsider its often-stated OCO policy will almost certainly be an uphill battle. An indication of how steep that hill is came little more than a month before the arbitration decision when several members of the ADAPSO leadership met with Akers. Pansophic Systems chairman David Eskra reports that Akers "restated with great finality" IBM's OCO policy at that meeting. "It was sort of bar the door."

But why shouldn't IBM "bar the door," as Eskra puts it, to its intellectual property? The independent software companies, by and large, do not release their source code. Wouldn't IBM be remiss if it did not protect its property? Hasn't it clearly stated that protecting its property, announced in the form of the OCO policy at the time of the Hitachi trade secrets case back in 1983, was its intent? And what right does any company have to IBM's programming materials even for a fee?

Robert Berland, IBM vice president for vendor and development operations in the Applications Systems Div., and a participant in the Colorado ADAPSO conference, says he feels the OCO issue has been overblown by ADAPSO member companies. "A major question for IBM is, how widespread is the question of OCO?" says Berland. "How many companies have been affected? Is it just a niche?"

Berland says his perception is that many IS people were pleased with the OCO policy because it put the brakes on what he characterizes as "tinkering in the heart of code," which has gone on for years. The OCO policy enables users to "identify exits, and build to those exits."

### ADAPSO's Poor Track Record

Berland, while declining to say what IBM may do with ADAPSO's latest request, did leave the door open. "They have the right to come forward," he says. "They are members of ADAPSO and we are, too. But is there some new news? Is there some substantive change? They know what the answer has been in the past."

## The Economic Argument

U.S. software companies are convinced that they have a right to IBM source code. The word "right" may be an exaggeration, but a novel economic theory making the rounds provides the underpinnings for ADAPSO's argument to IBM.

Milton R. Wessel, an adjunct professor of law at Georgetown University and ADAPSO's former general counsel, says an economic dependency between IBM and the independents has developed over the last two decades, during which many of the companies were born and flourished as a result of developing products that worked in the IBM world. During this time, moreover, the OCO policy was not in effect. To change the rules of the game now, the theory goes, may amount to an unfair competitive practice by IBM. Fujitsu had made a similar argument in its dispute with IBM.

IBM doesn't deny that a dependency has developed, and has consistently said it highly values the independents for their ability to develop software that in turn aids IBM in the marketplace. But the trend of thinking within IBM on this economic theory, say IBM insiders who request anonymity, is that the theory is valid only for software developed prior to the OCO policy. "We are making a distinction between the past and the future," says one IBM source.

That answer—that the OCO policy will stand—has been pretty consistent since it was announced. And since that time, ADAPSO's opposition has been largely ineffective. This lack of success has been due to a number of factors, including disagreement within ADAPSO over how aggressive the trade organization should be on this issue, and on the companion issue of bundling.

Other factors include the lack—until recently (see "IBM Source Code Policy Is Raising Cain with Vendors," July 1, p. 22)—of any companies able to demonstrate actual damage due to OCO. In addition, there apparently seems to be some private agreement, according to sources, between certain unidentified companies and IBM to get source code, which also is taking wind out of ADAPSO's sails.

Some members, most notably Martin A. Goetz, senior vice president of Applied Data Research, Princeton, N.J., have steadfastly urged a hard line, including enlisting the support of government. Goetz even went so far as to make an unauthorized visit to the European Economic Community over the issue, for which he was later criticized by some other ADAPSO members.

But Goetz was in the minority. As ADAPSO celebrated its 25th anniversary last year, the new chairman, Jay Goldberg, proclaimed an era of statesmanship in which the organization would take the high ground in disputes, eschew its Wild West image, and avoid litigiousness. Now, says Goldberg, IBM's practices "have created a consensus" to mobilize the organization.

Some observers think it ironic that an external event such as the arbitration decision was what it took to achieve the consensus that Goldberg is referring to. Nevertheless, one of the key questions now lurking in the minds of some analysts is whether IBM—assuming that the scope of the arbitration decision was a surprise—may now be in a defensive mode and unwilling to entertain any further inroads into what it considers its inner sanctum.■

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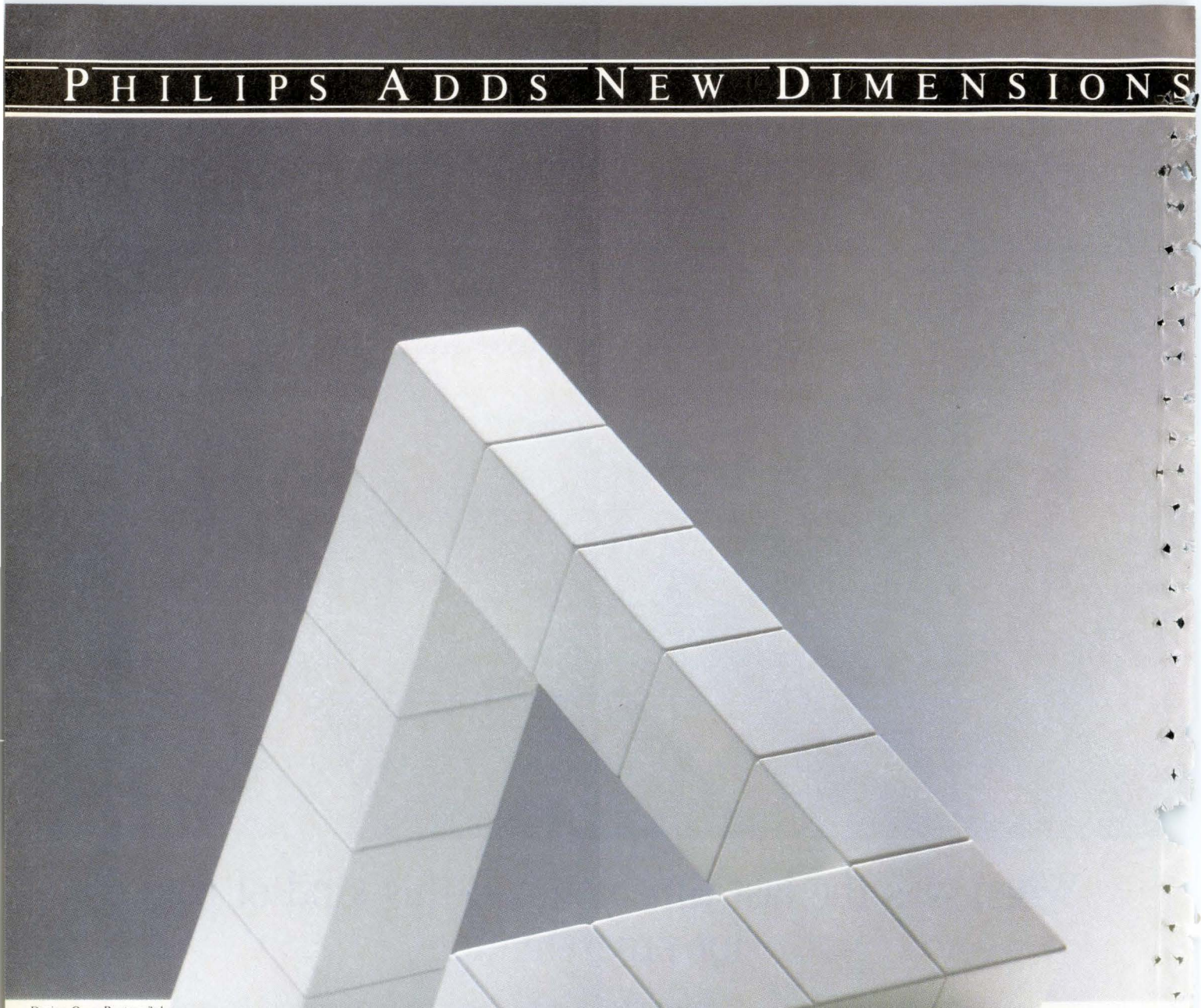

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COMMUNICATIONS

# Japanese Networks Expand After Deregulation

## Facing stiffer competition in financial services, Japan's insurance companies are beefing up communications gear and adding thousands of pcs.

BY ROBERT POE

Japan's leading insurance companies are pursuing major expansions of their nationwide computer networks. The new systems increase the level of automation in field offices and improve headquarters' ability to develop new products.

These overhauled networks are the impetus for not only a surge in the insurance industry's use of packaged software, but also for a pc revolution in Japanese business.

The network expansions come as a result of financial deregulation, which has sparked increased competition and put pressure on insurance companies to offer new services. Leading the networking movement is Nippon Life Insurance Co. of Osaka, the largest insurance company in Japan and the second largest in the world in assets.

Nippon Life's System 100, named in honor of the company's 100th anniversary of its 1889 founding, is expected to cost ¥70 billion ($483 million) by the time it comes on-line next year, including the cost of hardware, software development, and training. The headquarters' computer center will house three IBM 3090 400s and one 3084. Each of the 121 branch offices, employing a total of 10,000 people, will have an IBM System/36GP and 716MB of disk storage, while System/36SXs, with 120MB of storage, will be installed in 1,500 of the 1,800 local or satellite offices in which some 70,000 sales agents operate.

NIPPON LIFE'S YONEZAWA: "We lack the know-how for new services."

Photograph by Eiji Miyazawa/Black Star

Approximately 5,000 IBM 5540 16-bit Japanese-language PCs will be used throughout the system, and optical character readers (OCRs) controlled by Hitachi 2020 workstations will be situated in both branch and satellite offices. Offices in six major cities will be connected to the 5,000-employee Osaka headquarters by high-speed digital lines; branch offices will be linked by 9,600-baud leased lines, while satellite offices will use the Nippon Telegraph and Telephone DDX-P packet switching service.

Other life insurance companies are planning similar systems, though they trail Nippon Life both in scale and in scheduled completion date. Dai-ichi Mutual Life Insurance Co. is planning to spend ¥30 billion ($207 million) on its A-1 Plan, to be completed in March 1990; Meiji Mutual Life Insurance Co.'s System V2, also scheduled for 1990 completion, will cost about ¥40 billion ($276 million).

One example of the new competition that is changing the industry is in pension and annuity funds, traditionally the preserve of life insurance companies and trust banks in Japan. "Now," states Hiroaki Yonezawa, director of information systems at Nippon Life, "securities companies and [commercial] banks are trying to get into this field by supplying investment advisory services." Toshiyuki Nakamura, manager of the systems planning and development department of Meiji Mutual, notes, "Many U.S. life insurance companies want to open business in Japan, so pretty soon the government will have to open the market to them."

### High Interest Is a Spur

Nakamura observes that foreign companies have a wider variety of products than domestic ones do. Domestic companies are also coming up with new ways to get business, not only because deregulation is forcing them to, but also because they feel there is consumer demand. "People are looking for high-interest products," explains Nakamura. "It doesn't matter if it's insurance, securities, banks, or whatever. They just want high interest."

One such product that many are already offering is variable life insurance, in which the face value goes up and down with prevailing interest rates. A wider variety of products will allow insurance firms to offer both financial and insurance protection, in effect becoming "one-stop financial services companies," according to Zen Kurihara, manager of Nippon Life's systems planning division.

New financial products

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promise to do more than just transform Japan's financial markets. They may very well serve as the mechanism to open up Japan's inefficient software development system. Japanese companies traditionally have kept large in-house software staffs on hand, preferring to develop custom software by themselves rather than buy commercial packages. According to Hiroaki Yonezawa of Nippon Life, however, "Now it's better to buy package software for new products. We lack the know-how to provide new services; our former products were traditional products." The packages come from overseas, where financial liberalization is somewhat more advanced. "Through using the new packages," Yonezawa says, "we can learn from overseas life insurance companies' experience."

Yonezawa claims that his company has succeeded with variable life insurance because of the foreign package it is using, and that a competitor has been unsuccessful because its self-developed software performed poorly.

Providing the necessary computing power to create and sell a variety of new products is certainly one of the major motivations behind the new systems, as seen in Dai-ichi Mutual's decision to upgrade its three 3090s to model 400s from model 200s.

Some of the most dramatic changes, however, are being made at the branch and local levels and in communications capabilities. Meiji Mutual, for instance, is replacing 41 communications controllers with more powerful models, and then adding 50 more; installing 3,000 32-bit workstations; adding 2,000 to 3,000 16-bit pcs to the 2,000 it already has; and doubling the capacity of all of its communications links. Such efforts illustrate the heavy emphasis being placed on automating the opposite end of the sales chain: the agent in the field.

Such an approach makes good sense as a competitive strategy, since the Japanese life insurance industry's greatest advantage, as well as its greatest expense, may be its huge sales force bent on maintaining intimate contact with individual customers.

### Personal Contacts Are Prized

Meiji Mutual has 38,000 agents, most of whom are women selling to other women, usually housewives. A substantial proportion of the premiums are collected in cash, on the saleswoman's monthly visit to the customer's home. The goal is to have ongoing "face-to-face communication," in order to cement the human relations that Japanese people often value more highly than mere financial advantage in a business relationship—and, not incidentally, to know in advance when the family is going to need a new policy. Meiji's V2 system will make the sales agents more productive in several ways—but not by changing the personal nature of their sales methods.

The OCRs being installed in all 1,360 local offices will allow the agent to feed data from the preprinted premium statement directly into the computer system each time a payment is collected; currently, payment records are input by clerical workers at the 91 branch offices. New policy applications will be input locally by agents using pcs connected to the network instead of being mailed to one of the branch offices for input.

At both Dai-ichi Mutual and Nippon Life, OCRs will find wider use than at Meiji. They will be used to input handwritten data (phonetic and alphanumeric characters) from policy application forms, worksheets, and contracts filled out by the agent. Clerks now do the inputting by keyboard.

**MEIJI'S NAKAMURA: The government will have to open the market.**

Meiji's customer information database will be more widely distributed and further automated under its new system. Agents will enter relevant information on customers and new prospects into pcs at local offices, where it will be stored on 3½-inch floppies rather than on paper.

The savings that result from having more data input directly by agents will be substantial. Nippon Life estimates it will be able to get by with 4,000 fewer clerical workers and save ¥6 billion ($41 million) per year with its new approach.

There will be intangible advantages also, as agents will be kept more up-to-date. Meiji Mutual will have an optical disk-based "guide system" at branch offices, containing information for administration and on new products. Agents will be able to get printouts via digital facsimile machines at local offices.

### Push-Button Response System

Dai-ichi, taking another tack, says its system will permit access to central databases through combined phone/facsimile devices just coming on the market. Agents calling in will respond to synthesized voice menus using the phone's push buttons, and the desired data will be digitally transmitted for printout by the facsimile.

The only specific provision for selling newly developed financial products is to be found in Meiji Mutual's V2 system. Among the new hardware is what the company calls CWS 32-bit workstations, to be installed in branch offices.

The fact that the technology for the new networks exists is itself a significant development for Japanese business. Until as recently as five years ago, pcs able to handle Japanese ideographic characters were virtually nonexistent, and keyboard skills were similarly lacking. That's no longer true.

That major service companies are installing networks with 5,000 or more pcs and workstations in every corner of Japan indicates that the country is on the verge of a belated micro revolution that will help alleviate the notorious inefficiency of its white-collar world. Foreign competitors of Japanese service industries may find themselves nodding in agreement with what Meiji Mutual's Nakamura gives as the ultimate reason for undertaking such a project: "If we don't develop this kind of system, we might lose everything." ■

Photograph by Eiji Miyazawa/Black Star

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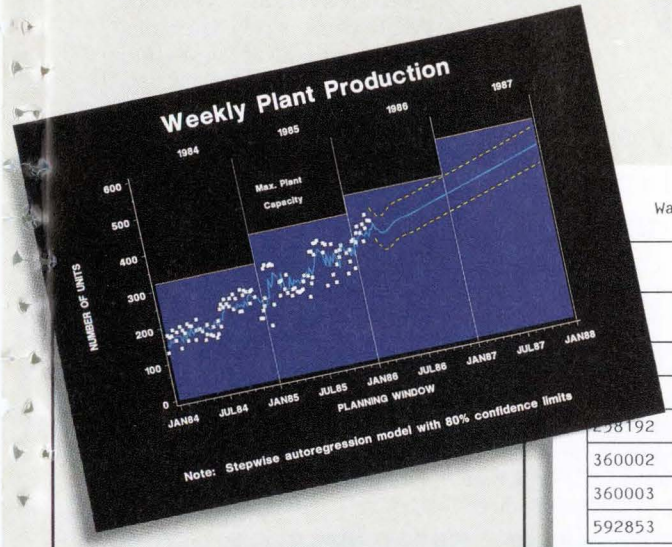


Warehouse Inventory Report - 16JAN87

| | Quantity on Hand | Quantity on Order | Projected Reorder Date |
|---|---|---|---|
| | | | |
| | 123980 | 10000 | THU, FEB 12, 87 |
| | 89450 | 5000 | FRI, FEB 20, 87 |
| 298192 | 20110 | 1000 | MON, MAR 30, 87 |
| 360002 | 8585 | 0 | TUE, FEB 10, 87 |
| 360003 | 15985 | 500 | TUE, FEB 10, 87 |
| 592853 | 469120 | 20000 | WED, FEB 18, 87 |

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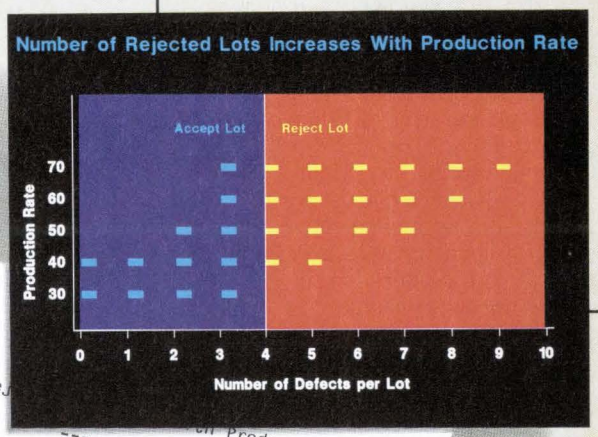


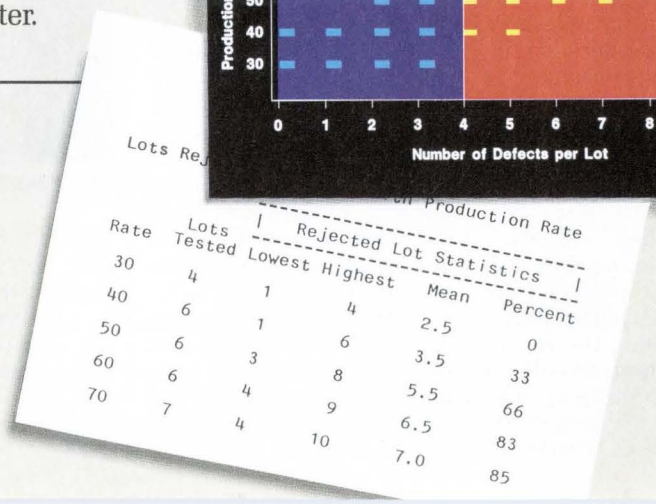


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SECURITY

# New Wave of LAN Security Products Hailed by Users

## Local area networks have posed new security problems for IS, and vendors are responding with solutions ranging from password protection to encryption.

BY SUSAN KERR

If information equals power, then networks can equal big trouble.

Ever since the era of local area networks dawned just a few years ago, the issue of security has been duly noted and then typically ignored. Now, a growing number of popular communications vendors have decided it's time to pay more than lip service to security and are unveiling products for LANs that range from password protection all the way up to end-to-end data encryption.

That's good news for the many users who've had few security options and, indeed, little time until now to give the problem much thought.

"We put workstations into people's hands so rapidly, we didn't really consider it fully," says Mark Maxwell, network manager at Philips Lab, a Briarcliff Manor, N.Y., unit of North American Philips Corp., and user of Ethernet products from Bridge Communications Inc., Mountain View, Calif. While the research lab has implemented physical security measures such as card readers for employee access, it has not yet addressed the desire for enhanced data security. "There is a definite mandate," says Maxwell. In fact, company officials "would like us to investigate encrypting," he adds.

Companies need to worry about two types of intruders: employees and outsiders. Notwithstanding the recent rash of incidents involving hackers gaining access to dial-in networks, some companies say they are just as concerned about limiting or preventing access by what could be legitimate network users.

Until now, there have been few viable alternatives for commercial, security-minded LAN users. Locking up the computer room is always a good idea, but the distributed nature of networks can make that tactic unfeasible. While many network managers have implemented password protection, users can bypass this authorization scheme with a little reprogramming knowledge.

"We generally caution people that if the file's important, don't use the network," says David DeVries, senior office planner at First Bank Systems, Minneapolis. That may be sound advice, but it's not always preferable. DeVries oversees a network linking 300 pcs and 10 Banyan Systems Inc. servers crossing over three departments, including personnel.

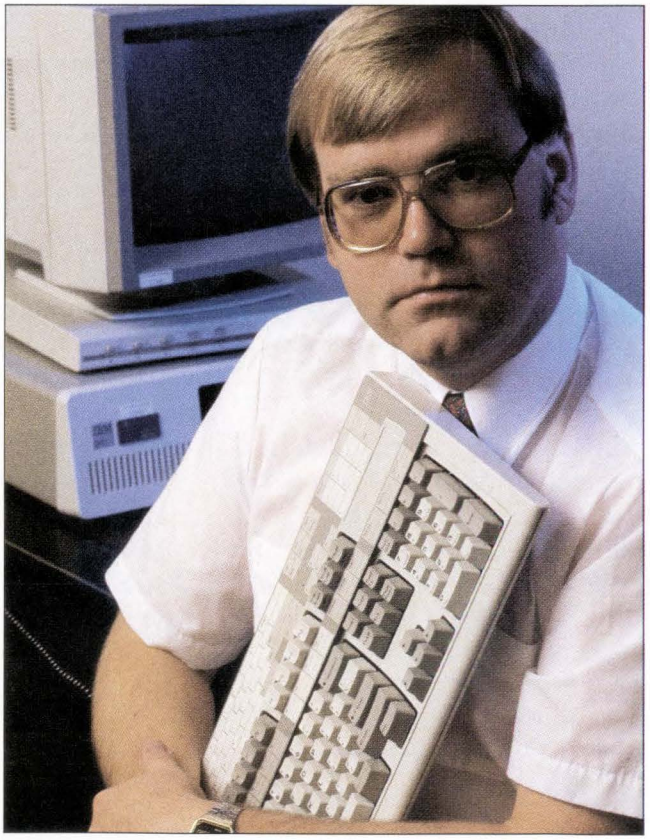
### Generating Security Problems

The switch inside customer sites to local networks has taken away a security advantage inherent in point-to-point, terminal-to-host networks. Ungermann-Bass Inc. engineering vp Greg Hopkins says, "While we've tried to talk customers into getting on one wire, whether it be Ethernet, token ring, whatever, it's also potentially increased the data security problem."

At First Bank Systems, plans call for installing VANGuard, a new security capability being integrated into Westboro, Mass.-based Banyan's next version of its VINES network OS. VANGuard, available next month, features password encryption, audit trails, and improved access rights lists. "Each user has a profile—his or her right to various services," says Banyan product marketing director Mary Kirson. "Now, we can prevent users from changing that profile."

Security also is getting the nod from other pc LAN companies, such as Novell Inc. The Provo, Utah-based company's newest LAN operating system—NetWare V2.1, to be ready later this year—will offer first-time password encryption and better file server access control. It's the large-scale network companies such as Santa Clara's Ungermann-Bass and Bridge, whose products connect bigger systems operating potentially more critical applications, that face more squarely the need for—and difficulty in—providing security in their product lines.

"The operating systems companies are mainly file server based," explains Joe Kennedy, vice president of Bridge's Government Products Division, which just completed its first commercially available security offerings. "If you have a file server on the network such as a 3Com [Corp.], you might want to attach passwords to get certain



FIRST BANK'S DEVRIES: "If the file's important, don't use the network."

Photograph by Steve Weitz

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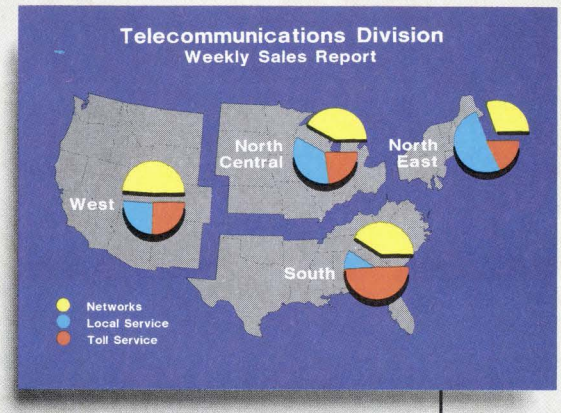


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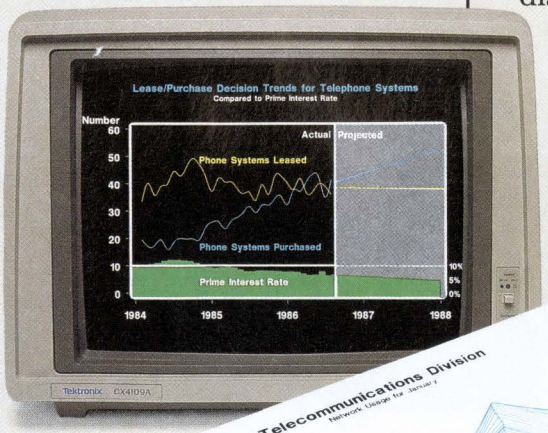


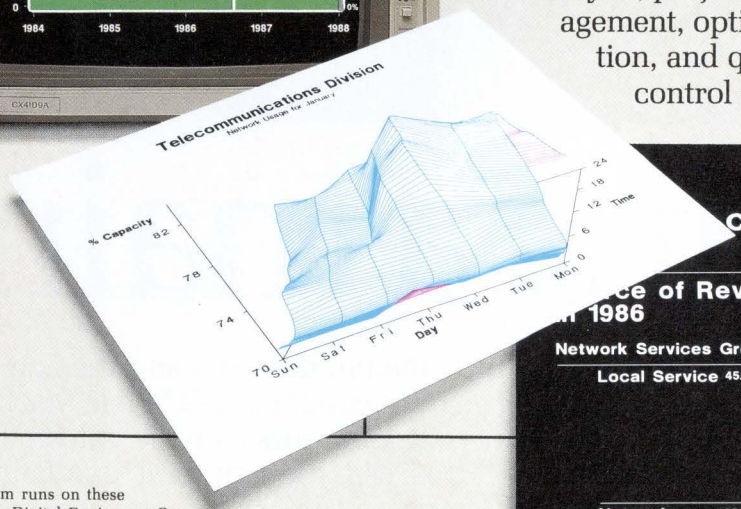


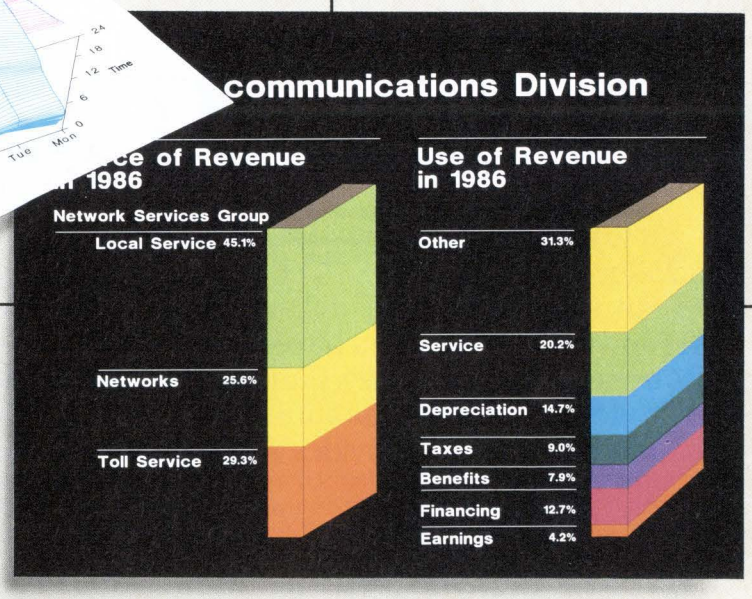


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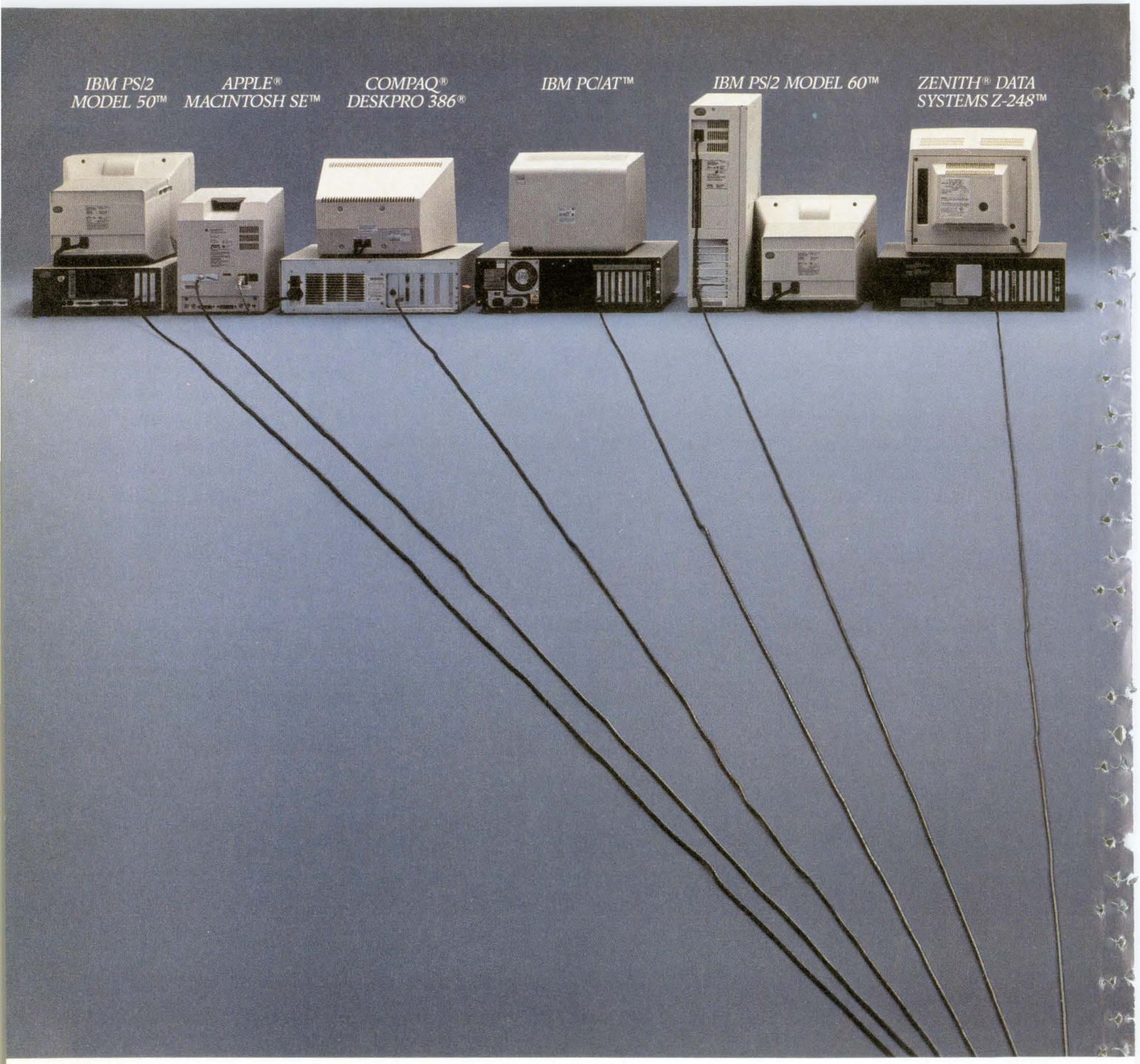


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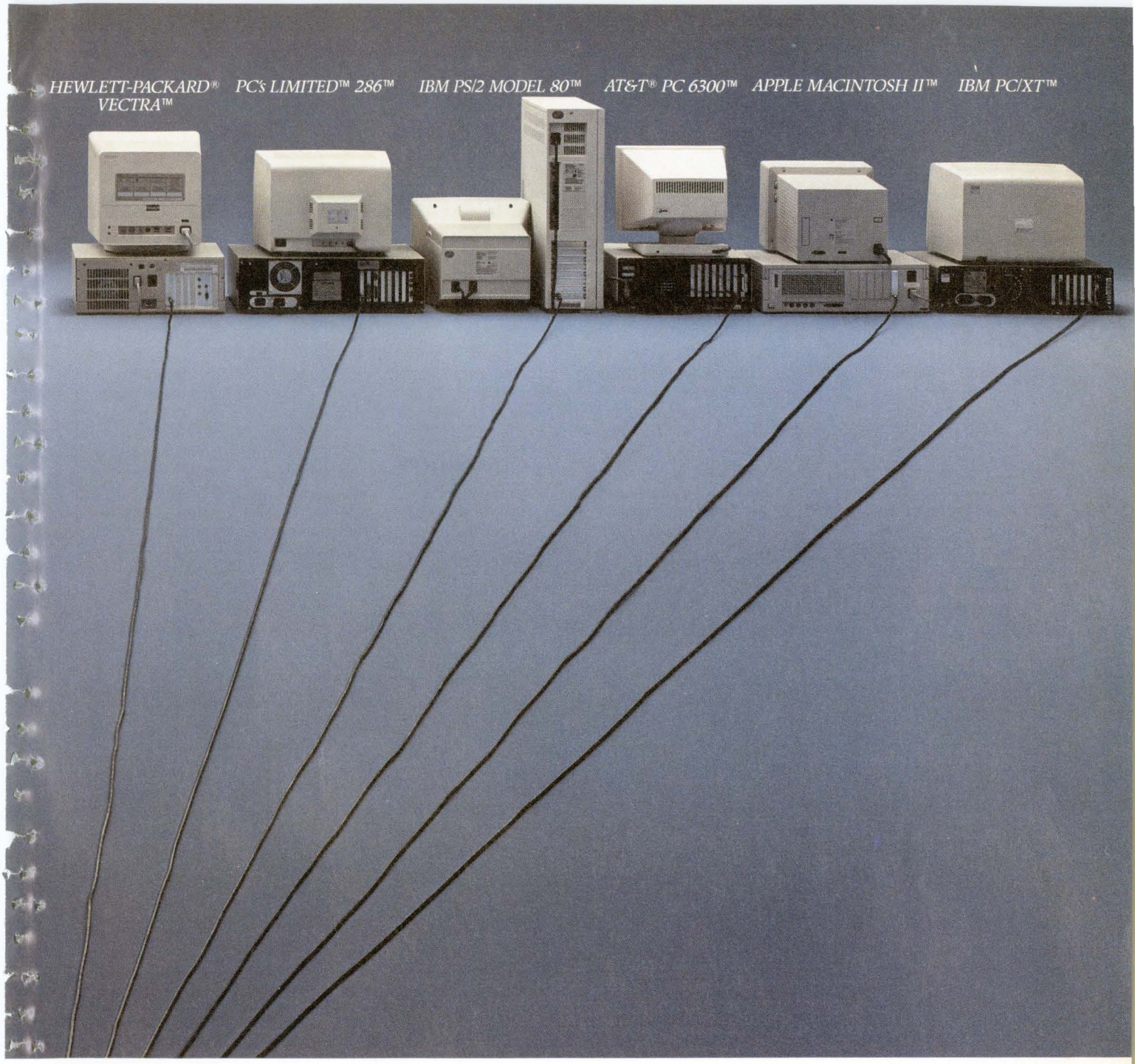


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Circle 18 on Reader Card

volumes on a shared disk."

In fact, Kennedy notes, one of the biggest areas that needs to be addressed in future products from Bridge is the availability of encryption in bridge and gateway products for internetwork security. Users agree that there is definitely a requirement for that capability. "What we need," says Philips Lab's Maxwell, "is some way to encrypt what's going out over X.25 as opposed to internal security."

Unless vendors were already heavily involved with supplying classified government locations, security is a relatively new twist, and most are beginning within the local area network.

### Easier to Eavesdrop

"We get dragged into the issue of security," admits Ungermann-Bass's Hopkins, who as a result is readying a large number of security products at the company's Andover, Mass., site.

"The flexibility of a LAN in some sense made it easier to eavesdrop on other users," Bridge's Kennedy says. To help prevent snoops, Bridge recently unveiled its first offerings in the security area: the CS/50 Communications Server and Secure NCS/AT Network Control Station, which support the Defense Dept.'s TCP/IP suite over Ethernet.

The two products, available this month for a total price of $20,095, offer Bridge users network access controls and data encryption for the first time. Bridge is encrypting all TCP sessions with the Data Encryption Standard (DES) algorithm certified by the National Bureau of Standards, and is using a public key encryption system for all administrative and audit trail information transferred to and from the NCS/AT.

Ungermann-Bass has already offered some access controls but, according to Hopkins, the company now is readying a family "of security products which are protocol independent . . . .Our products will work with our server and [anybody else's] server. And anybody's 802 equipment. We'll encapsulate anybody." Hopkins refuses to be pinned down to a delivery time, however.

Ungermann-Bass also will incorporate the DES and will offer encryption on a session-by-session basis, Hopkins says.

The associated overhead and cost have held up some usage and development of security products. Classified government and military sites have demanded—and have been willing to pay extra for—network security. But most of the products that they require are not economically feasible in, or even available to, the commercial world.

"The request for security is always there," says Daniel Lynch, president of Advanced Computing Environments, a Cupertino, Calif.-based network consulting company that is heavily involved in the TCP/IP and OSI protocol standards, "but when people are faced with the cost," Lynch says, he finds that they tend to back off. In his experience with the government, "They have a whole host of concerns that the commercial world doesn't care about."

### Security Features in OSI

Many still look to Washington on security issues, however. The DES algorithm for nonclassified encryption is one example. Now the National Security Agency has revealed plans to add security features to the OSI protocol suite This potentially could have commercial ramifications, though its first effects will be felt on network users in U.S. defense and intelligence agencies.

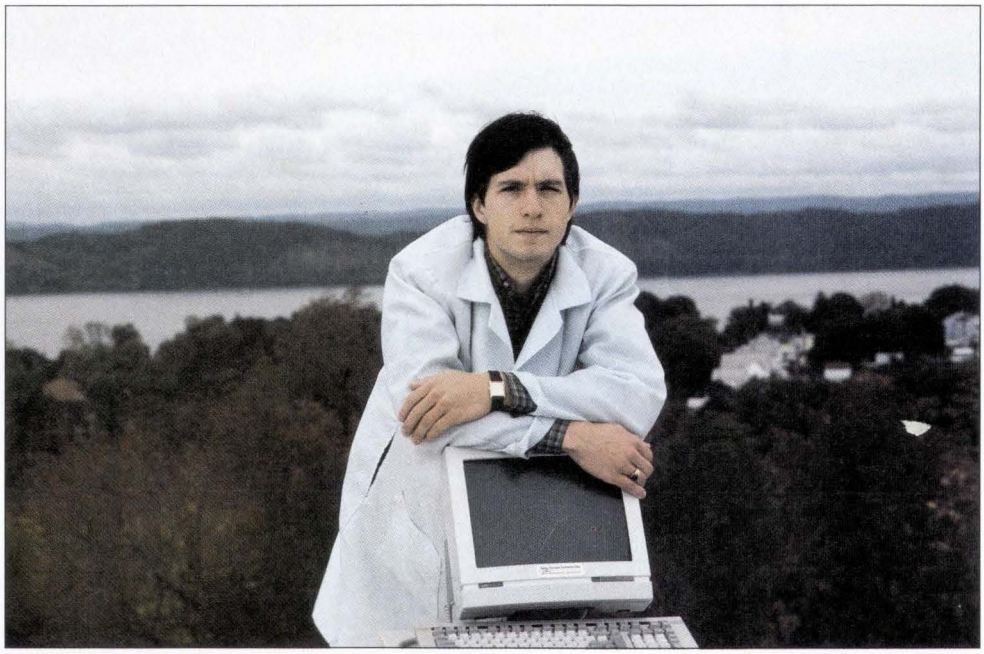
While companies such as Ungermann-Bass will follow the NSA's lead, says Hopkins, "the jury's still out" on whether any commercial effects will occur. "It depends on the cost and applications," he says.

Those are now two of the more important criteria for many users. Indeed, some say that they currently have little need for security products beyond log-in control.

"Right now," says Dennis Anderson, manager of data communications and systems software at LSI Logic, Milpitas, Calif., "we have no intention of using [encryption] on a LAN." The company uses about 80 Bridge servers.

"We're more worried about somebody not authorized than about employees," Anderson remarks. Therefore, LSI Logic implemented a callback system for dial-in users, but it seems that one of the biggest jobs is allowing the company's product developers to have access to data, as opposed to prevention. "We try to keep it as easy as possible," he says, for the company's workers to do their jobs.

