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JANUARY 15, 1987
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Life at the Low End

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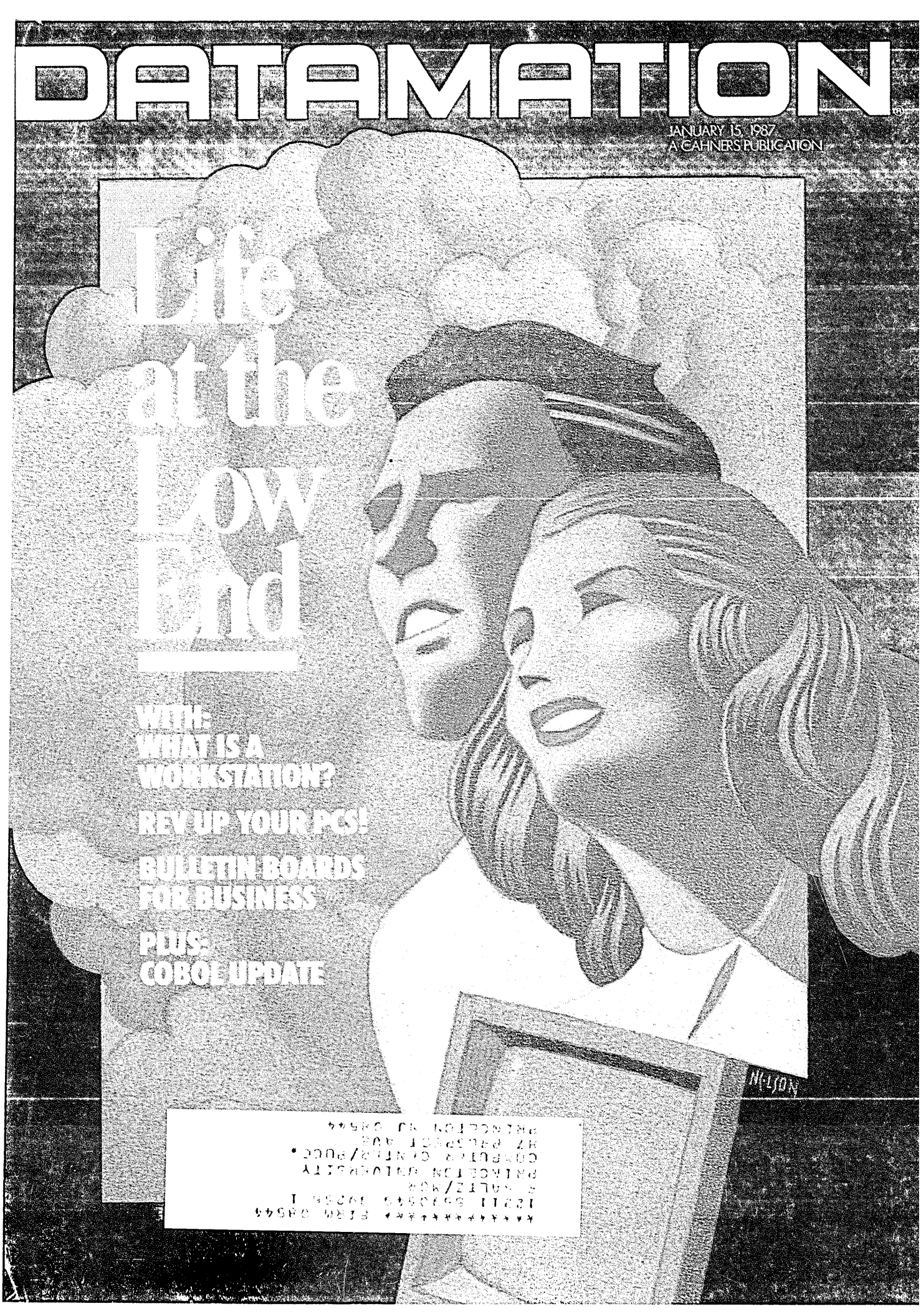

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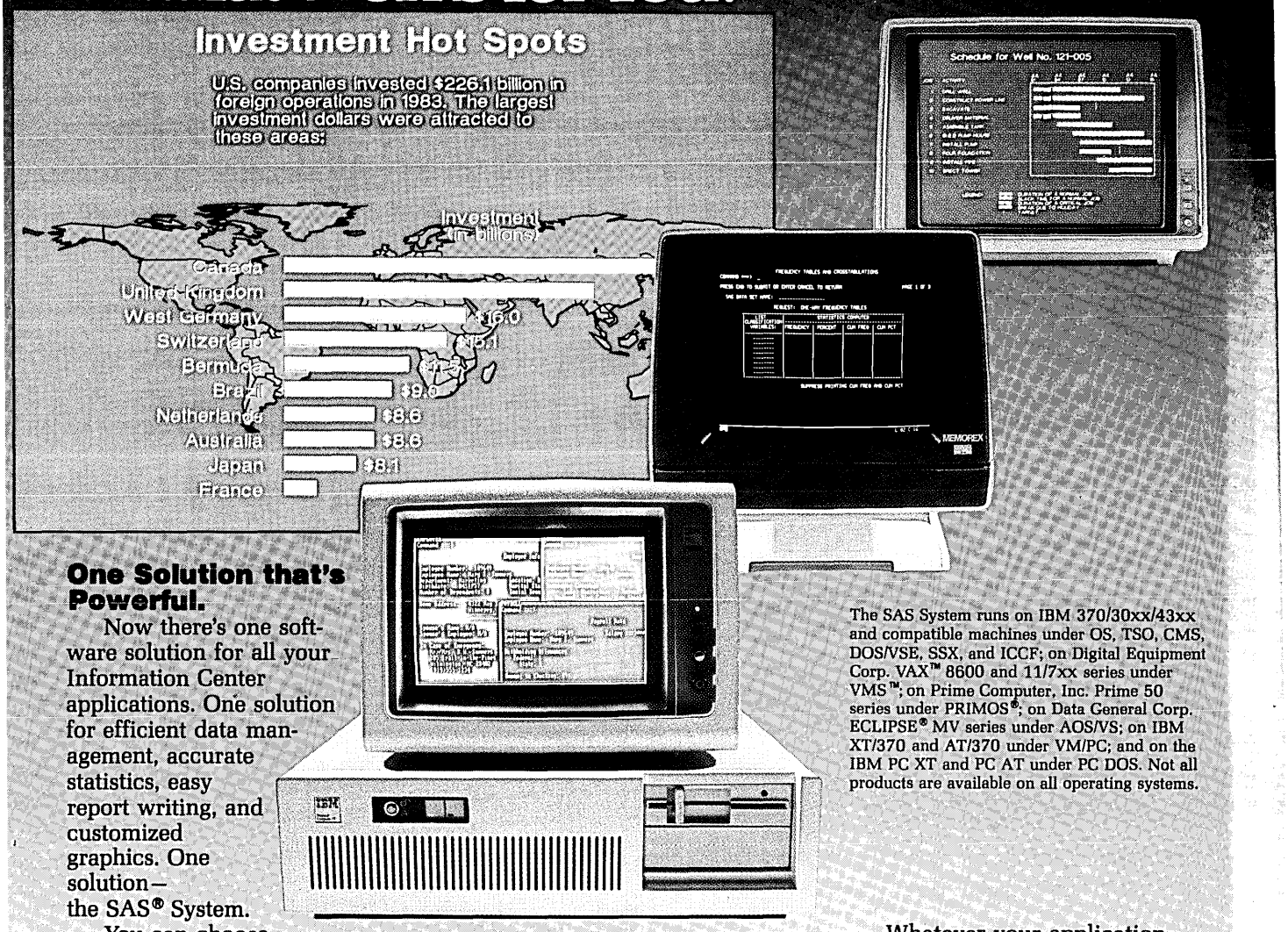

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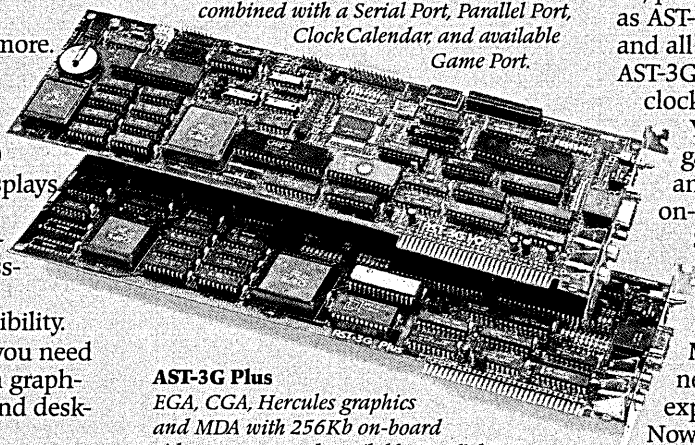

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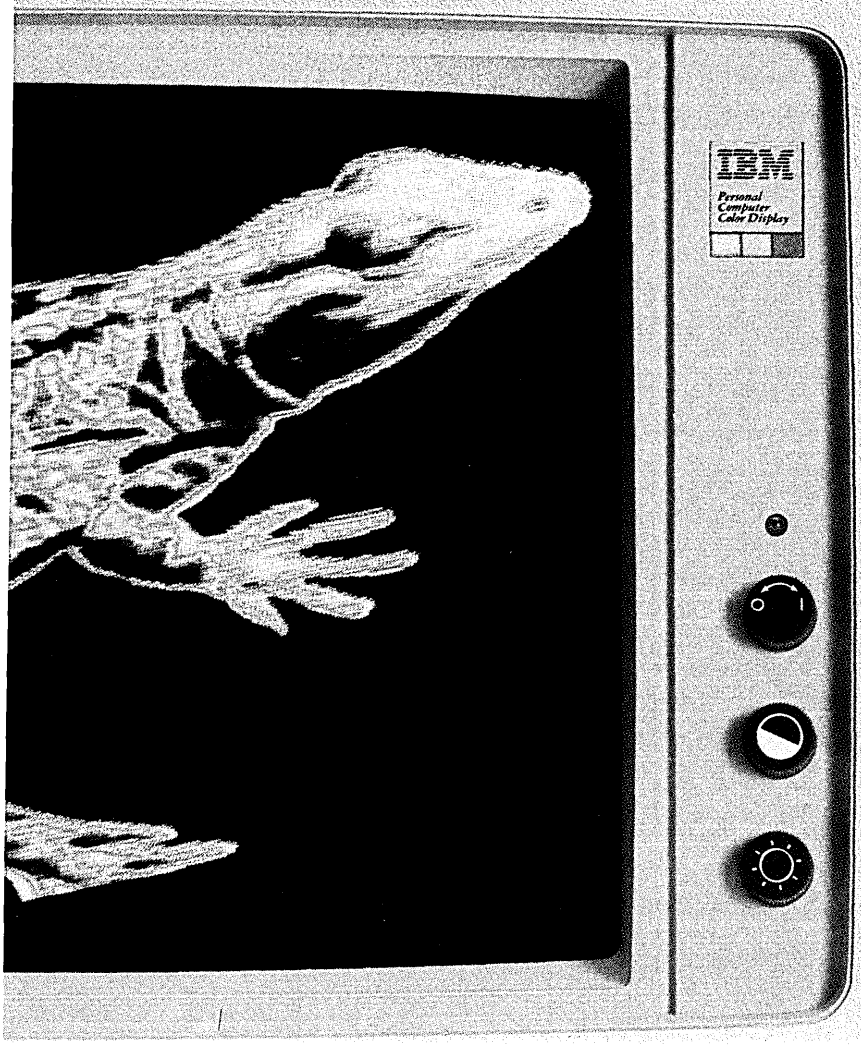

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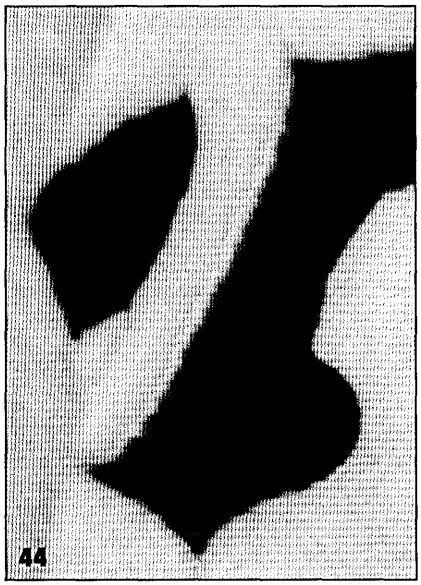

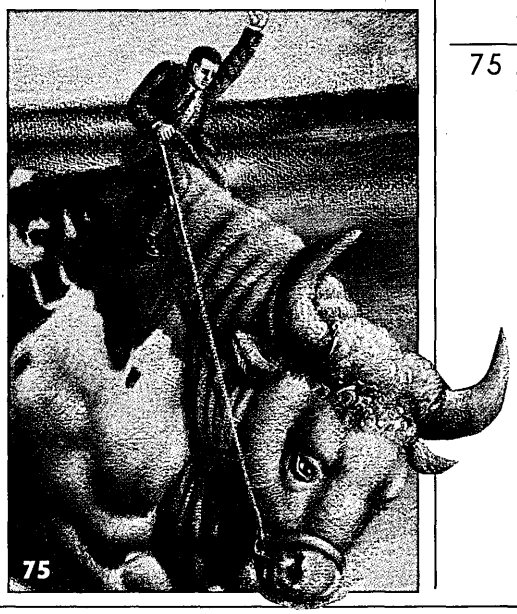

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DEPARTMENTS

OEM EDITION 40-1

COVER ILLUSTRATION BY BILL NELSON

OEM EDITION

JANUARY 15, 1987
VOLUME 33
NUMBER 2

Editorial

Lo! The Low End

Forecasts? Forsooth! All too often, forecasts are fraught with predilections instead of predictions.

Having said that, we now confess to falling prey ourselves to the forecasting mania. We recently asked our editorial advisory board, comprised of esteemed gurus and practitioners of all industry segments, to share with us their own looks into the future. The exercise brought home one truth: not all crystal balls are compatible!

But since pcs are the theme for this issue, we can't resist sharing with you the observations on that market from Robert L. Patrick, the longtime DATAMATION advisor and industry consultant based in Southern California. As you read through our pc coverage, keep in mind Bob's sage and sagacious words. They give new meaning to our theme of "Life at the Low End."

"The pc boom is over," Bob writes. "All the pent-up demand has been satisfied. Sure, there are more sales to be made—maybe five times the total of what has already been sold—but these will not be the emotional impulse buys of the past. Rather, buyers will be *demanding* ease of training and installation, some reasonable form of support (not yet invented), and only slight impact on the productivity of the office.

"The pcs have touched a large population. Productivity lagged mightily while we learned to use them. Intellectual discipline was eroded and now stands at an all-time low. It will be years before our business institutions catch up and recover organizationally from all the amateur computer users the pc spawned. The primary vendors gave no consideration to the organizational impact of so many MIPS and megabytes in the hands of the user. The resulting disorganization will take years to correct. I'm almost ready to label the pc a disservice to mankind (though I confess to using one to write this!).

"The field needs education, training, and people—not rank amateurs who can use a pc, but seasoned leaders to help us assimilate what we have and lay the foundation for the next surge. These people are in short supply and are hard to grow.

"Bank your fires. We've got two years of winter before spring."

Rebecca S. Barna

REBECCA S. BARNA
EDITOR

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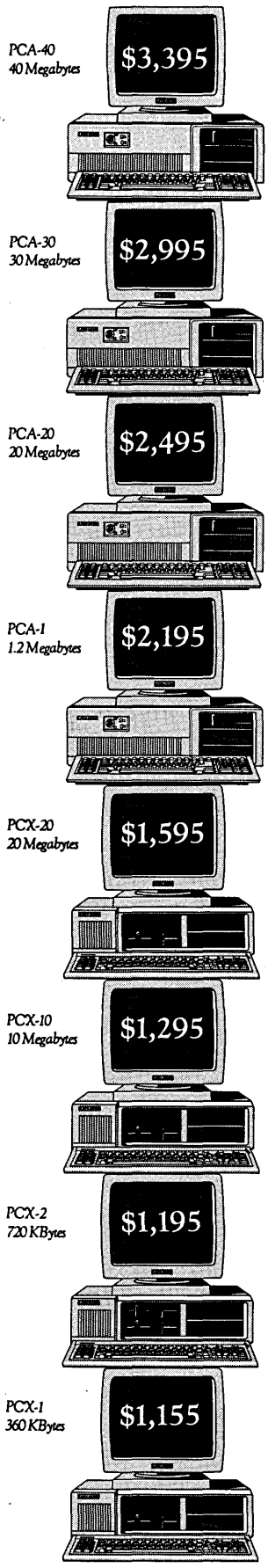

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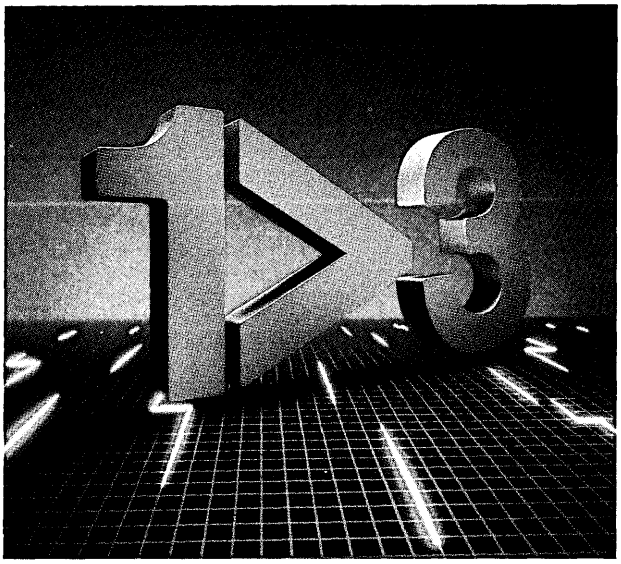

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CIRCLE 7 ON READER CARD

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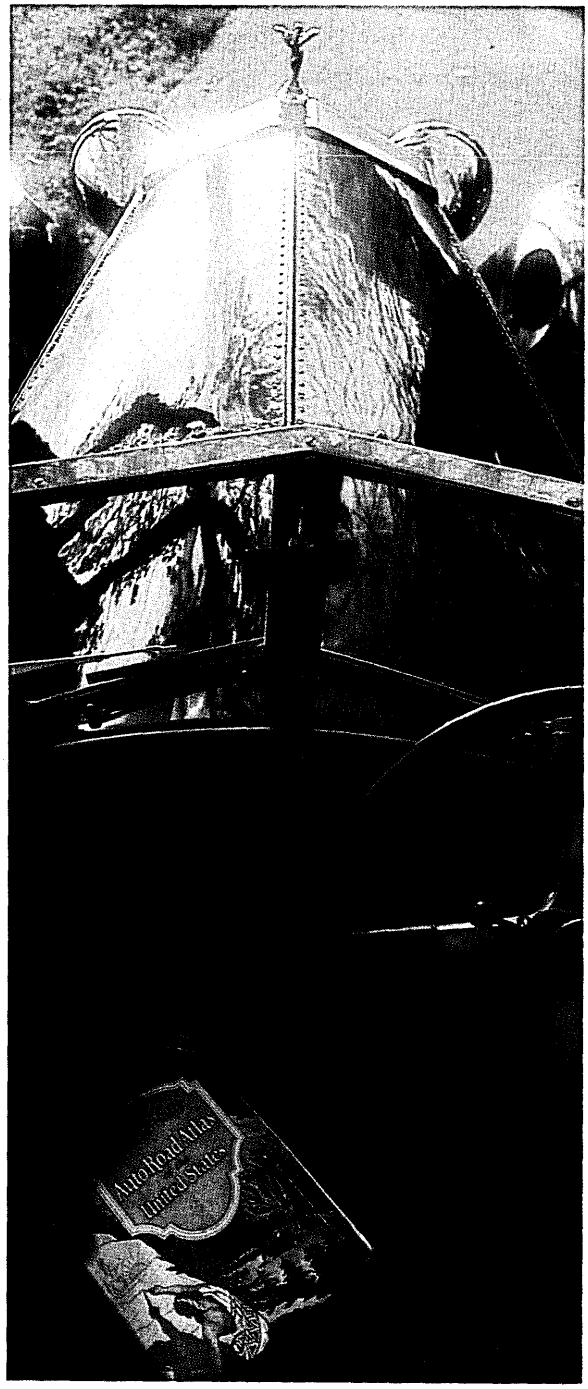

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CIRCLE 8 ON READER CARD

Look Ahead

WATCH FOR NEW HIGH-END VAX

MAYNARD, MASS. -- Digital Equipment Corp. on Jan. 20 will stack a new VAX multiprocessor computer rated at up to 24MIPS against the bottom of IBM's 3090 line. Dubbed the VAX 8850, the system, with nearly double the speed of DEC's present top-end VAX 8800, was described by sources as including high-speed input/output channels to support hundreds of terminal connections. With a MIPS performance falling between IBM's 3090 models 150 and 200, the system extends VMS beyond its present asymmetric capabilities. In addition, DEC will bring out a long-delayed replacement for its RA 81 disk drive. The new RA 82, which marks DEC's first use of thin-film technology, will provide 615 megabytes of formatted storage.

U.S. TO REPLACE MULTICS UNITS

WASHINGTON, D.C. -- The Pentagon this quarter will announce a request for proposals to replace 21 Honeywell large-scale computer systems, of which 15 run Honeywell's Multics operating system. How the Pentagon will replace the super-secure Multics is still up in the air, but Major Chuck Bowen, who's in charge of the bid, says, "Honeywell isn't going to support the equipment after 1988." Honeywell group vp Eugene Manno hasn't heard about the bid, but says work is progressing on HVS 6 Plus, a new OS that will take some Multics functionality and is expected in 1989. Unlike Multics, which runs on a special version of the 36-bit DPS 8, HVS 6 Plus will run on the 32-bit DPS 6 Plus.

REPOSITORY IS DELAYED

CHICAGO -- IBM's plan to provide its DB2 customers with an integrated data dictionary, or Repository, has hit snags. Customers can't seem to agree on what the scope or structure of the Repository should be, say GUIDE sources. IBM has been polling customers to find out what new function they want in DB2. In addition, an IBM-GUIDE project team has worked on a joint analysis document to determine the best form and function for the Repository. Sources who had expected beta test this year now view 1988 as the likeliest start.

MOSS TALKS TO FOCUS ON SUPERS

TOKYO -- The Market-Oriented Sector-Selective (MOSS) trade talks between the U.S. and Japan are expected to focus late this month on closing a loophole that lets the Japanese effectively exclude foreign supercomputer vendors from government procurement. Less than 20% of the more than 50 supercomputers installed or on order in Japan are American. Many are in government research organizations, which are subject to GATT rules requiring public requests for proposals in government buys of big-ticket items. U.S. embassy offi-

cials say, however, that the agencies involved have avoided this by leasing rather than purchasing machines, explaining that since leasing is a service and not a procurement, GATT rules don't apply. Another complaint is Japanese discounting by up to 50% to win domestic market share.

JAPAN WORKING ON 32-BIT UNIT

TOKYO -- In the tradition of ICOT (the superspeed computer project), MSX, and SIGMA, the Japanese are making another move to develop an original computer design that will free them from dependence on foreign technology. This time it's TRON (The Real-Time Operating Nucleus), a 32-bit microprocessor design developed by University of Tokyo professor Ken Sakamura. Hitachi and Fujitsu will try to put the design into CMOS silicon at 1-micron to 1.3-microns. The design is predicted to deliver double the performance of an Intel 80386.

THREE BACK X WINDOWS

CAMBRIDGE, MASS.-- Perhaps not surprisingly, its three biggest competitors have decided not to support Sun Microsystems' proposed windowing software standard for Unix-based technical workstations (see "Three Hats in the Ring," Oct. 15, p. 32). DEC, Apollo, and Hewlett-Packard will announce today that they have chosen instead to back the older X Windows standard developed at MIT. Also reportedly leaning toward X Windows over Sun's Network Extensible Window System (NEWS) are Data General, Sony, and Siemens.

STC READIES TAPE, DRIVE

LOUISVILLE, COLO.--The spotlights will be trained on pcm peripherals vendor Storage Technology Corp. on Jan. 27, and for once the company won't be talking about bankruptcy court or the IRS. This time, StorageTek will be introducing its long-awaited automated cartridge tape library and drive developed under the code name Cimmeron. Sources expect the company to ship beta versions of the tape library by midyear, with production shipments to follow later in the year.

PEAT EYEING CONSULTANT

LEXINGTON, MASS. -- The next wave of dp growth, with its accent on complex systems integration, promises to be a boom time for MIS management consultants--so much so that the Big Eight accounting firms are eager to get in on the act. Sources say Peat Marwick & Mitchell may be negotiating to buy one of the most prestigious dp management consulting groups, Nolan & Norton of Lexington. Principals believed to be involved in the acquisition talks were unavailable for comment at press time.

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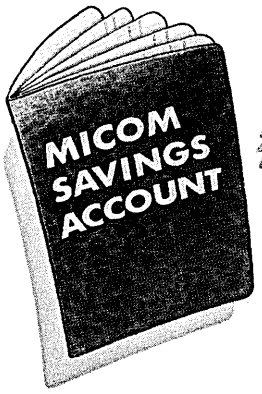

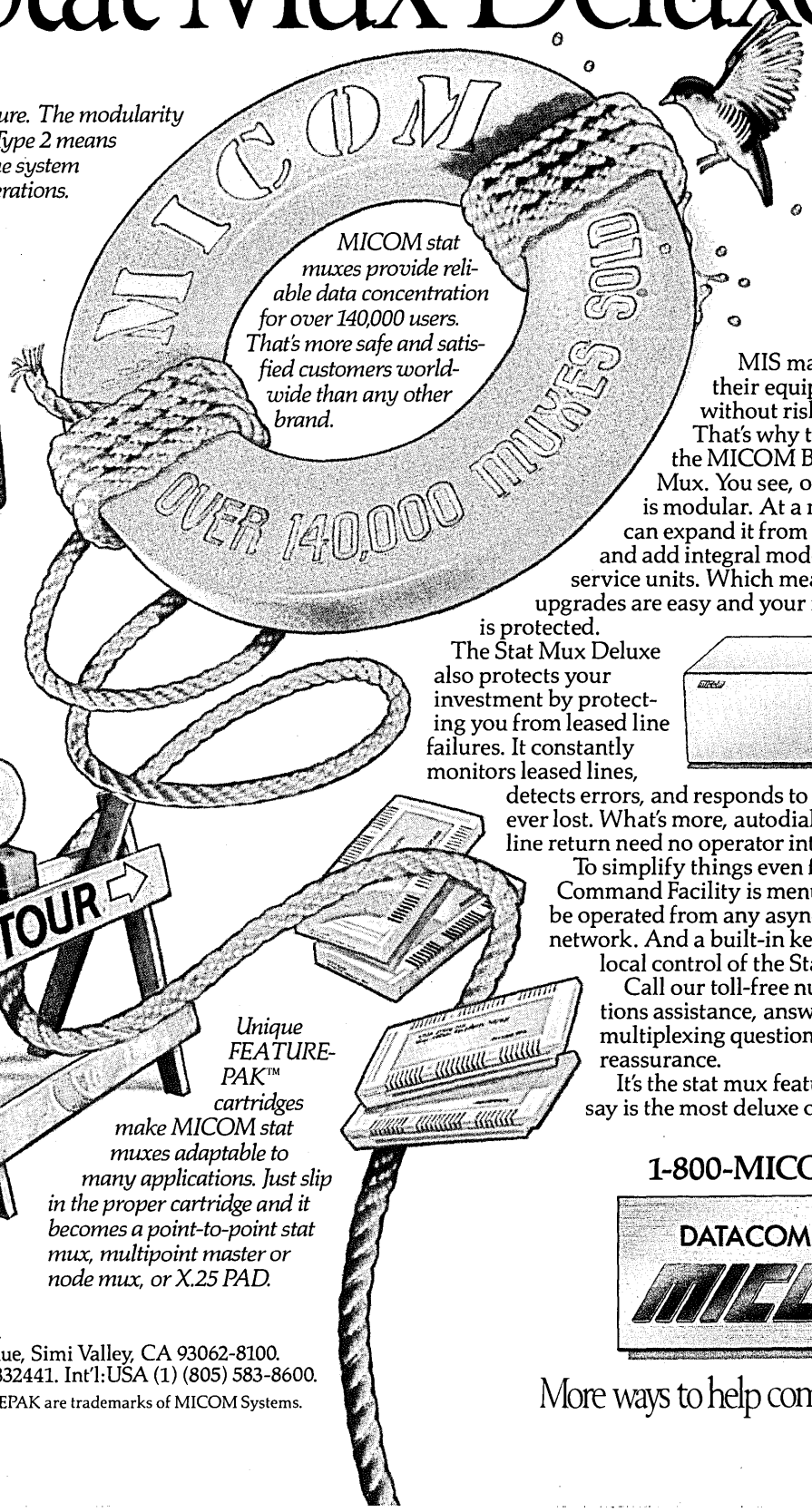

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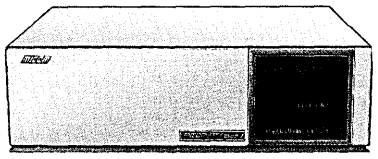

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More ways to help computers do more.

Look Ahead

ADMIRATION FOR BIG BLUE

PEKING -- The Chinese government is starting to make aggressive noises about developing an indigenous computer industry. It now says it plans to build a Chinese technology company as big as IBM in the U.S.--Big Red, perhaps? The proposed company will be developed under the auspices of the China Development Corp., which was set up as an umbrella organization for the country's six computer firms, a leasing outfit, and a computer exhibition and advertising agency.

FLOATING POINT TO EVALUATE TRANSPUTER

BRISTOL, ENGLAND -- British chip maker Inmos is lining up customers for its latest 10MIPS Transputer processor. Among the buyers may be Floating Point Systems of Beaverton, Ore., which hopes to evaluate the T800 chip when samples are available in the U.S. First U.K. samples, priced at about $200, are expected early this year.

PREPARING FOR Q2

MOUNTAIN VIEW, CALIF. -- Network vendor Bridge Communications Inc. is scheduled to unveil a flurry of new products in the second quarter, says president Bill Carrico. Slated to be announced are an Ethernet/Token Ring internetwork bridge, the company's first TOP product line, and its first encryption product.

OLIVETTI'S PLANS IN INDIA

RAMPUR, INDIA -- Italian office systems giant Olivetti is currying favor with the Indian government by setting up a joint venture personal computer firm in the state of Uttar Pradesh. Called Modi-Olivetti, the venture is with one of India's largest industrial companies, the Modi Group, and each of the two partners will hold a 40% stake. Olivetti, which will provide the technical know-how and a pc license, is hoping to get government approval for the deal by the summer.

RUMORS AND RAW RANDOM DATA

West German dp giants Siemens and BASF have set a 1987 turnover target of $500 million for their new pcm venture, Comparex Information Systems GmbH, which would double their aggregate pcm business of last year. Some jobs at the firm, which is selling both Fujitsu and Hitachi products, are expected to be lost in West Germany, leaving the company worldwide with 1,000 people. . . . Don't be surprised to see IBM Australia bring more PC copyright infringement cases to court down under following the success of its lawsuit against Taiwanese company Chendai. . . . 2,400-bit-per-second telecommunications for pc users takes a step closer to affordable reality this week when Intel Corp. is scheduled to introduce a two-chip set Hayes-compatible modem, designated the 96024.

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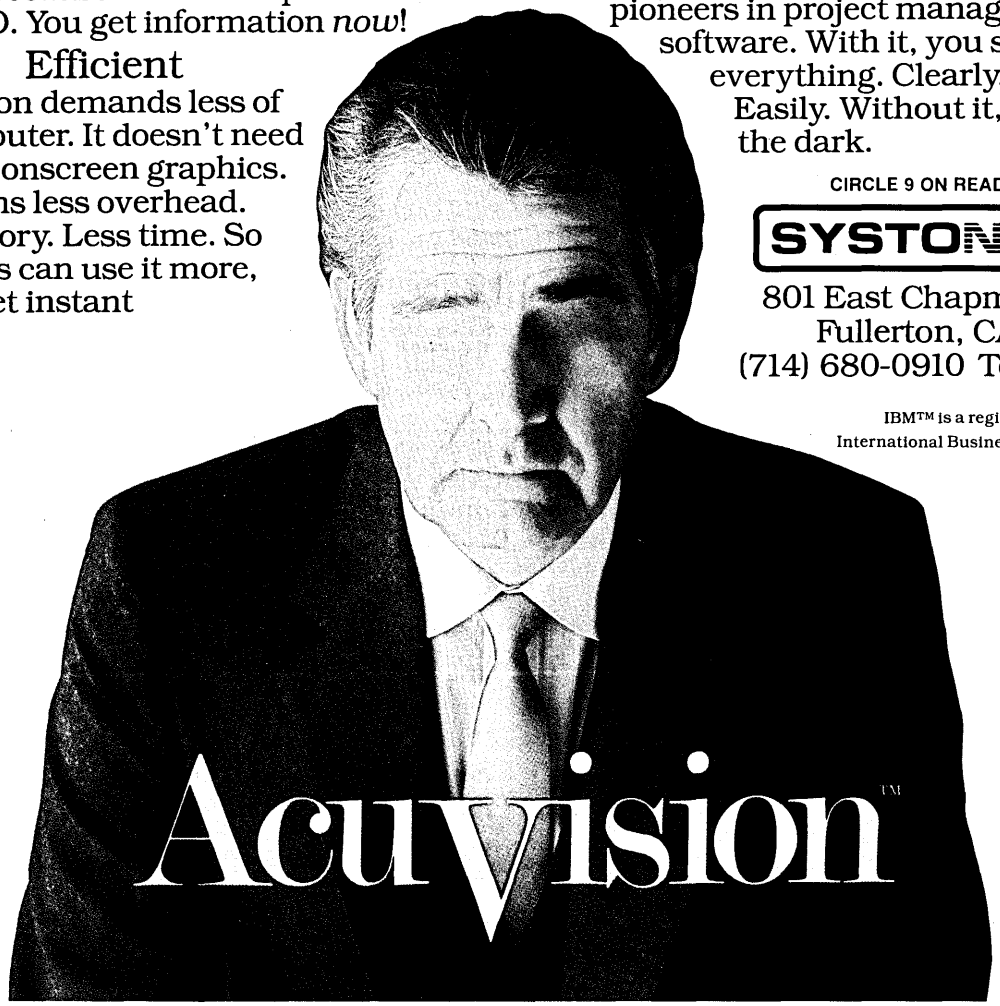

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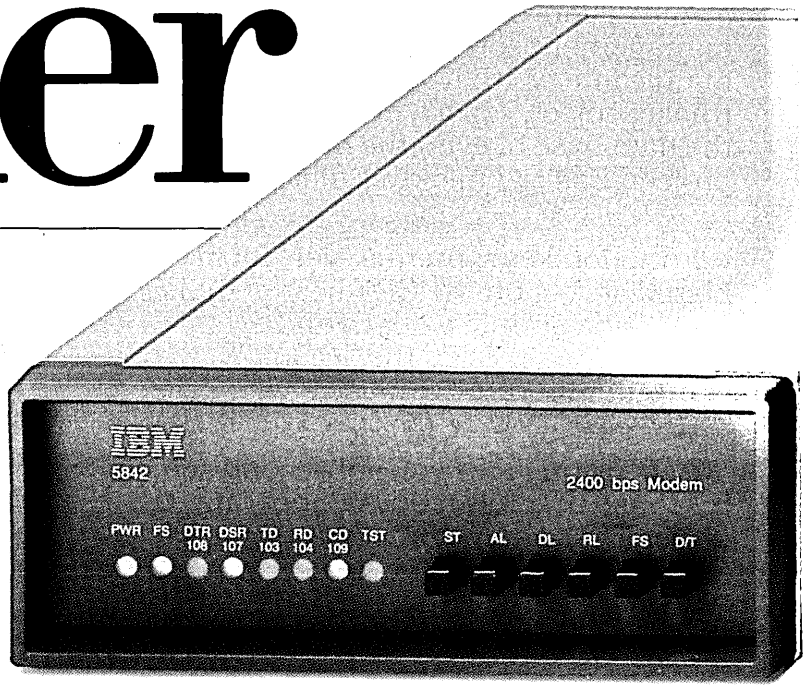

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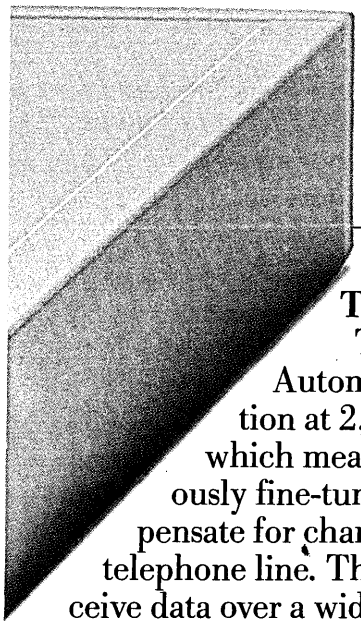

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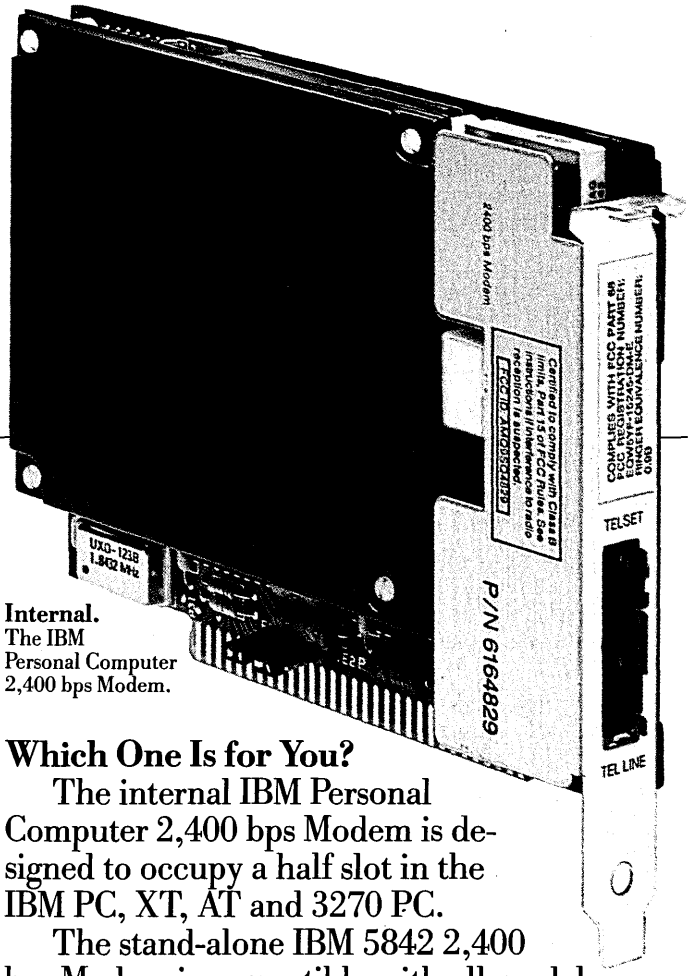

Internal.
The IBM Personal Computer 2,400 bps Modem.