Yet in some companies, it may be too easy. "It [the network] is so distributed, mistakes could be made," complains First Bank System's DeVries. ■



**PHILIPS LAB'S MAXWELL: There's a definite mandate for enhanced data security in local area networks.**

Photograph by Allen Orling

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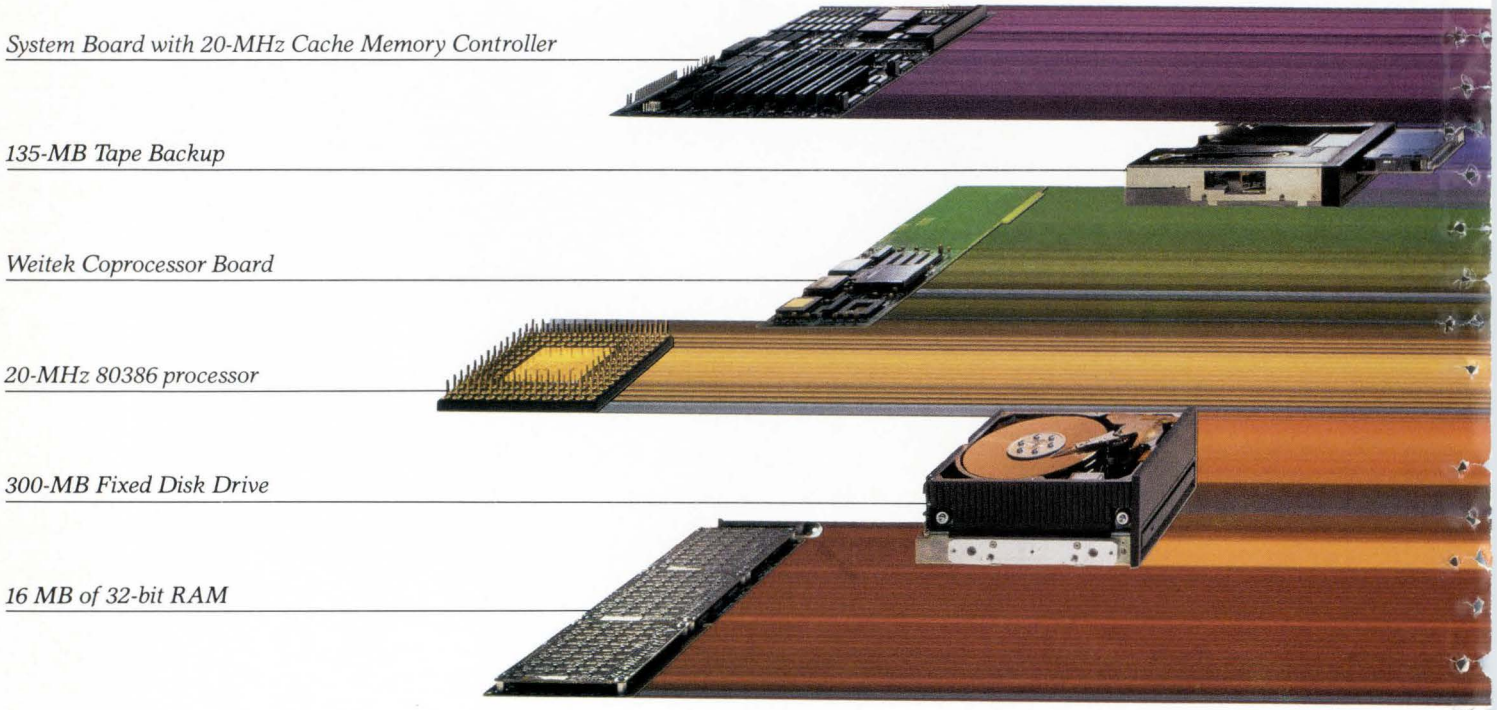


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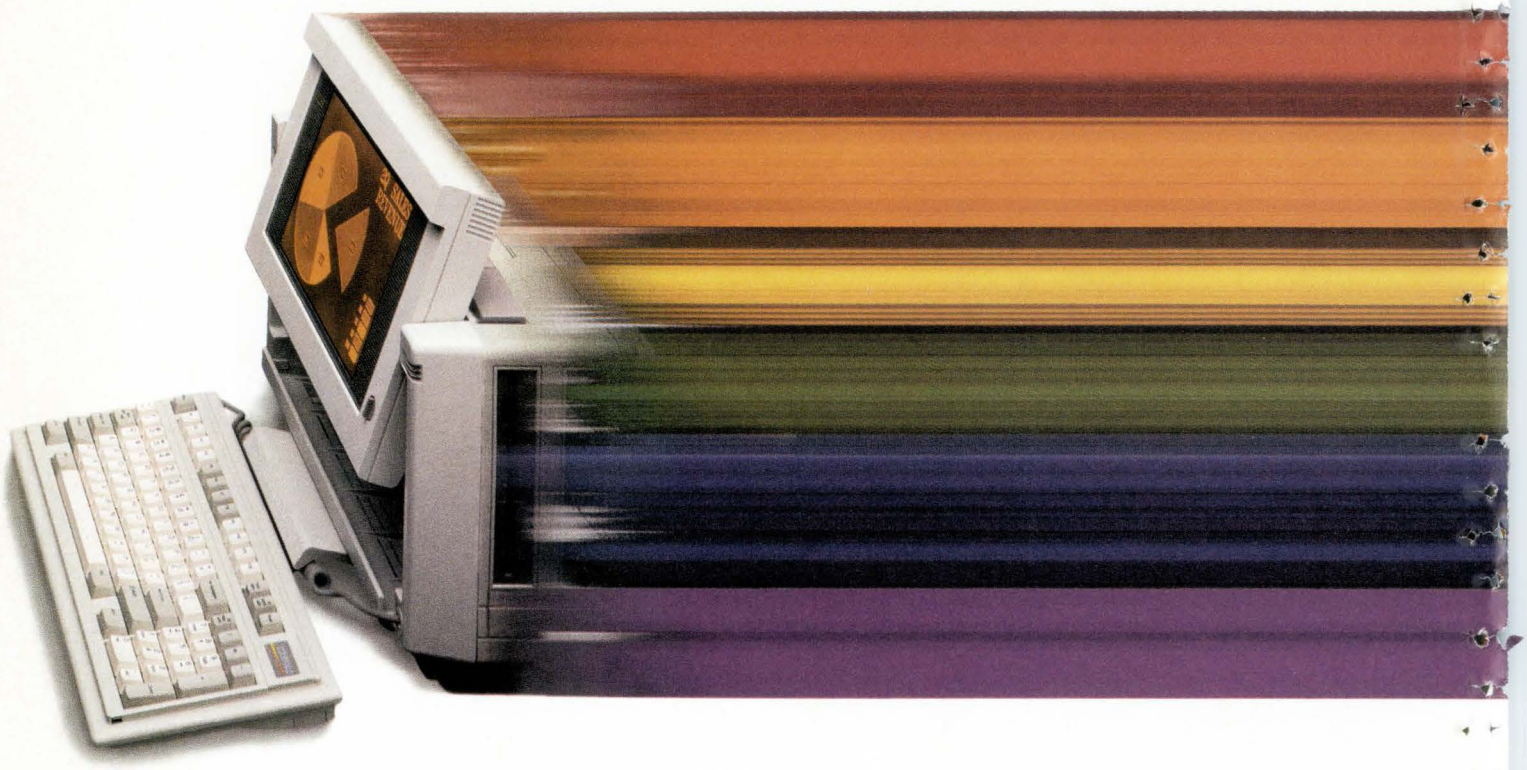

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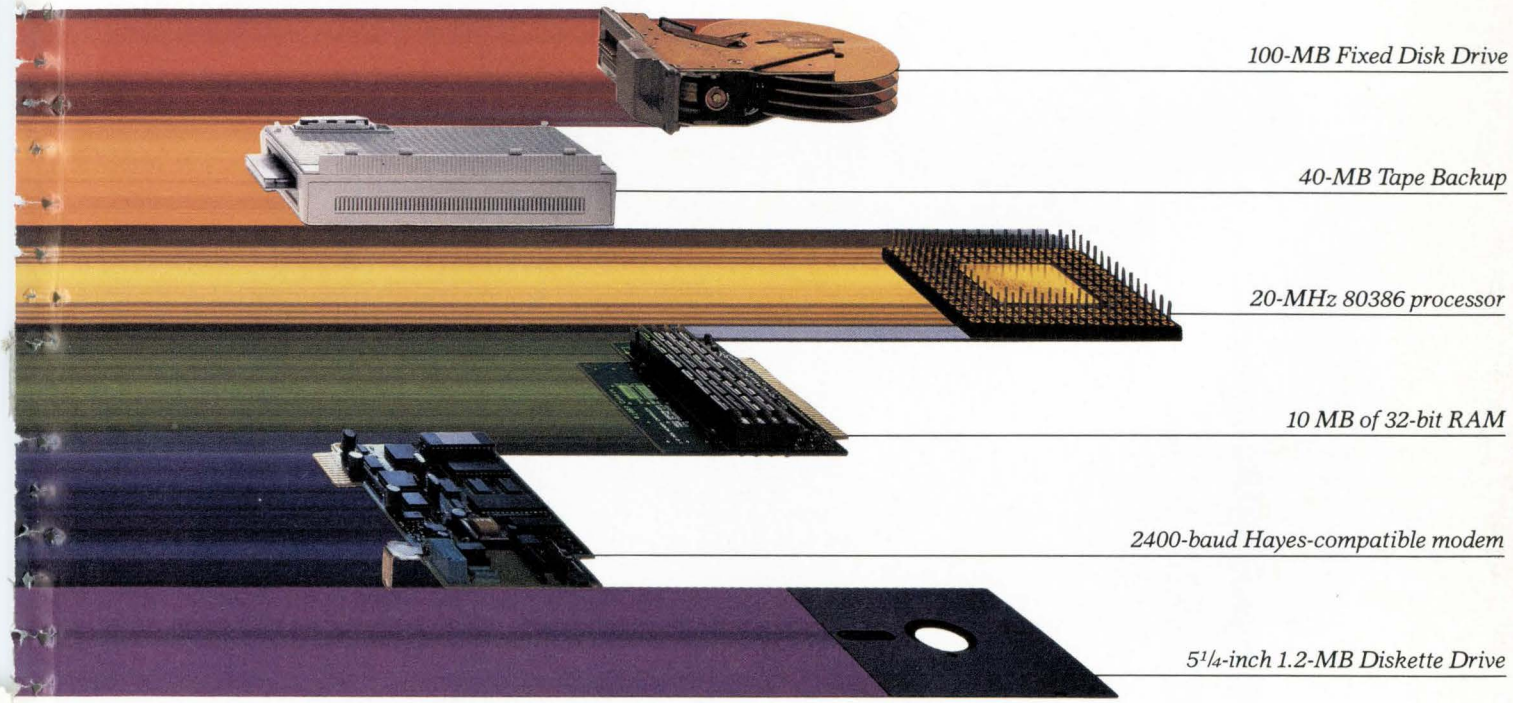


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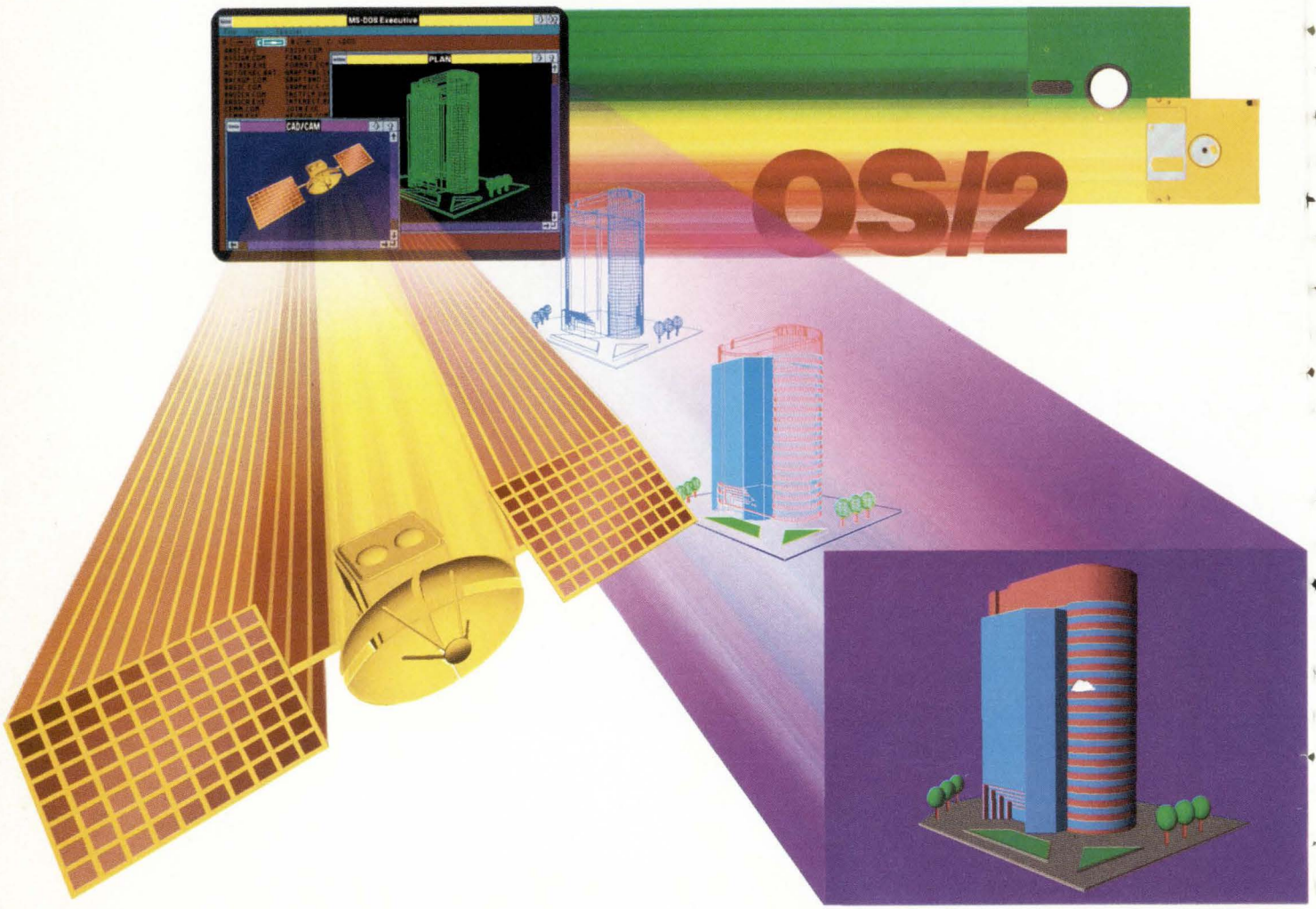


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NETWORKS

# DECnet Challenges SNA For Backbone Championship

## Network management tools will play a key role in the battle for network control, but users say integration and other problems must be addressed first.

BY GARY McWILLIAMS

The backbone network used by Cambridge, Mass.-based Polaroid Corp. could once be described in three letters: SNA. The spread, however, of non-IBM computers and protocols has changed that. A mélange of DECnet, Appletalk, and Apollo Computer Inc.'s Domain protocols now handle the role previously exclusive to SNA.

The largest portion of Polaroid's network has been taken over by Digital Equipment Corp.'s Ethernet-based DECnet protocols. Over the past two years, DECnet nodes have grown so rapidly at Polaroid that they now surpass the SNA network in size.

Just as at Polaroid, DECnet networks are on the drawing boards or are newly installed at such traditional SNA shops as Aetna Life and Casualty Co., Cabot Corp., and the Liberty Mutual Insurance Co. Encouraged by these and other successes, Digital is jockeying to position itself as equal to IBM in backbone network capabilities.

Whether DEC can pull this off remains unclear. For all the spread of DECnet at Polaroid, the company isn't ready to relabel the network just yet. "We're getting away from calling it a Digital or IBM network," says Robert Arsenault, Polaroid's DECnet network manager. "It's a corporate network."

Winning the title of lead supplier of the backbone network is unlikely to depend on a simple count of network nodes or installations. The title will go to the vendor whose equipment does the best job monitoring and controlling all portions of the network, including other vendors' devices. For this reason, both DEC and IBM recently have been heavily promoting their network management tools.

It's too early in the contest to place any bets. Users are still learning how to manage multiple networks. Many companies that run the two networks say they are far from able to manage both using the equipment of only one vendor. Some, such as Polaroid, have only recently merged network operations into the same data center and have not even attempted to use the same tools to manage the two.

As Digital begins its backbone drive, there are signs that it won't find IBM as vulnerable as it was in midrange systems. Compatibility is one of the primary reasons that companies chose Digital for midrange systems, and it may not be relevant to this contest. Rather than trying to create totally new networks, many companies are trying to tie together and control systems from a variety of vendors, all on the same network.

### SNA Is Entrenched

Another advantage for IBM is the close links SNA has with many large businesses. They are now experimenting with DECnet, but few say they are ready to center their information systems on it. "Our bread and butter is our SNA network," says the network operations manager for a company that is pilot testing DECnet. "At [September's] DECworld, they painted a very rosy picture of the things they can do. But on a large scale, I'm not sure it's the best way to go."

In the face of strong SNA sentiments, it won't be easy for Digital to convince SNA users to turn over network management to DECnet alone. "From a pragmatic point of view, we're unlikely to be convinced to use DECnet as the network manager," says Randy Potvin, manager of scientific computing and telecommunications at Cabot Corp., Waltham, Mass. "Given that we already have SNA installed, I can't ever see that becoming a popular topic for discussion."

Paul W. Chisholm, vp of telecommunications at the Shawmut Bank of Boston, adds, "Our biggest network is our SNA network. The Digital systems are primarily special applications systems. Everyone has a need to get to the IBM network; not everyone has a need to get to our Digital systems."

Another hurdle for Digital is IBM's aggressive stance in voice products. IBM's assembling of voice management and T1 products caught Digital off guard. After years of arguing against integrated voice and data networks, the mini maker is seeking help from the regional Bell operating companies and the independent telcos to bring voice management tools into its network offerings.

SHAWMUT'S CHISHOLM: "Not everyone has to get to our DEC systems."

IBM has the upper hand in this area via NetView management tools and NetView/PC, which lays out a set of specifications for interfacing to, and controlling non-IBM devices with, SNA. The two NetViews are receiving strong interest from SNA users (see "IBM NetView Enhancements Stir Interest of MIS Shops," Aug. 1, p. 19). And for NetView/PC, Digital has no ready answer.

Cabot, Aetna, and the Shawmut Bank say NetView/PC's promise of broad abilities to monitor and control a variety of network devices is very alluring. "We're pushing for Digital to give us an answer [to NetView/PC support] so we can start planning," says Kathryn A. Minck, network systems en-

Photograph by Seth Resnick

# News in Perspective

gineering administrator for Aetna Life and Casualty Co., Hartford, Conn. The insurance company runs SNA in four divisions and is implementing DECnet at two others, she says.

### A Closed Network

Right now, DECnet, like SNA, is a closed network. It is moving to match Open Systems Interconnection (OSI) standards. But, unlike NetView/PC for SNA, DECnet has no published interface specifications that would enable users to control a variety of non-Digital devices with existing management tools. Digital's support for OSI implies this potential although the OSI management structure is as much as two years away. In the meantime, only a few non-Digital devices, such as IBM PCs, can share its network.

Digital is under pressure to act soon. Although familiar with its OSI plans, Minck says, "We will be pushing them to do something before OSI." Whether the company would consider releasing a NetView/PC equivalent is unclear. Michael J. Gayowski, Digital's IBM interconnect marketing manager, confirms that the company is planning to release specifications to wide area network products vendors. The local area network management portion continues to be Digital only.

Its position on NetView/PC also is uncertain. "If, in fact, NetView becomes a standard for managing these networks, we will look at supporting that," says William R. Johnson Jr., Digital's vice president of distributed systems. Given that NetView/PC largely puts the onus of interface development on users, there is no impetus to act sooner, he says.

The company hopes to blunt NetView's appeal by pushing its own network management tools and by claiming that IBM's plan to adapt SNA to support peer-to-peer networking is evidence of DECnet's superior design. Rather than bow to NetView/PC, DECnet management tools and gateways are sufficient to gather data from, or even manage, an SNA host, says Johnson.

While support of NetView by Digital would effectively concede the network management role to SNA, failing to offer an alternative prior to OSI may ultimately force Digital to adopt NetView.

At best, deferring multivendor interfaces until OSI matures preserves only the Digital portion of the network for DECnet management; it still requires IBM or others to furnish tools to manage non-Digital portions of the network. Says Chisholm, "The issues are how well Digital does and how much IBM does with NetView."

### Network Control Still Separate

For instance, when Polaroid decided to meld its SNA and DECnet network management in the same data center, they were combined into the SNA control center. The center has IBM-trained managers controlling the SNA portions of the network and Digital-trained managers handling the Digital portions. The next phase will see network managers cross-trained in the two protocols.

"Our aim is to get a single group managing the corporate network from one central source," says Polaroid's Arsenault. Shawmut Bank has done the same. "In the past, there was a Digital network manager," says vp Chisholm. "Now, my people in network services run both the IBM and Digital networks."

He says such dual network and management strategies have certain advantages. "We like the idea of running two networks because it means we don't have to give in to one or the other."

For those who have a combined staff managing the two networks, there is often no more than a melding of operating centers and the cross-training of staff. Combined operation is still a hope, however. "Realistically, there have to be separate terminals and software monitoring the two networks," explains Arsenault, "because there aren't products to monitor the two combined."

Joe Saylor, Polaroid's SNA specialist, says, "Sometimes the same person is running between two [network] displays; more often the DECnet people here are autonomous. We put together a proposal that brought them into our data center. We said we'd manage [the connections], but they're still their VAXs."

Similarly, Aetna's plans for maintaining its DECnet networks will place the upper levels of control with the SNA-trained staff. "Right now," Minck says, "the divisions with DECnet control their own networks. We plan on getting into the picture by controlling the links, the multiplexors, and front ends. Eventually, the divisions will send questions up when they find out the problem is not with the application or processor."

For the time being, Digital's efforts to carve out a role for DECnet as a corporate backbone seem a necessary move to users running Digital and IBM networks. Whether these efforts can satisfy those users as their DECnet networks grow and network management merges hasn't been answered. Until then, companies such as Cabot will consider DECnet as only an appendage to its SNA backbone.

"We'll probably say to the IBM environment, 'Hey, you guys, here's another device to deal with,' " says Potvin. "It's the path of least resistance; they already have the network management capabilities." ■

## Shares Exchanged

General Electric has exchanged its 36% interest in Industrial Networking Inc. (INI) for a 3.6% share of Ungermann-Bass and an option to purchase an additional 3.6% over the next four years. Ungermann-Bass and GE had great expectations when they created INI, which lives and breathes the Manufacturing Automation Protocol (MAP) specifications, but INI suffered some unprofitable quarters thanks to a sluggish MAP market. The deal leaves INI under Ungermann-Bass's control.

## Avanti Names President

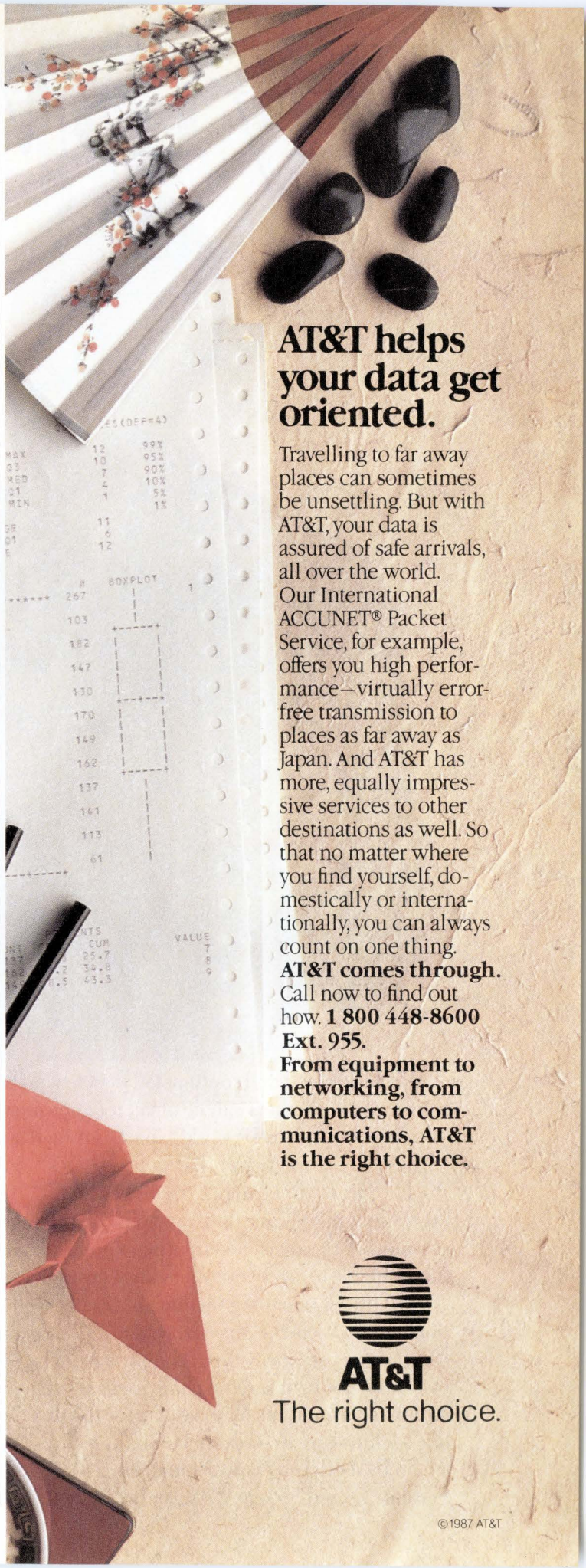
Newport, R.I.-based T1 switch manufacturer Avanti Communications Corp. has recruited Tom Taylor as its new president. Taylor comes from Telenet Communications Corp., Reston, Va., a value-added network subsidiary of U.S. Sprint Communications Corp. Prior to his tenure at Telenet, Taylor held positions at Uninet and GTE Corp.

## Mac Move

In a move designed to strengthen its position in the Apple Macintosh market, Cupertino, Calif.-based Symantec Corp. has signed an agreement in principle to acquire Think Technologies of Bedford, Mass., a developer of Macintosh and IBM PC communications and programming software.

## IS Chief Retires

Wells Fargo Bank has announced the retirement of Jack L. Hancock, the San Francisco bank's executive vice president for systems and strategy and its top IS official. Hancock, a former major general in the U.S. Army, had been with Wells Fargo for five years after coming over from Chemical Bank of New York. Wells Fargo said Hancock, 57, won't be directly replaced. ■

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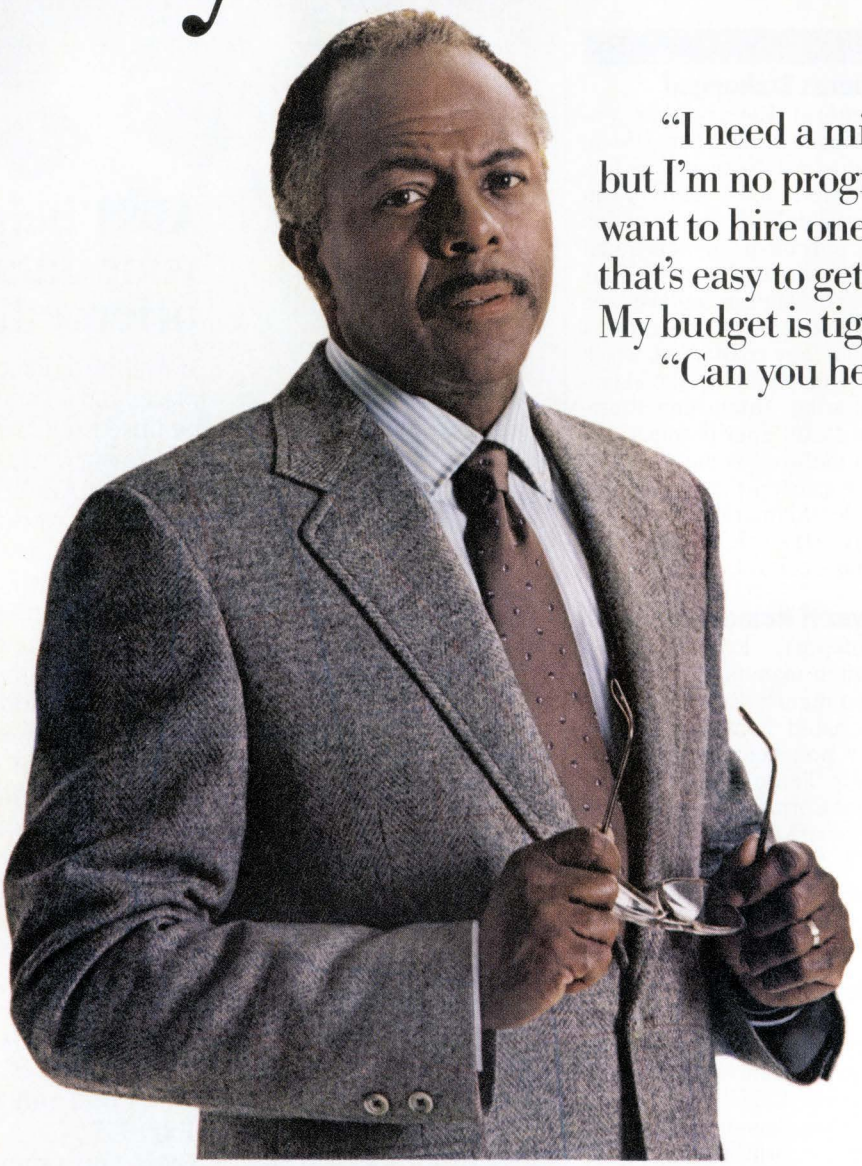

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# Behind the News

**POLITICS**

Illustration by Colos

## Of Systems, Solidarity, and Struggle

The Polish underground is using computers and telecommunications to keep alive its fight against the government.

BY BUCK BLOOMBECKER

Sitting in the dining room at the Warsaw Polytechnic one recent evening, Zygmundt R., a Polish expert on terrorism, pondered a paradox of Polish life. "You know why there are so few sophisticated computer terrorists in the United States?" he asked. "Because your hackers have so much ease of mobility into the establishment. Here, there is no such mobility. If you have the slightest bit of intellectual integrity, you cannot support the government. If you don't support the government, it's almost impossible to join the establishment. That's why the best computer minds belong to the opposition."

In Poland, that opposition is centered on the nationwide trade union organization Solidarity. Today, even as you are reading this article, members of Solidarity are producing files, transmitting messages, or carrying floppy disks containing information they don't want the government to see. (The names of some Polish contacts quoted in this article have been deliberately changed or abbreviated to protect them from possible repercussions, enabling them to talk freely during face-to-face interviews in Poland.)

Necessity and the spread of information technology have bred a computer-savvy opposition in Poland that is capable of breaking into tv news broadcasts, producing alternative information that contradicts government data, and developing publishing and distribution systems that can spread the opposition's cause quickly and efficiently. Though some of the methods seem commonplace to Western observers, all this activity is done at the risk of imprisonment, equipment seizure, and stiff fines.

What is happening in this central European country has much broader significance, though. It reflects the problems faced by many totalitarian countries in their efforts to computerize. Personal computers, in particular, foster individualism, and governments find it difficult to monitor the spread and the uses of the technology. Those governments then face a dilemma: by fostering economic progress through extensive computer use, they run the risk of eroding their totalitarian power.

But there may be more than that to it all. Irrespective of the country involved, what could a dedicated opposition do if it had a technological edge over the establishment? How would other computer professionals, faced with the moral conflicts of an autocratic society, use their advanced knowledge of computing? The possible answers are the stuff of a computer security consultant's nightmare.

Over the past few years, a number of Polish computer professionals have resolved their own crises of conscience by using their computer expertise to help the opposition. Their activities, though only a small part of Solidarity's overall work, have shown skill, daring, and a real understanding of how computers can be applied to the task of reforming a society.

Solidarity began to grow in the late '70s and at its height the trade union organization claimed a membership of 10 million Poles, roughly one third of the population. Its major stand against the government took place in 1980 with the massive strike at the Gdansk shipyards.

### Private Line Communications

The government's reaction was swift. Among other measures, it cut telephone communication to prevent news about the strike from spreading. But Solidarity supporters fought back. With the aid of insiders at the state Naradowy Bank, underground leaders were able to communicate via the bank's private dedicated lines. Then, in December 1981, a state of martial law was declared. Again, one of the first actions taken in the clampdown was the disconnection of all telephone service throughout the country. This tactic clearly demonstrated the importance the government placed on telecommunication as an opposition resource.

Since the early days of Solidarity, "the opposition has had the technological edge," according to Polish computer journalist Rafal K. "Who brought technological advance here first?" he asks rhetorically. "The opposition—they needed it to communicate and to print."

Rafal claims that Polish computer professionals in general tend to support the opposition. There weren't that many in the fraternity at the beginning, and most of them knew each other. So it was relatively simple to cooperate.

In his book *Solidarity* (Simon & Schuster, New York, 1982), Lawrence

Illustration by Colos

Wechsler argues that Solidarity was a revolution based on communication. Weschler writes that Gen. Wojciech Jaruzelski's "brilliant insight was that the way to extinguish the movement was not so much by attacking it directly as by smothering the openness it lived on. For months, everyone had known everything. Now, suddenly, no one seemed to know anything."

In the apparent silence, conversations persisted. Mirik L., a physicist from Lublin, explains: "Those operators and other computer professionals who supported the opposition talked among themselves during martial law, and became even closer in their cooperation. They spread the gospel of computer use."

By 1984, there was a minor computer boom in the country. As cheap pcs like the U.K.-produced Sinclairs and Amstrads and the Asian PC clones became more widely distributed, "more and more of us brought machines home with us when we went abroad," says Rafal. Adds Mirik, "If you had 500 in dollars and wanted to invest it in the future, a computer seemed an excellent choice." This boom led to more ingenious underground uses of the technology. In 1985, elections were held for the Sejm—the Parliament of the Polish People's Republic. Solidarity organized a boycott of the elections, the first organized on such a scale in a communist country.

According to Solidarity spokesman Konrad Bielinski, "The elections were . . . not over who was to be elected. The election 'campaign' concerned the extent to which authorities could prevent a large boycott . . . and the extent to which Solidarity could successfully organize a boycott, and thereby discredit the government's claims of 'legitimacy' for its policies."

### Breaking the Information Monopoly

The boycott activities were designed to achieve two main results—first, to persuade as many Poles as possible to stay away from the voting booths, and second, to measure how many people actually voted. The idea was to break

## Computer Aided Spying—The Government's View

In April, a U.S. diplomat, Albert Mueller, was arrested for spying in Poland. The government spokesman, Jerzy Urban, along with Capt. Roman Karczewski of the Polish Interior Ministry, held a press conference to explain what Mueller had done. According to the two officials, Mueller had passed a leather pouch bag containing certain materials to a local contact. Among the items inside were "programmed computer disks."

This confiscation is not an unusual event in Poland. Computers, as well as disks, are often seized in the course of an arrest of someone accused of opposition activities. Polish law permits seizure of any items believed to be involved in the commission of a crime. This has led to the seizure of computers owned by a number of arrested opposition figures. Often, government spokesman Urban makes special reference to the presence of computers as proof of the suspicious nature of the activity.

When opposition leader Zbigniew Bujak was arrested, his Casio computer and software were seized. Later, Urban claimed that the police had decoded some of the material contained in Bujak's machine and were working on the rest of his coded messages. In the absence of any subsequent arrests of opposition leaders, most undergrounders simply discount Urban's comments.

The theme of electronic spying, though, is often used to discredit underground activities. The Minister of Internal Affairs, Gen. Kiszczak, stated in a recent interview, "The entire cooperation between the . . . underground and anti-Polish groups in the West is in fact based on intelligence methods: codes, secret writings, the most up-to-date electronics."

This attitude can result in ludicrous conclusions. A pc recently found in a flat occupied by an opposition leader was shown on Polish tv with the comment, "This is typical spying equipment."

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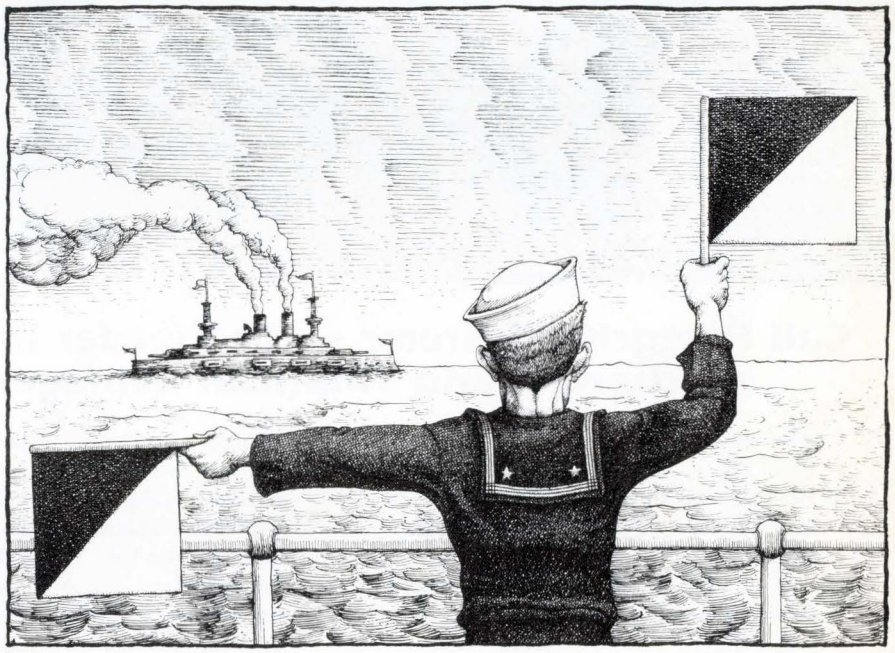

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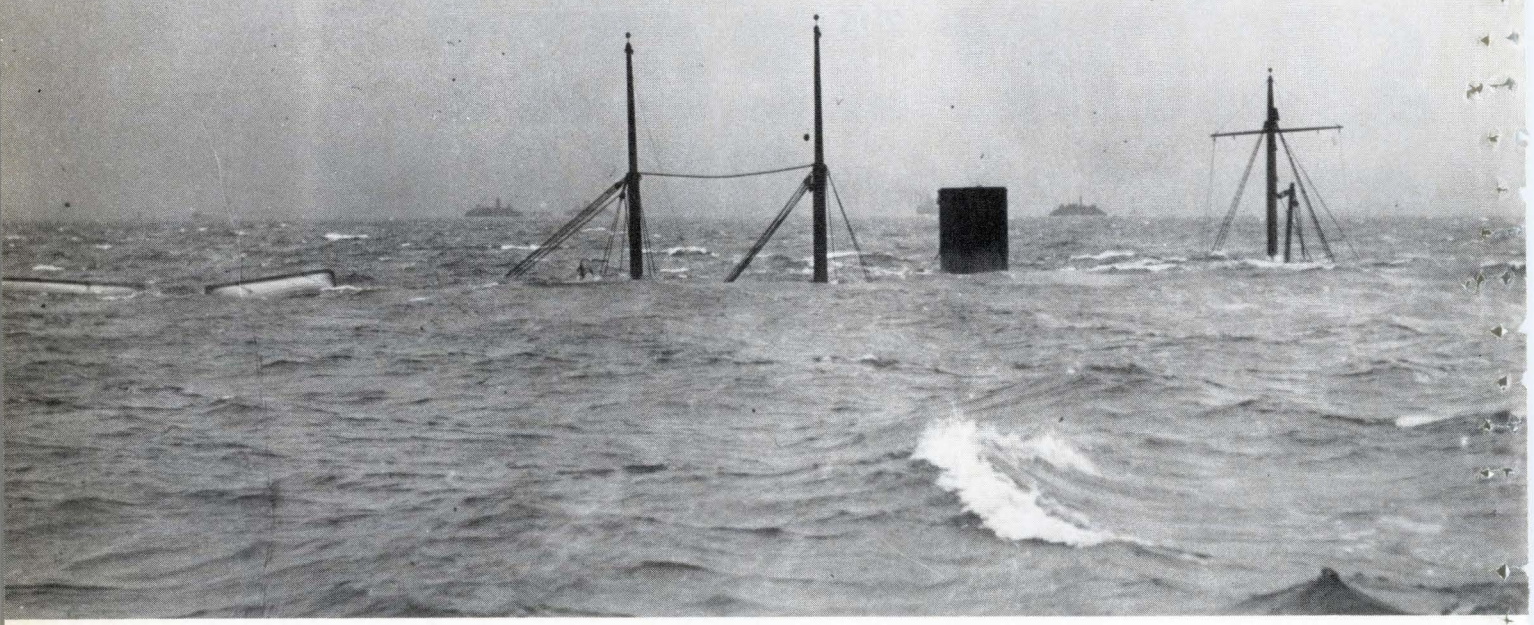

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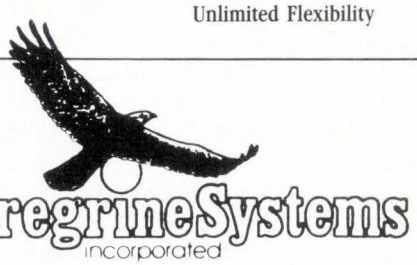


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the government's monopoly of information over how the election was working. Computing technology became an important asset.

Perhaps the most spectacular—and certainly the most widely publicized—attempt to sway the voters was a bit of computer-assisted television piracy. Three astronomers from Toruń University—Jan Hanasz, Leszek Zalewski, and Zygmunt Turla—along with local engineer Piotr Lukaszewski, worked together to produce what was Poland's first alternative political announcement on tv. According to their trial in the Regional Court of Toruń, Dept. 2, they acheived this with the minimum of equipment and a great deal of ingenuity.

A picture transmitted by the official Polish television station was received on a Neptune 150 television set. Vertical and horizontal synchronization pulses were input to a digital device controlling and working with a Sinclair Spectrum microcomputer and a transmitter. The digital device caused the microcomputer to time its generation of signals in synchronization with those of the government station, allowing television viewers to receive both the government signal and the Solidarity signal at the same time.

While watching the evening news, some 60,000 residents of a suburb of Toruń also viewed this written message: "Enough price increases, lies, and repressions. It is our duty to boycott the election." Accompanying the message was the stylized writing used to identify support for Solidarity, and the words "Solidarity Toruń."

The four who worked together to take a share of Polish television were tried for possession of an unlicensed radio transmitter, and for publication of materials that could cause public unrest. After four months of incarceration without bail, they were tried and convicted in January of last year. Each was sentenced to pay a fine of between $80 and $120.

At the trial, the prosecutor claimed that the voting around Toruń was from 10% to 20% less than in other parts of the country. Hanasz plays down their achievement. "There were also leaflets and speeches during the boycott. Our action was only the most spectacular. People like spectacular actions."

The "5-minute Campaign," as it was called, was a high-tech approach to the difficult statistical and political problems involved in trying to count accurately the

number of people actually going to the polls. It began with statistical theory and the development of sampling algorithms. It then depended on the precise assignment of thousands of observers—1,500 in Warsaw alone—to five-minute observation periods at specific times and locations. Finally, it required high-speed data processing to analyze all of the observers' reports and produce estimates of the voting as soon after the close of the polls as possible.

The previous year, Solidarity had been much slower in announcing the results of its monitoring of the elections. This was because the quality of the data necessitated extensive processing and analysis, which caused a two-week delay in reporting.

To achieve the goals of rapid analysis and reporting, a number of local reporting centers were established, each equipped with a Radio Shack computer (which are available to a reasonable degree in Poland). All the information that was collected by the observers was captured on these systems. Disks with the local information were forwarded to one of the six regional centers that Solidarity had established for mathematical analysis of the information. Solidarity personnel at each center had been shown how to sample the data on the disks, and on the day following the election, Solidarity was able to publish estimates of voter turnout for Warsaw. The day after that, it published figures for a large number of urban centers.

### Subverting the Information Monopoly

Solidarity supporter and systems analyst Jan C. was pleased with the re-

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sults of the monitoring. "The official results exceeded ours by 12% to 20%," says Jan C. "In the past, a vote of less than 90% was never recorded."

In fact, according to the official figures, 78% of the population voted in the boycotted elections; according to Solidarity, 60% to 64% voted.

Konrad Bielinski, one of the leaders of the project, explains the results: "For me, the primary goal was not to show that the authorities lie about election results. To do that does not require much effort. It is sufficient to report the falsification of results by a few electoral commissions to cast doubts on the authenticity of the total election. Rather, we wanted to achieve something more, namely to take away from the state its monopoly over giving us information about ourselves. And we can say that we succeeded."

Since then, computing has become a matter of national economic strategy. In public statements, Polish government officials sound much like those in the Soviet Union, praising computing as a key factor in the growth of their economy.

Reliable figures about Poland's installed base of computers, however, are hard to come by. Eighteen months ago, the New York-based *Journal of Commerce* estimated that there were over half a million computers in private hands in Poland. London-based Ralph Land, Rank Xerox's manager for Eastern Europe, acknowledges that "pcs are certainly being installed in considerable numbers."

In Poland, Aleksandre Kwasniewski, Minister of Youth, draws an interesting connection between computers and the underground. "Computers are most important for the development of our country," he enthused recently, suggesting that "it is much more useful for youth to study computers than to regret and publicize the lost chances of Solidarity times."

There's plenty of activity already. Swap meets for computer buffs of all ages occur every Saturday in Warsaw. The classified column in the local magazine *Komputer* shows "swappers" interested in software or advice concerning ham radios, electronic music, mathematics tutorials, games, CAD, graphics, chemistry, and biology.

Despite this popular interest and increased accessibility to computer technology, most of Solidarity's computing is now concerned with more mundane but still important activities, particularly underground publishing and the exchange of data among members.

ASTRONOMER/TV PIRATE JAN HANASZ

Underground publishing is a massive business in Poland. An estimated 700 newspapers, bulletins, and journals are produced by the underground press. This exuberant exercise in free speech involves people who face prison sentences of more than one year for the offenses of possessing these publications, discussing them, or producing them. Two thirds of the sentences for nonviolent crimes pronounced in 1984-85 involved some independent publishing.

Paul Smith, formerly information officer at the U.S. Embassy in Warsaw, notes that one of those underground publications, *Tygodnik Mazowsze,* is looking much better than it used to. The biweekly four-page paper looks like the


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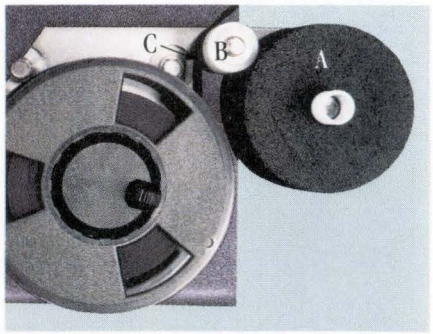


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desktop-published newsletters now beginning to proliferate throughout the U.S. It has graphics, photographs with reasonable resolution, and all the variation of type fonts one could want. Laser printers are rare in Poland, underground or above, but according to one Solidarity supporter, "Whoever needs, has." Smith has seen three or four underground publications that look like products of state-of-the-art desktop publishing.

Jacek P., meanwhile, laughs when asked about the use of computers in publishing underground literature. "What we need is low-tech solutions to our problems," the 25-year-old mathematics major explains. "This is a country where it is hard to get paper." Jacek has been jailed twice, once for the possession of underground literature (16 months) and once for possession of materials to print underground literature (also 16 months).

Nevertheless, some Poles are writing articles for the underground on word processors, and editors use daisywheel or matrix printers to produce copy that is ready for photo-offset duplication.

A recent customs seizure suggests the direction in which underground publishing is headed. A truck from Sweden was seized at the Polish port of Swinoujscie in November of last year. Its contents included a number of West German offset printing machines, 500 cans of printing ink disguised as car paint, some 5,000 books whose contents are deemed "harmful to the interests of the Polish state," and an unspecified number of photocopiers and Tandy computers.

Just as authors send articles to the underground on disk, leaders of Solidarity communicate among themselves using magnetic media. At times, they use encryption to ensure the security of their communications. Stanislaw G., a Warsaw scientist actively involved in Solidarity efforts, explains: "Information is transported between centers and individuals in Poland, sometimes in the mail, sometimes in person. The messages include instructions and reports about activities of the underground movement and other intelligence information."

Stanislaw is a member of a major opposition group, the Fund to Support Independent Scientific Activity, which administers small grants to support scientific research suppressed by the government. It currently uses two computers, a Commodore and an Amstrad, to track its projects in a way that is hard to detect. Pointing to the six-volume Polish documentation for dBase III, Stanislaw says, "It's very important to be able to hide information. We're only beginning, learning dBase III, and putting correspondence, articles, and instructions into one computerized system."

This is the direction of the future, Stanislaw says. "Every Solidarity center has piles and piles of paper. It's difficult to keep things a secret that way. Perhaps most important of all, the disks can be easily destroyed, and the information protected. This is very important. I've been to places where I've been eating paper, everyone else was eating paper, and a policeman was standing at the door. Now, all you have to do is bend a disk."

These applications of computer technology by Poland's opposition are only the tip of a potential iceberg. Poland is still a developing nation in its use of computing when compared with the U.S., Western European countries, or Japan, but if the underground continues to attract members with leading-edge expertise, the scope for more extensive high-tech subversion will be enormous.

At this stage, Solidarity is cautious about its plans. When asked about its attitudes on outright computer sabotage, systems analyst Jan C. says, "Perhaps it is better to save that until harder times."

In the West, meanwhile, such examples of alternative processing may be less obvious or necessary because of the more open nature of Western political systems. The moral conflicts of computer professionals are very different. Even so, there are still many unanswered questions about what a dedicated opposition, or even a terrorist group, could do with the power of global information systems at its fingertips.

Computer security is often regarded as protection from a malevolent individual or a small local group. Perhaps the industry should now be taking a much broader view of the kind of security breaches that the future may hold. ■

*Buck BloomBecker is a computer security consultant based in Los Angeles.*

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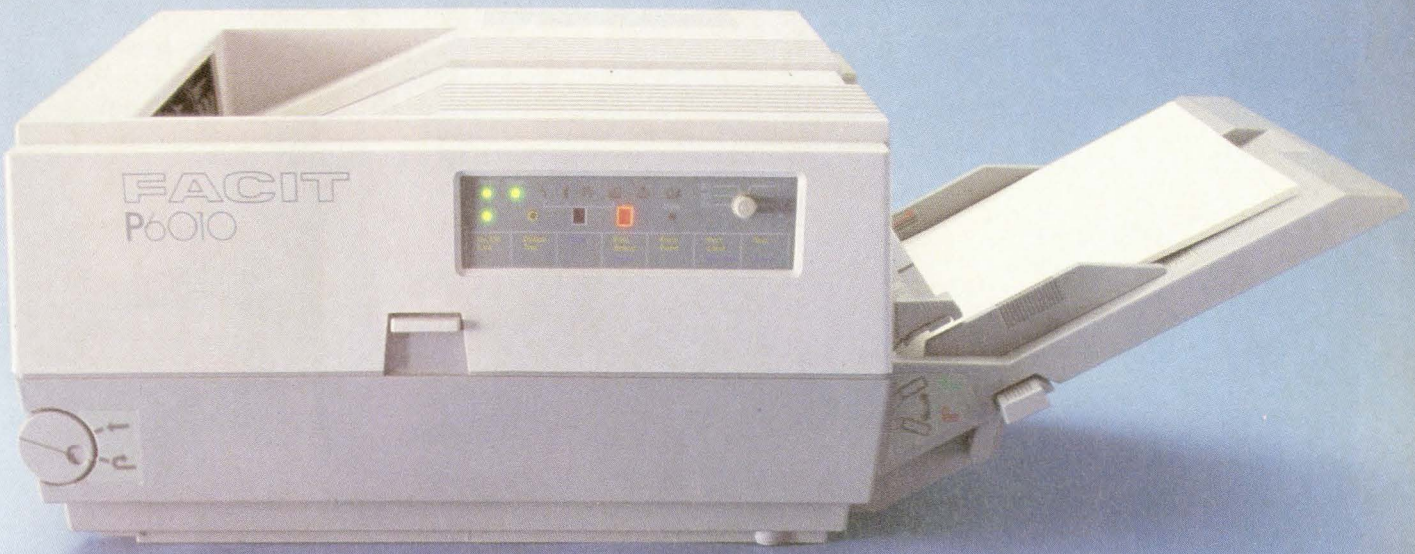


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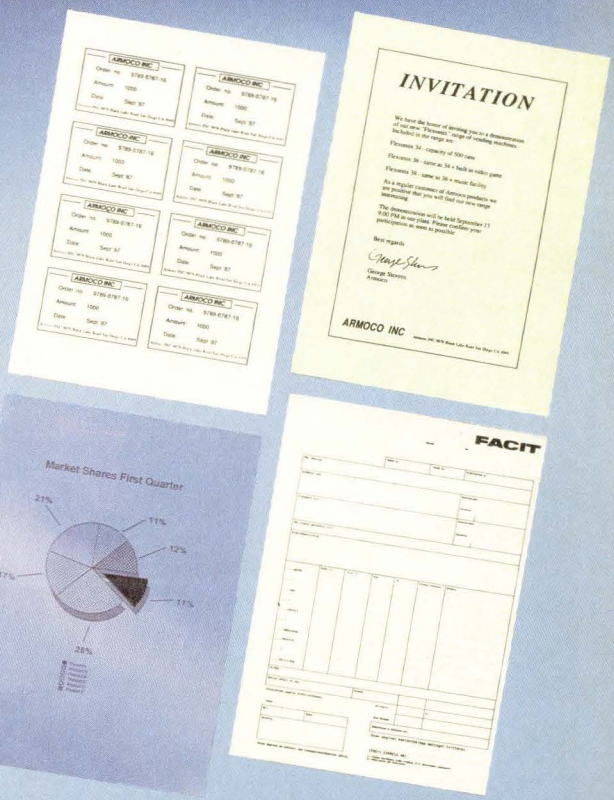


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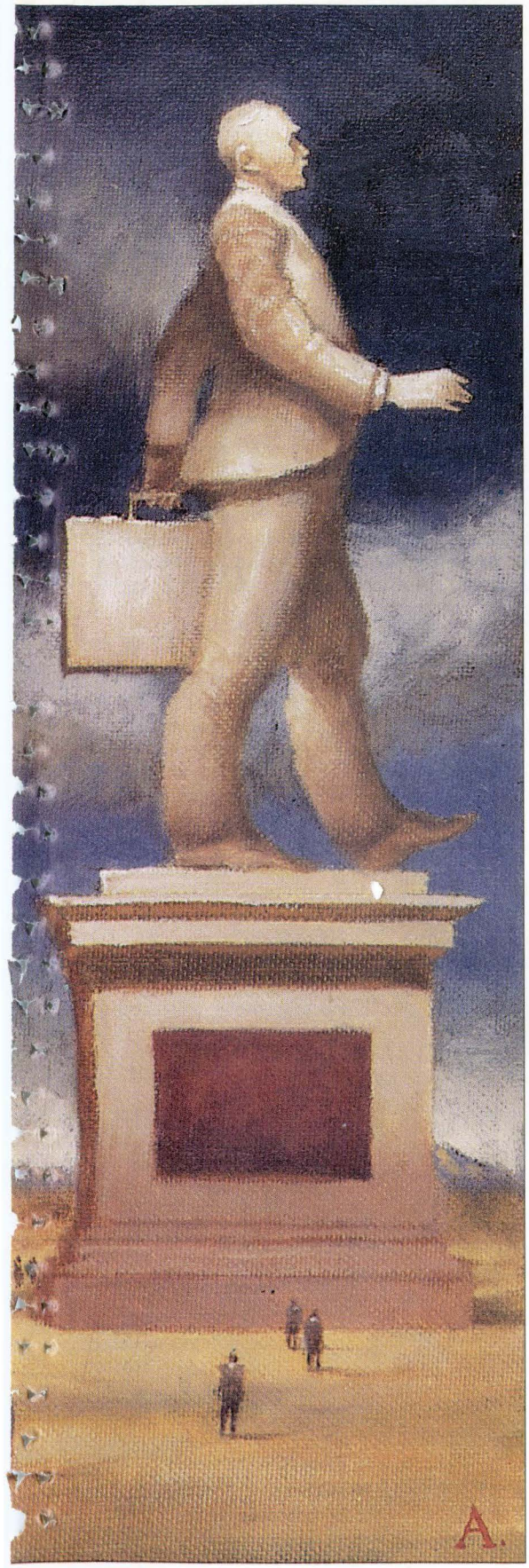



**As information processing in major companies becomes critical to their business goals, computing centers are finding new identities. In Europe and Japan, some are being transformed from service-oriented cost centers into aggressive, marketing-driven subsidiaries, selling their skills both inside and outside their organizations. Over the next five years, many more will make the change from Dp Dept. to IS Inc.**

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The pressure's on for the world's information systems departments. The backlogs don't seem to be shrinking, a growing piece of the corporate IS budget is being handed over to departmental management and end users, and the uncomfortable partnership with telecom technology is still, well, uncomfortable.

Yet corporate management, economists, and governments all expect those IS centers to perform strategic and commercial miracles, which are needed by yesterday.

Something had to change. In Europe and Japan, information systems departments in major companies have found new identities. Some have become aggressive profit centers, seeking business both inside and outside their organizations.

Anthony Dandolo, MIS director of Fininvest Servizi, the information systems division of Italian conglomerate Fininvest, Milan, confirms, "There is a definite lean toward marketing and hiring marketing people so we can approach the rest of the company with our services. We are active rather than reactive. We look for every opportunity to show the company the strategic use of information systems."

The role of the IS center as a simple development and coding department is long gone. According to a survey of U.K end users by Price Waterhouse, 31% of installations report that more than three quarters of the systems development effort is supplied by end users. Price Waterhouse suggests that this will rise to 74% of installations within the next few years. Confirming the role shift, the survey also reveals that topping the priority list for U.K. IS centers in the next five years is the production of core systems—not specific applications.

In many organizations, pcs, intelligent workstations, and fourth

## The Info Center and the Help Desk

With so much of the applications development effort being supplied by end users in many companies, the success of end-user contact points is crucial.

Information centers and help desks allow much needed expertise to be developed within the computing operation. An understanding of diverse end-user concerns is a great help to an IS division intent on transforming itself from a coding shop into a corporate consultancy. These end-user functions have their problems, however.

The info center, that promised land flowing with the best corporate knowledge in micro and departmental computing, can be a great success and a vital link in the corporate computing chain. The concept is almost 10 years old, and while some companies are just now realizing they need an info center, others are finding that they can achieve what they need in other ways.

At the Banque Nationale de Paris, Vivien Lévy-Garboua has adopted many info center concepts in his dealings with end users without actually setting up an info center. "The task of the dp department has been to manage the decentralization of dp toward the end user, to decide what to make available to users and what to keep in the hands of the dp department," says Lévy-Garboua. "We have set up a team of 10 people to help all micro users in their choice of software, examining products and advising them, but we haven't really created an info center. We are moving toward a system of making data files available to users while keeping our databases intact."

The point is that an info center is not always necessary or, if it is, then it may have a set task to perform, such as aiding IS decentralization projects. Once distributed systems are installed, users tend to get deeper into applications development and to develop their own skills, and, eventually, systems support and training become a local affair. In this situation, the info center may simply outlive its usefulness.

The help desk, a frequent first contact point for users throughout the company, often is badly managed. In a U.K survey by industry analyst Xephon in Newbury, England, 70% of the installations contacted had help desks manned part-time by existing staff. Many gave staff no training for the job and only a handful provided a separate office.

"The biggest single problem experienced by the help desk was users ignoring it," says the report's author, Trevor Eddolls. One site remarked that "users still tend to ring any dp contact they have."

Creating an effective help desk can be expensive, so some companies (15% according to the survey) have begun to charge the costs back to those using the service.

Also, Xephon found that half of the respondents had both an information center and a help desk; sometimes, these were the same thing. More generally, the info center looked after the micro problems and the help desk fielded queries about mainframe systems. The vast majority claimed high rates of growth for these activities.

generation languages have taken over much of the burden of applications development, while third-party software developers are used extensively to look after the coding of major systems. The help desk and the information center have stepped in between the IS departments and the end users to aid the distributed development of systems. These end user-oriented functions help make the IS Ivory Tower accessible—though, of course, they have their problems and sometimes are not managed well enough to allow key staff to use their expertise more broadly within an organization (see "The Info Center and the Help Desk").

The positive result of these trends, however, is that a growing number of information systems groups now consist almost exclusively of key development teams, each member acting as in-house consultant and IS center diplomat. They also have a role to play as sales reps.

"The idea of entrepreneurship very much applies in this IS department," says Hans van Mierop, corporate IS manager of Dutch wholesale and packaging conglomerate Bührmann Tetterode outside Amsterdam. "We are doing a selling job internally, selling IS as a tool of management and as a business function."

That takes a new kind of management approach, a new set of staffing criteria, and clear objectives. In the early '80s, the IS division at Bührmann Tetterode had two central IBM 4300s and 70 people. Now it has a range of IBM 3X systems, Digital Equipment Corp. VAX machines, and only 25 people. Initially, it served two large Dutch companies in the group and specific functions in seven or eight others. "It was an internal service bureau," van Mierop says. Now the central IS function has no direct responsibility for operations. It's all decentralized.

Aided by Amsterdam consultancy Database Consultants Europe, van Mierop was able to convince top management that "centralized IS didn't suit the corporate decentralized approach. We have succeeded in leaving the administrative support role in the eyes of management. We are well on the way to establishing a partnership between IS and Bührmann Tetterode as a corporation."

Before he took on the IS job, van Mierop knew the corporation well. He was IBM's account manager for Bührmann Tetterode before joining the company. He defines his IS department's new role as a fusion of "quality assurance and consultancy in IS planning." It was a role that had to be understood throughout the company before it could work. Over the last two years, 135 line managers and senior executives, including the chairman of the board, have attended internal seminars on the management of automation.

Van Mierop's 28-member staff is made up of three kinds of people—consultants, project leaders, and a support team. "We have shifted the role from

**"WE ARE ACTIVE RATHER THAN REACTIVE."**

programming to systems definition and functional design," he explains. "Now we are becoming advisors on organizational change."

That transformation is largely the result of van Meirop's marketing approach to running an IS division. Italian tire and rubber group Pirelli, based in Milan, took a similar approach and the result was even more dramatic: a new company called Pirelli Informatica built around the old IS division, and eager for new busi-

# The Changing Face of Japanese IS

More and more large Japanese companies are turning their computer operations into profit-making subsidiaries that supply information services to both the parent firm and their numerous affiliated and group companies.

The reasons for doing so vary, and increasing revenues is not always at the top of the list. Often, such moves are designed to improve cost controls on information services while making more efficient use of computer resources within the group as a whole. Only in certain cases will new IS subsidiaries be expected to make major contributions to corporate coffers.

Better cost control was one of the main motives behind the setup, in November 1985, of Nippon Oil Information Systems Co. (NISCO), created out of the old Computer Systems Dept. (CSD) of Nippon Oil Co. Ltd. of Tokyo. According to Takahiro Miura, NISCO managing director, "Year after year, the expense of CSD was increasing," so the parent company decided on a new structure "to stop the unlimited increase of expenditures."

When the organization was still a department of the main company, says Miura, "personnel costs were not discussed much." With the establishment of the separate company, however, "Our parent company can control total costs, including hardware, software, and personnel," explains Miura.

"Nippon Oil has many affiliate companies," he adds, "and they all want to modernize by computerizing." It was expected that NISCO, already familiar with the affiliates' businesses, would be ideally placed to supply much needed services to them, so money that might otherwise go to outside suppliers would stay within the group.

Similar thinking was behind the creation in July of "K" Line Information Systems Center Corp. (KISC) from the IS group of shipping company Kawasaki Kisen (known as "K" Line) of Tokyo. Explains director Yusuke Hara, "Increasing the cost consciousness of computer control" was a major goal of the change.

"Nobody cares about the cost of software and hardware," Hara claims, "but if we make up a bill, they'll understand the cost. They thought of computer services as free, like water." As with the Nippon Oil subsidiary, KISC is expected to increase its business by supplying other Kawasaki companies.

Another important goal is to simplify the sometimes chaotic process by which it is decided what services will be supplied to what end users. The experience of Renown Inc., Japan's largest apparel company, where information services are still handled by a conventional systems department, illustrates the problem. "Right now, our computer center is not positive, it only receives orders," complains department manager Hideo Suga. "Sometimes, we are asked unfair requests, but if effectiveness or cost performance are bad, we reject them. So we receive many complaints." Some of the advantages of a profit-oriented computer operation are attained by billing end users for services, but Suga would prefer a separate company sometime in the future.

**FADING FIRMS MAKE IMPRESSIVE MOVES.**

At Nippon Oil, a new information systems planning office with 17 employees decides what systems and services the company needs, and then places its orders with NISCO. Previously, the computer system department had to negotiate directly with end users, and "make them give up useless programs or projects," asserts managing director Miura. On the other hand, he admits, "We selected projects by our own opinion, which is the maker's side only. This was not good from the corporate viewpoint, because sometimes we selected only easy or interesting projects. Now, the selection is more user oriented."

Even though the new IS subsidiaries are profit-making entities, there are definite restraints on their pursuit of new revenues. One is the parent company's claim on their efforts. NISCO, for example, gets 70% of its revenues from Nippon Oil and 30% from affiliated companies. "I want to make it 50-50, but Nippon Oil wants to keep it at 70-30 because they have such a backlog of requests," reveals Miura.

A more serious restriction is a limited area of IS expertise, which constitutes an almost built-in barrier to growth beyond a certain point. For example, "K" Line subsidiary KISC will concentrate on supplying computer and software services to the shipping industry with which it is familiar. Since it doesn't want to help "K" Line's competitors, however, its customers will be largely limited to Kawasaki affiliate and group companies.

Only a few major corporations have a level of skills that will let them produce serious revenues from IS subsidiaries. Trading house C. Itoh & Co. has 80 programmers and systems engineers working at systems supplier C. Itoh Data Systems, while subsidiary Century Research Center Corp. offers such IS services as time on a Cray supercomputer. Much of the trading company's IS work is still handled in-house, however.

The most impressive moves are being made by firms in fading industries that are looking seriously for new sources of revenue. Nippon Steel Corp. (NSC) is a leader in this category, due to its extensive experience using computers in steel production—around 2,000 of its approximately 64,000 employees currently are involved in computer-related work. On June 26, it changed its articles of incorporation to permit it to enter the electronics business.

Instead of separating its electronics, computer, and communications systems division from the company to form a subsidiary, NSC intends to test different products and markets and to establish niche companies as deemed appropriate. In the long term, it is planning the production and sale of hardware from control devices to computers (excluding mainframes), according to Hiroshi Furukawa, a group manager in the division.

NSC sees more immediate prospects in developing systems and supplying services such as timesharing and value-added networks. Furukawa says that the company plans to earn 20% of its revenues, or ¥800 billion ($5.5 billion), from IS fields by 1995.

BY ROBERT POE

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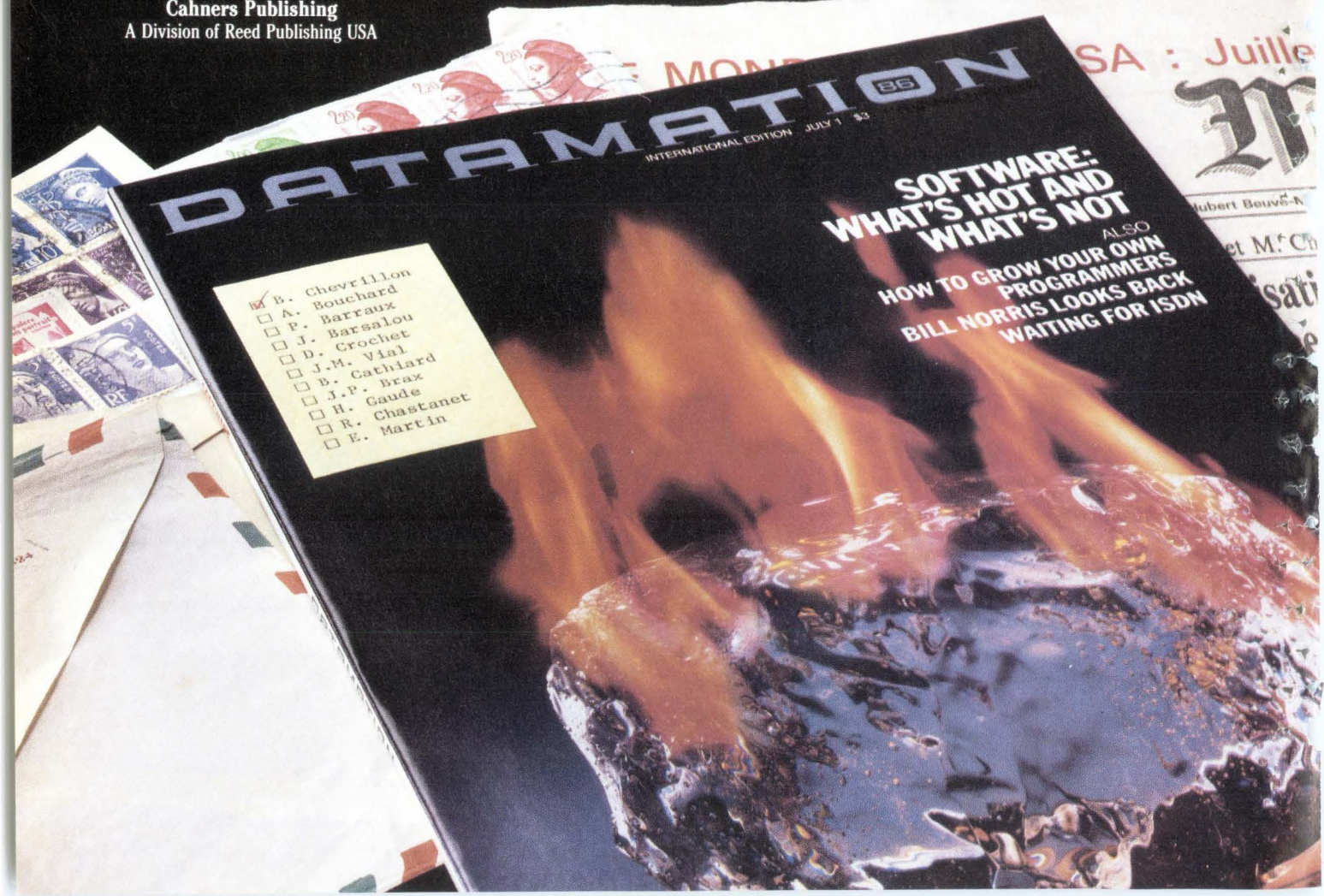

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ness outside the Italian corporation.

Luciano Rodighiero brought marketing skills to the company when he took over as Pirelli Informatica's managing director in 1986. He argues that it was user demand that changed the face of Pirelli Informatica's functions. "Up until 1984," explains Rodighiero, "the dp department was a central unit cost center providing services to a captive market [the Pirelli companies]. Since then, the department has been changing. In 1985, we decided to enter external markets, transforming our experiences into marketable services."

He details three basic objectives for the new company that characterize the new aggressive marketing mission. First, he wants to break the perception of working for a captive in-house market while continuing to regard that history as the core of Pirelli Informatica's experience. It is a good background to have. The Pirelli Group has 110 locations in 16 countries with over 70,000 employees. He also wants to use the external IS market as a window "to gain new experiences outside and move them back to in-house companies. This will help the firm become recognized as one of the best IS consulting companies in its own right." Finally, he wants to dominate the market for implementing new technologies in Italian corporations.

"We get the best out of new technologies," claims Rodighiero. "In Italy, we're the only ones to use new technologies at a corporate level, such as relational DBMS applications. We develop and sell expert systems for manufacturing, financial, logistical areas. We develop LANs that are not hardware intensive but that are software intensive. In videotex, we developed a system for use inside and we sell it outside."

Why does Pirelli Informatica have these objectives? "Competitiveness," Rodighiero responds. "In Pirelli today, the philosophy is to look at information technology services in a new way, apart from the way dp has been looked at traditionally. Our minimum base option is to represent the leverage to give a company the competitive edge with only one focus—to create added value for the client through information systems."

Pirelli Informatica has five areas of internal and external consulting—added value systems and network services, financial and administrative systems, human resources management, strategic IS planning, and end-user computing including office automation, expert systems, DBMS, CAD/CAM, LANs, and decision support systems.

According to Rodighiero, building a reputation for Pirelli Informatica as a separate entity in the group is the most important overall objective of the company. He says, "Our goal is to be a leader first and to have market share second. But quality must come before volume."

### Conservative Goals for Some

Of course, not all European information systems departments are exhibiting such strong ambitions. For a start, the performance of the parent corporation can be a significant dampener on IS development. The abrupt deterioration of the oil business last year, for example, has taken its toll on French oil company Elf Aquitaine and its IS operations.

"We are now thinking of closing one of our computer centers on the basis of its loading rate," explains Louis Nardon, group IS and telecom manager for the Paris-based company. He is reponsible for the distributed computing activities of five operating divisions.

**COST SAVINGS ARE ONE OF THE MAIN REASONS FOR CHANGE.**

"Our dp investments were made on the assumption that there would be a continued expansion of our exploration/production activities," he says. "Those are declining now. Before that happened, instead of expanding the capacity of our existing computer centers, we decided to set up a new one to give us some backup as well as extra capacity. We were wrong to make that investment and we may now sell the computer we bought. That would be a strategic decision in light of the absence of any recovery in the company's prospects. It would bring savings in operational costs and in personnel, because some jobs would be eliminated."

Cost saving is among the main rationales for changes in the structure of Japanese IS centers too. While Elf Aquitaine in France may be having trouble coping with the erratic oil business, Nippon Oil in Tokyo has found a way of reorganizing its computing operations so that they are more effective and more accountable (see "The Changing Face of Japanese IS").

Fininvest's Dandolo, meanwhile, is serving a company in the media, finance, and real estate businesses and his parent company is expanding rapidly. "We're involved in a search for productivity because the curve of growth in the group is too steep to keep up with and is causing problems," he says. "The backlog of work is tremendous; we double every year."

So does Dandolo's budget, which has risen to L50 billion ($38 million) in 1987 from L7 billion ($5.4 million) in 1984. That has helped him afford new ways of coping with the backlog by farming out programming. Around 25% of the group's programming needs are now taken care of outside the company.

That has allowed Fininvest to make better use of its in-house expertise. Dandolo, following the trend toward in-house consultancy, set up a prototyping group approximately two years ago. It works in various divisions at the user level, identifying user needs, developing and testing subsequent applications. Users are encouraged to identify and develop their own applications with help from Fininvest Servizi.

Dandolo has become involved in projects for outside organizations also, such as a ticket and subscription system for the Milan soccer club. He adds, however, that his subsidiary isn't "really a profit or a cost center; we want to make money but then give it back to the company in reduced rates for our services."

The new roles of IS departments in Europe and Japan, with the emphasis on in-house consultancy, strategic planning, defining core systems, and extending their operations to provide systems for firms outside their organizations have further improved their positions within their corporations. It is a process that Dandolo expects will continue.

"At first," he recalls, "we tried to impose change, but then ended up directing change instead. The corporate culture has to adapt as information center and dp center changes come along. Part of the continuing education here is to show that each job is part of the organic whole of the company, not an isolated unit." ■

*Contributing to this article were James Etheridge in Paris, Janette Martin in Milan, Robert Poe in Tokyo, and Paul Tate in London.*

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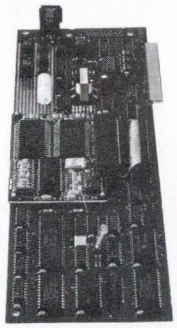

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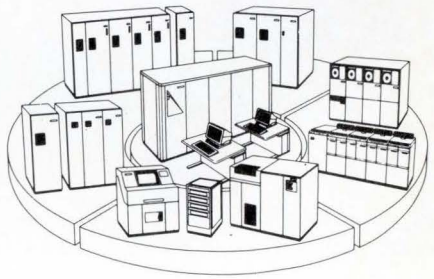

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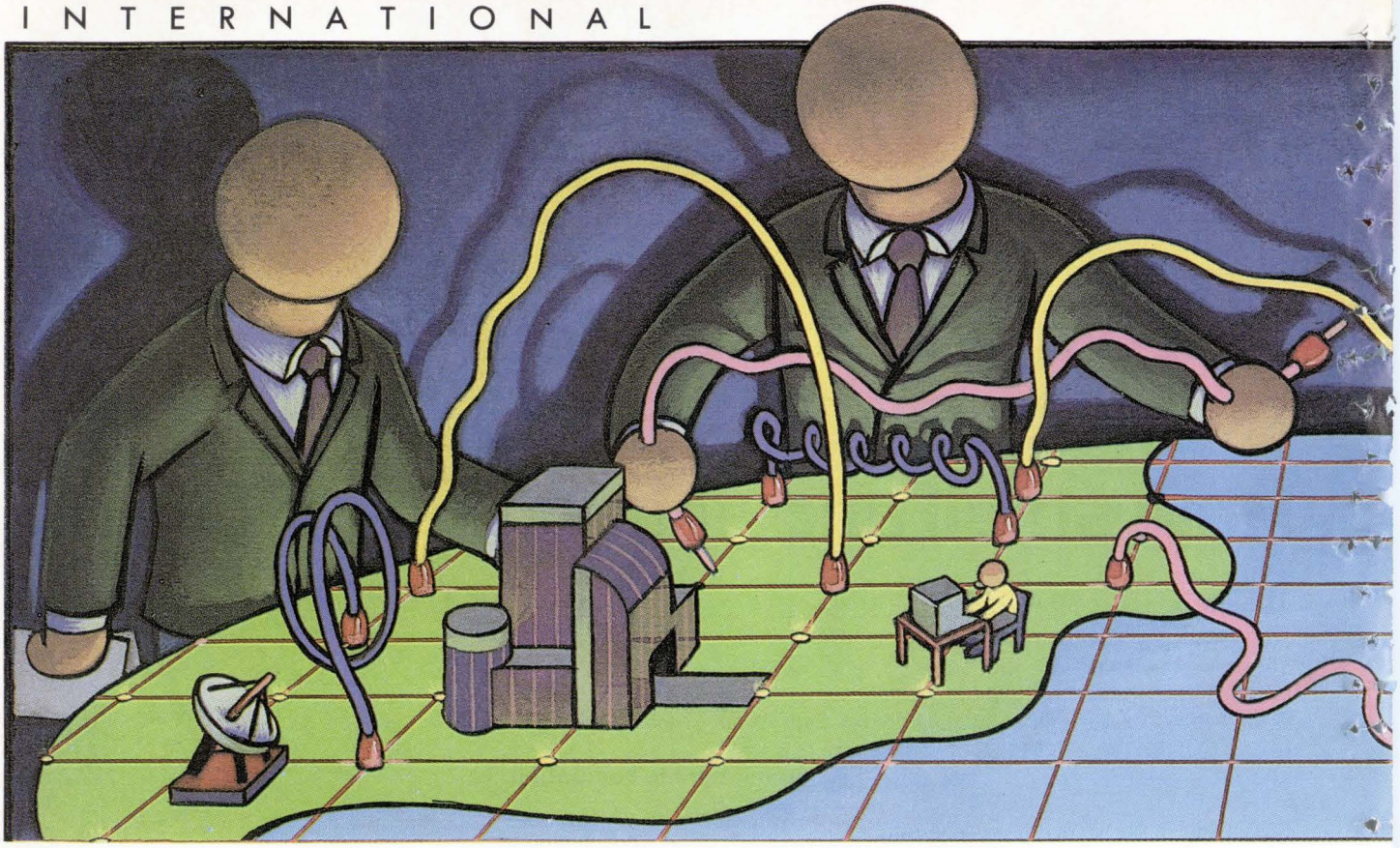


# Real World Corporate Com

**To properly manage a corporate communications network, crucial business goals must be established as constraints on the system. The decisions regarding where, when, and how much company commitment is required is a function of careful corporate communications management. The following article examines the requirements on, and considerations of, corporate communications.**

BY PETER FREDRIKS
AND FRED VAN LEEUWEN

Communicating information in an ordered, efficient, and timely way is a skill that many organizations are still learning. It is a skill they need to develop quickly, because competitive pressures and the growing use of technology in all industry sectors demand it.

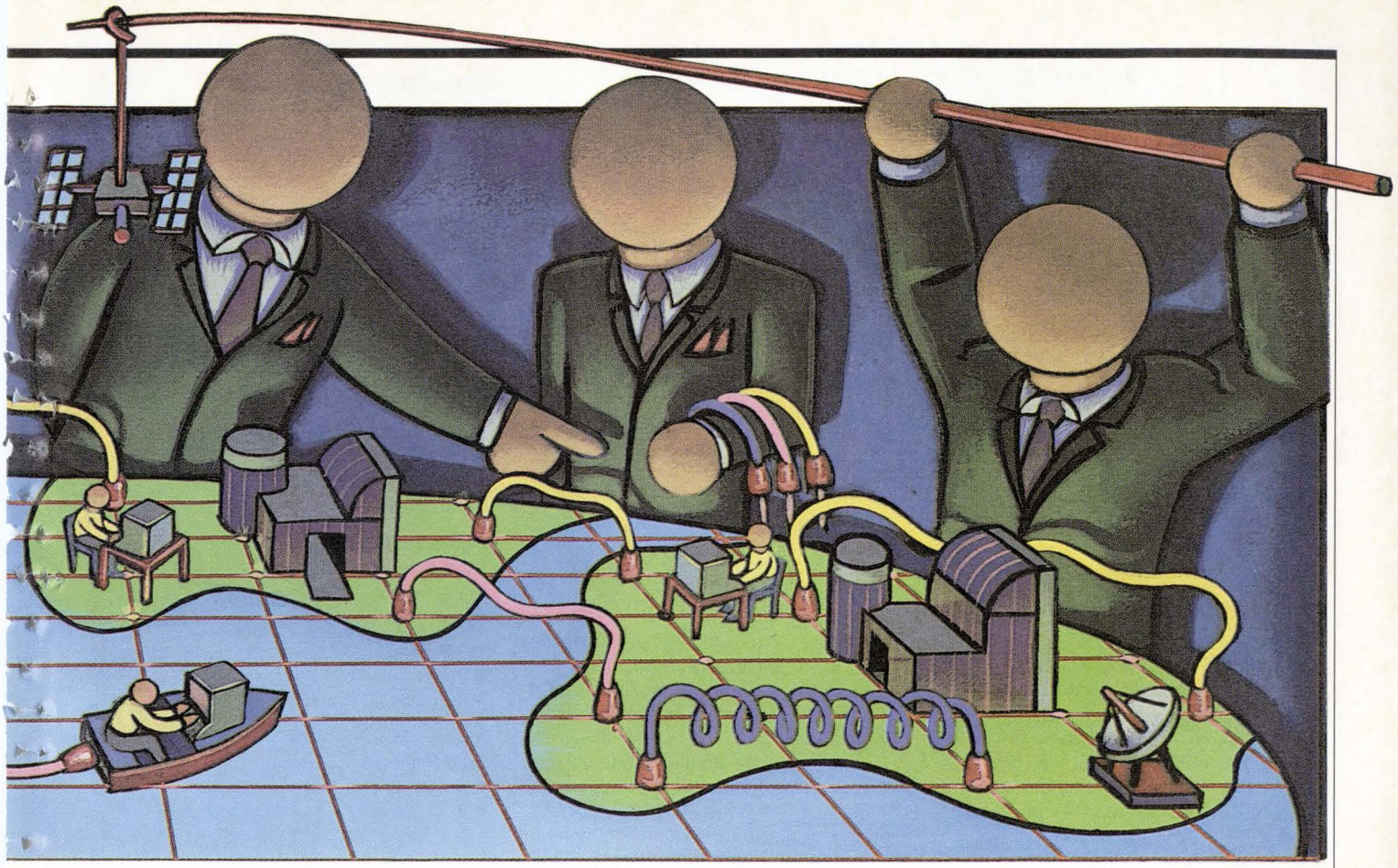
What's more, the corporate benefits of other technological developments such as distributed databases, internal and external messaging systems, and high-level decision support systems cannot be fully realized until a well-managed communications infrastructure is in place. Ultimately, this has to be the responsibility of a central department because of the far-reaching effects that data communication has on an organization. It connects many autonomous units into one organic whole and, increasingly, reaches out beyond the boundaries of the organization into the outside world.

Despite its obvious importance, however, the corporate communications management (CCM) function is often badly coordinated and ill-conceived. If corporations want to make the most of existing and developing communications technologies, then they need to be clear about how to manage their resources effectively.

Though CCM covers a highly technical aspect of corporate structure, there are some crucial business-related goals that must be established. These can be summarized as follows:

- Optimize the use of information as a corporate resource by ensuring its efficient and cost-effective distribution.
- Help the company adapt quickly in an increasingly dynamic marketplace by enabling more flexible operations.
- Manage the corporation's inevitably scarce communications expertise.
- Help control the organization's dependency on suppliers of information technology.

When these goals are taken seriously, the benefits can be significant. For example, Bert Boutmy, the director of corporate communications at the headquarters of Philips in Eindhoven, the Netherlands, explains, "In the last couple of years, Philips has managed to reduce the investments in inventory, which used to be consistently above 30% of annual revenue, to 23.5%. [I believe]



# munications Management

the availability of the corporate data network has played a substantial role in finally achieving this goal. It has enabled the introduction of distributed but tightly controlled production and inventory management for some 300 Philips factories spread around the world."

Clearly, results like this are not achieved overnight. There tend to be four main phases that an organization goes through before its CCM function reaches maturity (see Figure 1).

*Phase 1: Operational.* In this first phase, communications planning is largely done on a short-term basis, often as a side effect of a specific applications project and in some cases just before the system is implemented. Longer-range planning is usually done only when there is an obvious need for it—when installing a voice switch, for example.

In large and complex environments, this piecemeal planning is costly and results in structures that are inflexible and difficult to manage.

*Phase 2: Infrastructure.* As a reaction to the problems encountered during the first phase, organizations then embark on the planning of an "ideal infrastructure." On the surface, this appears to give total flexibility and to provide a neat, technical communications solution. The corporation starts to pay attention to the problem of operational management —but the resulting network management function is usually seen as something separate from the management of the attached computer systems. This is an organizational time bomb.

### Focus on the Priorities

During this phase, companies also tend to concentrate on the technological aspects of the communications system. The analysis of user requirements often takes second place. If the organization has no awareness of this problem, or no mechanism to identify it, this phase can last a dangerously long time. These symptoms are particularly prevalent in monopoly situations.

*Phase 3: Service.* Sooner or later, the organization will move into the third phase where user needs become the starting point for the planning process. Also, the existing operational management is complemented by the addition of product or service management. This allows the definition and monitoring of a user service that runs on various technical subsystems.

This phase may well lead to more satisfied users but will not automatically lead to the planned, strategic application of technology. There's often an inadequate allocation of resources, and it may prove difficult to plan the infrastructure over the longer term because in this phase users tend to formulate their requirements by looking only at the (very) near future.

*Phase 4: Strategic.* Finally, the business needs of the organization become the focal point. Beginning with strategic communications planning where business objectives are the primary concern, it will eventually mature into a complete corporate plan integrating four key aspects: the business, the information systems, the technical infrastructure, and the main organizational structures.

The result is that the directors, the corporate strategy planners, the corporate communications manager, and the MIS manager are all involved in the creation of a fully integrated strategy. Today, few companies have achieved this position but many of the larger organizations are moving in this direction.

Once a corporation reaches this

## FIGURE 1 Stages of CCM Development

| STAGE | SCOPE OF PLANNING | RESULTING RISKS |
|---|---|---|
| *1. Operational* | Individual Applications | Sub-optimal, inflexible systems<br>Lack of control |
| *2. Infrastructure* | Technical Communications | Lack of user orientation<br>Theoretical solutions |
| *3. Service* | User Needs | Inadequate priorities<br>Short-term orientation |
| *4. Strategic* | Business Needs | Late implementation<br>Wrong strategy |

stage of development, the CCM function becomes fully active. It has many areas of responsibility but they all fall into five main categories (see Figure 2):

*Architecture and standards.* The most important issue here is the definition and maintenance of a model of corporate requirements for communications.

In many firms, the exisiting infrastructure is the result of more or less organic growth. The need for communications has been solved in a piecemeal fashion and so-called "spider networks" have grown up. Such networks are excessively complex, difficult to manage, and costlier than necessary. To improve this situation, an organization needs an integrated model of the requirements for both current and future applications. The reconstruction of a corporate network based upon this model leads to greater flexibility and significant cost savings.

Making that model work inevitably means linking incompatible systems, but there are many areas where interconnection standards don't—or only partially—exist. What must be remembered is that even where there are international standards, these are not a replacement for management and don't necessarily make the job of management any easier.

The development of international standards like X.400, MAP, TOP, etc., requires constant monitoring because applications not possible today may well be feasible tomorrow. In order to maintain the competitive edge, corporations need to be able to grasp new technological opportunities as soon as they are appropriate.

In addition to implementing established technical standards, CCM must also define corporate standards for application-to-application communication. Only when distributed applications can communicate with each other can an organization start to take full advantage of the corporate network. The problem becomes more complex when the internal network is made accessible to external organizations.

Swedish automaker Volvo has come to grips with this problem by including its car and truck importers around the world in its decision-making process (see "Volvo's Net Gains," Oct. 1, p. 76-1). Roland Linderoth, Volvo Data's director of product development explains that "with access points to the worldwide backbone network, our smaller importers and dealers can forward their orders electronically to Volvo. Long-term communications policies are being defined by a corporate network board, chaired by a corporate officer, with representatives from Volvo Data and the major users."

*Accessibility of resources.* The trick is to make information and network resources available throughout the corporation while still keeping the system secure and well supported.

### Reporting to CCM

A corporate communications manager often has to construct a network across national borders and will need to work with local staff who have knowledge of their own national environment. The successful operation of such a multinational net is more likely if the local staffs functionally report to the CCM department. There also may be many legal issues to solve in transporting data between countries. Consequently, the manager needs legal advisors either on the permanent staff or readily available.

Such a net will also be vulnerable to hackers, professional intruders, and competitors. The network must, therefore, provide services that cover access control, authentication, and encryption. The CCM department should be able to provide consultancy on all areas of security. While the debate about whether system or network designers are responsible for data security continues, a joint approach is probably the best solution.

## FIGURE 2 CCM Responsibilities

**Architecture and Standards**
- Model of corporate requirements
- Industry and applications standards

**Accessibility of Resources**
- Companywide access
- Legal aspects
- Security

**Network Management**
- Internetwork interfaces
- Monitoring and cost control
- Directory services

**The Marketplace**
- Suppliers
- Regulatory aspects
- Competitors' solutions

**Technology and Applications**
- Existing within the organization
- Planned by the organization
- Unplanned but desirable

*Network management.* Sooner or later, the internal corporate network will interface to other networks at national and international levels. These networks will, jointly, provide the end-user services. Hence, a well-integrated strategy for internetwork management is important. The starting point should be one point of contact for the end user, so functions such as the help desk and network control facilities must be integrated. The CCM department will have to draw up guidelines for a standard approach to the management of the various national, international, and local area networks so that vital information on topics such as network loads, services, performance, and costs can be gathered.

Communications costs are significant to an organization and, unfortunately, are not always readily visible. Philips' Boutmy reveals, "At least 2% of Philips' revenue is being spent on communications. Since it is not yet possible to consolidate all the costs, I would not be surprised to find that the real costs are a third or so higher."

A companywide, user-friendly directory is also essential if users are to be able to contact each other easily. The directory needs management, maintenance, and standardization.

*The marketplace.* The selection of the right products and suppliers to build the corporate backbone network is the job of the CCM department. This task requires considerable knowledge about subjects ranging from the regulatory aspects of leased and switched lines to new communications technologies and international standards. It is also very important to establish solid working relationships at various levels within the international carriers, especially within the public carriers.

Leased lines play a very important role in the corporate backbone network and many communications managers feel there is a need for better international public services. Volvo's Linderoth explains, "If we could have more influence on the quality and tariffs of PTT services, we would, in many cases, prefer to use managed data networks instead of our own leased lines for international communications."

The struggle taking place between suppliers of computer equipment and suppliers of telecommunications equipment complicates matters. The conflict does not help the development of accepted standards—standards that would make life easier for the user. In this complex arena, the CCM function can prove its value to an organization by shopping around for the best deal, comparing supplier solutions, and ensuring that there is a long-term commitment from the supplier.

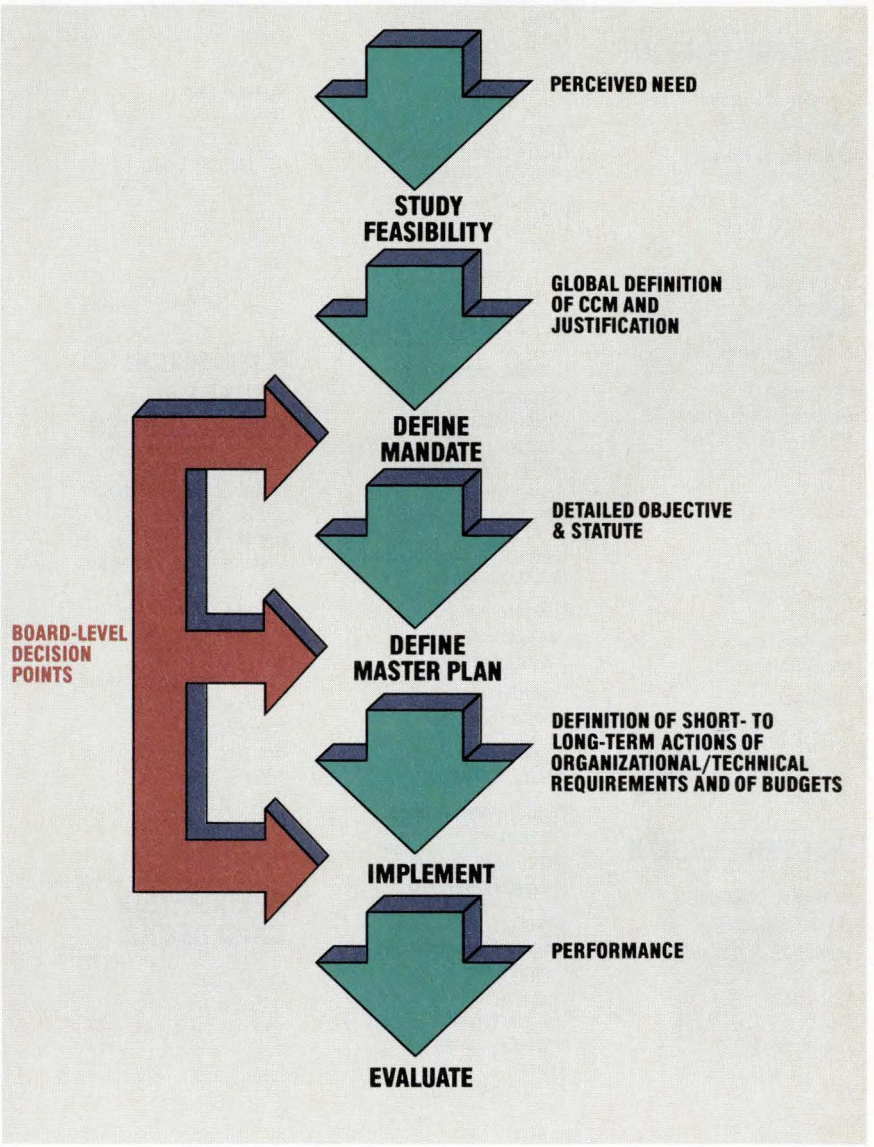
*Technology and applications.* The CCM will need to acquire and to maintain information on the existing technologies and applications within the organization, as well as to coordinate any plans for future developments.

This will require close contact with the business users. Existing facilities should be marketed within the organization and a communications expert should be closely involved with the development of new applications so that the opportunities that new communications techniques offer can be utilized. Furthermore, watching technological developments closely enables the CCM to better judge the life cycle of new and planned systems.

Once the CCM department has accepted these areas of responsibility, it should have the knowledge, the organization, and the ability to run the corporate network effectively. There is still, however, one major element missing: corporate backing at a senior level.

Clearly, the implementation of CCM, with its potentially enormous impact on the corporation, must be preceded by a decision from top management. In fact, as Figure 3 illustrates, the decision is usually made in stages.

**FIGURE 3** Preparing for CCM




The most important factor here is cost-justification, quantifying the problems that may occur, and the opportunities that would be missed, if a CCM function is not implemented. In practice, this can be done in the following manner:

- Estimate the total costs involved in communications and evaluate the current approach to monitoring this expenditure.
- Identify areas in which costs could be reduced (e.g., improved utilization of transmission facilities).
- Demonstrate that corporate standards will be required in order to allow systems to interconnect to meet future business requirements.

Since implementing a new function like CCM will also have an effect on existing departments, areas of influence and responsibility must be clearly defined.

"At the time we introduced the corporate communications function at Philips," Boutmy explains, "we defined a mandate and got it approved up to the board of management. This helped us a great deal in our interactions with other departments, since it defined our responsibilities and tasks clearly from the beginning."

The ideal situation is where CCM is on the same level as MIS and both man-

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## Corporate Communications Management

agers are reporting to the same board member (perhaps the chief information officer), who is then responsible for linking the complete range of information technology resources to the business needs of the corporation.

In practice, there are many variations on this idea. In some cases, CCM reports to the MIS manager—a structure that can work well if the MIS manager has overall responsibility for information technology as above. The important point is that neither the strategic planning of telecommunications nor that of computing should be subordinate.

### The CCM Center as Profit Center

Another variation is where the CCM and MIS managers each have separate reporting lines to the board. This can, of course, be a risky situation, since it obstructs the symbiosis between telecommunications and computing services that exists today, and could, therefore, create fragmented management.

By definition, CCM will include the operation of corporate networks, and this provides an excellent opportunity to establish the CCM center as a profit center by charging the users for their communications services. It may not be desirable actually to make a profit, of course, but the center should at least break even, so that CCM will not be yet another corporate overhead.

Such an arrangement will also be a mechanism to make CCM more responsive to user needs. Users will know exactly what they can expect for their money and will have a clear way of quantifying any dissatisfactions they may have. It is very important that the CCM function be sufficiently oriented toward users.

This is, of course, exactly what corporate communications management is all about: integrating what may appear to be mysterious communications technologies with business objectives in such a way that the corporation and its users benefit. ■


*Peter Fredriks is a senior consultant for Database Consultants Europe in Amsterdam, the Netherlands; Fred Van Leeuwen is DCE's communications department manager. The authors specialize in the organizational implications of the design, implementation, and operation of networks.*



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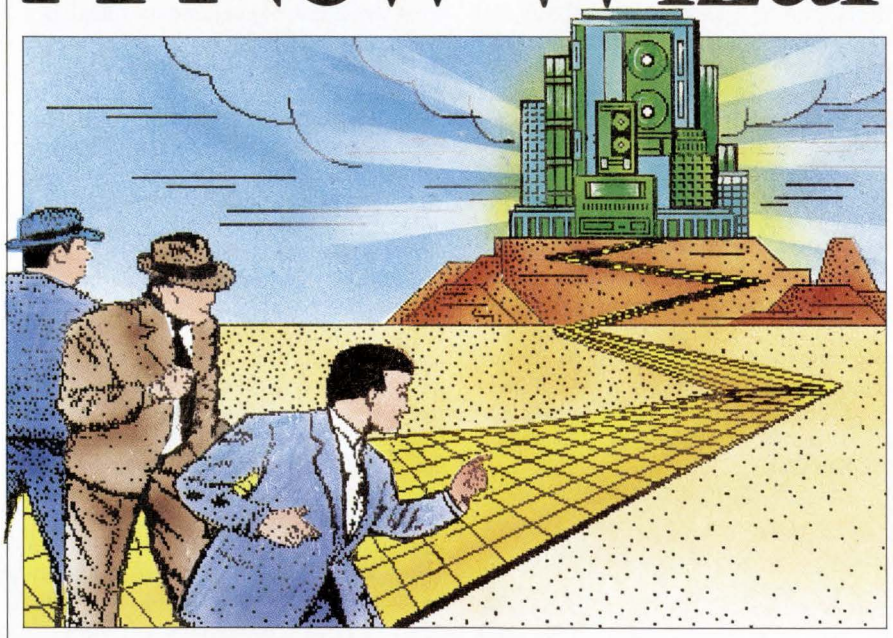
**In an effort to cash in on its national computing resources, the Australian government is sharpening the commercial edge of a onetime sleepy research institute, CSIROnet. It has already set up a range of international database services, a bureau for the Australian scientific community, and marketing deals in Asia. By 1990, CSIROnet hopes to become a significant profit-making force in the Australian IS industry.**

# A New Wizard in Oz



BY NORMAN KEMP

The most powerful computer in Australia—a Control Data Cyber 205—is now helping scientists investigate the devastation of large portions of the country's famous oceanic asset, the Great Barrier Reef. The culprits are massive hordes of crown-of-thorns starfish that are devouring the live coral.