The Automatic Modems

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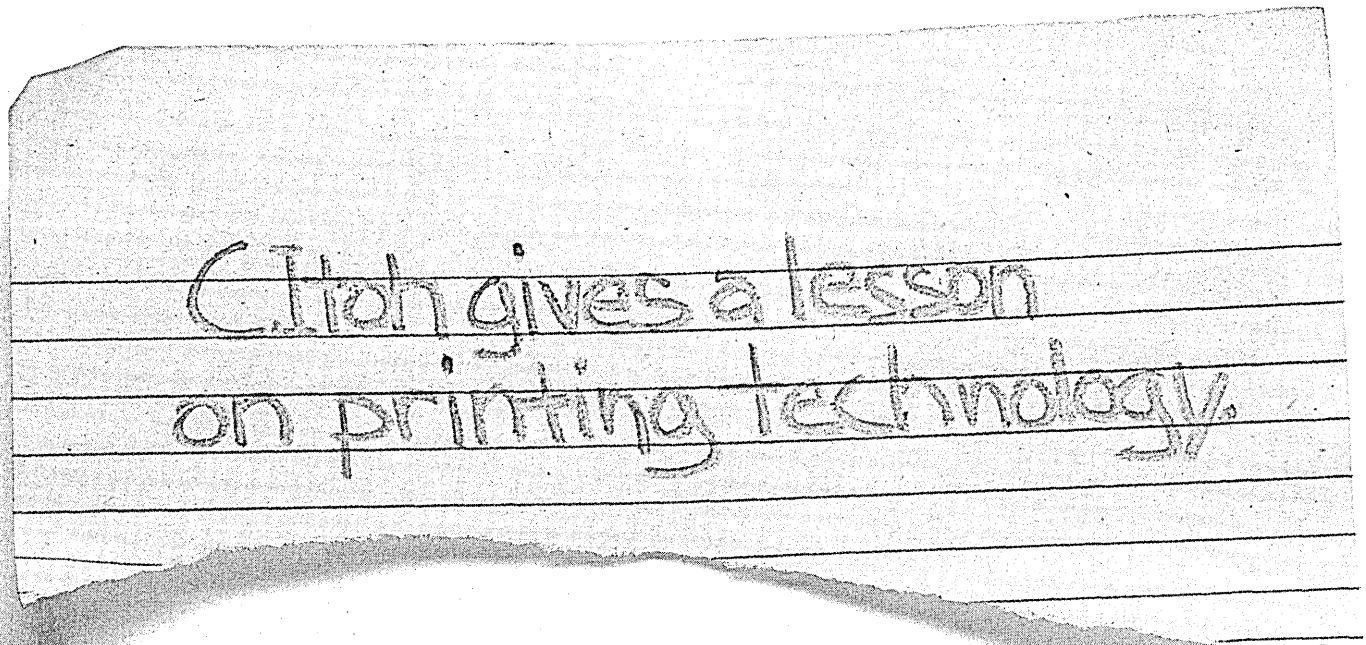

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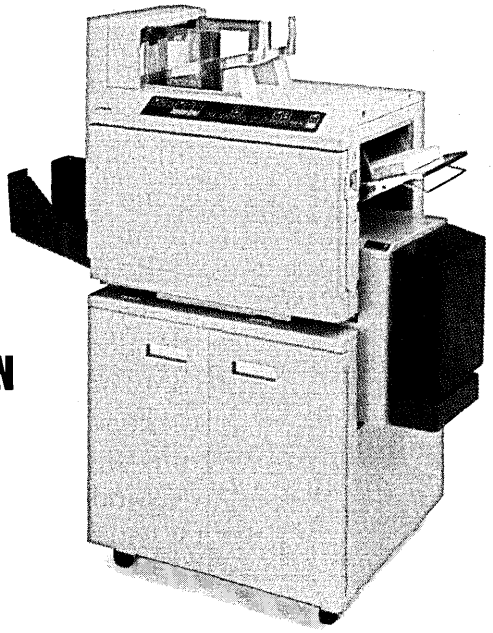

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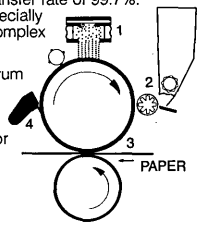

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CIRCLE 10 ON READER CARD

BANKING

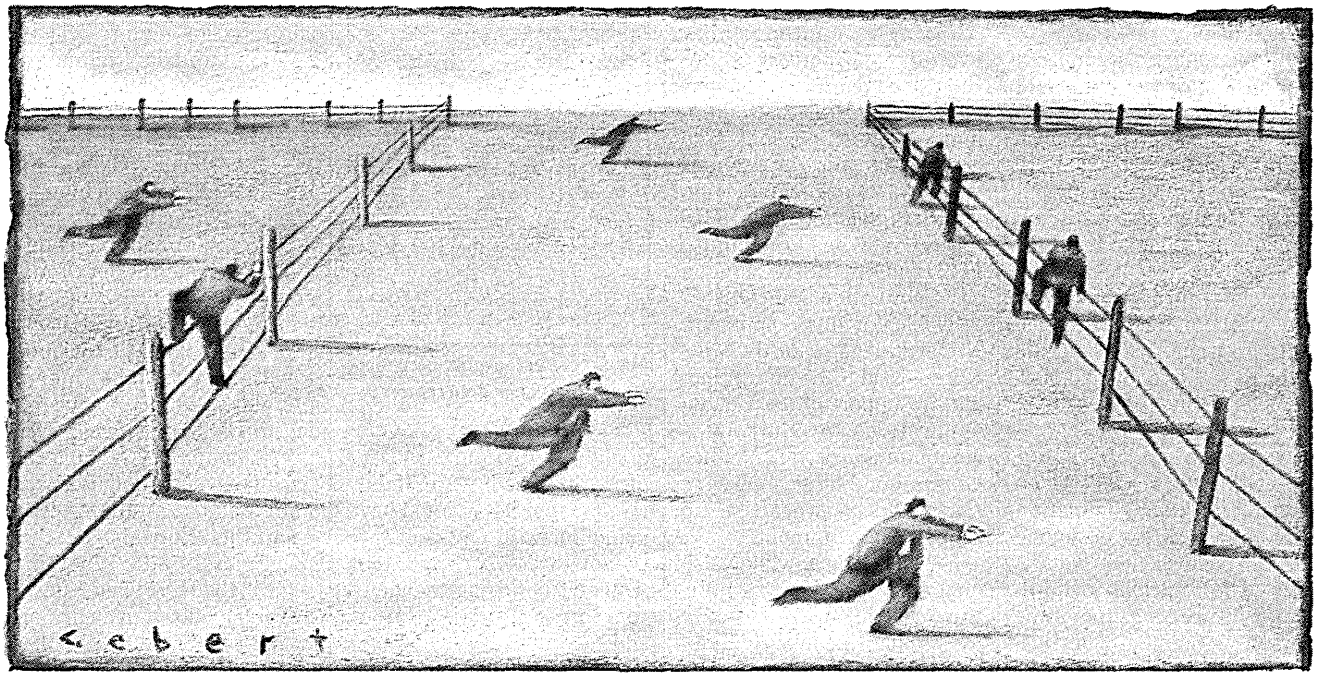


Illustration by Warren Gebert

Crossing the Border to the Blue Zone

Defection to IBM is now the name of the game in the banking world.

BY ROBERT J. CRUTCHFIELD

Unisys doesn't need to look very far to discover what is happening to its financial customers. Right in the newly merged company's corporate backyard, two Detroit banks—one of them is Michigan National Bank—are in the process of switching from Burroughs to IBM mainframes.

But the defections don't stop there. Banks in the South, Southeast, and Midwest—the heart of the Unisys customer base—are either in the process of converting to IBM or are seriously considering it. Other Unisys customers in the U.S. as well as overseas are also pondering a switch to IBM or are in the throes of conversion.

Uccel Corp., a Dallas-based systems and banking software company, estimates that upwards of 130 financial institutions currently using non-IBM computers will convert to IBM during the course of this year.

"I have several banks calling me on a weekly basis to monitor the progress of the conversion at Carteret Savings Bank," says John DeCruccio, a senior consultant at John Diebold & Associates, a New York consulting firm that is assisting the Morristown, N.J., savings bank with its conversion from Burroughs to IBM. "Some of these banks have already made the decision to switch to IBM while others are still considering the move."

In a recent survey, DATAMATION was able to identify 15 financial institutions involved in converting to IBM hardware or adding IBM mainframes to Burroughs, Sperry, or NCR equipment. Many of these banks made their decision to convert to or add IBM equipment before the merger of Burroughs and Sperry. In addition to the Carteret Savings Bank, the institutions include the Bowery Savings Bank (New York), the Bank of Virginia (Richmond, Va.), the Long Island Savings Bank (Queens, N.Y.), Huntington Bank (Columbus, Ohio), Georgia Federal (Atlanta), First Commercial Bank (Little Rock, Ark.), American Bank & Trust (Baton Rouge, La.), and Midland Bank (Sheffield, U.K.).

"I HAVE SEVERAL BANKS CALLING ME ON A WEEKLY BASIS."

Bank deregulation, mergers, the availability of third-party software, choice of new or used equipment, the demand for more MIPS, and cost-effectiveness are some of the reasons financial institutions are switching to IBM hardware, according to MIS executives queried by DATAMATION.

The Unisys View

Unisys officials, meanwhile, have a different view of this seeming trend. Mark Roberson, program general manager for financial systems, says that he knows of at least 12 instances—including Seattle's Mariner Bank, Westamerica Bank, located in San Rafael, Calif., and First Source of South Bend, Ind.—where it's the other way around—customers switching to Burroughs equipment. "We are continuing to grow our user base and to protect it. We don't see that since the merger there's been a mass exodus of users. You're asking us to address the hemorrhaging of our user base and

we don't think there is a hemorrhaging."

According to Rodney D. Hardin, senior vice president of central services for Westamerica Bank, the financial institution replaced its IBM 1419 check processing equipment with a similar system from Unisys. "We chose the Burroughs 3955 because it is the best check processing system on the market," he says. But the California bank still runs the rest of its applications on an IBM 4341.

Software Reason for Moves

Of all the reasons given for conversion, application software appears to be among the most prevalent.

"The availability of third-party software was the prime reason we moved from Burroughs to IBM," says Doyle Cannady, senior vice president of MIS for Little Rock's First Commerical Bank.

"Software is the driving force in this industry and its costs are dropping while people costs are going up," he adds.

According to MIS executives at these financial institutions, third-party software that runs in the IBM environment is also appealing because of the diversity and large selection. Consultant DeCruccio explains, "We looked at the software available today that is suitable for Carteret's [strategic direction] and found that there was a lot more software for IBM mainframes than for Burroughs. The decision was user-driven. The applications users demanded were available from software that ran on IBM equipment."

Carteret has two Burroughs 4955s. According to DeCruccio, the software was more than 10 years old. To upgrade the system would have been cost-prohibitive—and the bank still wouldn't have had what it could get from off-the-shelf software available today.

Unisys contends that even though there are more third-party software packages offered for IBM equipment, its own Global Financial System and third-party software from McDonnell Douglas (St. Louis), Florida Software Systems (Orlando, Fla.), and others are as good as, if not better than, what is available for IBM equipment. Nevertheless, Florida Software is said to be discontinuing its support of its banking applications for Burroughs computers in 1989. Neither Unisys nor Florida Software responded by press time to requests for comment.

Users, meanwhile, also challenge the Unisys software claims.

"That [the availability of software] may have been true before deregulation, but not today," says a southern savings and loan MIS executive who requested anonymity. "Burroughs stays in the mainstream [of core banking applications] and doesn't get into areas like discount brokerage or insurance. We may be a bank today, but tomorrow we might also be an insurance company—that's why we have to go with IBM." This bank recently replaced its Burroughs 4748 and 4900 with a used IBM 4341 and 3380.

"WE DON'T THINK THERE IS HEMORRHAGING."

"Burroughs and NCR are both offering new software packages," adds James H. Jarrell, a senior vice president at Georgia Federal Bank. "We don't want to be an early user of anybody's software. If they [Unisys and NCR] would have come out with new software two or three years ago, they wouldn't be losing their customer base today," Jarrell adds.

Movers are becoming a more common sight as bank data centers make tough choices.

Georgia Federal will replace its NCR 8635 and 8645 mainframes with an IBM 3091 by the end of the year. Jarrell says the NCR mainframes were running out of steam and he needed more MIPS.

Despite the complaints of some Unisys customers, not all users are unhappy with the company. Phillip Mason, vice president of computer operations at the Bank of Virginia, is pleased with the performance of his Burroughs equipment, which includes an A 15 mainframe. "You have to realize that 19 years ago we were initially an IBM shop and switched to Burroughs," Mason says. "We have developed a sophisticated central information system that links all applications under one address."

But even though Mason is pleased with the Burroughs hardware, the bank recently acquired an IBM 3081. Mason says that at least for now, his bank will run a dual dp shop and operate both systems. Like many financial institutions, the Bank of Virginia joined the list of mergers when it recently joined with Union Trust in Baltimore. Union Trust was an IBM shop and its data centers will be consolidated in Richmond, Va. In April, the merged institution will be called Signet Bank.

"We don't apologize for having Burroughs equipment; not many organizations have a central information system as sophisticated as ours," Mason states, adding "but we will keep an open mind."

Much of the justification for the Burroughs-Sperry merger was synergy. According to Dick Hairshine, a vice president for Unisys' financial line of business, both financial user bases complemented each other. Burroughs has approximately 3,000 installations in the U.S., while Sperry has about 500, with the majority outside the U.S. IBM has 11,000 sites in the U.S., according to industry estimates.

"There has been a lot of pressure for us to convert to IBM, but we are going to stick with our five-year plan and remain with Sperry," says Allen Gilbert, assistant operations manager for the Bank of Canada, Ottawa, Ont. Canada's central bank uses its 1100/72 for econometrics, but uses an IBM mainframe for other banking applications.

One bright spot for Unisys and NCR is that while the banks are converting to IBM mainframes, they say they will continue to use non-IBM equipment for tasks like branch banking, check clearing, ATMs, and special systems for applications like econometrics.

So, while Unisys has targeted the banking industry as a strategic vertical market niche, will it become merely a niche player within the niche market? Or will the combined company make a difference and give IBM a run for its money in the banking market? ■

Assistant news editor Karen Gullo assisted in the preparation of this story.

Are Three Heads Better than One?

"Niche marketing" is the battle cry of the new computer unit formed by Honeywell, Bull, and NEC.

BY SUSAN KERR

For Honeywell mainframe users, there's no question as to who's gaining the most from that company's sale of much of its computer business to Compagnie des Machines Bull of Paris and Nippon Electric Corp. (NEC) of Tokyo.

No, it's not the users. Nor is it Honeywell, which sold out for less money than many thought it could and should have gotten. Instead, some users quip, the grand prize winner is that old favorite, the Berlitz School of Languages.

"From what I've heard, a lot of Honeywell employees are taking quickie courses in French," says one user, who requested anonymity.

The common opinion of Honeywell followers and users is that it'll take more than proficiency in French to make this deal successful. Despite Honeywell officials' claims of "business as usual," Honeywell Information Systems (HIS) is going where no computer company has gone before. Its customers, employees, manufacturing facilities, and R&D labs are being swallowed up by the first computer entity owned jointly by U.S., European, and Japanese partners.

It may be the first with ownership that stretches east and west, but it's certainly not the first time a grand alliance has been formed to defend that increasingly rare turf known as the mainframe computer market. Unisys, to name the most recent example, has driven its flag into what it hopes is the high ground of the power of two. Unlike the Sperry-Burroughs conglomerate, Honeywell executives are not yet portraying themselves as potential IBM killers. Instead, the first order of business appears to be putting a stop to an eroding market share.

Honeywell, says Stan Lauck, president of the Honeywell Large System Users Association, "can't compete head-on with IBM as a mainframe vendor. They've stated they must coexist with IBM."

Lauck points out that HIS has been moving into niche markets. One is manufacturing, its parent company's strength. Others are local and county government and health care industries.

A Minicomputer Focus

HIS executive vice president Jerome Meyer, in a recent interview with DATAMATION, gives indications that that may be Honeywell's strategy. Much of the growth HIS is looking for won't come from Honeywell's traditional battleground: mainframes competing with IBM. Instead, HIS is counting on its recently announced DPS 6 medium-range minicomputers. "The mainframe market is growing at the 5% to 6% range," comments Meyer, "but all sorts of markets are spawning [elsewhere]. We are looking at our DPS 6 line as the product that takes us into new markets."

All three companies involved in this latest alliance have been longtime associates—NEC supplies Honeywell's top-of-the-line DPS 90, Honeywell owns more than 2% of Bull, Bull buys part of its DPS 7 computer technology from NEC, and so on—but joint ownership of a lagging computer company could be a unique challenge.

Meyer, while excited and optimistic about the new, as-yet-unnamed company of which he will be top manager, admits that "Clearly, NEC is a separate company and Bull is a separate company and they will have separate strategies. Honeywell, too, has its own strategies."

Funneling three parent companies' wishes, skills, and cultures into one company, therefore, is sure to be a challenge, but users say there really were few alternatives.

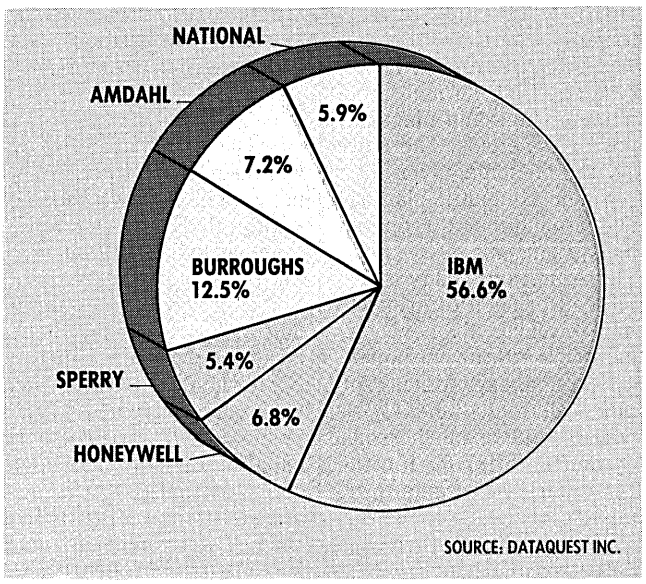
"It can't get any worse" than it was, says Kenneth Bodger, vice president of systems at McDonnell Douglas Corp., Torrance, Calif. "Honeywell hasn't had their heart in the computer business for the last four to five years and that was real obvious to the user. [Now] we'll have a commitment to doing a good job for the customer base that they'll want to protect.

"It will be interesting to see the remnants of the BUNCH and see how IBM takes advantage of it. And I'm sure they will. Users either want the security of the IBM name or [in some cases] some will feel foreign ownership is an issue."

As Bodger indicates, removing itself from day-to-day involvement with the sluggish computer industry has been a Honeywell goal. For the first nine months of 1986, HIS profits fell 39% from the same period a year earlier. By watering down its HIS interest, Honeywell is free to concentrate on its multibillion-dollar controls and aerospace concerns. To drive that point home, Honeywell recently purchased Sperry's aerospace unit for $1.03 billion.

Honeywell was so anxious to sell that for 57.5% (a 42.5% stake going to Bull and 15% to NEC) of HIS, it will gain only roughly $175 million in cash. Given HIS's 1985 revenues of $1.85 billion, the price Honeywell set "is a crime," says Kidder, Peabody & Co. Inc. assistant vice president Bahar Gidwani. Honeywell said late last month that as a

FIGURE 1 **Mainframe Market Share**



result of taking a loss on the sale of a majority interest in Honeywell Information Systems to Bull and NEC, it would take after-tax charges against fourth quarter earnings of about $575 million, resulting in a 1986 loss of about $380 million.

A Fair Price?

Honeywell officials will say only that they think they got a fair price. Others claim NEC and Bull had slicker investment bankers, and that Honeywell, which so obviously wanted out of a languishing computer operation, was in no position to push up the price. Additionally, Francis Lorentz, Bull managing director, told DATAMATION in Paris that there was another potential buyer, which he refused to name.

"This operation was advantageous to both Bull and Honeywell [but we all were] in danger of losing out if the deal did not go through amicably," says Lorentz.

It's easier to see NEC's and Bull's interest in the venture. Neither wanted Honeywell in potentially unfriendly hands. By virtue of the pact, Bull and NEC each gains a ready-made U.S. distribution arm as well as easy access to Honeywell's blue-chip customer base of 10,000.

The three are in the process of sifting through product offerings and plans for possible overlaps. There are sure to be some, given their common computer platform built around the GCOS operating system.

A first possibility is that instead of each offering its own terminals, the new company will settle on one universal version, says Meyer. Another calls for NEC and Honeywell to settle on one personal computer offering for the U.S. Honeywell wants to offer NEC-designed compilers. There are many other such potentials for savings.

JEROME MEYER: Looking at niche markets.

Although the ties clearly are there, easy answers aren't. For now, HIS management will run the show, but Bull will have most of the say. A new nine-member board of directors will be set up, with Bull naming five directors, Honeywell three, and NEC one. Bull can, and probably will, pick up another 22.6% of HIS from Honeywell in 1988, say Honeywell insiders.

Bull control makes some nervous and Bull is sensitive to those concerns. "We will maintain the continuity of the existing management," says Lorentz. "There won't be many Frenchmen appointed to the company. Those that are sent over will be put there to strengthen relations. The firm must remain American."

Improvements Needed

One area that all Honeywell users say can stand improvement is new products. Although Honeywell over time has looked to remarketing products from Bull and NEC as a way to keep up-to-date, delays in enhancements is a loudly voiced criticism. For example, one user cites the seeming slowness in providing certain virtual memory capabilities—in particular, compilers for the GCOS 8 operating system. Another is that the new version of the DPS 8 system, first introduced a decade ago, is not expected to be unveiled until the latter part of 1987.

"Obviously the gain for the three of them is a collectively broader marketplace," says Bob Hench, vice president and general manager of information processing technology at General Electric Information Services Co., Rockville, Md., one of Honeywell's biggest customers. "The gain for us is that the stronger and healthier your vendor is, the better off you are. I'm also looking for a greater influx of new products."

Primarily, most users look to NEC to provide real technological leadership. Although not a concern of Hench's, others say their initial optimism for the deal was somewhat tempered by NEC's smaller than anticipated involvement.

A number of users contacted by DATAMATION say that when Honeywell first discussed the possibility of the three-way deal last fall, NEC was portrayed as becoming an equal partner.

"I guess I was hoping for a little stronger NEC participation," says Daniel Robert, senior vice president of information services, Coleco Industries, Hartford, Conn. "The only thing I can read into it is that it's all NEC had to put in to get what they wanted."

Although Honeywell officials say NEC did discuss a variety of equity positions, it is not known whether the Japanese giant planned all along to take no more than a 15% interest. The officials stress that NEC and Honeywell will continue work on a new high-end mainframe, a follow-on to the DPS 90, to be unveiled in the next few years. One of NEC's top goals in investing anything was making sure nothing interrupted that development or marketing of the current DPS 90.

Product development may be the easiest task for the new company. Marketing issues are a different matter.

The new consortium's first job is expected to be holding onto current customers and then attracting new buyers. Joe Alexander, Honeywell director of software product marketing, points out that NEC's emphasis has been on the engineering and scientific communities, whereas Honeywell has concentrated on commercial applications. HIS probably will follow NEC's lead and target more scientific users in the future, he says.

Applications Needed

A big task will be pressing for more third-party development, without which HIS is doomed. Even users association president Lauck comments that "One serious deficiency Honeywell had was application software. It will be an uphill battle. It's a matter of ensuring third-party vendors that the marketplace will be there. The R&D dollars the three companies can put together may be a big help."

"IT CAN'T GET ANY WORSE" THAN IT WAS.

But some current customers might not hold on. "I've not found Honeywell very reliable in what they say," charges Bobbi Ozier, chief of computer systems management divisions at the Army's Military Traffic Management Command, Oakland, Calif. "Releases, in particular of operating systems, take a long time." Her base is operating under a contract with

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Honeywell that concludes in 1992. Pressed as to whether she'd choose Honeywell again, Ozier says, "I personally wouldn't."

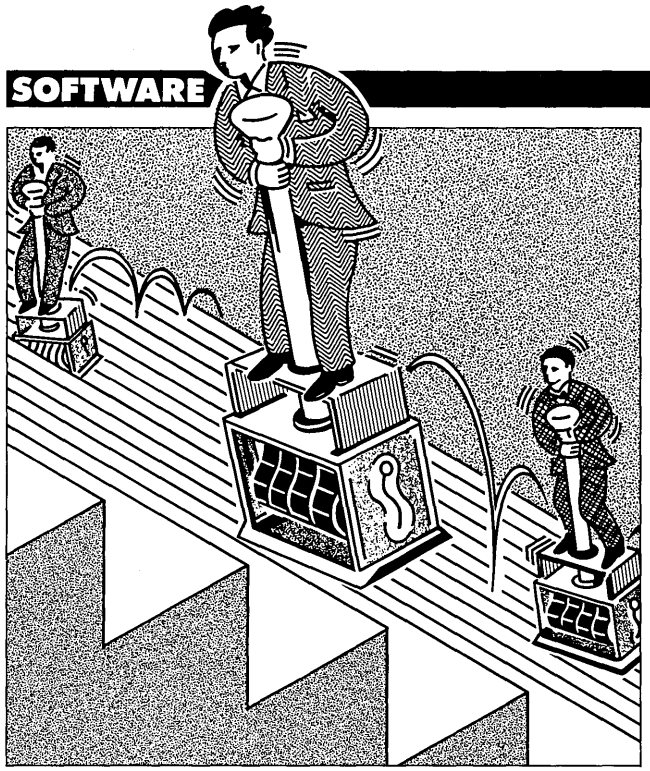
Honeywell may face competition within its own ranks. Honeywell is expected to be the largest customer for the new company, buying systems for internal data processing, reselling systems to the federal government (Honeywell's $250 million Federal Systems Division was left out of the deal due to concerns about foreign ownership), as well as bundling Honeywell computers with Honeywell control and industrial automation systems. As to the latter two, Meyer denies speculation that other Honeywell divisions will stop buying Honeywell gear once the deal goes through.

"There is documented commitment" that Honeywell will continue buying systems from the spun-out group, says Meyer. Yet, third-party developers say they are receiving cautious inquiries from other Honeywell divisions to the possibility of using external equipment. Roger Schell, president of Gemini Computers Inc., Carmel, Calif., is one of them. Gemini supplies Intel Corp. microprocessor-based systems to users with high-security requirements. Honeywell's Federal Systems Division is now "a potential customer. A year ago they weren't," says Schell.

Yet, Honeywell may have gained more than it lost. "To me," says Kimball Brown, a Dataquest Inc. industry analyst, "the three most 'feared' competitors of IBM are DEC, Tandem, and NEC. Though I don't think IBM's scared of anybody, these three present the chance of being problems. It should be interesting." ■

Correspondent James Etheridge in Paris assisted in the reporting of this article.

SOFTWARE



Taking the Cue from Big Blue

Independent software companies are picking up the beat of IBM's new software pricing policies.

BY JEFF MOAD

Users trying to determine exactly how IBM's October introduction of graduated pricing for mainframe software will affect their future software costs may want to wait a bit before totaling up all the pluses and minuses. If the signals coming from the industry's third-party software suppliers are any indication, MIS managers are going to have a lot more graduated pricing to factor into the equation later this year.

Most mainframe third-party systems software suppliers are planning to follow IBM's lead in switching from a policy of standard, one-time charges per product on VM and DOS/VSE systems software to one based on the power of a user's hardware, with users of larger systems paying significantly more than those running entry-level machines. That means by the third quarter of next year, when IBM starts shipping its new midrange 9370 system in volume, the majority of IBM VM and DOS users—those with 3083 systems and below—will enjoy lower one-time charges on systems software from third parties as well as from IBM. It also means users of large IBM 3081, 3084, and 3090 systems running VM and DOS will face higher one-time price tags on all systems software as third-party companies copy IBM in raising charges to high-end users to compensate for price cuts at the low end.

And it looks as if VM and DOS systems software pricing isn't all that will change. Most third-party software vendors contacted recently by DATAMATION expect graduated pricing to become the norm for applications programs as well as systems software. Moreover, all indications are that graduated pricing eventually will make its way into the MVS/XA and MVS/SP operating system environments.

First to react will be systems software third-party vendors with products running under VM and DOS/VSE. Companies such as VM Software, Reston, Va., and Computer Associates, Garden City, N.Y., are actively planning to adopt pricing policies based on cpu size. "We have already decided we're going to participate in the 9370 market, so we pretty much have to go to some kind of value-pricing structure to compete," says VM Software marketing vice president Ronald Kral. "It's one thing to sell a $50,000 piece of software to someone running a $7 million 3090, but someone running a $300,000 9370 is going to say, 'Wait a minute.' We have to consider lowering the price if we want to sell to him, which we do."

Cuts at the Low End

Likewise, Computer Associates "probably will do something to come up with value pricing based on system size," says ceo Charles B. Wang. "We have to do something if we don't want to end up out of line with hardware prices at the low end." Both Kral and Wang say their companies are likely to have graduated pricing in place by IBM's 9370 shipping date.

Also drawing up graduated pricing plans are third-party vendors Sterling Software Inc., Dallas; Pansophic Systems Inc., Oak Brook, Ill.; and Cincom Systems, Cincinnati. Eventually, says analyst Scott Smith of Donaldson, Lufkin & Jenrette Securities Corp., "They all [third-party soft-

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ware companies] are going to go to graduated pricing. It allows them to compete at the low end, and it's also a way of increasing revenue. It is a mistake to look at graduated pricing as a price cut. Overall, it's a price increase."

While the third-party vendors prefer to focus attention on their plans to cut low-end software charges, most acknowledge that price increases for products running on large systems will be part of the package. "We haven't zeroed in on a decision yet, but we'll probably go with graduated pricing, and that will mean some price increases," says Pansophic president William Nelson IV. "In fact, under graduated pricing, IBM and the rest of us will probably end up getting more revenue out of the spectrum of prices, while at the same time we can be competitive at the low end. It gives us a chance to have our cake and eat it too."

Exactly how individual users are affected by graduated pricing depends, of course, on software mix, cpu size, and discounts. Comparing the new IBM plan, which covers 122 program products, to the previous prices for the same products, 3081, 3084, and 3090 users choosing the one-time charge option, for example, will pay 125% more than they used to for CICS/DOS. They will pay 116% more for ACF/VTAM V2. At the same time, low-end 9370, 4321, 4331, 4341, and 4361 users pay 44% less than they used to for CICS/DOS and 46% less for ACF/VTAM. While all systems software prices dropped for low-end users, some prices for programs running on the large machines were unchanged. Others increased by over 200%.

Some current IBM mainframe users are just beginning to realize that graduated pricing may mean increased prices for them. "We had been hoping we would get a price break, but most of our systems fall in the high-end group defined by IBM, so I guess that won't happen," says Mike Mitchell, MIS director for San Francisco-based Levi Strauss Co. "We do have some small DOS shops, so we're hoping the overall increase won't be too great," he adds.

Applications May Be Next

But the increases may be just beginning if, as some market participants expect, graduated pricing is extended by third parties to include applications and if, as IBM is hinting, the MVS environment also changes over to graduated pricing. Pansophic's Nelson says the same logic behind graduated pricing for systems software also applies to applications. "The trend will be for all software to be priced on a value basis. We're looking for ways to make all software fit the customers' needs. To the extent a product can benefit a customer, whether it's systems software or applications, we'd like to be able to sell it to him." So, companies like Pansophic are likely to try to raise prices for applications running on high-end systems.

Cincom Systems is also planning to go to graduated

WILLIAM NELSON IV, president, Pansophic.

CHARLES B. WANG, ceo, Computer Associates.

pricing for applications as well as systems software. "If it makes sense for systems software, it makes sense for applications," says Cincom president Dennis Yablonsky, who also acknowledges that this will mean higher prices for users of larger systems and more revenue for the software vendors.

Cincom currently charges for its Mantis application development software on the basis of the number of terminals attached to the system. Cincom may create a graduated pricing schedule based on both system size and number of terminals. "Our goal is to come up with as many ways as we can to define functionality and price accordingly," says Yablonsky.

Most users seem willing to accept IBM's introduction of graduated pricing as logical or else they are resigned to the idea because they have no alternative. "There's not much we can do about it. We're stuck because IBM has a lock on the market for those systems software products it sells," says Paul Barnes, MIS manager for Portland-based Oregon Blue Cross.

It's not clear, however, that third-party suppliers will have the same kind of clout getting their users to accept graduated prices. It may be especially tricky getting large users to accept higher prices for applications at a time when competition has been driving some prices lower. "We've got to be careful not to offend our high-end users," says VM Software's Kral. VM, like some other software vendors, already has some limited experience with tiered pricing. Kral says VM is considering several options, including marketing lower-function versions of current products at a lower price to low-end users.

Many observers predict that eventually, with IBM's continued backing, graduated pricing will become standard practice industrywide. "It may be a little more difficult at first for third parties to sell it to their users, but that will change," says industry consultant Bob Djurdjevic, president of Annex Research, Phoenix. "The idea of charging for operating systems is only 10 years old, but it is now accepted as a standard way of doing business, and graduated pricing will be too.

"Software and services accounted for 20.9% of IBM's revenue and 19.5% of its gross margin in 1984. Helped by graduated pricing, they will account for 41% of IBM's revenue and over 45% of its gross margin by 1990," predicts Djurdjevic.

IBM Eyeing MVS

The view of graduated pricing as, in large part, a revenue-generating tool seems to be supported by the fact that, although the 9370 does not now support the MVS/XA operating system, IBM is evaluating the addition of XA program products to the graduated pricing program. An IBM spokeswoman, in a prepared response to a DATAMATION query, says, "We are looking at the requirement for and appropriateness of graduated charges and volume dis-

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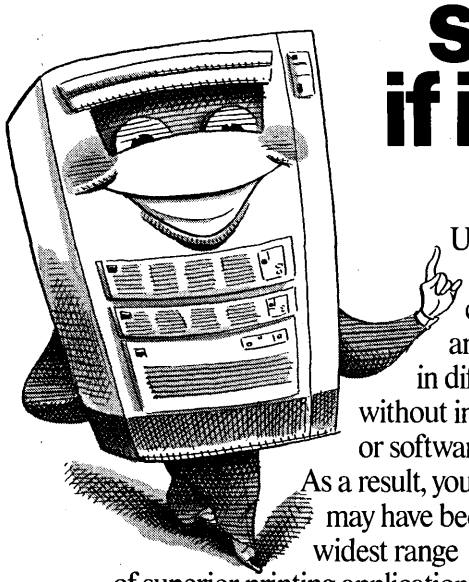

Until now, host computers couldn't "speak" to any and all printers, in different locations, without individual hardware or software enhancements. As a result, your IBM mainframe may have been cut off from the widest range of superior printing applications (read: Xerox Electronic Printing Systems) in the marketplace today.

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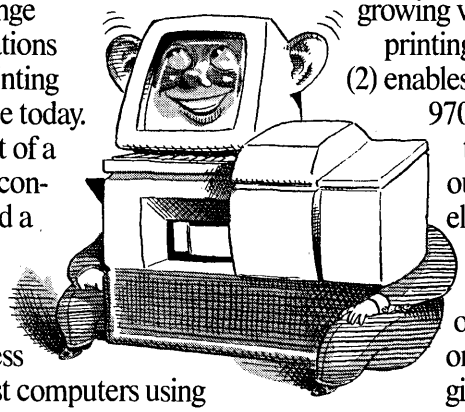

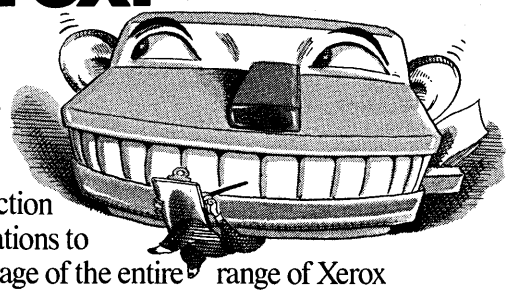

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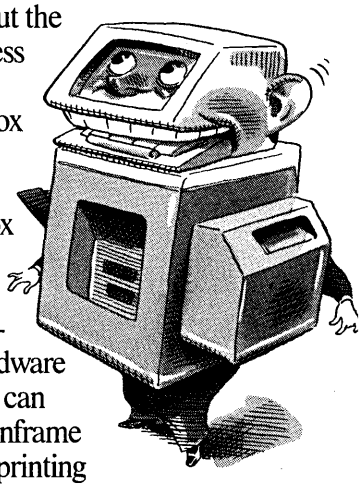

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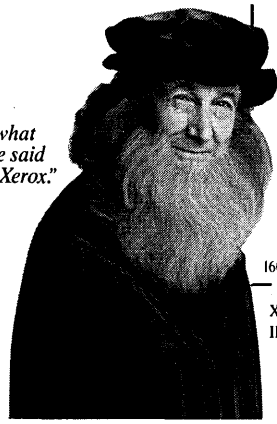

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counts for other IBM licensed programs including MVS/XA and VM/XA-SF." The spokeswoman adds that IBM currently is making no commitment to the announcement of graduating pricing for those operating systems.

The possibility that graduated pricing eventually will move into the MVS environment has even those third-party vendors unaffected by IBM's October pricing announcement making plans. One such company is Los Gatos, Calif.-based application-tool maker XA Systems Corp. "We've decided not to go with graduated pricing now because it currently pertains only to VM and DOS," says Marc R. Fey, the company's president. "But if and when it moves to MVS, we'll have to respond."

Another potential problem for third-party vendors attempting to follow IBM's new graduated pricing practices will be verifying that a user has the hardware he says he does. None of the third-party vendors have the same access to user information that IBM does, and some worry that administering graduated pricing may open up a can of worms on a par with another common industry nightmare, site licensing. "Monitoring this is going to be tricky," admits Pansophic's Nelson.

Meanwhile, some users are asking themselves just who is trying to take advantage. Says Bob Sandler, director of technical services for the Grand Union supermarket chain in Paramus, N.J., "To me this whole thing raises a question of fairness. It looks as if IBM and all the software companies are getting away from the idea of pricing products based on recovering the cost of their development and production. That's being replaced by 'whatever the market will bear.'" ■

APPLICATIONS

Yachts of Luck

Two teams hope supercomputer power can help win back the title Americans had held for 132 years.

BY KAREN GULLO

If an American yacht competes in the finals of the 1987 America's Cup races in Perth, Australia, at the end of this month, the crew will be taking along not only naval experience, craftsmanship, hope, and 65,000 pounds of aluminum boat in the attempt to recapture the cup from the Australians. They also will be taking the power and performance of a Cray X-MP/48 supercomputer.

The design and structure of both American entries, *Stars and Stripes* and *USA*, were simulated and tested on a Cray at the company's Mendota Heights, Minn., facility. At press time, the two boats were in a field of four, including French and New Zealand entries, vying for the chance to compete against Australia in the America's Cup final round.

Developed in Secret

By using computer technology to help design the boats, the Americans hoped to learn what pushed the 1983 America's Cup winner, the *Australia II*, a wing-keeled vessel developed in secrecy, over the finish line 41 seconds in front of the American contender, *Liberty*.

With diagrams and performance characteristics of *Australia II* in hand, a team of naval architects, 12-meter design specialists, aerodynamics and hydrodynamics specialists, and computer scientists three years ago began a meticulous process of testing and analyzing hundreds of different hull and keel configurations.

The team also analyzed five critical variables that comprise the physical state of a boat traveling over water: save drag, side force, lift-induced drag, viscous drag, and flow separation.

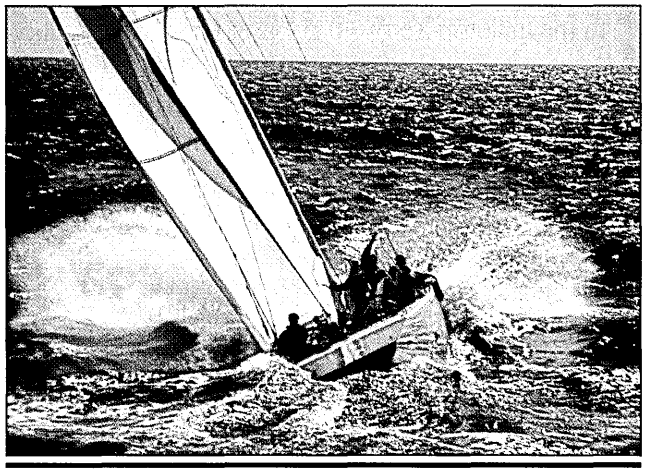
Design team members for the Sail America Foundation syndicate, San Diego, which sponsored *Stars and Stripes*, included Charles Boppe, technical specialist in aerodynamics at Grumman Aerospace; Louis Gratzer, at Boeing; and Niles Salvesen, manager of marine hydrodynamics at Science Applications International Corp., San Diego. Chief scientist for *USA*, sponsored by the St. Francis Golden Gate Challenge syndicate in San Francisco, was Heiner Meldner, a researcher in the defense sciences department at Lawrence Livermore Laboratories, Livermore, Calif.

The number one design challenge was to find a shape that cuts through water with a minimum of turbulence and drag. The effects of the flow of water around the hull were calculated, which in turn gave the characteristics of the "flat" surface produced by the boat as it sits in the water. With these results, the team could predict the side force exerted by the boat on the water at different wind speeds.

Heiner Meldner of the St. Francis design team calculated many shapes, looking at such features as overall boat length and winglets on the keel. With these data, he and a team of a dozen scientists executed a program of performance predictions. The team inputted probability curves for variables such as wind strength and wave height to predict the likely performance of various shapes in given conditions. The shapes that yielded the most favorable results were then tested by computer simulations.

Using computers to aid in yacht design for the America's Cup is not new. As far back as 1977, scientific processors were used for sail and keel designs. This year, however, as the Americans come into the race as challengers for the first time in 132 years, a boat of superior design will make a crucial difference.

Both syndicates say that their hull designs outperform the *Australia II* in computer simulation and tank testing. This, coupled with well-trained crews and luck, may put an American entry back in the winner's circle. ■



"Stars & Stripes," sponsored by the Sail America Foundation.

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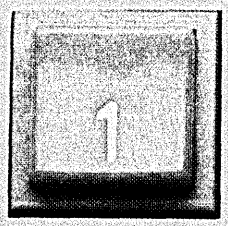

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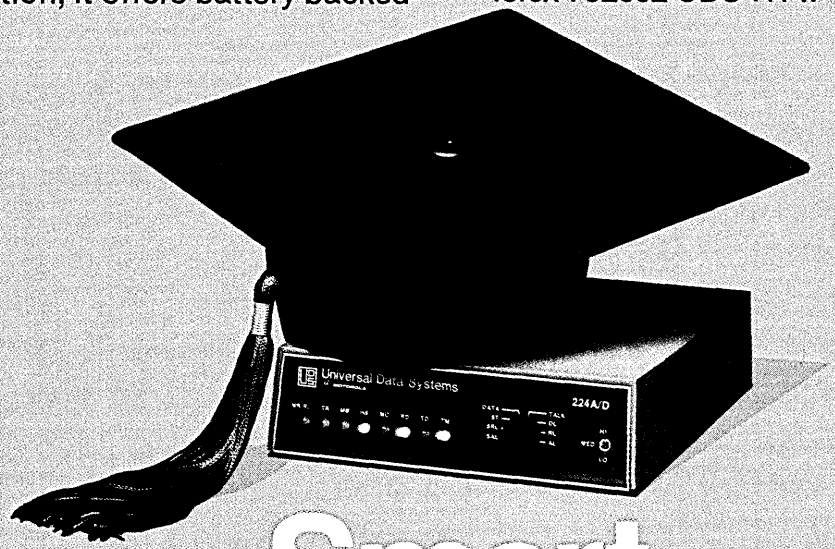

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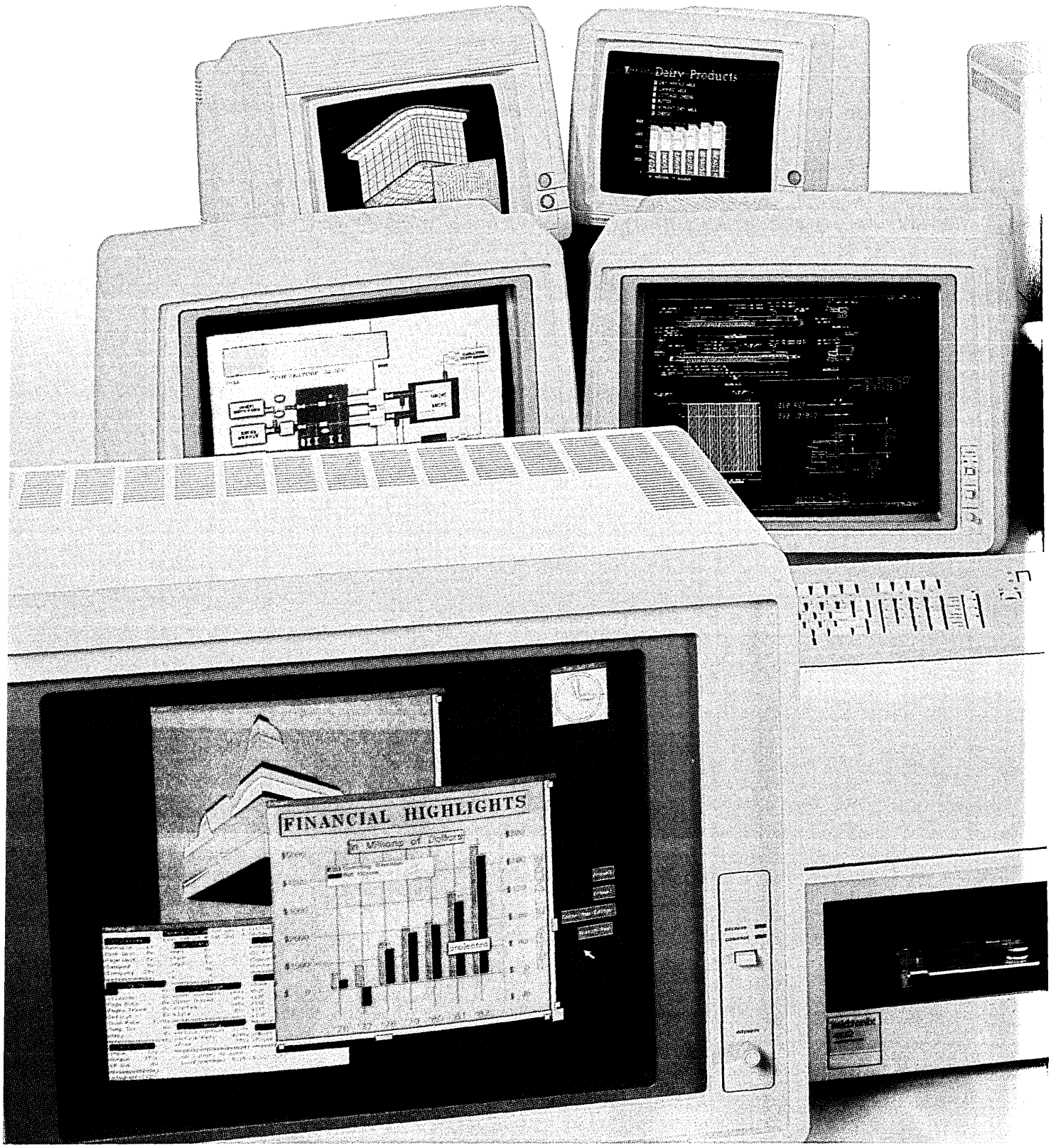

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FACTORY AUTOMATION

In the Wake of Ross

GM's need for MAP seems greater than ever, but what will EDS's role now be?

BY WILLIE SCHATZ

Roger Smith isn't the only guy in town who's had it up to here trying to deal with Electronic Data Systems. It hasn't been a blast being on the outside looking in, either.

"The time for purchasing and acquisition has lengthened dramatically since EDS came on the scene," laments the vice president of a small software company that's been trying to sell Manufacturing Automation Protocol (MAP) products to GM. "It takes four months to a year before a purchase requisition is approved. And GM plants can't do anything without EDS's permission.

"If a plant is going to buy an IBM XT, it has to pay EDS a $500 per month lease rate. The minimum lease is three years. That's an additional $18,000. Why don't they just buy an XT, expense it, and throw it away after a year? Those are the types of problems EDS has been causing."

So now what? With EDS founder H. Ross Perot and his three main men out of EDS's day-to-day affairs, will the external problems, as reflected by the software company's experiences, persist? Will EDS, which has reportedly been cool to MAP for some time, become just another stop on the GM corporate assembly line?

"Our objective is twofold," EDS chief executive officer Les Alberthal said in a statement. "To increase business outside GM at the pre-GM traditional rate of 20% per year while continuing to support GM and satisfy its expanding system and automation needs."

"MAP is continuing right on as far as GM is concerned," says Mike Kaminski, GM's MAP manager. "It's not going to stop unless we get in the position where we spend no more money on automation. The company's obviously had some problems [like a $364 million pretax loss in the third quarter of 1986]. But I'm relatively unscathed with the cuts they've made. Some departments took good hits. That makes it all the more imperative that we have automation as soon as possible. We need more of it for less money."

There's only one problem. The company GM hired for a lot of money to do the job hasn't exactly been tearing it up.

Fumbling and Bumbling

"EDS people were well intentioned, but not so knowledgeable about the plant floor," says a source who requested anonymity. "They did the best they could and tried to help, but were mostly fumbling and bumbling."

So much for great expectations. When GM acquired EDS in 1984, the automaker figured its data communications problems were history. If it was broke, EDS would fix it. If it wasn't broke, EDS would tinker with it. Never mind that the Dallas-based integrator came from an entirely different culture and might have had no experience in such minor activities as factory floor automation. EDS and MAP—matrimonial bliss.

But the systems integrator has done little more than implement MAP in five GM truck and bus plants. That's a long way from the 100% MAP takeover expected when EDS came on the GM scene. Now, Kaminski and others believe that EDS will do only part of GM's MAP work.

"EDS hates MAP," says Bob Crowder, president of ShipStar, a MAP/TOP (Technical/Office Protocol) education and training firm in Newark, Del. "They haven't had a big role on the MAP/TOP steering committee or the task force. EDS has spent the last two years trying to figure out how to integrate MAP into SNA. Now the opposition has softened, but not as much as some people might like."

That erosion is likely to continue. With Perot on the GM board, EDS was clearly an entity unto itself. When GM bought out Perot and his men, it incorporated EDS into a high-technology unit along with Hughes Electronics, Delco Electronics, and GM's defense operations. The unit is headed by executive vice president Donald Atwood.

So much for the entrepreneurial spirit, right? Wrong. Or at least, maybe.

"There's going to be more of the GM influence in the way things are done around EDS," Kaminski says. "I've seen signs of it already."

"I don't think that's going to happen," countered Steve McClellan, a vice presi-

Gearing up for the Meeting

No, the MAP Users Group isn't quite as desperate as the Mets were in the ninth inning of the sixth game of the World Series. But it's close.

"Things are askew now," admits Bob Crowder, president of ShipStar, a MAP training and education firm in Newark, Del. Crowder and other members of the MAP/TOP Steering Committee will be among about 600 attendees at this week's MAP/TOP Users Group meeting in Phoenix.

"Nobody's buying MAP version 2.1," Crowder says. "There are more vendors with product than there are users who need it. MAP can get back on track if the testing timetables and migration strategy are realistic."

No matter what the agenda says, migration is where it's at. Are companies ready to take that long walk from no network to 2.1? Or should firms hang out and wait for 3.0, which is at least six months behind schedule?

"The delay hasn't been the Users Group's fault," says Mike Kaminski, GM's MAP manager. "The AUTOFACT '85 tests weren't adequate, so there was reluctance by suppliers to commit to 2.1. Now there's a ground swell for 3.0. If companies install 2.1, there's a clear path to 3.0. But the lack of certified conformance tests has been a drag on 3.0's progress. The Corporation for Open Systems (COS) was supposed to alleviate that backlog, but it hasn't.

"We finally woke them up," Kaminski declares. "From 1985 [when COS was founded] to 1988 is a long time without doing anything tangible. We need good testing for our product demo in the second quarter of 1988."

"Migration is definitely the key issue," says Herb Falk, vice president of Sisco, a Detroit-based firm that's marketing a MAP-compatible 2.1 product that links pcs and allows remote file access. "MAP layers 3, 5, 6, and 7 all have migration changes that affect implementation as well as compatibility. The users meeting will have to start solving that."

Just what GM needs. MAP skeptics to the right, EDS doubters to the left. But not to worry. The Mets did win, didn't they?

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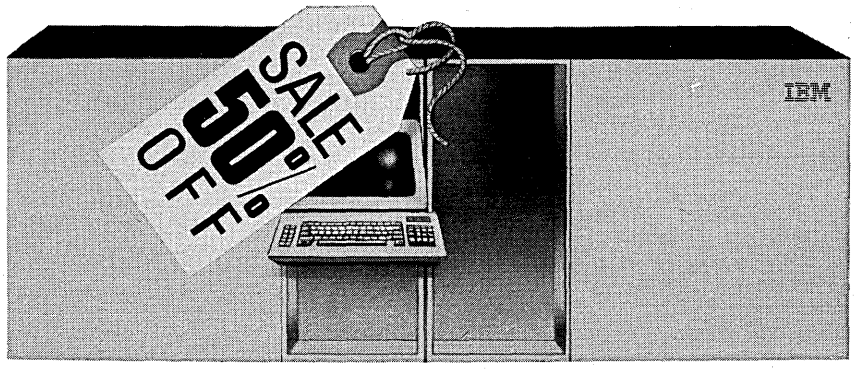

With ORACLE version 5, you save half the computer you thought you needed in order to "go relational"... some benchmarks indicate you save even more.

WHY IS VERSION 5 OF ORACLE SO FAST ON MAINFRAMES, ON MINIS AND ON MICROS?

□ REASON #1: AI OPTIMIZES QUERY PROCESSING.

V5 applies artificial intelligence to SQL query optimization. For example, few DBMSs can optimize the query "Select accounts 90-days overdue **and** accounts over $10,000." But only ORACLE can optimize "Select accounts 90-days overdue **or** accounts over $10,000."

□ REASON #2: ARRAY PROCESSING OPTIMIZES ACCESS TO LARGE SETS OF DATA.

Relational DBMSs have always dealt with **logical** sets of data. But they manipulated only one **physical** record at a time. V5 eliminates overhead by physically delivering arrays of hundreds, even thousands, of records at a time.

□ REASON #3: PARALLEL-PROCESSING OPTIMIZES COMPUTER RESOURCE USAGE.

V5 is 100% re-entrant shared code, and ORACLE's parallel-processing architecture fully exploits modern dyadic and quadratic processors from IBM, and other multi-processing computers such as those from DEC and Stratus. So ORACLE uses all the MIPS in parallel-processor configurations.

□ REASON #4: MULTI-TABLE CLUSTERING OPTIMIZES JOINS.

ORACLE stores data from different tables on the same physical disk page. This technique—called *multi-table clustering*—permits you to access data from multiple tables in one disk read operation. Clustering improves ORACLE performance on all multi-table operations, such as join queries, update transactions, etc.

□ REASON #5: HIGH-SPEED RELATIONAL SORT FACILITY OPTIMIZES DATA AGGREGATION

Ad hoc relational queries frequently request that data be grouped, ordered or otherwise sorted. V5's internal sort facility performs aggregation and elimination early, faster than previously thought possible.

□ REASON #6: EFFICIENT ROW-LEVEL LOCKING OPTIMIZES TRANSACTION THRUPUT.

Row-level locking and a read-consistency model optimizes ORACLE V5 transaction concurrency. For the first time, high transaction thruput is achieved by a fully relational DBMS.

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Mike Kaminski: EDS has a substantially improved attitude.

dent and technology analyst at Merrill Lynch, after attending a recent meeting in New York in which Alberthal asserted that EDS would retain its style.

"They're going to remain at arm's length and independent," McClellan says. "They're going to be more active going after outside business to win computer integrated manufacturing and plant automation contracts. They're going to retain their culture and entrepreneurial approach. The perception is that they're going to be lost in this new high-tech unit. But that's not true in reality."

That depends on how real we're getting.

"EDS has had a substantially improved attitude recently," Kaminski says. "Maybe that was an early warning sign that something was coming.

"In the last three to six months, EDS people have become a lot more knowledgeable and a lot more interested in MAP. They know how well MAP is going in the U.S. and they've seen that all of Europe is solidly behind MAP. They know the potential for a lot of revenue is there. They can sell their expertise as a MAP systems integrator. Folding EDS more into GM will definitely help MAP."

MAP could use it. It's had to live the badlands every day in the last half of 1986 (see "Slippin' and Slidin'," Oct. 15, p. 34).

The conformance and interoperability tests for MAP version 3.0 fell farther and farther behind schedule. Vendors couldn't make up their minds whether they should just manufacture products conforming to MAP version 2.1. Users couldn't decide whether to implement that version or wait for version 3.0. The denouement came with the announcement that the big 3.0 product demonstration at AUTOFACT '87 was no go (see Look Ahead, Dec. 15, p. 9).

"Right now, EDS looks like a mess," says Howard Frank, a Washington, D.C.-based independent telecommunications analyst. "Face it: it was a bad business deal that created all kinds of conflict.

"But for MAP, this is a little ripple in a long-term process. It takes at least a decade for new technology to percolate into the internal structure of business. It's going to be at least that long before there are MAP networks in the majority of factories. And the EDS situation is going to have no long-term impact on GM's automation effort. That's 15 to 20 years in the making."

So for all the sound and fury, we've only just begun. ■

BENCHMARKS

Massive Layoffs

Following months of rumors that large cutbacks were coming, AT&T has announced that it will eliminate 27,400 jobs and chalk up a $3.2 billion charge against earnings. In addition, AT&T says that the cutbacks may cause it to suffer a loss for the three-month period ended Dec. 31. The work force reduction will result in an 8.5% cut in ranks to 290,000 employees by 1988, when the cuts are to be completed. The move is necessary, AT&T says, for it to be competitive in its key businesses.

U.S. Launches Probe

The Reagan administration has announced an investigation into the sale of Japanese supercomputers in the United States. The Houston Area Research Center (HARC), a nonprofit research consortium of Texas A&M, the University of Houston, the University of Texas at Austin, and Rice University, has been severely criticized by U.S. supercomputer companies—including Cray Research and Control Data—for buying its supercomputer from NEC Information Systems, a U.S. subsidiary of Nippon Electronics Corp. of Japan. Deputy U.S. Trade Representative Alan Woods says the investigation will cover all aspects of Japan's supercomputer pricing practices to determine whether U.S. companies are being put at an unfair disadvantage and whether Japanese government funds used for R&D are legal trade subsidies.

Settlement Reached

Microsoft Corp., Redmond, Wash., has agreed to pay Seattle Computer Products Inc. $925,000 to settle a lawsuit involving licensing rights to Microsoft's MS/DOS program. Under the settlement, Microsoft agreed to buy back licenses that Seattle Computer claimed gave it rights to resell the original version and subsequent updates of MS/DOS. In its suit, Seattle Computer claimed that it was entitled to resell MS/DOS as a result of a 1981 license agreement it signed with Microsoft.

Federal Bidding

It may well be the procurement to end all procurements. The Federal Telecommunications System (FTS) 2000 contract will run 10 years and is estimated to be worth from $4.5 billion to $50 billion. The bidders are many. Martin Marietta Corp., Bethesda, Md., got together with MCI Communications, Washington, D.C., Northern Telecom, Nashville, and the seven regional Bell operating companies. Then AT&T and Boeing Computer Services, Vienna, Va., joined the fray. BCS will add project management and systems integration to AT&T's network expertise. They were followed one week later by Electronic Data Systems, Dallas, and U.S. Sprint Communications, Kansas City.

Challenge to GM

Legal challenges to General Motors' $750 million stock buyout of EDS founder H. Ross Perot and three other EDS executives have surfaced as expected. Milledge A. Hart III, a founder with Perot and former president of EDS, filed a class action suit in New York State Supreme Court. In addition, a shareholder suit filed in federal court in Detroit seeks to block the stock purchase by GM.

Hart's suit contends that the buyout is a breach of the GM board's fiduciary responsibilities to both GM and to shareholders of GM Class E stock, the instrument created when GM acquired EDS. Hart owns 140,000 Class E shares, and a family trust is said to have the same amount. A hearing in the state court had been scheduled for Jan. 16. ■

LAN REPORT 5

A Hard Look at LAN Choices.

Novell's LAN Report Package makes choices easier.

The flexibility of local area networks allows users to assemble LANs using network components that best suit the needs of the installation. But choosing those components can be a confusing process.

Novell, Inc., has published two reports designed to make the process easier: the *LAN Operating System Report 1986* and the *LAN Evaluation Report 1986.*

These reports help users evaluate network components and make informed decisions when choosing the components that meet their needs. Hardware and software issues are separately evaluated in the two reports, and extensive performance benchmarks are included.

Software Choices.

Choosing a network operating system, or LAN software, is the most critical aspect of designing a network. Simply, the better the operating system, the better the network. The *LAN Operating System Report* contains an in-depth analysis of LAN software, beginning with an examination of LAN software standards such as MS-DOS 3.1 and NETBIOS, and the file server environment. Issues like internetworking, system reliability, security and performance are addressed as well.

The *LAN Operating System Report* also evaluates Novell Advanced NetWare, the IBM PC Network Program and 3Com 3+. The report shows users how the design and implementation of these products translates into real performance.

Hardware Options.

The *LAN Evaluation Report 1986* focuses on evaluating network hardware. It examines hardware issues that affect LAN performance, including an analysis and benchmarking of major LAN products.

"Hardware and software issues are separately evaluated in the two reports..."

A key element of the study is the NetWare Evaluation System. The system provides a mechanism for matching site needs to specific hardware. Whether a new network is being planned or an existing site is being upgraded, the study is useful in the performance evaluation of any network.

System planning starts with the network interface card (NIC) and cabling. NICs analyzed in the study are:

- AT&T StarLAN
- Corvus Omninet
- Davong MultiLink
- Gateway G-Net
- IBM PC Network
- IBM Token Ring
- Interactive Systems Vista LAN/PC
- Nestar PLAN 2000
- Novell S-Net
- Proteon ProNET
- Standard Microsystems ARCNET
- 3Com EtherLink
- 3Com EtherLink+

The report analyzes each NIC according to its access scheme, raw bit rate, on-board processor and NIC-to-host transfer method.

Another important component of the LAN is the network server. In examining network servers, the *LAN Evaluation Report* looks at several performance indicators. Processor type is the most obvious feature to differentiate servers. However, other factors important in determining server performance are also evaluated, including processor clock cycle speed, wait states, server memory cycle speed, memory channel and transfer bus channel. And the report examines the effect of disk channel speed on network performance.

In addition to providing a careful examination of LAN hardware, the *LAN Evaluation Report* features an evaluation formula. Using the formula, a LAN's estimated future site activity is measured and matched to the appropriate LAN hardware.

To Get the Reports.

The *LAN Operating System Report 1986* and the *LAN Evaluation Report 1986* are available free of charge from Novell. To obtain a copy of the Novell Report Package, call or write Novell Corporate Communications, 122 East 1700 South, Provo, Utah 84601, (801) 379-5900.

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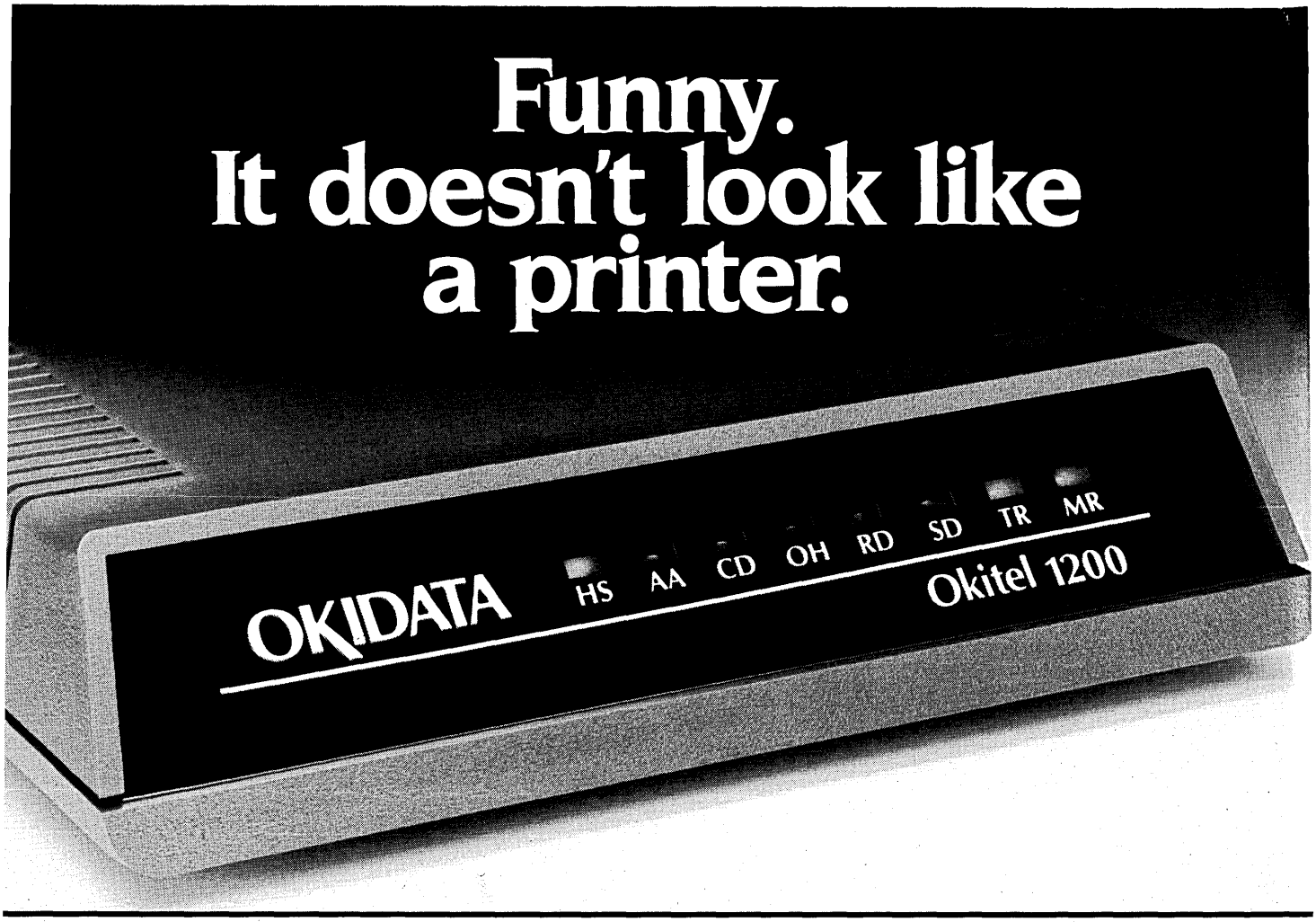

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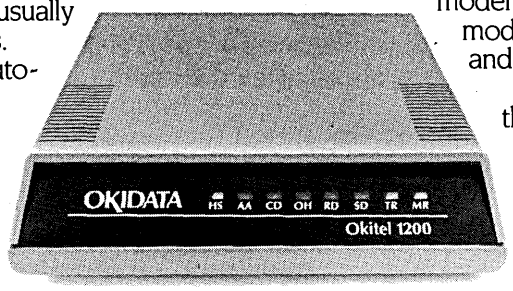

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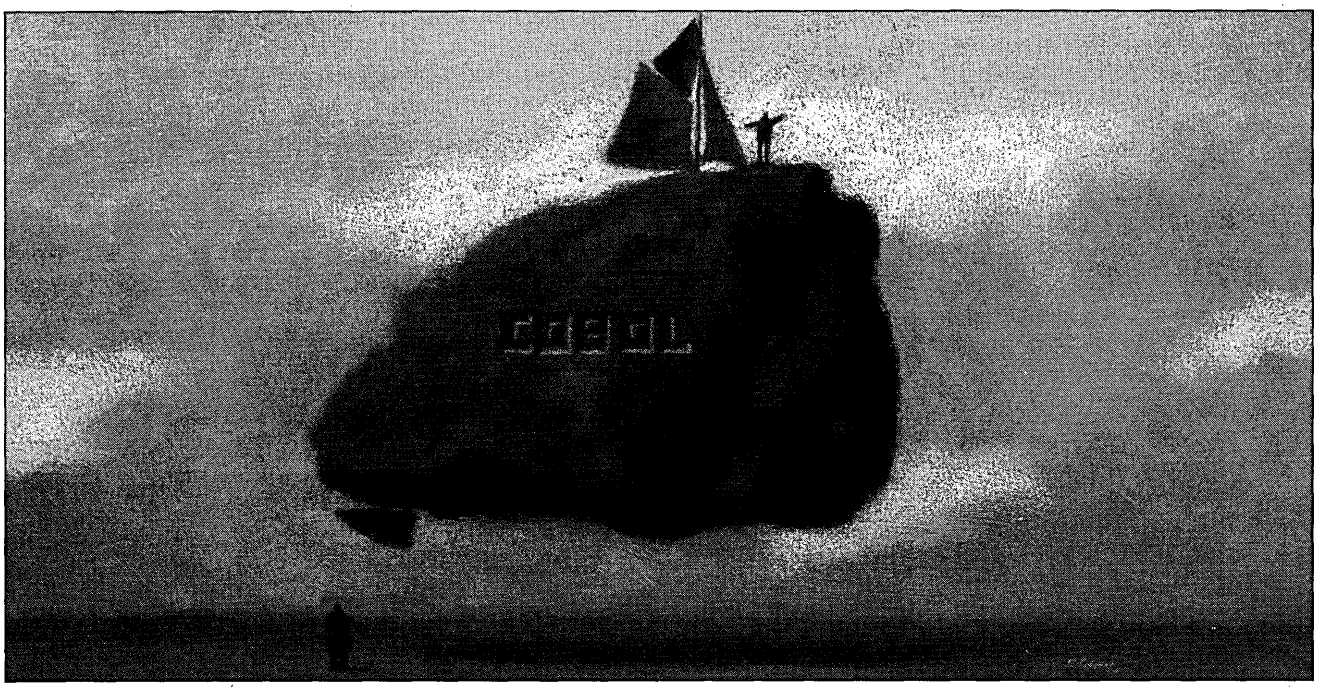


Illustration by Rob Colvin

Steady as She Goes

With the aid of an improved standard and new maintenance tools, COBOL is keeping a steady grip on dp shops despite the incursion of 4GLs.

BY KAREN GULLO

As COBOL celebrates its 28th birthday this year, it is a language marked by both change and continuity. With an estimated 70 billion lines of code in use worldwide, COBOL is the premier programming language in today's dp shops, controlling areas like manufacturing, distribution, and finance. Even as other development tools such as fourth generation languages have emerged over the last decade to challenge COBOL, it continues to thrive. "No one is tired of talking about COBOL, because it never goes away," observes one vendor in the COBOL world.

There's plenty to talk about these days. Recent events are changing COBOL and having a big impact on users. The establishment of a new standard by the American National Standards Committee (ANSI), the emergence of new products and restructuring tools that promise to automate the costly process of maintaining code, and the development of pc-based tools are giving COBOL a long-overdue shot in the arm. Though the effect of these developments has only begun to be felt by users, in the long run it is likely to shake up an otherwise staid corner of the dp industry.

In September 1985, ANSI adopted a new standard for COBOL, called COBOL 85. It introduces structured programming to the language and allows it to be migrated more easily from one piece of hardware to another. The new standard eliminates certain language elements that were deemed obsolete, such as double character substitution and enter statements. The first products to implement this standard, notably compilers, began appearing on the market this past summer.

While observers in the COBOL world say the new standard is long overdue and its features advantageous for users, COBOL 85 has met with concern among users because its implementation would require the huge task of rewriting programs that were written under COBOL 68 or COBOL 74, the previous standards. Those programs won't run if they are recompiled on a compiler that conforms to COBOL 85. After October of this year, products sold to the government must embrace the new standard.

Consternation over COBOL 85 began several years ago when it was just beginning to be formulated. Today, with the standard in place, the concern has not lessened. COBOL 85 "scares me," says Jim Doyle, manager of programming support at Raytheon Co., Waltham, Mass. "I haven't looked at it in depth, so we're not sure how it will affect us. We'll eventually have to rewrite our programs, but we'll do it as late as possible." Several vendors now offer COBOL compilers that adhere to the new standard. Among them are California companies Ryan McFarland, Rolling Hills Estate; Micro Focus, Palo Alto; Tandem Computers, Cupertino; and Hewlett-Packard. Mike Saccomanno, director of product marketing at Ryan McFarland, says the company's compiler eliminates the need to rewrite code by including a "switch" that enables users to alternate between existing COBOL 74 features and COBOL 85. Programs can be compiled under either standard.

Makes Life Easier

The feature certainly makes life easier for users who have previous versions of Ryan McFarland COBOL compilers. Ed Fisher, systems analyst at the Apollo Services group at United Airlines in Austin, says conversion to COBOL 85 was "relatively painless. When we wrote our code, we knew another version of COBOL would come out." Fisher started out using the switch, but now has con-

verted almost all his code to the new standard. He acknowledges, however, that conversion may not be so easy for users who have used compilers from vendors other than Ryan McFarland. Furthermore, continuing to compile programs under COBOL 74, he points out, only prolongs, not solves, the problem of rewriting programs.

Saccomanno agrees, saying that compiling in both standards could prove to be a problem in the maintenance cycle of the code when programmers have to be aware of the existence of two different standards. But, he says, "We support [COBOL 85] and believe that's what the world wants." Meanwhile, "a lot of the user base is not concerned about COBOL 85 yet and is not in a hurry to convert."

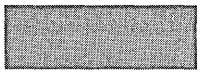
The Struggle with 4GLs

Do the features of COBOL 85 make it a more viable programming alternative to so-called advanced programming languages? COBOL has come under siege in the last decade from a variety of 4GLs on the market that have been particularly successful in dp shops for development of new applications. According to Vaughan Merlyn of Merlyn Consulting, Atlanta, the new standard does not make COBOL any more competitive, but it gives the language more "wind."

"COBOL 85 is simply a long-overdue update of the standard to reflect modern methods. It should have been done 15 years ago," Merlyn says. He points out that there are two schools of thought concerning the use of COBOL vs. 4GLs for development. "There are those who feel it's important to preserve COBOL, that COBOL generators are the way to go, and there are those who say COBOL is worthless, let's get rid of it, 4GLS are the way to go. The more COBOL code you generate, the more COBOL code you have to maintain," Merlyn says, "but people want to use a language that's tried and true." While 4GL vendors wholeheartedly agree that COBOL is alive and well, they say that their products are being used more often for new applications development. There is evidence from both users and studies that this claim is more than just product hype. "Most mega-applications are still being done on COBOL," says Dave Litwack, executive vice president for product development and technical support at Cullinet Software, Westwood, Mass., "mainly due to the maturity of compilers. A 4GL is not up to par with the 20 years of technology behind COBOL compilers, but it's catching up fast." Cullinet's 4GL product, ADS/Online, is in use at 2,000 sites, Litwack says. "As to how it's being used, we don't have any hard statistics, but we think it's being used in about 80% of all new development."

Tom McLean, vp of marketing at Cincom Systems, Cincinnati, says in-house studies show that customers use Mantis, the company's 4GL product, more than COBOL to develop new applications. Seventy-five percent of all new applications are developed with Mantis, the studies show, and users project that 70% of their portfolio of applications in 1990 will have been developed using Mantis. "The sooner you get away from COBOL, the better," says McLean. "The maintenance costs are too high. When you do maintenance, that's the time to rewrite the program using Mantis. That's what a lot of our users are doing." McLean says Cincom is close to releasing a product that will generate an interactive, interpretive compiled language.

Other 4GLs on the market include Natural from Software AG, Reston, Va.;



"THERE'S NO REAL MICRO COBOL MARKET."

Focus from Information Builders, New York; Ramis II from On-Line Software International Inc., Fort Lee, N.J.; Ideal from Applied Data Research, Princeton, N.J.; and Nomad2 from D&B Computing Services, Wilton, Conn.

As for code generators such as Pacbase from CGI Systems, Pearl River, N.Y, Telon from Pansophic Systems, and APS from Sage Systems, Rockville, Md., their popularity seems tied to a large extent to the faith MIS has in a proven code. "The buyer who is spending X amount of money on a productivity tool and then spending X amount to use the application," says Merlyn, "is not willing to invest in a 4GL for fear that the vendor may change direction or go out of business. At least with a cogenerator, you know what you're getting and you can rely on it."

Nevertheless, along with generating COBOL code comes the task of maintaining that code, a royal pain for every dp shop. COBOL applications are changed and refined by any number of programmers over the years, so that when it comes time to make a modification in the program to reflect a new business rule, for instance, a programmer can spend hours poring over stacks of printouts containing lines of code. Over the past few years, a number of products have been introduced that vendors claim will automate the process of program analysis, coding, compiling, and testing. One such product, available since last July, is Via/Insight, from Viasoft Inc., Phoenix.

The software does program analysis that captures information about the COBOL program and then sets up an interactive, on-line query session during which programmers can trace logic paths. Via/Insight is priced at $60,000 for a 99-year license. Viasoft president Ken Petzold says that the problem of maintaining code is one that has been overlooked by the software industry. "COBOL isn't the problem," he says. "It's provided dp shops with solutions for 20 years. It's maintenance that's the enemy. Eighty percent of the problem is being addressed by only 20% of the vendors."

Transforming Code

Another product, introduced in November 1985, comes from Language Technology, Salem, Mass. Called Recoder, the product is said to automate the process of transforming unstructured spaghetti COBOL into structured code. Company president Bill Engel says the product reduces a program's structure to its simplest form and then runs a new abstract of the syntax tree through a COBOL generator that outputs structured chart and control flow reports. Language Technology had marketed the product as a service before it began making it available in license form. A perpetual license is $150,000; yearly, it's $75,000. "The emphasis in today's dp shops has been on buying tools for development," says Engel, "but the magnitude of the maintenance problem is so great it can no longer be ignored."

In November, Language Technology introduced a product called Inspector for automatically measuring the testing of industry standards and degree of structure in COBOL programs. Other maintenance products on the market include Superstructure from Group Operations Inc., Washington, D.C.; Fastbol

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CIRCLE 21 ON READER CARD

from Analytic Sciences Corp., Reading, Mass.; and PerFix from Triangle Software Co., San Jose.