The supercomputer, which is front-ended by a Cyber 845, is run by CSIROnet, a onetime sleepy research institute that now is being magically transformed by the Australian government into a hard-edged commercial wizard. In its new guise it has to fulfill an entrepreneurial role as a revenue-producing, value-added service provider and consultant. The starfish project is a prime example of how it is linking commerce and science in an unusual but vital national project.

Divers who work under the water for two thirds of the year provide visual reports for scientists at the Australian Institute of Marine Science in Townsville on the Northern Queensland coast. Using a range of personal computers, sensitive measuring devices, and a Digital Equipment Corp. VAX 11/785, those scientists monitor the life cycles of the starfish edging down the 1,000 miles of multicolored coral that is classified as one of the world's natural wonders.

The supercomputer allows the researchers to process information up to 100 times faster than their previous equipment had. Apart from analyses that may prevent unlimited wanton damage to an important part of Australia's natural heritage, the researchers also are making a substantial contribution to the preservation of one of Australia's most important commercial assets. The Reef attracts tourist business worth millions of dollars a year.

Scientific cooperation that also assists the nation's business interests is one of the major directions for CSIROnet. For 17 years, CSIROnet was a back-room enclave for computer research and development experts of the Commonwealth Scientific and Industrial Research Organization (CSIRO) in Black Mountain, Canberra. Now, CSIROnet has been unleashed as a trading organization with the charter of an unlisted public company to sell computer services on bureau-type hardware ranging from mainframes to communications nodes. It is also developing worldwide packet switching networking facilities and links between databanks in Australia and overseas.

In its new role, CSIROnet has been looking for partners for overseas ventures and has appointed a national sales force to market its products and launch

## A New Wizard In Oz

its new image inside Australia. Early in 1987, David Glavonjic was named chief general manager of the organization. Glavonjic joined CSIRO in 1966 with an accounting diploma from a Canberra university. More recently, he was the second-in-command to CSIROnet's former chief executive, Peter Claringbold, who retired in 1986.

"By July," predicts Glavonjic, "CSIROnet will be self-financing with a strong sales force selling value-added professional services, and it will be a provider of facilities for networks. We have now established a healthy customer base, developed strategies for further market penetration, rationalized our cost structure, and developed a commercial focus for our development activities. CSIROnet is poised on the threshold of an exciting future—one that will see the organization emerge as a significant Australian force in the information technology services industry."

### CSIROnet's First Joint Venture

During March, CSIROnet geared up for its first joint venture—a major international marketing deal targeted at Asia and China and involving a Hong Kong distributor, Four Seas Telecom. The product at the heart of the deal is the Ultranode, a Unix-based multiprocessor workstation for file management, data processing, and scientific computation. It also allows organizations to link various computer networks that have different communications protocols.

Ultranode was a brainchild of CSIROnet. It was developed and built in conjunction with a Canberra manufacturing company, Network Research, formerly known as Office Automation Proprietary Ltd., which was acquired last year by Techway, a Sydney-based firm.

The new trading alliance, in which CSIROnet has a 40% interest, has been named Network Automation. According to Techway managing director, Jess Barker, CSIROnet will be the technical supplier and advisor, providing the main hardware, peripherals, and software that it has developed for the Unix System V operating system. Techway will provide the marketing facilities and commercial thrust that he hopes will raise the capital of the new company to $A30 million ($22 million) over five years.

Hopes for the Ultranode product hinge on two recent purchasing deals with the South Australian Department of Justice and the New South Wales State Rail authority.

The Department of Justice contract, in late 1986, marked the first attempt by CSIROnet to compete in a commercial deal. It won business worth $A2 million ($1.5 million) for the data communications component of the South Australian Justice Information System (JIS). Fujitsu Australia won the contract for the mainframe hardware, valued at $A3 million ($2.2 million).

The JIS, the first system of its kind in Australia, will link the Attorney General's Department, Police, Correctional Services, Community Welfare and Labor Departments, and the Industrial Registry through a single computerized information network. It will cost about $A20 million ($15 million) to operate in its first six years of operation, but offsetting this will be estimated gains of $A24 million ($17.5 million) over the same period in the rationalization of data and the elimination of unnecessary duplication of information among departments.

The deal with the State Rail authority, worth $A3.4 million ($2.5 million), is for 84 Ultranodes from Network Automation. These will form the basis of a fully integrated communications network providing high-speed data links between three different computer systems and the many data management systems in use by the authority. Eventually, the State Rail network will also interface to the neighboring Queensland and Victorian State Rail data networks. Over the next five years, it will provide support for more than 3,000 terminals.

These commercial deals apart, CSIROnet is also building up its commercial profile as a bureau company. Before it became an autonomous unit, CSIROnet had established an extensive computing network offering wide facilities on Control Data and Facom (Fujitsu) mainframes. These included a Facom M180 and M190 with OSIV/F4 operating systems, and a Facom M159 with VM/CMS. In a joint venture with Fujitsu, these were used to develop operating system enhancements for the Fujitsu range including a programmer's tool kit for the Facom OSIV/F4 series and a system for file transfer and batch input and output.

Although CSIROnet has this substantial base of computers to fulfill its medium-term requirements, Glavonjic believes that there is an urgent need for a national supercomputer facility. CSIROnet has prepared a draft proposal for a national supercomputer strategy that he says would rank Australia with the U.S., Japan, West Germany, Italy, the Netherlands, and the United Kingdom. "Similar measures are required in Australia," he feels, "if we are to gain a foothold in high-tech areas so that local manufacturers can compete in the international market.

"The supercomputer project should not be regarded as a profit-making center but should be for a national tool," Glavonjic says. CSIROnet's own contribution toward a national supercomputer facility is the Control Data Cyber 205 with 16MB capacity. Initially,

## The CSIROnet History

CSIROnet was established in 1963 as the computing research section of the Commonwealth Scientific and Industrial Research Organization (CSIRO), a government-financed technical organization based in Canberra. The CSIROnet network was set up in 1971 to link processors in five cities, and a number of distributed I/O peripherals, through one of the world's first packet switched networks.

Over the next eight years, the network was enhanced with Australia's first 48,000bps lines between Canberra, Melbourne, and Sydney. In 1979, the CSIRO/FACOM Joint Development Program began with a Facom (Fujitsu) M190. CSIROnet also began its first overseas services through the Overseas Telecommunications Commission Midas system. In 1980, joint development with Office Automation Proprietary Ltd. on the Micronode gateway terminal, which has since become the Ultranode, got under way. The first production model was delivered in 1983.

On Jan. 1, 1985, CSIROnet became an autonomous agency within CSIRO. A Facom M190 was upgraded to an M380, and a Cyber 840 was added. In 1986, several public databases, including the statistical Ausstats database, were added. By then, CSIRO had two LANs in use, each with a speed of 50Mbps. It also had more than 150 basic PDP-11 and Ultranode points of connection for interactive terminals, auxiliary computers and batch input or output devices, and 30 communications and host-connecting modes with 17 CSIROnet-owned and 36 non-CSIROnet-owned host computers and gateways accessible to users.

CSIROnet now has more than 3,000 registered users, including private firms, government departments, universities, libraries linked to the bibliography of the National Library of Australia, and overseas databanks including Dialog and Orbit.

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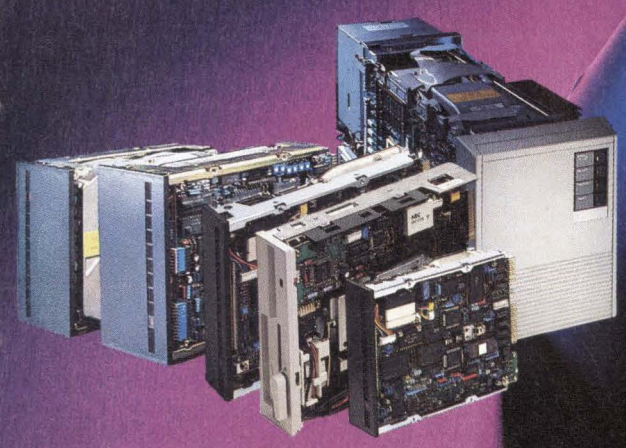
# SUCCESS STORY



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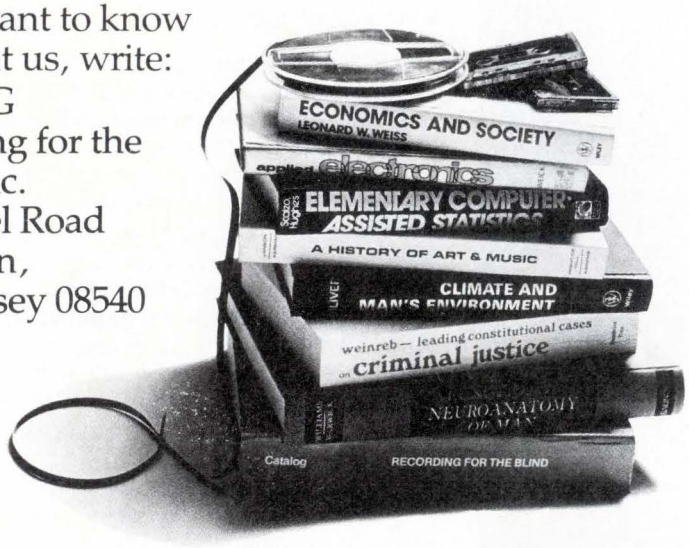


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## A New Wizard In Oz

this was leased for two years, but it was bought outright in January 1987 for $A3.7 million ($2.7 million).

Yet CSIROnet has had some problems making the best use of the system. High operating charges led to an indifferent response from corporate and government users, for whom the power of the machine was beyond requirements and the software too expensive. It won a few recruits when CSIROnet acquired Control Data's Cybernet computer bureau business, which had more than 200 customers. The main usage is now the result of a $A5 million ($3.6 million) deal with Telecom Australia for engineering development and future planning.

As commercialism rings the changes for CSIROnet, international moves toward recognized standards in communications for mixed networks are increasingly being supported. Common protocols and interfaces would facilitate the marketing of scores of CSIROnet software packages developed over the years. CSIROnet is also among the world leaders in the development of software supporting the Open Systems Interconnection networking protocols.

National databanks are another area of commercial interest for the organization. Australia has attracted consistently high levels of foreign investment, and it is apposite that CSIROnet service is heavily patronized for its trade and financial figures.

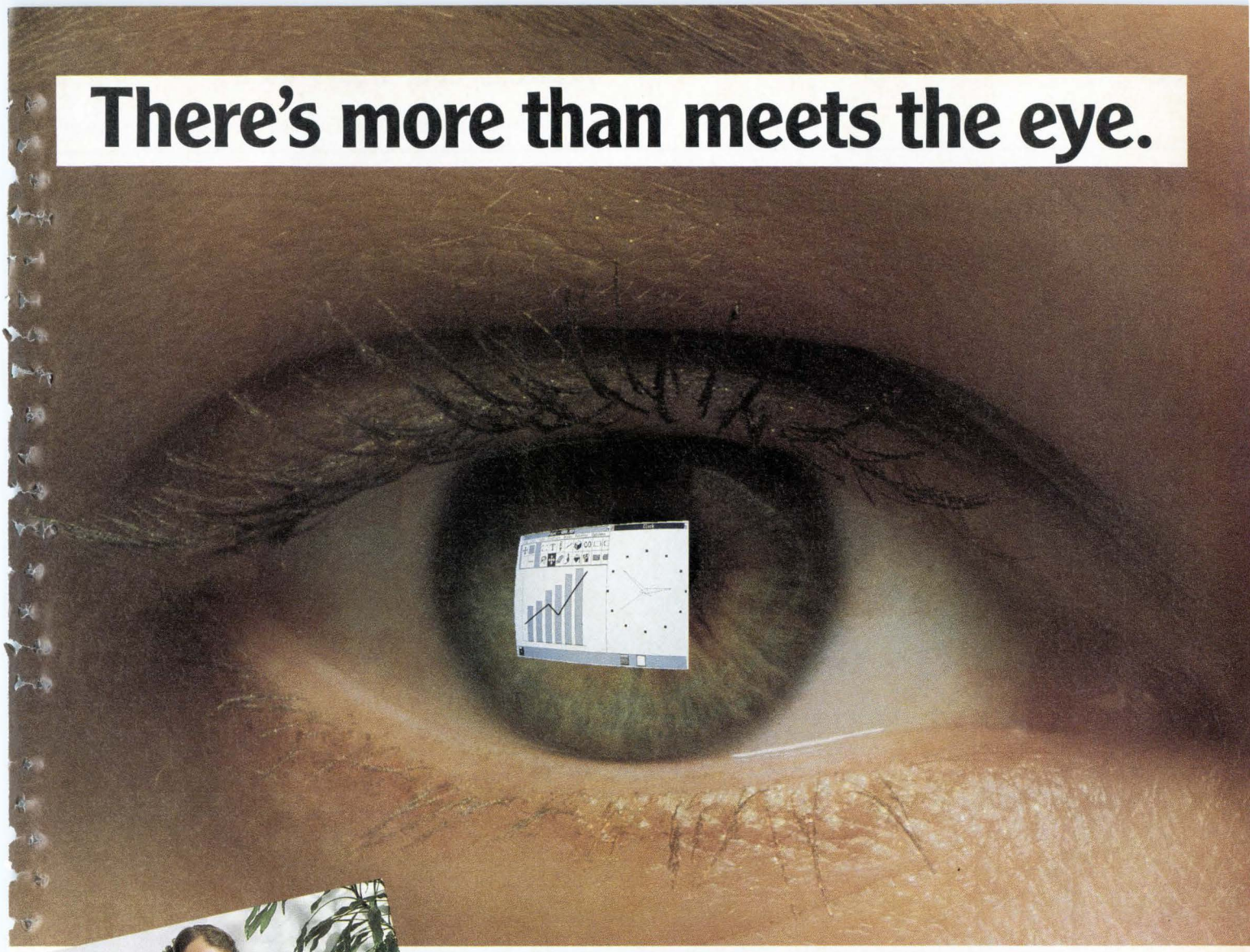
In the research field, CSIROnet provides access to databases on agricultural crop growth and harvesting, mining and exploration, and industrial planning and manufacturing expansion.

### No Shortage of Plans

CSIROnet expects to consolidate its operations over the next couple of years, and it is not anticipating a profit on its activities until about 1990. With networks interlinking with overseas databanks and allowing quick communications between major centers in different countries, it hopes to quicken the growth of interest in Australia. Similarily, it is working with the government-owned trade and commerce organization Austrade to give wider promotion to Australian-developed ideas and products that are suitable for world markets.

Essentially, CSIROnet will focus its operations on being an organization for exchanging practical information with the world and placing not only the electronic services but the entire nation into a world of social and economic development until the end of the century. ■

# There's more than meets the eye.



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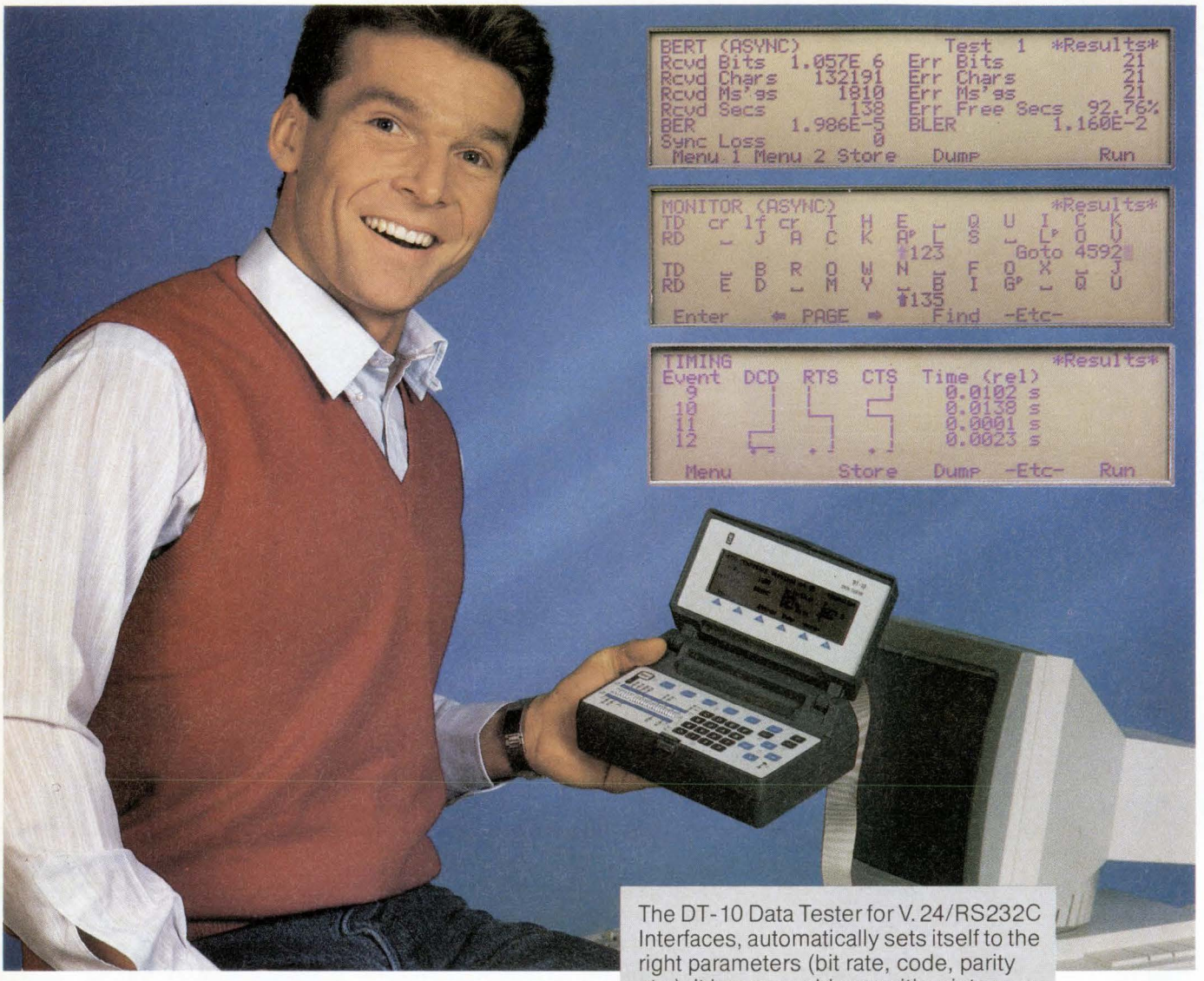


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**A European country with 58 telephone companies and a state-owned PTT is unique. In Finland, this mix of private and publicly owned telecommunications services is generating data communications networks that are the envy of many of its neighbors.**

# The Finnish Line

BY SARAH UNDERWOOD

Finland is more popularly known as the land of reindeer and the midnight sun than as a leader in high technology. Yet its telecom system is among the most advanced in the world. Telephone density in Finland is higher than in the U.S. or in Canada and much of the telecommunications network is already digitalized, providing a solid base for new data communication services.

Finland has such an advanced telecom infrastructure today because of a decision made over 100 years ago. In 1877, just a year after the invention of the telephone, the country's inaugural call was made in the capital city of Helsinki. Just over four years later, in January 1882, a Helsinki telegraph mechanic was authorized by Czar Alexander III to set up a telephone company in the capital. (At the time, Finland was an autonomous grand duchy of Russia.)

**FINLAND HAS HIGHER PHONE DENSITY THAN THE U.S.**

The growth of local telephone companies around that first enterprise has left Finland with a unique telecom organization, halfway between the U.S. commercial system and Europe's predominantly state-run networks. There are now 58 local telephone companies in Finland, owned by their subscribers and operated on a nonprofit basis.

The Finnish government did not become involved in telecommunications until the 1930s. The network operated by its PTT administration, Posts and Telecommunications of Finland, now covers one quarter of the nation's telephones. The PTT also has a monopoly on trunk and international services, although its grip on long distance traffic has lost some strength since the founding of the private long distance carrier, Datatie Oy.

Formed by Helsinki Telephone Co. and a number of other local companies in Southern Finland in 1985, Datatie charges lower tariffs than the PTT. It is widely regarded as a catalyst in making Finland's telecom services competititve.

The phase of data communications development that Finland is now entering will build on this mixture of public and private services. But, as Tuomas Kotovirta, an analyst with Finnish telecom consultancy TKN Oy, points out, "The competition that is generated by such a two-pronged approach can be as harmful as it is beneficial."

New legislation has sought to regulate data communications services for the first time. Most important of the new rules—which add to the telephony laws laid down a century ago—is a clause requiring all telephone companies to link their data communication services to other local companies' networks, as well as to PTT services.

### More Competition, Lower Cost

Companies using Finland's data communications networks will benefit by being able to use the shortest and most cost-effective routes through the telephone companies for their data traffic. For the telephone companies and the PTT, however, the requirement will mean more competition. In the past, they have refused to make connections for fear of losing business to competitive networks.

The law is already having an effect. The PTT's packet switched network, Datapak, and a similar service operated by Helsinki Telephone, Digipak, are now

# The Finnish Line

being linked. With no other option under the new law, the two service providers have agreed to connect their networks and are ironing out the technical problems. They plan to have a gateway in place later this year.

Other issues raised by the new regulations will not be as easy to resolve. In particular, analyst Kotovirta points to the confusion surrounding chapter 10 of the legislation. "The law says that local companies can use existing telecommunications lines to supply value-added services," he explains. "But it goes on to say that they must not disturb the normal telecommunications operators. That could be open to a number of interpretations." Companies worried that the clause could limit their right to offer data communications services have referred the issue to the Ministry of Traffic, which is responsible for telecom in Finland.

Besides this lack of clarity about how value-added network (VAN) services will be run, the new laws leave open the vital question of who will be licensed to operate such services.

The first organization to broach the issue is likely to be a newly formed private VAN supplier, Palveluverkko Oy. It is backed to the tune of Fmk4.75 million ($1.1 million) by 18 shareholders—five large banks, six insurance companies, six retail groups, and one industrial firm—and is based on the premise that cooperation, not competition, is the best way to secure data communications traffic.

Besides basic data transfer, the company plans to offer store-and-forward file transfer, terminal access to a wide range of host computers, all common protocols, and support for electronic document interchange standards.

### Will There Be License Delays?

Palveluverkko held its first board meeting at the end of April and will offer its first services, initially using existing PTT or Helsinki Telephone lines, early next year. Its plans could be delayed, however, if a license to run a value-added network is withheld.

The company argues that a license should not be needed to offer services across networks that are already licensed. The PTT argues that a new license must be obtained. Kotovirta contends that the PTT's case runs deeper than that. "The PTT is talking about offering value-added network services, so a license to Palveluverkko may be delayed to give the PTT a better competitive chance," he maintains.

Datatie will also broach the issue, since it intends to run both VAN services and leased-line services. If it is refused permission, Datatie will return to the Ministry of Traffic to argue its case along the same lines as Palveluverkko.

It is not only VAN suppliers that may be caught by the legislation. Kotovirta sees a potential problem for IS service bureaus. "One interpretation of the law requires bureaus offering telecom services to be licensed," he says. The country's bureaus hope to avoid the issue by refusing, en masse, to apply for licenses.

The pressure on Finland's new conservative-led government to issue licenses will be stepped up if IBM seeks to enter the VAN market. It has already shown interest in making such a move, although, not having approached the Palveluverkko consortium, it is expected to limit its early involvement to marketing equipment for the network.

Value-added network services are by no means a giant step forward for Finnish telecommunications, even though they will be an important link in keeping data traffic moving in the future. Companies in Finland already have the option of a range of services based on either the Finnish circuit switched data or packet networks.

**IBM MAY SEEK TO ENTER THE VALUE-ADDED NET MARKET.**

Datex is a dedicated data communications network using the circuit switched network. It provides asynchronous and synchronous connections with V.24 and X.21 interfaces, allowing users of its 4,500 subscriber lines to make relatively low-cost terminal-to-computer and computer-to-computer connections.

### More X.25 Experts than Lines

The country's packet switched networks, Datapak and Digipak, have been comparatively slow to gain widespread appeal—they are up to 200 times more expensive than circuit switched data networks. When the two companies are interconnected later this year, however, they are likely to attract more customers looking for an X.25 networking solution.

Vesa Parkkari, a specialist in networking and the president of Mikrokonsultit Oy, comments, "Packet networks seem to be a promising area, because in Finland there are more X.25 experts than subscription lines. When Datapak and Digipak interconnect I'd predict that the number of subscription lines will triple."

Although Finland is well provided for with public services, private networks have become popular on the basis of cost, performance, and independence. The country's largest oil producer, Neste Oy, has chosen to build its own data switching network using multiplexors and protocol convertors developed by CASE of Watford, England, and distributed locally by Helsinki-based Jertec Oy.

Full, private X.25 networks are run by Nokia, one of Finland's largest industrial groups, as well as by such concerns as the SYP Union Bank of Finland and the country's state-owned railways.

Reaching beyond simple data communications, Finland is using its expertise in telecommunications technology to push forward the arrival of Integrated Services Digital Networks (ISDNs).

A forerunner to full ISDNs has been operating in Finland for over a year. It is called Diginet and was designed by Helsinki Telephone in conjunction with Nokia to provide 64Kbps lines with switched access using V.24, V.35, or X.21 protocols. The network can be used for data, speech, fax, and real-time image transfer—particularly popular in Finland considering the terrain and weather conditions that make personal meetings difficult.

Diginet currently supports 80 subscription lines. Fixed costs for the first year are about $2,000 per line, with usage charged at roughly the same rate as telephone usage.

In an effort to win subscribers, Finland's telephone companies hope to keep ISDN costs down when a full service is available. Both the Finnish PTT and Helsinki Telephone are building ISDN networks with equipment from West Germany's Siemens. Field trials will begin this year.

With both the private and the public sector network operators eager to uphold their country's reputation as a telecom trendsetter, those trials should soon grow to a full ISDN service extending from Lapland in the north to the archipelago in the south. ■

*Sarah Underwood is the former European associate editor.*



Circle 42 on Reader Card ⟶

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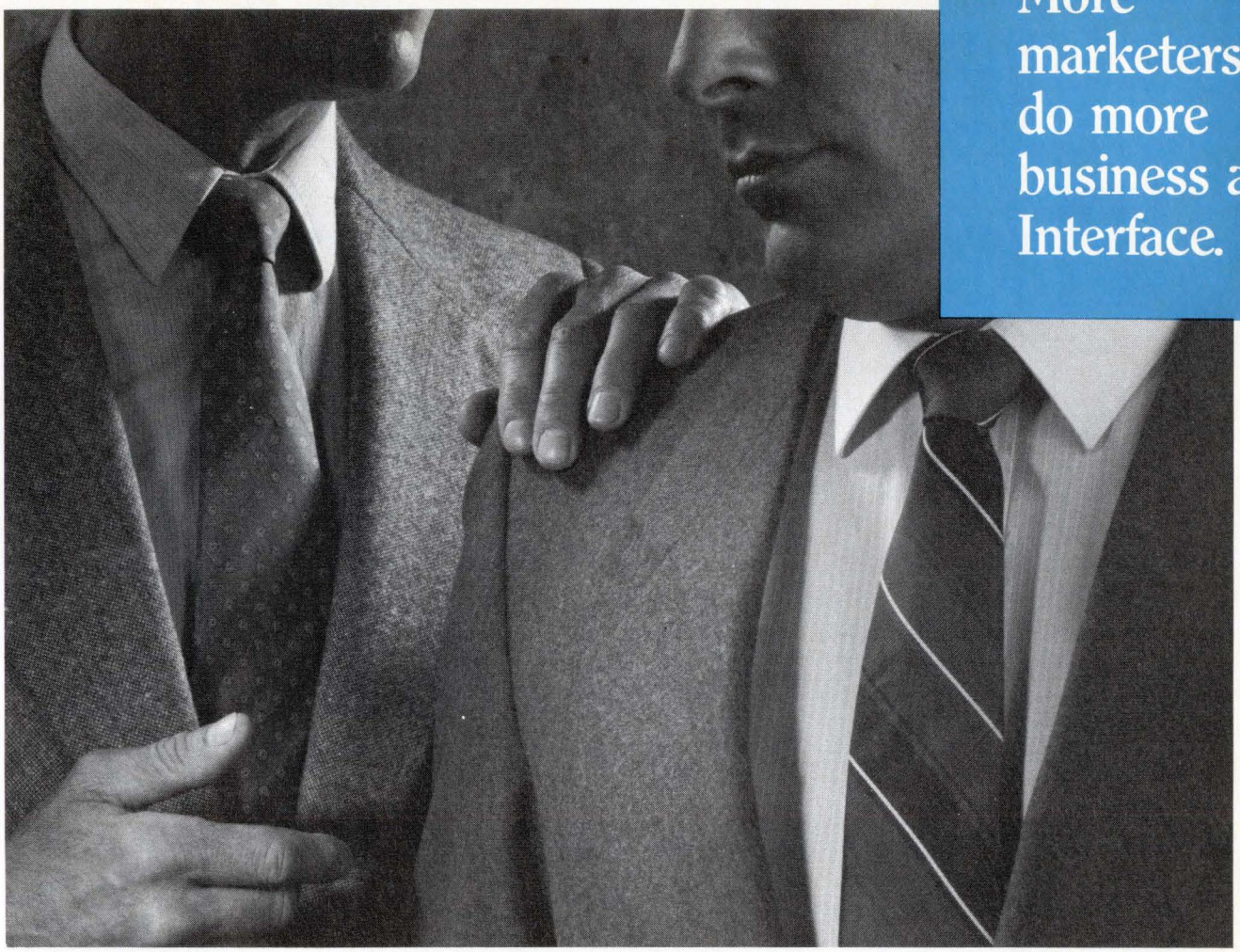

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**Circle 43 on Reader Card**

**IBM will be left with ink on its face unless it can quickly address the problem of producing documents that merge text with graphics. IBM's answer, which is still two to three years away, is System Application Architecture (SAA). This new group of software standards and conventions presents a slew of problems to users who must decide which printer to buy.**

# The Printer Promise of SAA

Paper sculpture by Bill Finewood

BY HESH WIENER
AND SHARON BRADY

At the biggest banks, the wealthiest stockbrokerages, and the most immense insurance companies, getting new business forms into production is still a hassle. Even though these giants have multimillion-dollar mainframes, $250,000 printers, and more terminals than Greyhound Bus Lines, they can't easily crank out compound documents that contain both text and graphics.

Acutely aware of this and a host of related problems, IBM has proposed its Systems Application Architecture. SAA promises to help mainframe users process an array of compound documents such as invoices, statements, and sales call reports.

The most optimistic observers predict that a substantial part of SAA will be in place within the next two to three years. That will be a long time to wait for users who already feel that IBM is late in providing support for compound documents.

"Setting up a new form can take four to six hours," complains Tony Durante, vice president at Wall Street Data Services (WSDS), the New York computer service bureau owned by Wall Street Trust Co., part of the Bank of New York. "Of course, some changes can be done in 10 minutes, but those are the exceptions," points out Durante.

So for now, WSDS staff must code its graphics piece by piece. Durante's shop has two of the biggest page printing systems on the market, IBM's 3800-3 and Xerox's 9700. Currently, only the Xerox hardware is used for jobs involving graphics. The graphic elements, which are coded via a micro that sits on top of the 9700, are merged with a data stream from a 3090 mainframe that's not even located in New York, but at the other end of a T1 line that reaches across the Hudson River from a Teaneck, N.J., computer center. WSDS's 3800 printer, which is currently used as a very fast line printer, may also be producing graphics output next year.

At Chase Manhattan Bank in New York, all of the graphics images produced by its 3800 for its forms are generated photographically, with one exception. Chase prepares transparencies that are flashed on its 3800's imaging belt as it prints text. "The one form that was coded," explains Chase vice president Gary Neville, "was done years ago. The disclosure material required on most of the output we send to customers is best prepared on preprinted forms anyway. But all of us in banking would like to get away from expensive color printed forms if the technology would let us."

### Destined to Reshape the World

SAA is the technology that IBM is banking on to fill this bill. Not really a program but a bundle of software standards and conventions, SAA is still not fully defined. But like SNA, SAA is destined to reshape the world in which users must work. That reshaping process is expected to start next year, after IBM provides its first implementations of SAA.

While most of SAA remains a mystery, one thing is certain: line printers are dead under SAA, which will support only page printers. All of IBM's software will be rewritten with SAA in mind, a chore that could take some time. Nevertheless, users who have been given a peek at unreleased products forecast that SAA will be everywhere in a couple of years.

"IBM sets the standards," asserts Joe Hodge, vice president for information systems at Hospital Corp. of America in Nashville. "If it dallies, someone else just might move up to take its place."

Big Blue, however, is not about to let that happen. Because the stakes for user dollars are high, Hodge claims that IBM "really has its act together" for the launch of SAA. Hospital Corp. of America is also gearing up for SAA. It is actively building systems that will use SAA and related standards to bind its PS/2s, minicomputers, and mainframes into a coherent network.

IBM has quickly picked up on the network angle. In fact, SAA is IBM's way to make it easier for programs to interchange data, and to move that data among diverse network nodes. It will help users link a variety of computers that support many different terminals and printers.

One of the key aspects of SAA is that it will define full printer support only for all-points-addressable printers. On large systems, all-points-addressable printers are based to an overwhelming degree on laser-xerographic techniques, although other technologies, such as ion deposition, may yet come into play. IBM's 3800-3 printer is the de facto standard in the IBM mainframe market, which certainly simplifies the giant's problem of providing support for compound documents. The 3800-3 can produce graphics along with text, a capability IBM calls Advanced Function Printing, or AFP.

Alternatives to the 3800 at the high end of the page printer market either emulate the 3800-3 hardware or understand AFP print commands. Siemens' printers and those it makes for StorageTek emulate the 3800-3, while Xerox's machines work at the AFP level.

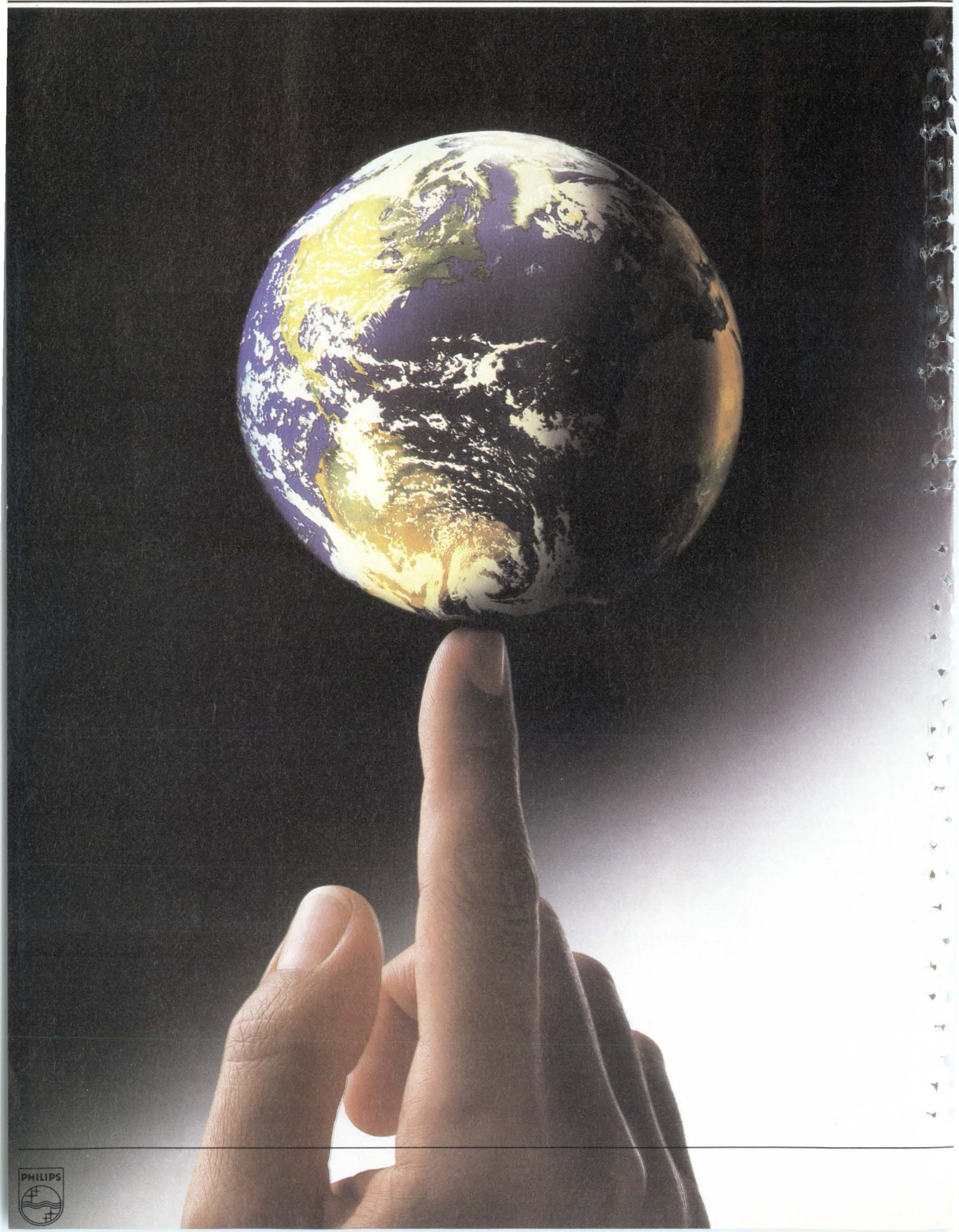
There are, however, quite a few mainframe users with printing subsystems that do not conform to IBM's 3800-3 AFP specifications. Users of these printers will have to change or face the fact that they will be denied entry into the SAA software environment. This may not be a consideration for IS users with old printers that will be replaced before SAA becomes part of their software scene. But it is a factor that must be weighed by all users planning to install printers in the near future. Printers purchased today are likely to be around for five to 10 years—a period during which IBM, as slow as it may be in making good on all its promises, is certain to have made SAA a standard.

**All of IBM's software will be rewritten with SAA in mind, which could take some time. But users who've seen unreleased products predict SAA will eventually be everywhere.**

Today's mainframe users have only a handful of page printing systems from which to choose. But whatever brand they select, the issues involved in conforming a high-end printer to SAA will have to be addressed by their vendors, who have a significant interest in keeping users happy.

Beyond the boundaries of the mainframe world, where a multitude of printers offer the capability of drawing a page dot by dot, things are much less certain. Although IBM's own printers may be the first to meet its graphics standards, some of those models may even become obsolete as its product lines evolve. Printer makers, software developers, or even users will be left with the tiresome task of retrofitting printers to con-

PHILIPS ADDS NEW DIME



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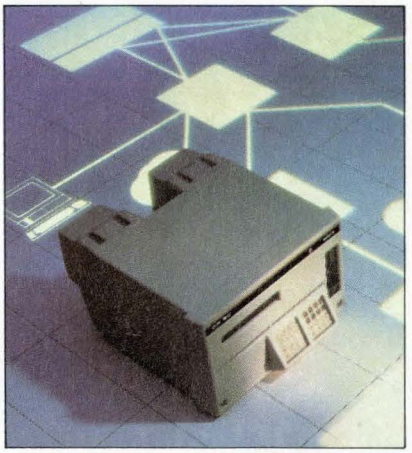

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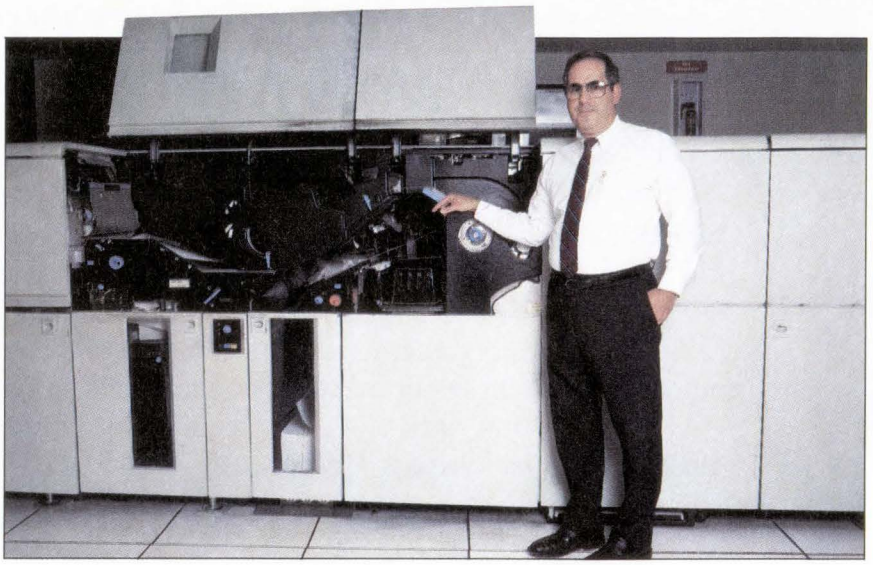
Circle 45 on Reader Card

Mainframe users with line printers won't be able to upgrade programs to the SAA standards.



HOME INSURANCE'S GRAFFEO: IBM has got to come through on SAA.

form to the new norms.

Some manufacturers will do a better job than others, and sooner. Those that want a piece of the action will soon have to decide just how much SAA will affect their customers. If they want in, they will have to modify their products or develop software that translates output generated in IBM formats to their native commands.

Xerox, with its broad line of nonimpact printers, is pursuing a dual strategy. On the one hand, it has defined its own end-to-end set of standards, called Xerox Document Printing Architecture. Within that architecture, it's also defined a standard data stream it calls the Xerox Printer Access Facility. On the other hand, the company cannot afford to walk away from a huge installed base of machines that are driven by IBM mainframes. Xerox has said it will continue to support IBM's AFP while keeping an eagle eye on any other SAA-related conventions that its customers may want.

Users creating documents on Xerox terminals that are shipped to Xerox printers via IBM computers will have to decide which standards they want. In mainframe shops, the odds favor IBM's standards.

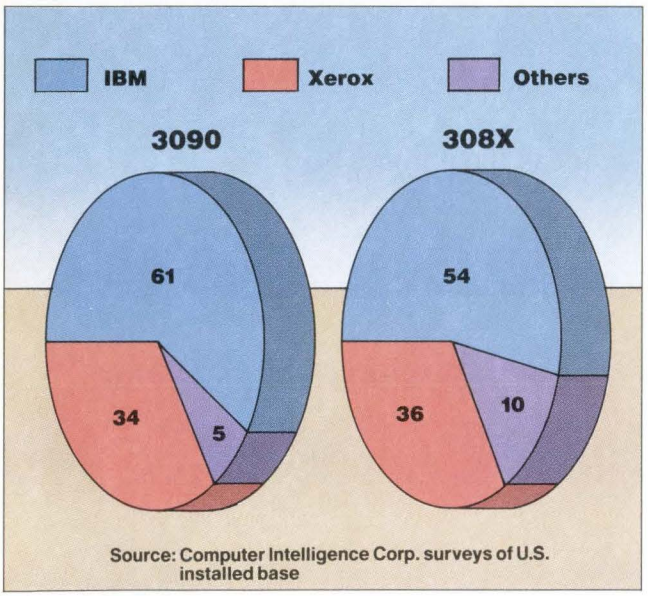
### Game Rules Will Be Available

While there may be a good deal of work involved in tailoring a printer to IBM's requirements, the rules of the game will be widely available. IBM says its SAA protocols will be open to all vendors. In order to work with SAA, printers will have to support what IBM calls the Intelligent Printer Data Stream (IPDS). This is IBM's generic page description language, the means by which all its software will send information to all-points-addressable printers.

IPDS is not as robust as Palo Alto-based Adobe's PostScript or Xerox's Interpress, two page description languages for publishing applications. It is, however, far richer than any of the device-level commands that are used to tell printers how to position a line of type or when to eject a page.

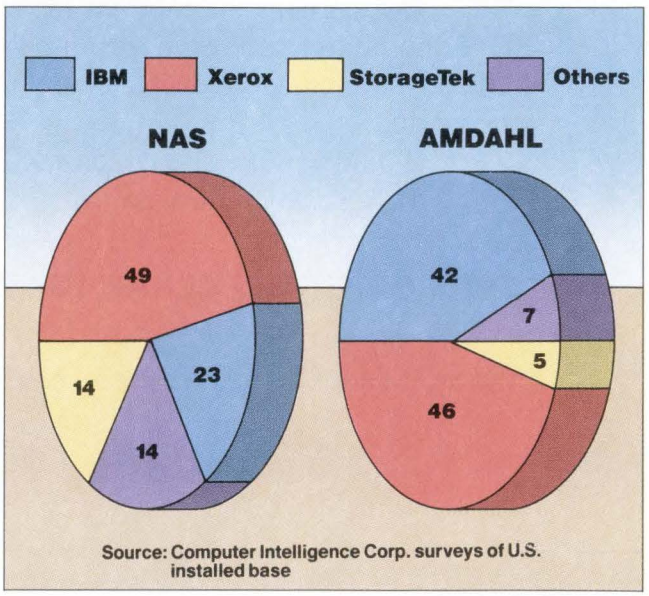
In addition to content-related data—the stream of characters that must be sent to any printer—IPDS provides the

## Page Printers for 3090s and 308Xs By Market Percent




Source: Computer Intelligence Corp. surveys of U.S. installed base

## Page Printers for NAS and Amdahl Mainframes By Market Percent




Source: Computer Intelligence Corp. surveys of U.S. installed base

Charts by Hayes Cohen. Photo by Crissie Hall

## FIGURE 1 Market Leaders in Mainframe Page Printers

| MANUFACTURER AND MODEL | SPEED (PAGES/MINUTE) | RESOLUTION (PIXELS/INCH) | PRICE | MONTHLY MAINTENANCE | PAPER | APA | FIRST SHIPPED |
|---|---|---|---|---|---|---|---|
| **IBM 3800-1** | 215 | 180×144 | $215,000 | $1,500 | Fanfold | No | 1975 |
| **IBM 3800-3** | 215 | 240×240 | 289,000 | 1,500 | Fanfold | Yes | 1983 |
| **IBM 3800-6** | 134 | 240×240 | 175,000 | 1,500 | Fanfold | Yes | 1987 |
| **Siemens 2200-2** | 103 | 240×240 | 165,000 | 695 | Fanfold | No | 1985 |
| **Siemens 2200-3** | 103 | 240×240 | 189,000 | 695 | Fanfold | Yes | 1987 |
| **Siemens 2300-2** | 206 | 240×240 | 265,000 | 1,200 | Fanfold | No | 1985 |
| **Siemens 2300-3** | 206 | 240×240 | 283,500 | 1,200 | Fanfold | Yes | 1987 |
| **Storage Tek 6100** | 103 | 240×240 | 107,000 | 502 | Fanfold | No | 1984 |
| **Storage Tek 6100** | 103 | 240×240 | 195,000 | 650 | Fanfold | Yes | 1987 |
| **Xerox 8700** | 70 | 300×300 | 199,000 | 1,600 | Sheet | Yes | 1982 |
| **Xerox 8790** | 70 | 300×300 | 191,000 | 1,600 | Sheet | Yes | 1986 |
| **Xerox 9700** | 120 | 300×300 | 375,000 | 4,000 | Sheet | Yes | 1977 |
| **Xerox 9790** | 120 | 300×300 | 399,000 | 4,000 | Sheet | Yes | 1986 |

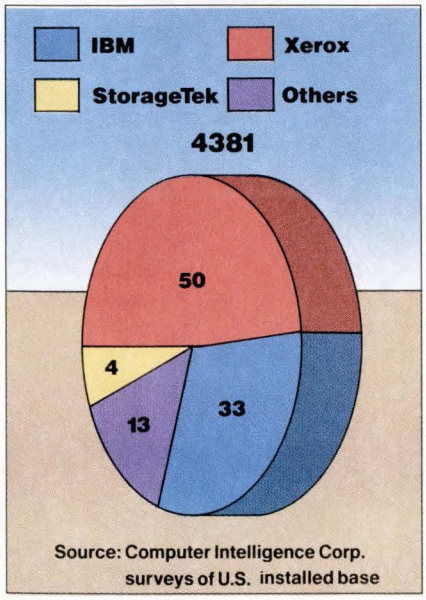
Note: Maintenance charges for printers are base prices. In addition, IBM charges $3 for 1,000 feet of output, StorageTek charges $4.30 for 1,000 feet of paper, and Xerox charges $3.20 for 100,000 sheets in excess of 700,000 sheets.

user application with numerous commands that affect graphics and typography. IBM will make these commands as uniform as possible across all its languages and systems.