Wide Acceptance Still Pending

So far, user acceptance of COBOL maintenance products has been relatively low. Viasoft has only 21 customers, while Language Technology has sold just 23 Recoder licenses. Some observers say they are not surprised to hear that COBOL users are not exactly knocking down vendors' doors for these products. "The shops I talk to don't have maintenance budgets," says Merlyn. "They've been doing it the old way for so long that they don't think about spending money on maintenance solutions. The new technologies are coming from small companies with low visibility and low budgets. It will be another year before these technologies gain wide acceptance."

The users who have invested in maintenance products have high hopes that they will increase programmer productivity. "We are planning on seeing a big benefit from our investment," says Dale Campbell, manager of the manufacturing support department at Texas Instruments. "The feature that allows tracing of logic flow backwards and forwards is outstanding. This is one of the most significant tools we've ever purchased."

At Phillips Petroleum, Bartlesville, Ohio, both Via/Insight and Recoder have been implemented. Delbert King, branch manager of dp support systems and applications productivity, explains that Phillips programmers are using Insight to learn programs quickly. "We brought Recoder in to help eliminate an old COBOL generator. We wanted to upgrade that portfolio, so we run it through Recoder and make it a structured program." King finds the strategy "very cost-effective."

Certainly, cutting costs and increasing productivity is important to a company like Phillips, where the oil slump has resulted in a smaller staff of programmers to do maintenance work. "We've cut back mainly in the area of new applications development," says King. "We're interested in ways of making maintenance more cost-efficient."

Other users remain skeptical of maintenance software. "We've looked at [the products]," says Jim Doyle at Raytheon, "but what a program looks like on the surface is not always what it looks like in design. Getting rid of the go-to does not make structure."

Micro Tools Being Tested

Along with maintenance software, another up-and-coming technology for COBOL is pc-based development tools. Almost all users queried by DATAMATION said they were either using on a trial basis or evaluating such products in order to ease the programming workload off the mainframe and onto micros or workstations. Companies like Knowledgeware Inc., Ann Arbor, Mich., which in the fall merged with Tarkenton Software of Atlanta, are developing pc-based systems that combine the features of a mainframe-based COBOL generator with micro software for systems analysis.

"Ronald, do you want to put the air-bassoon down for a moment and say hello to our guests?"

Cartoon by Nick Downs

Al Hershey, chief technologist at Knowledgeware, says one of the company's goals is to automate the creation of code based on program analysis. The technology has been called computer aided software engineering (CASE). The company plans to meld the technologies of Tarkenton's Gamma program, a mainframe-based COBOL generator, with the micro-based systems analysis products from Knowledgeware. In the near term, Hershey says, the company will release a pc version of Gamma.

Pansophic is completing the beta testing of Telon pc, a microcomputer version of the COBOL generator. The product will be available this quarter, according to Sue O'Brien, Telon marketing consultant. Jim Doyle at Raytheon has been trying out Telon on a trial basis. "We're in the process of bringing micros on for support and to start working on building applications," says Doyle. "We hope to eventually move a large piece of our COBOL programs off the mainframe."

Micro Focus recently released a new version of VS COBOL Workbench, a development tool for both mainframe and micro applications. The new version includes the ability to handle programs, records, and data items of virtually any size and enhanced screen handling capabilities for micro applications, according to the company. Micro Focus also offers Forms-2, a COBOL program generator for micros.

Phillips's King says his shop just started doing development work on micros. They are using Information Builders' Focus. "It's fairly new," he explains. "Our end users have been used to it, but not our applications people."

Some users say micro-based development tools have a ways to go before they are accepted in the marketplace. "There's not a real mature microcomputer COBOL market out there," says Ed Fisher at United Airlines. "We're evaluating some products and we're more impressed with what we see now." But, he feels, there are no products available yet that are sophisticated enough to work with portions of United's applications.

Such tools, along with COBOL maintenance software and the new ANSI standard, are keeping both users and vendors on their toes. "Ten years ago we thought COBOL had a 10-year life span," says Paul O'Grady, cofounder and vp of worldwide sales at Micro Focus. "Now, with the new standard, the language has at least another 10 years." ■

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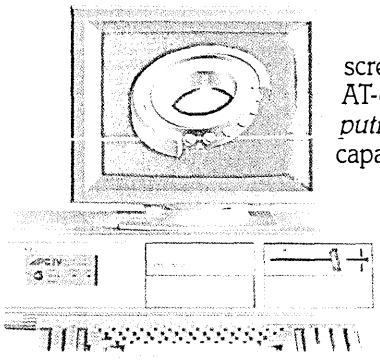

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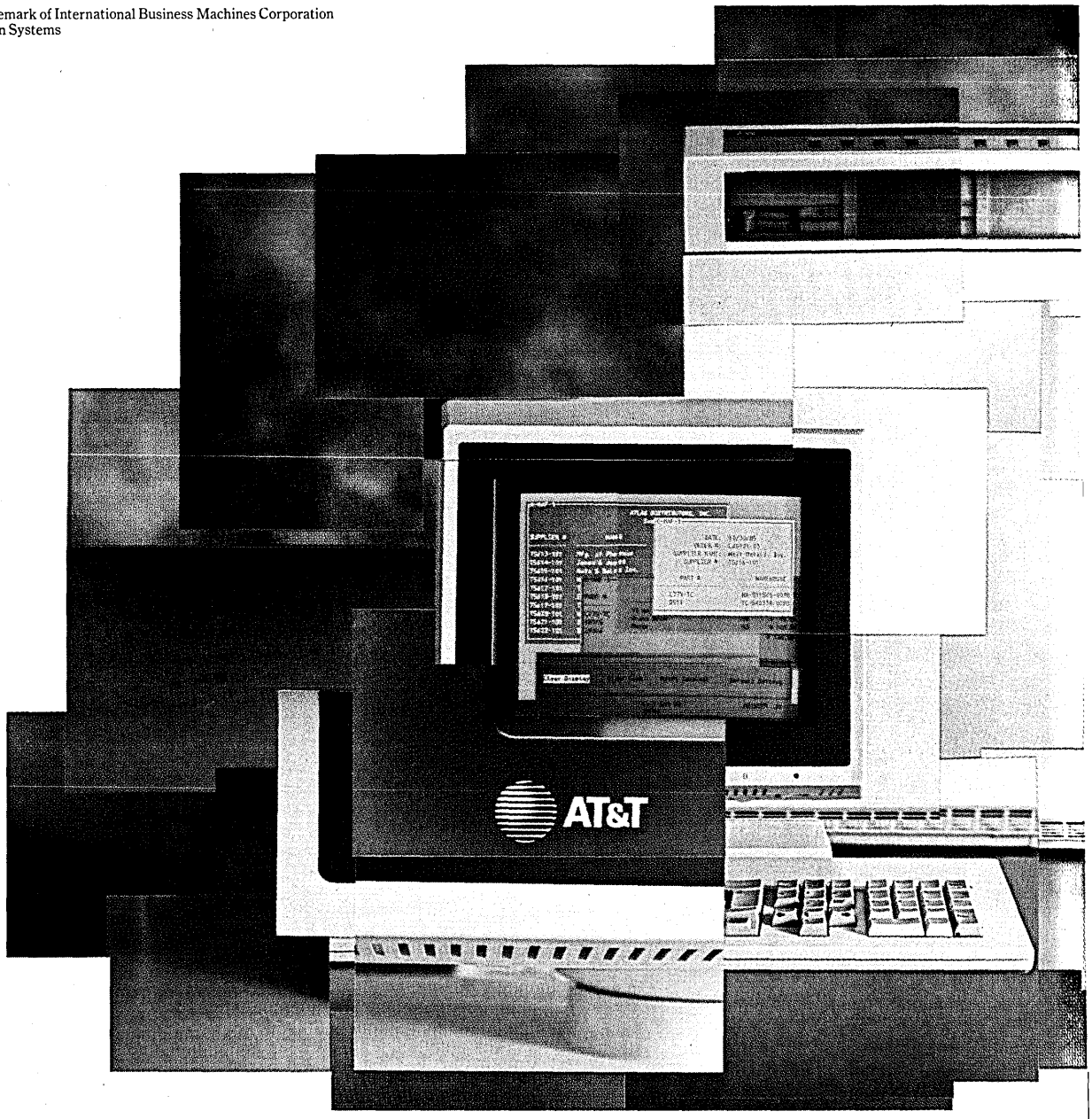

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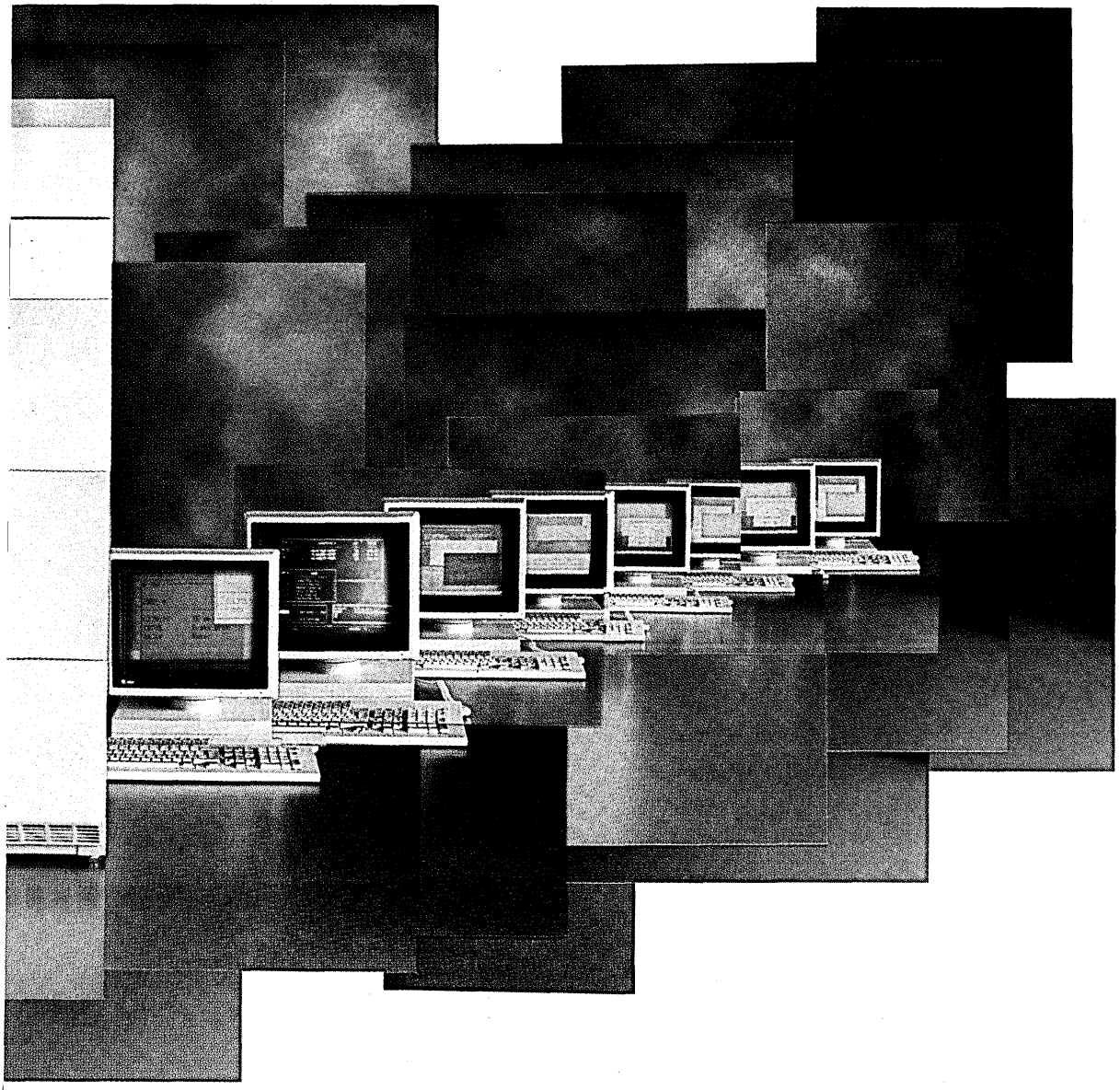

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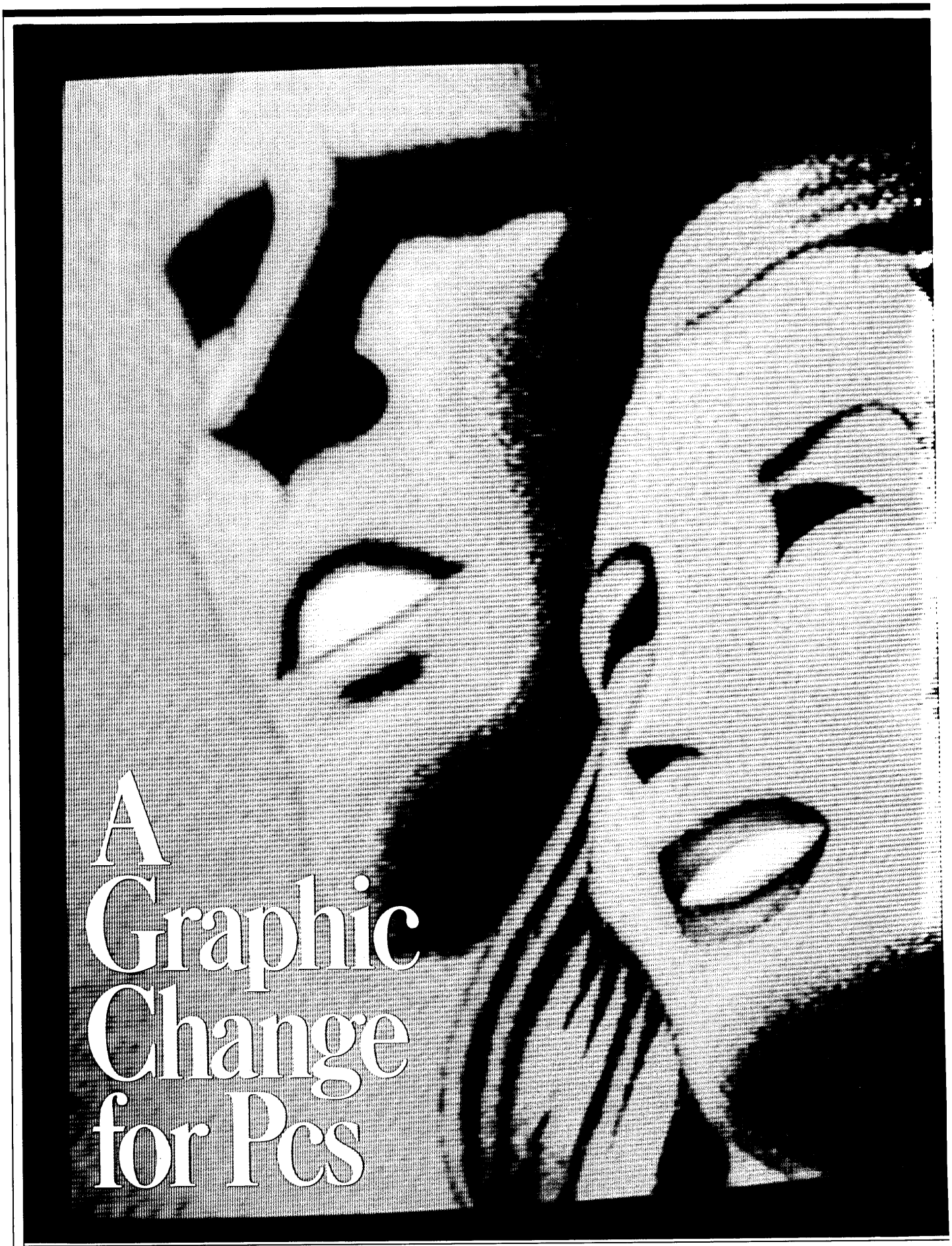


A Graphic Change for PCs

Photograph by Steve Cooper; illustration by Bill Nelson

ABSTRACT

Graphics packages are increasingly seen as a cost-effective tool for the corporate realm. But with over 150 software packages to choose from, potential users may have difficulty putting the graphics marketplace into focus. Understanding that all graphics packages fall into one of three categories may ease that confusion.

BY EDWARD M. FISHER

What's black and white and read all over? It's not the old-fashioned business report anymore. Far-sighted pc users have taken a cue from the glitzy newspaper *USA Today*: make it snappy and make it colorful. Aided by presentation-quality graphics software—and the steady improvement of the hardware used to transfer images from pc screens to printed page—businesspeople are reinventing that report, jazzing it up with impressive charts, graphs, and drawings.

"The whole notion of what business graphics are, and what the uses of graphics in business are, is getting much, much broader than it ever was before," says Dave Tarrant, general manager of Lotus Development Corp.'s Graphics Products Group, Waltham, Mass. "With the advent of graphics output devices that make it possible for people to put a good-looking graphic on a piece of paper, graphics are being used more and more." High-resolution graphics interface cards, color pen plotters, laser printers, and film recorders are a few of the devices extending the possibilities of graphics software (see "Picturing the Hardware").

While only 9% of all business pc users today work with graphics packages—Microsoft Corp.'s Chart, Ashton-Tate's Diagram-Master, and Software Publishing Corp.'s Harvard Presentation Graphics are representative examples—by 1990, some 25% will use the tools, says Sean O'Connor, director of Ashton-Tate's Graphics Product Center, Westport, Conn. "Considering that graphics will invade all areas, probably 80% to 90% of all users will touch some kind of graphics-oriented application on their pc," predicts John Page, vp of research and development at Software Publishing Corp., Mountain View, Calif.

To the users of presentation graphics programs, the benefits are clear. "There's an awful lot of preparation work when you're doing charts by hand. With a pc, I can do everything myself," says Bob Freeman, a management information analyst at Con Edison in New York. "The turnaround time is much faster, plus I have complete control over it." Freeman prepares

monthly "trend books" filled with charts and tables detailing every aspect of the huge power utility's far-flung operations.

Corporate decision-makers of every stripe are beginning to view graphics packages as highly cost-effective time-saving tools. "Instead of a graphic artist taking 10 days' turnaround time and $50 to prepare a slide, the quality of graphics hardware and software is at the point where you can do it cheaper with a micro," explains Brad Burnett, a New York-based marketing representative for Shaw Data Services, who regularly makes presentaions to investment managers in banks and trust departments. Indeed, costs have dropped dramatically: a 35mm slide or color plot of a graph can be produced for less than $2 a copy.

Those savings have spurred buyers to shell out some $359.2 million on pc graphics software in 1986, according to Dataquest Inc. The San Jose-based market research firm estimates that by 1990, 1,760,000 programs will be sold, generating $418.1 million in revenue.

With over 150 software packages to choose from, however, potential users may have difficulty putting the graphics marketplace into focus. The fact that all graphics software programs fall into one of three categories—charting, drawing, or word charting packages—may ease that confusion. Charting packages, like Microsoft's Chart, Ashton-Tate's Chart-Master, and Lotus's Graphwriter, convert data into colorful line and bar graphs as well as pie charts. Many programs feature on-screen menus to guide novice users through the chart-making process. Selections usually allow the user to tailor the size, colors, and arrangement of the various components of the chart. Some charting packages also have decision support features that help to calculate and put into graphic form a range of data used in financial analysis, such as linear regression and standard deviation.

Drawing packages produce more sophisticated output. Organizational charts, PERT charts, even, says one software maker, "charts which look like a United Way thermometer," are the domain of packages like Ashton-Tate's Diagram-Master, Apple's Macdraw, and PC Draw from Micrografx Inc., Richardson, Texas. Some packages even draw maps.

Chart Packages Flexible and Versatile

Why dub such chart makers "drawing programs?" Because they also let pc users paint free-form pictures, with the size of the printer's paper and the computer's memory serving as the only constraints. Being flexible, drawing packages generally demand that the user have some artistic aptitude. More important, producing a complex drawing-program chart or picture is slower going than running off a chart-program chart. For that reason, "drawing" accounts for less than 20% of the material included in a typical business presentation.

To ease the trials of pc paintsmiths and thus boost the percentage of pictures in presentations, some software manufacturers have begun adding canned images to their drawing packages. With a cursor or mouse, users can call up ready-made computer symbols, borders for pages, and pictures of flags, currency, human forms, even highway signs.

Commonly invoked tasks such as creating an organizational chart are also being built into drawing packages. "If you want to do the chart, instead of putting each box where you want it and putting the test in each box, we ask you what the structure of your company is and then we draw the organization chart for you [automatically]," explains Ashton-Tate's O'Connor.

A large category of presentation graphics—perhaps the largest category—depends more on words than pictures. So-called word charts (tables, to the uninitiated) include title pages for reports, viewgraphs or foils for business presentations, and agendas for meetings.

Although such charts can be put together using many word processing or charting programs, dedicated word charting packages—like GEM Wordchart from Monterey, Calif.-based Digital Research Inc.; Textchart from Hewlett-Packard; and Slidewrite from IBM—are more adept at helping executives spew out these text-intensive images.

Further progress in ease-of-use

The ETS Experience

Roger Kershaw, director of the Technology Research Group at Educational Testing Service, Princeton, N.J., describes some of the recent improvements in pc-based graphics that should enable standardized tests to be offered on a micro. In addition to job-related certification tests for industrial customers, ETS administers—under contract with the College Board in New York—several well-known college and graduate school admissions tests, including the Scholastic Aptitude Test (SAT) and the Graduate Management Admission Test (GMAT).

Transferring from paper-based tests to computer-based tests offers the advantages of immediate scoring and reporting along with improved test security. Computer-based tests also enhance the tester's ability to give hints and explanations of answers. ETS's R&D effort toward this transfer begins with the selection of hardware and software tools for both development systems and delivery systems. What we want to end up with is a system that will conform to our standards for displaying a wide array of shades and colors and be compatible with standards that prevail in the intended market. For micro-based tests meant for the school market, this means our target system must be IBM-compatible or Apple, requiring at most a modest hardware upgrade.

A recently completed R&D effort at ETS was designed to transfer to a micro a program of tests, previously paper based, known as the College-Level Examination Program. CLEP, which is offered by the College Board, is a way for students to gain equivalency credits for college courses. Many of the CLEP test items concerning the arts contain complex pictures of sculptures, paintings, and art objects. Until recently, capturing and displaying these pictures for a computer-based test was well beyond the scope of existing pc graphics technologies. With IBM compatibility targeted for our delivery system, we quickly determined that, at a minimum, we would need to include an add-in video interface board. This board, which would convert digital images to analog, would deliver those full spectral black-and-white or color analog images

to a non-IBM standard RGB (red, green, and blue) analog color display.

ETS's research staff chose the tools for development and delivery. The host machine was to be an MS/DOS 8088 or 80286 machine with 640K RAM, a 20MB hard disk and one 5¼-inch floppy drive, a Sony PVM monitor, a standard digital RGB monitor, and a Color Graphics Adaptor (CGA)—the IBM standard color video interface. We chose two add-in cards from AT&T as required components within our system unit: the Image Capture Board (ICB), which is primarily for image acquisition, and the Video Display Adapter with Digital Enhancement (VDA/D), which is for analog and digital RGB display. With the VDA/D, we found that we could even utilize the standard IBM digital monitors for effective reproduction of art-related source material.

The differences in display characteristics between the prevailing IBM video interface standards—both CGA and the emerging Enhanced Graphics Adapter (EGA)—and the AT&T VDA/D originate at the level of digital circuitry. The IBM Color Display system normally does not allow users to modulate the intensity of the output of a standard three-color electron gun system. By contrast, an analog video signal, such as that of VDA/D, delivers a variable voltage to the electron guns driving the crt phosphors, thereby producing on the analog display a wide and varying range of hues and colors. By converting digital information into analog form and simulating analog modulation to an RGB digital display, the results, given a substantial color palette, are very realistic.

For capturing the art-related source materials, the JVC GX-N8PC(U) color camera with RGB attachment has proven to be the best single-tube camera for our application. With a low to medium resolution of about 300 by 300 lines, the camera works well with the ICB for digitizing.

There remains a very important link in the development process—namely, putting these hardware components together in software products. In fact, this is the crux of our development effort. Whenever feasible, we attempted to modify existing software development tools to interface to the AT&T enhancement boards we added. We were thus able to create new functions that capitalized on existing features.

The less obvious task facing systems developers is a second level of integration—combining the existing software development tools with those required to support the advanced graphics products. Since our current methods of software development at ETS include the use of an in-house authoring system written in C, it was not a difficult transition to make. The AT&T developer's tool kit software is also written in C, so embedding functional support within our proprietary authoring system was much simpler than attempting to develop software bridges from scratch.

Once the images had been captured—using either the software tools included by AT&T, custom programs linked with subroutines from the ICB C tool kit, or AT&T's Truevision Image Processing Software (TIPS)—we used the TIPS artist package to make any necessary alterations. We found that once TIPS was learned, our flexibility in image enhancement and manipulation was limited only by artistic aptitude.

Questions that we now pose to ourselves concern where beyond our immediate applications development needs we can take this technology and how might future trends in such areas as interactive video and CD-ROM technology be combined to increase the power and flexibility of each other? We are now looking into the use of animated material to introduce situation-based criteria for assessment purposes. It was previously impossible to include animated material either in a paper-and-pencil exam or a simple graphics-based computerized test. While the use of animated video images is not an innovation in the computer industry, it is one that greatly widens the range of media that can be used for educational assessment.

We have already developed prototypes using interactive videodisks supported by the capabilities of the AT&T line of hardware and software. From a developer's viewpoint, the results have been as phenomenal and unexpected as those achieved by the initial inclusion of realistic static images. We are indeed eager to continue our pursuits in this direction.

should come in the form of standards for transferring, or importing, data from an applications program such as a spreadsheet or database into a graphics package, already a common practice in the mainframe and minicomputer arena. Because their output is so visible, the old garbage in, garbage out adage is particularly relevant for graphics packages, many of which require specially formatted input.

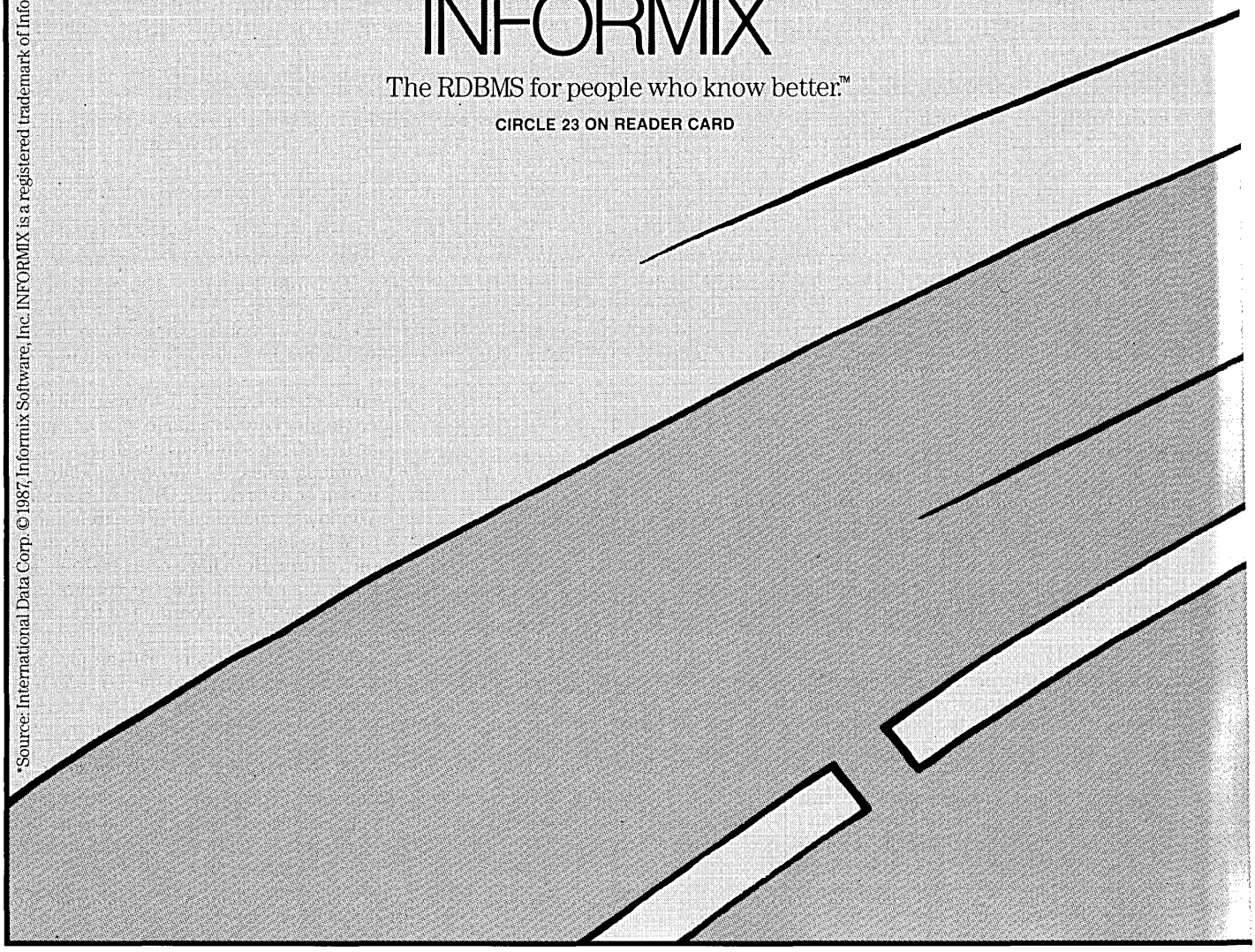
To help pc users get at essential data, many microcomputer software companies are specifying that their graphics programs will utilize standardized output files.

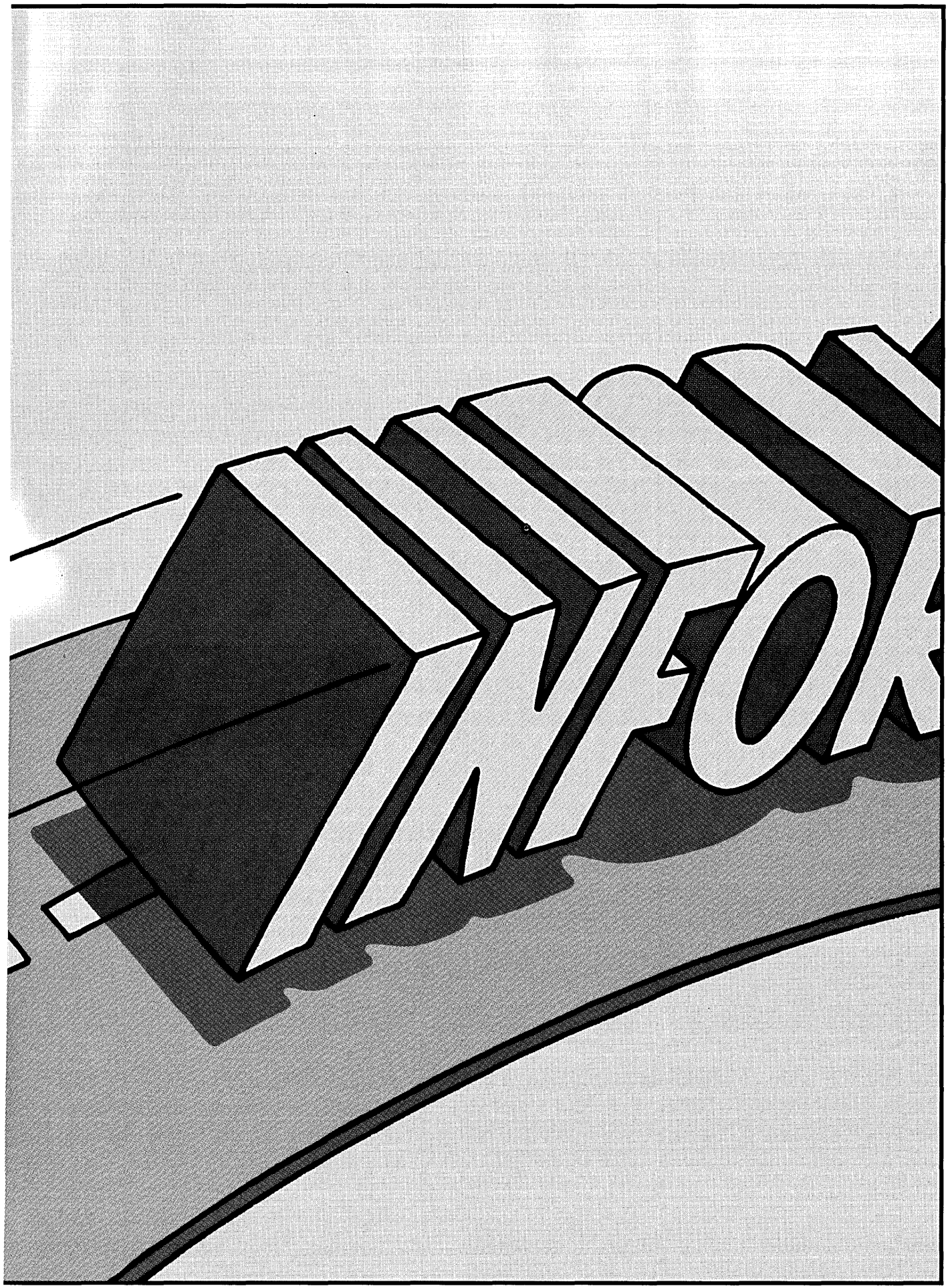
For maximum utility, the data-sharing feature should also be coupled with the ability for simultaneous screen display of both the graphic and the original data-bearing program. "What I'd like to do is have a window for my Lotus spreadsheet and a window for Chart-Master so I could go back and forth between them," contends Lew Brentano, a Dataquest analyst. That simultaneous display environment, called "windows," already exists in software form. Both Microsoft's Windows, and Digital Research Inc.'s GEM graphical user interfaces implement the feature. Both have been available for more than a year and are coming into widespread use. According to Brentano, however, "One of the drawbacks of [Microsoft's] Windows is that the physical drawing of information on the screen is very slow."

"IN THE NEXT YEAR OR TWO, DESKTOP PUBLISHING WILL PROBABLY DRAW IT ALL TOGETHER."

Lack of speed has become a common criticism of software windowing programs on today's pcs. In the future, more powerful hardware-based windows may be available as pcs based on Intel Corp.'s new 32-bit 80386 microprocessor hit the market.

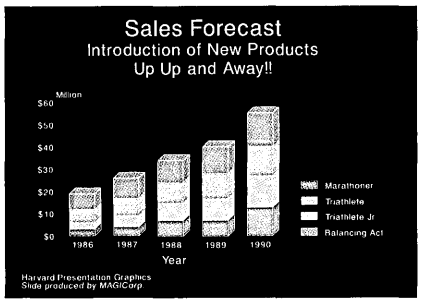
Tomorrow's graphics software packages, meanwhile, will become multi-



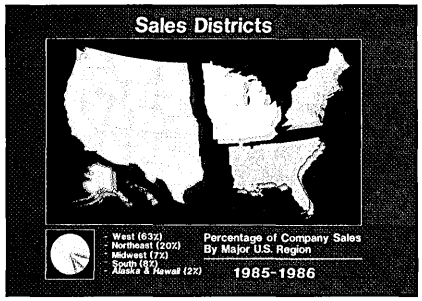

INFO

purpose. Already, a nascent trend is the integration of both charting and drawing features into a single program. "People ought to have graphics software that doesn't divide up among drawing and charting and symbol libraries and painting. They want graphics processing the same way they want word processing," asserts Lotus's Tarrant.

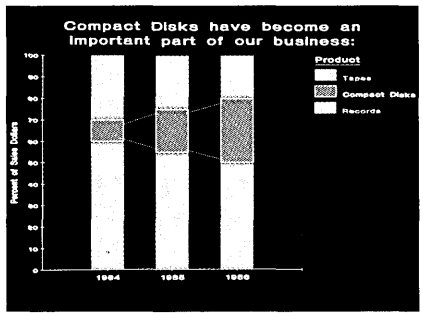
Ultimately, all pc presentation graphics software may be integrated within the desktop publishing category. Shaw Data Services' Burnett predicts, "In the next year or two, desktop publishing will probably draw it all together.



Charting programs convert data into colorful line and bar graphs, as well as pie charts.



Some drawing packages draw maps automatically.



Many charting packages feature on-screen menus to guide novice users.

A Graphic Change for Pcs

You're going to have a color laser printer that has graphics capability inherent in it, and you're going to be able to mix that with word processing to create really high-quality reports. As a result, you'll be seeing more and more reports looking like bound books."

Integration on the hardware front may also be on the horizon. "We're halfway through the evolutionary steps required to get good quality computer-generated pictures for things like presentations and desktop publishing," says John Page of Software Publishing Corp. "The next step beyond that will be dealing with actual video pictures. Then what you will start seeing is an amalgamation of computers and facsimile. [There will be] interactive networks of video where electronic mail is involved, and you will be able to send video images of presentations [across the network]." ■

Edward M. Fisher is a New York-based writer specializing in electronics and technology.

Picturing the Hardware

Technological advances may soon change the look of graphics software, at least when viewed on typical pc screens. "In terms of video displays, we are in a transition phase," says John Page, vp of research and development at Software Publishing Corp., Mountain View, Calif. That change centers around the graphics display card, the pc plug-in board required when running most graphics programs. Board manufacturers are scrambling to figure out what the ultimate graphics display card will look like.

Many have gone for EGA, the Extended Graphics Adaptor standard developed by IBM to add colors and improve resolution to its PC displays. "I don't think the issue is settled yet," Page says. "I don't think the EGA is the end point. EGA will evolve over time to become the minimum graphics capability on [pcs] and, in fact, will probably become the standard before long at no extra cost. What will happen is that companies like IBM will come out with some new standards up at [the desktop publishing] end of the market and that will become the de facto standard for everyone."

New standards will probably feature an on-screen resolution of at least 1,200 horizontal dots, or pixels, by 800 vertical pixels. In contrast, the typical EGA card can display 16 colors simultaneously at a resolution of 640 by 350 pixels. (The typical pc monochrome monitor also displays 640 by 350 pixels, but without color.)