On mainframes, SAA support will be provided under both the MVS and VM operating systems, on the System/36 and 38 under their standard operating systems, and on the PS/2 line under OS/2. Other operating systems such as PC/DOS will not be part of the initial SAA offering.

For each operating system, IBM will embed SAA in COBOL, FORTRAN, and C. SAA support will also be added to IBM's REXX language under VM and to its application generators. In addition, there will be SAA links in other languages in particular environments. For instance, IPDS is already defined for RPG II on the System/36, and its functions may be invoked through subroutines at sites that have added the appropriate software.

**Page Printers for 4381s, By Market Percent**




Source: Computer Intelligence Corp. surveys of U.S. installed base

IPDS addresses more options than most printers provide. And even though a printer conforms to SAA, it may not support every possible capability that can be invoked by IBM's commands. (But no matter what, that printer must offer all-points-addressability.) For example, there are features in IPDS that permit the user to specify the color a printer will produce. Such features are still beyond the reach of IBM page printers, which, like Model Ts, print in any color you want as long as it's black.

Other IPDS parameters that will affect the presentation of data sent to a printer include character style and pitch, line spacing, text placement, and angular orientation that allows output to be rotated.

Graphics output on IPDS printers will be controlled by a suite of subroutines that allow applications to define an area that must be filled with a background pattern. Using this capability, a program will select a fill pattern, draw a line or a circle, specify the position of a block text, or print what IBM calls markers and what typographers call dingbats.

There are further embellishments that permit a program to define the thickness of a line and its pattern (dash-dot-dash, for instance). Additional instructions will enable printers to produce bar codes and to select from several common bar coding schemes. In the event that IBM has not spanned all the applications areas and printer types it should support, there is a loophole in the IPDS definition that permits programmers to send control characters directly to a printer.

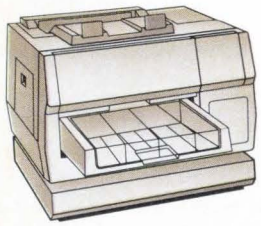
Despite the breadth of IBM's IPDS definition, there are still quite a few printers that will not be compatible with it. Significantly, as already mentioned, no line printers regardless of make will be supported under SAA, because the standard requires a machine that can put a dot at any point on a page. Line printer mechanisms do not allow for the reproduction of the images that are a major aspect of IBM's scheme.

Most of IBM's midrange systems use line printers or dot matrix printers. Page printers are growing more popular, yet they are common only on systems that are used for word processing applications. The main reason page printers are still not abundant in the midrange is that they cost too much.

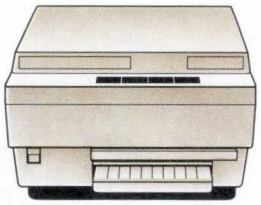
Japanese manufacturers, aware of the commercial potential and driven by the need to process their nation's iconic language, have long dominated the low-end page printing market. They are now pushing into the midrange with devices that run at speeds of up to 30 pages per minute.

Some Japanese models also offer resolution of 400 or 600 dots per inch.

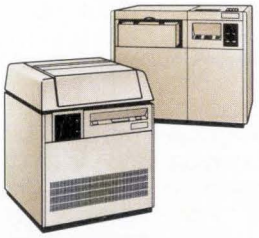
# Inside thes revolution



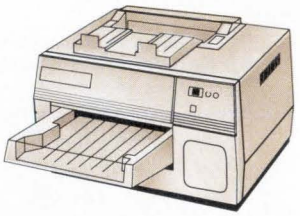
NBI, Inc. Model 908



QMS-PS® 800
QMS-PS® 800+
QMS-PS® 800 II



Linotype Company Linotronic™ 100
Linotype Company Linotronic™ 300



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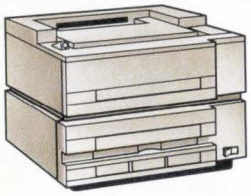
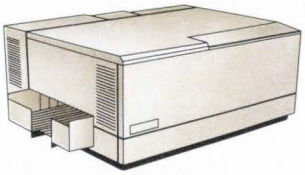
ScriptPrinter™



Qume Corporation ScripTEN™



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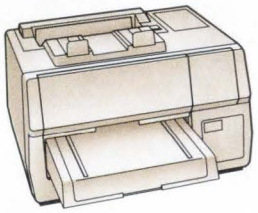

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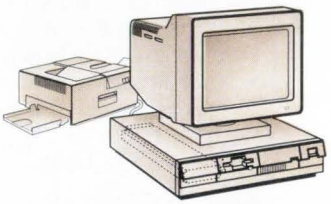
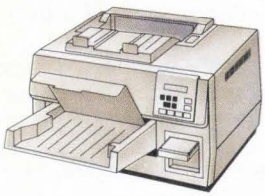
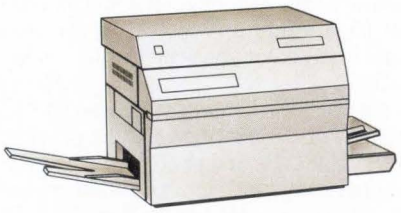


IBM 4216-020 Personal Pageprinter™



Texas Instruments OmniLaser™ 2108



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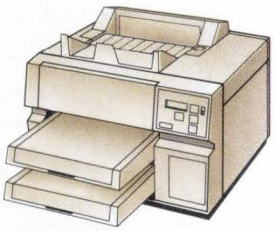

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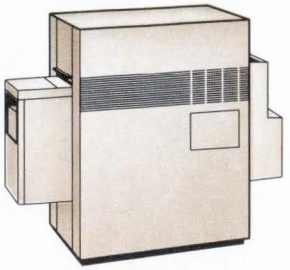

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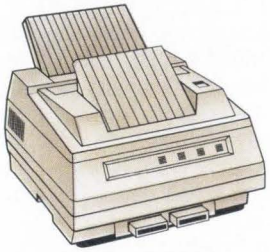

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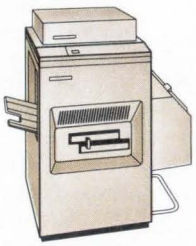

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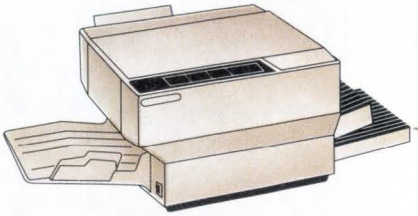

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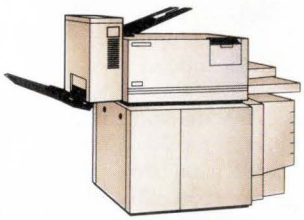

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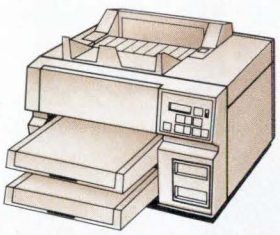

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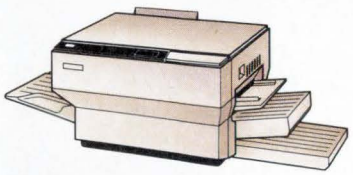

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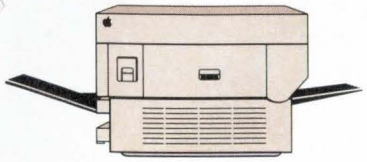

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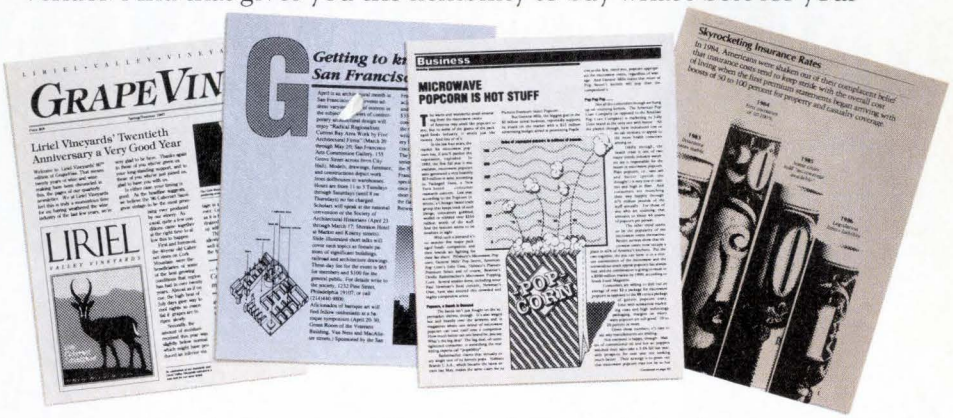


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This is a substantial improvement over the large IBM and Siemens printers, which are limited to 240-dot pitch. It also beats the top of the Xerox line, which has a resolution of 300 dots per inch.

### The Low End Is Split

At the low end, the standards battle may split the market. IBM's SAA and IPDS will have to compete with other established page description schemes, but IBM's ability to set standards in large companies, where PS/2s will be linked to mainframes, will be hard to challenge. Nevertheless, for small users and isolated departments in large organizations, SAA will be less compelling, at least in the short term. That doesn't mean that IBM will concede this turf. Big Blue, as its rivals well know, has never been deterred from pushing its ideas, even when it gets a late start.

Ironically, at the high end, where the company has the most clout, it still does not dominate the page printer market. At the largest IBM and IBM-compatible mainframe shops, the company's page printer market share varies between 23% and 61%, according to Computer Intelligence Corp., La Jolla, Calif. CI's research shows that after IBM, the two most important manufacturers in this market are Xerox and Siemens. Helping Siemens gain its strong foothold is StorageTek, which has installed more Siemens machines in the U.S. than the West German company itself.

**Once system users decide to leave the big blue hardware fold, they grow more willing to consider non-IBM page printers.**

In other words, the largest users already have hardware in place that can support SAA's IPDS, or at least AFP. That is, so long as IBM's current standards remain in place. If, on the other hand, IBM decides to announce new printers with new capabilities for its high-end mainframes, then the current user base, which includes sites with 3800-3s and other printers, will face some expensive decisions. Given the age of IBM's printer line and the success of IBM's rivals, the need for those decisions seems to be imminent.

The IBM 3800 printer, which began as the model 1, was first shipped in 1975. As far as applications programs are concerned, the 3800-1 is a page-oriented line printer that can be set up to draw forms. Eight years later, in 1983, IBM started shipping its 3800-3, which offered all-points-addressable printing.

Just this year, IBM began installing the model 6, a slower 3800 that also provides all-points-addressable page printing. The two faster 3800s, models 1 and 3, are similar, and IBM will upgrade a model 1 to a model 3 for $95,000.

Xerox, which entered the printer fray in 1977 with its 9700, announced its follow-on 9790 last year. The Xerox machines differ significantly from IBM's. Instead of providing plug compatibility,


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they offer data stream compatibility.

Xerox printers, which are based on copier engines, move cut sheets instead of the fanfold paper used by IBM's fastest page printers. The Xerox machines also offer significantly higher resolution, 300 dots per inch versus the 240 dots per inch provided by IBM's most expensive printers. Xerox also sells the smaller 8700 and 8790 page printers that are also used on mainframes.

Siemens, which peddles its own machines, the 2300 and the slower 2200, also sells its 2200 through StorageTek. Since 1984, StorageTek has sold the box as its model 6100. These printers are plug compatible with the IBM 3800.

**The Bigger, the Bluer**

At Members Life Insurance Co. in Farmers Branch, Texas, the coding for fancy output was done several years ago for an IBM 3800 printer. Since then, Members has replaced its IBM iron with Siemens gear. "We didn't have to touch our code," explains Jerry Thompson, vice president of MIS. "It wasn't broke, so we didn't fix it."

**The crucial issue is the price/ performance of IBM's next generation of high-end printers in SAA and non-SAA environments.**

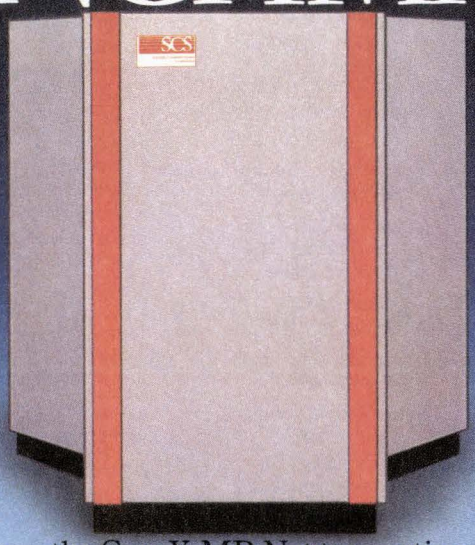
With so much competition, IBM must fight for every sale, particularly in the midrange. The largest IBM mainframes, the 3090s, are more likely to have 3800 page printers than any other make. Computer Intelligence estimates that 61% of the printers on 3090s are made by IBM, compared with 34% made by Xerox printers, mainly the 97XX models.

The older 308X mainframe shops surveyed by CI are a little less likely to have 3800s. IBM's share here is 54%, compared with Xerox's 36%. All IBM mainframe users have printers from various other makers, but these machines account for only a small piece of the market. These manufacturers, according to CI, have captured a scant 5% of the 3090 page printer base and 10% of the 308X base.

Once users decide to leave the IBM processer fold, they grow more willing to consider non-IBM page printers, too. CI reports that only 42% of the page printers on Amdahl's mainframes are from IBM, while 46% are Xerox machines. StorageTek shows up here with 7%, while various other vendors share 5% of the page printer market for Amdahl mainframes.

Customers of National Advanced Systems, Santa Clara, tend to be somewhat smaller companies with somewhat smaller mainframes than the 3090 or Amdahl machines. As a result, the edge here goes to non-IBM page printers, which are generally not quite as fast as the 3800. CI reports that Xerox has a whopping 49% share of the NAS page printer market, more than twice as much as IBM's 23% penetration. StorageTek has won a


BENCHMARK.

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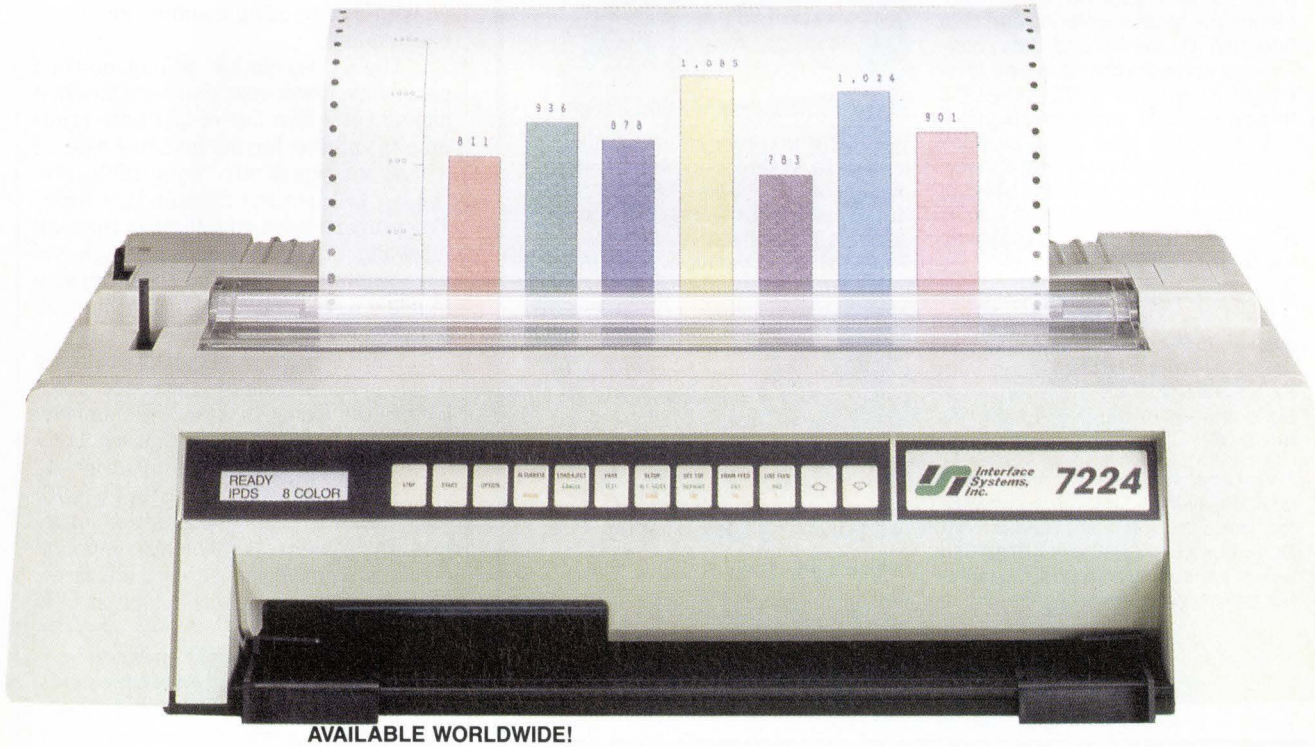


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healthy 14% of this pie, while various other vendors, including Siemens, vie for the remaining 14%.

The pivotal base for all the page printer makers is the IBM 4381 market. The midrange users of IBM's largest air-cooled processors have the reputation of being True Blue. Nothing could be farther from the truth.

Users of the 4381 apparently don't like IBM's page printers nearly as much as those from other makers. CI found that only 33% of the printers on 4381s are from IBM. Xerox has captured an impressive 49% of the 4381 printer market, while Siemens, along with several other printer makers, shares 13% of it. Some 4% of the 4381 shops have gone with StorageTek for their page printers.

As these users migrate to faster processors, they will probably leave their page printers in place. Unless, of course, they are unhappy with the printers they're now using. The result could be serious erosion of IBM's market share among its largest accounts.

IBM's comeback effort, based on the 3800-6, may not be enough to turn around 4381 users. These crucial customers, more so than users of the 3090 and 308X, could force IBM to revamp its page printer line.

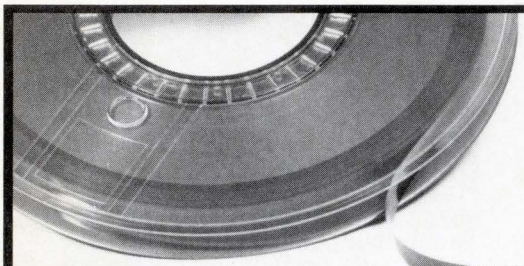
Because the major vendors in the market already comply with standards tied to the 3800-3, IBM may not just replace its largest page printer with an equivalent, lower-priced unit. What it may do instead is try to leapfrog the competition by offering a printer that's loaded with a compelling combination of enhancements.

**THE 3800-6 MAY NOT BE ENOUGH TO WIN 4381 USERS.**

Higher resolution is one obvious possibility, lower cost another. Once IBM announces a new line of fast page printers, its support for the installed base of 3800s and, implicitly, compatible machines, will become a secondary issue. The primary issue, and the one that will most affect the installed base of high-end page printers, is the price/performance of IBM's next generation of machines in both SAA and non-SAA environments.

One company anxiously awaiting SAA to solve its data interchange problems is the Home Insurance Co. in New York. Home Insurance senior vp Tony Graffeo reports that his company is "absolutely, positively going to go with SAA." Echoing the sentiments of many mainframe users caught in the compound document quandary, Graffeo declares, "IBM has got to come through on this." ■

*Hesh Wiener and Sharon Brady edit newsletters on medium and large systems at Technology News of America, a New York publishing and research firm.*

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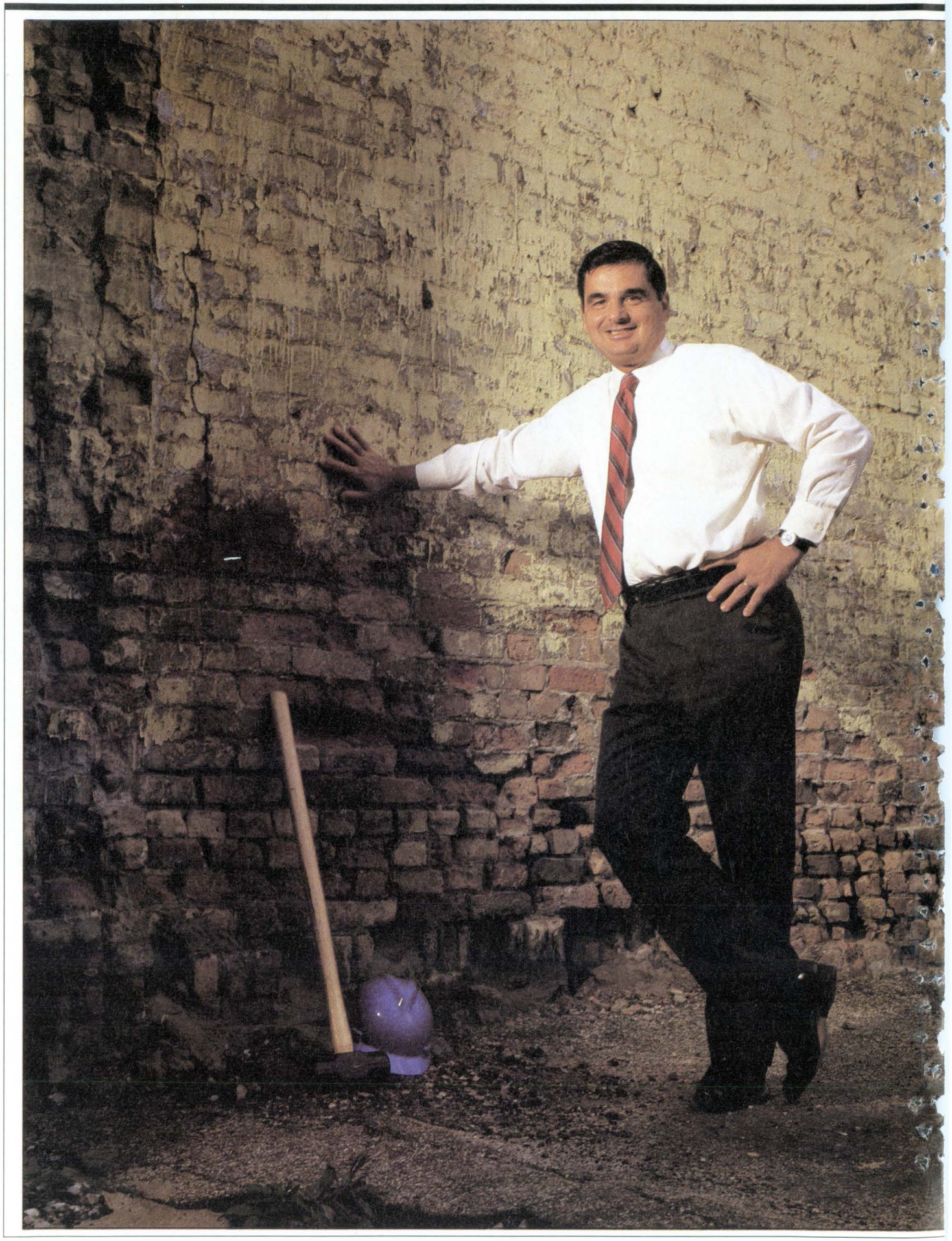

**As the information center at Quaker Oats approached its third birthday, IS management took a close look at the center's success. Although it concluded that the center was both successful and popular, it also discovered that the center had fulfilled its function. Once Quaker Oats' management accepted the fact that the info center had hit the end of its effective life cycle, it began to prepare for an orderly phaseout. Vice president of information systems Ronald Brzezinski provides a step-by-step account of how they broke down the walls of the info center at Quaker Oats.**

# When It's Time To Tear Down The Info Center

BY RONALD BRZEZINSKI

At the Quaker Oats Co., we recently celebrated our information center's third anniversary in an unusual way. We began tearing it down.

It is not that the info center wasn't doing a good job bringing micros to our Chicago staff. In fact, the info center had done so much to upgrade everyone's microcomputing skills that we no longer needed a separate department to support desktop technology.

By all industry measures, Quaker's info center was very successful. From its very inception, the center's 2,000 users—employees in marketing, distribution, manufacturing, accounting, and sales—complimented and applauded the information center's staff for their cooperation, professionalism, and dedication to making technology work for the user—or client, as we say. During the past three years, the success of the information center at Quaker has surpassed all expectations.

When our info center opened in May of '84, we celebrated in the traditional way. We held a ribbon-cutting ceremony to inaugurate the newly constructed facility, which was housed next to the information services department. The info center's charter was to act as an arm of the information services department dedicated to providing technical support and services to Quaker's staff and management in acquiring and using personal computers.

In three years, the info center has accomplished much. The information center staff managed the orderly introduction of over 1,200 desktop computers into the business. They trained over 2,000 employees in the fundamental and advanced concepts of desktop computing. By installing over 3,000 software packages, they achieved cooperation and standardization throughout the company for tools such as word processing, spreadsheets, and database systems. Through a hot-line service, they provided on-the-spot expert advice to clients. They implemented and later enhanced an executive information system that is used by the company's senior management, including chief executive officer William Smithburg.

The information center staff was so adept at transferring personal computing technology ownership and responsibility

Photographs by Kevin Horan

# Now seriously, who would you rather have connect your PS/2 to your IBM network? Frank Burns or her?

The answer is obvious. And the answer is IRMA™ from DCA.

After all, what was the first 3270 micro-to-mainframe connection is now the undisputed industry standard. With more than half a million installations worldwide.

Now DCA is first again to introduce an alternative for those seeking the same ease of use and reliability from their IBM® Personal System/2™ models.

In fact, it was a mere 60 days after the PS/2™ announcement that we demonstrated IRMA's Micro Channel Architecture™ compatibility at COMDEX. And 60 days later that honest-to-goodness PS/2 users started transferring data with IRMA 2™ and Smart Alec,™ our micro-to-System 3X counterpart.

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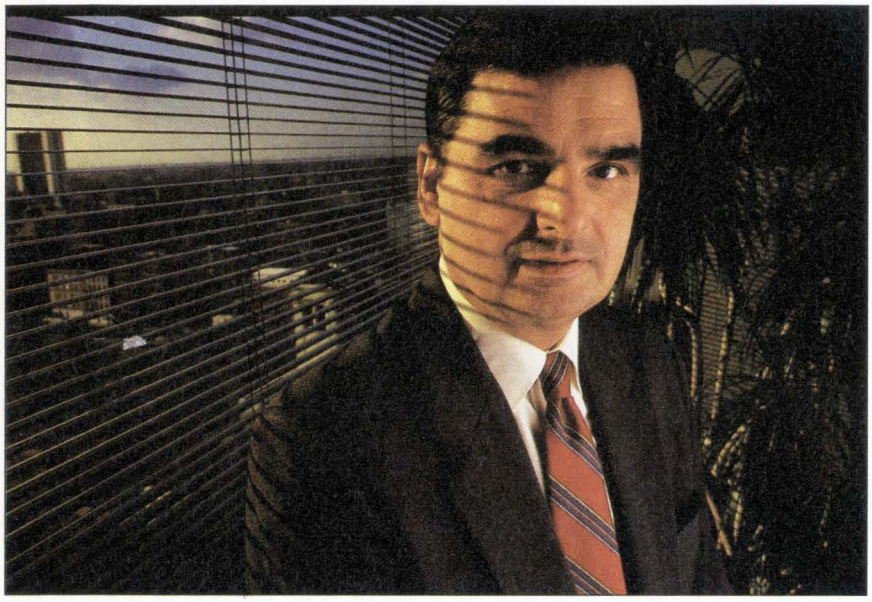
**Circle 51 on Reader Card**

to the clients that many users have become expert in the use of the new desktop and interactive technologies. Largely as a result of the efforts of our info center staff, many standalone and networked desktop and portable computers are now used throughout Quaker in a variety of applications, from tracking commodity purchases to measuring product performance. Several hundred imaginative business solutions have been developed by the clients and are now supported by them.

Following the center's success, we



**The author advocates breaking down the walls that isolate the info center.**

in information systems management began to ask, "What can the info center do for an encore, and how can the IS department leverage the talented information center staff resources?"

Many of our preliminary answers focused on expanding existing education, coaching, and technology support activities. Not surprisingly, these solutions required increasing the information center's size and budget to keep pace with the expanding client base. But as we began to evaluate the budget, it became clear that these added expenses could not be justified by a corresponding added value to the business.

As we began to analyze the directions the info center could take, we defined the relationship between the info center and the information services department. The info center's effectiveness is indirectly related to the IS department's commitment and capability to build an integrated data, communications, and technology infrastructure. Essentially, the effectiveness of the information center lessens as the technology infrastructure expands. Maintaining a separate information center contradicts the integration activities that the information systems department is struggling to achieve.

Knowing when to dismantle an information center is always difficult. It's easy to say, "If it ain't broke, don't fix it." Confusing the matter further is the trendiness of the info center. Many industry "experts" are still proclaiming the merits and benefits of information centers. Consequently, mixed messages are continually being sent to the clients, to IS staff, and to management regarding the importance and benefits of the information center.

At Quaker Oats, these mixed messages prompted us to look more closely at the information center work loads, its effectiveness, and its recent accomplishments. After observing the info center for a few weeks, several factors convinced us that it was time to dismantle and reintegrate it with IS.

Our talented information center staff was rapidly evolving into a maintenance mode, which didn't leverage their skills effectively. New administrative procedures—like chargeback systems and technology management processes—had evolved within the information center that duplicated existing IS department procedures. In many ways, the info center had evolved into a small business with its own set of technology inventory systems, chargeback processes, and service request procedures. The result was that the information center analysts, in their quest to be responsive to clients, were unknowingly propagating fragmented technology solutions. These "solutions" began hampering the IS department's applications and technology integration efforts.

Hindsight indicated that similar telltale signs had been surfacing for several months. Unfortunately, we in IS management did not recognize that these changes were symptomatic of an organization approaching the end of its effective life cycle.

In addition to our own observations, we began hearing complaints from the information center staff and their clients. The staff complained of being overworked. Requests came in for additional personnel. Clients began voicing concerns regarding service response; the hot line, they said, was not covered consistently.

The sheer volume of calls to the hot line—300 to 500 calls each week for less than 1,000 clients—indicated that clients were increasingly dependent on the center's staff. They found it easier to call the hot line than to read their manuals.

Like most info centers, Quaker's was instituted to help change how the business uses new technologies. Although nobody ever officially declared it as such, the information center was designed to be a transition department. We broke the function out of information services and established the info center as a separate department in response to a particular problem—the introduction of personal computers.

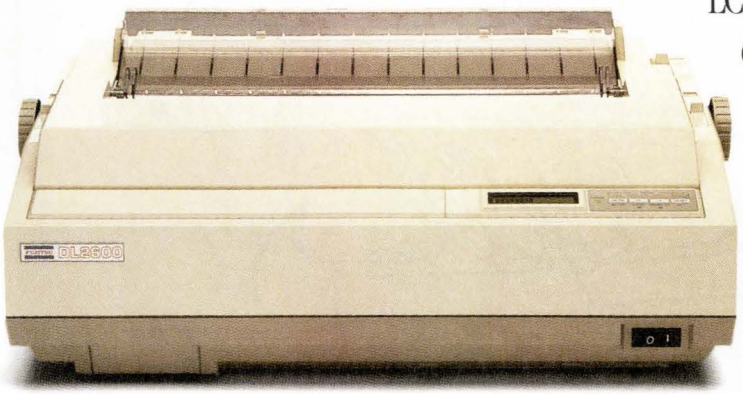
When we built the info center, we didn't know how long the transition period would last. What we did know, but overlooked, is that major organizational changes occur in three- to five-year waves. We should have anticipated that the information center's effective life cycle would be between three and five years. In Quaker's case, the information center life cycle is right on target.

It's important to remember that dismantling the information center is more than just knocking down the walls. You must address several important factors before you can begin the process:

- Transfer to another IS department the continued support for several key functions, such as executive management support, limited hot-line service, and training.
- Identify new career opportunities to leverage the info center staff skills.
- Prepare the clients to rely less on the

FUJITSU'S 24-WIRE DL2600 PRINTER

# The printer that stands the test of time.



Throughout each business day, the DL2600 24-wire, dot-matrix printer will quietly and reliably handle your printing needs.

## 8:35 AM — FAST!

Coffee is just starting to brew, but the new DL2600 in Purchasing is already wide awake, printing reports at a blazing ten seconds per page.

## 9:22 AM — GREAT PAPER HANDLING!

Marketing needs a proposal on letterhead. Now. No problem. The DL2600 automatically backs out and parks the computer paper, then loads the letterhead. Getting back to the reports is as simple as pushing a button.

## 1:31 PM — QUIET!

A meeting on the quarterly statement is held while the DL2600 quietly purrs nearby, printing spreadsheets for Finance.

## 3:15 PM — POWERFUL!

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| Emulation | IBM® Graphics Printer® and Diablo 630® API (plus Epson JX-80® on the color model) |
| Noise Level | 55 dBA |
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Circle 52 on Reader Card

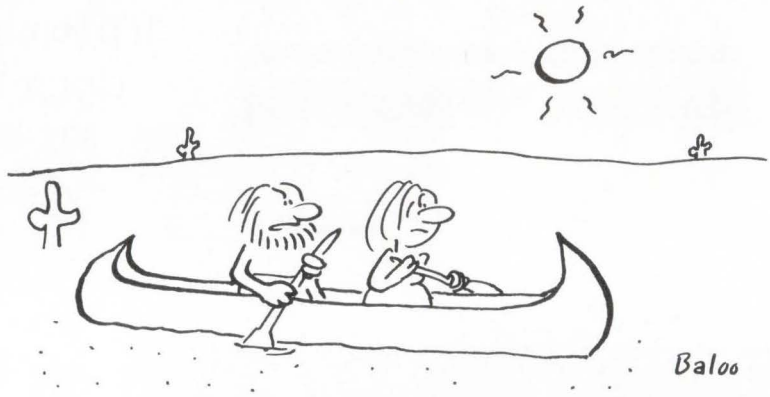
information center staff.

- Prepare the info center staff for new challenges.

At Quaker, we found it helpful to think in terms of phasing out the information center, with an emphasis on "phasing." Four separate shutdown phases are required:

- Refocus the purpose. Instead of helping the clients understand the technology, shift the emphasis to assisting the clients in accessing and manipulating computer-based data.
- Reorganize. Give the info center staff new objectives, direction, and management. At Quaker, the information center staff no longer reports to the vice president of information systems. Now, the staff reports to the director of information resource management. The organizational change reinforced the shift in the information center's purpose.
- Change the physical setting. Break down the walls that isolate the group from their coworkers in the information systems department.
- Phase out. Shift the support and coaching functions to the clients while still maintaining a centralized approach to investigate, standardize, and coordinate the use of personal and desktop technologies in the business. This phase will require moving the information center analysts into new applications support roles in order to more effectively leverage their skills. This can be accomplished by expanding and upgrading existing support functions in other information systems groups and/or by adding new job categories.

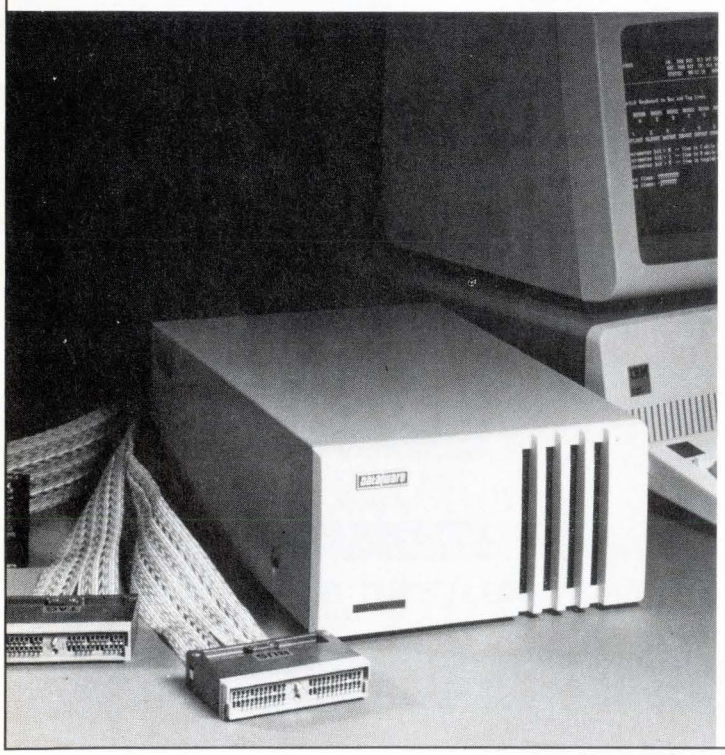
As an element of the phaseout process, Quaker's information center ana-




"If you ask me, it's a miracle that we've made it *this* far."

Cartoon by Rex May


# Introducing a 4.5 MB/sec PACE for IBM channel emulation.



For years designers have been using our Peripheral Automatic Channel Emulator (PACE) to develop and test IBM 370-compatible peripherals quickly and inexpensively without tying up the mainframe.

Introducing the new turbo PACE. An advanced version with a blazing 4.5 MB/sec data streaming transfer rate that's 50% faster than the IBM standard.

So you can be ready faster with faster peripherals as soon as new market opportunities open up.

And that helps you make more money faster.

The new Model DW145 PACE holds down costs by using an IBM-compatible PC as an inexpensive host processor to control and monitor test operations and to generate IBM Channel Command Words (CCW's).

With PACE you avoid costly mainframe crashes, too. It not only recovers from protocol violations, it reports them as well. And versatile, flexible PACE is user programmable and completely portable for field use and for trade shows and product demonstrations.

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# Using the wrong 4GL to write a production system has its risks.

Not every 4GL can handle a big production system. FOCUS can.

It has the completeness you need to create complex multi-user systems. It handles very large databases—some FOCUS applications use files of over a million records. And FOCUS offers flexible design options to optimize database operation and improve efficiency.

### Your Database or Ours

FOCUS has its own integrated database manager. And it also has interfaces to every important database system on the market. So you can run your large applications against existing files. Or use the powerful FOCUS database manager. Or both.

**Environmentally Sound**

FOCUS works in all of these environments:

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With the automatic system generation facilities of FOCUS, you can use a point-and-pick windowed interface to quickly design databases and create applications. Moreover, there's a full set of programmer tools, including a screen painter.

In fact, you can program so rapidly in FOCUS that you can easily create and test many prototypes of a large production application.

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Over 300,000 users have boosted their productivity by making FOCUS the most popular fourth-generation language in the world.

FOCUS runs in IBM's 370, PC and PS environments, on the DEC VAX, under Wang VS, and under UNIX. Your programmers can write an application using the windowing capabilities of PC/FOCUS,® and deliver window-driven applications that will run wherever FOCUS is installed.

FOCUS has a large and independent user group. And Information Builders backs FOCUS with local help lines in 12 regional offices, a central hotline, and a national network of technical support and training centers.

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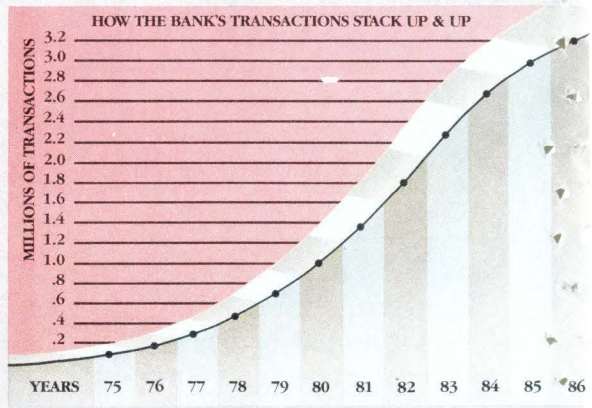
# Digital has it now.



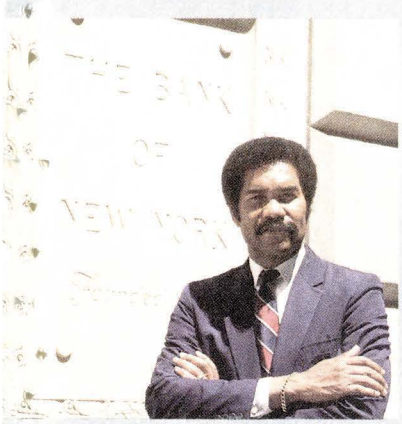
In the business of government securities clearance, if you can't complete a transaction on demand, you stand to lose thousands, even millions, of dollars. And sometimes clients as well.

So it's not surprising that a predictable, responsive computer network can be a huge asset. The Bank of New York knows it for a fact. With the help of a network from Digital, they've become one of the leading banks in the government clearance business.

According to the bank's Jorge Brathwaite, Senior Vice President Government Securities Clearance, "We compete by serving the client faster, better, and more dependably. There, the network is critical."

In effect, the bank's network hooks up to their clients' own back office systems. Even multi-vendor systems. This way, clients can enter trades directly, have instant access to clearance information, and make better decisions, faster than ever.

Of course, the network's flexibility is also something the bank has come to count on. As Brathwaite



# "A computer network that helped yield a 3000% increase in government securities transactions for The Bank of New York."

points out, "Digital's single architecture lets us add computers by simply plugging them in. And their VMS™ operating environment lets us streamline the process of modifying applications software. All very crucial when you have to react quickly to growth and new opportunities."

And The Bank of New York has been fast on the uptake. In fact, Brathwaite remarks, "Every day, we handle over 20,000 transactions and clear more than $100 billion. That's thirty times the volume we did ten years ago. What's more, we just had our ninth consecutive year of record earnings. And that's why I say a network from Digital is money in the bank."

To find out how a network from Digital can give you a competitive advantage, write: Digital Equipment Corporation, 200 Baker Avenue, West Concord, MA 01742. Or call your local sales office.

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PAC III can handle any kind of resource scheduling, quickly and accurately. And the System provides you with all the necessary information to bring your projects in on time, within budget, and with optimum resource utilization.

Flexible and easy to use, PAC III is constantly updated and enhanced. And it's backed by a complete support program.

PAC III runs on large and medium scale IBM (such as the System 38) and DEC computers, including MicroVAX. It also interfaces to PAC MICRO™, our project management system for the IBM PC.

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## Tearing Down the Info Center

lysts were invited to explore new career opportunities in the business and technology functions. Several information center analysts already have been promoted and/or transferred to user or client organizations. They have assumed key responsibilities to help integrate new technologies into complex business processes. Some of them are now responsible for the implemention of the use of handheld computers by sales representatives.

In addition, we've opened up technology career paths to the information center analysts. During the past several months, some of them were temporarily reassigned to information systems applications and technology development projects to take advantage of their technology, applications, and business skills. Because of their backgrounds, they provided the necessary expertise to effec-

**CLIENTS WERE INCREASINGLY DEPENDENT ON THE INFO CENTER'S STAFF.**

tively design new technologies into new business applications. We intend to continue leveraging the information center skills by establishing an architectural assurance function, which will help ensure that appropriate technologies are effectively designed for new business systems.

Because of the rapid changes taking place in the high technology industry, the new functions and jobs that former information center analysts are now fulfilling may also be transition services. We don't know how long the new services will be required, but we do know that support and service groups should not be isolated from the rest of the information systems department. The information center has taught us how to tear down the walls. ■

*A participant in* DATAMATION*'s roundtable on vendors (see "Alliance for Progress:* MIS *Views Vendors," June 1, p. 94), Ronald Brzezinski is vice president of information systems at the Quaker Oats Co. in Chicago.*

# INTRODUCING A NEW WORD FOR TANDEM AND STRATUS.

The fast world of transaction processing has a new speed limit. Because Sequoia has just introduced the Series 200: a fault tolerant system that delivers faster performance at a far lower cost per transaction. In fact, as these audited test results prove, Sequoia dramatically outperforms both Tandem* and Stratus.*

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| | SPECS: | Trans. Per Sec. | Cost/Transaction[4] |
|---|---|---|---|
| **SEQUOIA**[2] **SERIES 200** | **6 Processors** | **83** | **$11,200** |
| TANDEM[3] VLX | 4 Processors | 26 | $38,200 |
| STRATUS XA2000 | 4 Processors | 50* | $16,600 |

*Results produced without transaction protected files.
[1] Based on standardized ETI Benchmark. Results published by FT Systems Newsletter, 1987 ITOM Inter. Co. [2] Audited results published 10/12/87. [3] Using NonStop SQL™
[4] Prices for systems: Sequoia $929,000; Tandem $995,000; Stratus $830,000.

And with Sequoia, you finally have the capability to add pure power as you add processors, with no degradation.

## ARCHITECTURE THAT MEANS HASTE WITHOUT WASTE.

Sequoia's elegant, tightly coupled architecture is a significant new step in the evolution of fault tolerant transaction processing.

It balances work dynamically, to make sure you get maximum productivity at all times.

It eliminates both the overhead of a loosely coupled system, and the complex application design that's normally required for high performance. That makes linear expandability a virtual reality: when you double your processors, you can double your performance.

And with the Sequoia Series 200, you can expand your system piece-by-piece, adding processing, memory or I/O modules in any configuration you want. A remarkably cost-effective way to grow as large as you want at your own pace.

## FAULT TOLERANCE: THE PLUS OF "PLUS 1."

The Sequoia Systems Series 200 also eliminates some of the faults of other fault tolerant systems.

Instead of using a software approach, which by nature is complicated, costly, and inefficient, we built fault tolerance into our hardware. But, unlike systems that require *double* the hardware, with a backup for every primary processor, we have a much more effective solution: "PLUS 1."

Sequoia is able to achieve redundancy with just *one* more processor than normally required. When a fault is detected, the failed processor is taken off-line, and the workload is dynamically balanced among the remaining processors.

## NOW UNIX AND PICK ARE IN FAST COMPANY.

For maximum hardware flexibility and software portability, Sequoia supports the most popular industry standards, including UNIX.™ We also bring new power to the world of PICK™ users. And our open communications architecture allows you to connect to other systems through IBM protocols or international standards like X.25.

So if you'd like to transact business at a record pace, now is the time to learn more about how the Sequoia Series 200 can help you. Send us the coupon, or better yet, call our Marketing Services Department: **617-480-0800.**

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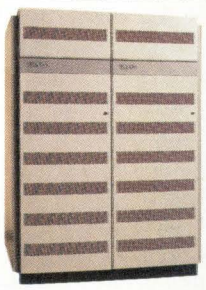
INTRODUCING THE SEQUOIA SERIES 200



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SEQUOIA

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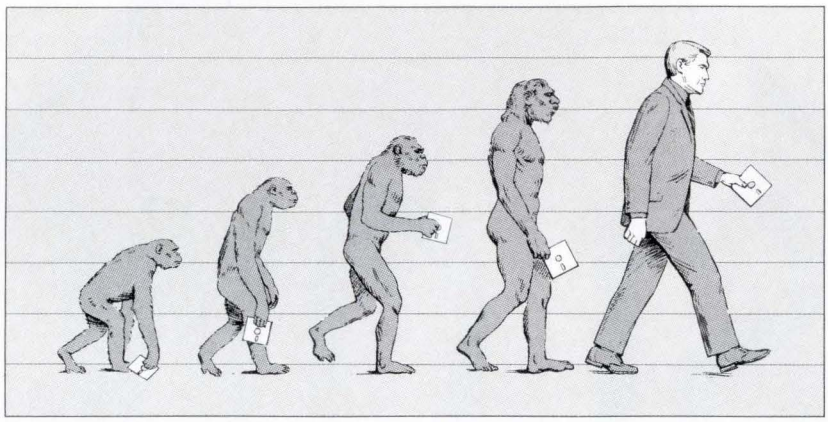
# System Fault Tolerant NetWare®

## The Logical Evolution of LANs

Many people don't realize that chimpanzees and humans share 90% of the same genes. A minor difference sometimes translates into major improvements.

Industry analysts predict that the LAN market will quadruple by 1990. Networks will get larger and will take on more serious tasks. As companies invest more capital into these systems, they are going to look for ways of guaranteeing performance and data integrity; in an environment as competitive as today's marketplace, even small mistakes can change the very nature of a business.



**"In this competitive world, a difference of just 10% can mean the distinction between pinstripe and primate."**

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 the second of a two-part series, seven examples are shown that illustrate the wide range of applications and advantages that can accrue to organizations that decide to plug in local area networks (LANs). While LANs can help your company better manage and control its information resources, they don't always offer clear-cut benefits that can be quantified in a traditional business sense. The organizations described in the seven case studies did their own evaluations and found that LANs did indeed measure up to their needs.**

# Putting LAN Plans To Work

Illustration by Jim Lutkie

BY MARTIN PYYKKONEN

In the first part of this article (see "Plan for Your LAN," Oct. 15, p. 109), 10 strategic steps in planning for a local area network (LAN) were explored. Drawing from the experiences of end users who used Cambridge, Mass.-based Arthur D. Little Inc.'s consulting services, a cornucopia of LAN advantages can be gleaned, not the least of which is help in managing and controlling information resources more effectively. Those and other business benefits of LANs, however, are usually difficult to quantify.

The advantages of LANs fall roughly into three categories: benefits that can be quantitatively measured and evaluated against traditional investment criteria, those that are too complex or time-consuming to be quantified, and the intuitive but intangible benefits that are unquantifiable.

Examples of potential LAN benefits in each of these three categories are shown in Figure 1. It is difficult to generalize any further because LAN applications vary so widely between user organizations. The following examples have been selected to illustrate the range of applications and advantages that organizations are achieving through the use of LANs.

### LANs for Financial Institutions

A major savings and loan institution in the Northeast is aggressively pursuing the implementation of departmental LANs throughout its locations. The S&L, which had no LANs in place, wanted the nets for facilitating the transfer of information about loans as they passed through the various stages of the approval process.

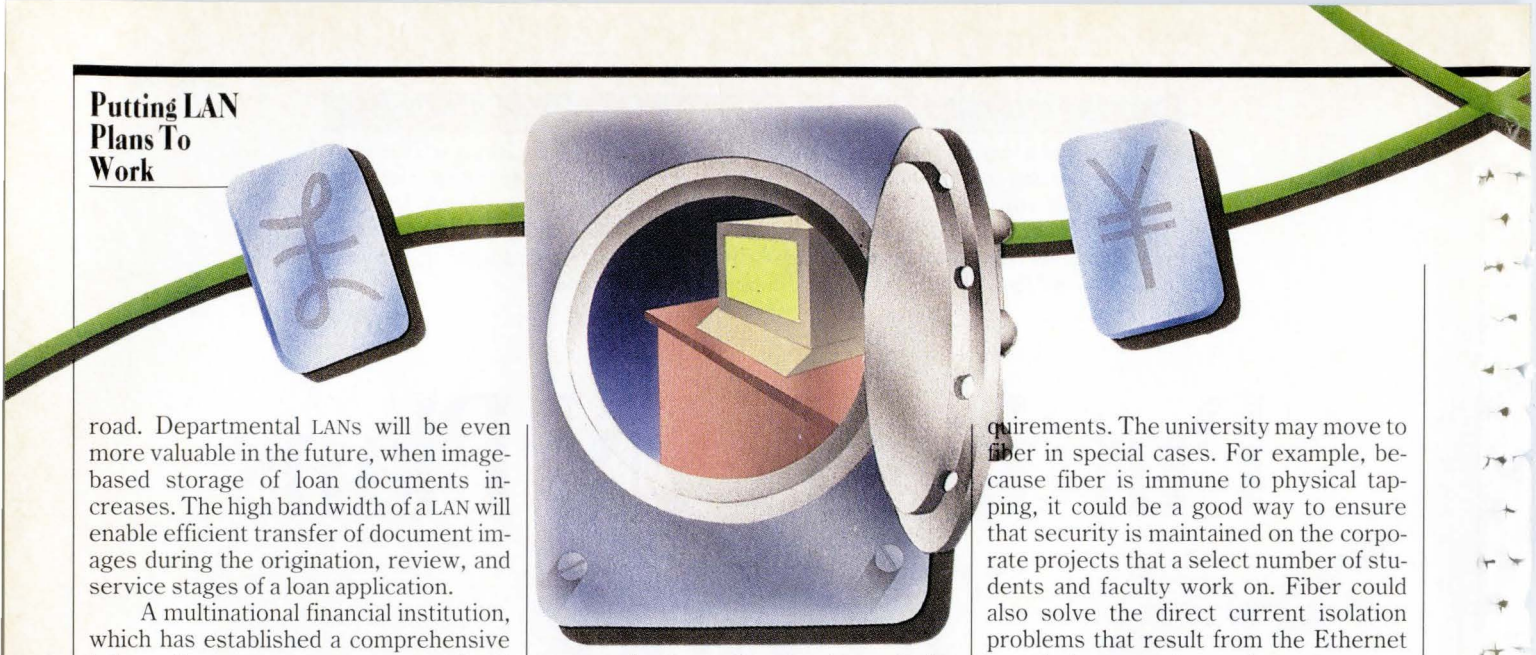
That information is transferred back and forth through IBM PCs that the company has been installing over the last three years. The S&L will initially use a single IBM token ring for peer-to-peer communications among its fleet of 40 to 50 micros.

Depending on the volume of applications for a particular loan type, either single, low-volume LANs or multiple, high-volume LANs will eventually be used for the entire process from loan origination through servicing. As loan volume grows, network bridges will be used to connect multiple token ring LANs. The functional workload will be divided among the staff, but multiple linked LANs will collectively service all the high-volume loans.

The S&L, which planned to use the LANs mainly for this peer-to-peer communication, held off on going with IBM until this June, two months after the company made its System/370 token ring connectivity announcement. The financial institution needed to know what IBM's mainframe connection moves would be because some mainframe access is required in the loan application process.

The S&L expects to have from three to four LANs serving some 60 pcs within two years. The goal is to make information processing more productive and loan procedures more efficient. Other advantages may accrue farther down the

## Putting LAN Plans To Work



road. Departmental LANs will be even more valuable in the future, when image-based storage of loan documents increases. The high bandwidth of a LAN will enable efficient transfer of document images during the origination, review, and service stages of a loan application.

A multinational financial institution, which has established a comprehensive information resource management (IRM) program to help it implement its annual IS budget of over $20 million, has put LANs to work to facilitate communications between previously incompatible equipment and to reduce the number of duplicate databases. The Ethernet and Cheapernet systems also improved peer-to-peer communications within the company's work groups, which are aligned by functional responsibility.

The several hundred LANs installed by the institution over the past three years have been supplied by Digital Equipment Corp., Bridge Communications Inc. (Mountain View, Calif.), Ungermann-Bass Inc. (Santa Clara), 3Com Co. (Mountain View), and Novell Inc. (Provo, Utah). The nets service some 2,500 people segmented into small work groups of no more than 20. The communications needs of these groups are approximately 80% internal. Those needs include electronic mail, text report preparation and review of financial modeling, transactions to and from accounts-receivable files, and long file transfers that have high communications content.

Since there are never more than 20 users per group, the most suitable systems were lower end, general office LANs. Micro clusters could not do the job, either because they were not peer-to-peer or because their file transfer speed was too slow. Larger office LANs based on Ethernet were also out because the server function is performed by a mini.

Most of the company's small LANs were implemented with a 10Mbps shielded twisted pair configuration along with token passing access and control and a dedicated file server for each net. A universal cabling system was used for installation and management of the shielded twisted pair wiring that connects the users on each LAN.

Fiber optics is being considered for future clustering of communications between multiple LANs. The 20% of LAN communications that go beyond the boundaries of each work group still represent too small an aggregate bandwidth to justify the use of fiber optics. Some Ethernet gateways, however, have been installed between groups. But the full benefits from these gateways have not been realized because of the structure and small size of of the departments.

### LANs on Campus

A major southeastern university put in a campuswide Ethernet LAN covering 128 buildings to enable its departments, mainly the science-related ones such as engineering and chemistry, to communicate with each other. The Net/One from Ungermann-Bass links the school's incompatible IBM, Control Data, and DEC mainframes, and also provides access to public data networks and database services.

Since many of the departments are scattered at various distances around the university, a combination baseband/broadband approach was needed. Baseband/broadband LANs are used inside the campus buildings, while broadband nets are used to link the multiple buildings of a single department.

These broadband versions of Net/One serve as the general backbone medium to carry large quantities of data and image traffic. They also enable the departments to share common database information obtained from outside database service providers. A broadband bridge allows network connectivity to be maintained as students and faculty change locations around the campus.

The students and faculty use IBM PCs or compatibles that are connected to the university's 26 hosts through front-end protocol convertors used on a shared resource basis. X.25 gateways are also used on a shared resource basis.

Fiber-optic bridges have not been installed yet because the university has insufficient LAN-to-LAN bandwidth requirements. The university may move to fiber in special cases. For example, because fiber is immune to physical tapping, it could be a good way to ensure that security is maintained on the corporate projects that a select number of students and faculty work on. Fiber could also solve the direct current isolation problems that result from the Ethernet LANs being spread over the campus at a distance of 2km.

### LANs Land in Hospitals

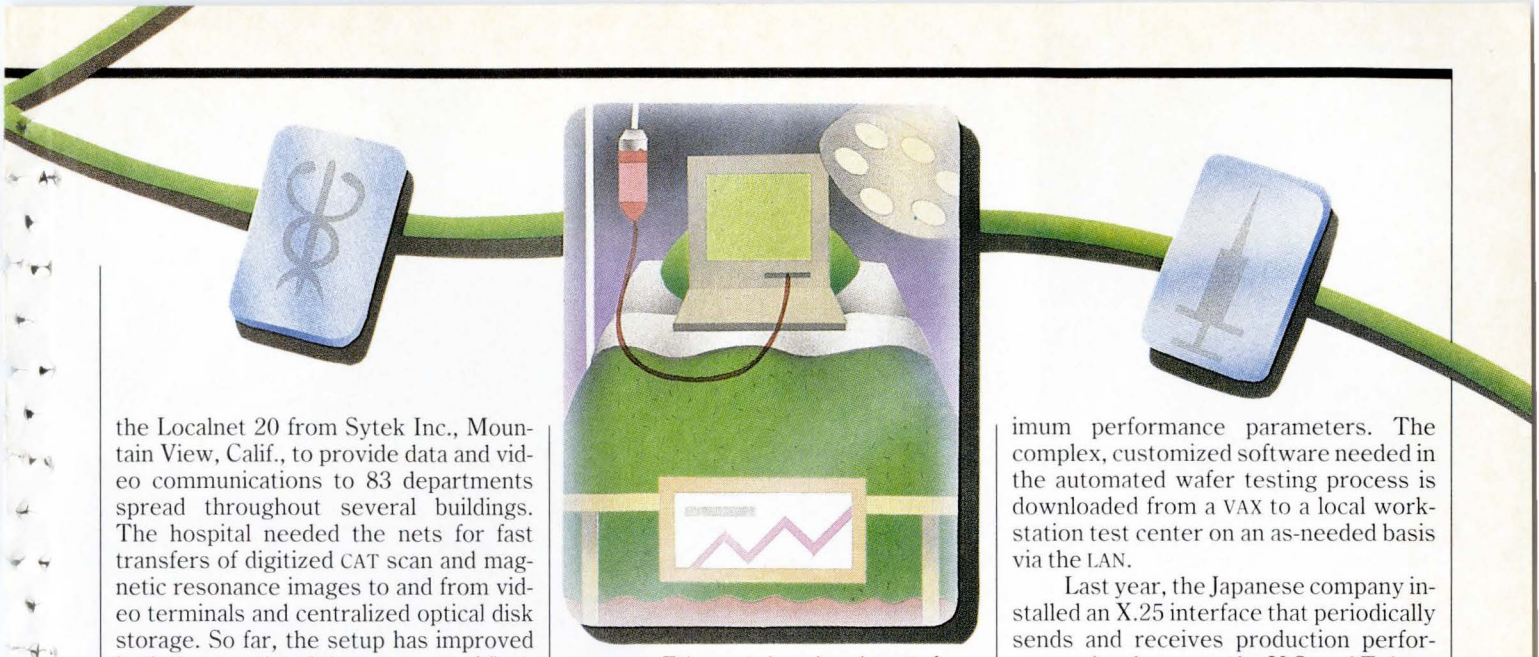
A Canadian hospital system that encompasses five sites within metropolitan Vancouver chose a baseband/broadband hybrid LAN to accommodate its intra-building and interbuilding traffic needs for departmental record-keeping. The Net/One Ethernet LAN from Ungermann-Bass is used to transfer data among the various hospital departments, such as admissions, radiology, and emergency. The LAN also allows for more automated transcriptions of patient data and records.

The demand for local networking at the hospital originated with the need for teleconferencing between buildings. The video link, which was established with broadband technology in 1983, enabled physicians to review patient cases and discuss treatment recommendations. Approximately a year later, individual Net/One baseband LANs were installed in each building, connectivity between them being provided over the same broadband network used for video.

The Ethernet LANs that swap data between the departments enable the hospital to have up-to-the-minute status tracking on each patient as he or she moves from admissions to discharge. Active records are held on a file server. The hospital staff can access the data through a local baseband Ethernet or remotely via a Net/One broadband bridge. Remote bridge access is typically needed when different hospital departments are involved in treatment of the same patient.

The five-building LAN has greatly reduced the manual flow of paper between the departments and has enabled the doctors and staff to be more responsive to patients' needs.

Another large hospital in the Northeast is using a broadband LAN based on



the Localnet 20 from Sytek Inc., Mountain View, Calif., to provide data and video communications to 83 departments spread throughout several buildings. The hospital needed the nets for fast transfers of digitized CAT scan and magnetic resonance images to and from video terminals and centralized optical disk storage. So far, the setup has improved both the speed and the accuracy of first- and second-opinion diagnoses—diagnoses that are vital in traditional as well as emergency patient care.

The broadband CATV LAN provides the video backbone. To supplement this, other logical channels are used to directly connect departmental pcs. This LAN video networking approach enables the hospital to share the very expensive imaging hardware that could only be purchased for the central site.

### LANs Make It in Manufacturing

LAN technology is helping the U.S. manufacturing operations of a Japanese semiconductor firm keep up with its competition. The California operation uses an Ethernet baseband LAN from Bridge Communications to connect its wafer fabrication, assembly, and final test areas with two central host DEC VAXs that contain information on production and quality control.

The LAN provides a quick and effective way of transferring information between production personnel and the VAX and file servers, helping the Japanese firm achieve consistently high production efficiency with superior yield performance. The net automatically transfers status information to a VAX host once each production step is completed.

To ensure product quality, wafer fabrication test data are sent to a VAX, which compares these data with the minimum performance parameters. The complex, customized software needed in the automated wafer testing process is downloaded from a VAX to a local workstation test center on an as-needed basis via the LAN.

Last year, the Japanese company installed an X.25 interface that periodically sends and receives production performance data between the U.S. and Tokyo. Down the road, the firm believes that between 1990 and 1991, fiber-based manufacturing applications protocol (MAP) LANs will be directly involved in production.

### LANs in Science and Engineering

A major U.S. aeronautical agency is using LANs at one of its regional sites to help send large, complex files that include 3-D images, simulation models, and computational aerodynamic data. The agency began installing the Hyperbus and Hyperchannel products from Network Systems Corp. (NSC) of Minneapolis five years ago. The Hyperchannel is a host-to-host 50Mbps network that reaches between buildings.

In this high-speed, high-performance environment, LANs must be able to accommodate large file transfers and the accompanying file manipulation that's done in preparation for mainframe computation. These high-end nets must also be able to fit into a distributed supercomputing setup that's characterized by high levels of host processing. That intense processing is needed for such tasks as numerical modeling and 3-D images.

In such applications, the LAN provides a common, high-speed interface between mixed vendor hosts and lower-speed terminal access points. In the case of the aeronautical agency, end-user computing needs are handled by Cray supercomputers, VAXs, and IBM mainframes with vector processing. Several DECnet Ethernet LANs serve local needs of the agency's science/engineering departments of 20 to 25 people. The most sophisticated communications needs, however, are filled by the NSC LAN and high-performance software. ■

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

## FIGURE 1 Potential Benefits of LANs

*Benefits that can be measured*

Resource Sharing
- Mainframe programs and storage
- High-cost peripherals
- Real-time database services

Consolidated Wiring/Cabling
- Reduction in number of connectors, patch panels, and total cable lengths to serve same user population

*Benefits that can be understood but are too complex to quantify*

Consolidated Wiring/Cabling
- Easier accommodation of equipment moves and changes

Partial information management in a distributed processing environment
- Network boundaries can facilitate better information management
- Complement trend toward departmental computing systems

Simultaneous distribution of information to entire end-user community via broadcast mode operation

*Benefits that are intuitive but intangible and unquantifiable*

More efficient peer-to-peer communications
- Electronic mail, file transfer
- Improved customer/supplier information linkages
- More efficient control and coordination of incoming and outgoing information

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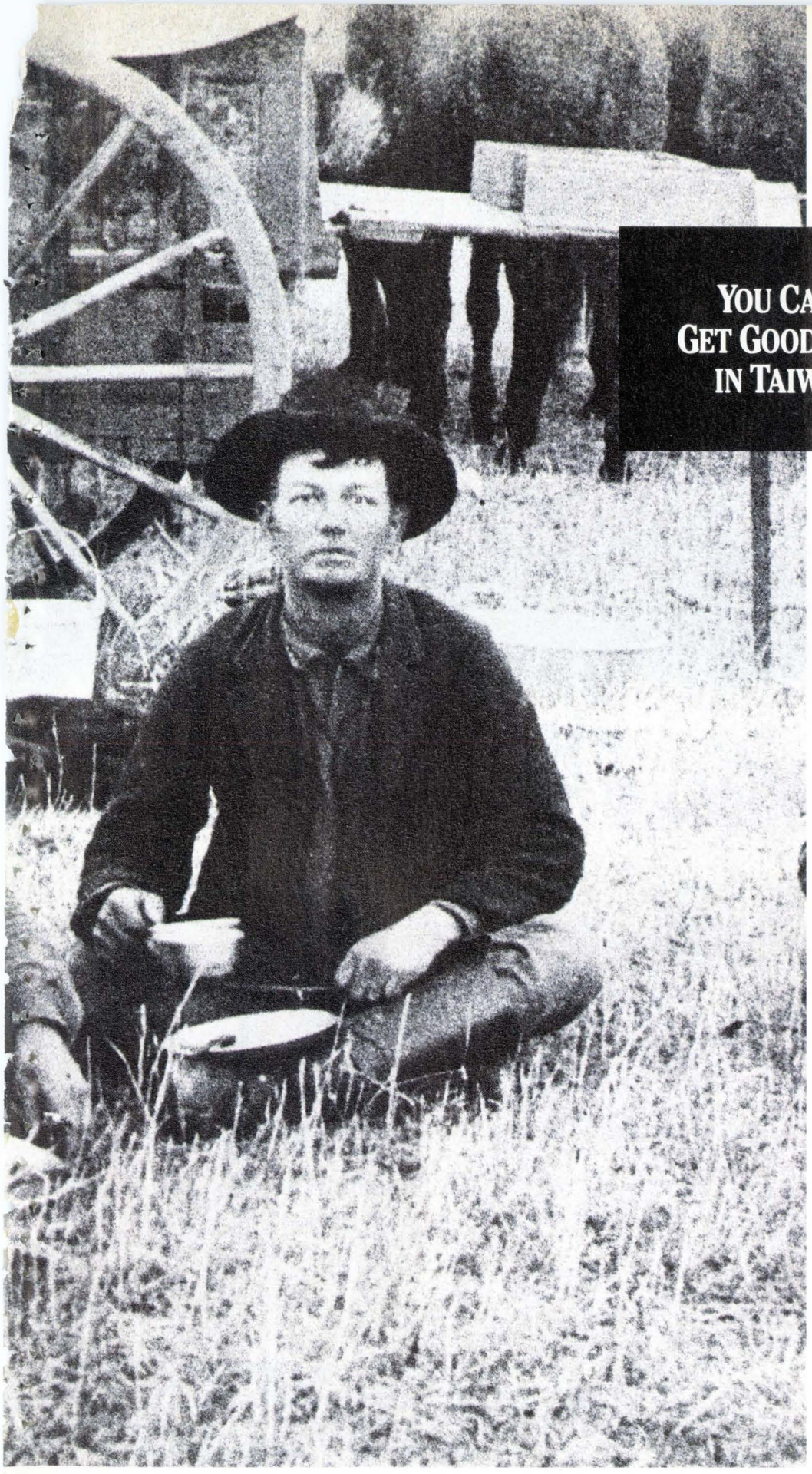

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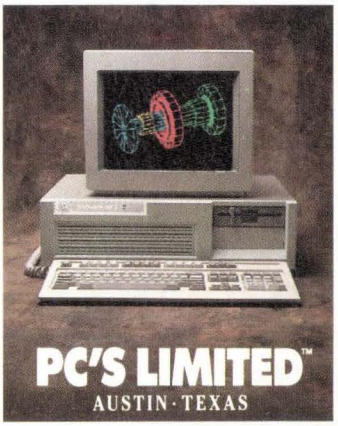


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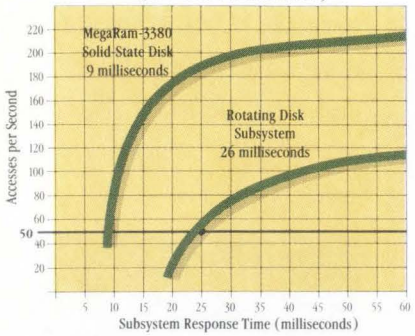


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With the MegaRam-3380, on-line response times can be less than half of those of a conventional disk. What's more, this increased system performance can be achieved at a fraction of the cost of adding or upgrading processors, or installing numerous conventional disks.

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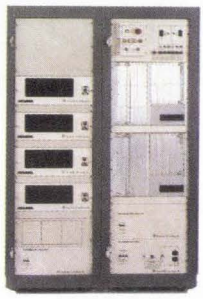

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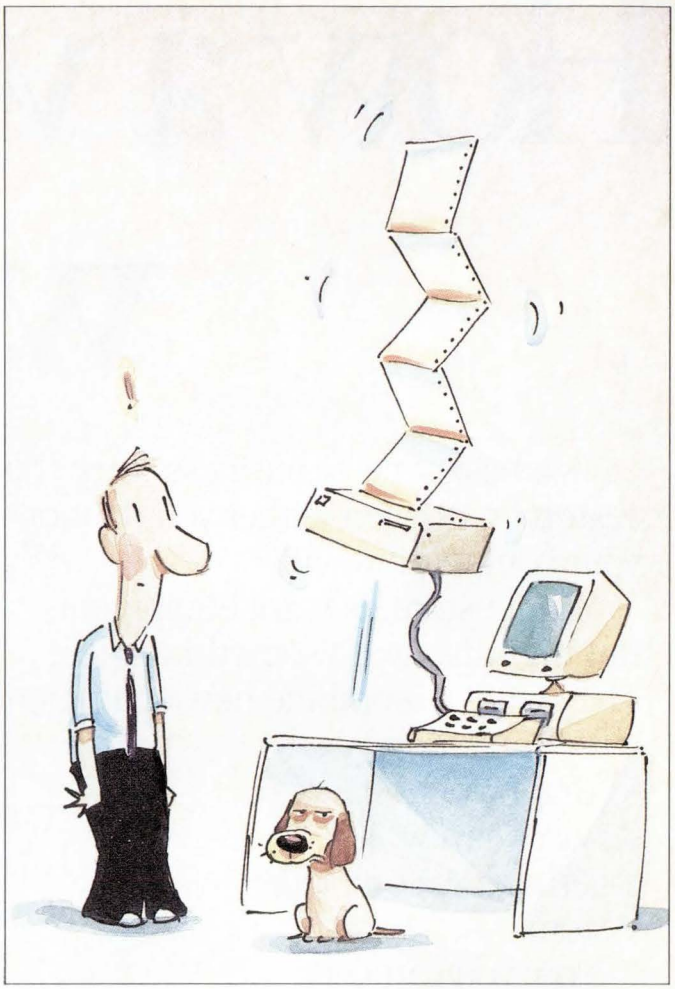

# Old Iron/New Tricks

**It's not necessarily because they loathe their marketing representatives that cagey IS managers look for ways to extend the life of existing "paid-for" systems. Sometimes it's a merger or a new system conversion that inspires new uses for old equipment. Whatever the impetus, these IS executives believe they've saved money while expanding their businesses in unanticipated ways.**

BY CONNIE WINKLER

They say you can't teach an old dog new tricks. But what's typically true with canines ain't necessarily so with computer systems.

"Let me tell you about my '71 Cutlass," quips MIS manager Allan B. Lopata as he tells how his company connected IBM XTs to a Honeywell Level 62 minicomputer, vintage 1974, and one of the last to be found in the New York metropolitan area.

"We're doing everything everyone said we couldn't do with a 1974 batch-oriented architecture," boasts Lopata, who also prides himself on keeping old cars humming.

Lopata and his firm, H.J. Baker & Brothers Inc., New York, vividly exemplify users who, as a matter of principle and of budgets, routinely run one- and sometimes two- or three-generation-old hardware. One giant Northeastern service bureau, for instance, is just now upgrading its 10-year-old IBM 3033 mainframe to a used IBM 3084, while another user clings to his IBM 7090, right out of the early 1960s.

According to Robert Stevenson, executive vice president of the computer leasing firm New York Systems Exchange, Melville, N.Y., some users can comfortably ride one generation behind the latest hardware because of the political atmosphere or the processing needs at their organizations. "They're the same ones who won't drive a new car because it depreciates so much when they drive it out of the showroom," he explains.

These users, Stevenson continues, contrast with those users who insist on having the latest state-of-the-art hardware for their staffs and who prefer to keep IBM's marketing representatives on their side.

Veteran Lopata's approach of mimicking a vendor's proprietary mainframe or minicomputer terminal by installing a $639 emulation board in a personal computer is just one technique for breathing

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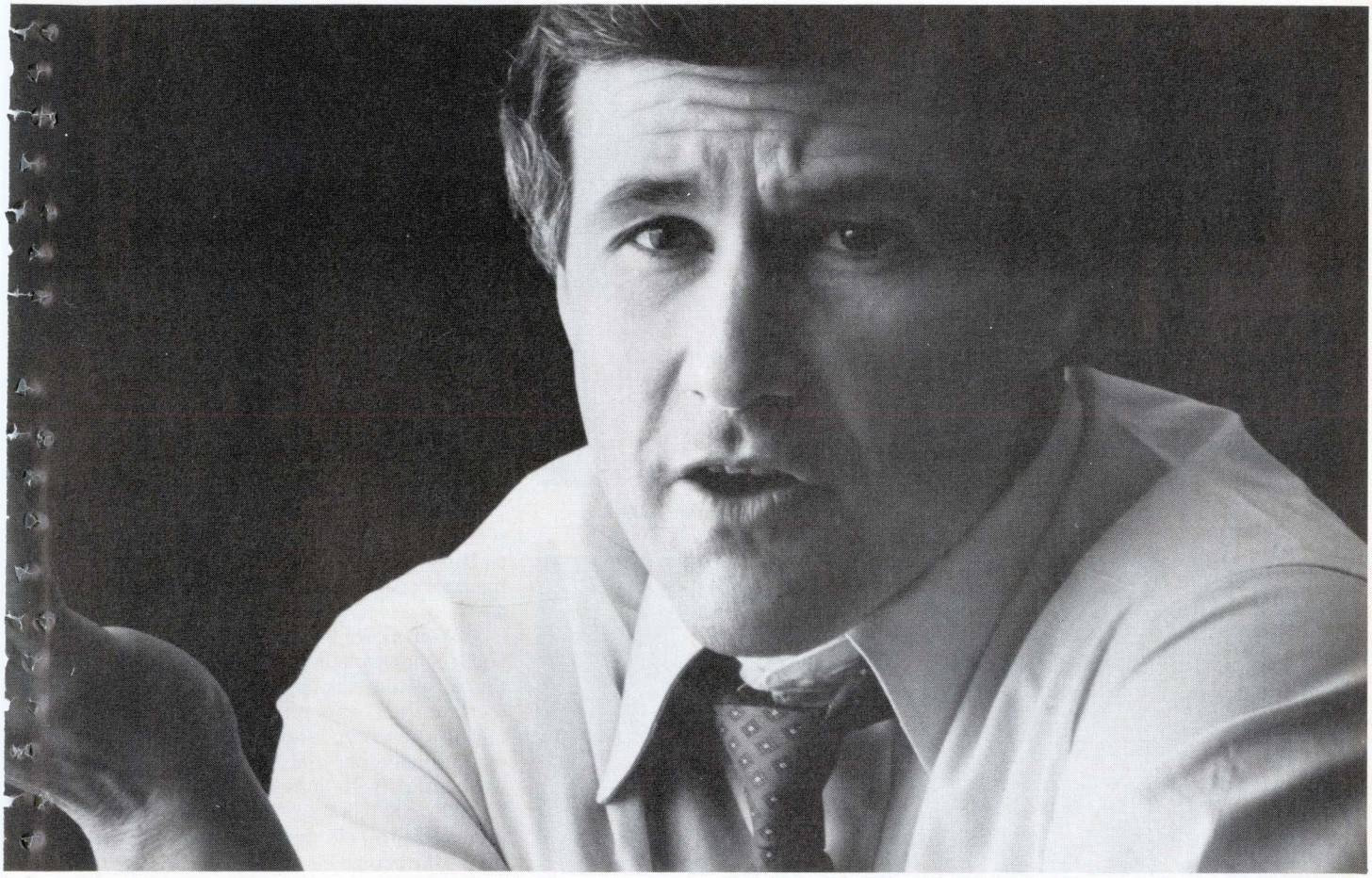

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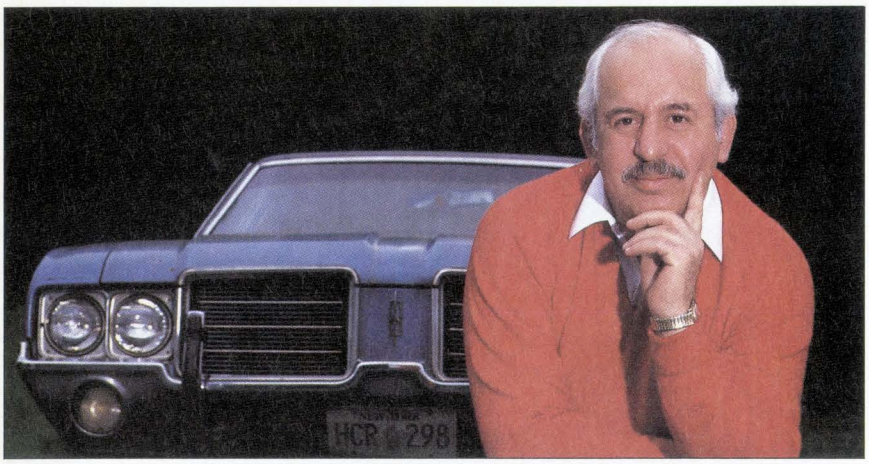
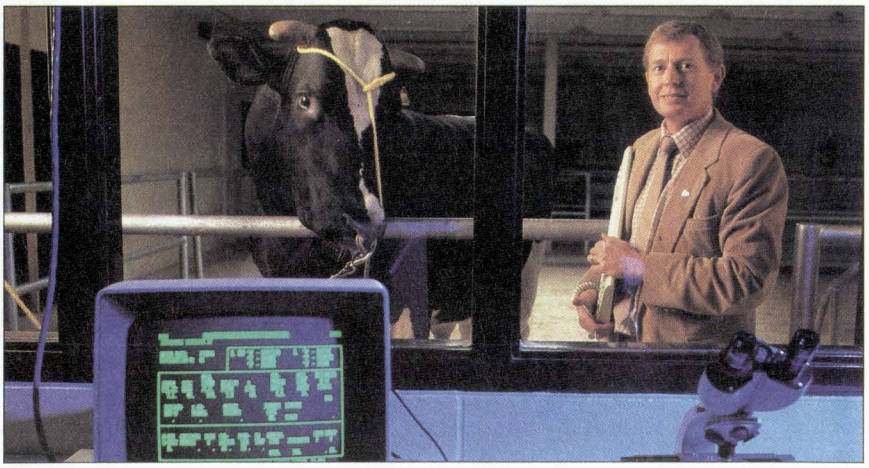
new life into old systems. It saves acquiring another larger (and probably newer) computer, and it gives users the much greater capability of the pc. Other users have tried these related but different approaches to extend the life of their systems:

- They've layered a new technology on top of existing applications and hardware. Assigning field employees a laptop computer for data collection and subsequent upload to in-place systems is an ideal example. Additional technologies here include bar code readers, handheld data entry terminals, or optical page readers.
- They've introduced what might be called "bridge" or convertor boxes as an interim means of transferring data from old to new systems, or between disparate systems such as those at their customer's or client's locations.
- They've installed convertor boxes when their company was merged with or was acquired by another company and the two data or text processing systems were incompatible.
- They've revved up existing systems by constantly tuning applications and hanging every available bell and whistle on their aging processors. Vendors regularly tweak these operating systems to squeeze out maximum performance.
- They've installed additional memory boards, but at a much cheaper cost because the boards are from independent add-on memory suppliers.
- They've held on to old systems as "hot sites" in event of a disaster, like the heavy flooding in the Chicago area this past summer.



H.J. BAKER'S LOPATA: He keeps his '71 Cutlass and his '74 Honeywell running like charms.



CUNNINGHAM OF UNITED BREEDERS: He updated his Honeywell DPS 4 to support a PC network.

Photograph by Bill Kelly (top); Peter Sibbald (bottom)

Charities, nonprofit agencies, governmental agencies, and universities traditionally make do with old systems, notes consultant Amy Wohl of Wohl Associates in Bala Cynwyd, Pa. Indeed, a quick, unscientific survey of national lists of computer users and their equipment indicates that much of the "classic" hardware is buried at government agencies and universities.

### Penny-Wise, Productivity-Foolish

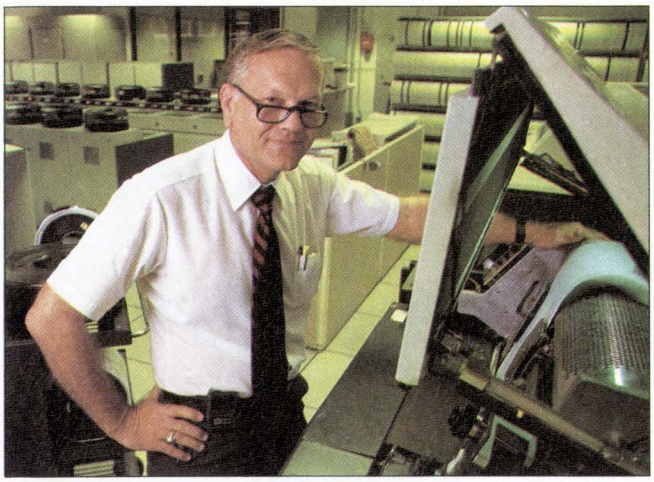
"There's a certain kind of user who thinks it's thrifty to save money by using old equipment, but they really ought to analyze the productivity versus the savings," advises Wohl, who consults to both manufacturers and users. "They're endlessly inventive." But even office systems expert Wohl admits to trying to salvage an old printer in her company, and spending an exorbitant amount for a "weird," custom-made cable.

Deciding whether or not to trade in a veteran processor is complicated by the pluses and minuses of the old technology, explains Michele Tampa-Hoag, division manager of Cablexpress, a Syracuse, N.Y., company that pulls out old systems and installs new ones. For example, while IBM's System/370 Model 168 requires about the same amount of power and floor space as the latest 3090 Model 200, the latest 3090 provides 64 internal channels versus the Model 168's 12 external channels, which require added external controllers. Duplicating the processing power of the 3090-200 would require two Model 168s—which, Tampa-Hoag points out, would take up twice the floor space, a luxury for many larger users.

Wohl's own example illustrates the need to monitor hidden costs. "Although the old system is bought and paid for, and therefore it seems much cheaper than buying a new one," she explains, "it may only produce one third to one half the work. And, with junior secretaries at $15,000 to $20,000 salaries, it's counterproductive to hold them half as productive as they could be.

"The issue is, what is the productivity of the old system versus what the new system could do," says Wohl. (Today's prime example of the more productive system is word processing done on a personal computer.) Thus, she advises, even nonprofit groups—if they're competing for personnel in the open market—need to carefully evaluate the productivity impact of the clunky old systems.

So, what's the motivation for clinging to old systems? Wohl offers some possibilities. The toughest case is that of the department head who's depreciated a system over a longer period than it's actually worth, and the organization's controller says it can't be replaced until it's paid for. Another common situation is



HARRIS COUNTY'S GREEN: He tweaks his old system to lengthen its life.

PEABODY'S MILLS: She preserves OS/6 disks for boilerplate operations.

the individual who doesn't have the authority—or the willingness to confront his boss—to acquire an upgraded system. Also, users may simply be unaware of the actual productivity of the old tools: "Find out what it really costs," warns Wohl.

Comparing price against performance is the big factor for a large percentage of users, says Stevenson, who helps users locate and finance new and used equipment. "There are a number of wonderful processing bargains," he reports, pointing specifically to the latest of IBM's previous generation, the 3084. After the announcement of the 3090 family in 1986, notes Stevenson, the 3084 held its value longer than many had predicted it would; he adds that the situation may change in 1988 as IBM improves its latest generation.

"In large accounts that want to stay current, it's politically necessary—if they want to keep the IBM salesman around—to have the newest systems," says Stevenson. He finds, however, that people he identifies as "middle market, IBM 4300 midrange users" are more budget-minded, and more likely to shop for used processors, disks, and other peripherals. They're more conscious of the need to make trade-offs between the costs and the benefits.

### Most MIPS, Least Money

"We are not state of the art—I don't believe it's good business," says one respected New Jersey IS director, who asks not to be identified. "We lease a 3081," says the director, who prides himself on meeting user requirements by providing MIPS at the lowest costs. "It's standard operating procedure to be behind one generation—you pay a premium for the new generation."

Certainly, cost was the case at H.J. Baker & Brothers, which is a 137-year-old, privately held agricultural and chemical product trading and brokerage company. But the Baker company got more than it bargained for: "It's changed how we do business," says MIS manager Lopata.

Whereas H.J. Baker envisioned installing on-line dumb Honeywell terminals in its six branch offices around the country, those offices now have IBM XT personal computers. There are also six PCs in the New York headquarters. The intelligent processor means that local offices can do processing off-line and thus have more control over their local workload.

"We had decided against upgrading because most of our software [originally written in small RPG programs for an IBM System/3] was not upgradable," explains Lopata. Nor did H.J. Baker believe it had tapped the full power of the Honeywell mini. Besides, the Level 62 (with memory built up to three quarters of a gigabyte) was paid for. "Getting new equipment for the sake of getting new equipment is not good business," asserts Lopata, echoing the opinion of many other users. "I'm keeping my company healthy with no added expenses." (Neither Lopata nor the other users interviewed have problems finding service—either from the manufacturer or from third-party providers—for their aging systems. Of course, they do pay more steeply for it.)

But H.J. Baker also wanted its branches to upload the day's transactions to the headquarters system daily—an expensive prospect if the company were to rely on the proprietary MIU-30 terminals for the Level 62. Daily transmissions of this sort would have meant that the branches would tie up phone lines for approximately six hours a day at prime-time communications rates to transmit contracts and shipping orders.

Several of the Honeywell terminals that were part of the original plan sit in Lopata's office, unopened and unused. At a Honeywell users meeting in late 1985, Lopata and Jack Williams, H.J. Baker's assistant financial vp, had learned of a board from Connect Tech of Guelph, Ont., for PCs and compatibles; it emulates the Honeywell terminal (in the same way the DCA IRMA board emulates the IBM 3270 terminal). The Connect Tech board at H.J. Baker works perfectly, but the company was forced to buy the Honeywell-specific Case-Rixon modem, at $1,195, to get the PCs communicating; cheaper, nonspecific modems just wouldn't work.

Lopata then set about programming in COBOL the 30 to 40 PC programs the branches needed to communicate with the Level 62. Now, the work is uploaded to New York at the end of the day. "Everything we did on the Honeywell is mirror-imaged on the PC, because programs can't be transferred between the two," says Lopata. "Everything is homegrown because it's unique to our business; there are no packages on the PC.

"In the last two years, we've written more COBOL code than in the previous 10 years," continues Lopata, who's unconcerned about the time his staff of seven and one consultant have devoted to the PC project. But because the system is updated daily, users get reports in a day, as opposed to in a week or a month.

H.J. Baker is just one Honeywell user who's felt abandoned as Honeywell Information Systems backed away from the computer business (although the firm has now merged with the European Honeywell-Bull and users are cautiously optimistic of better products and support). These users' needs for upgrades and support have been exaggerated by the several years of turmoil in industry. As entrenched computer companies pull

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Circle 62 on Reader Card

back or out, smaller ones proliferate new products, often in response.

"Honeywell told us it couldn't be done," says Bill Cunningham, IS director at United Breeders Inc., in Guelph, Ont., about his firm's request to connect personal computers to their Honeywell DPS 4 minicomputer. So, in 1983, United Breeders—which sells bull semen—asked several nearby engineers to develop the emulation product that grew into Connect Tech Inc.

### Big Ears, Small Voices

Small users have needs that the big manufacturers are not responsive to, explains Mike Powers, general manager of Connect Tech. "As a user of a Honeywell Level 62 or DPS, your chances of getting something out of them are zero to nil."

The emulation boards that H.J. Baker & Brothers and United Breeders use make a lot of sense: in the proprietary terminal worlds of IBM and the original Sperry, Burroughs, and Honeywell systems, there are not competitively priced alternatives as there are in the Digital Equipment Corp. world, according to Mark F. Milazzo of Computer Logics Ltd. in Toronto. "If the emulator is both cheaper and more functionally rich, for example with file transfer capability, then the decision to connect everyone to the mainframe with the pc platforms is much easier," he says. Computer Logics supplies emulators for IBM, DEC, Siemens, Honeywell, Burroughs, and Sperry systems.

"We couldn't expand our Honeywell DPS 4, so we thought, 'Let's put some of our processing on pcs,' " explains United Breeders' Cunningham. United Breeders already did a lot of scientific lab processing on personal computers. In United Breeders' "AI" business—in this case, artificial insemination from its herd of 280 bulls—it's necessary to track the semen quantities and related dilutions and breeding lines, information which is subsequently uploaded to the Honeywell system. This pc-based data collection and handling has been so successful that the firm now has 45 IBM PCs in use by its 160 employees.

Significantly, it has extended computing inside the barn door. United Breeders now equips its sales force and artificial insemination personnel with briefcase computers, Olivetti's M-10. "Rather than handwrite the data, these field people enter it directly into the laptop computer," says Cunningham.

United Breeders stumbled into a means of beefing up systems by breathing the new life into the applications software rather than the old hardware. "Instead of stretching the hardware," says Paul Berger, a Lawrenceville, N.J., IS consultant, "a growing number of users are stretching old applications by using laptop computers."

Other firms try new tricks when making more drastic conversions. In 1985, the Boston law firm of Peabody & Brown made a big jump: from five IBM standalone Office System/6s and assorted IBM magnetic card typewriters to a clustered DEC VAX system running the Mass 11 word processing software from Micro Engineering Systems, Hoffman Estates, Ill., near Chicago. But there was a catch: 2,000 OS/6 diskettes.

For the 92-member firm that specializes in boilerplate-intensive real estate syndication, those 2,000 diskettes

**OFTEN NEW SYSTEMS MEAN NEW HEADACHES.**

are critical to the business and will be for the next several years, says systems manager Susan Mills. "Because of the nature of real estate syndication, our documents are 200 pages long," she says. "Rather than convert everything at one time, we elected to do the conversion on an as-needed basis," says Mills. For that piecemeal conversion, the firm kept one OS/6, and installed a Codem 150 from Formscan Inc., Hauppauge, N.Y., which builds what it calls bridge products.

Because the Codem bridge converts the IBM 8-inch diskettes not only to the clustered VAX 750, 780, and 850 formats, but also to numerous other standalone word processors or pc word processing programs, Peabody & Brown planned to use the box to electronically transfer documents between their offices and their clients. That need, however, hasn't developed, Mills says.

Nevertheless, the Codem bridge was used heavily in the first year of the conversion, she says, and the firm keeps OS/6 (which IBM no longer services) for that occasional ancient document. "It takes up a lot of floor space and I'd like to throw it out," confides Mills, "but I can't do it just yet."

Resembling the processor unit of a personal computer, the Codem box costs from $19,000 to $25,000, depending on the number of word processing interfaces. Formscan adds customized software that mixes and matches the text exchange products it supports: 16 dedicated word processors (including Wang, IBM Displaywriter and 5520, CPT, NBI, and Lanier), 10 pc word processing packages (including Multimate, Word Perfect, and Wordstar), six electronic publishing systems (including Xerox and Interleaf), and sundry text systems such as the Atex publishing system.

### The Benefits of Bridge

"There are still a lot of standalone word processors that are very popular," explains Michelle Glover, Formscan's marketing communications manager. Its customers find that the bridge products are a time-saving connection to other systems when departments are merged or one company is acquired by another. Users find Formscan and similar companies through other users, consultants, and vendors who want to make a new sale.

The various bridge products also allow users with older technologies to take advantage of the lower-cost, next generation technologies such as laser printers. For example, the only printer available for the IBM 5520 administrative system or IBM Displaywriter costs about $19,000, says Glover. But with Formscan's LaserBridge, users can take advantage of the $3,000 to $5,000 desktop laser printers, saving money despite the $6,500 for the connector box. Even when the old word processors collapse, the user still has a viable desktop printer, she adds.

Other users resort to traditional data processing tricks to squeeze the most out of their existing mainframes.

In March, the Harris County Tax Collection office in Houston brought online a new automobile registration system that required adding 30 terminals to the 220 already running all day, says IS manager Edward M. Green. The good news was that there was still adequate capacity on the Sperry 90/80 system, the original Model 40 of which was installed in 1972. The bad news was that staffers had to carefully program the system and configure the front-end controllers to handle the additional throughput by avoiding bottlenecks.