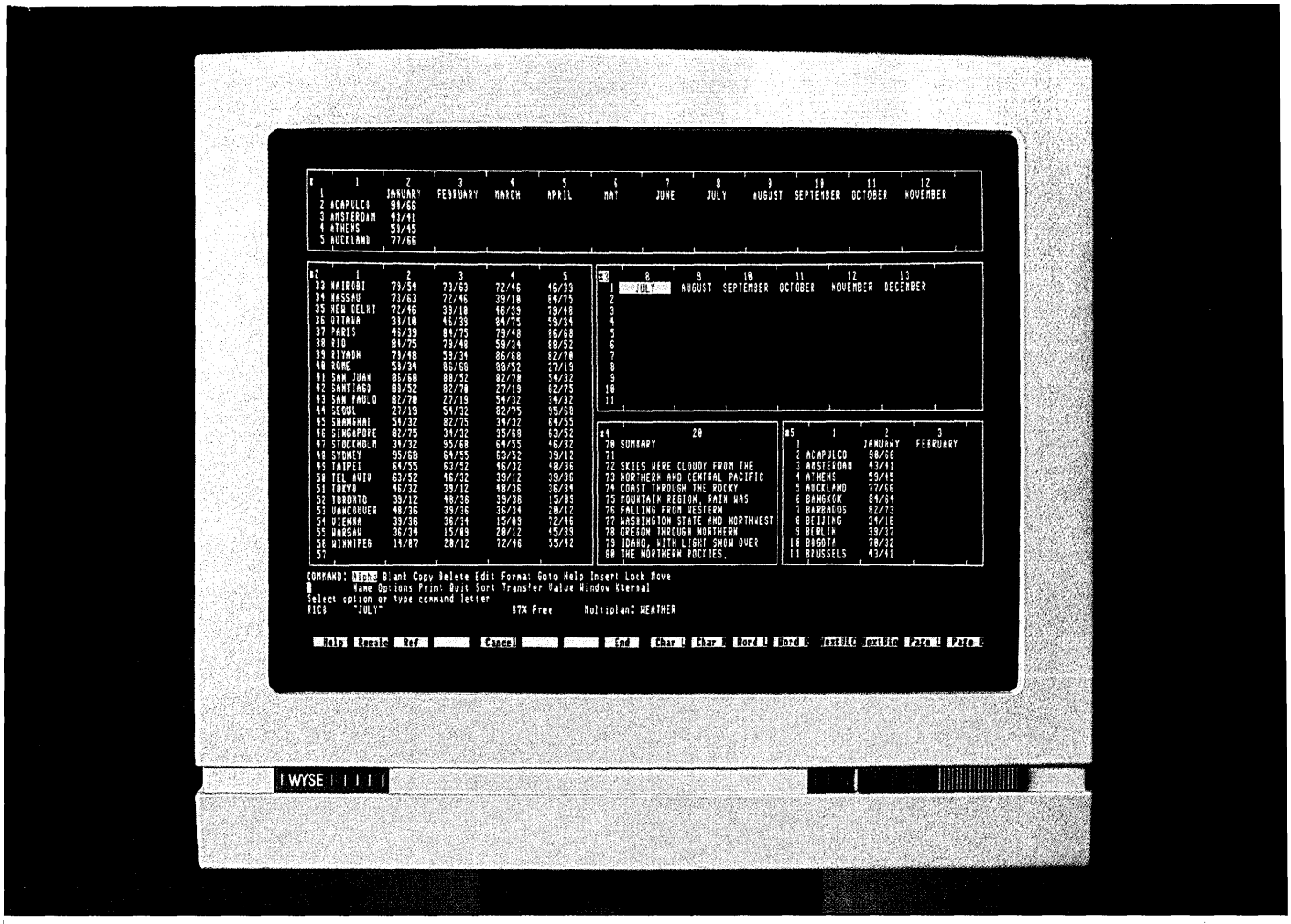
While pc screens are useful for previewing graphs, most live presentations require paper on the table. That provision has been a sticking point for the graphics industry, however. "The principal barrier to increased use of business graphics has been the [hardcopy] hardware—the quality and speed of the output available," explains Sean O'Connor, director of Ashton-Tate's Graphics Product Center in Westport, Conn. "Right now, if you want to do graphics you need to buy a $1,200 pen plotter—that means a substantial need and a substantial commitment."

Indeed, the sales leader in color plotters is the $1,295 Hewlett-Packard ColorPro 7440. Plotters in that price range are also made by C. Itoh, Western Graphtec, Sharp, and Epson America, among others, and are widely available from computer retailers and mail-order houses. In addition to speed, most plotters boast multiple fonts, or character sets, to add fancy typography to any graph.

Laser printers, while available for black-and-white output only, have a decided speed advantage over plotters and also feature multiple fonts. The cheapest laser printer on the market is probably Oasys's Laser Pro Express, typically discounted at $1,699. Canon's LBP8A1, with an eight pages per minute printing speed, can be had for $1,985. Other models include Hewlett-Packard's $2,489 Laser Printer and the $4,999 LaserWriter from Apple.

Another way to make video graphics presentable is to transfer a display image onto a 35mm slide with a film recorder. The trick is to capture an image that's sharper than the typical family album snapshot. In this quest for "boardroom-quality slides," film recorders such as Berkeley, Calif.-based General Parametric Corp.'s PhotoMetric 200PC come with sophisticated automatic exposure controls geared to popular types of Kodak film. The Polaroid Pallette, made by Polaroid Corp., Cambridge, Mass., offers instant results.

Photographs Courtesy of: top, Software Publishing Corp.; cnefer, Lotus Development Corp.; bottom, Ashton-Tate



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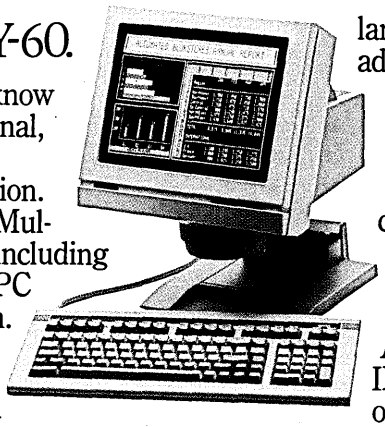

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CIRCLE 24 ON READER CARD

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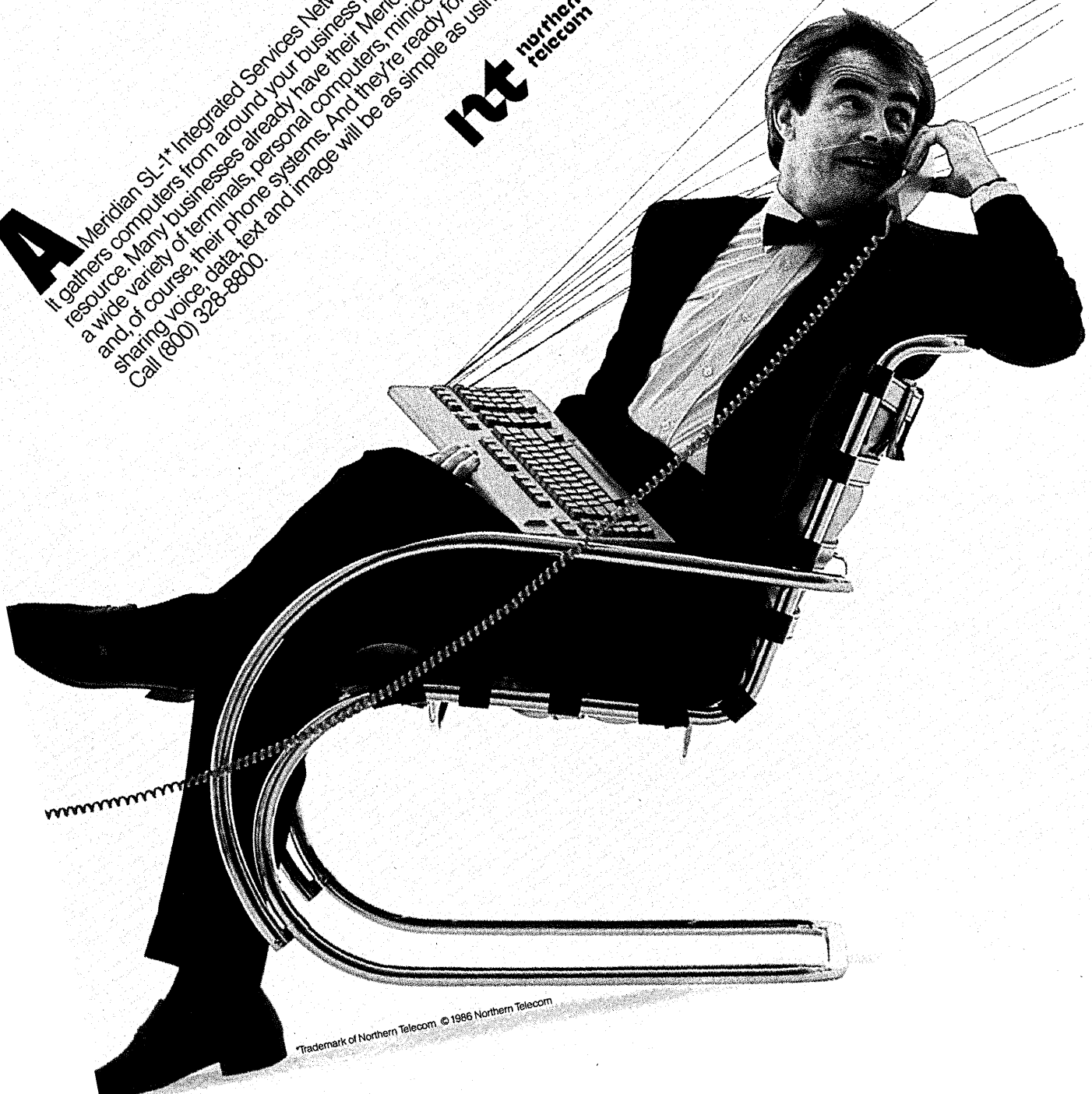

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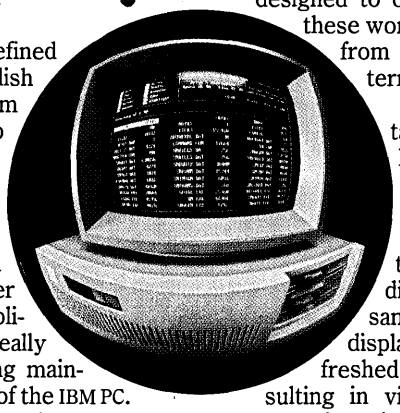
ABSTRACT

Continuing improvements in hardware and software will make the workstation approach practical for most network applications. The dumb terminal will become obsolete, as pcs and workstations converge in a single box. Led by IBM, the microcomputer world will begin in 1987 to make the transition from a single-tasking operating system standard to multitasking. The transition will be traumatic for many pc hardware and software vendors.

What Is a Workstation

BY MARTIN HEALEY



Photograph by Brian Kosoff

A workstation is not defined in the standard English dictionaries. The term was coined by the dp industry to refer to a user terminal that has a local processing capability. While workstations first gained currency in computer aided design (CAD) applications, the concept really entered the computing mainstream with the dawn of the IBM PC.

The key difference between a pc and a workstation is that workstations must have an integrated network attachment, which implies peer-to-peer communications and a multitasking operating system. The prime examples of office workstations are the Xerox, Datapoint, and Convergent Technology products, all using proprietary system software and most certainly not PC/DOS. Though designed to operate in a network, these workstations are a far cry from the common dumb terminal.

The many advantages that workstations have over vdts can be summarized in one phrase: user friendliness. Since a workstation's cpu, RAM, and display are all within the same box, a workstation display screen can be refreshed at memory speeds, resulting in virtually instantaneous response time. A networked vdt, on the other hand, is limited by the speed of the communications interface.

Further, the display of a workstation can be read as well as written. This capability makes graphics, windows, virtual consoles, and icons—the stuff of object-oriented processing—a practical matter. (Such features can be implemented on a vdt but not as easily nor, in

What Tomorrow Will Bring

Natural developments in LSI technology, display technology, and microprocessor software will enable today's best features to be converged into one workstation. High processing power and large memories, coupled to a low-cost, high-speed "telephone" LAN will mean that buildings will be wired with spare wall sockets to provide integrated voice and packet switched data transmissions. Flat-screen technology will provide a color display with a resolution high enough for facsimile.

Software will provide a graphics/windows/icon environment similar to Macintosh, but, most important, with a multitasking capability; the standard word processor, for example, will be similar to today's desktop publishing products. Compatibility with facsimile, together with convergence of scanner, printer, and copier devices, will allow editing of images, integrated with text. ISO standards, such as X.400, along with ISDN-based LAN protocols, will dominate. SNA and other proprietary protocols will play second fiddle.

There will be no hangovers from PC/DOS, or NETBIOS, or any integrated applications à la Symphony; integration will be via the operating system, resulting in common, simple user interfaces.

With the high processing power available, expert systems and natural languages will be prominent in applications.

Keyboards with a pointing device (possibly a mouse but there is room for innovation) will still dominate, but an integral telephone handset will be common. Voice messaging and voice annotation will be standard facilities of the network. Voice input and output as a substitute for keyboard and screen will still be used only for special applications.

Security features such as signature analysis and fingerprint recognition will be common options. Handwritten input is another option that will be developed, with the processing power and screen resolution available in cheap workstations. There will be no more dumb terminals.

most cases, as successfully.) With memory-mapped displays and laser printers, typical workstations, like some of today's pcs, can show information in the "what you see is what you get" (WYSIWYG) form.

While the dp world tends to think WYSIWYG is gimmicky compared to vdts, the concept is quite conventional. Where else has a user seen data constrained to rows and columns other than on a vdt? No wonder people have to be specially trained to use computers.

Imagine how much more user friendly conventional transaction programs could be with a WYSIWYG user front end and a relational database back end. The constraints of page-oriented displays would simply vanish. Today's sophisticated desktop publishing systems will become tomorrow's word processors.

Another advantage is that networks of workstations, in which the mainframe acts solely as a database server, can bring users more processing power than traditional networks, in which a mainframe serves dumb vdts. In fact, with each new log-on in a network of workstations, systemic processing power is actually increased rather than diluted as with vdts.

Thus, interpretive fourth generation techniques coupled with relational database technology can become the norm since the current curse of processor overhead is avoided. Problems with security and compatibility remain to be solved, but more powerful workstations eventually will lead to expert systems and natural language user interfaces.

With workstations seemingly poised to conquer the vast vdt world, the question arises, can pcs get there first?

Poor but Close Relations

Today's micros are poor relations to a workstation, but they are close. Given the cpu power and memory of, say, an IBM AT with an enhanced graphics adapter (EGA) graphics display and a LAN interface, it only requires an upgrade in the operating system and establishment of a peer-to-peer communications protocol, such as LU 6.2/APPC, and the transition is complete. As more micros use the 80386 processor and costs fall, particularly for the LAN interface, the pc and networked workstation will effectively converge (see "What Tomorrow Will Bring"). The trend is likely to kill off some specialty office-oriented workstations as well as common vdts.

Major moves should now come from the industry to create true networked workstations in the pc sector. The added benefit of this upgrade will be that many PC/DOS programs will survive the transition. Gone, however, will be hardware-dependent programs; integrated programs, too, will become pointless since integration will be via a display manager under the direction of the operating system. The user will create his or her own suite from a wide set of modules.

Multitasking software is needed that will allow peer-to-peer communications via system calls, clearing up the current pc LAN shambles, and eliminating kludges like NETBIOS. It will also allow multiple programs to execute concurrently, which is essential for communications.

Surely IBM will introduce, with its next generation PC, its own multitasking operating system—with a new version of the window manager utility, Topview, to handle graphics—utilizing SNA LU 6.2 protocols on a token-passing ring network.

IBM's change from single-tasking to multitasking, which will make the entire industry's changeover inevitable, may be a watershed event for many pc hardware and software vendors. Currently only Digital Research has a developed and tested multitasking product in its Concurrent/DOS (C/DOS).

What will applications vendors do when IBM moves the goalposts? Will Lotus and the rest be able to produce viable modules running the Topview windows or are they vulnerable to low-price clones? Clearly, 1987 will be the year of reckoning for the pc industry.

Unix in Pc Workstation Software

Another option in pc workstation software lies in Unix. Unix itself is inadequate, but it has been successfully used as a basis for many engineering workstations. These proprietary operating systems are derived from Unix, giving developers and users access to numerous utilities. Key examples are the Sun workstation and IBM's RT PC. It is doubtful, however, that similar developments will take place in the office sector.

Another fateful change in the prospective evolution of pcs to workstations will come with the hardware solution to the network interface.

THE ULTIMATE WORKSTATION LAN MUST BE COMPATIBLE WITH TELEPHONE CABLING.

What Is a Workstation?

To keep the cost of the LAN connection affordable, the ultimate workstation LAN must be compatible with telephone cabling. This constraint implies star-based switching similar to a telephone exchange. It is likely that the computer industry of tomorrow will become a communications industry with independent workstation and database server vendors, using ISO protocols, replacing the computer suppliers of today.

Hardware trends demonstrated by products like the massively powerful Atari ST1040 show what can be achieved in the low-cost workstations; IBM et al. could eventually reach this price/performance level, but the communications system industry could open the door to the entrepreneurs, creating *systems* from boxes.

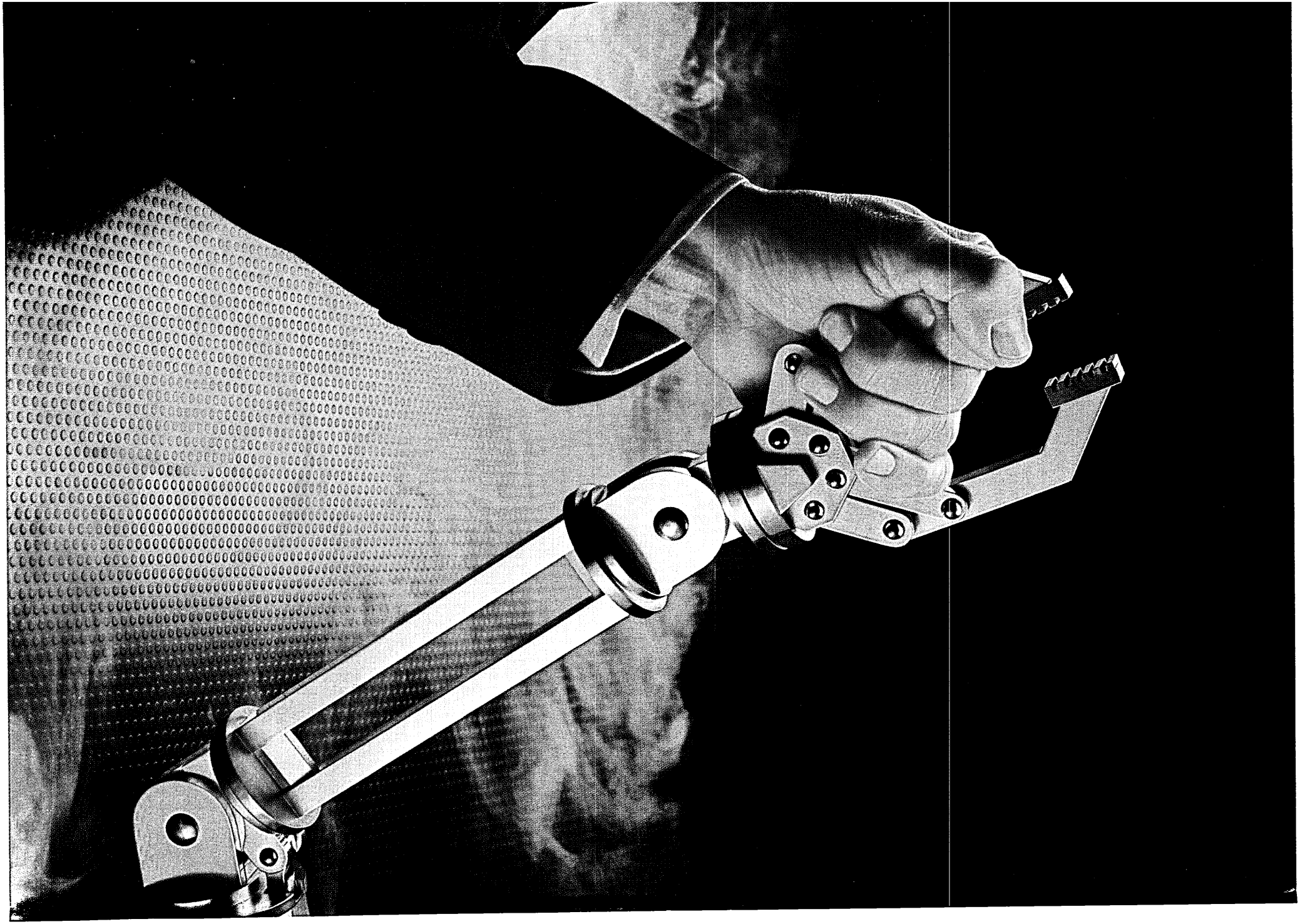
Still, the assorted vested interests restraining progress are very strong. Since programs like Lotus 1-2-3, Framework, Symphony, MS-Windows, etc., are threatened by the advent of true multitasking operating systems, the transition could lead to a major shake-up in the pc applications industry. To date, the ideal solution represented by Digital Research's C/DOS has gone nowhere inside the U.S. due to lack of support from the applications packages, fostered by IBM's strategic use of PC/DOS to keep the workstation concept low key. Why then should the situation change?

IBM will certainly move forward into a proprietary operating system, partly as a defense against the clones, but mainly because of Digital's recent success against IBM's midrange computers. All IBM's machines use page-oriented vdts that are designed for dp but not for office functions, which are essentially character-oriented.

With their asynchronous data exchange, Digital's systems have been able to combine data processing and office functions far more easily. Even with the new 9370, IBM has failed to address the problem. Instead of relegating the PC to a low-key role, IBM will want to create full function pc LANs with LU 6.2 protocols, using midrange machines like 9370s as servers.

The commercial incentive for IBM to replace PC/DOS and to move firmly into the workstation era has arrived, and IBM, alone, *can* move the goalposts. ■

Martin Healey, chairman of Technology Concepts Ltd., a microcomputer systems house in Cwmbran, Wales, is professor of microprocessor engineering at University College, Cardiff, U.K.



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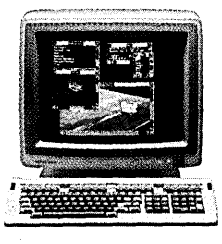

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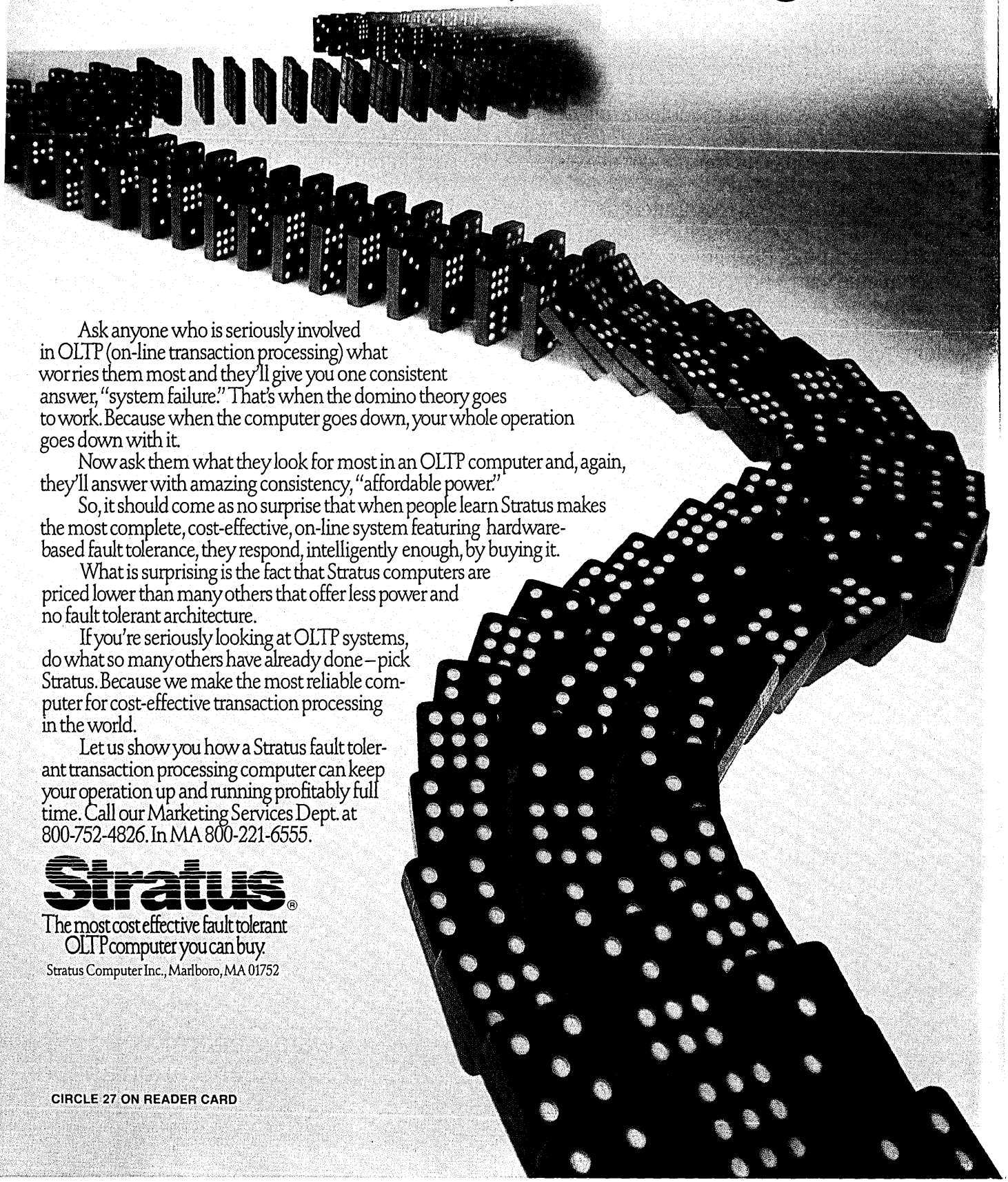
CIRCLE 26 ON READER CARD

The case for fault tolerant transaction processing.



Ask anyone who is seriously involved in OLTP (on-line transaction processing) what worries them most and they'll give you one consistent answer, "system failure." That's when the domino theory goes to work. Because when the computer goes down, your whole operation goes down with it.

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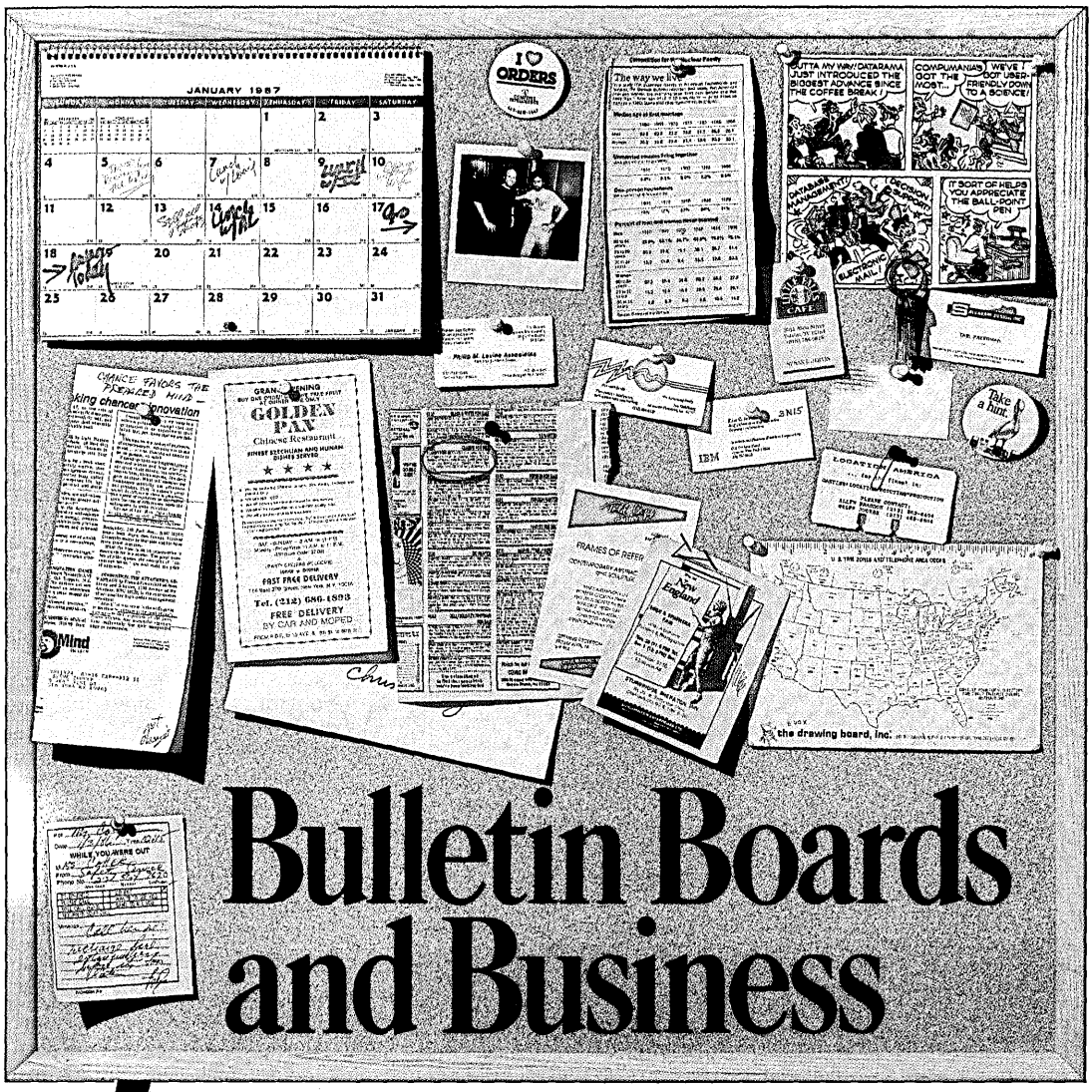


Bulletin Boards and Business

ABSTRACT

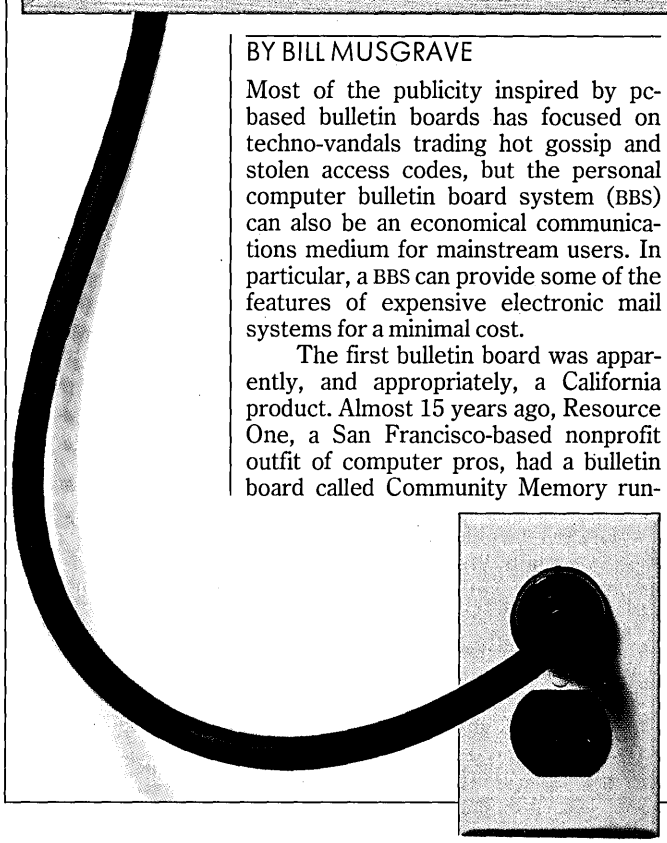
Personal computer bulletin boards can be cheap shortcuts to some of the benefits of electronic mail. Despite raffish publicity about some bulletin boards, mainstream users find that they can solve business problems in the real world. Bulletin boards are used as message exchange centers, billboards, and as a means of distributing software and support to dispersed pc users. Organizations that have set up personal computer bulletin boards tout the speed, accuracy, and efficiency of such systems, as well as the low cost. Software required to operate a personal computer bulletin board can be bought for $100; some systems in the public domain are free.

BY BILL MUSGRAVE

Most of the publicity inspired by pc-based bulletin boards has focused on techno-vandals trading hot gossip and stolen access codes, but the personal computer bulletin board system (BBS) can also be an economical communications medium for mainstream users. In particular, a BBS can provide some of the features of expensive electronic mail systems for a minimal cost.

The first bulletin board was apparently, and appropriately, a California product. Almost 15 years ago, Resource One, a San Francisco-based nonprofit outfit of computer pros, had a bulletin board called Community Memory running on a donated XDS computer. Terminals were in the San Francisco Public Library and in a health food store near the University of California, Berkeley campus. Today, Ken Goosens, a senior information center analyst who runs a bulletin board at the Federal National Mortgage Association in Washington, D.C., estimates that there are 400 bulletin boards in the nation's capital alone, and over 10,000 in the U.S.

Setting up bulletin board systems isn't a major investment. The hardware is a pc system of one type or another, perhaps one already owned. RBBS-PC Software, the most widely used remote BBS for pcs, has a no-charge limited license (but an $8 handling charge). Commercial bulletin board software can be list priced as high as $495, but because of the availability of free and low-priced BBS software, buyers can often do a lot better. Modem Controls, Chicago, has listed the price of a product called Channel One at $495, "discounted to $299." For a time in 1986, the product was being shipped for only $99. Clark Development Co. Inc., Murray, Utah, makes PCBoard in three versions: the most basic costs $80,



Photograph by Steve Cooper

a multitasking version is $120, and a multi-user system with three nodes is $180, with additional nodes—up to nine—costing $50 each. Other commercially available bulletin board software packages include Chairman, sold by Dynamic Microprocessor Associates, New York, and Net-works II from High Technology Software Products Inc., Oklahoma City (see "Bulletin Board Bulletin"). In addition, many general purpose office automation and electronic mail packages can perform bulletin board functions.

Running a system *does* require an operator. Housekeeping functions will vary with the application. For instance, if for reasons of security the BBS is private, someone has to maintain the roster of users. On boards that allow or encourage uploading, someone has to review the incoming files, perhaps categorizing each. Regardless of the application, someone should back up the system periodically.

While a BBS can run on a small pc system—even on a floppy-based system—a single-user system has all the drawbacks its name suggests. There are several approaches to supporting concurrent users. Some BBS operators use multitasking software to support multiuser partitions; others have added more pcs in a LAN with shared files. Among the multitasking software packages currently being used by BBSs are Multilink, made by The Software Link Inc., Atlanta; DoubleDOS, a product of SoftLogic Solutions, Manchester, N.H.; DESQview from QuarterDeck Office Systems, Santa Monica, Calif.; and IBM's TopView.

Put to a Variety of Uses

Some boards can act as message exchange centers. Some business BBSs are designed to permit remote communication, say, between people in different offices or on the road. Others can distribute software and support to dispersed pc users. Some bulletin boards act as billboards, making information easily available to outside users. To reduce telephone tag, a BBS can act as a central message repository for a project team. Not only can the BBS make it easier for team members to stay in touch, but it also can provide a log to track the history of a project. Most of the available bulletin board software supports any or all of these functions, and BBS operators can configure their systems to include, omit, or restrict features to meet organizations' differing needs.

Some BBSs can participate in store-and-forward communications networks wherein correspondents send and receive mail through local participating BBSs. Bulletins from the BBS operator can be posted for all to read. Files—text, data, and program—can be uploaded and downloaded with communications protocols eliminating transmission errors.

The user community can be restricted or open to all. Security features found on BBSs include passwords, encryption, multiple security levels for users, the logging of attempted security violations, and automatic disconnect for too many violations.

One company that uses a BBS for electronic communications is Coca-Cola Foods, Houston. The board supports electronic mail between regional sales offices and Houston, and in addition, serves as a document distribution center. About two years ago, Coca-Cola Foods installed its BBS, thinking at the time that it would be an interim solution, according to Cheryl Currid, manager of sales systems planning and information. The need for electronic mail was recognized, but not well defined, and the BBS approach appealed to Coca-Cola Foods because of its low cost. The investment? A personal computer system that could later be reused for something else. The software was free. At that time the system was expected to be in use for no more than six months.

A BBS CAN BE A CENTRAL MESSAGE REPOSITORY FOR A PROJECT TEAM.

"We knew we needed something like this, but we really didn't know exactly how we'd use it—things like volume of traffic and use patterns," explains Currid. "That's probably why we went around and around with the MIS staff. We couldn't answer their questions well enough for them to offer a solution."

Now Coca-Cola Foods can better identify its needs for electronic mail. "We know how many calls we have and what the traffic patterns are," says Currid. Statistics gathered from May through October tally up more than 15,000 calls into the BBS, 4,000 messages posted, and 6,000 file transfers.

One use Coca-Cola Foods makes of its BBS is the distribution of Lotus 1-2-3 spreadsheets to regional offices. The regions fill in the spreadsheets and return them to Houston. Error detecting and correcting protocols ensure accurate transmission of the forms in both directions. Currid says Coca-Cola managers find this a particularly effective way to survey the field. Currid says that the BBS will probably be replaced in the future—when someone demonstrates a system that does the job at a price Coca-Cola is willing to pay. In the meantime, the BBS has proved less costly than using a commercial common carrier electronic mail service.

As a software distribution system, BBSs are obvious tools for personal computer software developers and marketers. For proprietary software, licensees can be given full access, while a part of the BBS can be set aside for demonstrations to potential users. Another class of software, sometimes called "freeware," "userware," or "shareware," is also found on BBSs, both those used by developers and those operated by independent groups. This software usually carries a limited license allowing redistribution of unmodified copies. Developers hope to recoup their development costs by soliciting nominal contributions from those who find the program useful. (Currid of Coca-Cola Foods says that while it can be difficult to locate program authors, Coca-Cola attempts to pay for programs it uses.) Paying the requested contribution usually gets the user a copy of the most recent revision of the program and whatever published documentation exists. The payment can also cover some user support.

A Business in Itself

Distributing public domain software has even become a business in itself for some BBS operators. There are for-profit BBSs that make large software libraries accessible to users for as little as $15 a quarter, while some other BBSs solicit contributions to offset operating expenses. Businesses with large or widely dispersed pcs use BBSs to distribute public domain software and userware. This makes useful software available throughout the organization, and it gives a point of centralized control and support. Additionally, it saves money by letting users try a variety of free (or at least inexpensive) packages before spending hundreds or thousands of dollars on com-

mercial packages or custom code.

The Federal National Mortgage Association, more commonly called Fannie Mae, uses a BBS to provide public domain software to users of its 500 or so personal computers. Fannie Mae also allows access to its BBS via two listed telephone numbers. A third, unlisted line is reserved for Fannie Mae personnel.

The board has about 1,500 users registered at any given time. Generally, users are dropped after two months of inactivity. In operation since 1984 and currently supporting 170MB of disk, FNMA offers a broad collection of software to callers from across the nation. Ken Goosens reports users of Fannie Mae's board say, "It's all there; there's nothing I can upload that they don't have."

With so much to sort through, it could take an FNMA user some time to locate a program that solves a given problem. Sometimes Goosens gets requests from staffers for a specific type of program. He then "sweeps off" and forwards to the user a diskette or soof full programs he thinks may fill the bill.

Some of the software on the BBS has come into wide use within FNMA. Goosens notes that an effort is made to pay any requested fees for code distributed on "try and buy" licenses, under which a user pays if he likes a given software package and wants updates and support. For instance, FNMA has paid for multiple copies of Extended Batch Language, a package distributed under limited license. The EBL license allows redistribution for noncommercial use and requests a $49 license fee for commercial use. Fittingly, FNMA got its original copy of EBL from another bulletin board.

While mainly a redistribution point for public domain software, the Fannie Mae BBS sometimes moves files between regional offices and headquarters. Goosens says it surprises some people that the board doesn't specialize in packages for mortgage processing or analysis.

The FNMA BBS, which greets users with "WELCOME TO FANNIE MAE, the Warp Drive of Power Downloading . . ." lets users register on-line. Like many BBSs, it presents some ground rules to which the user must agree if he or she chooses to register. The FNMA rules are simple: users agree to respect program copyright law by exchanging only public domain and freeware on the BBS, to use their true names, and to accept responsibility for using anything taken from the BBS. Says FNMA, "We provide a copy service only." Goosens takes an hour or so every few days to police the system and categorize software.