"It's tweak, tweak, tweak," Green

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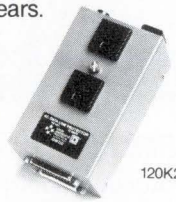
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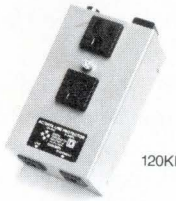
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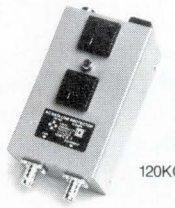
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## Old Iron/ New Tricks

says of the situation. "As time goes along, we have to look for ways to be more efficient. The Unisys [Sperry] system people make sure we get there." He adds, "So far, we have been able to maintain three- to five-second response time. We have got all the bells and whistles; the processor is beefed up as much as it can be."

Thus, the Harris County Tax Office is under the gun from the governmental budget process and purchasing procedures and from the aging technology as well. "The system is not obsolete, but we anticipate that by the early 1990s the Unisys field engineering staff with knowledge of the system won't be around to maintain it," accedes Green.

The natural progression for the 90/80 would be to the Sperry 1100 family, but Green does not relish that conversion prospect, even though the machines are supposed to be compatible. There would still be a shakedown time, he says. And acquiring a new system causes new headaches.

"With local government," says Green, "when you have to throw something open for bids, you don't know what's going to happen."

In fact, bringing in new hardware may not even solve the users' processing bottleneck, as Winston Tellis, manager of computer systems at Fairfield University in Fairfield, Conn., found out. When 3,000 students arrived on the first day of classes last year, the DEC VAX 8600 (with 12 megabytes), which was less than six months old, ran out of memory. Within eight hours, the University had an additional 16 megabytes on its doorstep from EMC Corp. in Hopkinton, Mass., which delivered faster and cheaper than Digital, Tellis says.

Other creative users have found they don't need to get rid of aged processors, reports Tampa-Hoag at the Syracuse installation firm. Older systems can be used as programming systems, not tying up the operations mainframe. Some users keep or acquire old systems for spare parts to keep other systems running. Or users maintain the old processor and computer room as a "hot site" in the event of a disaster. "Rather than taking the scrap value or obsoleting the system," Tampa-Hoag concludes, "they use the old site to their best advantage." ■

*Connie Winkler, who's been writing about information systems for 11 years, is the former executive editor of* PC Magazine *and New York bureau chief for* Computerworld.

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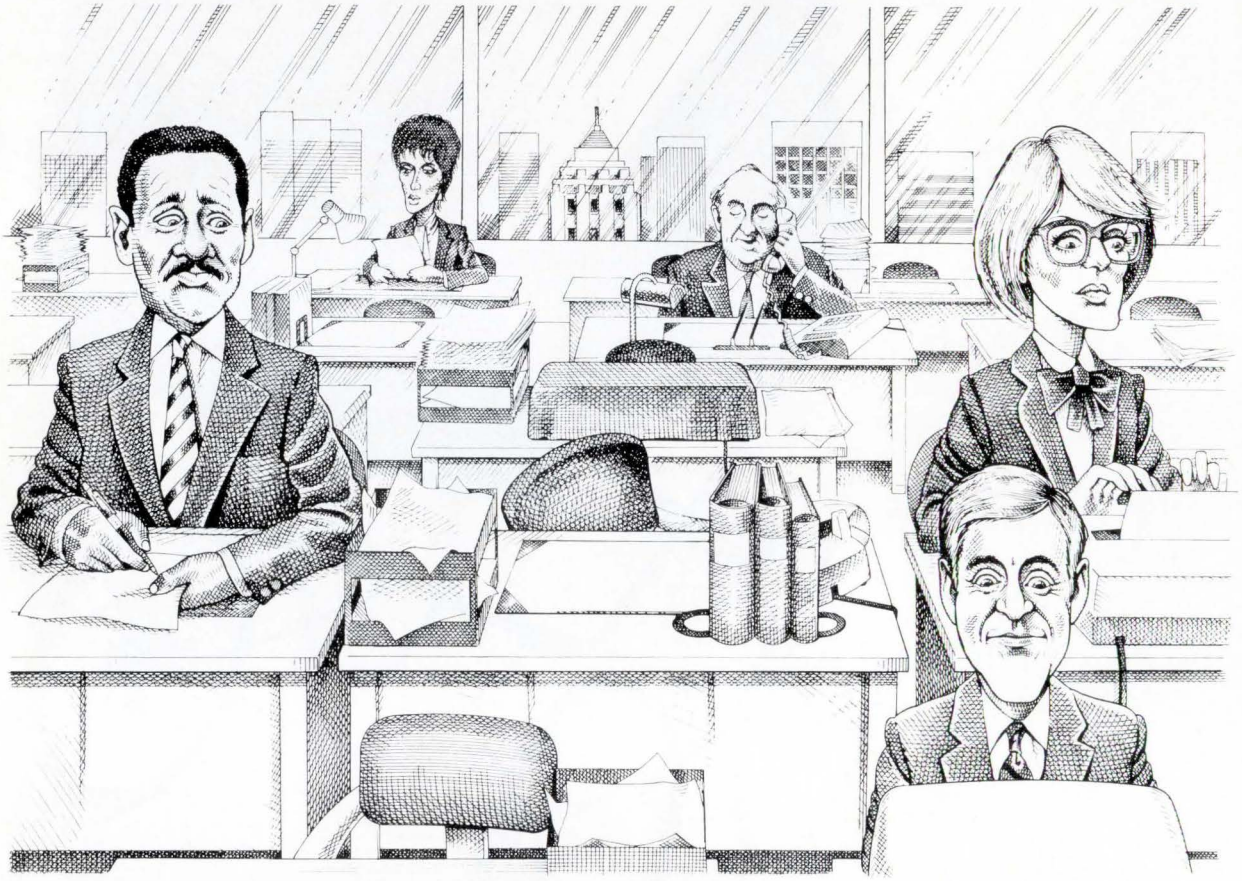

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## OFF-LINE

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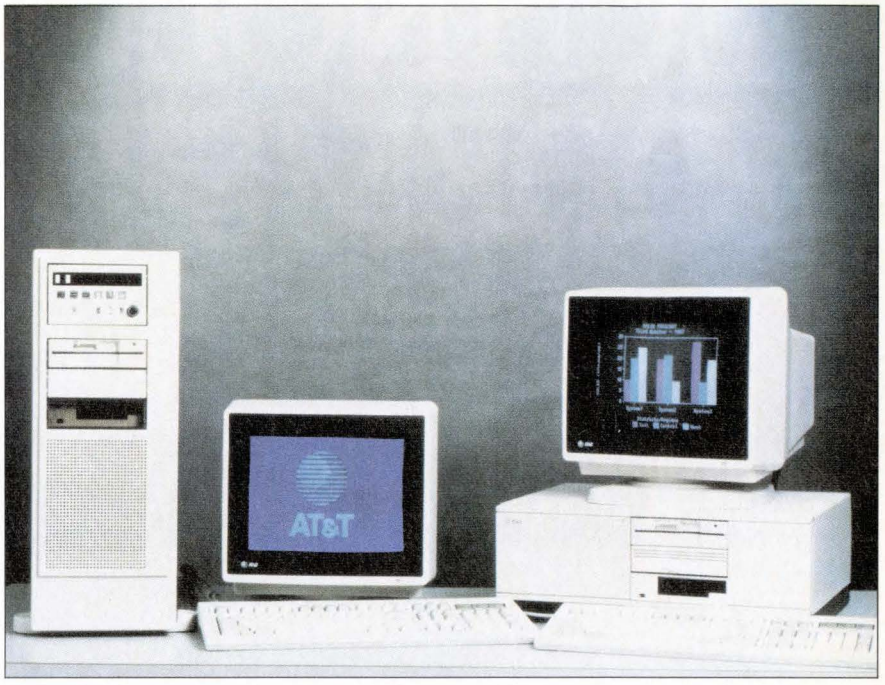
**The hardware consists of an analog receiver and a digital signal-processing section that is microprocessor controlled. An RS232C serial port and a TTL output interface the Time Source to other digital electronic devices. The VAX software at power up sets the system calendar clock according to the time zone and computer location and then monitors the clock against National Bureau of Standards time. When the computer clock drifts, as all do, Time Source will either resynchronize the clock automatically or signal an alarm for the operator to reset the clock manually. Time Source runs on any VAX using VMX.**

**PSTI is targeting Time Source for two distinct segments of the computer market. The first are those customers needing synchronous time for applications reasons, where critical time lost is financial loss. The stock exchange is an example, says Michael Faber, PSTI's president and ceo. The second group is operations. As Faber explains it, these are applications in which unsynchronized timing could result in lost data. Faber says Stanford University's Linear Accelerator Center uses Time Source in this way.**

**Time Source is priced at $1,495, including the VAX software. A hardware-only configuration is $695.**

## HARDWARE




# Modular 3B, 386-Based Pc Are Unveiled by AT&T

## Mini tailored to transaction processing applications; pc features multiple OS support.

BY THERESA BARRY

The 3B4000 is a high-end multiprocessor system that AT&T has added to its line of 3B minicomputers. The 3B4000 has a modular architecture, whereby users can add as many as 14 processors for maximum performance of 43MIPS and support of up to 300 users simultaneously. Data are transmitted at 20MBps over AT&T's proprietary Abus. The master processor features 1.6MIPS, uses AT&T's proprietary microprocessor, and supports up to 16MB of storage. The system runs Unix System V release 3.1 and a transaction processing operating system called Tuxedo, which sits on top of Unix. Networking support includes Unix-to-Unix system copy, AT&T Information Systems Network, the WIN 3B interface for TCP/IP, X.25, LU 6.2, 3270 emulator, and SNA emulator, among others. An entry-level system is priced at $187,000 and will be available in March 1988.

AT&T finally joined the ranks of the major pc suppliers with the introduction of its 6386 WorkGroup System (WGS), an Intel 80386-based pc that runs Unix applications concurrently with MS/DOS. The version of Unix that the WGS runs—386 Unix System V release 3.1—is being developed jointly by AT&T and Microsoft for use on Intel 386 machines. AT&T says the system is scheduled to be released in the third quarter of 1988. The 386 Unix System V also works with the company's Simul-Task 386, developed by Phoenix Technologies and Interactive System Corp., which allows the WGS to process multiple MS/DOS programs simultaneously under Unix. AT&T says WGS will support OS/2 when it is released next year.

WGS comes in two models: a 16MHz desktop model that accommodates up to 20 users and a 20MHz floor-standing model that supports up to 32 users. The desktop model is available in four configurations, including a single floppy unit, a 40MB hard disk unit, a 68MB hard disk unit, and a 135MB hard disk unit. Each includes 1MB of RAM expandable to 48MB.

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## Superminicomputer

### Data General introduces entry-level MV system and upgrades.

The new Data General MV/1400 DC is a 32-bit entry-level member of the MV family of superminicomputers. The system can be used as an office automation device and as a low-end file server in a DG Personal*Integration environment, or as a protocol convertor in a multivendor communications environment.

The base system, priced at $9,995, includes the cpu, 4MB of main memory, a 38MB Winchester disk, and a floppy disk drive. A high-end package has 4MB of memory and a 160MB Winchester and 21MB cartridge tape. The I/O bandwidth is 8MBps. Optional memory expansion modules of 2MB and 4MB allow for a maximum of 8MB of memory. Other options include a synchronous controller, local area network controller, and DG/Starlan controller.

DG has also enhanced the MV/2000 DC office system and DS/7500 graphic workstation by doubling the base memory on the system board to 4MB, allowing for a maximum of 12MB. The MV/2000 DC with 4MB of memory, a 38MB hard disk, and a 737KB floppy disk drive is $19,150. The price of a DS/7500 monochrome system with graphics controller begins at $15,400 without the monitor. A color graphics version is $23,000, and includes 4MB of memory, a 70MB hard disk, a 737KB floppy disk drive, and a 15-inch medium-resolution color monitor. DATA GENERAL, Westboro, Mass. CIRCLE **251**

## New Workstations

### Tandem rolls out seven MS/DOS-based systems.

Tandem's new PSX/300 series offers two models and the PSX/200 offers five models of MS/DOS workstations that can act as standalone units or can be integrated as terminals for Tandem NonStop and LXN systems.

Both the PSX/370 and PSX/340 are 80386-based machines. The 370 offers a 70MB hard disk drive and the 340 offers a 40MB drive. Both use a 16MHz processor with a 5¼-inch, 1.2MB disk drive.

The PSX/200 is a diskless station and the PSX/201 is a single-floppy model. Both are LAN workstations with 80286 processors running at 8MHz. The other three 200 series workstations are hard disk models. The 240 has a 40MB disk, the 220 has a 20MB disk, and the 220E entry-level machine has a 20MB disk. All have a 5¼-inch, 1.2MB disk drive. The 220E has an 8MHz processor and the 220 and 240 have a 12.5MHz processor.

All PSXs have eight option slots: six are 16-bit and two are 8-bit. All support 3½-inch, 1.44MB disk drives. All are upgradable. The 8MHz can be upgraded to 12.5MHz or 16MHz. All include MS/DOS 3.2, GW-BASIC 3.2, host integration software, a terminal emulation and file transfer program, and support for Tandem Multilan software. All can access MS/DOS, Guardian, Unix, or IBM system applications. Tandem says the series will support Microsoft's OS/2.

The workstations include 1MB of RAM and an enhanced AT-style keyboard with 16 function keys. Hard disk versions—except the 220E—include a serial/parallel/current-loop card and an EGA. Monitors are offered as options.

The models in the PSX/200 series range in price between $1,195 and $3,795. The PSX/300 models cost $4,895

and $5,695. All of the PSX workstations will be available in the first quarter of next year. TANDEM COMPUTERS INC., Cupertino, Calif. CIRCLE **252**

## Deskpro 386 MCAE System

### Aries Technology adds Compaq version to ConceptStation line.

The Aries CP1100 ConceptStation is Aries Technology's latest model in its line of desktop mechanical computer aided engineering tools. While the user supplies the Compaq Deskpro 386, memory, and disk options, Aries supplies the parts that make the Deskpro 386 a standalone MCAE system. Included is Aries' proprietary graphics accelerator, a high-resolution, 256-color monitor, and a three-button mouse.

The CP1100 also includes Aries applications software: a geometric modeler (solid, surface, wireframe) with assem-

bly modeling capability, a finite element modeler, a design rule processor, materials property management, and a macro language. A Xenix operating system is included. The CP1100 supports C and FORTRAN 77 compilers and Ethernet communications.

The CP1100 is available now for a base price of $21,850. ARIES TECHNOLOGY, Lowell, Mass. CIRCLE **253**

## OCR Page Reader

### CompuScan's new OCR reader can be used with PC fax board.

CompuScan's PCS Page Reader is an OCR device that reads, digitizes, and transfers pages of typewritten text into dedicated word, data, and communications processors, for IBM PCs, XTs, ATs, and compatibles. The company claims it allows operators to enter words at a speed of 600 per minute. Up to 50 pages can be stacked for automatic feeding.

The image processing features of the PCS are compatible with popular desktop publishing packages. Line art, logos, charts, signatures, and graphics can be scanned, and the reader accepts image pages ranging from five by three inches to 8½ by 11 inches. Scanning of pages is done in 30 seconds with a resolution of 100dpi to 300dpi.

CompuScan says the PCS scanner, with its CIES image editing software, can be used with the GammaFax PC-based fax board from Gammalink.

The CompuScan PCS Page Reader is $3,495. Options include graphics for image editing ($500), a general-purpose interface for OCRs with asynchronous ASCII or bisynchronous EBCDIC interfaces ($1,000), a word processor formatter ($1,500), and fax ($125). COMPUSCAN INC., Fairfield, N.J. CIRCLE **254**

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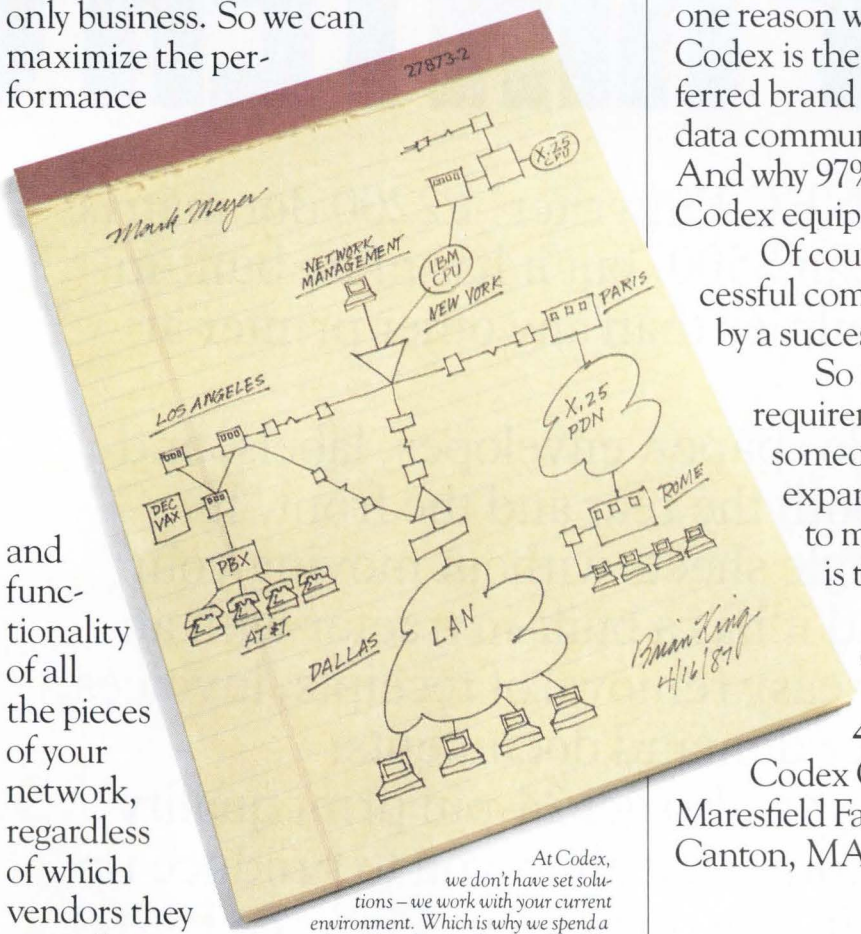


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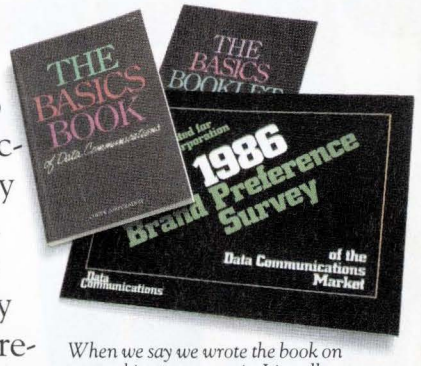


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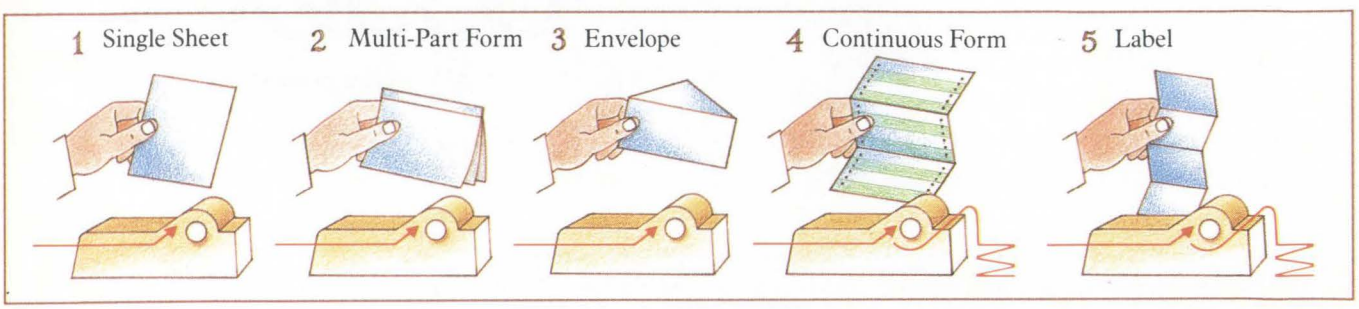

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Circle 70 on Reader Card

## Color Printer and Terminal

Digital offers nonimpact color printers and a video terminal.

Digital has made available two new color, dot matrix printers, the LJ250 serial interface printer, and LJ252 parallel interface printer. They can be used with its VAX, VAXmate, MicroVAX, MicroVAX 2000, and VAXstations, as well as IBM PCs and compatibles under MS/DOS.

Fox text-only documents, maximum print speed is 167cps, says DEC. Seven primary colors provide a 180 by 180dpi resolution, and up to 255 colors provide a 90 by 90dpi resolution. The machines' graphics employ ANSI sixels and color protocols, and print ReGIS graphics files via host-resident RETOS software, available from DEC. HP-PLC protocol is also supported. The printers are priced at $1,695.

DEC's new VT320 video terminal, a 14-inch, flat-surface monochrome video display, replaces its VT220 text unit. It includes all the features of the VT220, and some enhancements. A "paper-white" phosphor option, which is similar to a printed page in reverse, is offered in addition to a green and amber display. Font designs and the keyboard have been enhanced over the VT220. The twenty-fifth display line of the terminal informs users of terminal or processor status. It's priced at $545. DIGITAL EQUIPMENT CORP., Maynard, Mass. CIRCLE **255**

## LAN Gateway

Bridge Communications enhances CS/1-SNA gateway.

Bridge's enhanced CS/1-SNA gateway is called the Server/1-SNA. It's the first Bridge product to incorporate the 32-bit MC68020 microprocessor, which doubles the capacity to allow networked devices to share up to 48 host sessions. It's a LAN gateway that lets micros, 3270-type displays, and ASCII terminals and printers operate in an IBM 3270 SNA environment via Ethernet, token ring, or broadband LANs. TCP/IP and XNS protocols are supported.

Bridge says the gateway is compatible with IBM's 3274 Model 51C remote-SNA control unit. ASCII terminals emulate IBM 3278 and 3279 Model 2 and 5 display stations, and printers emulate IBM 3287 printers in either SCS or DSC models (LU 1 or 3). A variety of micro configurations are supported. IBM and compatibles attached directly to the LAN via Bridge's PCS/1 intelligent card and PC 3270 software, or via an EtherLink card with EtherTerm 3270 software, can emulate a 3278/79 terminal and transfer files using IBM 3270 PC file-transfer software. Where PCs are connected to the network via Bridge terminal servers using RS232C connections and ASCII terminal emulation software, the gateway performs the ASCII-to-SNA protocol translation that allows PCs to emulate IBM 3278 terminals. The gateway can also connect directly to the front-end host processor or use telecom lines in switched and nonswitched environments.

The Server/1-SNA costs $10,500, plus a $1,000 software fee. A $5,000 hardware/software upgrade kit is available to users with the original version. BRIDGE COMMUNICATIONS INC., Mountain View, Calif. CIRCLE **256**

## PC to Systems 34/36/38

Ideassociates connects remote PCs to minicomputers.

Two new 5250 products from Ideassociates connect remote PCs to IBM System 34/36/38 minicomputers.

The Ideacomm 5250/Remote Gateway is for remote offices with IBM Token Ring or other NetBIOS-compatible LANs. An Ideacomm 5250/Remote board and 5250/Remote Gateway software are installed in each server PC, which connects to the S/3X via a synchronous modem. User PCs need to load only the gateway software. The 5250/Remote Gateway can support nine sessions per gateway server. It allows as many as four gateway servers per LAN, providing a maximum of 36 sessions. A user PC can access up to nine sessions. The price, which includes the board and software, is $1,775. The software alone is $995.

Ideacomm 5250/Remote Share lets four remote PCs access S/3X computers via one emulation board installed in the server PC and software installed in the user PCs. User PCs are connected to the server locally via RS232C cable or remotely through an asynchronous modem. Nine host sessions are possible for the group, and a user can access all nine. A complete package, which includes a remote emulation card, Remote Share software, two serial ports on an Ideamini card, and cables, costs $1,395. The software alone is $495. A remote dial-up package, with software and two Ideacomm 2400 modems, is $1,495. IDEASSOCIATES INC., Billerica, Mass. CIRCLE **257**

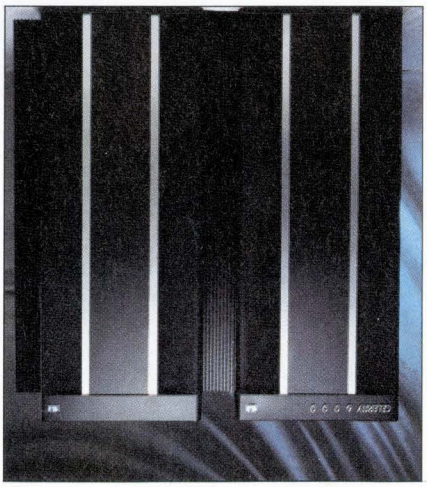
## Supercomputer

Celerity unveils 64-bit, vector/scalar departmental supercomputer.

The Celerity 6000 is the newest in Celerity's line of Unix-based systems for engineering and scientific applications.

The Risc architecture-based Celerity 6000, when fully configured, yields an integer instruction rate of 160MIPS or 60 million Whetstones, says Celerity. Fully configured with vector capabilities, peak vector instruction rate is 160MFLOPS.

Celerity says the 6000's vector coprocessor is modeled after the Cray X-MP architecture, including stride and scatter/gather addressing. The 6000's FORTRAN preprocessor takes standard FORTRAN code and generates code containing directives for the Celerity vector coprocessor. The resulting code is compiled to produce object code that uses the Celerity vector coprocessor. Configurable with up to four processors, the



6000 can accommodate up to 512 interactive users. Celerity claims a cycle time of 25nsecs. The 6000's I/O subsystem allows up to 11 parallel I/O channels.

All Celerity systems are object code-compatible. Both the 6000 and Celerity's C1200 superminicomputer series use the 4.3BSD operating system with System V Interface Definition.

The price depends on the configuration; typical systems range between $250,000 for a system with one scalar processor, 32MB of two-way interleaved memory, 690MB of disk, a tape drive, and Unix OS, and $632,000 for a system with two vector/scalar pairs, 128MB of eight-way interleaved memory, 690MB of disk, and Unix. The systems are available this month. CELERITY, San Diego. CIRCLE **258**

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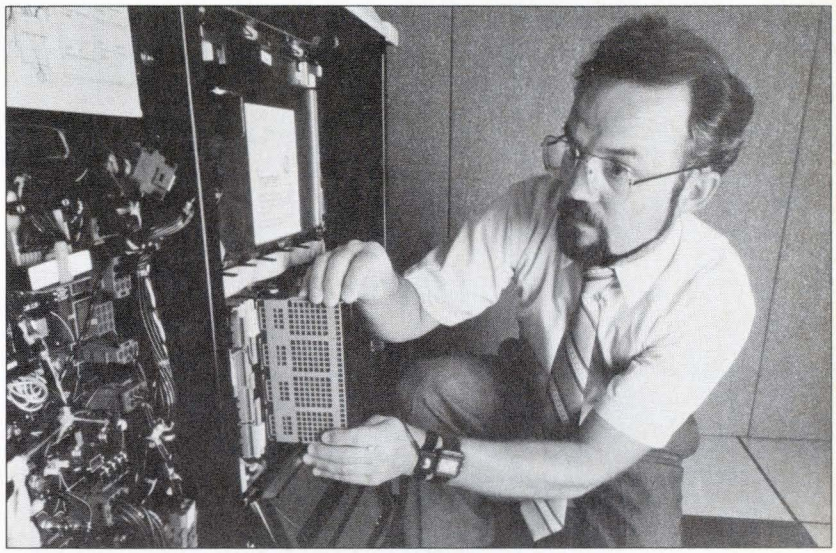

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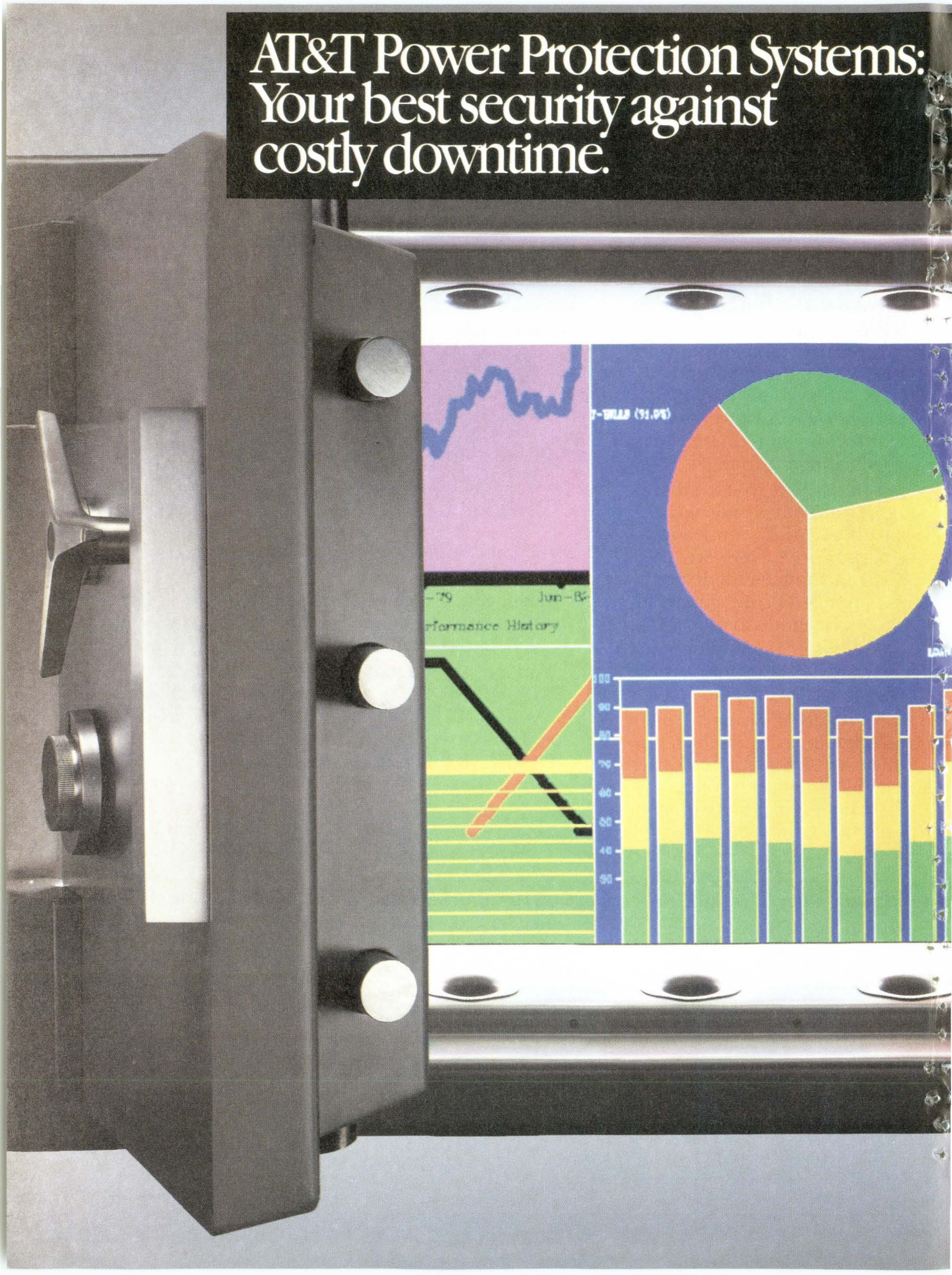
Circle 71 on Reader Card

# AT&T Power Protection Systems: Your best security against costly downtime.



# 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.

According to AT&T Bell Laboratories and IBM research, a typical computer site experiences as many as 135 commercial power disturbances a year, accounting for up to 50% of all computer downtime.

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## Easy does it.

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

Furthermore, AT&T backs you with an unequalled nationwide service network and a 24-hour toll-free number for technical service support.

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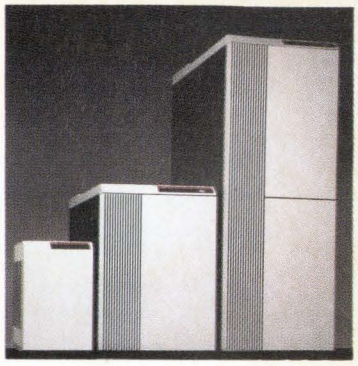

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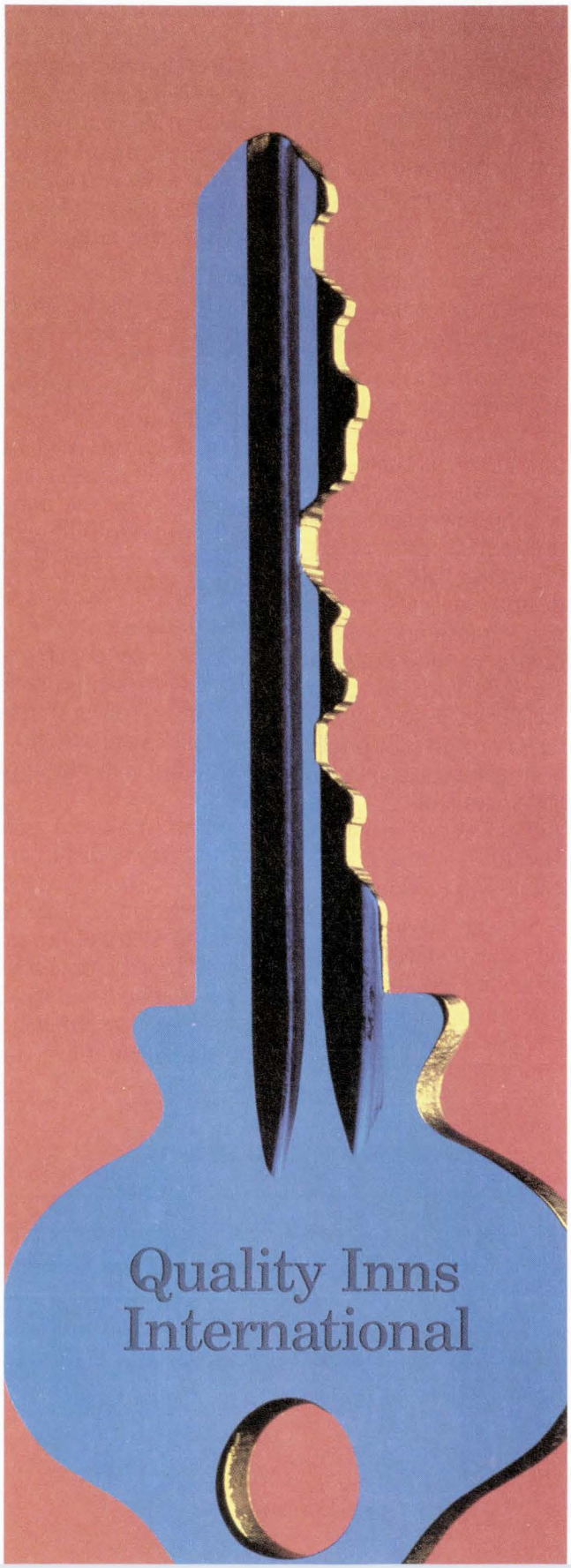


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Circle 73 on Reader Card

## UPDATES

**DESKTOP PUBLISHING SOFTWARE packages are going through the inevitable period of shakeout that accompanies an emerging market. Among the dozens of products on the market, the clear winners in both the IBM and Mac worlds are Aldus's Pagemaker and Xerox's Ventura Publisher. According to *The Seybold Report on Desktop Publishing*, these two will account for 80% of the expected 250,000 software packages for desktop publishing sold this year.**

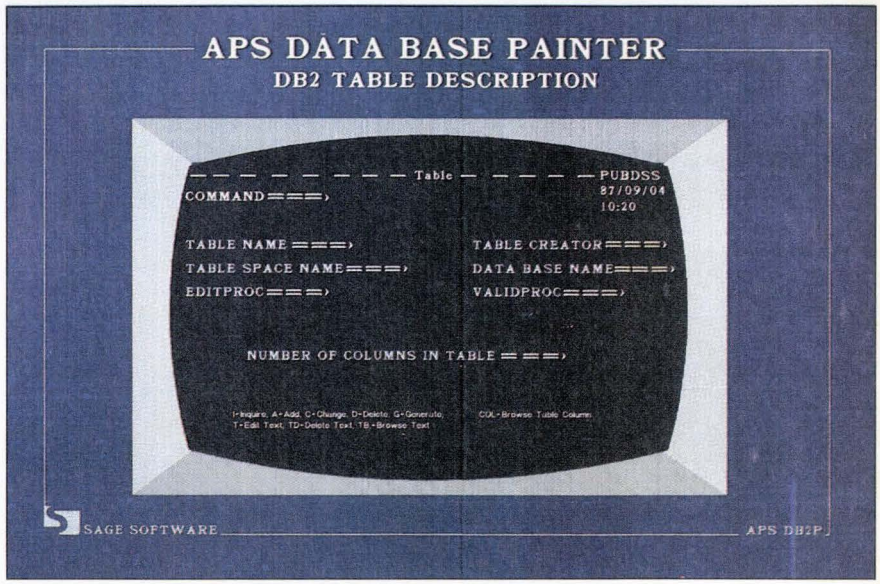
**Another phenomenon is the merging of the high and low ends of electronic publishing software: desktop capabilities are moving up, and the capabilities of the sophisticated, workstation-based systems are moving down, toward those of the desktop. The result is some higher-priced but more sophisticated pc packages. Late this past summer, for example, Bestinfo, of Media, Pa., introduced a high-end version of its Superpage pc-based package called the Document Management System, a more sophisticated, more expensive pc product (see Software, Oct. 15, p. 123). Now, Interleaf Inc., Cambridge, Mass., which has been a major vendor in the workstation-based arena, has brought its Interleaf Publisher package to the Apple Macintosh II.**

**Until Interleaf's latest announcement, Interleaf Publisher was available only on Digital Equipment Corp., Apollo, and Sun workstations and on IBM PC RTs. Interleaf claims that all of the functionality and performance of the high-end product has been transferred to Interleaf Publisher on the Mac II. The package is geared toward the creation of very long, complex documents, says the company. Documents running thousands of pages can be created. Text and graphics layout is done automatically, and the two capabilities are integrated.**

**Interleaf Publisher on the Mac II can be networked with the workstations mentioned above, so that writers, artists, engineers, scientists, financial executives, or anyone else on the network can share documents. When one copy is changed, all linked copies are automatically updated.**

**Interleaf Publisher requires a Macintosh II with 5MB of RAM and a 40MB hard disk. The price is $2,495. A system including hardware, software, and support costs $10,900. Apple will also act as a var for the product.**

## SOFTWARE




**Sage Software's APS/DB2 Data Base Painter for IBM and compatibles.**

# Sage Rolls Out Tool To Define DB2 Structures

## Sage adds a Data Base Painter to its APS Development Center.

BY THERESA BARRY

Sage Software has added the APS/DB2 Data Base Painter to its APS Development Center family of application generators for IBM and compatible mainframes and pcs. Sage says the new product provides users with a fill-in-the-blank means of creating and maintaining database file structures based on IBM's DB2.

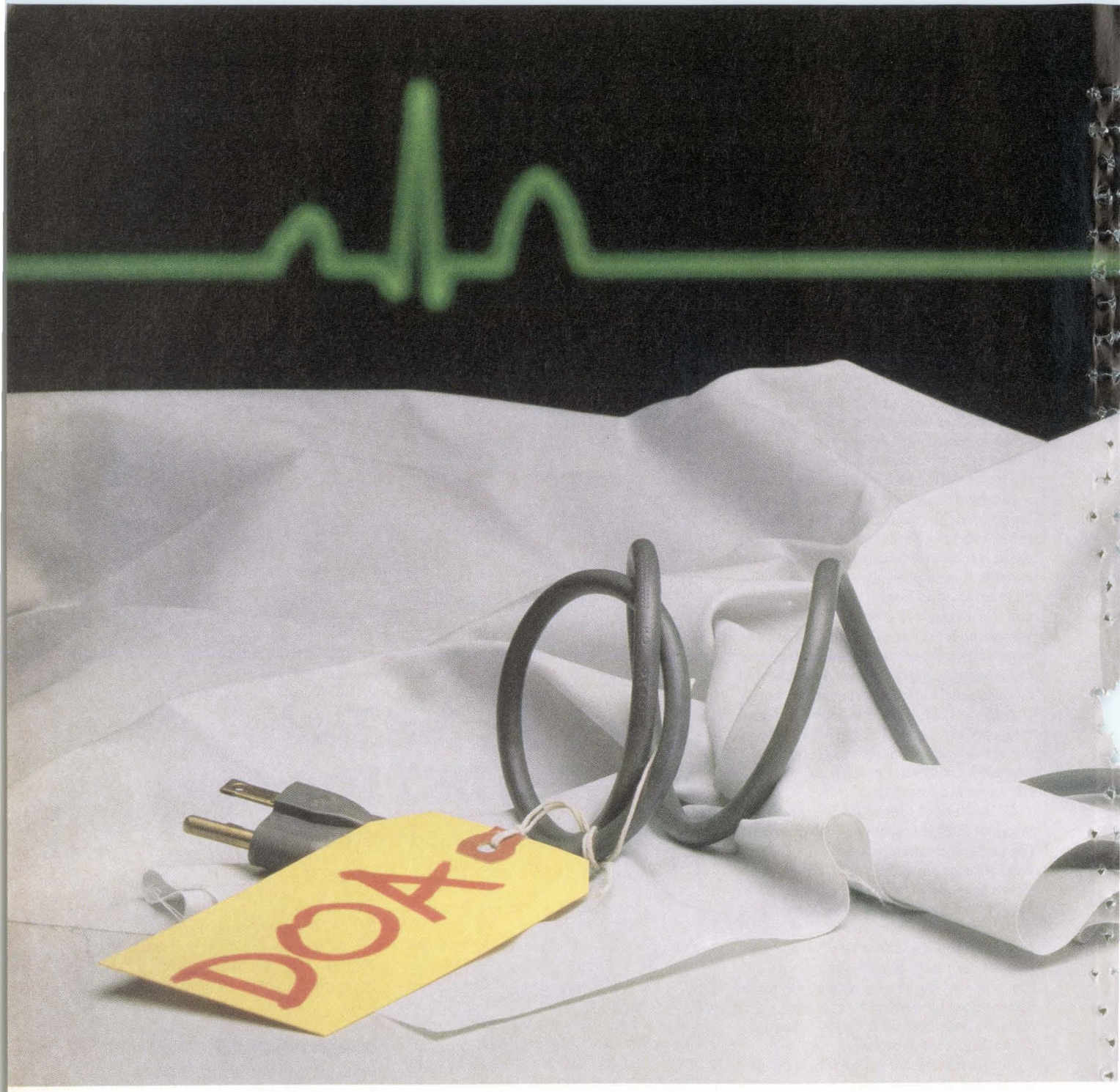
The Data Base Painter is a nonprocedural data administration tool used to define DB2 database structures outside the DB2 environment without using DB2 syntax. "Staging areas" are used to protect DB2 data integrity. In the areas, Sage says, administrators can define and document DB2 database structures, assess interrelationships, and analyze the impact of design changes before updating the DB2 catalogue.

APS/DB2 Data Base Painter can be used as a standalone product or in conjunction with other APS Development Center products, which are divided into five product groups that cover the application development life cycle, including design, prototype construction and execution, code generation, and maintenance. The Painter requires MVS or MVS/XA, IBM's ISPF 2.2 or above, and DB2 1.2 or above. It's available now for $20,000 per copy. SAGE SOFTWARE INC., Rockville, Md. CIRCLE **258**

### Relational DBMS

Data Access announces new release of DataFlex.

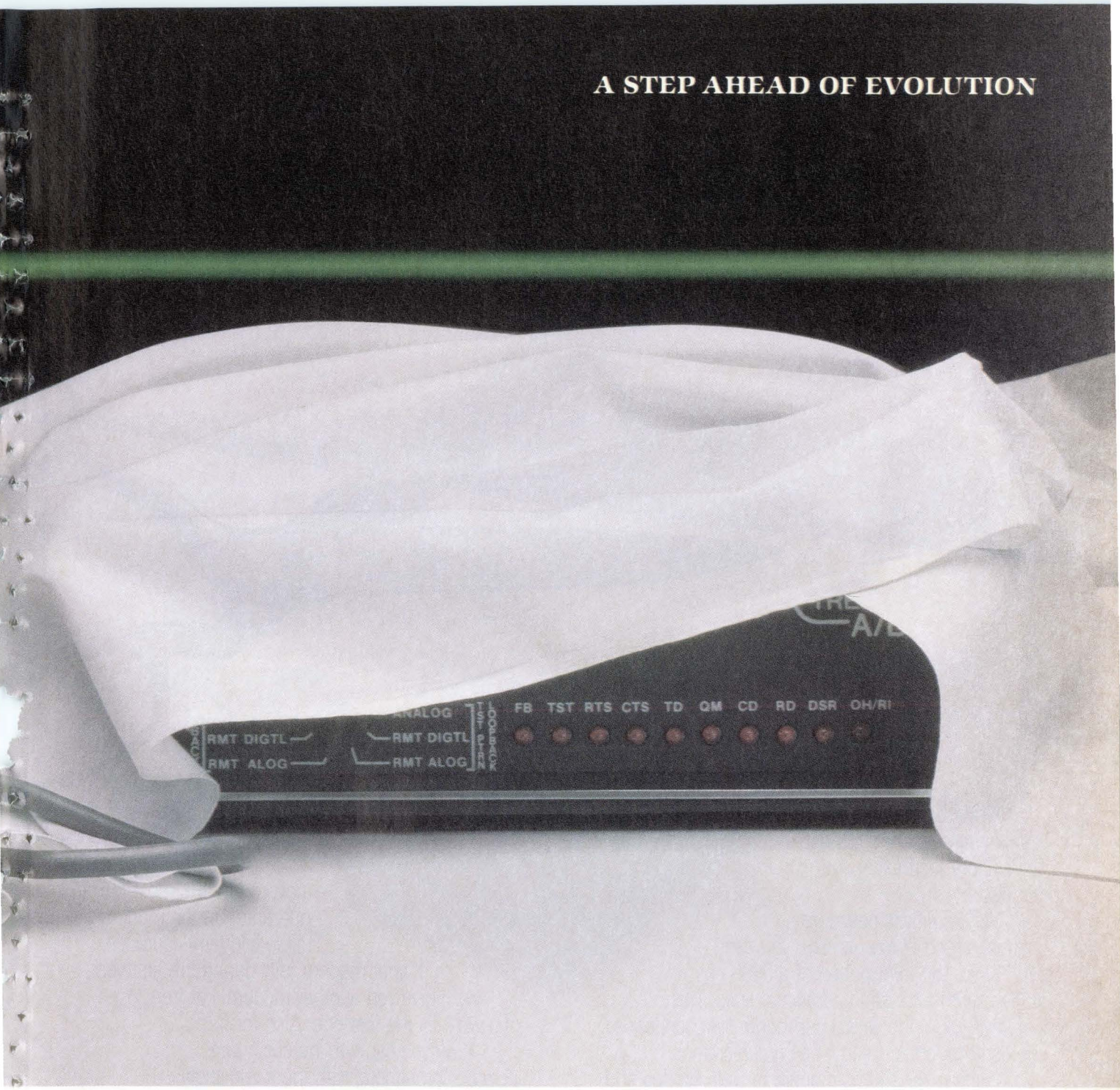
Release 2.3 of DataFlex, Data Access's relational DBMS, is written entirely in C. Its new features include support of floating point arithmetic and binary coded decimal (BCD). These allow programmers to access high-order math functions such as SIN, COSIN, and TAN. DataFlex will detect and utilize 80287 and 8287 math coprocessors that may be present in a system. The precision of BCD numbers, which were supported by the last release, has been increased from 14 places left and four right of the decimal point to 14 left and eight right. The program execution of this latest version has been increased 25%, says DataFlex, so that programs compile 30% faster.




# A Datacomm Problem Today; A Datacomm Disaster Tomorrow

Created by Dayner/Hall, Inc., Winter Park, Florida

# A STEP AHEAD OF EVOLUTION

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Graphics capabilities have been added. Thirteen new commands in the command language are geared toward the creation of routines for producing charts and graphs. MDA-, CGA-, EGA-, and Hercules-compatible displays are supported.

DataFlex prices range from $695 for a single-user IBM PC to $9,000 for unlimited users on a VAX/VMS system. DATA ACCESS, Miami. CIRCLE **259**

## Project Management

CA adds IBM PC-based package for professional managers.

Computer Associates International Inc. has added SuperProject Expert to its line of project-management software packages for IBM micros and compatibles. SuperProject is designed for professional project managers and offers features for planning, tracking, and coordinating complex projects that require extensive reporting. Computer Associates will continue to make and enhance SuperProject Plus, which is designed for users not requiring the advanced features of SuperProject Expert.

The software supports the IBM PS/2 and IBM PCs or full compatibles. Both 3½-inch and 5¼-inch diskette formats are available. SuperProject Expert needs at least 320KB of RAM with two double-sided diskette (360KB) drives or one 3½-inch diskette drive, while a hard disk is recommended for extensive use. Also required are DOS 2.0 or higher; an 80-column monitor, either color or monochrome; and a printer able to print at least 80 characters per line. The retail price for SuperProject Expert is $695; special pricing is available to users buying SuperProject Expert LanPaks. COMPUTER ASSOCIATES, San Jose. CIRCLE **260**

## Communications Package

Program-to-program link for PCs in SNA/SDLC network.

Network Software Associates Inc. has introduced a new program-to-program communications software product for IBM PS/2s, IBM PCs, and compatibles operating in a Systems Network Architecture/Synchronous Data Link Control (SNA/SDLC) network. The new product is the AdaptSNA LU 0 and offers an applications-independent implementation of IBM's Logical Unity Type 0 (LU 0) protocol for PC/DOS applications. With the software, users can implement PC/DOS applications that communicate as LU 0 devices with minimum lead time.

AdaptSNA LU 0 includes two complete sets of verbs used by the PC/DOS application: Basic Verbs and High-Level Verbs. AdaptSNA LU 0 runs on all IBM PS/2 systems, the IBM PC family, and compatibles equipped with 256KB of memory and an SDLC adapter card and that run under PC/DOS 2.0 or later versions. The software system is priced at $50,000. NETWORK SOFTWARE ASSOCIATES, Laguna Hills, Calif. CIRCLE **261**

## Performance Measurement

Forthright releases graphics tool for IBM MVS and MVS/XA.

Forthright Systems has released Forthright Real-time Environmental Display, or FRED, a real-time, high-resolution graphics-oriented performance measurement tool for IBM MVS/370 and MVS/XA performance managers, analysts, and capacity planners.

FRED is a PC- or compatible-based package that provides real-time graphics displays from IBM's RMF Monitor II online displays. It was developed using VantagePoint, another software system from Forthright, which provides one-touch access to corporate information residing in multiple databases or on multiple mainframes.

The multipage tabular RMF Monitor II displays are captured by FRED and transformed into graphics. More than 45 predefined dynamic color displays of MVS events and status indicators allow the performance manager to monitor the use of critical resources at a glance, with no need to plow through pages and columns of numeric data. FRED's remote capabilities give centrally located performance managers and measurement groups the ability to monitor the performance and service levels of their processor complexes running MVS anywhere in the world in real time.

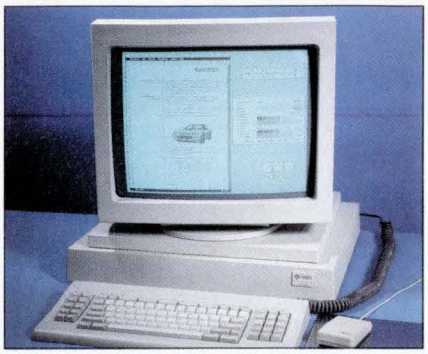
License agreements for FRED begin at $5,000 in single-user quantity. Forthright offers a 15-day evaluation program for FRED at no charge. FORTHRIGHT SYSTEMS INC., Sunnyvale, Calif. CIRCLE **262**

## WYSIWYG Word Processor

Frame has "what you see is what you get" on a Sun workstation.

Frame Technology has rolled out a WYSIWYG word processor for Sun workstations under the SunView windows environment. Frame says the new product, Frame Writer, allows users to run other applications concurrently, to perform simultaneous editing on multiple documents, share files on the Sun Ethernet network, and drive Postscript laser printers or typesetting devices and Imagen laser printers.

Frame Writer is compatible with Frame Maker, Frame's electronic publishing package for Sun workstations, and allows viewing and editing of text in



Frame Maker documents. Frame says text created by engineers or other professionals with Frame Writer can be edited and formatted into documents using Frame Maker. Frame also says the product can be used more broadly for creating, editing, managing, and publishing memos, proposals, and other reports.

Frame Maker runs on the Sun-2 and Sun-3 workstations in SunView windows under Sun Unix. The price is $2,500 for an individual license. FRAME TECHNOLOGY CORP., San Jose. CIRCLE **263**

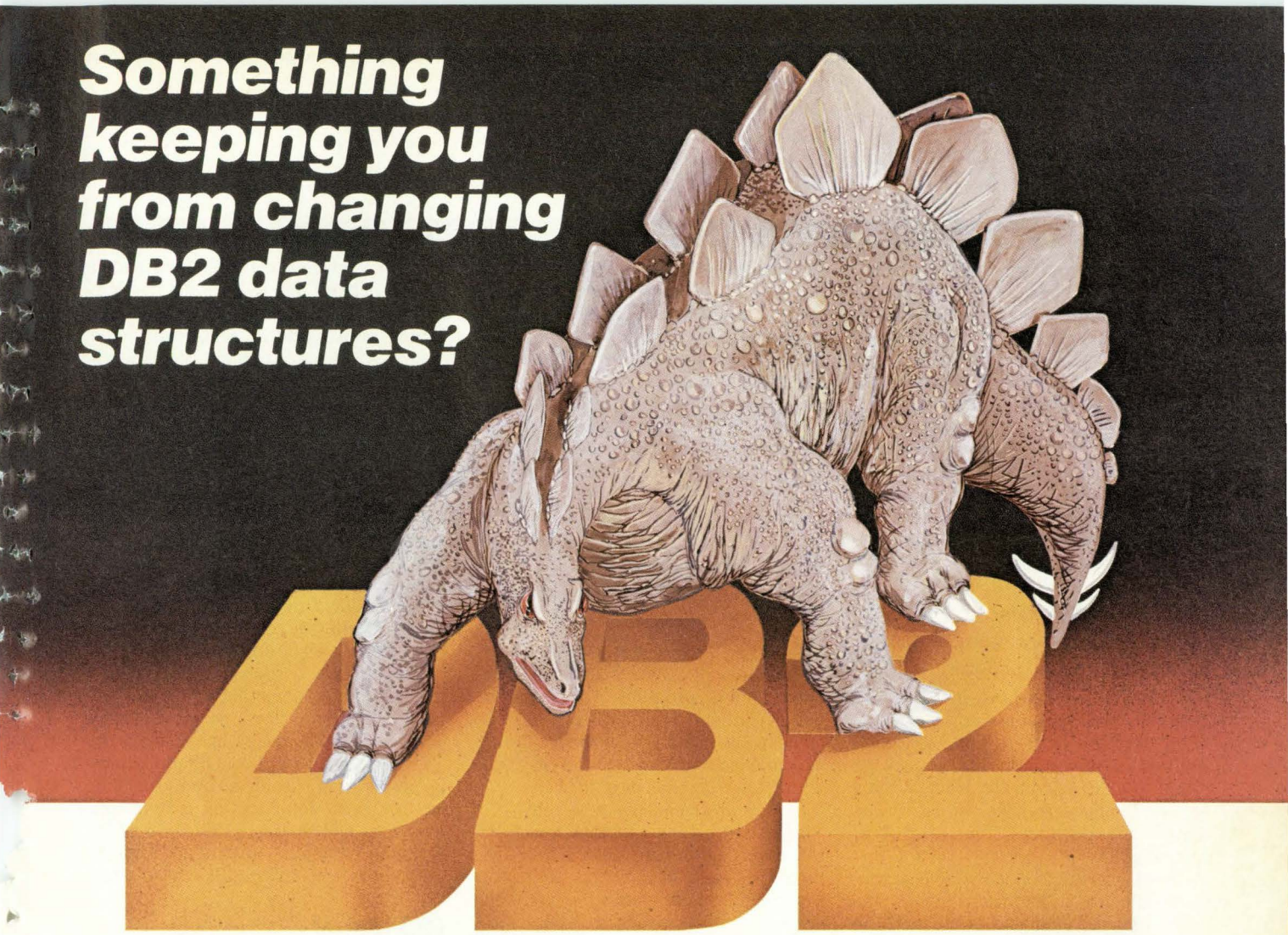
## CICS Migration System

Unisoft bridges IBM mainframes and Unix departmental systems.

Unisoft, in conjunction with U.K.-based Root Business Systems, which owns 60% of Unisoft, recently introduced UniTECS, a software program for use on the Sequent Balance Series of multiprocessing parallel minicomputers, the IBM RT, HP precision architecture systems, and the NCR Tower 600. In addition to acting as a CICS migration system that bridges IBM mainframes and Unix environments, the system is claimed to be able to act as a CICS-COBOL development tool and also a transaction processing environment.

As a migration tool, UniTECS allows IBM CICS-COBOL users to run their applications on Unix hardware. In the development environment, UniTECS allows users to develop mainframe applications

# Something keeping you from changing DB2 data structures?




Changeasaurus–(CHANGE-a-SAU-rus)

It's not that you can't make a change; it's what happens when you do make a change. Changeasaurus, that jealous guardian of the DB2 catalog, is dangerous when provoked. Because of the demands of Changeasaurus, DBAs have spent upwards of 50% of their time battling complex change procedures.

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on a Unix-based departmental machine. UniTECS allows programmers better access to mainframe resources as well as Unix features such as shell script and the facilities for cataloguing, retrieving, and editing program elements. In transaction processing, UniTECS allows programmers to build applications without recourse to a specialized systems group.

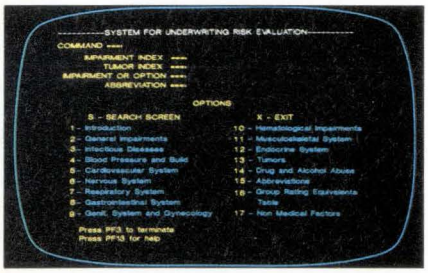
UniTECS is priced between $8,000 and $64,000 for a development license, depending on hardware configuration. UNISOFT, Emeryville, Calif., ROOT BUSINESS SYSTEMS, London. CIRCLE **264**

## Insurance Program

Infodata joins insurance company to market medical program.

Infodata, which markets the Inquire/Text text management software program for IBM and compatible mainframes, is now marketing a package called SURE (System for Underwriting Risk Evaluation) from Northwestern National Life Insurance Co. (NWNL) of Minneapolis.

SURE was developed by medical professionals and underwriters from NWNL using Inquire/Text and is currently in use at NWNL. SURE contains rating and background information on diseases and




conditions that underwriters use to evaluate applications. Included are a medical database, updated quarterly; ratings for each risk factor; menu-style computer screens; direct commands; the capability to calculate blood pressure and build ratings on-line; an index that retrieves the risk factor selected; and the complete Inquire/Text Advanced Software System. SURE sells for $225,000. INFODATA SYSTEMS INC., Falls Church, Va. CIRCLE **265**

## MVS VTAM Tool

Candle Corp. rolls out conferencing tool for real time.

CL/Conference 1000 from Candle Corp. allows on-line VMS VTAM applications to be viewed simultaneously on separate terminals in real time, says the company.

With CL/Conference, a conference is established between users via their terminals, says Candle. The conference can only be authorized by the originating user, who maintains control of both the application and the conference. All input and output, though, is displayed simultaneously on all terminals while the application is discussed over the telephone.

Pricing is available from the firm. CANDLE CORP., Los Angeles. CIRCLE **266**

## COBOL Maintenance

Viasoft integrates Via/Insight into IBM's ISPF Editor.

Viasoft Inc. has introduced release 3.0 of its Via/Insight COBOL maintenance and enhancement program. This latest release is integrated into IBM's ISPF Editor, allowing programmers to obtain the analysis information they need in real time, without leaving the editor.

Viasoft claims the new release of Via/Insight allows programmers to interactively estimate, research, implement, and verify the accuracy of their COBOL modifications within the same edit session.

Release 3.0 executes on any IBM mainframe or compatible running ISPF/PDF 2.0 and above under MVS and MVS/XA. Viasoft says that release 3.0 requires no changes to ISPF or the operating system when installed.

Viasoft is following IBM's pricing strategy for the product: price is based on cpu size and configuration and ranges between $45,000 and $69,000. VIASOFT INC., Phoenix. CIRCLE **268**

## SQL for System 38

Advanced Systems Concepts unveils data retrieval program.

Sequel, from ASC, makes Structured Query Language (SQL) available to IBM System/38 users. ASC says that Sequel users use standard SQL syntax, as defined by ANSI, to indicate what data they wish to see and where the data can be found.

Designed to reduce S/38 programming backlogs, Sequel replaces some report and inquiry functions that previously required custom-designed software. ASC says Sequel creates no permanent access paths and needs no predefined dictionary. Execution and optimization of the SQL views are largely done by the operating system, which contains significant relational features.

Data retrieval capabilities provided by Sequel are immediate file joining, grouping, calculation, ordering, and selection, which are available through the standard SQL syntax. Field mapping allows fields in underlying files to be redefined or restructured prior to presentation to the user. Expressions can involve 30 different functions and allow floating point and fixed point math.

Sequel uses an entirely nonprocedural approach, says ASC. All functions are available through the operating system command-level interface. Sequel can be executed directly from any command entry display, from within CL programs, or via calls to the QCAEXEC program supplied by IBM. Data can be output to the display station, a report, or a database file. Sequel is compatible with 132-column, 27-line displays, such as IBM's 3180, and 80-column, 24-line displays.

Sequel costs $1,500. Other modules in this series are promised by ASC, including a report definition, host language coupling, and an interactive view description module. ADVANCED SYSTEM CONCEPTS, Schaumburg, Ill. CIRCLE **267**

## CICS Control

On-line provides centralized control of multiple CICS regions.

CICS Central from On-line Software enables CICS managers to control and monitor up to 35 local and up to 35 remote CICS regions via one console. With CICS Central, users can view CICS and/or VTAM messages with facilities for color coding, filtering, and emphasis of certain messages.

Additionally, CICS Central allows for the creation of command lists for issuing CEMT and/or VTAM commands from a central location, either manually or automatically; the setup of an operations help desk for spotting CICS bottlenecks; the receipt of all VTAM primary program operator messages for the system or only of the VTAM secondary program operator messages; the definition of operator profiles on-line to customize the console display screens; and the creation of customized batch reports.

CICS Central runs under all CICS releases in MVS/SP, MVS/XA, and VSE, and uses standard CICS services. line. It supports all 3270-type screen sizes and colors for models 2, 3, 4, and 5. The price is $500 per month for DOS and $750 per month for MVS. ON-LINE SOFTWARE INTERNATIONAL, Fort Lee, N.J. CIRCLE **269**

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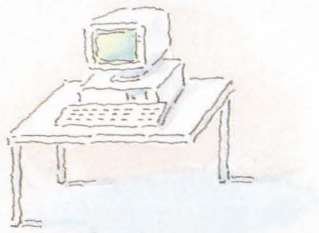

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PEOPLE

# Looking Beyond The Ways Things Are Done

## Charles Bachman is working on what may be his third major software accomplishment: automating applications development.

BY GARY McWILLIAMS

Charles W. Bachman is nearing the end of a long journey. As the father of the Codasyl database and of Open Systems Interconnection (OSI) networking, he's traveled the road to great discoveries before. Yet, this trip is different.

Bachman's past trailblazing was always performed under the protective wing of a large corporation. For instance, he began his work on database technology at General Electric Co. His networking designs, which provided the basis for OSI protocols, grew out of a long stint with Honeywell Information Systems.

This time, he's very much on his own—and with a very ambitious goal. He is developing a system that, using existing database technologies, generates applications from a description of relevant business activities. Bachman and others say it is a continuation of his earlier database and networking efforts.

**BACHMAN: "I wanted this work to go forward, and Cullinet wasn't ready."**

"It is the next unsolved problem," explains the 63-year-old inventor, who cultivates orchids in his leisure time. "Everyone has to build applications that use database and communications. We set out to solve the most pressing problem that sits in front of people. If we do it, well, then we've got a different set of problems."

Although he's spent some four years working full time on the software, the time devoted to the project is only part of the story. Though he had for years considered starting his own company, the pressures of a growing family kept him from venturing out on his own. In the meantime, accolades for his innovations kept pouring in.

"He always struck me as someone looking beyond the way things are currently done," says William E. Linn, a former vp at Cullinet Software Inc., Westwood, Mass. "He's a very far-thinking kind of person."

In 1973, Bachman's development of the world's first commercial database—Integrated Data Store—won him the Association of Computing Machinery's Alan M. Turing Award. It also led the British Computer Society to name him a Distinguished Fellow in 1978. As a result of Bachman's work on Honeywell's Distributed System Architecture network, he later chaired the International Standards Organization's OSI committee.

It wasn't until trouble erupted over the research which Bachman felt was necessary to develop his applications theories, however, that he seriously considered founding his own company. The decision followed a move from Honeywell to Cullinet.

The stay turned out to be a short one. Bachman, who was the database vendor's vice president of applied research, was considered too research oriented. "On the whole, most people there would have preferred he be less the grand thinker and more directly involved with the nitty-gritty," says Thomas E. Nelson, a former Cullinet executive who now is vice president of systems development at Artificial Intelligence Corp., Waltham, Mass.

Linn, who calls Bachman a "software visionary," says the difficulty of grasping Bachman's concepts for applications development contributed to his troubles at Cullinet. The former Cullinet vice president of research says, "He was so far ahead in his thinking, we didn't see how to take his ideas . . . [and] we couldn't get him to focus on getting them into software immediately."

Today, Bachman is more sanguine about the problems that led to his breaking away. "I wanted this type of work to go forward, and Cullinet wasn't ready," he says.

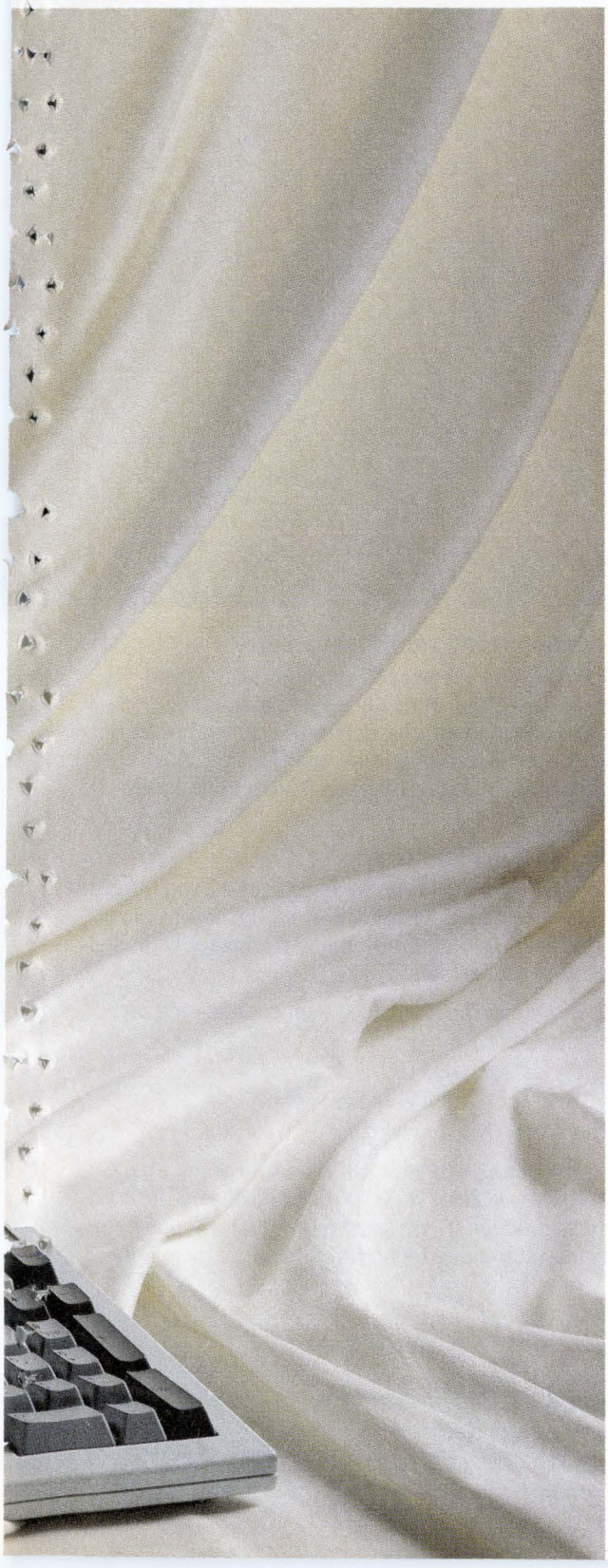
It was at Cullinet that Bachman met Philip A. Cooper, then vp of marketing and now chief executive officer at artificial intelligence software developer Palladian Software Inc. in Cambridge, Mass. "People see a tall, distinguished, white-haired man [and] think he's a banker," Cooper says. "If, instead of starting with appearance, they looked at his history, they'd find he's been an innovator and risk taker for 40 years."

For his part, Bachman has also changed. Rather than aiming for any technical kudos for his recent work, he says he's hoping to realize a business dream. "I've seen all the awards the computer industry can give me; what I want to do now is create a successful business," Bachman explains. "I want to be big enough to frighten IBM. If a business is big enough, [IBM] will wonder why it's not there." ■

Photograph by Steve Liss

# The Big Ban

# g Theory.



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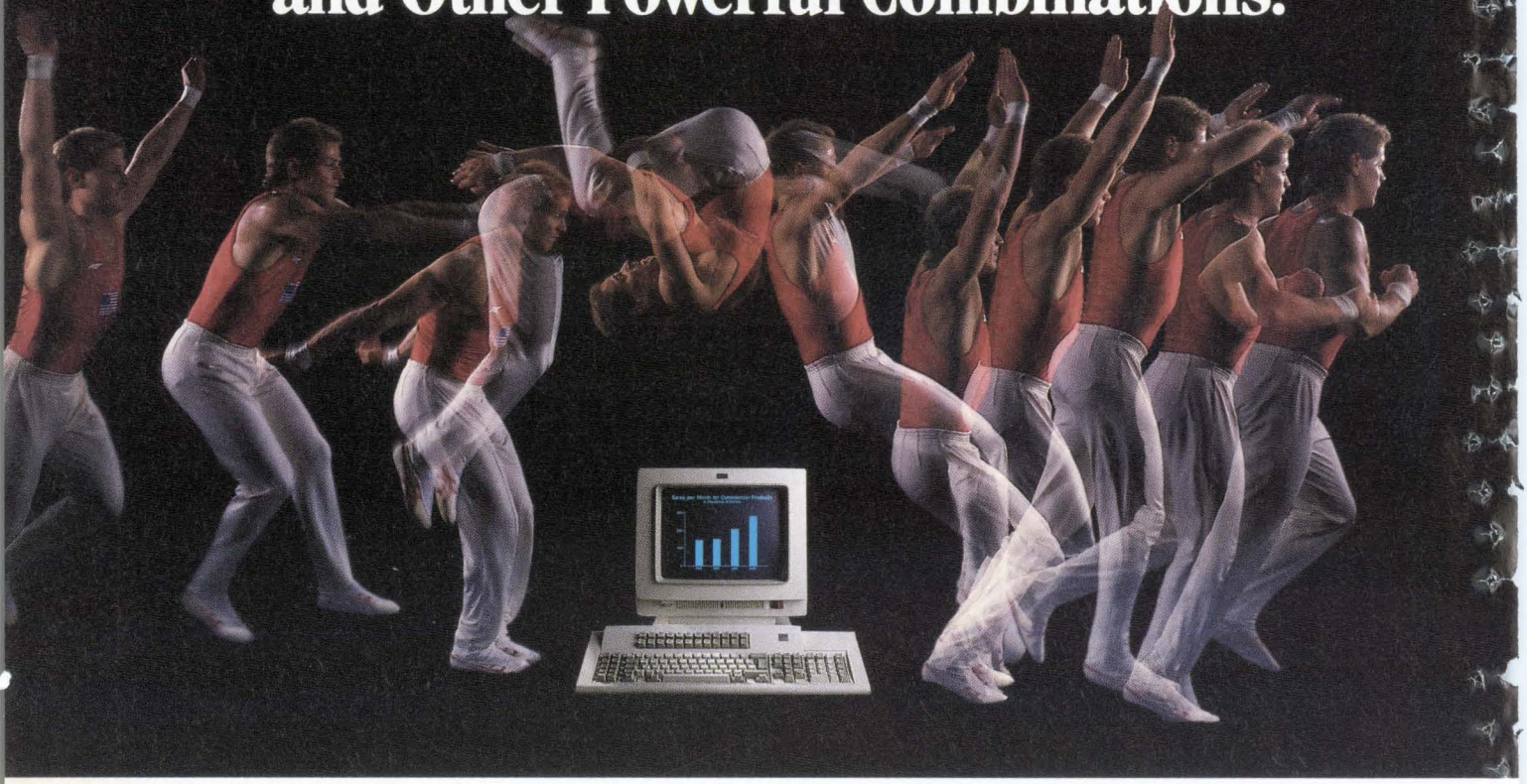

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BOOKS

# Hard Facts About Solid Software

QUALITY PROGRAMMING:
DEVELOPING AND TESTING SOFTWARE
WITH STATISTICAL QUALITY CONTROL
by Chin-Kuei Cho, John Wiley & Sons Inc., New York (1987, 473 pp., $43.95).

BY WILLIAM E. PERRY

According to Chin-Kuei Cho, we are in the midst of the third wave of the industrial revolution. The first wave began with the invention of machinery-based factories, the second wave swept in assembly line mass production, and now, the third wave is carrying in statistical quality control. Each of these waves results in a quantum leap in productivity, and the countries that are riding the statistical quality control wave most expertly—such as Japan—tend to dominate certain marketplaces because of the great productivity advantage they are utilizing.

In *Quality Programming*, the author posits that the use of statistical quality control in data processing would result in a quantum leap in software productivity. Unlike other manufacturers that are able to offer their customers quality warranties, software developers typically issue disclaimers. Cho cites the standard software postscript: "This program is sold as is without warranty of any kind, either expressed or implied, including, but not limited to, the warranties of merchantability and fitness for your purpose. The entire risk as to the quality and performance of the program is with you. If the program is found to be defective, you (and not the developer) assume the entire cost of all necessary servicing, repair, or correction." The fact that most software comes with this written or implied disclaimer, the author laments, demonstrates the sorry state of software quality.

There are two types of quality. The first is quality of design, and the second is quality of conformance. The quality of design comprises the attributes of the product being built. They are the requirements or attributes of a product. Quality of conformance relates to the process of manufacturing, or the extent to which the requirements of a design are met in production.

The front-end activities of the developmental process are formulated to ensure that the right product is designed. In other words, its emphasis is on quality of design. At this stage, the introduction of statistical quality control relates to implementing design in a defect-free manner. The author emphasizes quality of conformance, but only after making a strong plea for expanding the software development process to deal with the current level of design deficiencies in software.

Because of incomplete software life cycles, however, the introduction of statistical quality control into software development is inhibited. In order to properly utilize statistical quality control, several steps must be added to the conventional software development life cycle. These steps are product concept formulation, product quality characteristic specification, and product design, all of which are front-end activities used to ensure that the product is right before manufacturing begins.

As is the case with all manufactured products, each software module has quality characteristics that are closely related to every phase of the development cycle. Cho stresses the fact that the quality characteristics of each module can and should be defined as precisely as those of any manufactured product.

The author cites several sets of these characteristics in *Quality Programming*, some product-related, some system-related, and he suggests that these quality characteristics be defined in quantitative terms for each software module being developed. The characteristics include the following: correctness, usability, communicativeness, robustness (the system should be able to continue execution under certain imperfect conditions), and portability.

Statistical quality control was invented in the U.S. by W. Edward Deming. The author quotes Deming frequently and, adopting Deming's principles, advocates that software development cease its dependence on conventional software methods, break down barriers among departments, institute modern methods of supervision of software personnel, end the practice of awarding software business on a lowest-cost basis, and drive out fear.

Much of the emphasis on quality control lies in the area of software testing, and the author holds that testing is a process that parallels and supports development, but in order for it to do so, test requirements must be established.

An important concept in testing is the definition of software success criteria, also called software engineering goals. In other words, if you don't know where you are going, you will never know when you get there. The author recognizes that the problem with "doing it right the first time" is that it takes a lot of up-front effort to assure the quality of software.

In an earlier book by Cho, which was entitled *An Introduction to Software Quality Control,* the author introduced the concept of the Symbolic Input Attribute Decomposition (SIAD) tree, which can be used for both design and testing. Cho's current book refines the SIAD technique and presents several cases in which the technique has been used effectively.

Although a knowledge of statistics is essential to the application of statistical quality control, the book may contain too much statistical discussion for the business analyst/programmer. Several chapters are devoted to teaching statistical methods and techniques, but unless you are a statistician, you will have difficulty with these sections. The author covers distribution for software quality control, random number generation, sampling, and basic concepts in probability.

Fortunately, enough of the book is written in everyday English to be of benefit to every software programmer and analyst. The concepts and techniques in this book should be required reading for anyone developing software. The concepts of statistical quality control are not complex, and their application can, in fact, result in a quantum leap in productivity.

It is essential to the long-range success of the software industry to incorporate statistical quality control principles into software development and maintenance. The software industry does make products, and the quality characteristics of the products must be defined and controlled if software productivity is to have any dramatic increase. Studies published over the years have indicated very low increases in productivity in programming. Statistical

quality control is the tool that can reverse that trend.

One of the most important points Cho makes is that the current software industry treats the software itself as the end product and does not understand that the user is interested in the quality of the software only as a means to an end. Once statistical quality control is applied to software development, it becomes readily apparent that the quality in creating software is a bigger issue than the quality of the final software product.

SOFTWARE RELIABILITY: MEASUREMENT, PREDICTION, APPLICATION
by John Musa, Anthony Iannino, and Kazuhira Okumoto, McGraw-Hill Book Co., New York (1987, 621 pp., $47.95).
SOFTWARE ENGINEERING: A PRACTITIONER'S APPROACH
(Second Edition)
by Roger S. Pressman, R.S. Pressman & Associates, McGraw-Hill Book Co., New York (1987, 567 pp., $44.95).

BY TOM McCUSKER

Software engineering is the development of software as a usable, marketable, profitable product, which is not to be confused with developing a program that works. In *Software Reliability: Measurement, Prediction, Application,* authors John Musa, Anthony Iannino, and Kazuhira Okumoto explain that "software reliability is the probability that the software will work without failure for a specified period of time."

John Musa, the book's chief author, brings a wealth of qualifications to the work. He is supervisor of software quality at Bell Labs, a winner of a meritorious award for his work as chairman of the IEEE technical committee on software engineering, a fellow of the IEEE, a member of a number of IEEE editorial boards, and a top executive of the IEEE Computer Society.

A well-indexed work, this book is a good reference tool and is likely to appeal to people involved at all levels of software engineering. The first three chapters are aimed at high-level managers, engineers who use software, and people who buy, lease, or use the software. There is a section devoted to the people who actually use and apply software reliability measurement, and another section is for researchers and students of reliability, software engineering, applied statistics, operations research, and related disciplines.

The Bell Labs engineers list some characteristics they look for when measuring software quality at AT&T Bell Laboratories, Whippany, N.J. In addition to accompanying documentation, training, and other support facilities, they require that software products be capable of evolving easily to meet changing user needs.

The user-machine interface must be easy to learn and to remember, and it must work in a way that minimizes the risk of introducing incorrect commands. When it doesn't work properly, a diagnosis must be easy to perform. Finally, the authors observe, "The program must not depend on the intelligent intervention of the user to help it over situations that may not have been considered beforehand." (A program written for yourself usually works even if you haven't considered all the problems that can occur. You simply handle the problem in real time.)

Managers as well as practitioners of software engineering might also want to add an updated edition of *Software Engineering: A Practitioner's Approach* to their libraries. Written by consultant Roger S. Pressman, president of R.S. Pressman & Associates, Orange, Conn., the book leads both students and practitioners step by step through all phases of the software engineering process—not only the reliability techniques discussed by Musa, Iannino, and Okumoto.

Pressman's first edition was published in 1982. This second edition contains new sections on computer system engineering, software project planning, analysis methodologies, programming languages and coding, testing strategies, and software maintenance. The best chapters, in terms of high-priority benefit, are on testing and software maintenance, the latter subject justifying the book's value in one's reference bookcase.

Noting that—until very recently—software maintenance has been the neglected phase in the software engineering process, Pressman says that its cost as a percentage of software budgets has risen to 60% in the '80s from 40% in the '70s and probably will approach 80% by the 1990s. ■

*William E. Perry is director of the Quality Assurance Institute in Orlando, Fla.*

*Tom McCusker is a DATAMATION contributing editor who covers software.*

## CALENDAR

### NOVEMBER

**Fifth 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.

**Canadian Computer Show & Conference.**
Nov. 16-19, Toronto. Contact Industrial Trade Shows, 20 Butterick Rd., Toronto, Ont., M8W 3Z8, (416) 252-7791.

**Wescon '87 (Electronic Show and Convention).**
Nov. 17-19, San Francisco. Contact Electronic Convention Management, 8110 Airport Blvd., Los Angeles, CA 90045, (213) 772-2965.

**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.

**Conference on Superconductor Markets.**
Dec. 15-16, Boston. Contact Kessler Marketing Intelligence, 31 Bridge St., Newport, RI 02840, (401) 849-6771.

**AMS West (Advanced Manufacturing Systems Exposition and Conference).**
Dec. 15-17, Anaheim, Calif. Contact Pat Dickinson, Cahners Exposition Group, 999 Summer St., P.O. Box 3833, Stamford, CT 06905, (203) 964-8287.

### JANUARY

**Computer Graphics '88.**
Jan. 13-15, San Diego. Contact Carol Every, Frost & Sullivan, 106 Fulton St., New York, NY 10038, (212) 233-1080.

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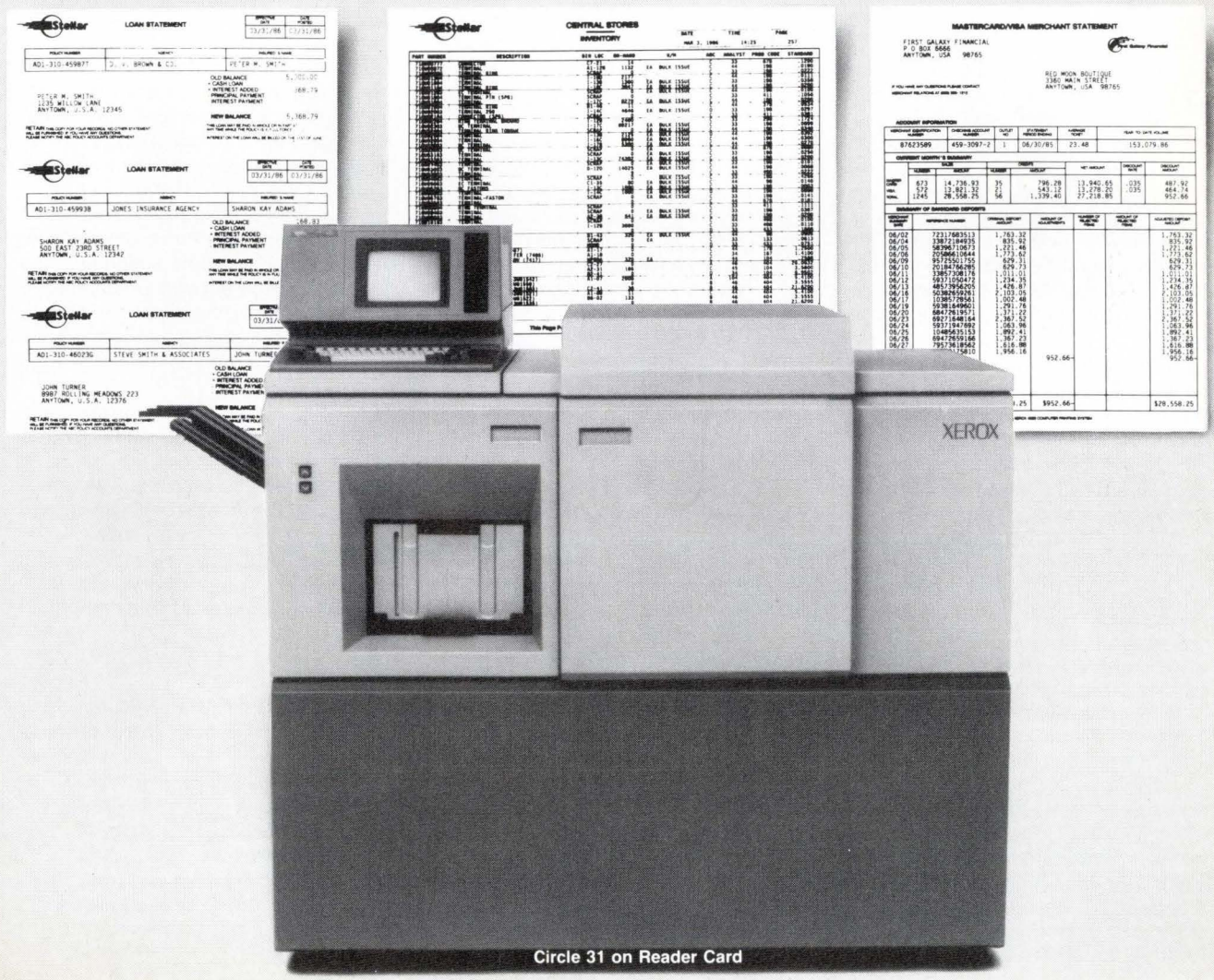


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## READERS' FORUM

### The Structured Programming Productivity Boost

When Lewis Carroll penned "Then the bowsprit got mixed with the rudder sometimes" in *The Bellman's Speech*, he could have been referring to computer programming. We have been on this journey for more than 30 years and sometimes the good ship *Programming* seems unresponsive to the helm.

Although a lot of programming gets done and business runs reasonably well, we still cannot produce consistently within budget and on schedule. Over the years, much heat has been generated on the topic of programming productivity. I'm going to continue this tradition by feeding the fire with heat kindled by my 33 years in the business.

First, there is no satisfactory method of measurement for either programming productivity or quality. Productivity will not improve much until we can either devise good measurements or transform programming into some other type of activity that we can measure. The common measurement of lines of code is especially vexing. The counting of lines of code makes no distinction as to whether a system is simple or complex, nor does it consider the quality of the end product.

Second, business systems inherently are not neat, and programming systems only mirror business systems. This makes programming systems very expensive to build, and the development effort takes longer and costs more than it should.

Significant progress has been made in programming during the past 30 years. In 1955, programmers wrote fairly large programs by hand in machine language. Assemblers, and then later languages such as FORTRAN and COBOL, were created for general data processing programming. In more than one presentation, I have heard it said that COBOL would solve the productivity problem because nonprogrammers would be able to read the code about as easily as they could read English. It must have been one of us programmers who said that. Still, it cannot be denied that the productivity effect of COBOL and other high-level languages was powerful.

Then, rudimentary but effective operating systems were developed based on magnetic tapes and drums. They helped programming productivity, but their main impact was in speeding up production by streamlining computer operations. In 1964, IBM announced the S/360 family of compatible computers. S/360 had inexpensive large main memory, massive disk storage, and much more powerful operating systems that were built upon the large storage capacities. Productivity rose as a result of the new hardware and new operating systems that had more effective program libraries, better programming testing support, and more powerful data management facilities.

Then code generators appeared, which allowed shorthand notation to be used to circumvent some of the wordiness and clumsiness of COBOL.

Structured programming, introduced in the early 1970s, provided the largest boost to productivity since the assemblers of the '50s. The concept of structured programming, including the top-down design, deserves considerably more credit for improving programming than it has ever received.

The primary reason why structured programming has been soft-pedaled lies in the measurement dichotomy. Because the cost per line of code has not changed a great deal since the arrival of structured programming, some people believe that productivity has remained stagnant. But without structured programming, the cost per line of code would have exploded because both the complexity of applications and the cost of programmers have increased greatly.

The structured programming revolution has been a quiet one. Most training took place in-house without expensive consultants or seminars. In many cases, the most troublesome production programs were quietly rewritten, sometimes without management's knowledge.

We should proffer our highest accolades and sincerest gratitude to the originators of structured programming. This development has played a major role in the enormous expansion of computer use.

The popular view of software maintenance is out of focus. The literature frequently says that up to 50% or even 75% of all programming efforts are applied to maintenance as opposed to development, which would seem to imply that a bad maintenance situation exists due largely to incompetent programming. These estimates of maintenance expenditure are usually accompanied by a statement that most organizations have a two- to four-year development backlog. The backlog cannot be addressed fast enough because the maintenance hog is taking too much of the pie. Sometimes we are informed that the problem is so bad that there is also an invisible development backlog that managers do not even bother to tell programmers about.

I suggest that most maintenance is caused by our rapidly changing business systems rather than bugs introduced by sloppy programming.

This "high" maintenance expenditure is often the most cost-effective way to run the business. In other words, management and programmers are generally competent, and in a great many cases it makes more sense economically to modify an existing system than to develop a new one. Thus, a good part of this maintenance is performed in lieu of development.

I further suggest that widespread adoption of the structured programming technique has often made it possible to choose the more economical option of maintenance rather than a totally new development effort.

Of course, maintenance does warrant a tremendous amount of attention, since any improvement in the maintenance area will have such a high payoff. Development backlogs certainly do exist. But it may well be that our economy ought not devote any more resources to production programming beyond the huge sums we are now spending. And perhaps the ratio between maintenance and development is nearly at an economic optimum considering our state of the art. May a productivity breakthrough come soon!

We appear to be on a programming plateau. Database management systems have helped some, as have fourth generation languages. Now, computer assisted software engineering and artificial intelligence are moving into the picture. Perhaps these technologies will lead us to higher productivity and give us a method of measuring productivity and quality.

JAMES H. BARNHILL
President
Barnhill Consulting
Raleigh, North Carolina

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DATAMATION

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### Program Development & Software Integration

Provides highly advanced engineering knowledge and technique to aid in the development of new or substantially improved computer systems. Perform as principal investigator or software team leader overseeing program development and software integration. Requires experience in formal analysis and design methodologies, familiarity with data base design, SQL, 4th generation languages, knowledge of UNIX and VMS operating system, and C programming language.

## Engineering Specialist
### Hardware Definition & Systems Integration

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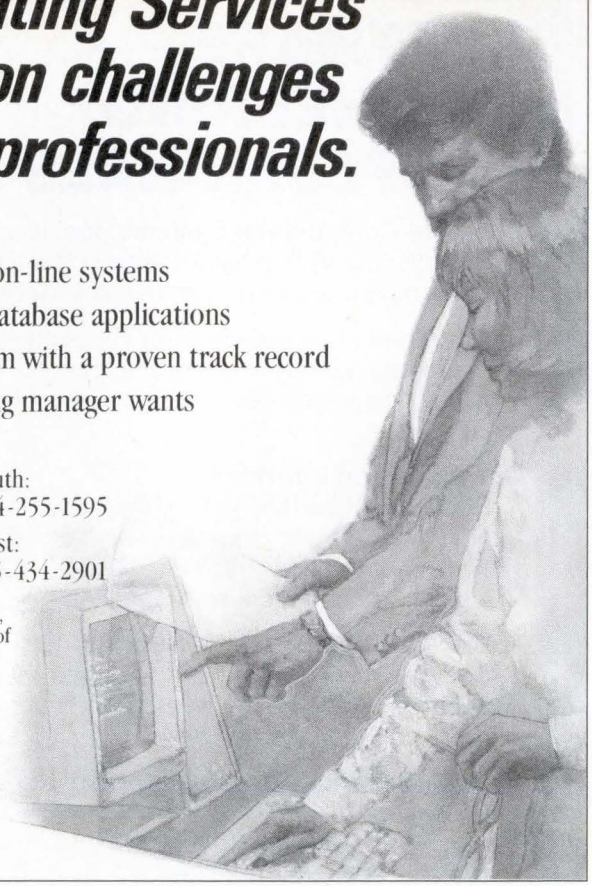

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# Datamation Databank

## Professional Profile

### Announcing a new placement service for data processing professionals!

Datamation feels an obligation to help its readers advance their careers. So, Datamation has affiliated itself with Placement Services, Ltd. to form the **Datamation Databank.** What are the advantages of this new service?

- Your qualifications and career goals are entered into PSL's computer system. And the computer never forgets. When your type of job comes up, it remembers you're qualified.
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- Service is nationwide. You'll be considered for openings across the U.S. by PSL and their affiliated offices.
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## IDENTITY

Name _____

Home Address: _____

City _____ State: _____ Zip: _____

Home Phone (include area code): _____

## PRESENT OR MOST RECENT EMPLOYER

Parent Company _____

Your division or subsidiary: _____

Location (City, State) _____

Business Phone if O.K. to use: _____

## EDUCATION

| Degrees (List) | Major Field | GPA | Year Degree Earned | College or University |
|---|---|---|---|---|
| | | | | |
| | | | | |
| | | | | |

## POSITION DESIRED

_____

## EXPERIENCE

Present or Most Recent Position From: To: Title:

Duties and Accomplishments: Industry of Current Employer:

Reason for Change:

## PREVIOUS POSITION:

Job Title: _____

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

Division: _____ Type of Industry: _____ Salary: _____

Duties and Accomplishments: _____

## COMPENSATION/PERSONAL INFORMATION

| Years Experience | Base Salary | Commission | Bonus | Total Compensation | Asking Compensation | Min. Compensation |
|---|---|---|---|---|---|---|
| | | | | | | |

Date Available

I Will Travel ☐ Light ☐ Moderate ☐ Heavy

☐ I own my home. How long? _____ I rent my home/apt. ☐

☐ Employed ☐ Self-Employed ☐ Unemployed

☐ Married ☐ Single

Height_____Weight_____

Level of Security Clearance

☐ U.S. Citizen ☐ Non-U.S. Citizen

My identity may be released to: ☐ Any employer ☐ All but present employer

☐ WILL RELOCATE ☐ WILL NOT RELOCATE ☐ OTHER _____


# Datamation Databank


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