While Fannie Mae's BBS has electronic mail capabilities, FNMA uses Data General CEOs installed in its offices to handle routine electronic mail. Once in a while, however, someone from Fannie Mae visiting a lender office may unexpectedly need a file. Goosens says it happens rarely, but it has proved possible to load the file onto the BBS and download it to the lender's office. Additionally, Goosens suggests that the BBS electronic mail capability can be used on an ad hoc basis, for instance, to support consultants working off-site.

While Fannie Mae operates its BBS as a two-way street, the U.S. Department of Commerce Economic Bulletin Board operates its BBS primarily as a read-only system. This board, supported by users paying a small annual fee, is an attempt to provide a single distribution point for current economic information developed by several federal agencies, including the Bureau of Labor Statistics. Bulletins provide general news, guides to different agency contacts, and a calendar of release dates for pending announcements. The board also offers information on new data and products offered by Commerce agencies, and executive summaries of larger studies available through the Government Printing Office.

Acts as Billing Agent

NTIS, the National Technical Information Service, acts as the billing agent between Commerce and its users. Many users of the Economic Bulletin Board are from the New York financial community, but others are located throughout the world. In fact, to better serve subscribers in the U.K., the board recently included a bulletin explaining how a caller in Britain can make sure his connection is via the transatlantic undersea cable; when the choice is left to the phone system, users routed over satellite can experience awkward transmission delays.

By putting the information onto the BBS, dissemination is faster, more accurate, and requires less labor, explains Ken Rogers, chief of the statistical staff in the Office of Business Analysis at the Department of Commerce. There are eight lines into the BBS, and the system runs at capacity several days a month, according to Rogers, when eagerly awaited data or announcements, such as the Gross National Product, are posted.

This is not the only BBS operated by the Commerce Department. For example, the Bureau of the Census uses a BBS to post job vacancies ranging from entry level to senior management. Another BBS offers pc information to Census Bureau staffers: software and hardware reviews, training programs for Census and Commerce personnel, and support for individual personal computer users.

The National Weather Service operates a number of boards, each targeted to a specific group. Among the users are analysts needing historical meteorological data, and others that seek marine weather and nautical information.

As users come to recognize the potential, bulletin boards may become as common in software as they are on walls. ■

A former associate editor at DATAMATION, Bill Musgrave is a California-based freelance writer specializing in computers and communications.

Bulletin Board Bulletin

Here are sources for some bulletin board software.

RBBS-PC Software
Capital PC User Group Software Exchange
P.O. Box 6128
Silver Spring, MD 20906 CIRCLE **244**

Channel One
Modem Controls
30 N. LaSalle, Suite. 2400
Chicago, IL 60602
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PCBoard
Clark Development Co. Inc.
P.O. Box 71365
Murray, UT 841007 CIRCLE **246**

Chairman
Dynamic Microprocessor Associates
545 Fifth Ave., Room 1103
New York, NY 10017
(212) 687-7115 CIRCLE **247**

Office Automator
The Logical Choice (Div. of Sharp/Tal Ltd.)
60 E. 42nd St.
New York, NY 10165
(212) 490-0528 CIRCLE **248**

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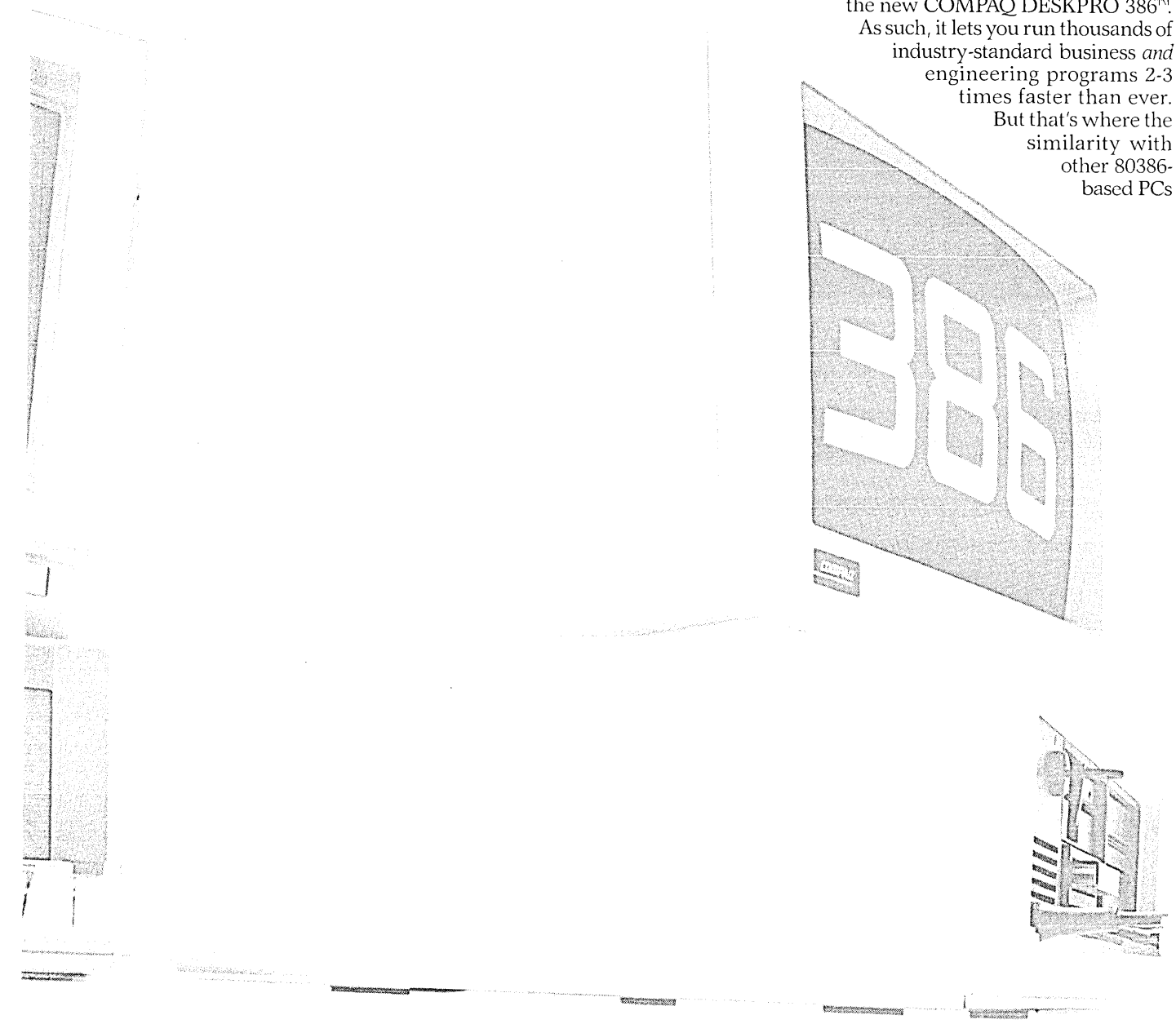

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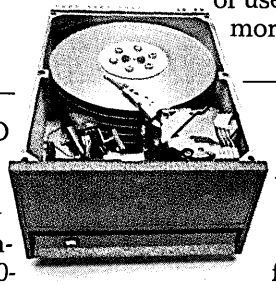

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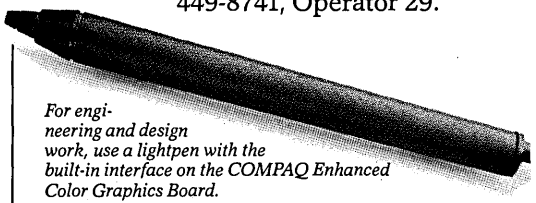

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ABSTRACT

Accelerator products can help MIS managers deliver more power and performance to the corporate pc, but this revving-up process almost always creates some compatibility problems. The same acceleration device that makes a spreadsheet recalculate faster may cripple a database and make nonsense of a graphics screen. MIS chiefs should test them very carefully before committing to a long-term installation.

Rev Up Your Pcs

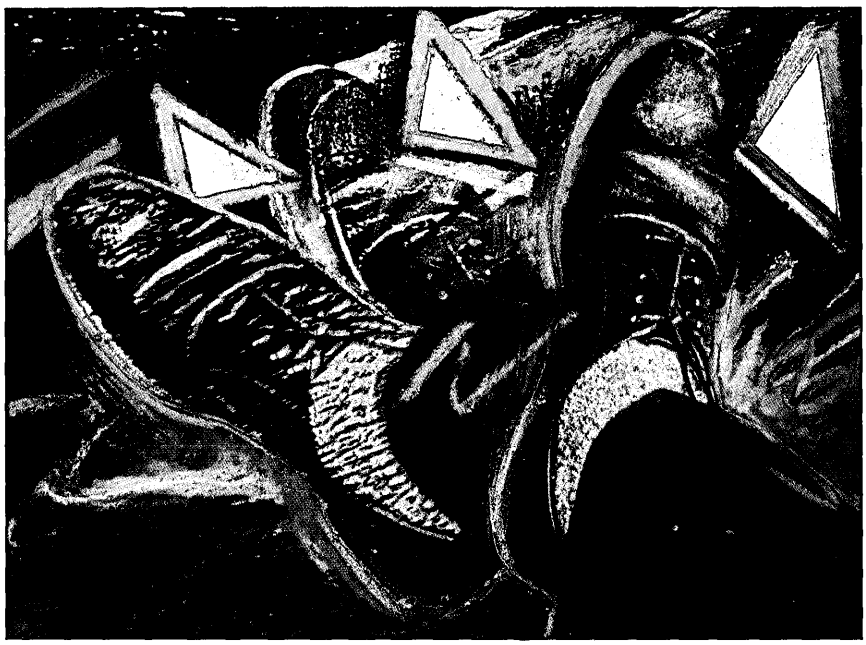

Illustration by Jane Sterrett

BY ROBERT MOSKOWITZ

A new breed of products that delivers more bang for the bit is helping MIS managers rev up the corporate pc. These devices, known as accelerators, provide desktop micro users with improved performance and better access to mainframe resources. Instead of moving micro users to newer and faster machines, MIS chiefs can beef up the performance of existing hardware by adding aftermarket acceleration devices that minimize processing times.

This acceleration process, however, almost always creates some degree of compatibility problems because the acceleration is usually achieved through shortcuts and compromises inside the micro.

When a pc is accelerated, any or all of its complex internal characteristics can be altered in unexpected ways. This is particularly true when only part of the system is being worked around or replaced. Thus, a plug-in card that provides a new and faster cpu to the pc may also create incompatibilities that disable the micro-to-mainframe networking card. That means the same acceleration device that makes a spreadsheet recalculate faster may cripple a database application, make nonsense of the graphics screen, or prevent resident utility programs from operating.

It is important that MIS managers test an acceleration device carefully before committing to long-term installations. They should also make sure that the products are reliable, easy to use, and interfere as little as possible with users' routines and applications.

There are four basic groups of accelerators now on the market: software products that are designed to minimize processing delays; plug-in chips and subsystems that replace a chip on the system board without using an expansion slot; standard pc expansion slot plug-in cards that contain a new cpu chip cooperating with or replacing the original; and system boards that replace the original pc system board and support existing peripherals, adaptors, and software at higher levels of performance.

Software accelerators work by speeding up critical functions inside the computer, including disk access, screen display, and keyboard input. Disk access, of course, is often the most important because it usually consumes more computer time than any other operation.

Another technique is the disk cache, which involves special software that intercepts every disk access command. The disk cache retains as much information read from the disk as possible in much faster RAM storage. That means the micro doesn't have to read those same data again from the disk because they're in RAM.

Screen display accelerators work

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by bypassing some of the slower and more cumbersome routines built into the pc's standard DOS and BIOS programs. By controlling the display with more sophisticated routines, the pc can scroll faster and flash text onto the screen more rapidly, greatly increasing performance. Some hardware accelerators come with software accelerators that can be used to increase the DOS execution rate. Software can also speed up the key-repeat rate, providing controls to recall and edit previous DOS commands.

Programs in the software category just discussed can be used alone or in conjunction with hardware accelerators. Software accelerators are fairly simple to install and remove and they require no extra power. They create compatibility problems, however, and they do not speed up every computer operation; applications that are memory intensive may show little acceleration due to the software. In addition, accelerator software may conflict with the application or memory-resident utilities.

Simplest Devices Replace Single Chip

Often, the least expensive and simplest accelerator devices are those that replace a single chip. One product, PC-Sprint from Exec-PC, Shorewood, Wis., replaces the computer's original 4.77MHz timing chip with a tiny card that contains one high-speed and one normal-speed timing chip. The user can select fast or slow operation, even in the middle of an application, by simply flipping an external switch hardwired to the card.

Devices such as PC-Sprint attempt to drive the computer faster by forcing all its components to operate in the higher ranges of their tolerances, but if the computer is driven too fast, the tolerance of one component will be exceeded, causing the entire system to fail.

PC-Sprint overcomes this problem by replacing the pc's timing crystal. PC-Sprint comes with interchangeable timing crystals that run the computer at 6MHz, 7MHz, and 8MHz. All that the installer has to do is find the fastest one that works by running the portfolio of important applications and hardware enhancements with different timing crystals. When an application doesn't run correctly at the high speed, the user simply flips the switch to return to the normal speed. These devices, however, don't offer complete compatibility.

A more sophisticated approach to accelerating a micro is to give it a new cpu instead of a new timing chip. The easiest way, of course, is to pull the original cpu chip and replace it with one that operates somewhat faster. The advantage of these chip-replacement products is that they do not require an expansion slot nor do they put a strain on the pc's power supply. Since they don't alter the electrical characteristics of the pc expansion bus, most plug-in cards for displays, drives, networks, and special functions should operate normally, but be aware that replacement chips can provide only limited acceleration because they still have to use the micro's original components.

It's also worth noting that these higher-speed cpu chips may not be fully compatible with every application users want to run. This is particularly true for graphics applications. Another big drawback to the replacement cpu chip is that it is usually impractical to open the box and restore the pc to its original condition when the user discovers an incompatibility.

Another type of accelerator device replaces the standard cpu chip with a piggyback card that contains the new cpu plus the circuitry needed to support the adaptation. Devices such as the Surprise! card from Maynard Electronics, Casselberry, Fla., attempt to intelligently control the various pc components so that each runs at its maximum practical speed.

Boards that plug into the cpu chip socket and contain both a new cpu and

FIGURE 1 Selected Accelerator Products

PRODUCT	PRICE	SUPPLIER
Accelerator PC plug-in card CIRCLE **215**	$795-$1,195	Titan Technologies 310 W. Ann St. Ann Arbor, MI 48104
Acme Turbo Card plug-in card CIRCLE **216**	$2,000	Intel Personal Computer Enhancement Operations 3065 Bowers Ave. Santa Clara, CA 95051
AT Turbo Switch II plug-in card CIRCLE **217**	$370-$645	Megahertz Corp. 2681Parley's Way, Suite 2-102 Salt Lake City, UT 84144
Bullet-ii replacement system board CIRCLE **218**	$695-$1,395	Wavemate Inc. 2341 205th Street Torrance, CA 90501
FastPak plug-in card CIRCLE **219**	$495	AST Research 2121 Alton Ave. Irvine, CA 92714
Fast88 plug-in card CIRCLE **220**	$149-$169	Microspeed 5307 Randall Pl. Fremont, CA 94538
Number Smasher ECM plug-in card CIRCLE **221**	$599	MicroWay P.O. Box 79 Norwood, MA 02364
PC Elevator 286 plug-in card CIRCLE **222**	$1,495	Applied Reasoning Corp. 765 Concord Ave. Cambridge, MA 02138
PC Sprint time chip piggyback card CIRCLE **223**	$79.95	EXEC-PC P.O. Box 11268 Shorewood, WI 53211
PC Turbo Charger plug-in card CIRCLE **224**	$595-$995	Univation 1231 California Circle Milpitas, CA 95035
PC-286 plug-in card CIRCLE **225**	$1,295-$3,995	Seattle Telecom & Data 2637 151st Pl. NE Redmond, WA 98052

PRODUCT	PRICE	SUPPLIER
Performer plug-in card CIRCLE **226**	$799	MA Systems 2015 O'Toole Ave. San Jose, CA 95131
Plaster 286 plug-in card CIRCLE **227**	$1,495-$1,895	Phoenix Computer Products 320 Norwood Park S. Norwood, MA 02062
Quadsprint *Quad 386 XT* plug-in cards CIRCLE **228**	$595	Quadram One Quad Way Norcross, GA 30093
SpeedPack 286 plug-in card CIRCLE **229**	$595	Victor Technologies 380 El Pueblo Rd. Scotts Valley, CA 95066
Supercharger plug-in card CIRCLE **230**	$995	Emulex/Persyst 3545 Harbor Blvd. Costa Mesa, CA 92626
Surprise! cpu piggyback card CIRCLE **231**	$295	Maynard Electronics 480 Semoran Blvd. Casselberry, FL 32707
The Software Accelerator plug-in card CIRCLE **232**	$79.95	Polytron 1815 N.W. 169th Pl. Beaverton, OR 97006
Tiny Turbo 286 Jet 386, *PCturbo 286e* plug-in card CIRCLE **233**	$1,195	Orchid Technology Inc. 47790 Westinghouse Dr. Fremont, CA 94539
Turbo Excel 286 plug-in cards CIRCLE **234**	$895	Earth Computers 9531 Slater, #6 Fountain Valley, CA 92708
286 Express plug-in card CIRCLE **235**	$595	PC Technologies 704 Airport Blvd. Ann Arbor, MI 48106
286 Speed Pak plug-in card CIRCLE **236**	$995	Classic Technology 2090 Concourse Dr. San Jose, CA 95131

THE SYSTEM REPLACEMENT BOARD ESTABLISHES A NEW OPERATING MEDIUM.

support circuitry share many of the same characteristics as simple replacement chips. These cards, though, are more expensive and they may have hardware or software switches that allow a return to normal-speed operation when incompatibilities are encountered. The disadvantage is that the cards tend to modify the operation of the expansion bus, creating the possibility of problems with some of the pc's standard plug-in cards.

Next Level of Sophistication

Accelerated processors mounted on cards to fit expansion slots are at the next level of sophistication. These contain either preemptive or cooperative processors. Preemptive cards, such as the 286 Express from PC Technologies, Ann Arbor, Mich., and the Tiny Turbo 286 from Orchid Technology, Fremont, Calif., totally eliminate the standard cpu. Others, like the 286 Speed Pak from Classic Technology, San Jose, and the highest-performing PCturbo 286e from Orchid, create cooperative environments. They do this by relegating the original cpu to simple I/O activities and modifying pc operations so that their own high-speed chip functions as the system's central processor.

Either way, the cards may contain some high-speed RAM to support their accelerated cpus. The cards may also have room for an accelerated math coprocessor that further boosts performance. (Unfortunately, the standard math coprocessors for pcs generally won't operate on these plug-in accelerator cards.)

Cooperative cards require some form of software utility that modifies the standard operation of the pc and allows the accelerated processor to function. Similar to the piggyback cards, the plug-ins, with the help of cooperative processors, use the resident pc ROM BIOS and other components. This tends to limit the acceleration they can provide. However, since the original cpu is left to handle I/O, the expansion bus can usually support standard plug-in cards when operated at normal speeds.

Once again, compatibility can be a concern. The PCturbo 286e, for example, provides considerable compatibility for other plug-in cards, but it creates problems for demanding applications, such as getting the mainframe to push data into the accelerated pc at rates faster than 1,200 baud, which results in characters being lost.

Some of the cooperative processor accelerator cards have an 8K high-speed RAM cache that allows the accelerated cpu to access data in memory much faster and more efficiently. That's achieved because data from the micro's standard RAM is shuttled to the high-speed RAM cache, where it can be used by the cpu at the highest possible rate.

Not only is the 8K RAM cache less expensive than a full 640K of memory, but it also corresponds with the amount of RAM used by many of the benchmarking programs, giving these cards high-speed ratings that are misleading. The RAM cache unquestionably helps these cards run faster, but the acceleration is considerably restrained when memory-intensive operations require constant swapping of 8K increments from standard, slow RAM into the high-speed RAM

cache. Accelerator cards with a full 640K of high-speed RAM are a much wiser choice.

While accelerator cards with preemptive processors are somewhat harder to install, they need no special software to modify pc operations and take over as the new cpu. As is the case with cooperative processor cards, some preemptive cards use an 8K RAM cache to speed up memory access. Others load data and program into their own 640K high-speed RAM.

Because the micro is operating with a new cpu at higher speed, the expansion bus usually strays from pc standards. Certain plug-in cards may not operate normally. Since some of these cards may consume more than 25% of the pc's electrical power, it may be a good idea to replace the power supply when the accelerator is installed.

System board products represent the most complete approach to pc acceleration. Because the replacement system board is a fully functional unit, it does not have to play as many tricks on the standard pc components as the accelerator software or plug-in hardware to achieve improved performance.

The replacement system board establishes a completely new operating environment for both software and hardware. In addition to a higher-speed cpu, replacement system boards contain their own expansion slots, ROM BIOS, timing chips, RAM, and other components. For example, the Bullet-ii board from Wavemate, Torrance, Calif., consistently the highest-performance accelerator in the market, has no need for a RAM cache because it provides a full 640K of high-speed RAM.

Better than Plug-Ins or Piggybacks

Replacement system boards have other inherent advantages over plug-in or piggyback cards. They draw no more power than a standard pc and they leave all the expansion slots free for standard plug-in cards.

Another plus is that they can contain more than 40K of memory, which can be used as a disk cache. In addition, the system board can contain circuitry and components that plug-in cards cannot support. The Bullet-ii board, for example, supports all the standard networking, graphics, and communications cards without compatibility problems. Special circuitry also allows Bullet-ii to support accelerated micro-to-mainframe connections without the usual compatibility hitches.

Although their prices may seem high, accelerators can provide MIS managers with a cost-effective way to increase performance of pc systems. In general, the price of the accelerator will be quickly recovered if it works reliably and does not conflict with pc hardware and software components. But, because speeding up the performance of a standard micro is a tricky business, MISers must pay particular attention to the problems and difficulties acceleration products may create. That's why testing before the switch is thrown is so important. ■

Robert Moskowitz is a business consultant based in Woodland Hills, Calif., who specializes in technology and management.

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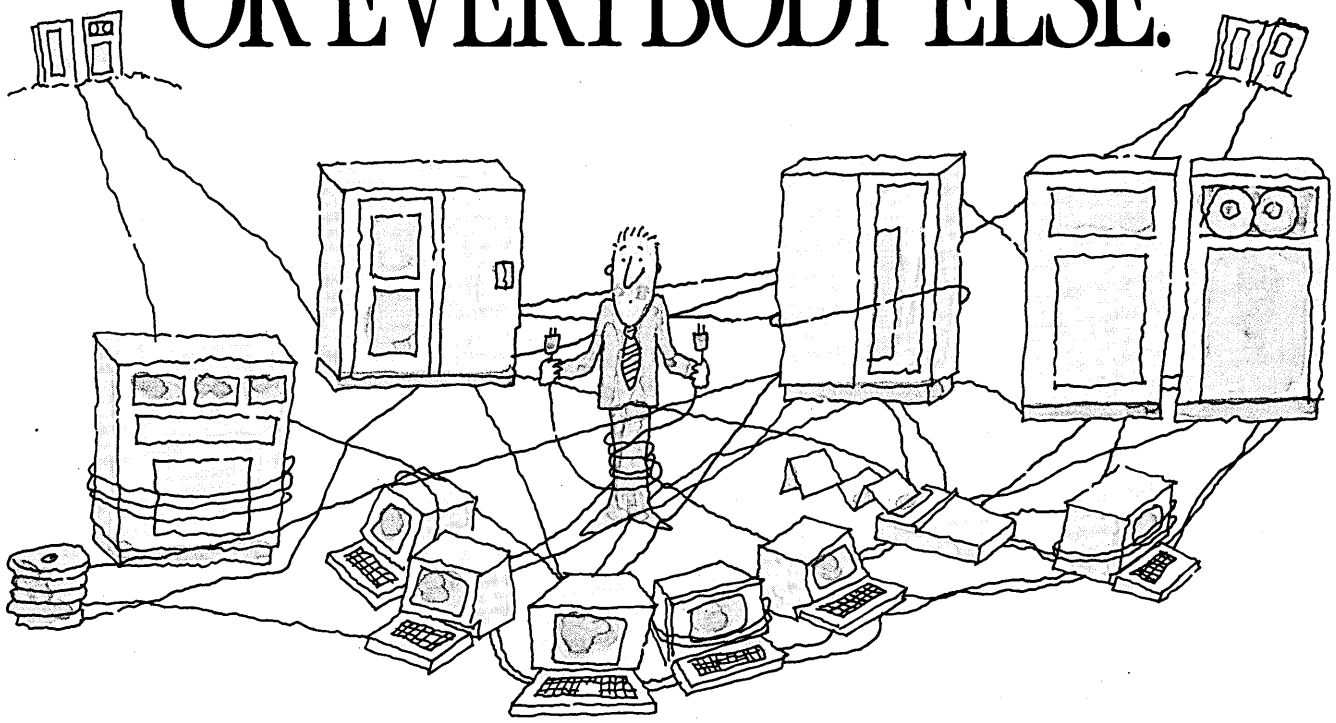

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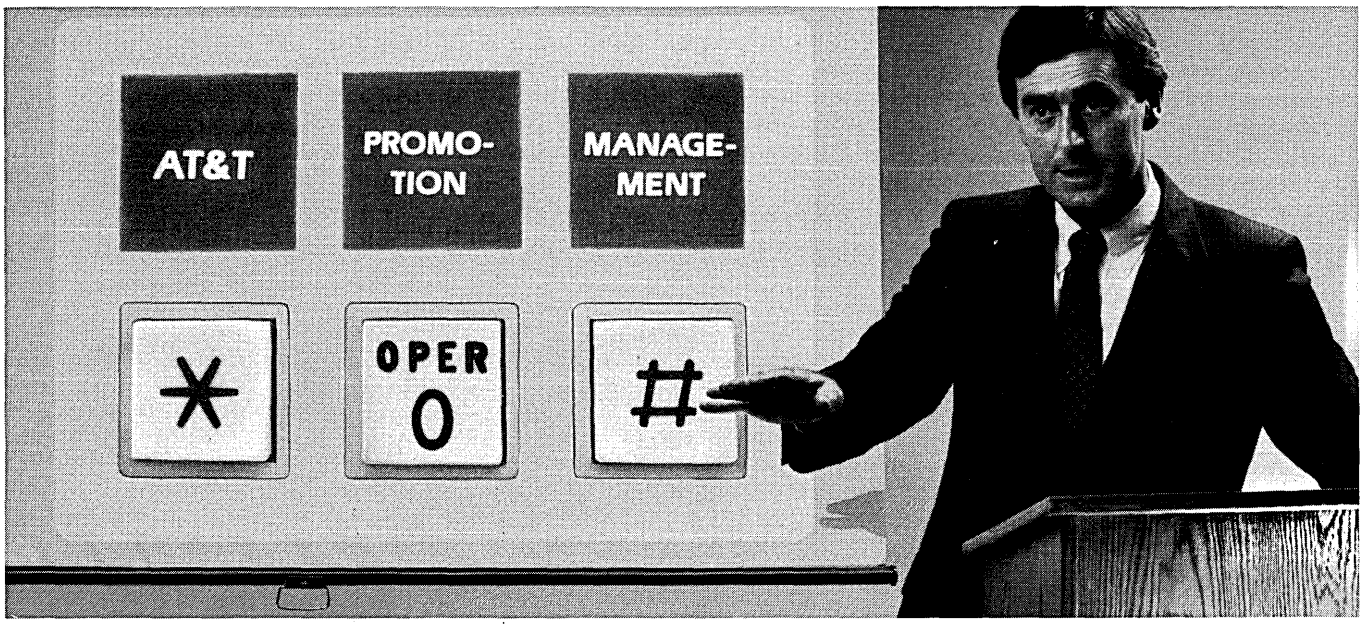

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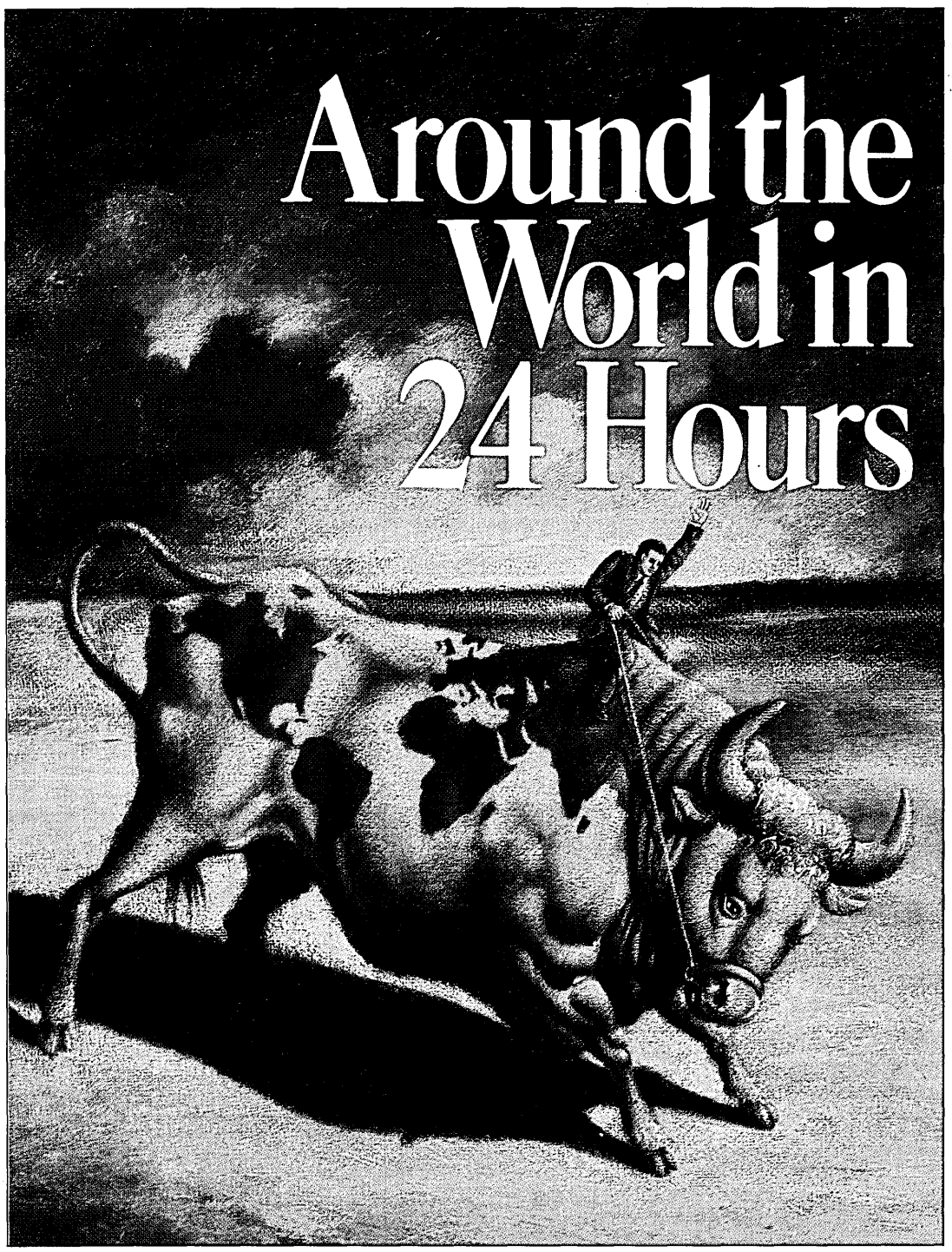


Illustration by Rafal Olbinski

ABSTRACT

Money makes the world go around, or so goes the song. In fact, the relationship works the other way around. As the world turns, it hauls billions of dollars with it. No sooner has the sun risen on one of the world's stock markets than cash flows in from a market entering the evening shadow. From London to Wall Street, Tokyo to Milan, nothing has helped make this possible more than the spread of data processing and communications technology. The flood of automation has brought the financial community a step closer to a global electronic trading floor that's open 24 hours a day.

BY JEFF MARANOFF, PAUL TATE, AND BOB WHITEHOUSE

It's 4 p.m. in New York and Joe Wingtips has just spent an exhausting day swapping $50 million for foreign currencies needed by his firm, the Morgan Stanley Group Inc. Today's trading didn't go very well. Other brokers, fearing the dollar would drop against their Japanese yen, French francs, and German marks, had been reluctant to offer deals. In an effort to salvage the situation, Wingtips pushes the button on his telephone console that opens the direct link to his counterpart in the Morgan Stanley office in Tokyo, where it's 6 a.m.

"Hello, Akio? Good morning, this is Joe in New York. I'm through for the day. Let's discuss what's left in the book. Maybe you'll have better luck than I did." Though thousands of miles apart, the same book, or inventory of currency orders, appears on each one's screen. They discuss their positions—the specific amount of dollars and other currencies that must be delivered on certain days to meet internal profit goals or the financing obligations of their multinational customers. Hours later, at the end of his hectic day, Akio calls the Morgan Stanley branch in London, where a new

Around the World in 24 Hours

business day is just beginning. He repeats the discussion of trading strategies and the day's events with his London counterpart.

This scene could become more familiar as automation of the financial market takes hold around the world, around the clock. The deregulation of major financial markets in London and Tokyo has helped fuel this computerization.

Last October there was a regulatory explosion known as the Big Bang in London's financial district; it brought down the walls of tradition that have governed the way the City's stock exchange has operated for centuries. Replacing that tradition is technology and new stock trading regulations allowing freer securities dealing between local firms and between markets in London and abroad.

In preparation for the deregulation detonation, London's financial community shelled out more than $1.5 billion over the last several years to develop international networks and systems for on-line stock quotation, settlements, and electronic mail. These systems will also provide the foundation for screen-based trading. This flood of automation and internationalism has pushed the financial community another step closer to a global electronic trading floor that's open 24 hours a day. Despite some glitches during startup, the London Stock Exchange remains confident that the transition to technology will be successful.

The stock market considered to be most advanced on the automation front is the Cincinnati Stock Exchange (CSE), where the trading floor has been completely replaced by technology. The CSE's National Securities Trading System (NSTS), which went live in January '85, allows dealers to trade securities across an electronic network. "No exchange in the U.S. can provide better access to stock trading at lower cost than ours," claims CSE president Richard Niehoff.

Most stock markets are using less ambitious systems that tend to fall into two general categories.

In the first category are systems that replace the trading floor. The National Association of Securities Dealers Automated Quotations system (NASDAQ) here in the U.S. and the London Stock Exchange's Stock Exchange Automated Quotation (SEAQ) system have adopted this approach.

The second category includes systems that maintain most of the workings of the trading floor, automating only clerical functions. This method is being used by Tokyo with its Computer Assisted Order Routing and Execution System (CORES) and by Toronto with the Canadian Computer Assisted Trading System (CATS).

Encouraging Electronic Connection

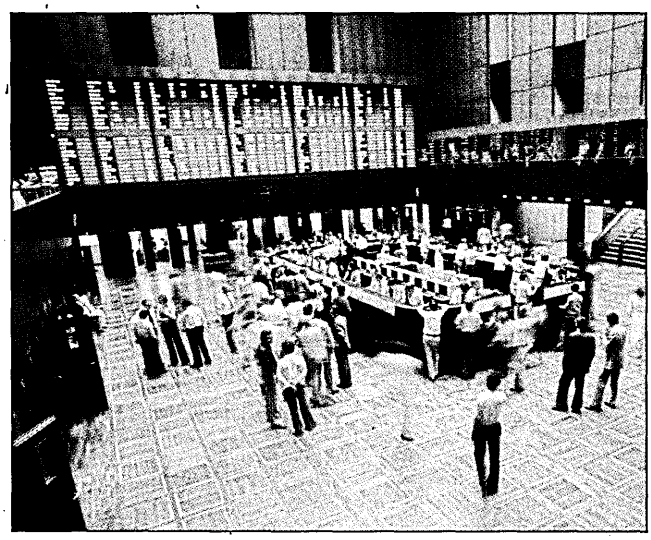
Over the last few years, on-line technology has encouraged the electronic connection of various exchanges. Last August, a pilot link was set up between the London and Chicago exchanges. Other stock exchanges around the world that have linked up include Chicago and Toronto, London and Australia, London and New York, and Tokyo and Amsterdam. What's happening to traditional stock exchanges is also affecting the newer financial markets. On the day before the London-Chicago test began, the U.S. Commodity Futures Trading Commission approved a hookup between the Sydney futures exchange and New York's Comex commodity exchange.

Those interexchange connections will become even more common in Europe over the next few years as a result of the Interdata Information System (IDIS) project being run by the Committee of Stock Exchanges in the European Commission (EC), which is based in Brussels. IDIS joined 12 European exchanges last fall so they can swap historical data on finished deals. The plan is to extend this cooperation to bidding and asking prices by the end of this year and perhaps to full-screen trading by 1990.

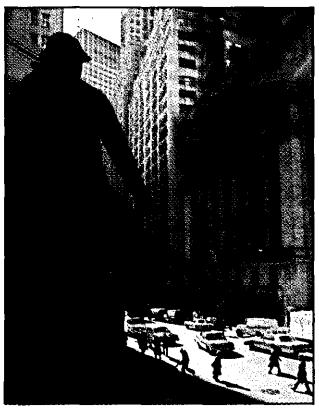
In the U.S., financial houses know they will need plenty of hardware and software if they want their traders to be able to discuss a complete corporate inventory in real time. That's a capability most financial firms don't have today. In fact, what their separate offices usually have is a standalone system and a batch processing cpu that prepares summary reports overnight.

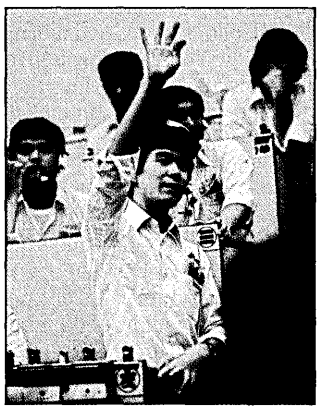
To make matters worse, bonds may be on one system, equities on another, and currencies on still another. This makes management of the risks associated with the total corporate position a treacherous undertaking.

"The volumes of securities and currencies traded daily have increased greatly, and with that increase comes an exponential increase in risk," explains



The European Committee of Stock Exchanges is pushing for more electronic links among members. Left, the trading floor of the Frankfurt Exchange.





"The Tokyo guy wants to see the gold position in yen, but the New York traders want to see it in dollars." Left, the New York Stock Exchange; right, trading inside the Tokyo Stock Exchange.

Photographs by: top, L. Kaufman/Black Star; far left, Comstock Photos; left, E. Miyazawa/Black Star

Global Risks and Books

Knowing all the details of a transaction—what happened or what is to happen—is crucial for securities firms trading in the 24-hour world. They must keep track of their exposure—the measure of how much they owe or how much is owed to them—in every stock market around the world.

"It's a very real risk that they run in terms of exposure on a 24-hour basis," warns Ian Newman in GEISCO's office in London. "Knowing the exposure is absolutely vital if these firms are not going to lose their shirts. Because if they don't know they've got any particular oil stocks, they won't bother to sell them if the market's dropping."

Financial firms are also interested in using data communications networks to pass a global book between their offices in each city—from London to New York, New York to Tokyo, and so on. The book represents the billions of dollars' worth of trade the company does each day. Data networks are ideal for this transfer—indeed, it is hard to think of an alternative.

But there are still obstacles to global trading, put there mainly by the traders themselves, claims Newman, citing this example: "Here is a [trading] house in London that is a profit center, and all its people are remunerated on the profit they make. If you're going to bed tonight a hundred million up, you'd like to come in the next morning still a hundred million up. But if New York actually takes it $10 million into the red, then that's going to impact your remuneration."

One solution, already practiced by the Morgan Stanley Group Inc. in New York, is for the different regional branches of an organization to buy and sell the book from one another. So, from London the book would be sold to New York, which in turn would sell it to Tokyo eight hours later, and in another eight hours, Tokyo would sell it back to London.

If it becomes highly popular, this global book passing would step up the pace of the money markets significantly. Under this practice, the same money could be transacted several times in the same day by being passed on to where traders are awake. Some observers warn that this around-the-clock world could prove to be an economic nightmare of global proportions to tax collectors, currency regulators, and the whole trading industry.

Paul Rachel, president of Chicago-based Internet Systems Corp., one of several software development companies to introduce an integrated system for real-time securities tracking.

Essentially, what the major firms in the financial industry are building is their own version of an internal, real-time manufacturing resource planning system. Morgan Stanley's Trade Analysis and Processing System (TAPS) is one of a handful of packages that can manage a large company's inventory of financial instruments in real time, showing a firm's bond, equity, and currency exposure in multiple currencies.

"The competition lacks an operating system to function in the 24-hour environment," contends Gerald Lynch, a managing director at Morgan Stanley.

Lack of Global Inventory System

It was rather surprising to learn that some major financial firms currently lack a real-time, global inventory system. Citicorp says its "global book," which will be based on a commercial version of TAPS, won't be in operation until next year. And Merrill Lynch reports that its system won't be in place for another year or two.

"If you're not running a global book by 1990, you'll be shut out of the market," claims Brian Traquair, director of banking and investment products at I.P. Sharp Associates, the Toronto database company that offers a value-added network and software for worldwide currency trading. Vendors like I.P. Sharp and Internet have a lot to gain from predictions that financial houses will spend billions of dollars over the next few years to replace batch processing cpus with fully integrated systems.

Nevertheless, installing a global system is no easy matter. Financial firms switching to a global inventory system face a dramatic corporate restructuring as a result of the change.

"There's handwringing and hair pulling on Wall Street and in London over the strategic and structural reorganization implications of globalization," comments one senior vp at a major international brokerage company in New York.

Excessive inventories are another reason why many traders are going global. A tangle of regulations requires each office to balance its inventory at the end of the day—a firm can't borrow or commit to pay more than its official capital reserve limits. Lacking a global system, regional offices can wind up at opposite ends of the same deal, one buying, the other selling the same security.

Overcoming the technological obstacles to going global is also a daunting project. "We're redesigning our whole trading and support system," explains Bernard Weinstein, first vp at E.F. Hutton. "We needed a dynamic inventory for management information. This will have what I call an international architecture. It will support equities, government and municipal bonds, and mortgage-backed securities in multicurrencies. That's the trick. The Tokyo guy wants to see the gold position [denominated] in yen, but the New York traders want to see it in dollars."

E.F. Hutton and Shearson Lehman/American Express, both based in New York, hired the same software developer, Cytrol Inc., Minneapolis, to write their global trading software. As the banks and brokers buy or develop global inventory software, international telecommunications traffic is expected to increase dramatically. Harry Freeman, executive vp at American Express, predicts that international message traffic volume will double every two years. In the past, those annual growth rates hovered around 20%. Financial firms that already have a network are in a better position than the newcomers.

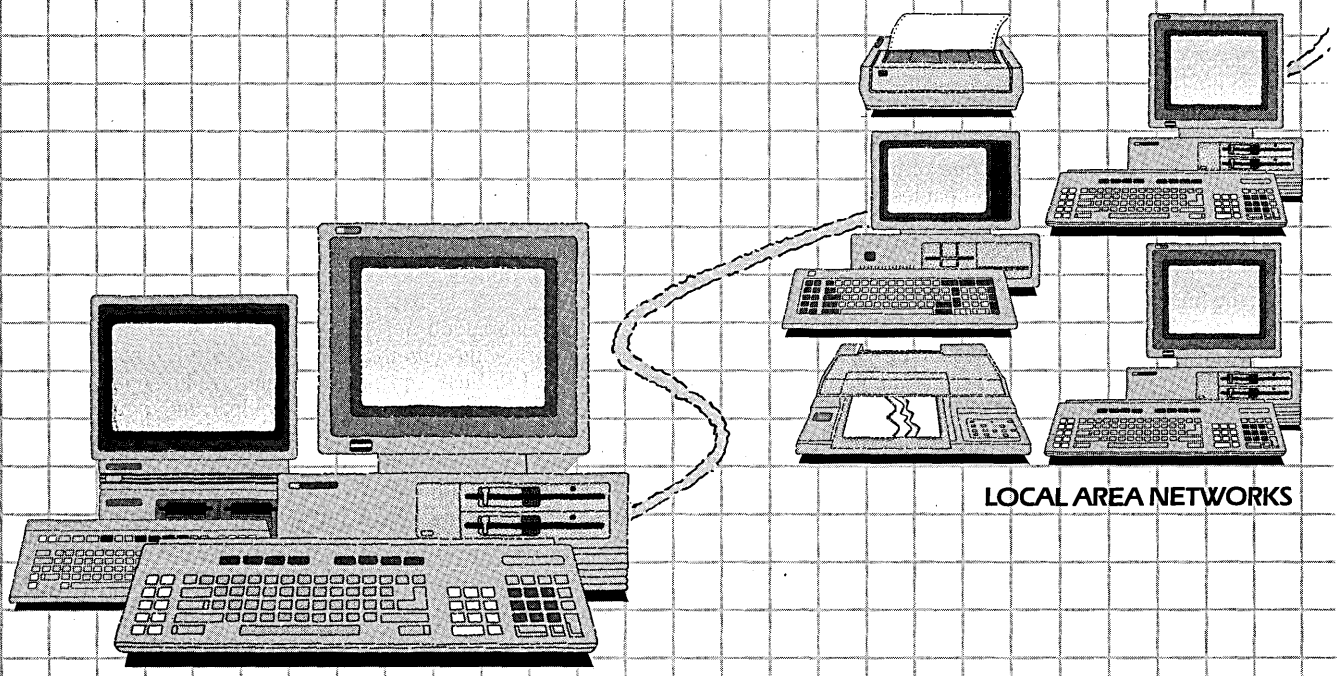
There is no doubt that the introduction of high tech to the world's fast-track financial markets will have some long-lasting effects. Just as global markets speed up trading, communications nets also accelerate the ability of companies to see their trading positions, and trading firms are learning to monitor their exposure and their books in many markets during a day.

Ian Newman, who heads a team that pushes financial networks for GE's Information Services Co. (GEISCO, Rockville, Md.) in London, predicts a more turbulent market movement because of networking. "I think one might observe a greater speed of change, a greater volatility in the markets," notes Newman, "but that is simply a natural consequence of putting technology in place." ■

Jeff Maranoff is a New York-based writer who specializes in business and technology. Bob Whitehouse, a freelance journalist based in London, writes on communications topics.

"What if...

you could grow from one PC to a network of a thousand without losing control?"



LOCAL AREA NETWORKS

INDIVIDUAL PCs

△ HP THINKJET PRINTER

△ IBM PC/XT

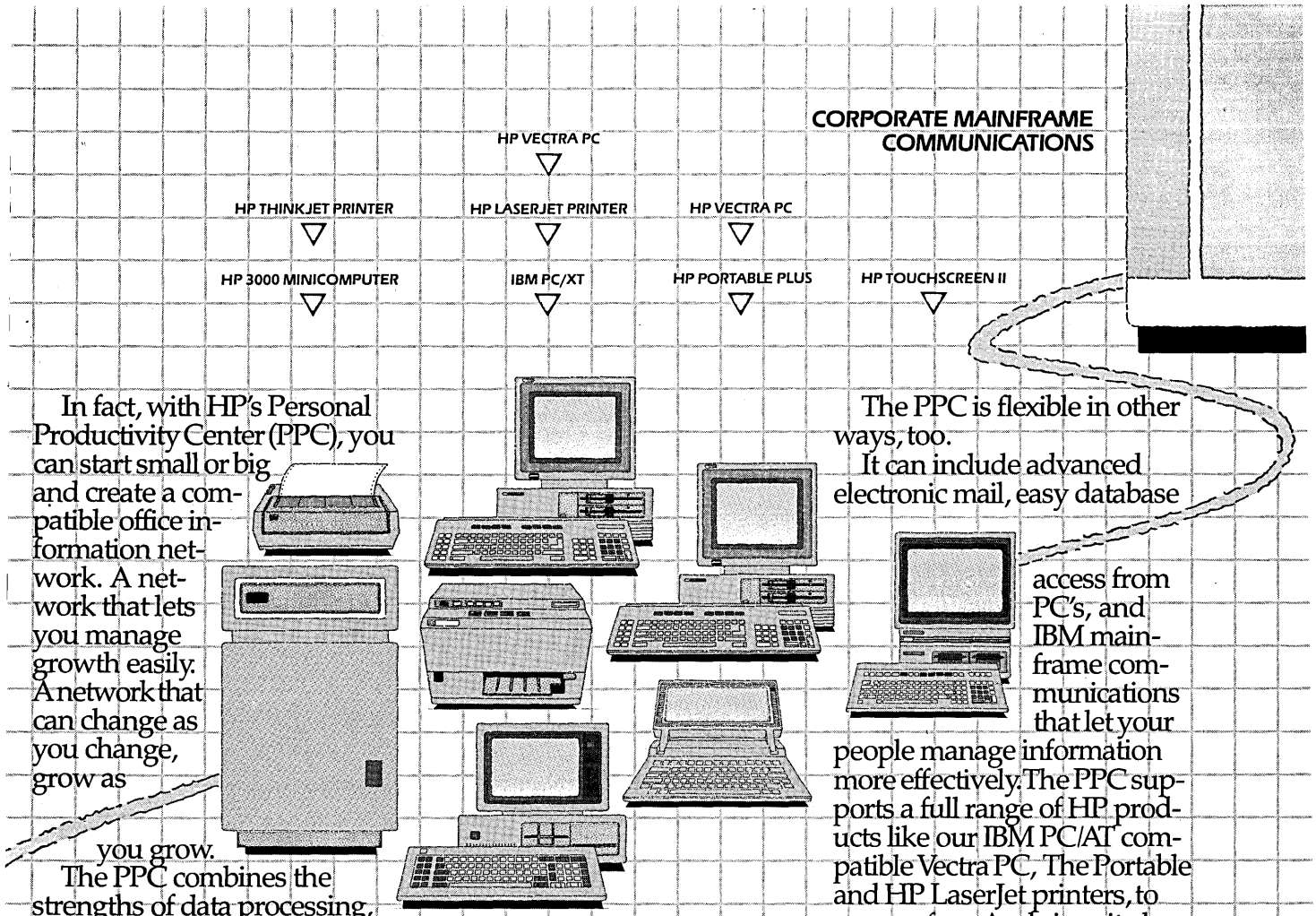
△ HP VECTRA PC

△ HP TOUCHSCREEN II

△ HP VECTRA PC

△ HP COLOR PLOTTER

△ HP VECTRA PC



In fact, with HP's Personal Productivity Center (PPC), you can start small or big and create a compatible office information network. A network that lets you manage growth easily. A network that can change as you change, grow as you grow.

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PC LAN PURCHASES are not a one-time deal. The majority of local area network users plan to expand their LAN configurations, taking advantage of the tremendous aftermarket opportunities, reports Dataquest of San Jose. The industry research firm recently published some of its findings from a survey conducted last year of personal computer LAN users. This report focused on the number and type of devices connected to LANs and the means of connecting those devices to outside resources. Users' reasons for purchasing a LAN were examined, as were their plans to expand their LANs and their communications resources in general.

Dataquest found that pc LANs are and will continue to be a work group communications solution; that is, pc LANs are expected to remain small, serving small groups with a high need to communicate among themselves.

The survey shed light on the typical LAN. Even in the largest firm, it generally has four to seven users. These users share one or two printers, of which one fourth are laser printers. Only 5% of the those surveyed indicated that a need to share a printer was one of their reasons for a LAN purchase.

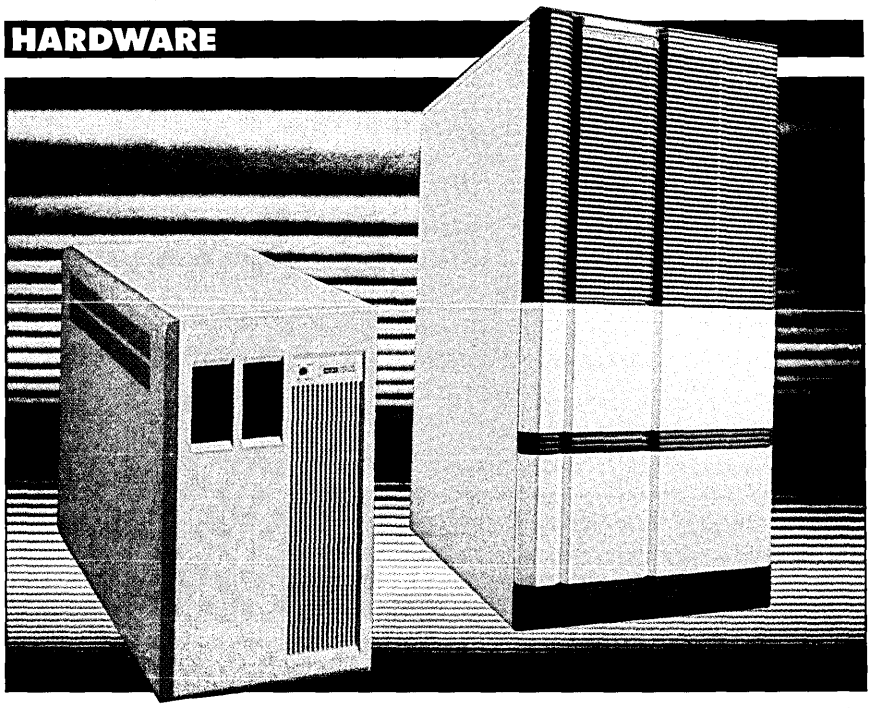
Though the LAN sites surveyed had an average of 5MB of network storage per user, a wide range of storage capabilities was reported. For instance, some networks had a single pc-based server with 10MB or 20MB of storage while others had large dedicated shared drives or multiple shared drives. Shared storage was one of the main criteria for a pc LAN purchase. Dataquest expects that as pcs pack more and more memory, sharable resources will be distributed among several pcs on the network rather than accessed through a single dedicated server.

Forty-six percent of the sites offer communications outside the network, most frequently access to a multi-user computer on-site; 21% are connected to remote resources, and another 18% plan to do so; while 10% connect to another LAN on-site and 25% plan to.

By 1990, Dataquest expects the average LAN to grow to six to 10 users. Aftermarket opportunities will open up as users upgrade their printers (Dataquest sees users migrating to laser and other high-quality printers), expand their storage capabilities (coinciding with dropping prices in this area), and add shared communication with resources outside the network (65% said they would have access to outside resources).

Overall, Dataquest does not see users buying pc LANs to decrease peripherals expenditures but as a way to improve the productivity of these expenditures.

HARDWARE



Computer Consoles' new 5MIPS Power 6/32S and 8MIPS Power 6/32SX superminicomputers are positioned in the company's low and midrange.

Two Companies Introduce Superminicomputers

Computer Consoles and Pyramid add to existing superminicomputer families.

BY THERESA BARRY

Computer Consoles Inc. recently introduced two additions to its family of superminis, positioned in the low-to-middle range of its product line.

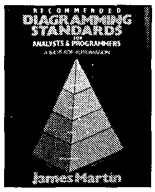
The new Power 6/32S features 5MIPS and may be upgraded in the field to the new 8MIPS Power 6/32SX. Both have 4MB of memory expandable to 16MB. When running CCI's proprietary Office-power office automation software, the 32S and 32SX can support 32 to 80 users. Each has five expansion slots. The system noise level is 53dba. It uses standard 220-volt single-phase power, and operates in an air conditioned environment. Both computers use CCI's System V operating system, a Unix System V derivative.

An optional floating point processor is available now for both models for $18,250. The 32S and 32SX are the first of CCI's superminis to incorporate its new multiprotocol communications controller (MPCC), which CCI claims permits concurrent use of asynchronous, bisynchronous, and bit-oriented protocols.

Both models will be shipped to customers this quarter. The Power 6/32S with 4MB of memory, disk controller, one 380MB disk, tape controller, a 45MB cartridge tape drive, and a Unix System V license is priced at $89,950; a similarly configured Power 6/32SX is priced at $99,950. COMPUTER CONSOLES INC., Waltham, Mass. CIRCLE **250**

Pyramid Technology Corp. recently introduced two new models to its Series 9000 family of 32-bit superminis.

The 9810 features a single RISC processor; the 9820 is a tightly coupled, symmetric system with two RISC processors. Like all Pyramid computers, both new models use the company's proprietary OSx operating system, a dual port of both Berkeley 4.2BSD and AT&T System V versions of the Unix operating system.



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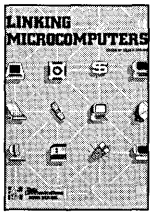

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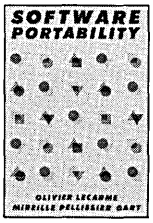

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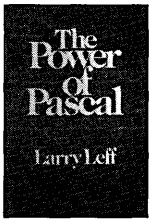

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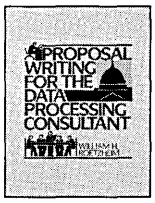

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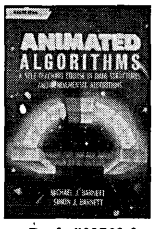

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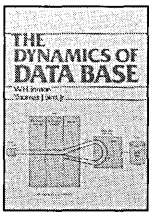

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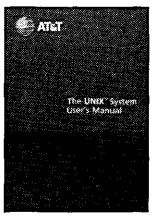

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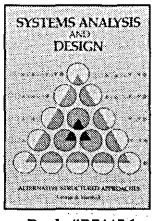

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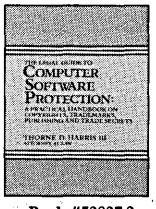

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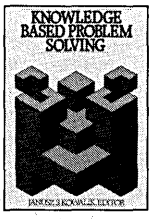

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CIRCLE 33 ON READER CARD

The Series 9000 architecture has a highly pipelined cpu with 528 registers, 64KB of data cache, and 16KB of instruction cache. The architecture also includes Pyramid's proprietary 40MBps message-based XTEND bus, which facilitates high-speed direct access between system memory and three intelligent I/O subsystems. A TPE controller provides Ethernet networking and printer interface. An intelligent terminal processor offloads terminal I/O activities from the main cpu.

Pyramid Series 9000 products are expandable to 128MB of main memory, 256 users, and over 15GB of disk storage. Standard in the series is an arithmetic accelerator unit that enhances integer and floating point performance.

The 9810 in a basic configuration includes 16MB of memory, 16 RS232 ports, a 470MB disk drive, a half-inch streaming tape drive, a system console and Ethernet, and an OSx license for up to 16 users. Price is $199,950. The 9820 comes standard with the same, except for 32 RS232 ports and an OSx license for up to 32 users. Its price is $299,950. PYRAMID TECHNOLOGY, Mountain View, Calif. CIRCLE **251**

Two New Minis from HP

First to use proprietary NMOS III chip technology

The HP Micro 3000 and HP Micro 3000XE are the newest members of Hewlett-Packard's line of HP 3000 business minicomputers. The 3000 will succeed the existing 3000 Series 37 and 37XE and the 3000XE will succeed the 3000 Series 42 systems, the company says.

Both systems incorporate Hewlett-Packard's NMOS III chip technology and 1MB memory chips, which HP claims yield 30% to 50% better price/performance than existing HP models (the technology was also used in the HP 3000 Series 950 Precision Architecture system, scheduled for shipment in the second quarter).

The Micro 3000 supports four to 16 users and the 3000XE supports eight to 56 users. Up to 30 additional users can be tied into each by using a LAN. Main memory ranges from 2MB to 4MB on the 3000 and from 2MB to 8MB on the 3000XE. Both systems take advantage of HP's disk-caching software and support a range of disk storage options. Maximum disk capacity is 2.2GB on the 3000 and 4.5GB on the 3000XE.

Both systems are claimed to be software compatible and peripherals compatible with the entire HP 3000 product line. They both use the MPE V operating system.

A four-user HP Micro 3000 system is $25,730; a 12-user HP Micro 3000XE is $57,500. Both are available now. HEWLETT-PACKARD, Palo Alto. CIRCLE **252**

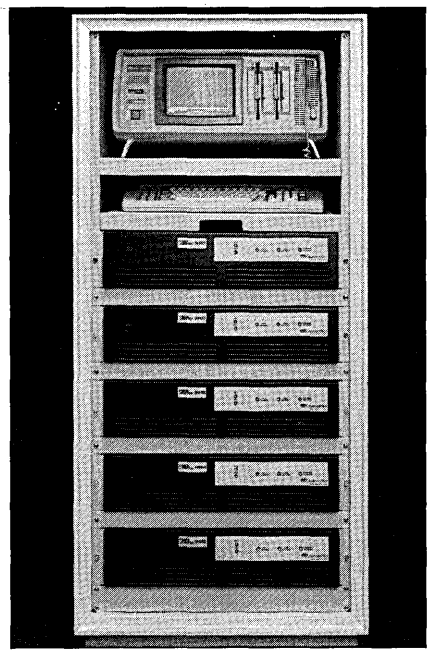
Three Data Switch Products

For communicating over fiber-optic networks

Data Switch Corp.'s new ChannelNet Model 9055 enables IBM mainframes and peripherals to communicate at maximum channel speeds of 3 million cps over high-speed T-3 fiber telephone circuits. Data Switch claims it eliminates the need for front-end processors, which are limited to a T-1 data transfer rate. The Model 9055 includes two extender units: one attached to the computer channel and one attached to multiple installed control units. They're compatible with the telephone companies' T-3 interface and attach to the network. Installation is said to require no software or firmware modifications to the host computer or control units.

The Model 9055 will be available in February and is priced between $100,000 and $180,000 per link.

The new Model 9045 links mainframe computers and remote high-speed devices, including data-streaming tape drives, over customer-installed fiber networks, providing the resource-sharing benefits of the Model 9055. It will be available in February for between $35,000 and $75,000 for two extender units and a systems controller.



The Model 9044 connects computers and both low-speed and medium-speed control units, such as laser printers and terminals, over fiber-optic links at distances up to 7km and at speeds up to 1MBps. It's available now for from $16,000 to $32,000 per link. DATA SWITCH CORP., Shelton, Conn. CIRCLE **253**

Telex Enters S/3X Market

Nine new products unveiled, including four terminals

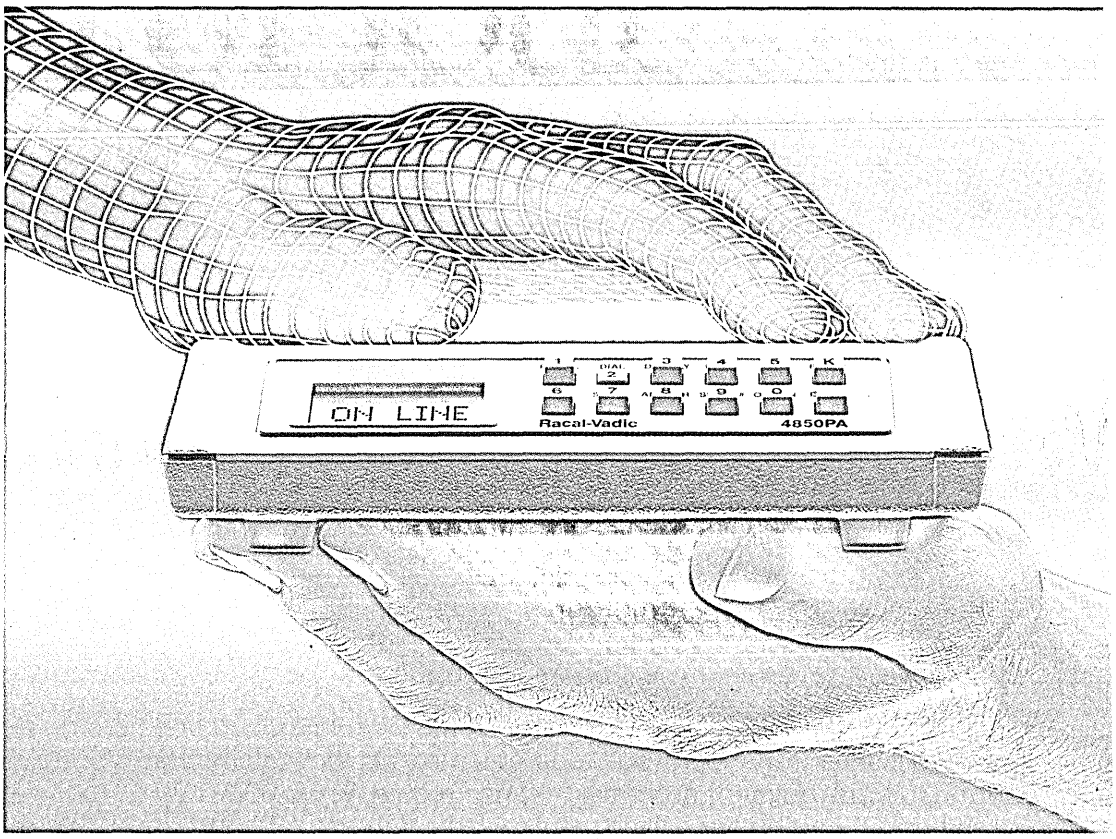
Telex has entered the System/3X market with four new terminals, three new printers, and a 5250-emulation package for its workstations.

The Telex System/3X display terminals include the 078-2, a 12-inch display terminal, available in green or amber phosphor with displays of up to 1,920 characters; the 079-2, a seven-color, 12-inch display containing up to 1,920 characters and plug compatible with IBM's 3179-2; the 180-2, with a green or amber monochrome 15-inch display that is plug compatible with IBM's 3180-2, capable of displaying either a 1,920- or 3,564-character screen; and the 179-2, a full-size color display offering IBM 3179-2 plug compatibility with a seven-color, 14-inch monitor and a screen display of up to 1,920 characters. The prices, respectively, are $1,295, $1,895, $1,995, and $2,095. All displays have a 122-key adjustable keyboard with up to 1,500 keystrokes of record/playback capability, and a standard printer port feature for attaching a local screen printer.

Telex System/3X printer terminals include the 201 matrix message printer, which supports speeds up to 220cps in draft and 110cps in near letter quality (NLQ); the 851 ink jet printer, offering speeds up to 220cps in draft and 110cps in NLQ; the 214XP, with speeds of 400cps in draft and 100cps in NLQ; and the 225 line printer, a plug-compatible replacement for the IBM 5225, with speeds of up to 600 lpm in normal mode and 800 lpm in draft. Prices respectively are $545, $775, $5,100, and $12,800.

The 5250 Emulation Workstation offering is a full-size add-on card and software that provides Telex's 1200 series workstations with hot-key capability between S/3X sessions. Price is $849. TELEX CORP., Tulsa, Okla. CIRCLE **254**

The Ideal Sync For Your Mainframe Lynk.



Now you can autodial from any remote site, in any sync protocol, with Racal-Vadic's new 4850 PA modem.

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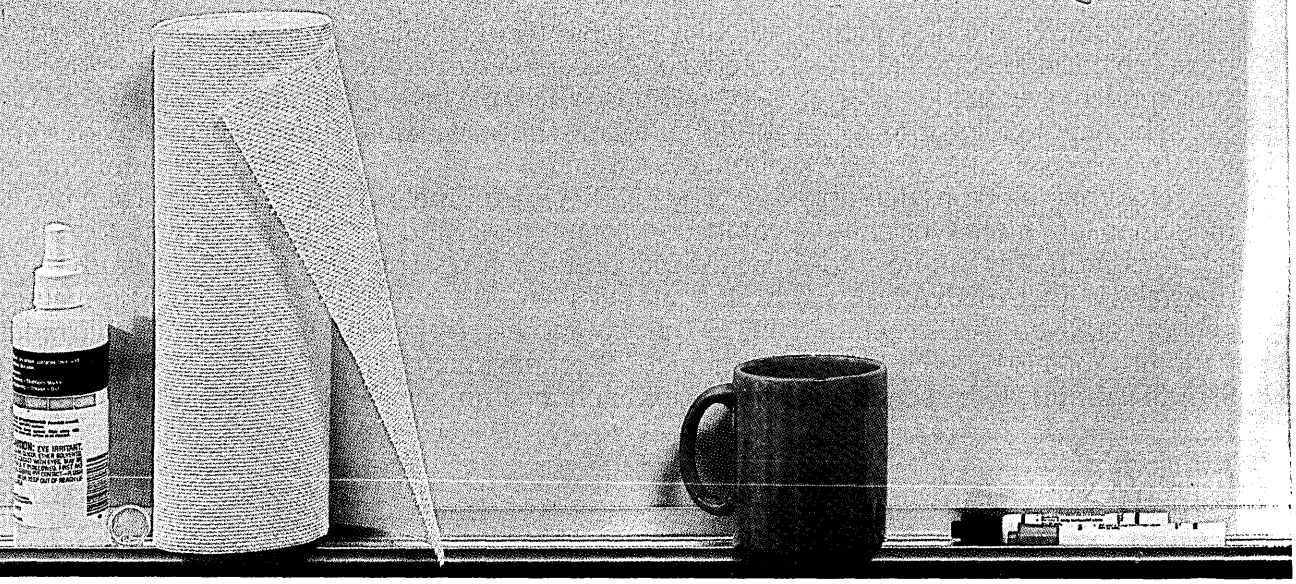

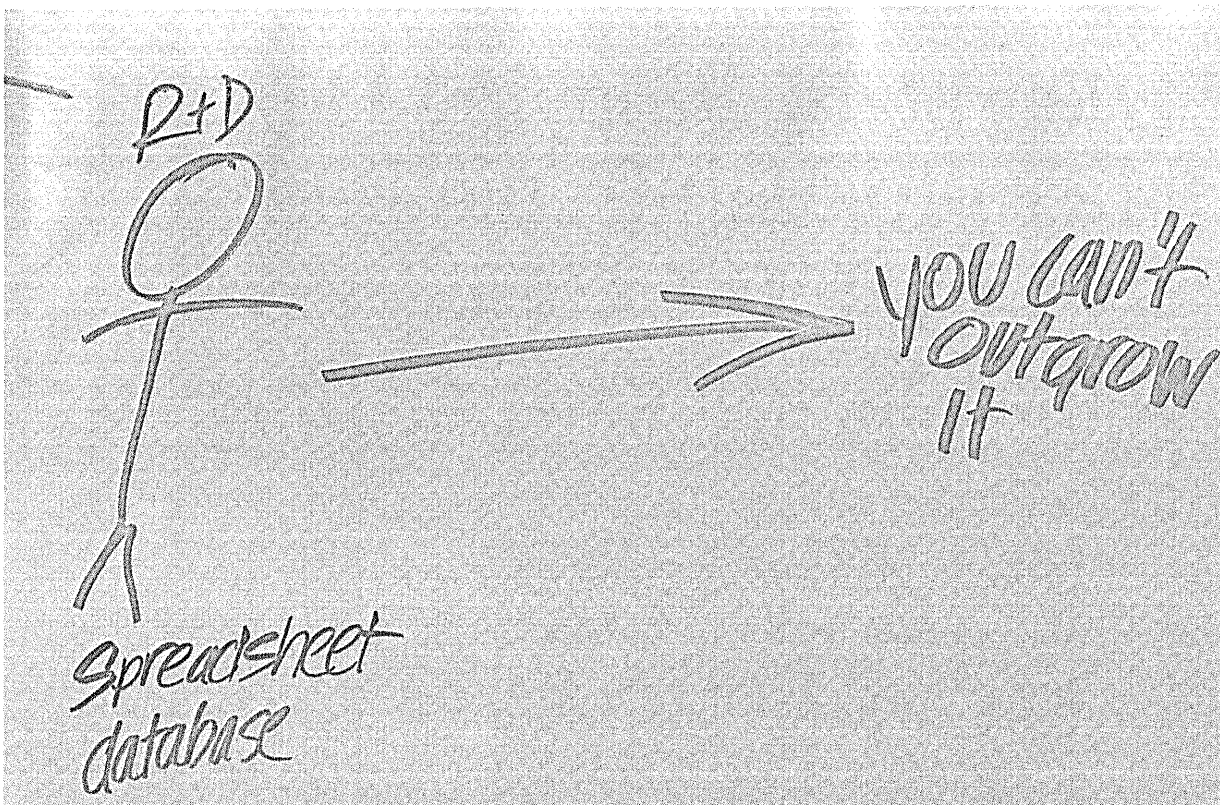

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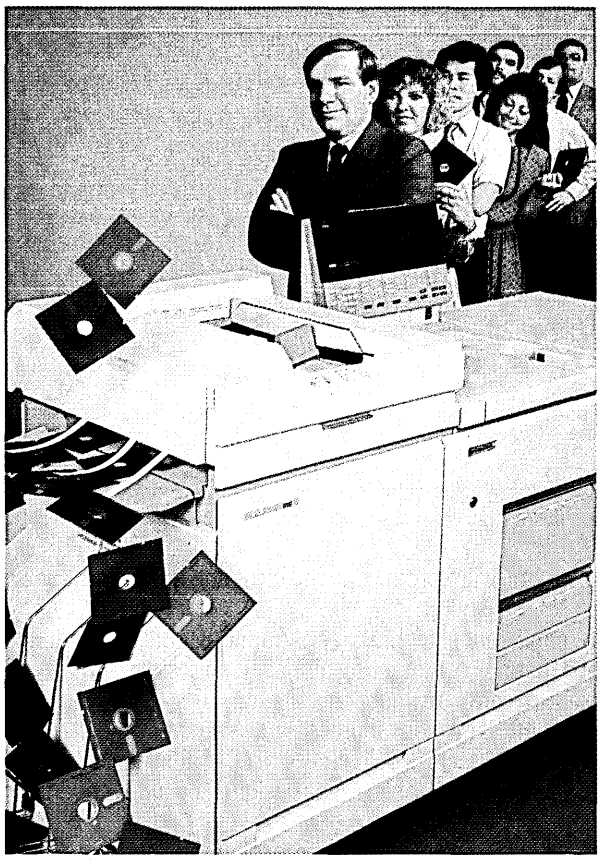

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UPDATES

WHEN A COMPUTER operations manager wants to keep track of all the mainframe hardware that comes under his or her jurisdiction, the usual method is to create manually a configuration diagram either on paper or on a pc screen. A reliable method, yes, but a tedious and time-consuming one.

Simware Inc., an Ottawa-based supplier of data communications software products, recently introduced some pc software that automates the creation of cabling diagrams and assists in maintaining a centralized database of all mainframe hardware. Developed jointly with Chroma Systems, also of Ottawa, Sim/Config runs on an IBM PC, XT, AT, or compatible and requires a hard disk, a color monitor, and 512K of memory.

Sim/Config provides a way of creating a complete inventory of a mainframe installation and an historical database, which is useful in performance analyses. The product, says Ed Sterling, vp of development at Simware, allows for the fact that mainframe shops may have many types of devices from different vendors. The software's built-in database contains 800 hardware device specifications, and it includes information about the physical attributes of popular mainframe computers, peripherals, and communications devices as well as their connectivity rules. A user builds a database on top of the product's existing database, indicating which devices are in use and how they are connected. Users can incorporate actual model numbers, serial numbers, cable number, or even log-on names in their databases. With these data, the software automatically creates a picture of the configuration for output on a plotter or printer.

To allow for new hardware introductions, Simware will update the master database quarterly and maintain a staff of engineers to add new devices when necessary. Users can also add to their own database and assign rules to any device they install.

Sterling says that although Sim/Config is not an AI-based product, the defined rules help users either validate or invalidate configurations. "Sim/Config won't allow someone to make a faulty connection," he adds. Simware is planning to introduce in June a mainframe-based product that will incorporate AI technology. Aion Corp. of Palo Alto, maker of expert system development tools, will provide the engine to drive this system, says Sterling. The mainframe product will allow for two-way communication between mainframes and microcomputers, and will go beyond Sim/Config in capabilities.

Sim/Config is priced at $8,500 and carries a 20-year license.

SOFTWARE

Computer Associates Introduces First VM Product

CA-Unicenter for VM is software solution for managing corporate data centers

BY THERESA BARRY

Computer Associates, citing a 35% to 40% annual growth in the number of users moving to the VM operating system environment, recently introduced its CA-Unicenter for VM as an extension of the CA-Unicenter concept it introduced for the MVS and VSE operating systems last June.

CA-Unicenter integrates the full range of CA systems software, incorporating microcomputer technology for mainframe purposes and offering automated software support and maintenance services.

CA-Unicenter contains three components. The first consists of integrated software packages that address key functional areas, including scheduling, file management, and job accounting. The VM product also includes a VM directory administrator designed to ease the workload of system administrators and programmers, and it provides end-user tools such as CA-VTERM, a multiple workstation facility.

CA-Unicenter VM is an extension of Computer Associates' CA-Unicenter concept.

The second component, CA-Activator, is an interactive, on-line system that automates and simplifies software installation and maintenance.

The third component of CA-Unicenter is CA-Uniservice, a service and support system that links the client's mainframe to Computer Associates in Garden City, N.Y., by means of a communications network. It provides immediate access to program fixes and diagnostic information 24 hours a day, seven days a week.

CA-Director, the VM directory administrator, is designed to replace existing maintenance utilities by offering such things as multinode support, which allows multiple cpus to be controlled from a central location; profiles, which eliminate the need to continuously repeat information each time a directory entry is made; and prototype models, which reduce the time and effort needed to create and modify user IDs when the product is used by different operators.

CA-VTERM allows a user to access up to 16 virtual terminals from one physical terminal and features predefined sets of operational commands—automated terminal programs—to be executed automatically, permitting automation of repetitive or procedural screen functions.The price for CA-Unicenter for VM is $63,000 and it's available immediately. When purchased in conjunction with the HVS version, the price is $48,000. COMPUTER ASSOCIATES INTERNATIONAL INC., Garden City, N.Y. CIRCLE **258**

Spreadsheet Package

Compatible with Lotus 1-2-3, Release 1A

Words & Figures, from Volkswriter publishers Lifetree Software, features a Lotus 1-2-3, Release 1A-compatible spread-

sheet with a word processor.

Features unique to Words & Figures are an auditing capability for pinpointing errors as well as location of all circular references; a sparse memory model and support for the LIM extended memory specification, which allows for spreadsheets of 9,999 rows by 256 columns; and support of 8087 and 80287 math coprocessors.

Words & Figures is written in assembly and it runs on IBM PCs and compatibles. The price is $195. LIFETREE SOFTWARE INC., Monterey, Calif. CIRCLE **259**

Free-Form Database for PCs

Allows for retrieval of both text and numeric information

Version 3 of askSam, the IBM PC-based database from Seaside Software, was recently introduced.

Version 3 has a document mode, which is said to eliminate the 1,600-byte limit on the size of an individual record by enabling records to be linked together to form logical documents of any size. A report generator is also included in this version, giving the software the capability to produce business reports having control breaks with up to eight levels of subtotals on any number of fields. Reports can be 160 columns wide. A phone-dialer capability has been added, along with a sort option that enables sorting of words containing accents and other diacritics.

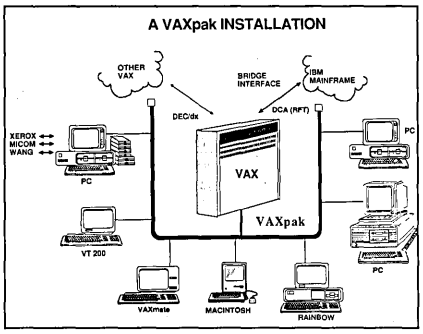
Seaside calls askSam a free-form database because it offers storage and retrieval of both text and numeric information in variable-length fields where every character can be searched without prior indexing by the user.

AskSam Version 3 is priced at $200 and requires 256K of memory. It runs on IBM PCs and compatibles. Current askSam users can upgrade to Version 3 for $50. SEASIDE SOFTWARE INC., Perry, Fla. CIRCLE **261**

Document Compatibility

For DEC VAX family of minicomputers

Keyword Office Technologies has entered the mini and mainframe system market with its recently introduced product, VAXpak. VAXpak is said to allow documents to be exchanged among multivendor office systems based on the DEC VAX family of minis, from the MicroVAX II to the VAX 8800.



VAXpak permits editable-document exchange among word processing systems such as WordPerfect running on an IBM PC, WPS Plus on a DEC Rainbow, Displaywrite 3 on a VAXmate, Microsoft Word on an a Macintosh, and Mass 11 on a VAX. A single document can be distributed in various word processing formats using VAX connectivity. VAXpak integrates with Digital's All-in-1 network, but also works as a standalone application.

VAXpak document translation is said to support all major pc-based and dedicated word processing systems. Prices range from $4,000 to $57,000, depending on VAX model installed. It's available now. KEYWORD OFFICE TECHNOLOGIES LTD., Calgary, Alberta. CIRCLE **262**

Ada Language Compiler

Software for embedded Intel microprocessors

Softech Inc.'s Ada-86 is an Ada language compiler and software development package for embedded Intel 80286, 80186, and 8086 microprocessors that was recently made available to the commercial market.

It is hosted on VAX/VMS and consists of an Ada compiler, binding tools, and a library manager. Softech claims that in conjunction with Digital and Intel products, Ada-86 provides a complete Ada software development system.

Ada-86 is available now and is priced at $15,000 for the 8086 and 80186 and $20,000 for the 80286. SOFTECH INC., Waltham, Mass. CIRCLE **264**

Text DBMS for Mainframe

Enhanced performance, capacity for IBM and plug compatibles

Infodata has unveiled Release 86.1 of Inquire/Text, a text-based database management system for the IBM and plug-compatible mainframe environment. Text management, as described by Infodata, is the ability to process structured or unstructured numerical and alphabetic data within a database management environment.

Performance and capacity enhancements are said to be incorporated into this latest release of Inquire/Text, including faster response time, reduced cpu time, fewer I/Os, and reduced memory utilization.

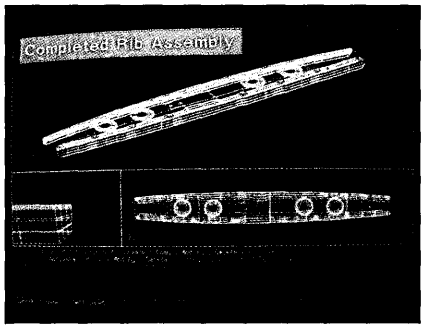
Inquire/Text, Release 86.1 is priced at $49,500; it's available without additional charge to customers with mainframe agreements. INFODATA SYSTEMS INC., Falls Church, Va. CIRCLE **260**

CAE/CAD/CAM Product

Shares data among applications and multiple hardware platforms

Axxyz (pronounced ak-sees) Integrated Software from Boeing Computer Services is a new mechanical CAE/CAD/CAM open-architecture software system developed for large industrial companies that build complex products. Boeing claims that with Axxyz, additional or different hardware can be incorporated as requirements change.

The product, written in Pascal, is composed of seven basic applications modules that can be used individually or in combination. They are the geometry



layout module, the solid geometry module, the finite element module, the automated drafting module, the system administration module, the production administration module, and the data transfer module, which allows users to send and receive data among Axxyz systems or hosts.

Axxyz will be available direct from Boeing this quarter. The average multiple application price range is from $15,000 to $20,000. It will be available initially on Apollo, Digital, and IBM hardware. BOEING COMPUTER SERVICES, Seattle. CIRCLE **263**

BOOKS

The Way of the East

LESSONS: AN AUTOBIOGRAPHY
by Dr. An Wang
with Eugene Linden
Addison-Wesley, New York (1986, 248 pp., $17.95).

BY ROBERT SOBEL

The Computer Revolution seems to have produced at least two distinct cultures: in Silicon Valley one finds scads of young, brash, irreverent, trendy, charter members of the counterculture; on the East Coast one encounters the typically more worldly representatives of the "Boston-Cambridge connection" who, though equally liberal, tend to be less noisy about altering the status quo. The Californians might be seen at rock concerts; the Cambridge set supports the Boston Pops. The West Coast group actively participates in events like Hands Across America; their MIT-Harvard counterparts attend cocktail parties to raise funds to combat apartheid in South Africa. Even those who dislike stereotypes may recognize this split in the computer industry; it is the difference between Steve Jobs and An Wang.

An Wang—the name means "Peaceful King" in Chinese—is quietly intelligent and elegant, and Wang Laboratories, the company he founded in 1951 with $600, very much bears his personal stamp. Wang writes that in 1956, IBM was 10,000 times the size of Wang Labs; "Today they are twenty times our size. If we continue to heed the lessons that brought us to this point, that gap will continue to narrow."

As his book's title indicates, Wang intends to specify those lessons in his autobiography. Had he done so, he might have produced a memoir worthy of a place alongside Alfred Sloan's monumental *My Years with General Motors*. As it turns out, the lessons in *Lessons* derive mostly from Wang's peculiar circumstances or what he considers good fortune, or are so obvious as not to require elucidation.

After leaving his childhood home near Shanghai and serving the Chinese Nationalist war effort as a radio engineer, Wang came to the United States in 1945 by winning a place in an industrial apprenticeship program. Chance, combined with his own pluck, brought Wang to Harvard, where he obtained his PhD and worked with Howard Aiken on the Mark IV. "By accident I got an opportunity to help make history," he writes of his time at the Harvard Computation Laboratory. At the lab, he invented a type of memory core vital to the giant electromechanical machines of the time. Wang applied for a patent for his invention while gamely starting a company he expected would manufacture and market memory devices and other electronic components.

Interesting material, but hardly the kind from which one can draw many general purpose lessons. Wang does say that from the first he prized simplicity, explaining that this stems from his Confucian background. "I was interested in determining the minimum number of electrical components needed to achieve some particular goal," he writes. Wang's goals tended to be market oriented; the simplicity he strove for usually led to marketable products that were relatively easy to make.

The modest initial success Wang achieved with his high-tech startup was followed by two errors in judgment. In 1956, Wang sold his patent on memory cores to IBM for a mere $500,000 plus some minor considerations; in 1959, he sold 25% of his company to machine-tool manufacturer Warner & Swasey for $50,000 plus a loan of another $100,000 (an investment that ranks with Georges Doriot's purchase of 60% of Digital Equipment Corp. for $70,000 in 1957). With the money, Wang developed Linasec, a phototypesetting device, out of which he derived this lesson: "One should be wary of building a product that another company will market, since the other company might get the idea of building the product itself."

The company was Compugraphic, which marketed Linasec so successfully that in 1964 Wang Labs posted its first million dollar year. Compugraphic then developed its own version, leaving Wang in the cold and in deep trouble. Even so, Wang himself derived some satisfaction from the episode, feeling he had profited from the experience.

Wang turned from Linasec to desktop calculators, introducing in 1965 the LOCI (logarithmic calculating instrument), which in turn was followed by the well-received 300 series. Strapped for

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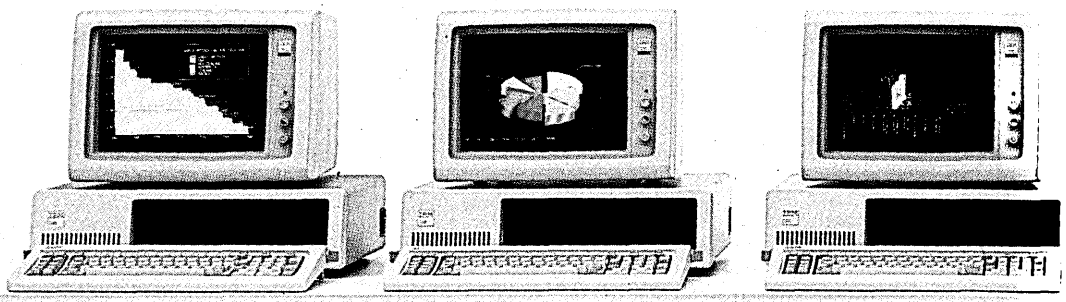

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funds needed to expand operations, Wang decided in 1967 to make his first public offering of stock, a decision that made him a millionaire (he claims that he has never sold any of his personal Wang stock, however). The company, which had net assets of $1 million, was capitalized now at $70 million. There is no lesson in this; Wang observes that by sheer good fortune Wang Labs came to market at the crest of the great bull market, when outlandish prices were being paid for such exotica.

Wang Labs turned from calculators to word processors to computers. In *Lessons*, we follow Wang from one business decision to another, in the process obtaining some insights into the reasoning of a highly successful scientist-entrepreneur whose modesty prevents him from lecturing to the readers, obliging them to draw their own conclusions from his experiences.

For example, Wang's account of his company's performance in 1985—when earnings collapsed to $15.5 million from the prior year's $209.3 million—mentions that John Cunningham, president since 1983, left for another post, obliging Wang to resume that post in addition being chairman.

There is more to Cunningham's departure than that. The perception in the company's ranks that Wang was grooming his son, Fred, for succession caused dissension that continues to be felt today. Now in the process of recovery, Wang Labs is doing interesting work in voice processing and networking. Growth has resumed but profit margins, which used to be around 20%, are down to half that amount. Survival is not a problem; rather, the question is whether Wang Labs can renew its growth.

What lessons has An Wang learned that might enable him to revitalize his company? Unhappily, the answer is not to be found in this book. Perhaps this is too much to expect. As Isaac Asimov once remarked to a disgruntled reader, "You don't get the key to the universe for 10 bucks." Or in this case, $17.95. ■

Robert Sobel, author of IBM: Colossus in Transition, *(Times Books, New York, 1981) among many other books, recently coauthored, with David B. Sicilia,* The Entrepreneurs *(Houghton Mifflin, New York, 1986), the companion volume to the current six-part television series of the same name.*

PEOPLE

He Gets a Kick out of Finding Things

The forever restless Sheldon Breiner's latest dig is in insurance expert systems.

BY SUSAN KERR

One of Sheldon Breiner's colleagues says that when he first met Breiner, who is now the president of Sunnyvale, Calif.-based expert systems startup Syntelligence Inc., he was convinced the man was an egomaniac. "But then I realized Sheldon's actually done everything," he says, shaking his head in wonder. "Egomaniacs just sit around talking."

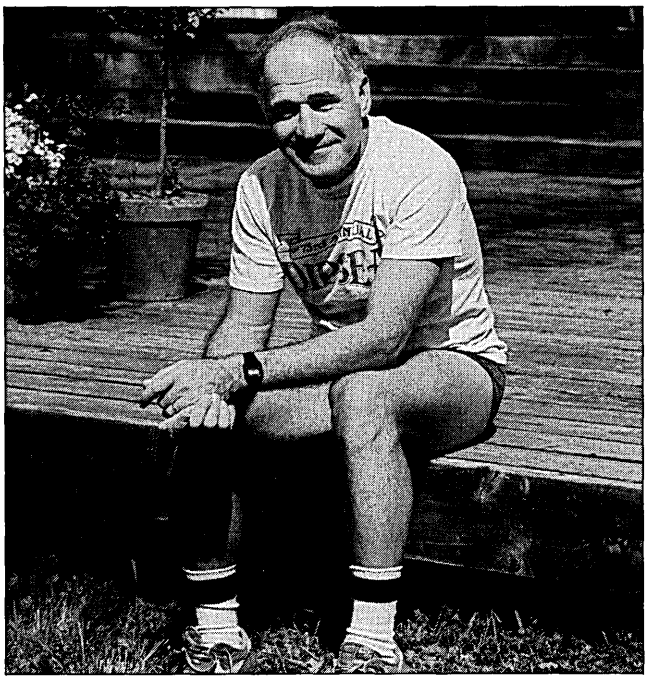
Breiner stands out as a man of action, even in the hyped-up community of Silicon Valley. This 50-year-old, small, trim man cites among his current activities running two companies, serving as a director of two others, heading a venture-capital partnership, running in marathons, and writing. This is only the primary list; he does plenty more in his "spare" time.

For the past two decades, Breiner has been known as one of the world's best finders of lost objects. While working on his doctorate in geophysics at Stanford University, and later at Varian Associates, Breiner conceived of applications for the magnetometer, a device that measures the intensity of the earth's magnetic field. His finds with the instrument range from oil and ore deposits to avalanche victims, sunken nuclear submarines, and ancient buried cities.

And, following the assassination of Robert Kennedy, Breiner was asked by the federal government to help find ways to improve public security. The result: Breiner developed the metal detectors in use today in airports.

Now, Breiner is devoting upwards of 60 hours a week to Syntelligence, a company he helped found four years ago to produce commercial applications for expert systems technology. Since September 1986, the company has been delivering these systems, which carry six-figure price tags, to insurance companies and banks. In his typical low-key but confident fashion, Breiner says Syntelligence now is negotiating a joint-marketing agreement with IBM.

For his sense of drive, Breiner



BREINER: It's not the object of the hunt that's important but the hunt itself.

Photograph courtesy Tioga Publishing Co., Palo Alto

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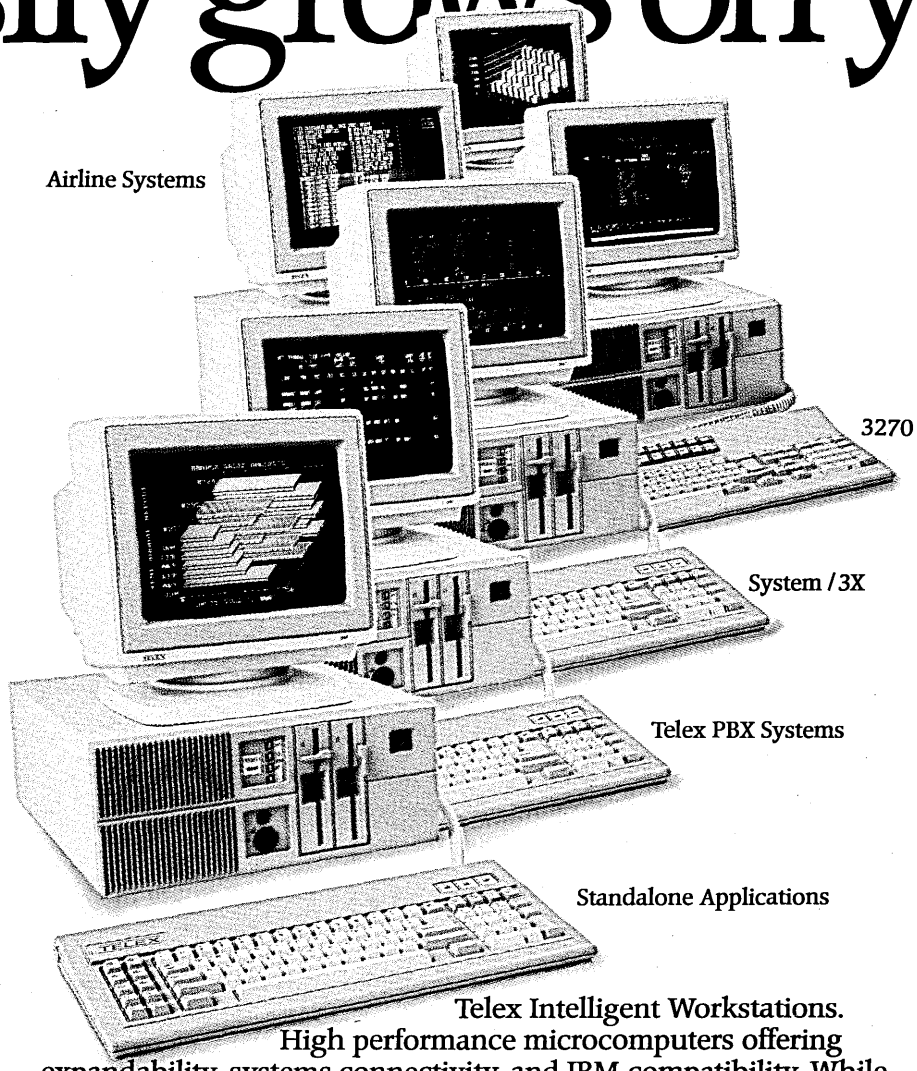

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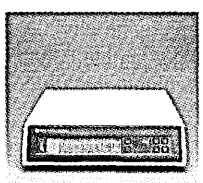

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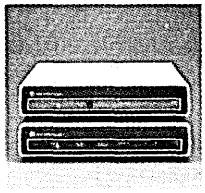

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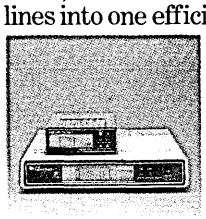

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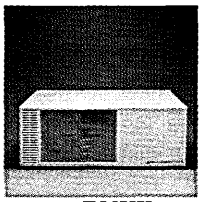

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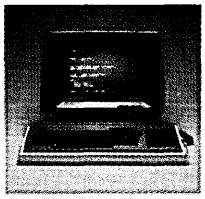

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credits his parents, both Eastern European immigrants who came to America determined to get ahead. "There was no question about my going to college and succeeding," recalls Breiner. "My father, no matter how well I did, would always ask if someone had done better. Their European work ethic was passed on to me."

Part of that ethic called for Breiner to work in his parents' St. Louis bakery during his school years. "Even while I was at the bakery I wanted to get out and explore," he says. "As a kid I read books on all the explorers from Stanley and Livingstone on. I knew geophysics would let me do that exploring."

He was right. Breiner's success in geophysics has allowed him to travel to more than 100 countries. His treks include archaeological digs in which, by using magnetic surveying techniques, he helped unearth the buried cities of Sybaris in Italy and San Lorenzo Tenoxtitlan in the Mexican jungle, site of the 3,000-year-old Olmec civilization.

Despite his continued interest in archaeology—he may take a week off in early 1987 to help on a new dig—Breiner says it's not the object of the hunt that's important but the hunt itself.

"I get a kick out of finding things. I don't care what it is. I'm just as interested in finding a steel thing as a major work of art," he comments.

"Here at Syntelligence," Breiner adds, "I'm exploring new ground technically. We're taking the hidden valley of expert systems that was buried in the research environment and bringing it out into the open."

Syntelligence expert systems software enables commercial lenders and insurance underwriters to evaluate risks associated with potential projects. Banking and insurance don't sound all that glamorous, admits Breiner, but they're the industries in which there is the best opportunity to commercialize back-room technology. In typical big-think fashion, Breiner says the company will be profitable in the first quarter of this year and should hit the $100 million mark in 1989.

Although he's keen on the idea of expert systems today, it was a different story when he was first approached on the subject a decade ago. Syntelligence cofounder Peter Hart, then the director of SRI International's Artificial Intelligence Center, Palo Alto, was introduced to Breiner by a mutual friend. Hart was interested in applying expert systems technology to the field of mineral exploration.

"Peter was going to capture what a geologist knows in a computer," recollects Breiner. "I thought he was going to be a crackpot. After lunch I became convinced [of the validity of expert systems], but I thought the business idea of mineral exploration wasn't it. I then thought about banking."

Hart also recalls that Breiner wasn't "impressed at the time [of our first meeting] that expert systems would be anything, but he was polite albeit skeptical."

The two men had little contact for the next few years. While Breiner was running his first startup, a manufacturer of geophysical instruments called GeoMetrics (Sunnyvale, Calif.), in the back of his mind he played with the idea of expert systems. It turned out that both he and Hart were moving to the same idea of applying the technology to the finance and insurance industries, and they decided to join forces in 1983.

Although he no longer owns GeoMetrics, Breiner isn't totally out of the geophysics industry. He cofounded and is president of ParaMagnetic Logging Inc., an R&D company based in Seattle that is developing instruments to measure residual oil in wells. Also, he is president of Foothill Associates, a Menlo Park, Calif.-based partnership of 10 executives investing in high-tech companies.

To an outsider, the obvious question is, hasn't Breiner taken on too many things to do any of them well? He bristles at the idea. "I'm not tackling things I can't follow through," he says. Yet, he admits later, "Probably given her druthers, my wife would prefer it if I wasn't as active." Still, Breiner notes, his wife enjoyed going to New York City with him for the weekend to watch him compete in that city's marathon. On the average, he manages to run 30 to 40 miles a week.

With his new life at Syntelligence, there are a few regrets. Although he takes at least three long vacations a year, they seem to be to more "civilized" spots such as Hawaii and Europe. And, he says, he'd like to do more with photography.

There's been time for one new project—Breiner recently began writing his first work of fiction: a thriller about "how viruses are used to combat nuclear war. People who've read the outline tell me it's very good," he says proudly. ■

CALENDAR

MARCH

Hannover Fair CeBIT '87.
March 4-11, Hannover, West Germany. Contact Donna Peterson Hyland, Hannover Fairs USA Inc., 103 Carnegie Center, P.O. Box 7066, Princeton, NJ 08540, (609) 987-1202.

17th Conference on Computer Audit, Control and Security.
March 23-27, Boston. Contact the EDP Auditors Foundation Inc., P.O. Box 88180, Carol Stream, IL 60188-0180, (312) 653-0950.

Interface '87.
March 30-April 2, Las Vegas. Contact the Interface Group, 300 First Ave., Needham, MA 02194 (617) 449-6600.

ADEE West (Automated Design and Engineering for Electronics Exhibition).
March 31-April 2, Anaheim, Calif. Contact Show Manager, ADEE West, Cahners Exposition Group, 1350 Touhy Ave., P.O. Box 5060, Des Plaines, IL 60017-5060, (312) 299-9311.

APRIL

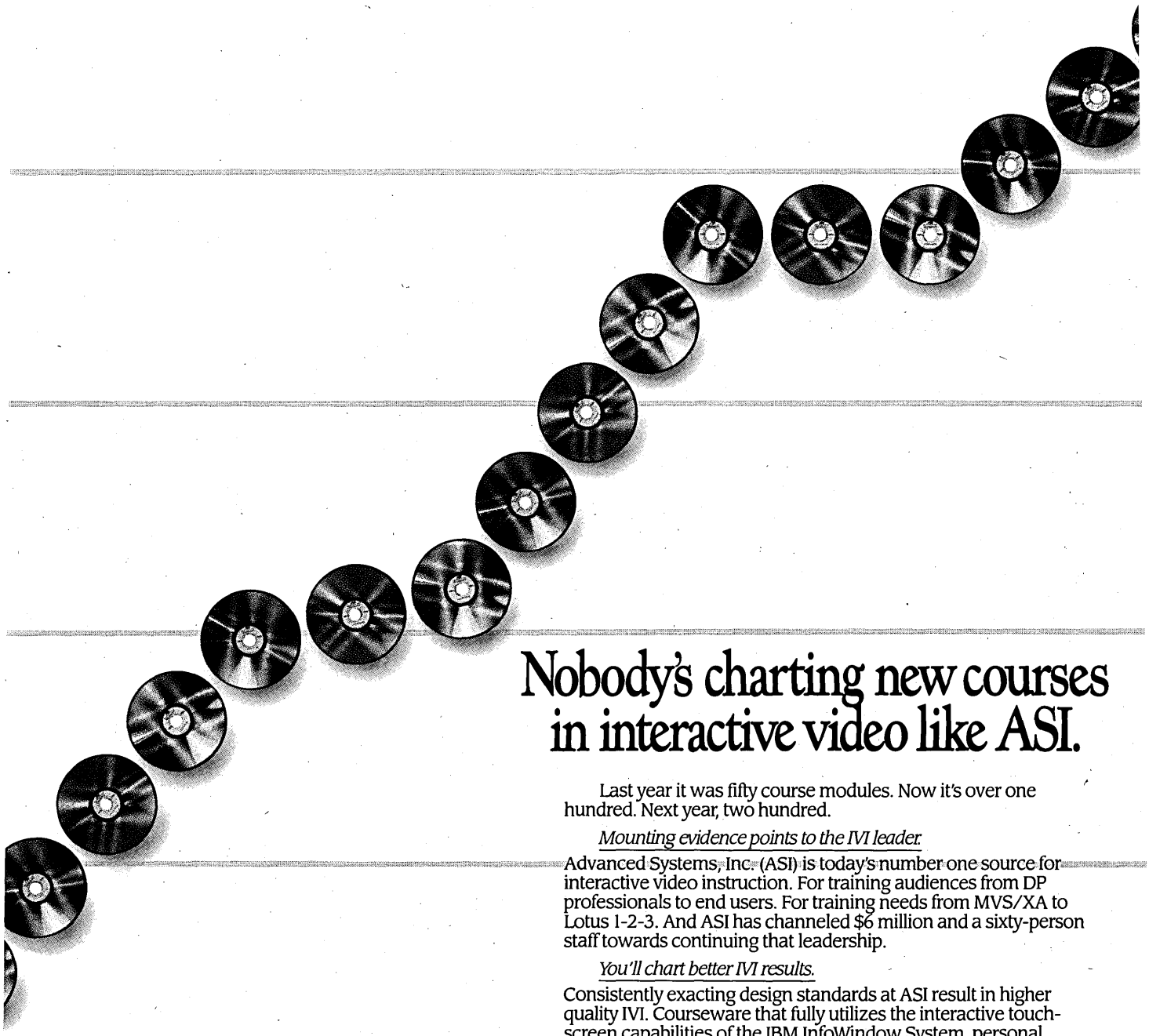
SICOB 1987 (Information Processing, Automation, Office Organization Show).
April 6-11, Paris. Contact SICOB, 4 Place de Valois, 75001 Paris, France, (01) 42-61-4621.

Infocom87 (10th Annual Rocky Mountain Exposition and Conference).
April 15-17, Denver. Contact Mile High Chapter, DPMA, P.O. Box 334, Denver, CO 80201-0334, (303) 789-4547.

AI '87. April 22-24, Long Beach, Calif. Contact Jim Hay, Show Manager, Tower Conference Management Co., 331 W. Wesley St., Wheaton, IL 60187, (312) 668-8100.

Robots II (17th International Exposition and Conference on Industrial Robots).
April 26-30, Chicago. Contact Gregg Balko, Robotics International of SME, 1 SME Dr., P.O. Box 930, Dearborn, MI 48121, (313) 271-1500.

EXPO BANK ASIA '87 (Japan's First International Banking Equipment and Technology Exhibition).
April 27-30, Washington, D.C. Contact E.J. Krause & Assoc., P.O. Box 70356, Washington, DC 20088, (301) 986-7800.



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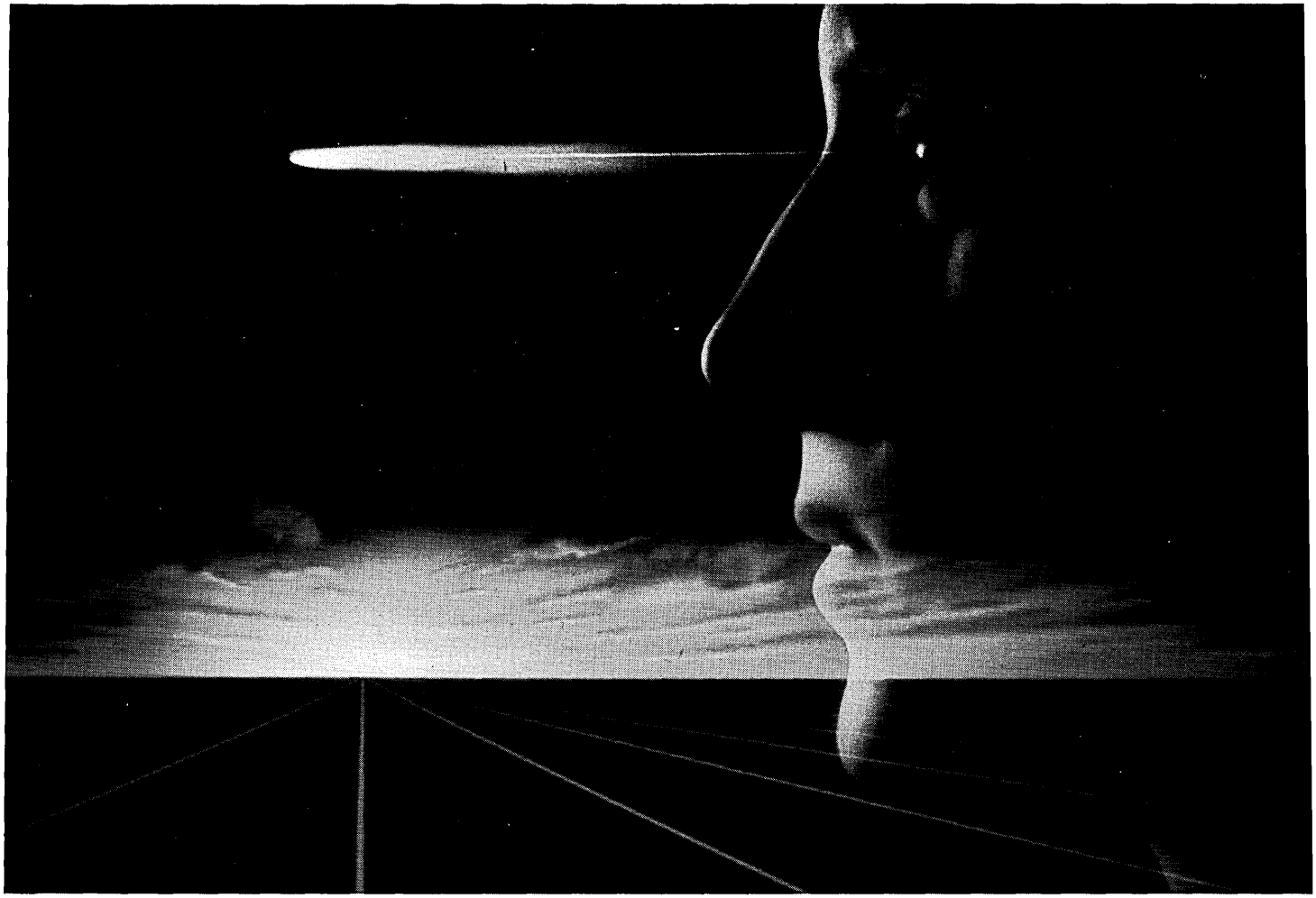

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LETTERS

Not a Panacea

Bravo! My congratulations go out to Daniel Klinger ("Rapid Prototyping Revisited," Oct. 15, p. 131) for recognizing that prototyping is useful under certain limited conditions, but it is not the universal panacea for all software development problems. What prototyping, fourth generation language-based tools, and team-based analysis methodologies do have in common is a recognition of the need to involve end users in the requirements definition process.

DR. DIANE L. LOCKWOOD
Seattle, Washington

The Consultant's Edge

I started a computer consulting company in 1973 and have never done missionary work. My approach has been not to argue with the "we don't go outside" mentality.

However, it is disappointing to see DATAMATION print an article ("Is Anyone Really Using Computer Consultants?" Oct. 15, p. 99) that only shows the attitude of companies that feel outside consultants are an expense to be eliminated as quickly as possible.

We have clients who periodically need service on 10-year-old systems, the designs of which we were involved in. We can respond within four hours to their needs. None, repeat none, of their employees who were originally involved are now available.

I fail to see the value of "invented here" if the inventors no longer exist as far as the company is concerned. We are a supplier and, as such, are available on an as-needed basis, year after year. Employees are not. Often they have either left the company or have advanced beyond the level at which they could be called upon to perform maintenance on old systems.

GARY E. OBERST
Oberst Associates Inc.
Norwalk, Connecticut

Wrong!

"Joining the Ranks," (Oct. 1, p. 24) incorrectly referred to Elxsi as a subsidiary of Amdahl Corp. Elxsi is a wholly owned subsidiary of Trilogy Ltd., San Jose. Peter Appleton Jones is president and ceo of Elxsi and Trilogy Ltd., and Gene M. Amdahl is chairman of the board.

DAVID W. DUNLAP
Vice President
Finance and Administration
Elxsi
San Jose, California

READERS' FORUM

The Importance of Proper Forms

I work for a small software house selling microcomputer-based systems—so small, in fact, that we have only two full-time programmers. The size of our staff makes us particularly vulnerable to distractions.

For a long time we accepted it as ordinary operating procedure for people from the service department to talk directly to the programmers whenever they had questions about how our products worked or when they had found (or thought they had found) programming errors. Recently, however, our programmers noticed they were spending more and more time answering questions from the service department and less and less time actually writing programs. (Why the problem grew so rapidly is not entirely clear; my personal theory is that it is simply due to growth in our customer base and correspondingly in our service department, while our programming staff has remained constant).

We tried various methods to solve this problem, such as improving our manuals, slowing the flow of new versions so we could more throughly check for errors, and so on, but none of these really helped. Finally, our company decided to attack the problem directly: we instituted a new policy stating that all future communications between service and programming must be in writing. We hoped that by having a written record of each request for assistance the service people would be less likely to ask the same question twice and there would be less confusion about both the question and the answer. We also frankly expected that the inconvenience of having to write out a question would make people more likely to experiment or read the manual.

We felt that it was important to develop a suitable form for this purpose, not one that was simply "thrown together." We set out to create a form that would take a minimal amount of time to fill out while fully conveying the information required. We observed that our programmers repeatedly had to give the same answers, not only because questions were repeated but also because different problems often had similar solutions. We feel that our final product met our goals admirably, and so I present a more or less generic version of it here. We welcome forms designers in other firms to study it and perhaps adapt some of our techniques to their own situation.

PROGRAMMING ASSISTANCE REQUEST
Date:
Requester:
Question/Nature of problem:

Programming response:
[ ] Try again and see what happens.
[ ] Reset the machine, try again, and see what happens.
[ ] Turn the machine off, turn it on again, and see what happens.
[ ] Send them a new version of the software and maybe the problem will go away.
[ ] Have Mitch fix the file with the hex file editor.
[ ] Have John replace the hard disk control board.
[ ] Install an uninterruptible power supply.
[ ] Obviously an operator error.
[ ] Read the manual:
  [ ] application,
  [ ] DOS,
  [ ] Unix,
  [ ] other: _____
  [ ] note especially p. _____.
[ ] That only works on the
  [ ] MS/DOS version,
  [ ] Unix version.
[ ] It works fine for us.
[ ] Why would you want to do that?
[ ] That's been fixed in the latest release, which is version _____.
[ ] It's on our list, scheduled for completion on _____.
[ ] No.
[ ] It can't be done.
[ ] Other. Explain fully:

Date of response _____
Programmer's initials _____

MARK JOHANSEN
Software Engineer
Programming & Systems Management
Beavercreek, Ohio

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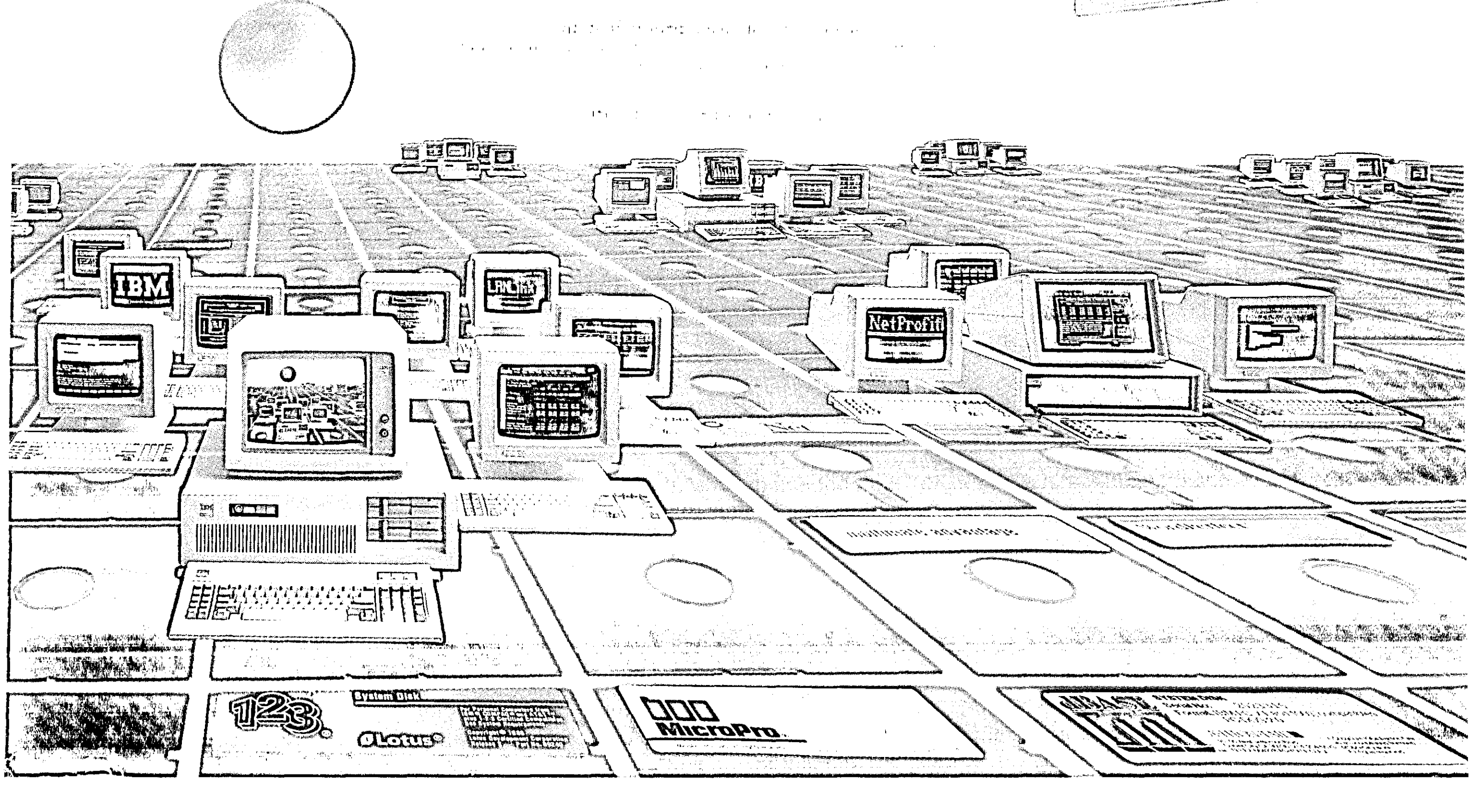

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